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THE POLITICAL ECONOMY OF ENERGY TRANSITIONS IN SUB-SAHARAN AFRICA: CONTRIBUTIONS TO AN ANALYTICAL FRAMEWORK

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ABSTRACT

Many countries in sub-Saharan Africa have set targets for non-hydro renewable energy but lag in implementation. The dominant approaches to analysing energy transitions have largely been developed based on European experience and provide a limited understanding of such developments in African countries. This paper combines a review of recent energy transition literature with a broader range of relevant energy-related literatures, each of which can contribute to a better understanding of the role of coalitions, politics and power in energy transitions in lower-income countries. The paper points to the decisive influence of a country's resource endowments on the potential for an energy transition. It further argues that resource endowments affect the type of finance that can be mobilised for energy sector development with implications for potential coalitions between international and domestic actors. Finally, the access agenda provides a window of opportunity for promoting non-hydro renewable energy, but there is no unambiguous relation between the two agendas. More empirical research is needed to further analyse these dynamics.

INTRODUCTION

Sustainable Development Goal 7 (SDG7) aims at ensuring 'access to affordable, reliable, sustainable and modern energy for all'.[1] At a glance, the goals of access to energy services, reliability of energy supplies, and sustainability of energy production appear to be easily compatible. Evidence from sub-Saharan Africa however suggests that the goals may not always be easy to reconcile (Blimpo and Cosgrove-Davies 2019). Thus, countries in sub-Saharan Africa have made more progress in terms of improving access than in terms of ensuring reliability and sustainability (Kazimierczuk 2019; IEA et al. 2020). This has been called an energy 'trilemma', and it is not least present in contexts where access for all, in spite of significant progress in many countries, has still not been achieved (Bridge et al. 2018). Different actors differ on how to prioritise between the three goals and, in turn, the choice of energy sources and technologies. Transition to more sustainable energy is, in other words, charged with political dynamics, but the approaches to analyse these dynamics in lower-income African countries[2] are still far from comprehensive (Bridge et al. 2013; Hansen et al. 2018b).

This paper aims at providing an overview of existing contributions, identifying emerging areas of research, and thereby contributing to a better understanding of

[1] https://sdgs.un.org/goals/goal7

[2] In this paper 'lower-income countries' is used to refer to low-income and lower middle-income countries in sub-Saharan Africa.

the political economy of energy transitions in sub-Saharan African countries. Much energy transition research has been carried out from a socio-technical perspective with a focus on how the development of new technologies could drive a transition to cleaner energy. This approach was initially developed based on European experiences and tended to assume common patterns across all countries and regions (ibid.; Baker et al. 2014). Consequently, issues related to politics and power have received less attention. Recent contributions indicate that different international and domestic actors may have different interests and may form coalitions that promote – or prevent – policies favourable to renewable energy and an energy transition (Hess 2014; Markard et al. 2016; Kern and Rogge 2018; Köhler et al. 2019).

Research from emerging economies furthermore suggests that the political economy of energy transitions cannot be considered independently of other policy areas (Hochstetler 2020). Vested interests related to existing energy technologies may resist non-hydro renewable energy as much energy transition literature indicates (ibid.; Baker and Burton 2018; Power et al. 2016; Ting and Byrne 2020).[3]. There may however be competing coalitions made up of actors from in- and outside the narrow energy field successfully promoting its deployment (Müller et al. 2020). That countries' resource endowments play an important role in this has been pointed to, but the analytical implications are still little developed for lower-income African countries (Collier and Venables 2012; Pueyo 2018).

This suggests that to develop a better understanding of the political economy of energy transitions it is important to look not only at the making of policies, but also at the interests and ideas related to different sources of energy that may affect implementation. To further unfold this relation between policy and implementation the paper combines a review of energy transition literature with a broader range of relevant, energy-related literatures as well as insights from various approaches to political economy, including adapted political settlement approaches, each of which can contribute to a better understanding of the role of coalitions, politics and power in energy transitions in lower-income countries. Because of the nascent state of existing approaches it furthermore provides summary analyses of key developments in Ghana and Kenya,[4] which both have targets for non-hydro energy but differ significantly in terms of implementation. While Ghana is an oil/gas country with very little non-hydro renewable energy, Kenya has not developed viable fossil fuel resources at scale and has become one of the countries in sub-Saharan Africa with most non-hydro renewable energy.

The paper puts forward several arguments about the adoption of non-hydro renewable energy based on a more complex understanding of coalitions, politics and power. First and foremost, it demonstrates the decisive influence a country's resource endowments have on the potential for an energy transition in lower-

[3] Questions have been raised with regard to the sustainability of hydropower on a larger scale due to its environmental and social impact. Small-scale hydro may be less harmful, but it tends to make up a relatively small proportion of investments (Baker 2021). Our main focus is, therefore, on non-hydro renewable energy.

[4] The annex to this paper provides a review of the developments in the energy sector in the two countries.

income African countries. Fossil fuel resource endowments (the availability of commercially viable oil/gas/coal resources) negatively influence the prospects of introducing non-hydro renewable energy on a significant scale. Secondly, and related to the first argument, it argues that resource endowments influence the type of finance that can be mobilised for energy sector development and thus the relative strength of the policy coalitions that are forged for conventional and non-hydro renewable energy respectively. Thirdly, significant differences do, however, exist among countries irrespective of their resource endowments but linked to domestic political and economic dynamics, for instance with regard to the character of state involvement in the energy sector, which influence the type, scale and ownership of energy investments. Fourthly, it argues that the access agenda provides a window of opportunity for promoting non-hydro renewable energy, but that there is no linear relation between the two agendas. Overall, these arguments point to the need for more empirical research that can further analyse the political economy of energy transitions in different country contexts.

The paper consists of six sections. The next section provides a review of dominant approaches to the study of energy transitions as well as the state of emerging fields of research on coalitions, politics and power in the energy field in lower-income African countries.[5] Based on data on countries' gas resource endowments, the third section outlines the association between countries' resource endowments and dominant ideas about energy, and their transition to renewable energy. It is followed by section four on the types of involvement of international finance and policy coalitions in countries with different resource endowments. In section five, the role of domestic actors' interests and ideas in policy coalitions is pointed to. Section six discusses how access is prioritised as well as the potential relation between access and energy transitions. The final section on perspectives summarises the paper's findings and discusses their analytical implications.

ANALYTICAL APPROACHES THE POLITICAL ECONOMY OF ENERGY TRANSITIONS

As mentioned above, the study of a potential energy transition to non-hydro renewable energy in sub-Saharan Africa and elsewhere has been dominated by research on innovation of niche energy technologies coming out of the socio-technical tradition. Eventually, these technologies were expected to become the new dominant sources of energy. Consequently, there has been a tendency to describe the focus on 'old' fossil fuel energy as characterised by regime resistance, lock-in of and path dependence linked to specific fossil fuel technologies, which hindered the emergence and growth of non-hydro renewable energy (Geels 2004; Geels and Schot 2007; Verbong and Geels 2007). Various recent contributions have,

[5] Significant conceptual contributions have been made based on South African experiences, which will be discussed in some detail in the paper. Since South Africa is an upper middle-income country with more public and private capacity than lower-income countries it is not, however, included as a case.

however, begun to analyse in more detail what 'resistance' towards non-hydro renewable energy implies, often combining socio-technical analyses with approaches with a stronger focus on social science (see for instance Geels 2014; Baker and Burton 2018; Ting and Byrne 2020). To some extent this moves the analytical attention from the development of niche renewable technologies to also include the dominant sources of energy and broader energy sector developments in different countries.

Initially, the socio-technical tradition and in particular its main contribution, the multi-level perspective (MLP), was a generic approach to the study of sustainability transitions across different sectors. The application of such a 'big picture' approach has however been criticised on several accounts (see Geels 2019; Köhler et al. 2019). First and foremost, the approach pays little attention to geographical differences and therefore research tends to be characterised by 'techno-economic determinism', assuming that there are common, almost teleological, patterns across countries that can explain the promotion of, or impediments to, non-hydro renewable energy (Bridge et al. 2013; Baker et al. 2014, p. 797; Hochstetler 2020, p. 18). Secondly, and relatedly, it has been criticised for having underdeveloped analyses of the role of politics and power within countries, that can explain different pathways.

The discussion about the relation between innovation, policies and politics is all the more relevant in sub-Saharan contexts, which are characterised by fewer resources, and less state and private sector capacity (Hansen et al. 2018b). Recent contributions have challenged the lack of analytical attention to the international level in the socio-technical research tradition, for instance by pointing to the importance of development donors (Power et al. 2016; Bhamidipati, Hansen and Haselip 2019), international finance (Newell and Phillips 2016; Newell 2019) and global energy governance (Van de Graaf and Sovacool 2020). Furthermore, as renewable energy technologies are maturing, with complex global supply chains, the dominance of established actors based in higher-income countries has become more entrenched, leaving less space for bottom-up technological innovation (Hansen 2018a; Hochstetler 2020).

Even emerging economies may struggle to develop their productive capacities. Studies of the production of wind turbine components in South Africa found that it is mainly low-tech components like towers and blades, not the high-tech nacelles, that are being manufactured locally (ibid.; Larsen and Hansen 2020; Morris et al. 2020). By contrast, Brazil has been highlighted as a country where a new coalition emerged around wind with localised production of components, which reinforced the promotion of wind (Hochstetler 2020). Two factors behind the Brazilian success have been highlighted. First the unbundling of the public utility, Electrobras, which had significant interests in hydropower, successfully weakened resistance to non-hydro renewable energy. Secondly, a belief that the higher costs of wind could be offset by the development of a national industry of suppliers and manufacturers drawing on existing productive capacities, for instance in the aeronautical industry (ibid. p. 127). This points to the often-critical role of public utilities in energy transitions.

A stronger analytical interest in unpacking resistance from vested interests in and around these utilities has emerged, in part based on research like this on emerging economy experiences. In South Africa, the resistance of the public utility, Eskom, to non-hydro renewable energy has been ascribed to the existence of a minerals–energy complex constituted by a reciprocal relation between mining industries, the energy sector and other related industries that caters to vested interests in cheap energy produced from coal (Baker et al. 2014; Power et al. 2016; Ting and Byrne 2020, p. 6). Contributions from other contexts identify how a country's choice of energy technologies is also influenced by national 'socio-technical imaginaries' linked to concerns over energy security (Jasanoff and Kim 2013; see also Kuchler and Bridge 2018; Berling et al. 2021).[6] The availability, materiality and properties of energy resources play an important role in such imaginaries.

Combined, these critiques of and contributions to the energy transition literature suggest that complex political economy dynamics across different levels are shaping energy transitions.[7] This mirrors recent publications on global energy politics that also emphasise the intertwined nature of resource endowments, national political factors and global market and governance dynamics (Van de Graaf and Sovacool 2020, p. 174; see also Newell 2021). The growing importance and complexity of private investments using an increasing number of different finance instruments, further changes the relation between public and private actors. A nascent body of literature on the financialisation of renewable energy is emerging, but it is still debated whether this perspective is relevant in sub-Saharan Africa countries, where donor finance continues to play a significant role (Klagge and Nweke-Eze 2020; Baker 2021). A challenge in assessing these developments is lack of transparency and non-disclosure of information on private investments (see Badissy et al. 2021).

The analysis of policy coalitions has emerged as a promising approach to the study of such energy transition dynamics (Hess 2014; Markard et al. 2016; Roberts et al. 2018; Rennkamp 2019; Müller et al. 2020). A focus on coalitions could also help understand shifting power relations, for instance if and when decision-makers change priorities as more private capital becomes available, or as energy from non-hydro renewable technologies becomes more cost-competitive vis-à-vis energy from fossil fuel. The approach was however developed based on research into policymaking in higher-income counties and pays less attention to the differences between policy and implementation that characterise many lower-income countries (see for instance Kazimierczuk 2019). It has furthermore been suggested that analyses of the political economy of energy transitions need to

[6] Socio-technical imaginaries have been defined as 'powerful cultural resources that help shape social responses to innovation' (Jasanoff and Kim 2013, p. 190). Emerging research on national energy imaginaries has contributed to establishing energy security as an interplay between societal discourses, technologies and natural resources, i.e. a more dynamic understanding, which also reflects the fact that the conceptualisation of energy security has changed from being primarily about securing oil and gas supplies to also include electricity (Chester 2010; Berling et al. 2021).

[7] This complexity combined with specific characteristics of the energy sector has led analysts to characterise the sector as 'messy' (Baker 2021).

include political and economic interests outside the narrow energy field (Hochstetler 2020).

The political settlement approach emphasises political economy issues more broadly in such contexts. Initially, the approach was more characterised by its focus on the, often informal, coalitions between domestic political and economic elites that contribute to maintaining stability and shaping economic development outcomes (see e.g. Khan 2010; Whitfield et al 2015; Behuria et al. 2017). For our purpose it is important to note that the approach is increasingly used in sector-specific studies, which conclude that the same policy applied in different countries may lead to very different results. In recent years, adapted versions have been applied in the energy field with more emphasis placed on the international dimension of policy coalitions as well as on the role of ideas[8] and of bureaucratic capacity in state organisations in shaping energy sector investments and developments (Lavers and Dye 2019; Dye 2020a; Pedersen, Jacob and Bofin 2020; Hickey et al. 2020).

The link between the access to electricity, social contracts and local populations has also emerged in political settlement analyses recently (ibid). Improving access to energy services has indeed become a bigger and joint priority of governments and donors in recent years. How this plays out, how costs and benefits are distributed among different societal groups, and the implications for energy sector development in different countries, is more developed in the energy access and other energy-related literatures (see for instance MacLean et al. 2016a; Briggs 2012, 2021; Blimpo and Cosgrave-Davies 2019). However, the implications of the access agenda for the political economy of energy transitions are still little understood.

These elements – resource endowments, capital, domestic and international policy coalitions and access – are intertwined but can be separated analytically by way of drawing on the above-mentioned emerging areas of research in energy transitions, other energy-related literatures and on insights from the political settlement approach's more developed understanding of the importance of coalitions, politics and power. This paper will in the following sections further unfold some of the analytical implications for the political economy of energy transitions in lower-income countries.

[8] Lavers (2018) distinguishes between shared ideas about the distribution of power and rents at the societal political settlement level in a country and the ideas that help build and sustain policy coalitions at sector level. Transnational ideas, for instance promoted by donors, are typically more evident at sector level. Due to the centrality of natural resources in many lower-income countries, ideas about their sector-level governance may, however, largely overlap with the ideas about the functioning of the political settlement itself (p. 19).

RESOURCE ENDOWMENTS, REGIME RESISTANCE AND THE IMPLICATIONS FOR NON-HYDRO RENEWABLE ENERGY IN AFRICA

Research into the political economy of non-hydro renewable energy in sub-Saharan Africa outside South Africa is still nascent in that it tends to highlight particular elements, for instance focusing on legal and regulatory frameworks and socio-technical elements in the development of niche energy technologies, more than on a broader understanding of how politics and power influence the prospects of a transition to cleaner energy.[9] South African experiences however suggest that politics and power matter by way of an interrelationship between resource endowments and resistance from vested interests that is still little analysed and understood elsewhere on the subcontinent.

By drawing on empirical material this section seeks to contribute to the understanding of the role of resource endowments in fundamentally shaping energy sector developments. First, it presents data on the relation between the availability of fossil fuel natural resources in a country and the (lack of) deployment of non-hydro renewable energy. Secondly, it identifies some dominant concerns about energy among ruling elites and discusses some of the political and economic dynamics associated to the materiality and properties of different types of energy. Finally, it provides evidence from Kenya and Ghana that suggests that a comparable focus on the development of indigenous sources and similar concerns about energy security drive energy sector development in both countries, which however differ significantly due to different resource endowments.

The section shows that there is a correlation between extractive resource wealth (commercially viable oil/gas/coal resources) and the (lack of) promotion of non-hydro renewable energy. The tables below provide data on the top ten gas-producing countries (table 1) and the top ten electricity consuming (but non-gas producing) countries (table 2) in sub-Saharan Africa (except South Africa) based on 2019 data from the International Renewable Energy Agency (IRENA). The average share of non-hydro renewable energy is 1.1% among the former and 13.4% among the latter. Among the non-gas-producing countries, four countries in Southern Africa (Zambia, Zimbabwe, Botswana and Malawi) are furthermore producing coal and if these four are also deducted, the share of non-hydro renewable energy among non-gas-producing countries reaches 19.83%. Kenya is a clear frontrunner with 45%. None of the listed gas-producing countries are producing energy on a significant scale using coal according to the International Energy Agency (IEA), which provides disaggregated data on thermal power, [10] but Tanzania and Mozambique have been developing their coal industries.

[9] Other recent analyses have tried to identify a number of factors that may influence renewable energy output and consumption in sub-Saharan Africa, but also pay little attention to politics and power (Olanrewaju et al. 2019; Ergun et al. 2019; Baye et al. 2021).

[10] See https://www.iea.org/data-and-statistics/data-browser/?country=TANZANIA&fuel=Energy%20supply&indicator=TPESbySource

Table 1. Gas-producing countries, electricity capacity and generation (2019 data)[11]

Country	Non-renewable (MW)	Hydro (MW)	Solar (MW)	Wind (MW)	Other renewable (MW)	**Non-hydro renewable as share of total (%)**
Angola	1 781	2 699	13		51 (bioenergy)	**1**
Cameroon	705	732	14			**1**
Congo, Republic of	170	214	1			**0**
Côte d'Ivoire	1 298	879	8			**0**
Equatorial Guinea	274	127				**0**
Ghana	3 161	3 161	63		8 (bioenergy)	**1**
Mozambique	518	2 204	55		14 (bioenergy)	**3**
Nigeria	10 937	2 111	28	3	10 (bioenergy)	**0**
Tanzania	1 082	583	26		70 (bioenergy)	**5**
Gabon	296	330	1		1	**0**

Table 2. Non-gas producing countries, electricity capacity and generation (2019 data)[12]

Country	Non-renewable (MW)	Hydro (MW)	Solar (MW)	Wind (MW)	Other renewable (MW)	**Non-hydro renewable as share of total (%)**
Zambia	524	2 398	96		43 (bioenergy)	**4**
Ethiopia	104	3 817	11	324	290 (bioenergy) + 7 (geothermal)	**13**
Kenya	750	837	95	336	88 (bioenergy) + 823 (geothermal)	**45**
Zimbabwe	1 200	1 081	12		101 (bioenergy)	**5**
Uganda	136	907	82		88 (bioenergy)	**14**
Mauritius	610	61	83	11	91 (bioenergy)	**22**
Botswana	917		3			**0**
Madagascar	622	164	33			**4**
Malawi	141	364	23		12 (Bioenergy)	**6**
Namibia	183	347	135	5		**21**

[11] 2019 data on electricity capacity and generation from Irena https://www.irena.org/Statistics/Statistical-Profiles

[12] 2019 data on electricity capacity and generation from Irena https://www.irena.org/Statistics/Statistical-Profiles

The data points to the role of domestic resource endowments and the priority that can be observed in many non-gas producing countries given to developing other sources of indigenous energy. These observed tendencies in the tables above do not explain the 'regime resistance' to an energy transition that has a prominent place in the socio-technical energy transition literature, but as indicated above, more strands of research have begun unpacking the relation between resource endowments and 'regime resistance', which will be further unfolded in the following sections of this paper. Here, as a first step, we draw attention to some key contributions to the understanding of the overall interrelation between the material and political sides of different resource endowments and energy technologies.

There are more elements to this. If domestic resources are developed, they at the same time improve energy security and reduce the use of foreign exchange for supplies from abroad. Frequently, major reforms and significant changes in energy systems have been driven by power crises, for instance linked to droughts that undermined supplies from the dominant hydropower industry (Pedersen, Andersen and Nøhr 2020). This in turn leads to a stronger focus on diversifying energy supplies, preferably from domestic sources. In Zambia, a utility-scale solar project was initiated upon the order of the president in 2014–15 in partnership with the International Finance Corporation's (IFC) Scaling Solar initiative in response to a 2014–15 drought (Stritzke 2018; Kruger et al. 2019). At the same time however, a coal project with significant Indian and Chinese finance and using domestic coal, the Maamba coal-fired power plant, was underway with financial close in 2015.[13]

There are more material sides to the preference for developing domestic fossil fuel resources. Different sources of energy come with different materialities and properties. It has been argued that oil comes with particular properties, which provides for different dynamics than, for instance, coal, allowing for new connections or coalitions between political power, finance and trade (Mitchell 2009; Mitchell 2011). If oil is discovered, it can easily be transported and exported and bring in much-needed foreign exchange. Gas on the other hand is often a by-product of oil production that, in smaller quantities, cannot justify the large investments in pipelines or LNG infrastructure that are required for export, and it is therefore most often used for domestic purposes (Pedersen 2014).

Some contributions on socio-technical imaginaries stress that whereas the presence of fossil fuel resource endowments clearly influences energy policies, they do not predetermine outcomes (Kuchler and Bridge 2018; Berling et al. 2021). The data above however indicates that in lower-income African countries the availability of commercially viable fossil fuel resources provides for an unusually strong incentive to develop these resources. This may relate to peculiar political

[13] https://ppi.worldbank.org/en/snapshots/project/maamba-coal-fired-power-plant-phase-i-8617; another coal project was also being negotiated though it appears not to have materialised, https://www.gem.wiki/Emco_Zambia_power_station

properties of fossil fuels. The resource curse literature points to dynamics related to oil, which in contexts with immature political institutions may allow for easily generated rents and/or taxes that can help ruling political elites maintain power (Bridge and Billon 2013; Ross 2015; Andersen and Aslaksen 2013).

A literature on the socio-technical imaginaries of non-hydro renewable energy is also emerging, albeit less developed, particularly in African contexts (Verschraegen et al. 2017; Simmet 2018). Some suggest that the lack of fossil fuel resource wealth has been an important factor for the deployment of cleaner energy in developed as well as in some developing countries (Gallagher 2013; Ćetković et al. 2016). In such cases, the opposite of fossil fuel resource endowments – non-hydro renewable energy potential – can play a role. In Ethiopia, which does not have large known viable fossil fuel resources, two donor-funded studies in 2006 and 2009 showed the country's significant wind power potential and each helped pave the way for a wind project in the late 2000s, which fitted with the ruling elite's long-held ideas about using electricity to drive economic development that in part could be financed through the export of electricity to neighbouring countries (Chen 2018; Lavers et al. 2021). As the then Ethiopian prime minister put it: 'carbon-based energy resources are going to be prohibitively expensive even before they make our planet unliveable (…) we are richly endowed with green and renewable sources of energy … [including] huge hydropower and wind power potential' (Zenawi 2015 in Lavers et al. 2021, p. 10). The Ethiopian wind projects in the late 2000s were further facilitated by concessional loans.

The quote above points to the existence of particular properties of non-hydro renewable energy, which however are likely to differ from one type of energy to another. Literature on renewable energy and socio-technical imaginaries from elsewhere suggests that different types of renewable energy are likely to generate different dynamics, but also that there may be contestations within the individual type of energy over the scale, siting of plants, as well as over whether it should be governed centrally or decentralised (Eaton et al. 2014; Burnham et al. 2017; see also Smith and Tidwell 2016). Touching on the economic properties of non-hydro renewable energy, it has furthermore been noticed that the high upfront costs for non-hydro renewable energy technologies in some contexts may make them harder to promote when compared to other sources of energy, where costs are distributed more evenly across a project's lifetime (Baker 2021).

Box 1. Resource endowments and energy security in Kenya and Ghana
Kenya: Concerns over energy security and focus on developing indigenous sources of energy appear decisive for the development of non-hydro renewable energy in Kenya. With an over 85% share of renewable energy in its electricity mix, of which non-hydro renewables like geothermal, solar and wind play a significant part, the country is a frontrunner when it comes to transitioning to cleaner energy in Africa. A combination of factors played a role in this development. Droughts had undermined the reliability of hydropower and in the absence of viable domestic fossil fuel resources, the country, supported by donors, developed its potential renewable energy resources, in particular geothermal. Energy security and reliability of supplies was a major advantage

with geothermal as stated by President Kibaki when he announced a new project in 2012: 'Unlike hydro generation that is at times affected by vagaries of weather forcing us to rely on expensive modes of generation, geothermal is affordable, stable, renewable and clean' (ICA 2012). Similar concerns over energy security seem to have played a role in the development of Kenya's wind power projects.

Ghana: A similar focus on energy security and the development of indigenous sources of energy can be observed in Ghana, but with very different results. Non-hydro renewable energy had featured in Ghana's energy plans since a major supply crisis due to drought in the early 1980s. With a 2006 strategic national energy plan that came on the back of a drought, a target of 10% of total installed capacity was set. The discovery of oil and gas in 2007, however, triggered a seismic shift. The shifting mood was demonstrated by the same President Kufour, who after the discovery in 2007 told the BBC that 'Even without oil, we are doing so well, already. Now, with oil as a shot in the arm, we're going to fly' (BBC 2007). The entire legal and institutional framework for petroleum was overhauled in the following years and the discovery also triggered a number of other projects with implications for the power sector and gas-to-electricity is now the dominant form of power. The contrast between the development of oil and gas and the development of non-hydro renewable energy is striking. Whereas the 10% non-hydro renewable energy goal has been upheld throughout the years, the required supportive regulation tended to get delayed and the achievement of the 10% postponed. In 2020, the share of non-hydro renewable energy supplies to the grid was reported to be 0.8%.

RESOURCE ENDOWMENTS, INTERNATIONAL FINANCE AND POLICY COALITIONS

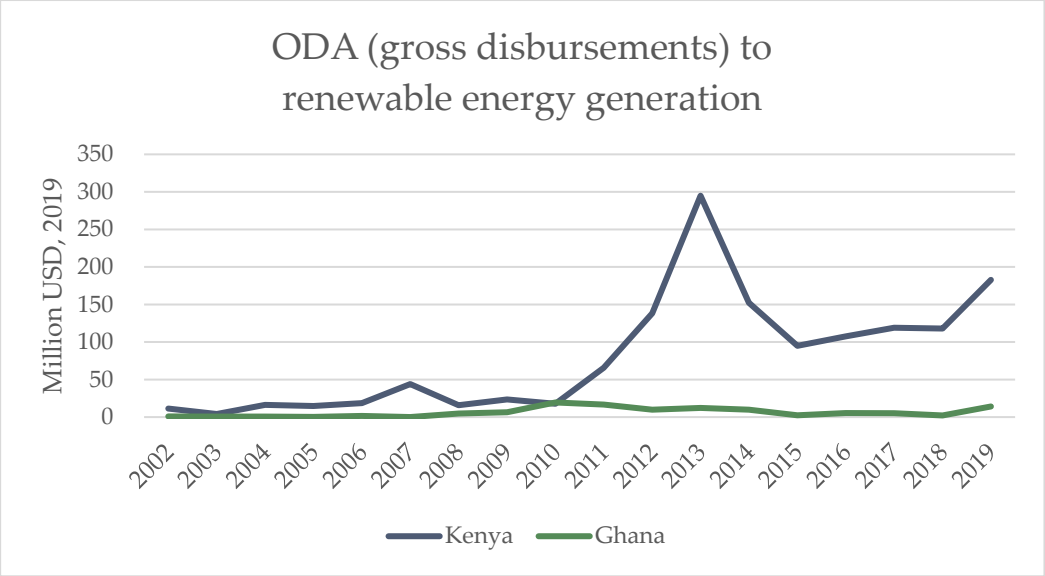
For lower-income African countries with limited resources, access to international finance and know-how remains important for energy sector development. The different resource endowments among countries affect the type of finance that can be mobilised for energy sector development. This challenges the tendency in much of the early energy transition literature of operating with a relatively fixed understanding of how a transition to cleaner energy can occur, viewing change as coming from innovation in niche technologies that is at first resisted, but may eventually overtake the (national) energy regime level. By way of building on the findings on the importance of resource endowments for the promotion of non-hydro renewable energy this section points to two dynamics with implications for the political economy of energy transitions. First, that resource endowment plays an important role for the types of coalitions that can be forged between governments, international private finance, donors and other domestic actors. Oil and gas abundance potentially cater for more private capital in the energy sector and, relatedly, donor finance tends to play a bigger role in non-gas countries.

Second, however, that the difference between gas- and non-gas countries is more a question of the relative strength of different actors in these coalitions.

African governments rarely just adopt Western power sector priorities. The latter's influence depends on their ability to forge coalitions with recipient country political and bureaucratic elites. The availability of private investors and finance also plays a role in this, with significant differences between gas- and non-gas countries. The production of oil and gas attracts substantial investments from international oil companies, which, despite increasing involvement of smaller companies and national oil companies, continue to dominate upstream exploration and production (Oppong et al. 2020). It also facilitates investments into gas infrastructure and power production that may involve private investments as well as concessional finance, particularly from China, on a significant scale. By comparison, Western development donors have played a significant role in promoting non-hydro renewable energy.

Figure 1 below demonstrates how more Official Development Assistance (ODA) for renewable energy has been mobilised in Kenya than in Ghana. As will be clear from the sub-section on Kenya and Ghana below, the latter, in turn, has mobilised private finance on a bigger scale for its oil and gas sector development.

Figure 1



Note: The figure is based on data in OECD's Creditor Reporting System (accessed 8 October 2021).

Different donors pursue different agendas, which furthermore change over time and contribute to new coalition dynamics. Whereas support for non-hydro renewable energy projects has existed for longer, it was only from the second half of the 2000s onwards that the World Bank as the dominant donor to sub-Saharan Africa's energy sectors gradually integrated non-hydro renewable energy into its strategic and results frameworks and increased its support (IEG and World Bank 2006; World Bank 2009; World Bank 2013; IEG and World Bank 2020). It thereby became more integrated into the standard model of sector reform that donors had

promoted since the 1990s. Western donor support for fossil fuel projects has also gradually been becoming less forthcoming. A similar shift towards non-hydro renewable energy can be observed in African Development Bank (AfDB) and European Investment Bank (EIB) approaches, the other major multilateral donors (AFDB 2016; EIB 2007; EIB 2019).

Donors and donor finance play a varied role in the promotion of non-hydro renewable energy. Müller et al (2020) identify differences among countries in terms of renewable energy policies where some countries strategically draw on donor support, some simply outsource the development of policies and projects to donors, some are characterised by internal struggles over whether to forge alliances with donors or not, and finally some stick to non-renewable energy (Müller et al. 2020). The latter are typically oil-producing countries. Uganda is an example of a non-gas country where development donors and domestic bureaucrats in the energy sector allied to promote a GET FiT scheme for small renewable energy projects that had been initiated as a response to a power crisis in the period 2005–7, but initially with limited success (Bhamidipati, Haselip and Hansen 2019). In close collaboration, donors and energy sector bureaucrats found a formula that in combination with additional donor finance meant that by 2019 GET FiT independent power projects (IPP) delivered more than 7% of Uganda's electricity consumption (Bhamidipati, Hansen and Haselip 2019; GET FiT Uganda 2019, p. 19).

Recently, much attention has been paid to supporting the creation of markets for non-hydro renewables with the goal of mobilising private investments. The increasing role of international private investment in renewable energy obviously changes the potential coalitions which can be established. Renewable energy projects at scale are increasingly funded by a mixture of public and private funds. A variety of finance instruments are used and specific purpose vehicles (SPVs) or similar are established to manage the project and the funds (Baker 2021). The IFC's Scaling Solar projects that are materialising in more countries is an example of such an approach using auctions to procure renewable energy IPPs (Pedersen, Andersen and Nøhr 2020). The financing model however typically involves only around 25% equity by private sponsors and the rest is financed through loans and guarantees from various World Bank entities and, at times, other donors (ibid). In some projects, state entities are also reported to be equity holders in the joint ventures with private developers.

Geopolitics and competition among donors have re-emerged as potentially important factors in energy sector development. The role of development finance and donors has however become more blurred with the increasing engagement of China. It has been suggested that the advent of Chinese finance in the 2000s, in particular supporting coal and utility-scale hydropower, meant an adjustment in both US and World Bank attitudes towards power sector finance for the continent (Hannam 2016). The USA Power Africa initiative in 2013 marked a re-engagement with Africa's power sectors and was explicitly designated to counter the influence of China, which had become a significant actor in Africa's energy sectors. The approach aims at using public money 'to provide market-driven solutions' and

thereby mobilise private investments (USAID 2017). It has been deployed for the promotion of renewable energy as well as for projects related to natural gas. The World Bank also became more pragmatic in its support to, for instance, utility-scale hydropower projects, which it had otherwise increasingly abandoned (Hannam 2016).

Box 2. International finance and policy coalitions in Ghana and Kenya

Ghana and Kenya have both liberalised their power sector more than most countries in sub-Saharan Africa (Eberhard et al. 2016). At a glance, the policy mix promoting renewable energy in the two countries is also similar to, for instance, a Feed-in-Tariff (FiT) scheme and tax incentives (Pueyo 2018). Such policies have typically been supported by donors (Pedersen forthcoming; Ockwell and Byrne 2016). Still, outcomes in terms of the deployment of non-hydro renewable energy differ widely, with Kenya having promoted non-hydro renewables and Ghana gas. Often, projects have been directly negotiated between government institutions and various combinations of developers, donors and finance. Different coalition dynamics are at play. International coalitions around non-hydro renewable policies thus exist, but so do competing coalitions around fossil fuels which in a dynamic relation with domestic resource endowments may influence which energy projects materialise on the ground.

Projects in both countries display a mixture of financing models, but the degree of public and private tends to differ. In Kenya, the involvement of finance and guarantees from development finance institutions has been central to the development of non-hydro renewable resources. Significant government support and donor funding facilitated Kenya's expansion of geothermal power and significant donor support can also be observed in instances of directly negotiated non-hydro renewable deals like the Lake Turkana wind power project and the Garissa solar project. In Ghana, the discovery of oil and gas in 2007 helped mobilise large amounts of private finance, particularly in upstream exploration and production. For instance, the Sankofa oil and gas project was assessed to cost more than USD 7 billion (World Bank 2020). Although the IFC and World Bank would provide some risk guarantees, the by far bigger share would be mobilised by the private sector. Such projects in turn enabled significant Chinese finance for state-owned gas infrastructure and private investments in gas-based power production with some donor support.

POLICY COALITIONS AND DOMESTIC ACTORS' INTERESTS AND IDEAS

The properties of a country's resource endowments play a role for the relative strength of different coalitions. Of particular interest in this section are the relations between ruling political elites, bureaucrats, domestic economic interests and the coalitions they forge with international finance. Whereas countries with oil and gas have tended to develop these resources in coalitions with international oil companies, non-gas countries have been more open to coalitions with development donors to develop non-hydro renewable energy, but also increasingly with both international and domestic private finance.[14] These developments strengthen some actors within countries and weaken others. There are, naturally, also significant differences within the two broad categories of gas- and non-gas countries. Furthermore, coalitions may change if the interests and ideas held by key actors shift. It is often assumed that improved price-competitiveness of non-hydro renewable energy technologies and bigger involvement of domestic economic interests will contribute to energy transitions. More knowledge is needed on such contemporary dynamics in lower-income African countries.

International private finance and donors provide framework conditions for energy sector development in lower-income African countries, but domestic actors, interests and ideas may play a no less important role in coalition dynamics and therefore for the political economy of energy transitions. It has at times been suggested that power sector liberalisation, unbundling, and competitive procurement that could help bring down costs, could be important components in the transition to non-hydro renewable energy (see for instance Kruger and Eberhard 2018; Gregory and Sovacool 2019; Hochstetler 2020). The causality between liberalisation and promotion of non-hydro renewable energy is however not unambiguous (see for instance Baker and Burton 2018). The complexity is confirmed by the Kenya and Ghana case material (see appendices).

Domestic interests in and ideas about the character of state involvement in the energy sector also play a role. Whereas African countries were under similar pressure from the World Bank and many Western donors to unbundle and liberalise their energy sectors in the 1990s and early 2000s, most countries ended up with hybrid models with various degrees of state involvement (Foster and Rana 2020). Ghana and Kenya have both liberalised their power sectors (Eberhard et al. 2016). Other countries have however had other ideas about the relation between state and markets. A more statist gas-producing country like Tanzania was initially on a trajectory towards more IPP involvement similar to Ghana's, but reversed track due to state-centric resource nationalism (Bofin et al. 2020). Subsequent power projects have predominantly been controlled by a public utility, TANESCO, and its national oil company, TPDC, has also been strengthened through investments in gas infrastructure. Similarly, a more statist

[14] As mentioned above, information on the role of private investors is not always accessible.

non-gas country like Ethiopia has generally prioritised utility-scale hydropower controlled by public utilities (Lavers et al. 2021). Its utility-scale wind projects, which have materialised with significant donor support, have been controlled by public utilities (Chen 2018; Gordon 2018; Chiyemura 2019; Fanabc 2020).

Struggles over the role of public utilities thus play a role. In South Africa, a power crisis in 2007–9 provided openings for IPPs, including non-hydro renewable energy ones, first through a renewable energy feed-in tariff (ReFiT) and later an auction scheme that led to a significant number of renewable energy projects. Due to weak regulation, conflicting mandates, and unclear accountability, Eskom in the period 2015–2018 was however able to postpone new projects by delaying the signing of power purchase agreements (PPAs) and by changing the rules (Baker and Burton 2018; Ting and Byrne 2020, p. 6). This was also influenced by powerful interests of the trade unions, which had a strong base in the mining industry and were an important part of the ruling African National Congress party's (ANC) constituency. A severe power crisis and a new minister unfroze the process as political pressure on Eskom under the new president, Ramaphosa (in power since 2018), mounted (Africa Confidential 2019b, Africa Confidential 2020a, Africa Confidential 2020b). Tensions over the relative importance of coal and non-hydro renewable energy as well as over the role of IPPs and the public utility however remain (BusinessDay 2021).

The politicisation of procurement touches on public utilities' autonomy and capacity. To what extent are their decisions on energy sector projects based on sound and realistic analyses of needs, demand and feasibility? Blimpo and Cosgrove-Davies (2019) suggest that a national electrification strategy is key to successful electrification, but also note (pp. 3 and 22) that less than half of African countries have such officially approved plans. Furthermore, adherence to such plans should not be taken for granted (Foster and Rana 2020, p. xxix). There are two elements to this. First, whether bureaucrats in state administrations and utilities have the technical capacity to carry out such planning. Secondly, whether decisions on energy production and infrastructure investments are taken based on their knowledge or whether they are politicised to such an extent that it may undermine the long-term viability of utilities as well as the reliability of energy supplies. Empirical evidence suggests that major decisions at times have been made with little regard for either. For example, excess supply, including from renewable energy, has been observed in several countries, at times due to political elites' priorities overruling sector bureaucrats (Lavers et al. 2021; Chemouni and Dye 2020).

Domestic private finance and its relation to decision-makers also potentially plays a role. The importance of such domestic economic interests is likely to differ from one type of energy technology to another and from project to project. Domestic ownership or co-ownership of projects both in- and outside power production may influence political priorities. There are multiple examples of pension fund and private investors owning or co-owning fossil fuel plants in lower-income African countries (Eberhard et al. 2016, pp. 52 and 289}. Whereas this trend to increased domestic private engagement emerged later in non-hydro renewable

energy, it is likely to be on the increase. In Kenya, the Kipeto wind power project, which was fully commissioned in 2021, has minority private domestic co-ownership (Kazimierczuk 2019, p. 443). Such projects may be favoured by domestic political elites either because of ideas about promoting domestic economic development, but may also involve potential irregularities and outright corruption, which allegedly is not that uncommon in power sector procurement (Eberhard et al. 2016). It is not clear from empirical studies whether the involvement of domestic private finance changes coalition dynamics in favour of non-hydro renewable energy.

Other domestic economic interests, for instance linked to local content in energy production or technologies, may also play a role. It is a key assumption in the transition literature that change towards an energy transition should come from innovation in niche energy technologies – and companies – that could eventually overtake energy provision. This has led to more studies of the potential of and barriers to such developments in different African countries. Hitherto, progress has been limited. A study from Kenya suggests that the supply of solar and wind technologies for utility-scale projects as well as for mini-grids – which are also by far the most important in terms of installed capacity – are completely dominated by international lead firms (Hansen et al. 2018a). Despite decades of support for innovation in solar, plants for solar home systems in African countries are still relatively small and seem to be characterised by assembling pre-manufactured products from elsewhere in the world (Ockwell and Byrne 2016; Lema et al. 2018; Kahinga and Sanyal 2021). The development of small and low-tech production plants may, however, over time lead to more complex manufacturing (Ockwell and Byrne 2016, p. 130; Bhamidipati et al. 2021).

Box 3. Domestic actors' interests and ideas in Kenya and Ghana

Kenya: IPP power increased to 35.95% in 2019. Renewable energy policies may have played a role in this, but not always as envisaged. Kenya has had a FiT framework for procuring renewable energy projects since 2008 and a large pipeline of projects, but very few projects have come to fruition. Over the same period other large energy projects have however materialised. In some cases, particularly in fossil fuel projects, links between politicians and economic interests have been mentioned as playing a role. The public generation utility, KenGen, owns a significant number of plants across different technologies. Geothermal has generally been procured through competitive processes, but not necessarily in open competition between public utilities and IPPs, and less so recently. KenGen has also developed its own capacity to explore for and produce geothermal energy, a capacity it has now begun exporting.

Ghana: Ghanaian governments have to a larger extent prioritised IPPs, whose share, utilising oil and natural gas, reached 47.4% in 2019. The pursuance of market friendly policies and dissatisfaction with public utilities are among the reasons for the growth of IPPs. All IPP projects in Ghana have been directly negotiated and this may have affected the promotion of non-hydro renewable energy. For instance, a power crisis in the period 2014–2017 led to the procurement of a number of projects by the Electricity Company of Ghana

(ECG) of which some were solar. Little is known about the terms of these contracts. Whatever process was followed, it was however overtaken by the three emergency power projects that the Ministry of Energy entered over the same period. There have been suspicions of irregularities related to the awarding of the latter, emergence, power projects (Ackah et al. 2021; *Financial Times* 2020).

ACCESS, LEGITIMACY, AND LOCAL POPULATIONS

Over the last decades significant gains have been made across countries when it comes to improving access to modern energy in sub-Saharan Africa. As access increasingly became a joint priority of governments and donors in the 2000s, access rates began climbing, from 34% in 2010 to 47% in 2018 (IEA et al. 2020). Recent research points to the importance of issues like social contracts and legitimacy, which touch on the relation between political elites and populations that is also gaining traction in the adapted political settlement approach (mentioned in section 2), suggesting that the paths through which service provision is improved differ from one country to another, linked to differences in the countries' regime types and political dynamics. Potential correlations between improvements in access rates and transitions to cleaner energy are therefore also likely to be highly dependent on domestic political economies of energy as indicated by a few empirical contributions. This section highlights some of the main dynamics, but more analysis is needed to understand each one of them and how they vary within and across countries.

Access and social contracts: an overall correlation between economic growth and improved access has been observed (Foster and Rana 2020, p. 15), but significant variation exists among sub-Saharan African countries. Recent empirical research has identified links between political dynamics and access, which should be further developed. Based on panel data from a number of countries Trotter suggests that a strong association between democracy and rural electrification exists (Trotter 2016: see also Aklin 2021). Maclean et al. suggest that social contracts between political elites and populations exist that have implications for the provision of electricity, and which vary from one country to another, in part shaped by the quality of democracy in a country, i.e. whether it allows for citizens to demand more and better services (MacLean et al. 2016a; Brass et al. 2019a). Similarly, Baker and Phillips (2019) suggest that during South Africa's transition from apartheid, the post-apartheid government made access to affordable electricity 'a basic need and basic right' and access rates began climbing rapidly from around one third of the population to approximately 87%.

Crises in energy supplies may in turn be a threat to the legitimacy of a leader or political party (MacLean et al. 2016b; Dye 2020b). The concept and understandings of energy security were initially focused on securing primarily oil and gas but this has increasingly come to include electricity (Chester 2010). Crises in energy supplies provide useful analytical entry points for analysing energy sector

development. Often, crises lead to major changes. For instance, in the 1990s crises made lower-income countries more open to the reforms or particular projects promoted by development donors. The promotion of model reforms is one example. Another is the willingness to facilitate new renewable energy projects as was the case with, for instance, Zambia's president pushing for the first Scaling Solar project in collaboration with IFC that came as a response to a drought-induced power crisis (Kruger et al. 2019). Power crises have however also made more governments procure or lease petroleum-based emergency power plants.

Box 4. Access, electricity prices and renewable energy in Ghana

In Ghana, consumers have grown accustomed to cheap energy and prices hikes are therefore often met with protests (Edjekumhene and Dubash 2002; Pueyo 2018). This may have implications for a transition to non-hydro renewable energy. It has been reported that Ghanaian planners, for instance in the Energy Commission, have been annoyed by the stricter conditions on finance from Western donors, including for instance the World Bank, emphasising the deployment of expensive renewable energy, which has made them look elsewhere for funding for energy projects (Gadzanku 2019, p. 59; see also Africa Confidential 2021). The cost-effectiveness of renewable energy still appears to be an issue. In 2020 the head of planning at the Ghana Energy Commission, Joseph Essandoh-Yeddu, explained: 'When you want to buy coca cola from the store you do not ask what energy was used to produce it. You are interested in the price! So the key thing is affordability! (…) Now if the coal is what you have. And then it is the most – cheapest – produce. And you have an issue with CO2 emissions. Then the challenge is how you do it. How you mitigate it. That is the key thing' (15 December 2021).[15]

The politicisation of access: the relation between democracy and access is not unambiguous. Intra-elite politics may play a role. Research from multiple countries suggests that some political elites have used improvements in access to modern energy services as patronage to target specific constituencies and to win competitive elections (Trotter 2016; Briggs 2021). In authoritarian Ethiopia, Lavers et al. have identified how ruling politicians embarked on electrification on a larger scale in the early to mid-2000s as a response to power struggles within the ruling party, the Ethiopian Peoples' Revolutionary Democratic Front (EFRDF) in 2001, and again later as a response to contested elections in 2005 (Lavers et al. 2021; see also Cuesta-Fernández 2015). This resulted in a centralisation of power combined with increased efforts to fast-track development in what Lavers et al. (p. 8) label 'performance legitimacy' and in which increased power generation came to play a key part.

Bridging the urban-rural divide and the choice of grid: there may be differences between how gas-producing and non-gas countries bridge the urban–rural divide in energy access that has been observed across the continent (IEA et al. 2020).

[15] Online conference: 'Critical Perspectives on Energy Transitions in Africa', 14–15 December 2020, University of Ghana; and Merian Institute for Advanced Studies in Africa (MIASA).

Historically, there has been a tendency among decision-makers across countries to focus on improving access through extending the grid, which has benefitted the urban population more. Off-grid and decentralised solutions may be less appealing politically. Scepticism towards solar micro-grids, which people fear may block their future connection to the central grid, has been observed in more countries (Boamah 2020; Cross and Neumark 2021). A greater willingness to pay for grid electricity than for decentralised, standalone, off-grid technologies has also been identified across multiple sub-Saharan African countries (Sievert and Steinbuks 2020). Expectations of access to the central grid are likely to influence the priorities of a country's political elite. Whether and how the elite can accommodate such expectations may be influenced by resource endowments. As outlined below, gas-producing Ghana has generally prioritised grid expansion. Non-gas producing Kenya, albeit also generally prioritising grid extension, has demonstrated more openness to decentralised and off-grid solutions.

Tariffs and consumer choices: energy prices also impact on access. They may furthermore have implications for energy transitions. There are costs to the political emphasis on improving access to energy, including to non-hydro renewable energy, that will have to be paid sooner or later. The dual character of energy systems in many African countries, where traditional and modern energy systems and practices co-exist, means that when prices for electricity increase, the use of charcoal may become more attractive – as happened in Tanzania after tariff hikes in the first half of the 2000s (Ghanadan 2009; Sokona et al. 2012). Public utilities may have a public purpose of supplying services that implies that they do not necessarily have to operate with a profit (Bernier et al. 2020; Foster and Rana 2020). Healthy finances in public offtaker utilities in transmission and distribution, often implying cost-reflective tariffs, have however been seen as important elements in promoting private off-grid and IPP investments in renewable energy (Gregory and Sovacool 2019). A too-rapid expansion of access may furthermore undermine the reliability of energy supplies, which hurts commercial and industrial consumers, who rely on power for their activities, more (Blimpo and Cosgrove-Davies 2019).

Subsidies, solar, and the risk of defections: it has been claimed that subsidies in sub-Saharan Africa are highly regressive because the majority in many countries cannot access electricity (Kojima et al. 2014). A number of cross-subsidies among consumer groups however exist that are not per se regressive. Foster and Rana (2020, p. 19ff) suggest that three out of four developing countries provide cross-subsidies between commercial and residential consumers, which imply transfers from the former to the latter. This can take different shapes. Another way is the application of a lifeline tariff, which provides for a package of low-cost electricity for consumers, or a 'free basic electricity (FBE) allowance' like the one introduced in South Africa in 2004 with the aim of providing 'electricity to all' (Baker and Phillips 2019). Cross-subsidisation can also be geographical. The maintenance of uniform tariffs across a country will thus mean that people in densely populated areas subsidise consumers in more remote areas where the cost of connecting is higher. The level of cross-subsidisation differs from one country to another (Foster and Rana 2020, p. 260). There may be dynamics related to renewable energy where

a country like Kenya has provided for profitable renewable energy investments as well as cross-subsidisation, which may have contributed to some customers defecting from the grid (*The Nation* 2020). In South Africa, defections by wealthier customers in favour of solar could also potentially undermine the viability of public utilities and undermine cross-subsidisation (Baker and Phillips 2019).

Exchange deals, local populations, and the risk of conflict: the location of energy plants affects local populations. Because of their physical properties some renewable energy technologies like solar and wind require large swathes of land and thereby may have a no less significant local social, economic and cultural impact than for instance oil and gas. Often such projects are located in remote areas with marginalised or indigenous populations whose (land) rights may be more or less protected (Baker 2021). Whether this gives rise to conflicts is likely to depend on the local exchange deal, i.e. whether or not people benefit from and feel fairly treated by projects (Buur et al. 2020). Evidence from oil and gas investments suggests that there may be struggles between investors, government authorities, and local people over which standards should be applied (Pedersen and Kweka 2017). Energy projects, including non-hydro renewable ones like the Kinangop wind project, have come to a halt in Kenya due to conflicts over land (Eberhard et al. 2018; Herbling 2015; Waruru 2015; Osiolo et al. 2017; Mwebe 2021). Whether and how local populations themselves gain access to electricity may also be part of the equation. A significant body of literature has emerged that focuses on 'just' energy transitions, emphasising various social elements and at times highlighting the importance of local ownership over energy production (Healy and Barry 2017; Müller, Neumann et al. 2021).

Box 5. Access in Ghana and Kenya

Ghana has prioritised access to electricity for longer than most other countries in sub-Saharan Africa, including Kenya, and it has one of the highest access rates. It has been argued that access to grid electricity has become part of the country's social contract that also influences election outcomes. The expectation of cheap, grid-provided power may also explain the limited progress in off-grid and mini-grid solutions.

Kenya's improvements in access rates are of a more recent date, emerging in the late 2000s possibly linked to increasingly competitive elections. The direct involvement of key political decision-makers has led to highly ambitious targets, which however have contributed to undermining the profitability of the public distribution utility. Kenya has seen earlier and more progress in terms of off-grid and decentralised modern energy supplies than most countries in sub-Saharan Africa.

PERSPECTIVES

In this paper we have tried to show that the energy sector and in particular the political economy of energy transitions is associated with specific characteristics, which differentiates the energy sector from other sectors. This comprises a potential competition between different segments of the sector and a more complex configuration of actors. We further argue that analyses of the sector will require an adapted analytical framework that is better able to explain the differences in the pace of the energy transition in lower-income African countries than the socio-technical approaches of the past.

The analytical approaches to understanding the political economy of energy transitions are largely developed based on experiences from high and higher middle-income countries. For a long time these approaches were dominated by socio-technical analyses, which tended to focus on technological innovation as the driver of change, but more developed understandings of the role of political and economic factors have emerged recently. Analyses of the political economy of energy transitions in lower-income sub-Saharan African countries tend to be more partial. Dynamics there are, however, likely to differ in that the countries have to balance the expansion of access to modern energy with the goal of ensuring reliability and sustainability of supplies. These goals are not always easily compatible. This is all the more important in lower-income African countries where state and private sector capacity is limited, and innovation of niche technologies consequently restrained. Based on a review of existing energy transition and related literatures as well as insights from various political economy approaches, this paper points to a number of dynamics that deserve more attention in the literature as well as in policymaking and implementation.

1. Understanding entire energy systems and their dynamics, not merely selected technologies

Recent energy transition research points to the importance of unpacking resistance from actors attached to existing energy technologies towards the deployment of non-hydro renewable energy. Focusing on entire energy systems and unpacking regime resistance as part of this moves the analytical attention away from innovation of niche technologies towards the interests and ideas that influence energy sector development more broadly. Promising contributions in the energy transition literature have thus pointed to the decisive importance of politics and power. These approaches should be further developed drawing on, for instance, insights from the adapted political settlement framework, which puts more emphasis on the international dimension of policy coalitions, on the role of ideas, bureaucratic capacity, and popular legitimacy, and also on empirical research in different country contexts. Combined, this will contribute to a better understanding of the particular dynamics of energy sector development in lower-income African countries.

2. The importance of resource endowments

Unpacking resistance towards energy transitions requires a better understanding of the role of resource endowments. This paper demonstrates the relation between countries' fossil fuel resources and their choices of energy technologies. Non-resource rich countries have a significantly higher share of non-hydro renewable energy in their energy mixes. The paper indicates that concerns over energy security and focus on developing indigenous sources of energy will play out differently in different countries. More research is needed into how exactly extractive resources – or their absence – influence the choices that shape energy sector development. Identifying and analysing the properties of different sources of energy could be important steps in this regard.

3. The interplay between international finance, donors and policy coalitions

International finance and donors play an important role in energy sector development in sub-Saharan African countries. Again, the character of a country's resource endowments matters. The paper points to patterns where development finance and donors play a bigger role in developing and deploying non-hydro renewable energy compared to their involvement in oil and gas, where private finance plays a bigger role. These differences between gas- and non-gas countries appear to be more a question of the composition and relative strength of different actors than of either public or private involvement in the development of one or the other type of energy resource. Resource endowments in combination with international finance, furthermore, potentially feed into different policy coalition dynamics with domestic actors.

4. The importance of domestic political dynamics

Though resource endowments are important, there will be significant differences among countries where for instance some countries have allowed the private sector to play a bigger role than in other, more statist, countries. Little understood public and private economic interests may influence decisions. A careful unpacking of the relations between public utilities, political and bureaucratic elites, and public and private interests is required not only for understanding overall energy sector development but also for analysing the political economy of energy transitions. Policies promoting non-hydro renewable energy abound, but implementation is often lacking. Specific energy projects may get implemented influenced by political or bureaucratic elites outside existing planning frameworks. This can be done through analyses into decision-making around reforms and specific energy projects as well as the character and role of capacity and autonomy of public organisations in the energy sectors.

5. The access agenda and state–citizen relations

Correlations between improvements in access rates and transitions to cleaner energy are likely to be highly dependent on domestic political economies of energy. Empirical contributions point to some potential links between resource endowments, how access is improved, and the distribution of benefits and costs

related to such improvements, which may affect the political economy of energy transitions. These links should be further explored and developed. Democracy as well as country-specific social contracts have gained more traction in the access literature, but their potential interrelations with, for instance, the choice of centralised grid vs decentralised off-grid solutions in different countries are little developed. Crises in energy supplies that may pose threats to social contracts can be useful analytical entry points to unpacking energy sector dynamics. They may trigger different responses in countries with different resource endowments, but this too remains to be developed. Electricity prices may also influence the ability to attract investors in different types of energy technologies.

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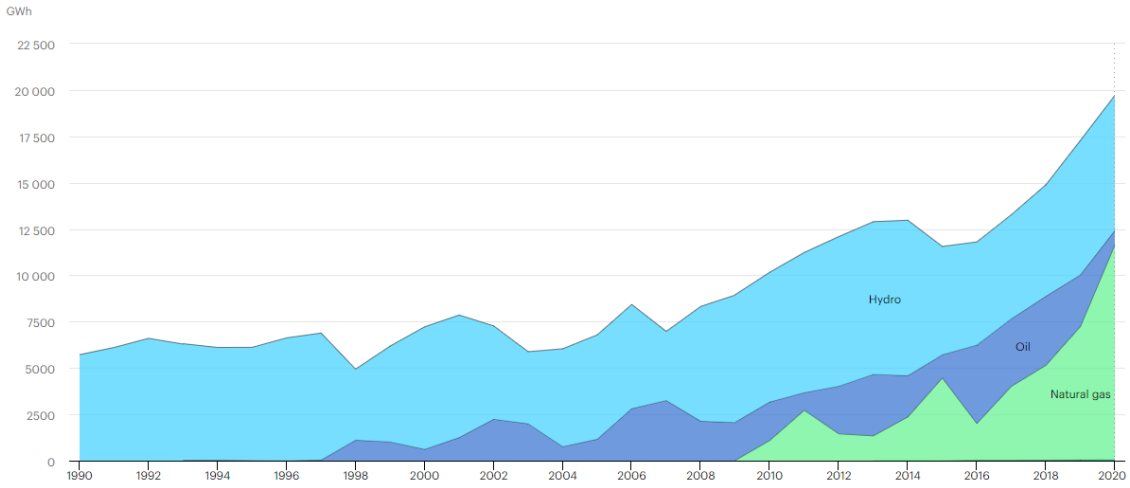
APPENDIX: GHANA

Ghana resource endowments and electricity generation

Figure 2. Ghana electricity generation by source[16]



Concerns over energy security and ideas about the development of indigenous sources of energy can be observed in Ghana. In 2003, then President Kufuor in his state of the nation speech in said that there should be prayers for the discovery of offshore oil, which would reduce the dependency on imports (Kufuor 2003). By then, the country was spending 20–30% of its export earnings on crude oil and petroleum products import (Turkson 1990; Edjekumhene et al. 2006). Non-hydro renewable energy had featured in Ghana's energy plans since a major supply crisis due to drought in the early 1980s and with a strategic national energy plan in 2006 a target of 10% of installed capacity was set. Coming on the back of droughts the plan had energy security as a main concern with a strategic target of 'diversifying sources of supply' (Ghana Energy Commission 2006, p. 86). Little has however been achieved in terms of deployment, which was derailed by the discovery of oil and gas in 2007. The discovery sparked a seismic shift in energy sector and national planning.

The discovery and production of oil and later gas by international oil companies in partnership with Ghanaian private oil companies and the Ghana National Petroleum Corporation (GNPC) was fast-tracked to begin already in 2010. The entire legal and institutional framework for petroleum was overhauled in those years and the discovery also triggered a number of other projects with implications for the power sector. The Atuabo gas processing plant that was also part of a western corridor gas infrastructure development project, began operating in 2015 and aimed at replacing imported oil with domestic gas (*The Economist* 2014; NS Energy 2015). At the end of 2019 gas, predominantly domestic gas, made up almost 60% of supplies for power production for the grid (Ghana Energy Commission 2020, p. 3). At the same time a new regulator, the Petroleum

[16] Data from IEA: https://www.iea.org/data-and-statistics/data-browser/?country=GHANA&fuel=Electricity%20and%20heat&indicator=ElecGenByFuel

Commission, was established and the national oil company – Ghana National Petroleum Corporation (GNPC) – was to focus more on commercial activities (Asante et al. 2021). In the latest EITI report it is reported that Ghana received US$977.12 million as petroleum proceeds in 2018 (Ministry of Finance and GHEITI 2019).

The contrast between the development of petroleum and non-hydro renewable energy is striking. Whereas the 10% non-hydro renewable energy goal has been upheld throughout the years, the required supportive regulation tended to get delayed (Meyer-Renschhausen 2013; Ashong 2016; Ghana Energy Commission 2016). In 2010, the Policy and Energy Sector Strategy and Development Plan emphasised Ghana's potential for transforming its economy through industrialisation with the development of domestic gas as the major means to achieving this, aiming for at least 50% of gas-based thermal power generation by 2015 (GOG 2010a and 2010b). For non-hydro renewable energy, there was now more emphasis on the importance of first addressing the lack of cost-effectiveness except for decentralised technologies 'where they are competitive' (GOG 2010b, p. 21). In 2015 the target of 10% renewable energy had been postponed from 2020 to 2030. In 2020, the share of non-hydro renewable energy supplies to the grid was reported to be 0.8% (GOG 2015; Ghana Energy Commission 2020, p. 3).

Resource endowments, international finance and policy coalitions in Ghana

Non-hydro renewable energy for the grid has seen limited progress in Ghana. The goal of 10% non-hydro renewable from 2006 has remained a mirage. By 2020, non-hydro renewable energy for the grid is reported to be 42.6 MW, a mere 0.8% share of grid supplies almost all of which was produced by two China-related solar companies (Ghana Energy Commission 2020, p. 3). The two have regular power purchase agreements (PPAs) and there are no reports about support from the Chinese state. It has however been reported that a Chinese–Ghanaian partnership involved USD200 million for ECG to improve infrastructure existed at the time of their initiation and China was furthermore significantly involved in Ghana's power sector in the first half of the 2010s (Anning and Vhumbunu 2018; see also https://chinaafricaloandata.bu.edu/). Among the reasons behind this limited progress are lack of clarity about the responsibility for implementation and a lack of coordination among public authorities (Bawakyillenuo 2017; Obeng-Darko 2019). A Renewable Energy Act had been passed in 2011 with donor support and provided for two major instruments to promote renewable energy, a FiT scheme for IPPs and a renewable energy purchase obligation (REPO) for renewable energy for grid companies (Meyer-Renschhausen 2013; Ashong 2016). The FiT scheme was in place in 2013/4, but by April 2016 the REPO, which was to open the grid for private producers, had still not been clarified, supposedly due to delays in one of the two regulators, the Public Utilities Regulatory Commission (PURC) (Ghana Energy Commission 2016, pp. 21 and 52; see also similar finding from 2017 in Aboagye et al. 2021).

Over the same period, large amounts of finance were mobilised for the development of Ghana's oil and gas sector. In upstream exploration and

production, projects were on a completely different scale than in the non-hydro renewable energy projects in Kenya. For instance, the Sankofa oil and gas project in the Offshore Cape Three Points block was assessed to cost more than USD 7 billion (World Bank 2020). Although the IFC and World Bank would provide some risk guarantees and the Ghana National Petroleum Corporation (GNPC) would be a joint venture partner, the by far bigger share would be mobilised by the private sector. The production of oil and gas in Ghana in turn enabled the financing for the close to USD1 billion Atuabo gas processing plant with 85% Chinese finance, and it was part of a bigger loan package using oil from the Jubilee field as collateral (*The Economist 2014*; Whitfield 2018, p. 287; see also Mihaly et al. 2020). The development of the national oil company was prioritised by the slightly more resource nationalist and statist NDC government, which came to power after elections in 2008 (Hickey et al. 2020).

The expansion of gas infrastructure in turn facilitated IPP gas-to-power projects. These projects display a mixture of financing models with more DFI support than in upstream production. The IFC has however generally helped finance more and bigger private energy projects in Ghana compared to Kenya (own calculations based on information from the IFC website, see also Pueyo 2018). There is no evidence that DFI financing was involved in Ghana's procurement of the three emergency power IPP producers from Turkish and Dubai-based companies in 2014–15 on 5–10 year contracts to address a power crisis (of which at least two are on build, operate and transfer terms).[17] They can all run on natural gas.

Policy coalitions and domestic actors' interests and ideas in Ghana

Ghanaian governments have tended to prioritise IPPs utilising oil and natural gas over the last decades. The share of IPP power from gas was 47.4% in 2019, a significant development in a country where the role of IPPs as late as 2013 was described as 'relatively marginal' (Ghana Energy Commission 2020; Kapika and Eberhard 2013, p. 196). The prioritisation may be due to the ruling political parties, which have both largely pursued market friendly policies, albeit with some variation in their views on the role of the state (Mohan, Asante et al. 2018, p. 278). Another reason could be a longer-held dissatisfaction with the Volta River Authority (VRA), a public utility, which for many years dominated power generation (Pedersen forthcoming). The decision to set up a separate public utility, the Bui Power Authority, to manage the Bui hydropower project, a project partly financed by a Chinese resource-backed loan which was decided on in 2006–7, was thus a deliberate move by the then more market oriented NPP government to break the VRA monopoly on utility-scale hydropower (Miescher and Tsikata 2009). IPPs producing energy from fossil fuels existed as a relatively small share of the energy mix, but with the discovery of oil and gas in 2007 and deliveries

17 http://ir.parliament.gh/bitstream/handle/123456789/994/321124072402_0001.pdf?sequence=1&isAllowed=y and https://www.ghanaweb.com/GhanaHomePage/business/Ameri-Energy-welcomes-new-partnership-with-Ghanaian-gov-t-707843

underway from the West African Gas Pipeline, which began supplies from Nigeria in 2009, their role increased (Fritsch and Poudineh 2015).

All IPP projects in Ghana have been directly negotiated and this may have affected the promotion of non-hydro renewable energy. There has been a process of licensing under the Energy Commission, the regulator, which in 2016 reported that 82 provisional wholesale electricity supply licenses had been issued to potential IPPs (Ghana Energy Commission 2016). Some of these were solar projects. A crisis in power supplies due to low water levels for hydropower and erratic gas supplies from the West African Gas Pipeline in the period 2014–17 however led the Electricity Company of Ghana (ECG), a public distribution utility, to enter 43 PPAs (Africa Confidential 2019a; Sarkodie 2019). As noted by the Energy Commission this happened 'with apparently not much due diligence to the price of the electricity to be supplied in terms of cost-competitiveness' (Ghana Energy Commission 2016, p. 43). Little is known about the terms in these contracts, but we do know that among the known PPAs in Ghana there are eleven solar, one biomass and one sea wave power project underway, the construction of which have not however begun (Ackah et al. 2021). Whatever process was followed, it was overtaken by the three emergency power projects that the Ministry of Energy entered into during the same period. There have been allegations of irregularities related to the awarding of the latter emergency projects (ibid; *Financial Times* 2020).

Access, legitimacy, and local populations in Ghana

Ghana has prioritised access since at least the National Electrification Scheme and the Self-Help Electrification Programme that were launched under President Rawlings in 1990 (Cuesta-Fernandez 2018; Sackeyfio 2018; Johnson et al. 2020, p. 105). It also has a lifeline tariff, and it has been argued that access to grid electricity has become part of the country's social contract. Today it has one of the highest access rates in sub-Saharan Africa (MacLean et al. 2016a). Electricity has also been a political element that could be part of winning or losing elections. In the runup to elections in 2016, the incumbent president Mahama got known by the nickname 'Dumsor', a reference to the frequent power cuts due to drought in those years. The urgency created by the crisis drove the procurement of three thermal emergency power producers that remain important in Ghana's energy system today. More analyses also point out how political parties in Ghana have used access to electricity as a tool targeting different voter segments to win elections (Briggs 2012; Cuesta-Fernandez 2018; Brass et al. 2019b; Briggs 2021).

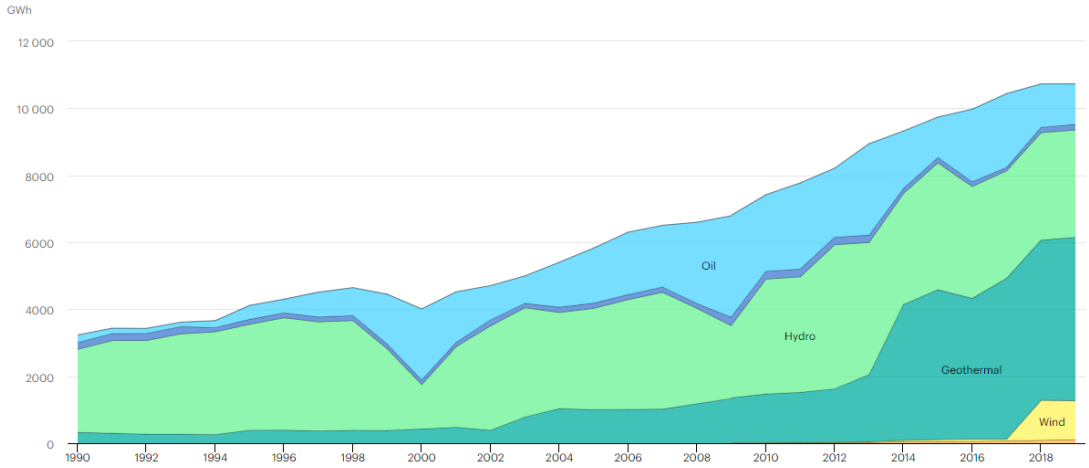
It has been suggested that expectations of grid-provided electricity are so strong that while some low-income households may be content with solar PV systems, many argue that this would relegate them to second-class citizens, threatening to vote against the incumbent party (Boamah 2020, p. 4; Boamah and Rothfuß 2020; see also MacLean et al. 2016a). Despite donor support to expand off-grid and mini-grid solutions in Ghana, progress has been limited (ESMAP and World Bank 2017; Johnson et al. 2020). The principle of uniform prices has been identified as a stumbling block for the expansion of (renewable) mini grids in remote areas,

which would be the more cost-effective way to improve access in those areas, but nonetheless are more expensive than the national price of grid power (ESMAP and World Bank 2017).

APPENDIX: KENYA

Kenya resource endowments and electricity generation

Figure 3. Kenya electricity generation by source[18]



Kenya's development of non-hydro renewable energy

Concerns over energy security and ideas about developing indigenous sources of energy appear decisive for the development of non-hydro renewable energy in Kenya. With a more than 85% share of renewable energy, among which non-hydro renewables like geothermal, solar and wind play a significant part, the country is a frontrunner when it comes to transitioning to cleaner energy in Africa (EPRA 2020). A combination of factors played a role in this development, one of which was the lack of domestic fossil fuel resources, and another the availability of potential renewable energy resources, which made the country, supported by donors, develop the latter types of indigenous energy sources. As a World Bank report put it, the Kenyan government chose to develop geothermal precisely because of the lack of domestic oil: 'In the absence of indigenous fossil fuel, the Government has sought to harness its own hydroelectric and geothermal resources to meet steadily growing demand at least cost' (World Bank 1990, p. 1).

There had been studies and exploratory drillings to establish the potential of geothermal power in the early 1970s, but it was only with the rising oil prices in the late 1970s that geothermal power was assessed to be a cost-competitive alternative to oil imports and hydropower development and its development began (World Bank 1990). By then, oil imports represented around 30% of all imports and the government allocated significant development spending for geothermal development (World Bank 1979, p. 11). In the late 1990s geothermal still only supplied less than 10% with hydropower still supplying close to 80% (World Bank 1997, p. 11-12). Droughts during those years however increased the interest in the reforms promoted by Western donors, including in further developing geothermal energy, and a slightly bigger share is mentioned in 2010

[18] Data from IEA: https://www.iea.org/data-and-statistics/data-browser/?country=KENYA&fuel=Electricity%20and%20heat&indicator=ElecGenByFuel

(World Bank 2010; Kazimierczuk 2019). By then significant expansions were already underway facilitated by the state-owned Geothermal Development Company, established in 2008 to undertake state-funded surveys and de-risk investments.

Energy security and reliability of supplies was a major advantage with geothermal as stated by President Kibaki when he announced a new project in 2012: 'Unlike hydro generation that is at times affected by vagaries of weather forcing us to rely on expensive modes of generation, geothermal is affordable, stable, renewable and clean' (ICA 2012). Similar concerns over energy security seem to have played a role in the development of Kenya's wind power projects. Among the motives we can identify explaining the government-requested donor support for geothermal power as well as the Lake Turkana wind power project were severe droughts that began in 2007, the same year as a new long-term planning document, Vision 2030, emerged that aimed at promoting industrialisation, improving access to energy, and, as part of this, reduce reliance on hydropower (Newell and Phillips 2016; Godinho and Eberhard 2019; World Bank 2011). The drought almost halved the supplies of hydropower energy, which by then still made up over 50% of energy production, and forced the country to rely on expensive emergency power at a time of high oil prices.

Resource endowments, international finance, and policy coalitions in Kenya

The involvement of finance and guarantees from development finance institutions have been part of instances of directly negotiated deals in Kenya. This approach also seems to allow for adjustment of framework conditions to facilitate specific projects (Godinho and Eberhard 2019; Kazimierczuk 2019). The Lake Turkana wind power project and the Garissa solar project are both examples of this type of policy coalition. The Turkana project and the Garissa solar PV project were both dominated by international investors and were directly negotiated. The Turkana project involved donors like Dutch FMO, Danish IFU, Finnfund, Norfund and Vestas, the producer of the turbines, as well as risk guarantees from first the World Bank and, when it pulled out, the AfDB (Godinho and Eberhard 2019). The 55 MW Garissa project was financed by a USD135 million concessional loan from China's Exim Bank and construction was further supported by the Jiangxi state enterprise, CJIC, a Chinese company (Bhamidipati and Hansen 2021). The project was part of bilateral collaboration between the Kenyan and Chinese governments and had been many years underway. It is owned by the Rural and Renewable Energy Corporation (REREC) (Lema et al. 2021).

The degree of private sector involvement thus differs between Ghana and Kenya. For instance, Ghana's 350 MW Kpone IPP gas-to-power project, which reached financial close in 2014 at a cost of USD900 million has USD207 million DFI financing. It is owned by a consortium that also includes African and Ghanaian partners (Eberhard et al. 2016, p. 289). By comparison, Kenya's USD861 million Lake Turkana wind power project, also with financial close in 2014, has DFI financing to the tune of USD 595.8 million as well as a risk guarantee (Eberhard et al. 2016, p. 289).

Box 6. The constraining influence of international finance on the realisation of Kenya's focus on developing fossil fuel resources

That energy sector development is an interplay between international private finance, donors and domestic political dynamics can be observed in Kenya, which is a frontrunner when it comes to non-hydro renewable energy. The development of geothermal, wind and solar has been supported by international donors for various reasons among which the idea of supporting climate mitigation is an important one. In Kenya, the focus on developing indigenous energy resources to replace imported oil may however have been more important than ideas about decarbonisation. The country has continuously sought to develop its domestic fossil fuel resources. Changing governments and the National Oil Corporation of Kenya (NOCK), in operation since 1984, have facilitated oil exploration and in 2012 oil was discovered in Turkana Country (Tyce 2020). Despite government and presidential attempts to promote its development, the limited size, fluctuating world market prices and disagreements over taxation have delayed production (Akwiri 2019; Matsiko 2020). Similarly, coal, which is considered a cheap and reliable source of energy, has been promoted, particularly over the last decade. Since 1999 there has been exploration in the Mui Bain, where in 2011 a private Chinese company, Fenxi Mining Group, was awarded concessions to develop mines (Ngugi 2020). At around the same time power generation from coal began featuring prominently in the country's energy planning (GOK 2011). A coal plant in Lamu county has been underway with the backing of the president and well-connected business interests, with the direct involvement in the project of a consortium with a Chinese company, China Power. Civil society protests and concerns over the project's environmental impact that led to an environmental tribunal revoking the environmental impact assessment, however, made AfDB, General Electric and the Commercial Bank of China pull out and the fate of the project is uncertain (Willing 2019; Yi 2021; Boulle 2019; Ayhan and Jacob forthcoming).

Policy coalitions and domestic actors' interests and ideas in Kenya

IPP power in Kenya made up 35.95% in 2019 (up from 24% in the previous year largely due to the Lake Turkana wind power project) (EPRA 2020). Renewable energy policies may have played a role in this, but not always as envisaged. Kenya has had a FiT framework for procuring renewable energy projects since 2008 and a large pipeline of projects, but very few have come to fruition (Ndiritu and Engola 2020). Among the reasons behind the failed FiT scheme in the 2010s are factors like tariffs that do not reflect current market rates and a lack of coordination among government bodies. Subsequent delays have been mentioned on the government side and inability to achieve funding, at times linked to inexperienced investors, on the IPP side (ibid; Hansen et al. 2018a). Over the same period, a number of large wind and solar renewable energy projects have however been directly negotiated by various government bodies. The dynamics and roles of these different entities and their relations to ruling politicians is little analysed in the literature, but it has been suggested that in coal, the president has been directly involved in promoting deals somewhat in collaboration with well-connected

businessmen (Ayhan and Jacob, forthcoming). Tyce reports about factional battles between the president and ministers from other ethnicities and parties, which have affected contracts in the oil sector (Tyce 2020).

Generally, the procurement of IPPs is done by KPLC, a utility, but the procurement of emergency power generators seems to involve the Ministry of Energy more directly (ibid, Kazimierczuk 2019). Not all of these procurement processes have been fully competitive, and it has been alleged that the continued importance of the diesel-powered subsector, where most IPPs are to be found, could to some extent be due to it being a source of political financing (Ayhan and Jacob, forthcoming). The public generation utility, KenGen, owns a significant number of plants across different technologies of which hydro, thermal and geothermal are on a major scale. KenGen's mixed ownership, being a listed, 70% state-owned utility (Godinho and Eberhard 2019), suggests that the distinction between public and private actors should not be taken for granted. Geothermal has generally been procured through competitive processes, but not necessarily in open competition between public utilities and IPPs, and less so recently (Eberhard et al. 2018). KenGen has also developed its own capacity to explore for and produce geothermal energy, a capacity it has now begun exporting (*The Kenyan Wall Street* 2021). It has been suggested that IPPs tend to get invited when KenGen is unable to attract funding (ibid. p. 44). The introduction of an auction approach to procuring non-hydro renewable energy IPP projects has been underway since the Least Cost Development Plan 2017–37, but only in 2021 did a renewable energy auction policy materialise (Arrumm et al. 2021). The FiT policy was also revised, specifically with the aim of encouraging local investor participation in power generation in smaller projects (GoK 2021).

Access, legitimacy, and local populations in Kenya

Kenya's improvement in access from 25% in 2013 to 75% in 2018 is impressive (IEA 2019, p. 152; Sergi et al. 2018, p. 64; see also AfDB 2014). The expansion was heralded in 2007, an election year, by the incumbent Kenyan president, Kibaki, who launched Vision 2030, which among other elements had universal access to and the development of indigenous sources of energy as a requirement to meet the goal of a high quality of life for Kenyans (GoK 2007; GoK 2018). A planning committee was subsequently established under the Energy Regulatory Commission (ERC), a regulator, to prepare a least cost power development plan that was launched in 2013 after having been modified to include the new President Kenyatta's 5000+MW programme (Kazimierczuk 2019). The goal was to be achieved within 40 months, but less than two years later it had to be scaled back due to a lack of adequate (transmission and distribution) infrastructure and concerns within the sector over potential oversupply (Eberhard et al. 2018).

The expansion nonetheless meant that the growth in electricity access rate was four times the growth in per capita consumption. Combined with political interference that has hampered the regulator's possibilities to adjust power tariffs during electoral periods this has led to problems with cost recovery with KPLC, also known as Kenya Power, a public distribution utility, at times struggling to

meet its debt obligations (Foster and Rana 2020, p. 192). Kenya Power, which holds a monopoly over power distribution, froze 23 PPA applications in 2019, and put on hold the signing of new PPAs (Bloomberg 2020). In March 2021, President Kenyatta appointed a task force to review the existing PPAs entered into by Kenya Power, which are blamed for the utility's poor performance (Mutai 2021; Mwere 2021). Under the PPAs, Kenya Power buys electricity from IPPs at a rate that is much higher than if it were to buy from KenGen. Kenya Power has maintained uniform tariffs despite major expansions into lower-demand regions (Foster and Rana 2020, p. 260). Tensions over tariffs and the threat of expansion of the grid are also reported as a perceived risk for private off-grid providers in Kenya (Gordon 2018, pp. 21–22). Nonetheless Kenya has seen more progress in terms of off-grid and decentralised modern energy supplies than most countries in sub-Saharan Africa (Ockwell and Byrne 2016; EPRA 2020).