



TOWARDS A POLITICAL ECONOMY OF RENEWABLE ENERGY IN GHANA: A REVIEW

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Abstract

New forms of renewable energy have featured in Ghana's energy planning since the early 1980s, but their share in the energy mix remains limited. This development mirrors similar trends in many other lower-income African countries. Based on a literature review, this paper explores the political economy of renewable energy in Ghana with a particular focus on the role of development donors, who have been identified as potentially important actors in the promotion and deployment of new renewable energy. The paper suggests that coalitions between Western donors and Ghanaian decision-makers with a shared interest in new renewable energy have emerged more than once, typically as a response to supply crises. However, these coalitions have been short-lived, partly due to the fragmented nature of Ghana's energy sector governance. Concerns over energy security and fossil-fuel resource endowments decisively influence the priorities of key domestic decision-makers. This became conspicuously clear after the discovery of oil and gas in 2007 when the development of Ghana's petroleum resources was prioritised at the cost of new renewable energy. Whereas expanding access to cheap modern energy has been a mainstay among key domestic decision-makers, decarbonisation does not appear to have been a major priority. Generally, more empirical research is needed.

Keywords: Ghana; energy transition; renewable energy; oil and gas; political economy

Résumé

Les nouvelles formes d'énergie renouvelable figurent dans la planification énergétique du Ghana depuis le début des années 1980, mais leur part dans le bouquet énergétique reste limitée. Cette évolution reflète des tendances similaires dans de nombreux autres pays africains à faible revenu. Sur la base d'une revue de la littérature, la présente étude explore l'économie politique des énergies renouvelables au Ghana en mettant l'accent sur le rôle des bailleurs de fonds, qui ont été identifiés comme des acteurs potentiellement importants dans la promotion et le déploiement des nouvelles énergies renouvelables. L'article indique que des coalitions entre les donateurs occidentaux et les décideurs ghanéens partageant un intérêt commun pour les nouvelles énergies renouvelables ont souvent émergé, généralement en réponse à des crises d'approvisionnement. Cependant, ces coalitions ont été de courte durée, en partie à cause de la nature fragmentée de la gouvernance du secteur de l'énergie au Ghana. Les préoccupations relatives à la sécurité énergétique et aux ressources en combustibles fossiles influencent de manière décisive les priorités des principaux décideurs nationaux. Cela est apparu clairement après la découverte de pétrole et de gaz en 2007, lorsque le développement des ressources pétrolières du Ghana a été privilégié au détriment des nouvelles énergies renouvelables. Alors que l'élargissement de l'accès à une énergie moderne bon marché a été un pilier pour les

principaux décideurs nationaux, la décarbonisation ne semble pas avoir été une priorité majeure. De manière générale, des recherches empiriques supplémentaires sont nécessaires.

Mots clés: Ghana; transition énergétique; énergie renouvelable; pétrole et gaz; économie politique

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Biographical Note

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Towards a political economy of renewable energy in Ghana: a review

Rasmus H. Pedersen

1. Introduction

New forms of renewable energy have featured in Ghana's energy planning since the early 1980s, and received a further impetus in 2006 in the country's Strategic National Energy Plan, which set a target of 10% of installed capacity by 2020 (GEC 2006). Subsequently, support legislation has been put in place, but implementation has generally been slow and uneven. New renewable energy projects involving, for instance, solar and wind were also included among the power purchase agreements that were entered into with Independent Power Producers (IPPs). The aim was to address a supply crisis in 2014-16, but later most of them were put on hold. Reaching the 10% target was repeatedly delayed and eventually postponed to 2030 (Obeng-Darko 2019; Afful-Dadzie, Mallett et al. 2020; GOG 2015). By 2020, new renewable energy only made up 0.8% of installed capacity (GEC 2020).

This development in Ghana mirrors similar trends in many other lower-income countries in sub-Saharan Africa (IEA 2019; Kazimierczuk 2019). What explains this difference between targets and implementation? Energy transition research has paid much analytical attention to the importance of innovating new renewable energy technologies to drive a transition of energy systems towards more sustainable forms of energy. However, this perspective was mainly developed based on European experiences (Bridge et al. 2013; Köhler et al. 2019; Ting and Byrne 2020). Research into the experiences of African countries suggests that new renewable technologies are increasingly being produced in global value chains dominated by international lead firms (Hansen et al. 2018, Morris et al. 2021). This challenges the findings and assumptions of the technology-centric transition literature.

The promotion of new forms of renewable energy in African countries is therefore as much about the deployment of technologies as about their development. Here, political economy factors can be expected to play a more decisive role (Kebede and Mitsufuji 2017; Baker and Burton 2018; Hansen et al. 2018; Müller et al. 2020). Recent findings suggest that development donors and development finance may be instrumental in promoting new renewable energy (Power et al. 2016, Bhamidipati et al. 2019; Klagge and Nweke-Eze 2020; Pedersen et al. 2020). However, research into the political economy of energy transitions in lower-income African countries is still in its infancy.¹

Based on a review of the literature on the development of the energy sector in Ghana, this paper explores the political economy of renewable energy in the country with a particular focus on the role of donors in the promotion and deployment of new renewable energy. It takes inspiration from an adapted political settlement approach. This has proved useful in combining analyses of sector-specific coalition dynamics with the broader political and economic interests affecting policymaking and implementation in lower-income countries (Khan 2017; Hickey et al. 2020; Pedersen et al. 2020b). The paper identifies four tendencies that can contribute to

¹ Significant conceptual contributions have been made based on South African experiences. However, since South Africa is an upper middle-income country with more public and private capacity than lower-income countries, its experiences are not directly applicable in lower-income countries.

explaining the difference between new renewable energy targets and their implementation in Ghana.

First, the paper suggests that Western donors have significantly influenced renewable energy policies in the country. Also, that their influence over the implementation of such policies has waxed and waned depending on donors' ability to forge coalitions with domestic decision-makers. Domestic Ghanaian concerns over energy security emerged in the wake of the global oil crisis in the late 1970s and the drought in the early 1980s. These led to explorations of the potential of new renewable energy, supported by donors. However, a combination of domestic and donor pressure in the late 1980s and early 1990s led key domestic decision-makers to shift their priorities. First, expanding access to modern energy became an important strategy for all political parties to build popular support in Ghana's increasingly competitive politics. Later, and with pressure from the World Bank, private-sector participation in the energy sector emerged. However, none of these developments involved new renewable energy on a larger scale.

Second, coalitions did emerge between some donors and domestic decision-makers with a shared interest in new renewable energy, particularly in response to the recurrent power crises that characterise Ghana's modern history. However, these coalitions were fragile and short-lived, partly due to the fragmented nature of Ghana's energy sector governance. For instance, formulating the 2006 Strategic National Energy Plan was supported by donors and provided a target for the deployment of new forms of renewable energy. However, this was overtaken as early as 2007 by the discovery of significant oil and gas resources. Thereafter, key domestic decision-makers saw the development of oil and gas as a more attractive way to realise long-held ideas of pursuing industrialisation and expanding energy access based on cheap and reliable energy.

Third, and consequently, the paper finds that a combination of concerns over energy security and fossil-fuel resource endowments (the availability of commercially viable oil and gas resources) decisively influenced coalition dynamics and energy-sector priorities in Ghana (see also Pedersen et al. 2021 for similar patterns in other lower-income African countries). After the discovery of oil and gas, domestic decision-makers formed new coalitions with domestic and international oil companies, as well as some financial institutions, to quickly develop Ghana's petroleum resources. Over the years, domestic gas has become the dominant source of energy in the power sector, largely replacing imported oil products. The sector also generated significant state revenues.

Fourth, despite pledges to fight climate change, decarbonisation does not appear to have been a major priority among key decision-makers in Ghana. The country chose to develop its petroleum sector around the same time that countries without significant oil and gas resources, like Kenya and Ethiopia, began developing new renewable energy on a larger scale (Gordon 2018). The importance of resource endowments is alluded to in a few academic contributions, but the analytical implications are less developed for lower-income African countries (Collier and Venables 2012; Newell and Phillips 2016). Generally, more empirical research into the dynamics of the political economy of renewable energy in lower-income African countries is needed.

2. Methodology and outline

The paper is based on an extensive review of the literature on the energy sector and renewable energy in Ghana and, as already noted, is inspired by an adapted political settlement approach. The political settlement approach has been used increasingly to study the role of politics and power in developing countries. Initially the approach focused on what impact the relationships between domestic political and economic interests and institutions made on overall development outcomes in a country (Khan 2010, 2017; Behuria et al. 2017). More recent adapted approaches have paid attention to how ideas and transnational actors interact with domestic actors in the form of policy coalitions at the sector level (Lavers 2018; Hickey 2019; Lavers and Dye 2019). This allows new renewable energy to be analysed as one of a country's energy-sector developments that are embedded in broader political and economic dynamics.

Therefore, the paper focuses on how new renewable energy policies and projects are being promoted or impeded and on the role of different actors, particularly donors, in these developments. Existing literature on the dynamics of political settlement in Ghana suggests that the country has been characterized by 'competitive clientelism'. In other words, the ruling political party often faces credible challenges from the opposition, as well as constant competition over political positions and state resources. This seems to have begun with the reintroduction of multi-party elections in 1992, and some argue that it started as far back as independence (Abdulai and Hickey 2016; Whitfield 2018: 47). However, significant sector-specific variation can also be observed for the development of the petroleum sector in Ghana (Hickey et al. 2020).

The review draws on searches on energy-sector development and renewable energy in Ghana and, more broadly, on how development donors have sought to promote new renewable energy in sub-Saharan African countries (see Pedersen et al. 2020). The existing literature on energy and new renewable energy in Ghana does not always systematically unpack the issues of politics and power in much detail. This means that at times the paper has the character of a mapping of these dynamics as they appear in the literature. As a result, more empirical research is needed for a full-fledged analysis of the political economy of new renewable energy in Ghana.

Searches were made in Google Scholar and WorldCat, a database linked to library collections across the world. Keywords included in the search were 'Ghana + electricity', 'Ghana + renewable energy' 'renewable energy + Africa', and 'renewable energy + Africa + development assistance'. During the course of the study, the scope of the paper was expanded to include literature on the development of Ghana's oil and gas sector. Additional reviews of donor documents, particularly from the World Bank, AfDB, EIB, IFC, and Power Africa were also conducted.

The paper is divided into three major sections, focusing on three significant changes in development assistance and national developments of new forms of renewable energy in sub-Saharan Africa. The periodisation is based on a larger review of donor aid for new forms of renewable energy that will be published in full elsewhere (see also Pedersen et al. 2020). The first section describes the emergence, in the 1970s, of new forms of renewable energy linked to a new agenda for sustainability and energy security. This was characterised by rather ad hoc and decentralised approaches that had little impact on overall energy-sector planning. The second section looks at the emergence of a broader reform agenda in the 1990s that was aimed

at introducing more competition in energy sectors but decoupled from more systematic approaches to promoting new renewable energy. The latter approaches became more pronounced when energy access and rural electrification was placed on the agenda around the year 2000.

Finally, the third section examines the market mechanisms that became more pronounced in many countries. These were partly linked to changing financing mechanisms that arose with the emergence of new climate finance. It became clear that something new was in the offing when feed-in-tariffs were introduced in South Africa and Uganda in 2007. Whereas Ghana mirrors these trends in many respects, it also has peculiarities of its own. Notably, in the 1980s there was the emphasis on improving access to electricity, and in the 1990s a market-centric approach to power generation emerged (being gradually institutionalised in the 2000s). Each of these came to influence the failure to promote new renewable energy.

3. Aid for new renewable energy: energy security, experiments and the nascent sustainability agenda (before 1992)

The advent of renewable energy in development assistance in the late 1970s and 1980s was driven by the emergence of the environmental agenda globally. This was embodied in the publication of 'Limits to Growth' and in the UN Conference on the Human Environment in Stockholm in 1972. The rise in global oil prices pushed by OPEC, also put a strain on non-producing countries, rich and poor, across the world (Foley 1992). The scramble for energy sources that could replace oil spread into development assistance, where several donors established departments working on renewable energy. Nonetheless, traditional large-scale hydropower projects remained by far the greatest recipients of donor support (Michaelowa and Michaelowa 2011). Support for new forms of renewable energy was characterised as a 'parachute approach' that was more about one-off investments and decentralised demonstration projects (Kozloff and Shobowale 1995). Increased support had been proposed at a UN Conference on New and Renewable Sources of Energy in Nairobi in 1981 but never materialised. Until 1991, only 5% of support earmarked for energy projects went to renewables (Kozloff and Shobowale 1995).

Donor support for new renewable energy in Ghana shared many of the characteristics of donor support for other developing countries. This emerged as Ghanaian policy in the early 1980s as a response to concerns over energy security due to a combination of high oil prices and droughts. By then, there was already evidence of donor support for new renewable energy, albeit on a small and experimental scale. Promises were made that new renewable energy could play a larger part in the systematic approach to energy-sector planning. One particular Ghanaian development was the emphasis on improving access to electricity that grew stronger in the 1980s as part of the then ruling party's efforts to build a rural support base. This could have included new forms of renewable energy, but this element did not materialise until the agenda shifted among key Ghanaian decision-makers and the most influential donors.

3.1 The early history and structure of Ghana's power sector

In Ghana, the Volta River Project of the early 1960s came to shape future developments in the energy sector. It also demonstrated the often-uneasy combination of domestic interests, ideas, and foreign donor finance that can be observed to this day. The project involved the

construction of a large-scale aluminium plant, and the Akosombo Dam. The aluminium and hydro-power projects had both been long in the making, dating back to the colonial era but after Independence President Nkrumah and his socialist Convention Peoples' Party (CPP) provided the final push. They prioritised state-led development that could help diversify the economy away from dependence on the export of crops and imports of industrial materials. Improving access to electricity for Ghana's citizens was also mentioned as part of the long process leading to the implementation of these projects, but it was power for industrialisation that was most important. President Nkrumah said, 'newer nations, such as ours, which are determined by every possible means to catch up in industrial strength, must have electricity in abundance before they can expect any large-scale industrial advance. Electricity is the basis for industrialization. That, basically, is the justification for the Volta River Project' (President Nkrumah speaking in 1961, quoted by Tsikata 2006: 43; see also World Bank 1960, 1961; Hart 1977; Miescher and Tsikata 2009; Miescher 2014; Darko et al. 2019: 11).

Despite the emphasis on state-led development, the projects' final forms were characterised by compromises shaped by the need for foreign capital to ensure their realisation. The Ghanaian government had been struggling to finance the project, in which Nkrumah had invested much of his personal prestige (Noer 2007). Volta Aluminum Company (VALCO) was to be privately owned, with majority ownership for the American company, the Kaiser Corporation. Only half of the funding for the hydropower project was to come from the government's own coffers. Much of it was made up of loans from the World Bank, US and UK government entities (Hart 1977: 21, 37; Darko et al. 2019). The involvement of the private and foreign components was not without controversy in Ghana around Independence, where African economic nationalism was on the increase. During the process, the US government, worried by Nkrumah's criticisms of America's foreign policy as well as his authoritarian tendencies and open flirtation with China and the Soviet Union – which included, among other things, a Soviet study of a potential Bui Dam project – demanded concessions (Miescher 2014: 357). Only after Nkrumah publicly committed Ghana to non-alignment, promised never to nationalise the VALCO investment and allowed more political freedom did the Kennedy administration consent to a loan. The World Bank's initial scepticism regarding the economic returns from the project was, therefore, overruled by the US government's enthusiasm and American financial and geopolitical interests (Tsikata 2006: 57).

The project set out the main structures of the energy sector that came to be reliant on hydropower (Brew-Hammond 1996). The British colonial authorities had not prioritised energy to any significant degree, and power supply had hitherto been concentrated in the cities. It was also dominated by isolated stand-alone generators run on imported diesel, almost half of them privately owned (Botchway 2000; Amissah-Arthur 2006: 274; Kapika and Eberhard 2013:199; Cuesta-Fernandez 2018: 57). Concurrent with the Akosombo project was the construction of the first major transmission grid, an element that, somewhat surprisingly, was also promoted by Kaiser Corporation, most likely in order to share the costs with other consumers and the Ghanaian government (Moxon 1984: 97-103).

For Nkrumah, it was important that the generated electricity would benefit industries other than VALCO (Chambers 1970). Further support from Germany, the UK and the World Bank provided for the expansion of the distribution system to smaller centres and industries in 1966 (World Bank 1968). In 1961, the government had set up the Volta River Authority (VRA)

as a separate generating entity with its own governance structures to manage the dam project (Brew-Hammond 1996; Edjekumhene and Dubash 2002). As one of its commitments under the World Bank loan agreement, the government also agreed to reorganise its power sector more comprehensively. After inauguration of the dam in 1966, the government replaced the department responsible for distribution within the Ministry with a newly established Electricity Corporation of Ghana (ECG) the following year. Its mandate was to be the main power distribution company in Ghana and to run diesel power stations and rural electrification.

The decision to separate generation and transmission between the VRA and ECG was thus also influenced by the advice of the Bank (World Bank 1985; Tsikata 2006: 41). For decades, the VRA was a key, capable and resourceful generation utility, also becoming involved, for instance, in the expansion of the Akosombo Dam in 1972. This was financed by loans from Canada, Italy, the USA and the World Bank. In 1977, the Kpong Dam received loan finance from the World Bank and Arab and European agencies, as well as from Canada (World Bank 1985; Miescher and Tsikata 2009). Between 1978-1983, interconnectors linking Ghana to Côte d'Ivoire were constructed, co-financed by the African Development Bank (AfDB) and the European Investment Bank (EIB) (AfDB 2005). The fact that VRA was supplying not only VALCO, but also other large commercial consumers and neighbouring countries meant that most of VRA's revenues were in foreign exchange. This provided a further cushion and more autonomy compared to the ECG (Brew-Hammond 1996; Botchway 2000: 190).

By comparison, the ECG struggled. It too was intended to become a quasi-autonomous entity operating on commercial principles. However, it was firmly located in the civil service system under the ministry responsible for energy, whereas the VRA was chaired by the President until 1966 and later chairmen were appointed by the President with the approval of the World Bank (Botchway 2000: 189; see also Briggs 2021 for more recent observations on the politicisation of the ECG). However, due to Ghana's growing national debt, investments in infrastructure generally declined in the years that followed. Limited schemes can be observed under President Busia (1969-72) that mainly targeted his native Brong-Ahafo Region, as well as a later ECG intervention in the mid-1970s to install 19 local diesel grids supplying regional capitals, some of which were in the north (MacLean, Gore et al. 2016: 117; Cuesta-Fernandez 2018: 58). Throughout most of its existence the ECG has struggled financially, managerially and technically and has often been unable to adjust its below-costs tariffs to support the supply of electricity to other consumers (Edjekumhene and Dubash 2002: 119). For instance, tariffs were not changed between 1976 and 1986, and when they were, they were still kept at below the Long-Run Marginal Cost (Keener and Banerjee 2005; Williams and Ghanadan 2006).

3.2 *Energy crises, shifting priorities and the emergence of new renewable energy*

In the late 1970s, Ghana entered an energy security crisis that also heralded the advent of new renewable energy. In response to a crisis in the supply of petroleum in 1979, the Ghanaian government established the Committee on Energy Resources to review options to improve energy security (Edjekumhene et al. 2001: 22-23). By then, oil imports accounted for around 30% of total imports. In general, this was a period of reckoning and shifting priorities in Ghana. After two *coups d'état* in 1979 and 1981 respectively, a junta headed, by Jerry Rawlings, pursued socialist policies with an emphasis on socialism and self-reliance. This was inspired by Nkrumah and influenced energy-sector development (Rimmer 1992: 180; Botchway 2000:

181). However, after failing to secure funding from communist countries and Libya, Rawlings made a U-turn and embarked on a general reform process – first with an Economic Recovery Programme (ERP) in 1983, followed by a Structural Adjustment Programme in 1986 that was funded by the IMF, the World Bank, and other Western donors (Herbst 1993: 29; Boafo-Arthur 1999; Opam and Turkson 2000: 52).

The oil crisis and concerns over energy security set in motion a process that in 1983, a year of severe drought and a power crisis, led to a law providing for the establishment of a National Energy Board (NEB). This was financed by a World Bank credit, to advise the government on energy policy and supplies. It included the establishment of a plan for investments in renewable energy based on demonstration projects under a special programme unit (World Bank 1983; Turkson 1990). The purpose of establishing the NEB in 1983 was to ensure energy-sector planning was less fragmented, and it became operational in 1985 (Edjekumhene et al. 2001: 3). Until then, the Ministry responsible for the sector had been characterised by limited sector-specific capacity and ad hoc approaches (Botchway 2000: 186). The NEB was designed to have greater autonomy. By then, the ECG's problems had also become so clearly visible that World Bank estimated that it 'could not discharge its responsibilities satisfactorily due to ineffective management and lack of foreign exchange to purchase spare parts and equipment' (World Bank 1985: 9).

Although there was a designated renewable energy unit under the NEB, the main motive behind its establishment was energy security rather than emission reductions. In 1983, a planning study had been launched that pointed to the importance of adding more thermal power production to supplement erratic hydropower supplies (World Bank 1985; see also Resource Center 2005: 20). Also in 1983, under the same World Bank loan, and with Canadian funding, resources were provided for the establishment of the Ghana National Petroleum Corporation (GNPC). The purpose was to facilitate further exploration of the country's potential petroleum resources and strengthen governance of the petroleum sector. The GNPC was headed by Tsatsu Tsikata, a close ally of President Rawlings, and the entity was granted significant autonomy (Hickey et al. 2015; Ayanoore 2017). In 1984, a Petroleum (Exploration and Production) Law was enacted, and the GNPC began operations in 1985 (GNPC no date).

The energy-sector reform agenda was partly one of improving the governance of the power sector, and partly reflecting a domestic political priority to improve access to electricity that became increasingly pertinent during these years. Rawlings' administration was characterised by a particular form of populism as the regime increasingly sought to build a rural support base to replace the urban constituencies that had become increasingly dissatisfied with the economic reforms undertaken with the support of the IMF and the World Bank (Ninsin 1991; Gyimah-Boadi 1993). The Volta River Project had already improved electricity supplies to the main towns in the south of Ghana. Now, improving access to electricity was to become an important ingredient in the years to come, and it also came to shape the reforms that were promoted and implemented, including with Western support (Nugent 1999; Cuesta-Fernandez 2018: 74).

Previously, at the inauguration of the Kpong Dam in 1982, Rawlings had suggested that the policy of state-led industrialisation, which had driven the decisions leading to the construction of the Akosombo Dam, had not materialised. Therefore, he suggested that rural electrification should be pursued, possibly through mini-hydro schemes (Miescher and Tsikata

2009: 30). In the second half of the 1980s, a Northern Electricity Department (NED) was established under the VRA as part of efforts to extend the national grid to northern Ghana and eventually to Burkina Faso. This began in 1986 and 1987 with funding from the World Bank, AfDB, Kuwait and other donors (Boafo-Arthur 1999; AfDB 2005; Amissah-Arthur 2006: 279). By then, most stand-alone diesel plants serving the north had ceased to operate. The establishment of the NED further strengthened the VRA (World Bank 1989).

3.3 *The burgeoning access agenda and the rise and fall of new renewable energy in the 1980s and early 1990s*

Whereas the development of new renewable energy appeared as a priority in Ghana in the early 1980s, implementation had been characterised by experimentation, with little influence on overall energy-sector development. The NEB, which had been set up in 1983 and was to coordinate the development of new renewable energy, only became operational in 1986. By then much was already going on in the area of new renewable energy, with many research and demonstration activities being conducted at Ghanaian institutions with the assistance of aid agencies (World Bank 1985; for an overview, see Edjekumhene et al. 2001: 41ff). The World Bank was already supporting the government with various kinds of technical and material assistance that could assist the preparation of ‘programs for investment in renewable energy and help attract foreign financing’ (World Bank 1985: 2). The demonstration projects under the NEB Board were funded by small levies on petroleum products.

The emphasis on research and experimentation can be observed throughout this period. For instance, the Joint Research Centre of the European Economic Community funded the Energy Research and Development Laboratory at the University of Ghana to study the performance of photovoltaic (PV) systems. Kwame Nkrumah University of Science and Technology (KNUST) has also been a significant actor in the development of several technologies, and more NGOs have since emerged in the field (Adanu 1991; Edjekumhene et al. 2001). In the early 1980s, various religious missions had installed the first solar PV units for their compounds and hospitals. Later, more installation projects were implemented, often funded through bilateral or multilateral donor assistance – for instance, radio transmitters and receivers in development projects or for health facilities, just as they began to be increasingly used in post and telecommunications (Adanu 1991, 1994; Amankwah-Amoah and Sarpong 2016). Still, by 1991 there were still only 335 PV installations with a total capacity of 160 kWp (Adanu 1994: 68). Research indicated the importance of more comprehensive approaches that involved demonstration, financing and dealer networks that could not only sell but also service solar products (ibid).

Towards the end of the decade, promises were made to introduce a more systemic approach as part of the burgeoning access agenda. In 1989, the Ghanaian government, in line with a new World Bank loan, stated that it ‘wishes to consider the expansion of electricity supplies to all parts of the country within thirty years’ (World Bank 1989: 32). This statement on universal access was repeated in subsequent plans and came to play an important part in future developments of the sector (GEC et al. 2012). As part of the priority to improve access, the government drew up a National Electrification Master Plan for what in 1989/90 became the National Electrification scheme. It was co-financed by a National Electrification Fund based on levies paid by power consumers (Edjekumhene et al. 2001: 113). Several programmes and

projects with significant donor funding were implemented subsequently (Cuesta-Fernandez 2018: 65).

There were also signs of commitment to include new renewable energy. The 1989 master plan to implement the goal of universal electrification was asked to look at solar and other potential indigenous sources of energy when drawing up a least-cost expansion scheme (World Bank 1989). In 1990, renewable energy was mentioned as an action point in the outline of a national plan from National Energy Board (GEC 2006). From 1989, the Board initiated several projects and programmes, of which 29 were on renewable energy. Similarly, in 1990, an outline of a national plan on the 'Issues, Strategies and Programmes in the Energy Sector under the Economic Recovery Programme', included renewable energy development as one of its five focus areas (GEC 2006).

However, it has been observed that overall energy planning and investments in developing countries generally continued to focus on the existing state-owned monopolies (Foster and Rana 2020: 44). This does indeed also appear to be the case in Ghana, where the renewable elements in the master plan and Recovery Programme were soon overtaken by other developments. In 1991, the NEB was dissolved and its staff absorbed by the Ministry of Energy (Edjekumhene et al. 2001). A lack of capacity, with staff having little or no previous experience, as well as irritation over the autonomy of the Board, have been cited as reasons for this decision (Turkson 1990: 708; Botchway 2000). Thus, the fate of most of the 29 Board-initiated renewable energy projects is unclear (Edjekumhene et al. 2001). One of the few lasting non-conventional interventions from this period was a national Liquefied Petroleum Gas Programme, which came to play an albeit limited role in providing energy for cooking in urban areas (Kemausuor et al. 2011: 5145). The World Bank was also becoming tougher in stipulating its conditions for support, and new renewable energy was not one of its main priorities.

4. Aid for new renewable energy: sustainability, power-sector reform and emerging renewable energy programmes (1992-2006/7)

Sustainable development was high on the global agenda in the early 1990s. Most importantly, the United Nations Framework Convention on Climate Change (UNFCCC) was adopted in 1992, and a number of funding vehicles, as well as more bilateral support, materialised for new renewable energy. However, this was 'largely orphaned' in the World Bank's broader work on energy-sector reform, which became influential in Africa in the 1990s (IEG and World Bank 2006: 8). In 1993, the World Bank published a new policy paper that heralded a shift from support for state-owned monopolistic power utilities towards introducing competition and private-sector involvement in developing countries' power sectors (Foster and Rana 2020: 42). Subsequently, several African countries embarked on power-sector reforms, though their scale and pace varied significantly. Over the years, more programmatic approaches to promoting new renewable energy emerged with donor support. For example, at the end of the decade, the World Bank gradually made new renewable energy part of the broader energy-reform track. Uganda was the pioneer in 2001/2, beginning its 'Uganda Energy for Rural Transformation Project' with an emphasis on the commercialisation of renewable energy through market-driven approaches (IEG and World Bank 2006). This also led to the establishment of a Rural Electrification Agency, a type of institution that also soon emerged in other countries in sub-Saharan Africa.

In Ghana's energy sector, the 1990s were a period of gradual reform, even though new renewable energy was not a significant part of those reforms. However, improving access to electricity from the grid remained a priority throughout the period although it could be regarded as part of a strategy for the then ruling party to win the rural vote after multiparty elections had been reintroduced in 1992. While donor-supported research and demonstration activities continued, they were not a major element in the reform policy. In 2001, the country went through its first major change of political regime in two decades. During this period, it was evident that ideas and policy objectives about market-based approaches were becoming more pronounced – for instance, investments in new forms of renewable energy, particularly in rural areas. However, progress in implementation and deployment of new renewable energy remained limited, pointing to the repeated decoupling of power-sector reform from new renewable energy in the country.

4.1 The power crisis and Ghana's funding needs in the 1990s

President Rawlings came to epitomise Ghana's peculiar way of improving access to electrification during his administration. As noted by Cuesta-Fernandez (2018: 74), his once-revolutionary motto of 'power to the people' took on a new, literal meaning. In 1990, when evaluating the connection of new regions to energy supplies, he explained how this 'vitalizing spark of electricity serves to reduce isolation and strengthen national integration' (Rawlings in MacLean et al. 2016: 572). In 1990, the National Electrification Scheme and the Self-Help Electrification Programme were launched. They were both implemented with significant donor support and focused on the grid. Self-Help Electrification, which remains an important programme in Ghana to this day, allows communities to connect to the grid if they contribute themselves (Cuesta-Fernandez 2018; Johnson et al. 2020: 105). In 1992, a lifeline tariff for disadvantaged consumers was introduced as part of broader tariff adjustments. This was supported by the World Bank, and it also favoured energy services from the national grid (Kemausuor and Ackom 2017; Edjekumhene et al. 2001: 23; Edjekumhene and Dubash 2002: 64).² The introduction of the tariff coincided with the reintroduction of multiparty elections and has been seen as a way to capture the rural vote (Sackeyfio 2018: 6-7).

However, the Ghanaian government was in urgent need of funding for more reliable thermal power supplies in the light of the rising domestic power demand and yet another power crisis due to drought in 1993. It, therefore, embarked on more far-reaching reform (Edjekumhene et al. 2001; Edjekumhene and Dubash 2002). The energy crisis was so severe that Ghana, which had been a net exporter of power since the construction of interconnectors to neighbouring Benin and Togo in the early 1970s, became a net importer in 1994. (Opam and Turkson 2000).

Donors also became more interested in reform around this time, most notably the World Bank. In 1992, it concluded a review of Ghana's energy sector, after which it agreed to fund the country's National Electrification Project on condition that reforms were undertaken in the areas of utility management, tariffs and regulation (Kapika and Eberhard 2013: 208). In 1994, a management contract for the ever-struggling ECG was entered into with an entity that

² The lifeline tariff had already been proposed by a tariff study in 1986 (see Keener, S. and S. G. Banerjee 2005: 3; Opam, M. A. and J. Turkson 2000: 60).

included Électricité de France. It should be noted that this had already been tried in the 1980s. The government, supported by the World Bank and Ireland, had entered first into a performance contract with the ECG, after which a technical assistance team from Ireland's Electricity Supply Board had given in-country support between 1987 to 1989 (Edjekumhene and Dubash 2002; Kapika and Eberhard 2013: 208). The Irish arrangement was, in effect, a management contract that had led to improvements in engineering, but not to significant results in the company's financial management. Again, in 1994 a new contract was negotiated but it had limited success (Kapika and Eberhard 2013; Owusu-Manu et al. 2018).

Some key Ghanaian decision-makers, however, were also committed to reform. In 1994 the Minister of Mines and Energy and the Minister of Finance communicated a strategic framework document to the World Bank, committing Ghana to a fundamental reform that exposed public utilities to competition in power generation and distribution. This would allow for private-sector participation while adopting an arm's-length approach to the regulation of power-sector entities (Kapika and Eberhard 2013; Edjekumhene and Dubash 2002: 125). This strategy was more far-reaching than had been proposed by the World Bank. The government's commitment to the reform drive was evidenced by the appointment of a Chilean consultancy firm (Chile was the poster child of reform at the time) as an adviser (Kapika and Eberhard 2013; Edjekumhene and Dubash 2002). That same year, a power-sector reform committee was established.

This paved the way for a loan from the World Bank and other Western and Arab donors to construct the Takoradi thermal plants. However, the involvement of independent power producers did not mean that the public utilities left the scene. The Takoradi project was initially made up of three 110MW plants owned by the VRA and co-financed by the US government. This was followed by an additional two 110MW plants in a joint venture between the US-based company CMS (90%) and the VRA (10%) – the latter seemingly involved IFC co-financing (World Bank 1995; Edjekumhene et al. 2001; Eberhard et al. 2016). This was Ghana's first independent power producer apart from the two costly short-term emergency thermal power plants constructed during the drought in 1997-98 (Kapika and Eberhard 2013: 206). At around the same time, the Osagyefo Power Barge was commissioned with financial assistance from Japan. It was intended to generate electricity from domestic offshore gas production (Opam and Turkson 2000: 54; Botchway 2000: 184; Wikipedia 2020; see also Petroleum Commission no date). The barge was ordered in 1995 by an Independent Power Producer (IPP), the Western Power Company, a joint venture between the GNPC and three American companies. The barge was to be fuelled by domestic natural gas, which had not been developed at that time. It was transferred to the VRA in 2003, and then leased to Balkan Energy Ghana in 2007. A lawsuit for non-delivery was subsequently filed, and it never became operational.

More was to come. In return for allowing private-sector participation, Ghana embarked on a wider process of power-sector reform. In 1997, the power-sector reform committee recommended the recapitalisation, reorganisation, as well as unbundling of the VRA into a transmission company and a distribution company, and it recommended transparent tariff-setting procedures (Edjekumhene and Dubash 2002; Gore et al. 2018: 7).³ A number of motives

³ A tariff formula, a perceived prerequisite for attracting private investors, had also been one of the conditions for the Takoradi loan. Tariff adjustments took place subsequently from 1998 to 2003, when cost-recovery levels were

were mentioned for the proposed unbundling, which was more far-reaching than the World Bank's recommendation of reforming the ECG rather than the VRA (Edjekumhene and Dubash 2002: 123). Most important was the wish to break the VRA's privileged position, which was perceived to benefit industrial customers more than ordinary Ghanaians (Edjekumhene and Dubash 2002: 126ff). Previously, the VRA's position and capacity had allowed it to take its own stand in debates about the development of the energy sector (Miescher and Tsikata 2009: 28).

The reform was far-reaching, but implementation was not always straightforward. The reform had also included the establishment of two regulators in 1997: the Public Utilities Regulatory Commission (PURC), mandated to regulate tariffs, and the Energy Commission (EC), mandated to advise, regulate and develop the use of energy and promote competition (Bayliss and Amenga-Etego 2007: 133; Fritsch and Poudineh 2015: 5). It was believed that the regulators could help shield the government from financial risks from both the public and private sectors. However, early assessments suggested that they faced challenges, for instance, in attracting skilled staff; another challenge was their limited financial autonomy, which undermined their strength vis-à-vis more powerful entities (Aryeetey and Ahene 2005; Wolf et al. 2007).

The VRA was against the proposed unbundling, arguing that it would weaken the company through competition under the proposed West Africa Power Pool (Williams and Ghanadan 2006: 828). It was also reported that the largest consumer, VALCO, was against the move, as was the potential American firm involved in the Takoradi thermal plant project, which wanted a stable partner (Williams and Ghanadan 2006: 828; Gore et al. 2018). However, the VRA and ECG were corporatised with their own boards of directors. The NED had already been registered as a VRA subsidiary, NEDCO, in 1997, but it was only operationalised as such in 2012 (VRA no date). Similarly, a national grid company for transmission was only incorporated in 2006 and has operated since 2008 (GRIDCo 2018). As noted by Opam and Turkson (2000: 78), the political will to implement policies, especially when it came to privatisation-like interventions, was at times elusive.

4.2 The access agenda and the elusiveness of new renewable energy

Whereas improving access was a mainstay in the development of Ghana's energy sector, new renewable energy remained marginal throughout the period. Donors funded both access and research and demonstration projects for new renewable energy, but the two rarely converged in practice. Policy-wise, the agenda for new forms of renewable energy did gain more traction towards the end of the period, but their promotion generally tended to lose steam during implementation. It is argued that the emphasis on expanding access to electricity in Ghana and the form it took may have undermined the potential of new renewable energy. Making electrification a national priority meant that people wanted the whole package of electricity provided through the grid, not partial off-grid solutions (Amisshah-Arthur 2006: 282).

For a long time, Ghanaian decision-makers did not appear to prioritise new renewable energy. The Power Sector Reform Committee of the mid-1990s failed to discuss more

believed to have been reached, and an automatic adjustment mechanism was to take over (Keener and Banerjee 2005; Bayliss and Amenga-Etego 2007: 146).

sustainable sources even though there was a search for reliable alternatives to hydropower, Additionally, incentives were not provided at the time, though some attention was paid to energy efficiency (Edjekumhene and Dubash 2002: 131). New renewable energy received more attention in an Energy Sector Development Programme (ESDP) in 1996-2000. The ESDP's core purposes was to plan for the energy security of supplies. It also had a Renewable Energy Development Program (REDP) as one of its five programmes (Edjekumhene et al. 2006). Its ambition, however, was to research, develop and demonstrate renewable energy technologies rather than larger-scale deployments. The REDP was separate from the Power Sector Development Programme, which was also part of the ESDP. Indeed, it was criticised for not being integrated into energy-sector planning and for lacking targets and an investment plan (Edjekumhene et al. 2001: 27, 33-34).

The World Bank, which was the dominant donor at the time, did little to change this. This reflected a general trend in the Bank's energy-sector assistance into the early 2000s, where support for new renewable energy was not a major priority (IEG 2006: 8). In the Bank's appraisal of the Takoradi thermal plants, alternative options that included new renewable energy were briefly discussed. Nonetheless, it was concluded that 'None of these options are suitable to provide for the large increment of supply needed to meet the existing load and medium-term load growth' (World Bank 1995). A Poverty Reduction Strategy of 2003 signalled some change, in that it highlighted the need not only to improve the viability of state utilities, but also the importance of improving access to electricity; for instance, through the promotion of renewable energy in rural areas (IMF 2003: 88). In its support for the Strategy's implementation, however, the Bank seems to have emphasised the former more than the latter. As part of its push to implement energy-sector reform, it covered adjustments to electricity tariffs as well as lifeline tariffs and, to prepare for this, included a study on 'Energy Sector Strategy and the Poor' (World Bank 2003, 2007).

However, three initiatives on the fringe of the overall reform track are worth mentioning. The first is the establishment of an Energy Fund in 1996-7 under the Energy Commission Act. It was funded by a levy on products and established in partnership with the private sector to promote the sustainable development of energy. The second was the reduction of import duties on solar panels from 27% to 5% in 1998-9 in the wake of an energy crisis (Amankwah-Amoah and Sarpong 2016; Ashong 2016). Finally, provision was made for an Embedded Generation Facility (EGF) to supply power-generation facilities with capacities of less than 50 megawatts. According to a 1999 policy document, this was intended to help promote renewables (Edjekumhene et al. 2001; Edjekumhene and Dubash 2002). Whereas this could indicate that renewables were designated to be used for decentralised solutions at the time, some smaller donors used it as an opportunity to promote renewable energy more generally, partly reflecting a shift in mood among key Ghanaian decision-makers.

In 2001, political power in Ghana shifted to a newly elected New Patriotic Party (NPP) administration, with signs that it could be more interested in promoting new renewable energy. Traditionally, the NPP is portrayed as being more pro-market and less inclined toward statist solutions than the NDC (Mohan et al. 2018). A new energy-policy document was published under the new government, which outlined several policy objectives, as well as the adoption and scaling-up of Renewable Energy Technologies (RETs). These were all to be developed into a longer-term strategic plan (Edjekumhene et al. 2006: 17). Potentially, this implied

supplementing the predominant focus on grid-extension with a concentration on using renewables for decentralised solutions in some localities (Edjekumhene et al. 2006: 17). A ‘master plan’ for the development of solar PV for off-grid electrification in the north of the country was reported in 2003, but implementation appears only to have begun seriously in 2007 with funding for a Joint Coordinating Committee for human resource development, as well as training and testing centres from Japan (Amankwah-Amoah and Sarpong 2016: 97).

The link between these developments and the drawing up of the Strategic National Energy Plan (SNEP), which was published in 2006, is not clear. However, Danida (the Danish International Development Agency) funded a Renewable Energy Development Project to identify and remove further barriers, and also came to fund the development of the Plan. Danida had already been approached by the then government in 1998 and supported the preparation of SNEP between 2000 and 2003 (Edjekumhene and Dubash 2002; Energy Commission 2006). The SNEP mentioned the target of 10% renewable energy in the electricity mix for the first time. Again, however, implementation appears to have been lacking and reliant on donor funding. A few private projects emerged over the period, but solar projects for rural electrification did not reach any significant scale. The UNDP, Global Environment Facility (GEF), the Spanish government and Danida are all reported to have supported the project primarily in northern Ghana (GEF and World Bank 2006: 15; Obeng and Evers 2009: 13; Amankwah-Amoah and Sarpong 2016: 95). Achievements were on a limited scale. For example, in 2003 close to 5000 solar systems in the country were installed, primarily solar homes, with a total capacity of around 1000 kW (Obeng and Evers 2009: 6).

5. Aid for new renewable energy: iteration, transformation and the creation of markets (2006/7-present)

From the mid-2000s, the evidence suggests that new renewable energy gradually gained acceptance in energy-sector development in sub-Saharan Africa. Donor approaches became more systematic, and larger-scale projects and programmes began emerging. Market-led approaches had long been underway, particularly after the 2002 World Summit on Sustainable Development in Johannesburg, with increasing emphasis on market facilitation and public-private partnerships (see, for instance, Stewart et al. 2017; Parthan et al. 2010). In 2005, the Clean Development Mechanism (CDM) under the Kyoto Protocol came into force. It introduced the practice of trading in carbon emissions, potentially mobilising new sources of capital for Africa’s energy sectors. The World Bank also gradually increased its support for new forms of renewable energy, integrating it into its strategic and results frameworks (World Bank 2009, 2013; IEG and World Bank 2020). This implied a promotion of the private sector through various types of PPPs, with the aim of moving new RETs at scale. The shift was enabled by a concurrent convergence in interests among key donors and governments in improving access to electricity (Pedersen et al. 2020). In 2007, feed-in-tariffs were introduced in countries like Uganda and South Africa, while wind and geothermal projects emerged on a larger scale, supported by donors, in Ethiopia and Kenya.

In Ghana, the SNEP of 2006, which had a target of 10% of new renewable energy, was a sign that the country was on a similar trajectory. However, implementation of the new renewable energy elements of the Plan stalled. Concerns over costs, which in turn were linked to the prioritisation given to access to modern energy, can be observed. By comparison, the

discovery of oil and gas from 2007 resulted in fast-track reform of the development of these resources. Resource nationalist ideas about promoting state-owned enterprises in oil and gas became stronger after the change in government following the 2008 elections (Hickey et al. 2020). It has also been suggested that oil and gas, and power contracts, became avenues of patronage in Ghana's competitive clientelist political system (Gyimah-Boadi and Prempeh 2012; Asante et al. 2021; see also Africa Confidential 2014, 2019, 2020; Modern Ghana 2019). The existing literature on the period does not clarify whether and how such political economy dynamics affected new renewable energy. However, it can be observed that a major power crisis in the run-up to the elections of 2016 led to the signing of many contracts with emergency and independent power producers, including new renewable energy projects, even though it has mainly been fossil-fuel projects that have materialised so far.

5.1 *Ghana's Strategic National Energy Plan: a gamechanger for new renewable energy?*

Coming on the back of rising demand and recurrent power crises linked to droughts, which occurred in 2002 and 2006, the SNEP's overall strategic target for the electricity sub-sector was to 'secure and increase future energy security by diversifying sources of supply, including increasing access to renewable energy technologies so as to achieve 10% penetration in terms of installed capacity by 2020' (GEC 2006). In other words, new renewable energy was scheduled to play an important role in the development of Ghana's energy sector. However, it is one thing to draw up policies and quite another to implement them. As outlined previously in section 4, Western donors were influential in promoting new forms of renewable energy both policy-wise and through demonstration and pilot projects. The interests of key domestic decision-makers were decisive in large-scale implementation, which was very limited in the case of new renewable energy.

New renewable energy had a prominent place in the SNEP, whose main elements are: (i) the completion of the West African Gas Pipeline; (ii) clarifying the role of the Osagyefo Power Barge; (iii) speeding up the development of the Bui hydropower project; (iv) supporting the development of alternative (including renewable) energy sources; and (v) exploring the option of decentralised systems for rural power supplies (GEC 2006: 86). However, pre-feasibility studies of nuclear power and coal were also encouraged (p. 87). A noticeable element in the plan was its focus on mobilising public and private funding for its implementation. Under the section on access to electricity, it is envisaged that new renewable energy was to play a major role in achieving 30% rural electrification and that efforts should be made to secure funding from the GEF and the Clean Development Mechanism (CDM) for this purpose (GEC 2006: 87-88). The Plan, in some respects, reinforces the impression that renewables were an option primarily for decentralised electrification. However, it did also state that the ECG should issue licenses for large-scale renewable plants in the country (GEC: 87).

The Plan, with its focus on mobilising funding, can be seen as a continuation and deepening of the reform track that had been set in motion in the 1990s. Thus, it emphasises the importance of separating the ownership of transmission from the VRA and establishing an independent system operator to ensure fair competition (GEC 2006: 48). The *Ghana* Grid Company (GRIDCo), which was mandated to run transmission from wholesale suppliers to bulk customers and distribution utilities, was incorporated in 2006 and has operated the National Interconnected Transmission System since 2008 (GRIDCo 2018). In 2009, Enclave

Power, an existing Ghanaian-owned company, became the first licensed private power distributor, servicing the Tema Free Zone Enclave (Atsu et al. 2016; see also <https://epcghana.com/about-epc/>). The NED, which had already been registered as a VRA subsidiary, NEDCO, in 1997, was operationalised as such in 2012 (VRA no date). The focus on mobilising private capital reflects, to some extent, the fact that the now ruling NPP party was more pro-market than its rival, the NDC.⁴

It is worth assessing what aspects of the Plan were implemented, as a great deal of pragmatism can be observed in this regard. The availability of funding and the prevailing ideas among key decision-makers played important roles. The projected Bui hydropower plant was thus expected to involve development assistance, which was deemed more economically advantageous than private capital (GEC 2006: 87). The Ghanaian government had already secured funding for the Bui hydropower project in November 2006. The project had a long history, but had remained chimerical until Sinohydro, a Chinese construction company, submitted an unsolicited bid for the dam in 2005. This prompted the Ghanaian government to request funding from China (see also Miescher and Tsikata 2009; Darko et al. 2019), which was granted at the 2006 China–Africa Cooperation Summit in Beijing. The project is partly financed by Ghana’s government (USD 60 million), a commercial loan from the Exim Bank (USD 292 million) and a Chinese concessional loan (USD 270 million) (Darko et al. 2019; see also Mihalyi et al. 2020). In addition, it includes a trade agreement in which Ghana’s revenues from cocoa will be used to pay back the loans. The project was to be run by the Bui Power Authority (BPA), whose establishment was secured with the passing of a bill by parliament in 2007. This ended the VRA’s monopoly on large-scale hydropower in Ghana, a priority of the now-ruling NPP government, which had less cordial ties to the utility than the NDC (Miescher and Tsikata 2009: 44-47).

The importance of funding may also help to explain the limited progress made in terms of new renewable energy during those years. The mobilisation of capital through the Clean Development Mechanism and domestic incentives remained disappointing across the sub-continent, as well as in Ghana. This was partly due to the general difficulties in attracting private-sector investments on the continent, namely the business climate, institutional barriers, and low public- and private-sector capacity (Kreibich et al. 2017; Ashong 2016). In 2007, the Ghana Energy Development and Access Project (GEDAP), a project supported by the World Bank, the GEF and other donors, was approved. Its overall purpose was to improve the operational efficiency of distribution by building up the capacity of government entities and to improve access (see GEC et al. 2012: 31). It included more elements on access and renewable energy: for example, proposals to develop a competitive framework for IPPs and facilitate renewable projects; establish an independent Rural Electrification Agency (REA); introduce electrification through grid extension; develop pilot mini-grids using small-scale renewable energy and distribute solar PV products using local credit agencies (GEF and World Bank 2006, World Bank 2007).

⁴ In 2005, a program document from GEF mentions that the government had ‘requested expression of interests from the private sector who have the technical and financial capabilities and experience to develop, construct and operate grid-connected renewable energy projects, including small hydro, biomass, and wind’ for projects on a larger scale (GEF and World Bank 2006).

In 2008, a new NDC government came to power and gave up on the idea of establishing a separate REA. Instead, it established a unit within the Ministry of Energy to take charge of promoting renewable energy at different scales (World Bank 2010, 2015). However, when the Renewable Energy Act was passed in 2011 – a significant outcome of the GEDAP – the Energy Commission was commissioned to ‘promote renewable energy in the country’. This involved its teaming up with other government and private-sector stakeholders and ‘assessing carbon finance facilities for grid-connected renewable energy projects’ (GEC 2012: v; World Bank 2015). However, it was mainly grid extension and the distribution of solar products that ended up being implemented. From 2009 to 2012, a project funded by a European government allowed the distribution of solar panels, controlled by the Ministry, in areas with poor access to electricity (Brass et al. 2019). The other decentralised components, however, were delayed with respect to the REA and mini-grids.

Similarly, only partial progress could be observed regarding the implementation of the Renewable Energy Act, which established two major instruments to promote renewable energy (Bawakyillenuo 2016). One is a feed-in-tariff (FiT) scheme for IPPs, which was introduced and gazetted in 2013/14. The other is a renewable energy purchase obligation (REPO) for renewable energy for grid companies (Meyer-Renschhausen 2013; Ashong 2016). Whereas the FiT scheme has been evaluated quite positively over several parameters, responsibility for its implementation was not very clear (Meyer-Renschhausen 2013; Ashong 2016). This mattered, as such approaches have been found to require constant adaption to changing markets and different locational circumstances (Pueyo et al. 2016). Furthermore, although there were already FiT tariffs for solar in April 2016, the REPO, which was to open the grid for private producers, had still not been clarified, supposedly due to delays in PURC (GEC 2016: 21 and 52; see also Aboagye et al. 2021). In the new Renewable Energy Master Plan from 2019, the REPO is still mentioned in the future tense as something that will be implemented later (GEC 2019: vii).

5.2 *The transformative power of oil and gas*

Whereas achieving the new renewable energy target of 10% in the 2006 SNEP was slow, the development of its oil and gas components was not. The contrast between the two in terms of implementation is striking. The development and production of oil and gas after the first discovery in 2007 was fast-tracked, and in the following years 29 further discoveries were made (Mihalyi and Scurfield 2020: 3). Similarly, the entire institutional and regulatory framework was overhauled. The difference that the discovery of oil and gas made is also clear in the overall energy-planning framework. Whereas the 2006 Strategic National Energy Plan had energy security as the main concern, the 2010 Policy and Energy Sector Strategy and Development Plan targeted Ghana’s potential to transform its economy through industrialisation using domestic resources such as oil and gas (GOG 2010, 2010). Examples of clientelist politics could be identified from when both political parties (NPP and NDC) were in government but it is noteworthy that the reform process resulted in outcomes that have been evaluated positively in terms of the performance of the key institutions governing the upstream oil and gas sector (Asante et al. 2021).

The 2006 Strategic National Energy Plan outlined three options for expanding electricity, all of which involved a significant role for natural gas (GEC 2006: 44). Although

gas did not then play any significant role in Ghana's power sector, this was to change because of two projects: firstly, the completion of a West African Gas Pipeline (WAGP) and, secondly, the potential developing of the Tano gas fields. The Tano gas fields had been previously explored by international oil companies and the GNPC without any commercially viable finds being made (Petroleum Commission, no date). The main motives for promoting gas in the Plan were to provide baseload power, reduce reliance on imports of more expensive oil products (gas providing the 'least expensive grid power') and to develop alternative indigenous sources of energy, assuming the Tano project materialised (GEC 2006: 46).

The discovery of oil and gas in 2007 marked a seismic shift in energy-sector planning and national planning. Until then, the country had spent between 20 and 30 per cent of its export earnings on imports of crude oil and petroleum products (Edjekumhene et al. 2006; Turkson 1990). The perceived importance of the oil and gas discoveries can also be seen in presidential speeches. In 2003 President Kufour, in his state of the nation speech, said that prayers should be said for offshore oil to reduce the country's dependence on imports of expensive crude oil (Kufuor 2003). Talking about the discoveries in 2007, by comparison, he 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). Similarly, in his 2010 speech, given around the time oil production began, President Mills emphasised that the 'exploitation of crude oil and gas is positioning Ghana for a major industrial take-off' (Mills, quoted in Childs and Hearn 2017: 849). By then, expectations were sky-high, and there was a scramble to secure a slice of the cake. Whereas the 2006 Plan had targeted a doubling of existing power-generating capacity from 1760 MW by 2020, the 2010 Energy Policy and Energy Sector Strategy and Development Plan increased this from 2,000 MW to 5,000 MW by 2015 (GOG 2010: 5).

The production of oil and later gas from 2010 onwards triggered several other projects, with implications for the power sector. IPPs producing energy from fossil fuels already existed, but their role increased with the deliveries from first the West African Gas Pipeline from Nigeria in 2009 (whose supplies, however, proved unreliable), and later from domestic sources (Fritsch and Poudineh 2015). Eberhard et al. (2016: 289) report that a 200 MW (later expanded) Chinese-owned Sunon Asogli power plant at Tema reached financial closure in 2007 and began operating in 2011. It was followed by an American-owned 126 MW CENIT Energy plant (2009/12) and a 350 MW Kpone plant (2014/17) owned by a consortium that included African and Ghanaian partners all running oil, gas or dual-fuel technologies. Thermal plants were constructed for, or gradually retrofitted to, gas (Fritsch and Poudineh 2015).

In 2015, the Atuabo gas-processing plant began production. The aim was to replace imported oil for the VRA Takoradi power plant, as well as producing liquified petroleum gas (LPG) for the domestic market. The Energy Commission reports that, the same year, gas from Atuabo made up more than half of the gas for power production, with further increases in subsequent years, including new supplies from the Sankofa Field. This implied that gas almost had replaced oil for power production by 2020 (GEC 2016, 2020). The Atuabo project had been long underway as part of a Western Corridor Gas Infrastructure Development Project (Economist 2014, NS Energy 2015). It was an approximately USD 1 billion project, with 85% Chinese finance from the CDB and the remainder from the government of Ghana. It was also part of a larger loan package using oil from the Jubilee field as collateral (Economist 2014, Whitfield 2018: 287; see also Mihalyi et al. 2020). The China model was chosen because it

was perceived to be cheaper and quicker than the other options such as the World Bank. Initially the project was to be implemented by Ghana Gas, a newly established national gas company incorporated as a state-owned limited liability company by the NDC government in 2011 (Whitfield 2018: 285f).

The oil and gas discoveries also changed the roles of donors and finance in Ghana's energy sector. While traditional donors became less important in production, private investments were on the increase. Development of the Jubilee Oil Field, with investments to the tune of USD 3.2 billion, was carried out by two smaller explorers, Kosmos and Tullow. These received a debt facility from the International Finance Corporation (IFC, the World Bank's private-sector arm) of up to USD 100 million and USD 115 million respectively in 2009 and an additional USD 100 million in 2012 (IFC 2009, 2012). The IFC also became involved in making major loans for various purposes; for instance, (i) the conversion and expansion of TICO 2, the Takoradi IPP with 10% VRA ownership (to facilitate a change from only running on light crude oil to also running on gas); (ii) the introduction of private-sector participation in the country's largest power distribution utility, the ECG; (iii) a Tema electrical substation and transmission lines for GRIDCo; (iv) a Tema petroleum storage facility to a subsidiary of the Quantum Group, a leading Ghanaian petroleum products trader; (v) the development of an oil field by Vitol, one of the joint venture partners, which included the GNPC, in USD 7.3 billion Sankofa Projects; and (vi) the development of non-associated gas with USD 300 million of IFC debt financing.⁵ The Sankofa Project also received guarantees from the World Bank for the development of the non-associated gas (World Bank 2020: 8).

The USA Power Africa initiative has also been involved in facilitating the Sankofa project. This initiative aims to facilitate market-driven solutions and has an enabling framework for private-sector participation as a condition (USAID 2017). It has also helmed several other activities aimed at improving gas infrastructures, with a view to making the gas sector more efficient, and has facilitated IPPs in the electricity sector (Power Africa 2016, 2020). An important rationale behind the Power Africa initiative was to counter the influence of China, which had become a significant actor in Africa's energy sectors, particularly in hydro and coal (Hannam 2016). Both thermal and renewable IPPs are supposedly part of the Power Africa support to Ghana, aimed at adding over 2000 MW to the grid (Power Africa 2016; Kumi 2017; for Kpone, see OBG 2018: 106 and Power Africa 2020). Though IPPs' share of power production has increased significantly over the last decade, not all of these projects have materialised yet (see Kapika and Eberhard 2013: 196; GEC 2020).

5.3 *Power crisis, emergency thermal IPPs and the failure of new renewable energy in Ghana*

Policy signals did indeed become more mixed after the discovery of oil and gas. On the one hand, the target of 10% in new forms of renewable energy was upheld, and Ghana signed the Paris Agreement on climate change. On the other hand, under the Paris Agreement, the NDC reported that the date of achievement of the target of 10% renewable energy had been postponed from 2020 (in the 2006 Plan and 2010 Policy and Plan) to 2030 (GOG 2015). The de facto prioritisation of thermal energy, despite policy targets to promote new forms of

⁵ See IFC project database at <https://disclosures.ifc.org/#/projectDetail/SPI/27550> for more information.

renewable energy, continued and was further reinforced by a severe power crisis. The process accentuated the effects of Ghana's competitive clientelist political settlement dynamics on power-sector development. Competitive elections, clientelism and patronage, and access and affordability all played a role. The procurement of multiple IPP energy projects which exceeded the demand for energy contributed to the economic crisis at that time. This altered coalition dynamics by opening the door to renewed World Bank influence over power-sector development in the country.

In the run-up to the 2016 elections, the country experienced a power crisis caused by low water levels for hydropower and erratic gas supplies from the West African Gas Pipeline. This led the Ministry of Energy, under the then government, to contract three emergency power producers with companies from Turkey and the United Arab Emirates (UAE). The ECG signed 43 power purchase agreements, a process that led to oversupply, with payments to the tune of USD 500 million per year for unused power and similar amounts for unused gas (Africa Confidential 2019; Conversation 2019; Ackah et al. 2021). However, whereas several renewable energy projects have been reported to be underway, some with donor support, not much of the new renewable energy capacity has yet materialised (OBG 2018; Ackah et al. 2021). Like previous IPP contracts, these agreements, which were entered into between 2014 and 2016, were awarded through non-competitive processes, and it has been reported that the Ministry of Energy was actively involved in pushing projects with little due diligence (Dye 2020).

A few factors have been pointed out that may help explain the debacle. First, a lack of coordination among the power-sector entities involved has been observed by Eberhard et al. (2016: 39), who suggest that the VRA, ECG and Ministry of Energy have all negotiated PPAs with IPPs following different procedures and 'with little regard for national procurement procedures'. There is an additional lack of coordination brought about by an institutional arrangement that has two regulators, a number of state-owned companies and possibly a Ministry of Energy playing a major role in electrification (Kapika and Eberhard 2013: 214ff; Sackeyfio 2018: 65; Cuesta-Fernandez 2018: 63). Furthermore, there seems to have been a lack of coordination between the power and gas sectors, resulting in incoherent planning processes and unreliable gas supplies for power production. According to the World Bank, this was partly due to the separation of the two sectors into the Ministry of Petroleum and the Ministry of Power which were later merged into the Ministry of Energy in 2017 (World Bank 2018). Finally, irregularities related to procurement and contracts have led to mutual accusations of irregularities and mismanagement between the political parties and civil-society organisations (Africa Confidential 2014, 2019, 2020; Modern Ghana 2019).

The three emergency power projects all ran on oil/gas. However, due to over-capacity, other scheduled projects, including several new renewable energy ones, have been put on hold (Ackah et al. 2021). This development adds to a pattern in which, for various reasons, new forms of renewable energy meet resistance in Ghana's power sector. Scepticism of new renewables within the bureaucracy is also demonstrated through expressed concerns over costs, which in turn are linked to the prioritisation given to access to energy in the country. The emphasis on cost-effectiveness can be observed in the 2010 Policy and Energy Sector Strategy and Development Plan, which stressed the importance of addressing the lack of cost-effectiveness of new renewable energy with decentralised technologies 'where they are

competitive’. (GOG 2010: 21). The issue of cost-effectiveness is also one reason for the prioritisation of modern energy for cooking through the promotion of LPG and improved cookstoves. These were prioritised over other clean energy sources in the 2012 Sustainable Energy for All Action Plan, which was developed based on domestic priorities with support from the UN (GEC et al. 2012: x).

The focus on cost-effectiveness continued through 2020. Speaking at a conference⁶, Joseph Essandoh-Yeddu, head of planning at the Ghana Energy Commission, explained:

If you want to have that universal penetration, how do you do? 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. How do you mitigate the CO₂, the greenhouse gas emissions? And take advantage of the affordability of it? (conference 15 December 2021).

Boamah (2020: 4) observed a similar emphasis on affordability and access among Ghanaian decision-makers and energy-sector bureaucrats. In the late 2000s and into the 2010s there seemed to be a tendency to suspend or delay the automatic, but unpopular, tariff adjustments required to adequately reflect the costs; in 2012 the rationale for this was linked to the upcoming elections (Foster and Pushak 2011; Dye 2020). Consequently, there appears to be a reluctance, over the period, to grant more favourable conditions to renewable IPPs than thermal ones. For instance, Sakah et al. (2017: 552) report that the Ministry of Energy had been reluctant to provide government guarantees for new renewable energy projects and had directed investors to the World Bank and AfDB for partial risk guarantees. Finally, it has been reported that Ghanaian planners were annoyed by the stricter conditions imposed on finance from Western donors and the AfDB – with an emphasis on the deployment of renewable energy – and therefore turned to look for funding for energy projects elsewhere (Gadzanku 2019: 59).

The issues of cost and funding may also help explain the few projects that have been implemented despite resistance to them. Of the 42.5 MW of solar energy on a larger scale (0.8% share of grid supplies) that is reported in the Energy Commission’s 2020 Energy Outlook and Demand report, BXC and Meinerger each have a plant rated at 20MW. The BXC project has a PPA with ECG that is supposedly purely funded by its Chinese mother company, with no government funding (PVtech 2016). However, BXC is also reported to have entered a partnership with the Chinese Shaanxi Regional Electric Power Group (SPG), which in turn has helped mobilise USD 200 million for ECG to improve infrastructure (Anning and Vhumbunu 2018: 1083). Similarly, Meinerger often features as a Ghanaian company in the news but has links to China (Afrik21 2018, PV-magazine.com 2018, GEC 2020; Oilnewsafrika 2022). The outstanding 2.5MW plant belongs to the VRA, which is reported to have had larger plans for new renewable energy that have not materialised (Daily Graphic 2013).

⁶ The virtual conference ‘Critical perspectives on energy transitions in Africa’ was organized by the Interdisciplinary Fellow Group 4 at the Maria Sibylla Merian Institute for Advanced Studies in Africa (MIASA) 14-15 December 2020: <https://www.ug.edu.gh/miasa-africa/content/ifg-4-virtual-final-conference-critical-perspectives-energy-transitions-africa>

Some commitment can be observed in the off-grid and mini-grid sectors which, however, also tends to be linked to the availability of development finance. As mentioned above, since 2007, but extended several times, multilateral development banks have contributed to the Ghana Development and Access Project (GEDAP), just as bilateral and other multilateral aid has contributed to the more than one hundred microgrids that reportedly have been constructed in the past decade (Johnson et al. 2020: 82; see also Nuru et al. 2021). Between 2009 and 2012, Ghana's Ministry of Energy and Petroleum (MOEP) collaborated with a donor-funded European company to install 1,242 solar panels in public institutions in remote and unelectrified areas (Brass et al. 2019). In 2016, an election year, a government-sponsored National Solar Rooftop Programme was introduced. The purpose was to subsidise solar panels and distribute them freely in the wake of the power crisis to diversify supplies from a power system under pressure (Boamah and Rothfuß 2018; Boamah 2020; Rothfuß and Boamah 2020). Also in 2016, a policy notification on mini-grids was issued, which suggested adopting a public-sector model of ownership under existing public utilities (Bukari et al. 2021). However, one larger private Ghanaian company, Black-Star Energy, owns and operates 17 microgrids (Johnson et al. 2020: 82). Most other grids have hitherto been involved with funding from donors, particularly the AfDB and US agencies (Johnson et al. 2020: 84; see also AfDB 2019).

Currently, there are signs that attitudes towards new renewable energy in Ghana may be shifting, particularly when it comes to devising decentralised solutions for remote areas – although it is not immediately clear whether this is due to the shift in government after the 2016 elections, more influence from Western donors or other factors. Whereas it had previously been observed that there might have been a better understanding within the Ministry that mini-grids could be better and more cost-efficient for some areas than grid extension, in 2018 it was being reported that the government had signalled a greater commitment towards off-grid renewable electrification in remote areas through private companies, and involving more donors (ESMAP and World Bank 2017; ESI-Africa 2018).

This could be related to donor involvement in the Energy Sector Recovery Programme after the power crisis debacle earlier in the decade. For instance, the programme has resulted in a policy on the competitive procurement of energy power contracts, a commitment to improve the coordination of energy and power activities, and a process of reviewing contracts and adjusting tariffs (World Bank 2017, 2018, ESMAP 2019, IMF 2019, ESI-Africa 2020). In 2018, a World Bank technical assistance credit provided funding to develop an investment plan for 100% electrification. It included assessments of 'the limits of extending the grid, and determine the cost of standalone off-grid and mini-grid solutions where grid extension will not be feasible, in particular for the north of Ghana' (World Bank 2018: 19).

In 2019, the Energy Commission published a new 'Ghana Renewable Energy Master Plan', an outcome of the Danida-funded 'China-Ghana South-South Cooperation on Renewable Energy Technology Transfer' project that ran from 2015 to 2018. It involved government entities in the two countries, and the UNDP (Anning and Vhumbunu 2018, GEC 2019). The Plan acknowledges previous renewable energy policies, strategies and plans, including the old 10% renewable energy target, even though it does not itself specify this target explicitly. Instead, it aims to (i) increase the proportion of renewable energy in the energy mix 'from 42.5 MW in 2015 to 1363.63 MW' by 2030, (ii) put a greater emphasis on off-grid power generation by emphasising 'decentralised electrification options in 1,000 off-grid

communities’, and (iii) promote local content and local participation in the renewable energy industry (GEC 2019: iv).

6. Discussion and conclusion

New renewable energy has played a role in Ghana’s energy planning since the early 1980s, but its share in the energy mix has remained minuscule. This paper has identified some tendencies that can contribute to explaining the difference between policies and implementation, based largely on a literature review with a focus on the political economy of renewable energy, and particularly on the role of development donors. Overall, the paper suggests that key Ghanaian decision-makers have been interested in new renewable energy more out of concerns over energy security than from a wish to decarbonise energy production. Thus, policies to promote new renewable energy emerged with support from donors in periods of supply crises, only to be undercut as the crises abated and other agendas took centre stage.

A coalition between domestic decision-makers and Western donors with a shared interest in new renewable energy emerged in the 1980s as a response to high oil prices and a power crisis brought about by a drought. This shared interest could potentially have brought about interventions that systematically integrated new renewable energy into energy-sector planning. However, in the 1990s, new renewable energy was largely sidelined by a combination of the following: a wish in the then ruling party to improve access to electricity from the grid coupled with an energy-sector reform agenda that was being forcefully pushed by the World Bank as the most important donor. Reform was also a precondition for funding the expansion of energy production that was required as a response to increased demand and yet another drought-induced supply crisis. The outcome was increased thermal production. Some donor-funded new renewable energy research activities and demonstration projects continued but on a smaller scale only.

In 2006, a 10% target for including new renewable energy in the supply mix was introduced in the Strategic National Energy Plan, which had been drawn up with Western donor support, but implementation of the new renewable energy elements of the Plan was limited. A key explanation for this is the discovery of commercially viable oil and gas resources in significant quantities in 2007. That could more easily help realise long-held ideas among domestic decision-makers to promote socio-economic development and improve access to modern energy. This emphasis on improving access to cheap and reliable modern energy, which emerged in the late 1980s and became a mainstay of the development of Ghana’s energy sector, has been linked to Ghana’s competitive electoral system in which political parties targeted different voter segments (see Briggs 2012, 2021; MacLean et al. 2016; Marx 2017; Cuesta-Fernandez 2018; Brass et al. 2019).

Thus, the discovery of oil and gas decisively shifted the dynamics of the coalition, allowing for the mobilisation of private and new donor capital at a time when traditional Western donors were increasingly promoting more sustainable forms of energy. As a result, significant investments were made by international oil companies, and the GNPC, in oil and gas production and distribution. Chinese funding also became important, with a large oil-backed loan for gas infrastructure development. So did co-funding from IFC, the World Bank’s private-sector arm, for various thermal projects. It was also thermal energy projects that tended

to materialise among the many IPP power purchase agreements as a response to the power crisis prior to the 2016 elections. New renewable energy projects were largely put on hold. Throughout the period, donors, Ghanaian decisionmakers, and private investors formed coalitions that shaped the development of the country's energy sector. However, the composition of these coalitions shifted over time in ways that have not been conducive to the adoption of new renewable energy. The growing fragmentation of energy-sector governance also played a role. Allegations of irregularities and patronage politics have been made regarding various fossil-fuel energy contracts. The implications of such political economy dynamics for the promotion of new forms of renewable energy has still not been much analysed in Ghana, nor in other lower-income African countries. Consequently, more empirical research is needed on these topics.

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