Resource Regionalism: The Role of Regional Electricity and Development in Africa
Kathleen J. Hancock  
Colorado School of Mines, khancock@mines.edu

Agathe C. Maupin  
South African Institute of International Affairs, agathe.maupin@wits.ac.za

While regionalism has become of increasing interest in the scholarly community as well as among political leaders and international organizations, little attention has been given to regionalism as it relates to energy generally and more specifically electricity. In this paper, we examine two related regional energy issues in sub-Saharan Africa: (1) regional electricity grids and (2) the infrastructure associated with electricity production (major hydropower plants, transmission lines used to transport electricity across international borders and interconnectors). We conclude with suggestions for future research on the resources nexus, energy security, issue-area spill over, third-party players, and overlapping regions. We note that there are numerous opportunities for IPE scholars to contribute to this literature, particularly working in multidisciplinary teams with economists and engineers as well as other social scientists.

Keywords: Sub-Saharan Africa, energy, development, electricity, infrastructure, power pool

Producing a projected 44,000 MW of power, the Grand Inga Dam Project, if fully developed, will set a record for the most important hydropower project in the world, dwarfing even the Three Gorges Dam in China. While the dam will be built in the Democratic Republic of the Congo (DRC) and is thus a national decision, it has major regional ramifications. Largely funded by regional and international organizations (the European Investment Bank, African Development Bank, and World Bank’s International Finance Corporation, among others), it is expected to feed electricity into a regional power grid, the Southern African Power Pool (SAPP), with South Africa as the most important international purchaser. The dam is thus an example of both a state and regional energy project. With financing from international and regional development banks as well as

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1 Prepared for the FLACSO-ISA, Toronto, Canada; July 23-25, 2014. Research for this paper was supported in part by funding from the Colorado School of Mines.
states and private companies, institutions required to develop and manage the power pools, and potential environmental and social ramifications, the project is a natural case for international political economy (IPE) analysis. Yet, to date, there have been negligible publications from IPE scholars, particularly using advanced theoretical frameworks. Furthermore, while IPE of energy is a re-emerging field, only a few researchers have linked their findings to the regionalism literature. Despite its importance in Europe, the former Soviet Union, and Africa, even less attention has been paid to regional electricity grids, which link together two or more states.

To explore how regionalism and electricity intersect, we explore two key and related issues in sub-Saharan Africa: (1) the four regional electricity grids and (2) the infrastructures associated with electricity production (major hydropower plants, transmission lines used to transport electricity across international borders and interconnectors). These two research areas all link with energy issues and in some ways intersect with other resources, such as water when rivers are dammed for hydroelectricity, which is then transported through grids that cut across states. We begin with a brief overview of regionalism (Section I), followed by a discussion on the linkages between energy and regional integration (Section II). Sections III and IV explore the issues surrounding electricity grids and related infrastructure in Africa. We conclude with a number of suggestions for future research.

I. Defining regionalism

In broad terms, regionalism refers to states coming together for a variety of purposes and issue areas. More specifically, regionalism includes “purposive interaction, formal or informal, among state and non-state actors of a given area in pursuit of shared external, domestic, and transnational goals.” The “new regionalism/regionalisms approach” moves

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3 The type of regionalism evaluated in this paper does not include sub-state regions, such as provinces, as discussed by scholars who study comparative federalism.
beyond formal structures and the role of the state to evaluate the ideas, policies and goals that transform a geographic area into an identifiable social space.\(^5\)

The vast majority of the regionalism literature covers economic (trade and monetary) integration, with security issues being a secondary focus, particularly in Asia. Over the last two decades, several factors have ignited economic regionalism around the world. First, the European Union has deepened its integration and broadened its membership, features that have increased its global power and its concomitant interest in encouraging other states to organize in regional groups. Second, as the global GATT negotiations stalled, regional economic agreements have been widely embraced by numerous states that had previously opposed them, including the U.S. and China. Notably, the US negotiated its first major regional agreement (the North American Free Trade Agreement) in 1993 and the EU expanded membership from 15 to 28 countries between 2004 and 2013. The most recent major player is China, which signed the Asia-Pacific Trade Agreement in 2001, after which it signed accords with Hong Kong (2003), Macau (2003), ASEAN (2004), Chile (2005), Pakistan (2006, goods; 2009, services), New Zealand (2008), Singapore (2008), Peru (2009), Costa Rica (2010), and Switzerland (2013). Finally, a customs union in South America (MERCOSUR) and in Eurasia (the Eurasian Customs Union) expanded the number of regions with deeper economic integration efforts.\(^6\) In addition, particularly in Asia, security and regionalism have been linked.\(^7\)

Even as regionalism is enjoying a renaissance in the academy, scholars of Africa note that the continent is often ignored in the scholarship and debate on regionalism.\(^8\) This is also true in IPE textbooks, most of which now have dedicated sections to regionalism, but continue to omit African cases. This is surprising since Africa has a large number of economic integration agreements. In southern Africa alone, there are seven regional economic agreements to which states belong: African Union, Common Market for Eastern


\(^6\) Kathleen J. Hancock, *Regional Integration: Choosing Plutocracy* (New York: Palgrave, 2009), Ch. 2.


and Southern Africa (COMESA), East African Community (EAC), Economic Community of Central African States (ECCAS), Nile Basin Initiative (NBI), Southern African Customs Union (SACU), and the Southern African Development Community (SADC). In addition, the 100+ years old SACU is the oldest customs union, going back to the founding of South Africa. Both the European Union and the World Trade Organization have played a significant role in encouraging and developing economic regionalism on the African continent.

Furthermore, the United Nations Conference on Trade and Development (UNCTAD) argues for broadening regional integration by incorporating a development-based approach, as opposed to focusing exclusively on increased trade. UNCTAD’s 2013 report on intra-African trade defines developmental regionalism as involving regional cooperation in a wide range of areas, including research, policies, and investments aimed at accelerating regional industrial development, and providing infrastructure to develop and enhance vibrant regional markets. In its five chapter report, a full chapter is dedicated to this concept. UNCTAD identifies four drivers for fostering developmental regionalism: (1) developing a regional industry policy incorporated in the Regional Economic Communities, which correlate to the major regional economic agreements, (2) strengthening development corridors, (3) establishing special economic zones, and (4) promoting regional value chains by investing in infrastructure. Interestingly, UNCTAD focuses on the Greater Mekong sub-region as a useful comparative case. In light of this recent redefinition, regionalism, at least in Africa, is perhaps shifting away from the traditional focus of removing trade barriers to include

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12 For example, the East African Community (EAC), the Common Market for Eastern and Southern Africa (COMESA) and the Southern African Development Community (SADC) have negotiated a regional industrial development policy of the EAC and the industrial development pillar of the Tripartite Free Trade Agreement.
broader socio-economic development.

Just as few integration studies focus on Africa or incorporate it into comparative studies, few regionalism studies, for any world region, focus on energy resources, leaving African regionalism and resources as a vast lacuna in the literature. The primary exception to this gap is water, which has received some sustained scholarly attention.\textsuperscript{14} Of course, Africa’s abundant oil, natural gas, and minerals have been well studied as part of the “resource curse” but regionalism has not played a role in these analyses.\textsuperscript{15}

\section*{II. Linking Energy and Development}

In its 2010 report, the United Nations Advisory Group on Energy and Climate Change (AGECC) argues that access to electricity is a major barrier to development. Worldwide, about 1.5 billion people have no access to electricity. Around one billion more have only unreliable access. As shown in Figure 1, energy needs can be broken into three levels: basic human needs, productive uses, and modern society needs. The International Energy Agency estimates that meeting only basic human needs will require $35-40 billion/year to achieve access to electricity for all by 2030.\textsuperscript{16}

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Although developing states are grouped together as “energy poor,” access varies significantly between and within regions and between rural and urban areas within states. Among world regions, sub-Saharan Africa stands out as having the lowest average electrification access rate, at 34.6% overall (excluding South Africa); rural electricity access is a mere 8%. Despite global growth of 70% in electricity generation in the period 1998-2008, 85% of the sub-Saharan population relies on traditional biomass (mostly wood).\(^{17}\) Table 1, which shows electricity access for members for the Southern African Development Community (SADC), illustrates the variation between countries in one region, as well as the growth in electricity access since 1995. Note that the range for 1995 was between 2.0% (Lesotho) and 45.0% (South Africa). By 2011, the numbers had improved, ranging from 9.0% (Malawi) to 75.0% (South Africa), with the average rising from 11.1% to 29.9%. Higher access to electricity generally coincides with higher GDP/capita, but not in all cases. For example, in the region, South Africa and Botswana have the highest access rates and GDPs/capita, demonstrating this correlation. On the other hand, Zimbabwe has the third highest access rate but is ranked eighth in terms of GDP/capita.\(^{18}\)

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\(^{18}\) The lower GDP/capita may be explained by Zimbabwe’s 2000-2001 political and socio-economic crisis.
Table 1: Access to Electricity, Members of the Southern African Development Community

<table>
<thead>
<tr>
<th></th>
<th>Access to Electricity (%)</th>
<th>Population (2011)</th>
<th>GDP/capita (2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1995</td>
<td>2011</td>
<td>Millions</td>
</tr>
<tr>
<td>Angola</td>
<td>NA</td>
<td>26.2</td>
<td>19.62</td>
</tr>
<tr>
<td>Botswana</td>
<td>3.0</td>
<td>45.4</td>
<td>2.03</td>
</tr>
<tr>
<td>DRC</td>
<td>NA</td>
<td>37.1</td>
<td>67.76</td>
</tr>
<tr>
<td>Lesotho</td>
<td>2.0</td>
<td>16.0</td>
<td>2.19</td>
</tr>
<tr>
<td>Malawi</td>
<td>2.5</td>
<td>9.0</td>
<td>15.38</td>
</tr>
<tr>
<td>Mozambique</td>
<td>2.7</td>
<td>11.7</td>
<td>23.93</td>
</tr>
<tr>
<td>Namibia</td>
<td>NA</td>
<td>34.0</td>
<td>2.32</td>
</tr>
<tr>
<td>South Africa</td>
<td>45.0</td>
<td>75.0</td>
<td>50.59</td>
</tr>
<tr>
<td>Swaziland</td>
<td>8.5</td>
<td>NA</td>
<td>1.06</td>
</tr>
<tr>
<td>Tanzania</td>
<td>13.0</td>
<td>13.9</td>
<td>46.22</td>
</tr>
<tr>
<td>Zambia</td>
<td>7.5</td>
<td>18.8</td>
<td>13.47</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>16.0</td>
<td>41.5</td>
<td>12.75</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>11.1</td>
<td>29.9</td>
<td></td>
</tr>
</tbody>
</table>


Overall, sub-Saharan Africa’s electricity comes from a variety of resources, with coal dominating (see Figure 2). However, potential energy sources vary significantly throughout the continent and are mostly untapped. North Africa, Sudan, Ethiopia, Chad, Mozambique, Namibia, Tanzania and the states on the Gulf of Guinea (such as Gabon) have significant oil and gas reserves. Central and eastern Africa have enormous hydropower potential, with the greatest rivers in the DRC, Ethiopia, and Cameroon. South Africa is rich with coal deposits. In east Africa, Kenya, Ethiopia, and Djibouti are leaders in geothermal energy, while Egypt, Morocco and southern African states, such as Namibia, have substantial winds that could be harnessed for energy.19

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Figure 2: Sources of Electricity in Sub-Saharan Africa, developing states only, 2011

The United Nations Energy/Africa initiative, developed in 2004 in collaboration with the International Atomic Energy Agency, formulated several policy options, which were presented at the 15th Commission on Sustainable Development in 2007. An entire chapter is dedicated to regional initiatives to scale-up energy access for economic and human development, with the examples of EAC and ECOWAS. The report also covers investments in electricity for development; sustainable energy; regulations and policies for energy services; links between environmental concerns, cities and energy; reforms in the power sector; and prospects for nuclear energy.20

Regionally, the objective is to integrate energy into national and regional development strategies in support of economic development, poverty reduction and achievement of sustainable development. The Regional Economic Communities, consisting of eight regional organizations recognized by the African Union, appear to have a strategic role to play, along with the New Partnership for African Development (NEPAD), the technical arm of the African Union. NEPAD’s six themes include regional integration and infrastructure, the focus of this paper.21 There are also initiatives at the national and global levels. For example, the Renewable Energy Independent Power

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Producer Procurement Program (REI4P), launched in 2011 by South Africa, illustrates how private producers and operators are now working on renewable energy projects in the South African energy market. Globally, the UN’s Sustainable Energy For All initiative (SE4ALL), also launched in 2011, reinforces the importance of energy access, efficiency and renewable energy for development.

We next evaluate two major issues in which energy and development intersect and for which there are major regional implications: the regional electricity grids, and the infrastructure associated with electricity production (major hydropower plants, transmission lines used to transport electricity across international borders and interconnectors).

III. Issue One: Regionalism and African Power Pools

Beginning in 1995, with substantial funding from the World Bank, the EU, and other international organizations and states, the sub-Saharan African states created four regional “power pools” which are regional electricity grids that allow electricity sharing: Southern African Power Pool (SAPP), East Africa Power Pool (EAPP), West African Power Pool (WAPP), and Central Africa Power Pool (CAPP); see Table 2 for a list of the members and ongoing projects. These power pools were developed over a decade, starting with SAPP, which was created in 1995, one year after the end of apartheid, and ending with the East African pool, created in 2005. North Africa also has a power pool, started in 1989, called the Comité Maghrébin de l'Electricité (COMELEC). DRC and Tanzania, both members of SADC, may eventually link the different power pools, leading to a continental wide grid. DRC’s national power utility, SNEL (Société nationale d'électricité), is already an active member of three of the four power pools in sub-Saharan Africa (SAPP, EAPP and CAPP). These power pools are the primary institutions facilitating cross-border power trade for their respective regional economic communities (SADC for SAPP, COMESA for EAPP and ECCAS for CAPP). The power pools are at different stages in implementing interconnection projects, adopting regional market rules and concluding bilateral contracts for regional trade. Figure 3 shows the grids as of 2013. The regional

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22 More information on the REI4P is available on a dedicated South African Department of Energy website [http://www.ipprenewables.co.za](http://www.ipprenewables.co.za)
23 Sustainable Energy for All, [http://www.se4all.org](http://www.se4all.org).
grids, able to be supplied by a variety of energy sources, are the backbone of all regional electricity trade.\textsuperscript{24}

Table 2: African Power Pools

<table>
<thead>
<tr>
<th>Regional Group</th>
<th>Year Founded</th>
<th>Linked Economic Agreement Members</th>
<th>Status</th>
<th>Generation and Transmission Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comité Maghrébin de l'Electricité (COMELEC)</td>
<td>1989</td>
<td>Arab Maghreb Union: Algeria, Libya, Mauritania, Morocco, Tunisia</td>
<td>Energy independent, this power pool exports extra electricity to Europe.</td>
<td>Development of wind farms and solar central in Egypt and Mauritania, Strengthening of the transmission line Maroc-Espagne, building of three new lines Turkey-Libya</td>
</tr>
<tr>
<td>Southern African Power Pool (SAPP)</td>
<td>1995</td>
<td>SADC: Southern African Development Community: Angola, Botswana, Dem. Rep. of Congo (DRC), Lesotho, Malawi, Mozambique, Namibia, S. Africa, Swaziland, Tanzania, Zambia, Zimbabwe</td>
<td>As of 2013, Angola, Malawi, and Tanzania not connected to the grid; Several dam projects such as Grand Inga, Mphanda Nkuwa, etc.</td>
<td>SAPP generation priority projects in 2013: Batoka, Kafur, Mphanda Nkuwa, Inga 3, Baynes SAPP transmission priority projects in 2013: interconnector ZIZABONA, Kafue-Livingstone, Central Transmission Corridor (CTC)</td>
</tr>
<tr>
<td>West African Power Pool (WAPP)</td>
<td>1999</td>
<td>ECOWAS: Economic Community of Western African States: Benin, Burkina Faso, Cabo Verde, Cote d’Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo</td>
<td>Key components include projects (1) linking Benin/Togo, Cote d’Ivoire, Ghana and Nigeria; (2) developing a 2nd generation hydropower project and to interconnect Guinea, Guinea-Bissau, the Gambia and Senegal and (3) connecting Burkina Faso, Cote d’Ivoire and Mali.</td>
<td>Energy Project including the realization of the 240 MW Kaleta Hydropower Plant, the development of the 128 MW Sambangalou hydropower dam and the 225 kV The Gambia – Guinea – Guinea Bissau – Senegal Interconnection Project Domunli (Ghana) and Maria Gléta (Benin) Regional Power Generation Facilities (gas), Tiboto (Côte d’Ivoire – Liberia) Hydropower Project Souapiti (Guinea) Hydropower Facility Ghana-BF-Mali interconnection project, Birnin Kebbi (Nigeria) – Malanville (Benin) – Niamey (Niger) – Ouagadougou (Burkina Faso) Interconnection Project</td>
</tr>
</tbody>
</table>

\textsuperscript{24} Agathe Maupin, "Building a Regional Electricity Market: Sapp Challenges (PERISA Case Study 4: Public Goods)," (Johannesburg, Maastricht: SAIIA, ECDPM, 2013).
The regional power pools are designed to lower electricity prices and expand access, by encouraging trade and investment in electricity. The SAPP followed from analysis demonstrating that southern Africa would see significant advantages from regional electricity integration and improved trade. These calculations were admittedly based on optimistic assumptions, but they were persuasive enough to move the political leaders of the 12 SADC members and their national power utilities to create and sign the legal framework for the SAPP. From 1997 to 2000, USAID’s EAGER (Equity and Growth through Economic Research) program funded a partnership between Purdue University and SAPP, to create models for electricity trade among the SAPP members. Purdue also analyzed the feasibility of WAPP, which resulted in the formation of that power pool.


As of 2011, the power pools have been implementing a number of regional interconnection and generation projects. The power pools have a range of installed capacities, with SAPP dominating at nearly 50,000 MW, and relying on varying energy sources, with CAPP notably overwhelmingly fueled by hydropower and the others by thermal power (see Table 3). The percentage of electricity traded is still low, at less than 1% for CAPP and EAPP, and slightly higher (approx. 7%) for COMELEC, SAPP and WAPP.27 SAPP is in a more advanced stage of development than the others, with an operational Short Term Electricity Market, for trades up to about one week, and a Day Ahead Market, where market participants purchase and sell energy at financially binding prices for the next day. Institutional set up and market rules and regulations have already

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been implemented in SAPP, are being implemented in WAPP and under design in EAPP. CAPP and COMELEC must still design and develop their power market institutions and rules. Multilateral and bilateral agencies (World Bank, African Development Bank, EU, etc.) have played a key role in establishing institutions for the power pools and in funding initial investments.28

Table 3: Installed Capacity by Power Pool

<table>
<thead>
<tr>
<th>Power Pool</th>
<th>Installed capacity (MW)</th>
<th>Hydropower Share (%)</th>
<th>Thermal Share (%)</th>
<th>Population (millions)</th>
<th>kW/1000 inhabitants</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPP (2009)</td>
<td>6,073</td>
<td>86%</td>
<td>14%</td>
<td>123.9</td>
<td>49</td>
</tr>
<tr>
<td>COMELEC (2009)</td>
<td>27,347</td>
<td>8%</td>
<td>91%</td>
<td>85.6</td>
<td>319</td>
</tr>
<tr>
<td>EAPP (2008)</td>
<td>28,374</td>
<td>24%</td>
<td>73%</td>
<td>385.6</td>
<td>74</td>
</tr>
<tr>
<td>SAPP (2010)</td>
<td>49,877</td>
<td>17%</td>
<td>83%</td>
<td>160.5</td>
<td>311</td>
</tr>
<tr>
<td>WAPP (2010)</td>
<td>14,091</td>
<td>30%</td>
<td>70%</td>
<td>260.6</td>
<td>54</td>
</tr>
</tbody>
</table>


The power pools demonstrate how electricity can create interlocking regions and the role of regional institutions. As shown in Figure 4, the North Africa power pool is now linked to Europe and has plans to link to other pools, creating the potential for new or further developed regions (North Africa-southern Europe) and mega-regions (pan Africa). When the regions are large or overlap at the continental level, what does it mean to be regional? As for institutions, applied to the African energy context and with the specificities of each region and countries in mind, specific energy measures should be carried out by the best geographical/administrative/social entity possible, however that is measured. This might be a regional structure, sub-national entities (provinces) or national organizations. In the case of the African Power Pools, it appears that regional electricity markets are crucial to achieve sustainable development goals. However, these markets require strong regional economic institutions; guidelines; and short, medium and long-term infrastructure investments and building designs. The funding for developing states

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will likely need to come from a variety of international and regional sources, both private and public. This leads us to our next section: energy infrastructure and development.

**Figure 4. North Africa’s Energy Links**


**IV. Issue Two: Energy Infrastructure and Development**

Although scant research has been conducted on the energy infrastructure role in development, a few essential elements have been highlighted: infrastructure has been critical in Africa’s recent improved economic growth; however, the continent’s infrastructure lags behind those of other developing regions; and Africa continues to suffer from missing regional links and stagnant lack of access. Moreover, the infrastructure challenges vary greatly by country and sub-region. For example, a large share of South Africa’s infrastructure is domestically financed, often by the central government, while in DRC, international donors are the main financial supporters. These differences are

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29 For a comprehensive approach of the Infrastructures’ roles in Africa, see the report produced by the African Development Bank and the World Bank (2010), *Africa’s Infrastructure, a time for transformation*, Washington

30 Southern African Power Pool, "Inter-Government Memorandum, Inter-Utility Memorandum and Operating Guidelines."; "Operating Guidelines."; "Agreement between Operating Members, Revised Document."; "Notes on Differences in Revised Inter-Government Memorandum of Understanding."; "Inter-
worth considering as we advance our IPE understanding of the linkages between electricity and development.

At the regional level, the power pools illustrate how essential the association of transmission lines with hydropower projects is when it comes to the electricity distribution. In addition, transmission lines used to transport electricity often come across international borders and require interconnectors. In the SAPP case, the ZIZABONA (Zimbabwe-Zambia-Botswana-Namibia) interconnector project is one of the priority projects within the SADC.³¹

Three of the power pools—the Southern, East, and Central African Power Pools—are related to the highly-anticipated Grand Inga Dam project, which has been touted as being able to create enough electricity to light up half of Africa. According to early 2014 reports, the Grand Inga project is likely to be constructed in several development phases, starting with an upgrade of Inga 1 and 2, and then building Inga 3, which would itself be constructed in two steps: the first phase is expected to include the building of a dam with a height of 100 meters (Basse Chute) and then an elevation phase (Haute Chute). There would be no closure of the Congo River and no tunnels, just an open channel. When completed, the third phase of Inga 3 would produce 4,800MW of electricity. Further phases would necessitate the flooding of the Bundi Valley, to form a 22,000 hectares reservoir and drowning of the Inga 3 channel. According to recent studies and various documents from the DRC and international donors (African Development Bank and World Bank’s International Finance Corporation), the latest design of Grand Inga into phases will result in medium- and long-term gains in electricity to DRC and the southern African region. (For an analysis of the tradeoffs between regional and domestic energy security gains and the uncertainties of the project, see Green, Sovacool, and Hancock.³²)

In addition, the project will be developed and run by private-public partnerships. Three consortia—China's Sinohydro and Three Gorges Corporation; Spain's Actividades de Construccion y Servicios, Eurofinsa and AEE; and a South Korean-Canadian consortium consisting of Daewoo-Posco-SNC Lavalin—are currently bidding for the contract. As of January 2014, the US Agency for International Development was reportedly considering

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³¹ Personal interview (by Agathe Maupin) with SAPP representative at the SAPP Coordination Centre, Harare, Zimbabwe in May 2013.
joining one of the consortia. The African Development Bank, World Bank’s International Finance Corporation, French Development Agency, European Investment Bank and the Development Bank of South Africa have all expressed interest in financing parts of the project, and South Africa has committed to purchasing 2,500MW of Inga 3’s capacity, making it the primary purchaser. Figure 5 depicts the differing aspects of the project, as of January 2014.

Another important point is that the African regional power pools link directly to both national and regional development, a point illustrated by the proposed Grand Inga Dam. The SAPP enables South Africa, which relies on coal for 95% of its electricity, to buy hydroelectricity from the DRC, Zambia, and Mozambique.\footnote{In March 2013, South Africa announced it would buy 2,500 MW from the DRC Inga dam. Franz Wild, "South Africa Secures Energy Promise from Congo's Inga Dam," Bloomberg, http://www.bloomberg.com/news/2013-03-08/south-africa-secures-energy-promise-from-congo-s-ingga-dam.html.}
The DRC anticipates the energy sector will contribute to economic development. For example, two of the six main objectives introduced in the government’s most recent five-year plan (2012-2016) refer to the strategic dimension of the energy sector to consolidate macroeconomic stability and boost growth and job creation and to improve Congolese living conditions. The chapter on the Electric Power Sector acknowledges the inadequate energy supply in DRC as one of the biggest constraints to the country’s economic and industrial development. Predictably, the most important envisaged hydropower infrastructures are the Inga dams and the associated high-voltage transmission lines. The DRC’s plans call for renovating and extending Kinshasa’s electrical network to increase household access to electricity from the current 9% to 19% in 2016. Returning again to the regional focus, compared to the 2007-2011 plan, which focused on rehabilitating the Inga 1 and 2, the current plan stresses the export potential of the country to its fellow SAPP members, including by building new transmission lines and interconnectors. Figure 6 shows the SAPP grid in detail, including the thermal, nuclear and hydro stations.

36 République Démocratique du Congo, "Document De Stratégie Pour La Réduction De La Pauvreté 2006-2010 (DSRP 1)," (Kinshasa2006); "Document De La Stratégie De Croissance Et De Réduction De La Pauvreté 2011-2015 (Dscrp 2)," (Kinshasa2011).
37 "Programme D’action Du Gouvernement 2012-2016," (Kinshasa2012). [Check sources; WDI shows higher access rates now. Do we mean rural rates?]
The Congo River and its Inga dams are just one case of the intersection of water resources and energy on a regional level. In the West African Power Pool, several hydropower projects are under construction on the Senegal River and in the East African Power Pool, the future Millennium Dam in Ethiopia is now envisaged as a regional project. Furthermore, hydroelectric plants require that water reservoir or river levels be maintained, which requires the inclusion of climate change simulation. Large-scale hydro has to be considered along small-scale hydro and other renewable energy sources. As Figure 7 illustrates, Africa has a significant hydropower potential, with only about 7% of this potential tapped. Note that Africa is almost entirely water scarce or water stressed (see Figure 8). Dams for hydropower will raise issues about water use, including whether

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states can afford new forms of electricity generation, the drain that some resource exploration (mining, e.g.) might put on countries, and the conflicts between using water for energy, agriculture, and drinking.

**Figure 7. Africa’s Hydropower Potential**

Source: International Rivers (2010) World Rivers Review, n°3, vol. 25. Note: “Hydropower hotspot” refers to places where new dams and hydropower stations could or have created tensions with the local population, per International Rivers, an NGO that opposes building large dams.
African power pools and related infrastructures such as dams and transmission lines contribute to create a resource-based region, which might lead to greater cooperation and governance. Moreover, states that already have a productive regional relationship before water and energy becomes an issue will be better able to navigate the challenges that damming may bring. According to Libiszewski, the critical factors that determine how well states handle these potential resources-related conflicts includes the “degree of dependency on exogenous sources of water, the distribution of power between adjacent states, and the relationship of an antagonistic versus cooperative tradition in inter-state relations.” States are most likely to resolve favorably issues when there is an existing institutional and legal framework.43

V. Energy Research Future Areas of Interest
The above discussion of two key areas where energy resources, regionalism and development intersect in Africa suggests a number of areas for future research, much of

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which has yet to be tapped into. In addition, these issues can be extended to comparative analysis with other world regions.

- **Resources nexus** Many resource issues link with other resources, creating “the resource nexus.” As noted in the discussion above, energy overlaps with drinking water and agriculture, which in turn affects food and land use. While this is most obviously the case for hydro, there is overlap for other types of energy as well. For example, the DESERTEC initiative is a massive solar energy project meant to bring energy from North Africa to the EU. However, the sponsors argue that it can help solve water scarcity issues in the Middle East and North Africa: “In desert regions near the coast, solar-thermal power plants can be combined with seawater desalination so that they not only produce electricity, but also drinking water.” This suggests a research agenda into how these different resources intersect with regionalism issues. For example, if you solve one regional issue (energy), do you create another resource problem (lack of accessible drinking water)? If so, how might we address this new challenge? If the challenge is not addressed, the project may face significant political risks.

- **Energy security** Scholars should explore the connection between these regional resources and the energy security literature, which has become extensive in the last five years. Several energy-related security issues come to mind in the nexus context. Bearing in mind the linkages between water, energy and food resources, it is interesting to note that several regional policy documents address security as a...

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crosscutting challenge in these sectors. For example, SADC has started to develop a regional climate change strategy including references to the Energy and Water sectors. Indeed, dams, pipelines and off-shore drilling raise concerns of environmental injury that affect regions beyond the state where the project is located. This includes potentially harming fisheries in rivers and oceans, as well as damaging drinking water. This type of damage could undermine regional cooperation, or result in greater cooperation in order to resolve the problem.

• **Issue-area spill over** As some regional integration scholars argue, regional agreements can have a spillover effect, moving from one issue area to another. ECOWAS is a prime example of spillover in Africa. When ECOWAS was created in 1975, the members were focused on economic cooperation, with no mention of security and only passing reference to human rights, governance, and political issues. It seemed a particularly unlikely group to integrate. Of the various African regions, West Africa’s member states are the most diverse in terms of geographic size, development levels, and languages inherited from colonialism – in nine states, the colonial language is French; in five, English; and in two, Portuguese. Despite these significant differences, ECOWAS is now an organizing center for security issues and energy issues, including the West African Power Pool and the ECOWAS Center for Renewable Energy and Energy Efficiency (ECREEE). This suggests that further research should be done on how regional organizations expand into other areas, reinforcing particular regions.

• **Role of third parties** A variety of regional and global organizations, states and non-state actors—in addition to the African states themselves and their regional organizations—often play a key role in energy regionalism. For example, the East African Power Pool has received technical and financial assistance from the European Union, USAID, Norway’s Ministry of Foreign Affairs, the UN Department of Economic and Social Affairs, and the African Development Bank.47 The EU has been a critical player in advocating for, or even pushing, African states to follow the EU’s lead in creating regional organizations. For example, the Africa-

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EU Energy Partnership (AEEP) is one of eight partnerships organized between the two continents in 2007.\textsuperscript{48} NGOs can play critical roles as well. For example, International Rivers has been active in identifying problems with—and mostly opposing—large-scale infrastructure projects, notably dams.\textsuperscript{49} While some states may opt to continue with these projects, the NGO can provide capacity to the less developed state in the form of political and economic research and technical and legal advice. In its 2011 report on regionalism, the World Bank concluded that “regional integration is critical to accelerate progress in Africa.... For example, trading power through regional pools can cut US$2 billion off energy costs and reduce carbon dioxide emissions by 70 million tons every year...Beyond infrastructure, regional approaches are needed across many sectors to tackle the challenges of trade, food security, water resource management, climate change, disease prevention, tertiary education, and governance.”\textsuperscript{50} Other third parties to consider include multinational corporations, the various groups within the World Bank (MIGA, IFC, etc.), and regional development banks. Scholarly research on how effective these actors are, in absolute and comparative terms, would provide useful information for both the involved states and the third parties. A database of who is doing what kind of support work would further this research.

- **Overlapping regions** Regions sometimes bleed into each other, raising additional questions about what it means to be in a region. For example, the North African electricity group also links to Europe and is in the process of linking Mauritania, which already links to Mali and Senegal, part of the West African Power Pool. In addition, DESERTEC, which links North Africa to the EU creates a new region.\textsuperscript{51} Scholars can examine what this means for regional identities and whether these regions might create new spillovers that affect other economic or security issues. The power pools also illustrate the issue about overlapping regions. DRC and

\textsuperscript{48} The other strategic areas are peace and security; democratic governance and human rights; regional economic integration, trade and infrastructure; UN millennium development goals; climate change; migration, mobility, and employment; and science, information, and space. For more on the partnership, see http://www.africa-eu-partnership.org/africa-eu-strategic-partnership
\textsuperscript{49} Naho Mirumachi and E. Van Wyk, "Cooperation at different scales: challenges for local and international water resource governance in South Africa," The Geographical Journal 176, no. 2 (2010).
Tanzania are expected to belong to two grids, linking the illustrate a potential overlap of interests between regions around the generation and transmission of electricity and raises the following question: which partnership is going to be privileged, by who and on what basis? In the Grand Inga project, Egypt was considered a potential buyer for the electricity before 2011. Furthermore, in the actual project’s frame into phases, Nigeria is also mentioned as a potential buyer for the future energy production of the Inga 4 to 8.

VI. Conclusions
In this paper, we discuss the regionalism literature and note that it is generally weak on energy issues and nearly devoid of analysis of the electricity sector. Yet, academics and political leaders, as well as development-focused regional and global organizations and activists increasingly recognize the importance of access to electricity, for basic human needs such as lighting and cooking as well as for advanced economic development through industrialization. Electricity initiatives are progressing at every level, from individual households to villages, local regions, states, multi-state regions, and globally through, most notably, the UN and the World Bank.

We analyzed here two major issues on the intersection of electricity, regionalism and development in sub-Saharan Africa. We find that the four African power pools have created the opportunity for greater electricity access and more efficient markets, yet their potential has not been fully realized. We also find that related infrastructure is being built but that in many states that are economically developing infrastructure projects will require significantly more international investments as well as careful analysis to ensure that political, social, and environmental issues are addressed. Our example of the Grand Inga Dam project, which has gone through several iterations, demonstrates how nationally-based infrastructure projects become regional projects with support from international donors.

Our final section suggested a number of research areas, including the resources nexus, energy security, issue-area spill-over, the role of third parties, and overlapping regions. This list is not meant to be inclusive but rather to illustrate that there is vast opportunity for IPE scholars to contribute to this research. We employed in our own analysis a number of key IPE players and concepts: electricity markets, regional and international agreements and organizations, and states. For the most part, these players
have been omitted in scholarly publications on electricity. Nearly all the literature is written by electrical engineers and economists, who, given their expertise, rightly focus their attention on the technical and economic aspects of electricity generation. Yet many of the barriers to higher electricity access are not about technical or economic issues, but about political and social issues. IPE scholars thus have a major contribution to make in this area of research. We need more IPE scholars using their theoretically guided research to better understand the political and social hurdles to these projects, along with providing research-based policy recommendations. Given the technical and economic aspects of the African power pools, this research would best be conducted in multidisciplinary teams with engineers and economists. IPE scholars might focus on the role of the World Bank and regional development banks, the intersection of public and private partnerships, and state, regional, and local interests. We plan to take up this challenge ourselves and hope others will join us.


