# The Impact of the United States Energy Revolution and Decarbonisation on Energy Markets in Africa


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## 1 Introduction

Given the extraverted nature of many African economies (Bayart and Ellis 2000), shifts in global energy markets are likely to have a significant impact on energy value chains and, consequently, prospects for development across the continent. Commodity value chains have always played an outsized role in Africa's resource-dependent economies. Deaton's conclusion that 'African economies export primary commodities, and most export little else' (1999: 23) remains all too relevant today. Moreover, debates about whether resource-led economic growth can translate into long-term, structurally transformative socio-economic development—despite the recognised (if contested) dangers of the 'resource curse' (Auty 2002, Gochberg and Menaldo 2016)—are integral to policy and scholarly debates about the continent's developmental potential (Ovadia 2016a). Alas, recent research suggests that even mere expectations of resource booms have caused resource-curse effects in Africa even in locations where the expected booms did not actually occur (Frynas et al. 2017).

Recent changes to African commodity flows, including in oil and gas, are partly the result of shifting flows of trade away from the West and towards the emerging markets of the Global South, especially China. But internal factors matter as well: impressive economic growth rates across Africa for much of the twenty-first century, albeit slowing markedly with the end of the commodities supercycle and the 2014 oil price crash (World Bank 2016), have created a growing middle class and purchasing power across the region—meaning that it has become more attractive for investors beyond those importing commodities. These developments also affect energy value chains. For instance, the global oil trader Vitol has been targeting investments in

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Africa's downstream sector to meet what it estimates will be a 3% annual growth in fuel demand across the continent. Investments in refineries, and in niche fuels like liquefied petroleum gas for regions with high urban population and consumption growths like Lagos, mean new opportunities for local firms and economies to benefit. Given concerns about slowing demand in China (Roberts et al. 2016), it makes sense—as argued by the South African mining company Exxaro—to promote inter-African commodity trade and to increase the amount of processing and refining being done on the continent itself (Reuters 2014).

In this context, the question of whether petro-developmental states can become a reality depends to some significant extent on the ability to upgrade energy value chains (Ovadia 2016b). In other words, will it be possible to disperse the benefits of Africa's oil and gas industries to wider segments of societies than has hitherto been the case? In countries like Angola and Nigeria, oil has become a byword for conflict, corruption and impoverishment—Ross's (2008) 'blood barrels'—rather than providing public benefits along the lines that Botswana's diamonds, producing what was once described as 'an African miracle' (Samatar 1999), were seen to be doing at least until recently (Hillbom 2008, 2012). As evidence from newer entrants into the ranks of African producer countries shows, ambitious local content policy law like that adopted in Ghana in 2013 has benefitted primarily established, large and medium-sized companies—with newer and smaller ones unable to gain access (Ablo 2015). A survey of countries anticipating the emergence of significant oil and gas industries (Mozambique, Tanzania and Uganda) strikes a more thoroughly pessimistic note, suggesting that 'in spite of high ambitions and strong expectations, local content is limited, shallow and inefficient' (Hansen et al. 2016: 201). By contrast, some research on Nigeria's mature energy industry rejects the conventional view that local content in energy value chains has been largely inconsequential by emphasising how local content policy combined with investments in infrastructure and telecommunication has indeed created backward linkages to local firms (Adewuyi and Ademola Oyejide 2012).

These questions of how value chains evolve and contribute to development must, moreover, be considered in an explicitly global context. However, for both proponents of resource-led development and its many critics, such as Gibbon (2001), 'there is a default to national-scale modes of analysis that pushes questions about the transnational organization of production into the background' (Bridge 2008: 393). This is because they perceive failure to stem 'primarily [from] state failure', and their 'difference of opinion is over whether these failures of the state are structural and necessary or contextual and contingent' (Bridge 2008: 393).

To gain a better understanding of the global context of current shifts in energy markets and associated value chains across Africa, this chapter focusses on the consequences of two crucial developments that, in combination, constitute a particularly significant threat to oil and gas-producing states. The first such development is the sharp increase in oil and gas production in the United States over the last decade—the so-called shale revolution (Aguilera and Radetzki 2014; Blackwill and O'Sullivan 2014; Wang et al. 2014). Together with the 2014 oil price crash, it resulted initially in a precipitous drop in energy export revenues across Africa's

producer countries—and constitutes a key exogenous effect on African energy markets (Brune 2015). The second development is the embryonic global transition away from fossil fuels towards a low-carbon economy which, while ultimately necessary for mitigating climate change, threatens to leave African producer countries with stranded—and therefore worthless—assets that currently contribute a major share of gross domestic product and export revenues (Cust et al. 2017). The push for decarbonisation, as manifested in the 2015 Paris Agreement on Climate Change, constitutes a more long-term and fundamental challenge to Africa's producer countries. Both of these developments have a strong impact on value chains in Africa given that the regional countries remain mostly at a lower segment of these chains, exporting energy resources but scarcely processing them. Thus, after providing overviews of the shale revolution, decarbonisation and their respective impacts on Africa, this chapter compares how an established and an emerging producer country, Nigeria and Uganda respectively, are attempting to deal with these fresh challenges.

## 2 The US Energy Revolution

One of the key exogenous developments impacting Africa's energy-producing states is the rapid and significant increase in US oil and gas production. Wang et al. declare that '[t]he biggest energy story that has happened in the twenty-first century so far is the extraction of natural gas from shale rock formations in the United States' (2014: 2). Indeed, US shale gas production increased ten-fold during the first decade of this century (Hart 2014). In 2016, 15.8 trillion cubic feet of natural gas was produced from shale and tight oil resources, contributing 60% of total US production. The Energy Information Administration (2016) projects that shale gas production will increase to 29 tcf by 2040, constituting 69% of total US gas production by then. Likewise, increases in shale oil production may allow the US to reach an all-time total oil production high of 9.9 million barrels per day by the end of 2017—surpassing the previous high in 1970 of 9.6 million bpd, with more than half of this production coming from shale oil (Energy Information Administration 2017). McKinsey (2017) forecasts that US shale oil production could reach nine million bpd by 2025. This transformation of the US energy landscape has produced shockwaves globally, including significant effects on the economies of key African energy producers and exporters (Brune 2015).

As the US produces more oil and gas, it will need to import less and less from elsewhere. Data from Oil & Gas 360 (2017) shows that whereas the share of the Organisation of the Petroleum Exporting Countries (OPEC) in US crude oil imports, currently at 40%, stands at the second-lowest value on record (down from 62% in 1990), it is exporters of light crude oil like Nigeria that have been impacted most severely. Nigeria's light crude oil is similar in grade to—and thus competes directly with—US shale oil. Consequently, the West African country experienced a massive drop in its crude oil exports to the US between 2010 and 2014: from 983,000 to 58,000 bpd. Medium-grade imports have been less severely impacted, but medium

crude oil exports from Angola to the US stand currently at less than one-third of the peak level in 2006.

The economic costs for major African producer countries have been significant: the *Financial Times* (11 June 2017) reports that, according to estimates by the Energy Information Administration, the reduction in annual oil export revenues between 2012 and 2016 amounts to USD 71.3 billion for Nigeria and USD 45.5 billion for Angola. As but one example of the difficulties caused, Nigeria's economy experienced for the first time in 25 years a contraction of its GDP (by 1.5%) in 2016. The country's oil minister, Emmanuel Ibe Kachikwu, has identified the need for Nigeria and other OPEC members 'to lower production costs to compete better with shale producers' (quoted by Reuters 2017b) as the key priority in reversing the destabilising trend of lower export revenues. His predecessor, Diezani Alison-Madueke, had likewise warned that US shale oil has become 'one of the most serious threats for African producers' (quoted in *Wall Street Journal*, 7 May 2013). Kitous et al. argue that Nigeria, 'a large, unstable and highly exposed exporter with a small [sovereign wealth fund, SWF] appears like the most vulnerable to a lasting low oil price', with 'other sub-Saharan African countries [. . .] also highly exposed, and without any back-up in the form of SWF, even if less unstable' (2016, 19). They continue to explain that:

> In sub-Saharan Africa, Nigeria, Angola and the smaller producers depend for about 20–30% on the fossil fuel sector and show a very high elasticity to oil price for their GDP (most countries) and their government revenues (all countries). Their SWFs are virtually non-existent while the reserves per capita are very low. This makes these countries very vulnerable for lower periods of low oil prices. (2016: 3)

In addition to needing less oil and gas, surging US production will impact producer countries in Africa in other ways as well—such as by exerting an overall downward pressure on prices, and by becoming a competitor in African export markets elsewhere (primarily Asia). While the effect of US production increases on prices are difficult to specify, in part because shale oil and gas influence markets and prices in different ways given that the former is a global market and the latter a regional one, US shale gas has had an impact on liquefied natural gas (LNG) markets in particular (Neville et al. 2017). Recent research also suggests that the US shale oil supply-shock has had a significant (downward) impact on global oil prices (Bataa and Park 2017).

With increased US production and competitiveness, that country's oil and gas products are becoming increasingly attractive to major importers—ranging from Europe (albeit a region where demand is stagnating) to the prized markets of East Asia, where demand is still increasing. Until recently the world's largest net-importer of oil, the US now exports both crude oil and—to an even greater extent—LNG. By 2017 US crude oil exports had reached a record high of nearly two million bpd, aided in part by the fact that it is trading at a discount to Brent—making it more attractive on global markets. To put this in perspective, US crude oil exports are now comparable to the entire production of major OPEC producers like Nigeria and Venezuela (DiChristopher 2017). LNG exports are likewise impressive. A first wave of LNG

export terminals are being built and will come on stream over the next few years, the first one being Cheniere Energy's Sabine Pass Plant in Louisiana, which began exporting in 2016. This first wave of LNG export facilities will have a capacity of nine billion cubic feet of natural gas a day, which amounts to about 12% of total US natural gas production. The project costs of these facilities are substantially lower than those of competitors in Australia, Canada, Mozambique and Russia and, with major buyers in China, India and Europe, there is a second wave of approximately 20 additional LNG export plants with global energy companies like ExxonMobil and Royal Dutch Shell providing investment (*Financial Times*, 5 October 2017).

Following the drastic drop in US demand, combined with contrariwise an increase therein across the Global South, Africa's producers have strong incentives to look for markets elsewhere. By early 2017 African oil producers, led by Angola and Nigeria, were exporting approximately two million bpd of crude oil to Asia, primarily China and India, the highest level of such exports since 2011. These opportunities are provided in part by production cuts across the Middle East in response to the persistently low oil price (Bloomberg 2017a). At the same time, there is emerging evidence suggesting that US crude oil and gas now entering Chinese and Indian markets (today the world's largest and third-largest oil importers, respectively)—as well as those of Australia, Japan, South Korea, Taiwan and Thailand too (Reuters 2017c)—will gain market share from OPEC countries, including African producers. This is part and parcel of the Trump administration's vision for US energy dominance, meaning that Africa's export revenues will come under pressure globally and not only in terms of direct bilateral trends in oil and gas trade with the US (*Financial Times*, 11 July 2017). As per a headline in the Nigerian newspaper *Vanguard* (5 August 2017), referencing India's Hindustan Petroleum Corporation: 'India considers dumping Nigeria's oil for US crude'.

Nor is there likely to be a let-up in these pressures on African producer countries. The early onset in increasing US shale oil and gas production was impressive in and of itself. The industry's ability to weather the 2014 oil price crash and subsequent expectations that prices may be lower forever, as per Royal Dutch Shell Chief Executive Officer Ben van Beurden's prediction, as the company readies itself to be profitable with long-term oil prices in the USD 40 range (which is less than 35% of the 2008 oil price peak; *Telegraph* 27 June 2017), may be even more remarkable and of greater consequence. While displaying many signs of a classic boom and bust cycle, the shale industry has also produced an impressive learning curve—improving production technologies, sourcing finance and, most importantly, reducing costs. Consequently, the break-even price of producing shale oil and gas in many of the country's shale plays makes it possible to yield profits even in a sub-USD 50 price environment (Business Insider 2017; *Wall Street Journal*, 13 September 2015).

These developments exemplify an oil and gas industry that is fully invested in and able to benefit across the entire value chain. They illustrate what is lacking in Africa's producer countries: leading companies involved in upstream exploration and production, from supermajors such as Chevron and ExxonMobil to globally prolific independents like Anadarko and Apache as well as global leaders in related services like Baker Hughes and Halliburton; a sophisticated domestic midstream

transportation and storage industry; and, given the status of the US as the world's largest consumer of petroleum products, an extremely diverse and sophisticated array of downstream marketing, distribution and consumer industries as well as markets. As a result, the great diversity of the US oil and gas industry (including more than 6000 independent companies), high degrees of technological innovation, the availability of sophisticated methods of finance as well as mature regulatory frameworks too have together made the US highly competitive (Bryce 2014). Due to its resilience to date, the shale revolution dynamic is likely to remain a significant force in global energy markets for the foreseeable future.

## 3 Decarbonisaton and Stranded Nations

If the US shale revolution has had a sudden and drastic impact on African energy markets, another development heralds more gradual and long-term—but nevertheless still fundamental—consequences. An accelerating global transition away from fossil fuels towards low- or no-carbon sources of energy will, over the longer term, leave African's producers—who are highly dependent on oil and gas export revenues—with assets that they will no longer be able to monetise, triggering a disastrous economic impact if the persistent lack of economic diversification impedes attempts to substitute the significant revenues accruing from energy exports.

So far, the evidence regarding economic diversification is not encouraging. The African Development Bank (2013) demonstrates that there has been little progress in diversifying exports, meaning that Africa's commodity exporters remain vulnerable to swings in prices—especially the oil-exporting countries in which this natural resource made up more than 85% of total exports in 2012. Moreover, a report by the International Monetary Fund (2016) discerns two distinct economic growth trajectories across the continent: the relatively high economic growth of non-oil exporters and little or no growth among oil exporters. The UN Economic Commission for Africa (2017) notes that in 2016, growth of oil-exporting countries—at a mere average rate of 0.8%—was decelerating and notably below that of oil-importing and mineral-rich economies (registering average growth rates of 2.5 and 2.2%, respectively). The African share of world manufacturing exports remains at below 1%. Diversification is simply not taking place at meaningful rates.

In addition to these challenges relating to the unfolding energy transition and consequent need to diversify, Bridge argues that the re-commodification of carbon consumption by means of tradable rights for carbon—for instance through carbon taxes—has introduced a new link in the hydrocarbon commodity chain. Such ostensibly progressive policies promise 'to redistribute value along the chain towards consuming governments. To the extent that carbon taxation encourages reductions in demand and/or substitution and decreases the price of oil, it involves a transfer of wealth from oil producing economies to oil consuming economies' (2008: 410). This will place an additional economic strain and risk burden on producer

countries that are already finding recent developments in energy markets difficult to cope with.

In this environment, hydrocarbon resources are increasingly viewed by governments and investors alike as liabilities and potentially stranded assets that could furthermore turn African producer countries into stranded nations should they fail to adapt to this transition (Cust et al. 2017; Van der Ploeg 2016). Indeed, these countries may find themselves in a no-win situation, where they either face climate disaster or a future in which their hydrocarbon endowments are turned into unburnable wealth. As Cust, Manley and Cecchinato argue:

> If there is no progress in combating climate change, poor countries are likely to be disproportionately harmed by the floods, droughts, and other weather-related problems spawned by a warming planet. But if there are successful global actions to address climate change, poorer countries that are rich in fossil fuels will likely face a precipitous fall in the value of their coal, gas, and oil deposits. If the world makes a permanent move away from using fossil fuels, the likely result will be a huge reduction in the value of their national and natural wealth. (2017: 46)

In other words, the question of how long there will remain fossil-fuel value chains along which to add value and extract increased public benefits remains increasingly unclear, even though these fuels are likely to remain a significant source of energy for the foreseeable future—even despite environmental consequences that may usher in a dystopia (Covert et al. 2016). Countries across Africa are, thus, trapped between the need to close an economically costly and developmentally detrimental energy gap between production capacity and growing demand (Andreasson 2017b; Kessides 2014), while at the same time also needing to reduce their dependence on fossil fuels that are environmentally and economically increasingly risky.

There is an embryonic and rapidly growing renewables industry in Africa, albeit emerging from a very low base and primarily driven by developments in a select few countries—notably Kenya and South Africa (Power et al. 2016; Shen and Power 2016). Embracing renewables is one important possibility for creating new (renewable) energy value chains across the continent, with a range of new opportunities for adding value. For instance, South Africa's Renewable Energy Independent Power Producers Procurement Programme (RE IPPPP) has attracted global investment into primarily the country's solar and wind industries. It requires energy-developer firms to meet a range of socio-economic development requirements, including black economic empowerment. Companies from Europe and the US, and increasingly also from China and India, providing renewables technology and infrastructure in South Africa via the RE IPPPP process are also involving that country's companies in joint ventures too (Power et al. 2016). Brazilian companies have likewise become involved in Mozambique's biofuels industry. The country's first solar panel plant was funded by the Export–Import Bank of India. Results have so far been less positive in terms of impacts on local value chains in Mozambique than they have in South Africa, as these niche spaces have not been able to support economies of scale and scope to thereby become competitive—this being due to a lack of regime backing, as well as support from Mozambique's wider (and fossil-fuel-dependent) energy landscape too (Power et al. 2016). Bos and Gupta weigh up the relative risks

and merits of investing in fossil fuels or foregoing such investments by focussing on Kenya as a prospective producer. They suggest that any short-term gains from new investments in fossil fuels are outweighed by the long-term ones from investing in renewables, as the latter come with less risk and are 'politically, socially, ecologically, and economically more rewarding' (2017: 436).

Ultimately what is becoming 'the new normal' in global energy markets poses multiple and interrelated challenges for Africa's producer countries, and prompts a multitude of questions. For instance, what is the potential impact of a persistently low oil price and waning demand? The most obvious effects are, first, lower revenues accruing to producer countries, which in most cases are already under significant pressure to improve economic performance and living standards, and, second, a future characterised by more precarious export markets—even if current demand in Asia is offsetting reductions therein elsewhere around the globe. And in terms of future production potential, who will provide much-needed investments in oil and gas industries across Africa, especially considering that less than 10% of such projects in that region can break even with an oil price below USD 50 a barrel (Addison 2016)? Many projects were placed on hold in the wake of the 2014 oil price crash, especially more expensive frontier ones (PwC 2015).

Furthermore, it is not clear what future strategies will be adopted by key actors in African energy markets—nor, indeed, who those key actors will even be. Will publicly held international oil companies (IOCs), which are mostly Western, continue to move away from high-risk assets such as those in the Niger Delta? Will other companies move in to fill any space left by IOCs, so that especially onshore production becomes increasingly dominated by African independent companies and African national oil companies (NOCs)—as well as NOCs from elsewhere across the Global South too (Andreasson 2017a)? Given current concerns about stranded assets, will there ever be a renewed demand for Africa's high-cost, ultra-deepwater resources and its unconventional energy ones—for instance shale gas, coal-bed methane and tar sands (Andreasson 2018a)? What, moreover, do trajectories relating to all of these questions portend for the ability of African producer countries to enhance backward linkages in their energy value chains, for instance by means of local content policies (Lange and Kinyondo 2016; Ovadia 2016a)? None of the eventual outcomes here are clear, while the future of production prices and, crucially, the future of fossil fuel demand remain increasingly uncertain too. What is clear, however, is that there is urgent pressure on established and emerging producer countries to respond to the key challenges indicated by these questions.

## 4 Recent Developments in Nigeria and Uganda

Delivering a lecture at the University of Ibadan in September 2017, the executive secretary of the Nigeria Extractive Industries Transparency Initiative, Waziri Adio, identified a long-standing predicament symptomatic of Africa's oil and gas-producing countries, ones in which the dependence on revenues from these

exports is invariably also very high: 'Despite being a major oil and gas producing country for 60 years [...] we have not fully optimised and maximised the opportunities in the oil and gas value chain' (quoted in *This Day* 8, October 2017). Notably, a country like Singapore—with a population only one-thirty-second of the size of Nigeria's and an oil production output merely 1% of the West African country's too—nevertheless boasts an oil-refining capacity that is more than 15 times greater than that of Nigeria—the world's twelfth-largest crude oil producer (*This Day* 8, October 2017).

Resource-rich countries seeking to link these assets to development need to become properly invested in and to publicly benefit along the entire value chain, which in the case of oil ranges from exploration and production (upstream) to transportation and marketing (midstream)—and, especially, refining, distribution and the diverse consumption activities that characterise the downstream end of the value chain too. To harness these benefits in ways that Nigeria and other African producer countries have previously failed to do, Adio focusses on the need to move beyond exporting crude oil to increasingly refining it for domestic consumption. Building a significant petro-chemicals industry as well as transforming the country's solid-minerals sector from one dominated by artisanal mining into a major contributor to export revenues, jobs and industrial development are also key. These undertakings would, furthermore, need to be facilitated by 'clear and predicable legal and regulatory frameworks' (Adio, quoted in *This Day*, 8 October 2017)—such as that to be provided by the long-awaited Petroleum Industry Bill that is currently in the process of being passed into law by the Nigerian parliament (Reuters 2017a).

If a country like Nigeria cannot make its oil industry contribute significantly to value-addition, it is bound to remain a country of 'price takers and marginal players' (Adio, quoted in *This Day*, 8 October 2017). The key question is how this can be accomplished across the energy sectors that dominate Africa's resource-dependent economies, given how recent developments in global energy markets provide new constraints and imperatives. This also begs the question of what opportunities lie beyond these existing options, especially in terms of emerging value chains in renewable sources of energy across Africa in the context of a global push for a transition away from fossil fuels (Newell and Bulkeley 2016). As one of Africa's oldest and largest crude oil exporters and with a complicated history of relations with IOCs, especially in the conflict-prone Niger Delta (Frynas 2001; Frynas and Paulo 2006), reforms to the energy sector have always posed a difficult challenge for the Nigerian government—as evidenced by, for instance, recent attempts to introduce significant fuel subsidy reforms (Osunmuyiwa and Kalfagianni 2017). However, the 2014 oil price collapse and prolonged slump have forced the Nigerian government to confront challenges all along energy value chains. 'These challenges stem from legacy and unresolved systemic problems [...] which have now been exposed and exacerbated by the global downturn of oil prices' (Akinrele 2016: 314)—hence, the proliferation of official and public debate about a range of potential reforms.

Nigeria is, consequently, attempting to implement a number of interrelated policies, with the aim of increasing local content and to deepen backward linkages along the oil and gas value chain. There has been some success in this regard since

the adoption of the Oil and Gas Industry Content Development Act in 2010, with recent studies estimating a 400% growth in local content capacity utilisation, the attraction of some USD 5 billion in investments into the local economy and the creation of 38,000 jobs (McCulloch et al. 2017). There are also attempts underway to expand the technical horizons of the industry. For instance, digitalisation of the country's energy sector would revolutionise management and control of a wide range of operations, and would also provide the sector's workforce with new skills and increased productivity. Onyeche Tifase, the chief executive officer of Siemens Nigeria, notes that the introduction of new technologies could provide a 20% reduction in capital expenditure across the oil and gas sector, including in operating costs by 5% upstream and 2.5% downstream (*Premium Times*, 21 August 2017). She argues that:

> Nigeria's best approach will be a combination of local skills and knowledge, and the expertise and experience of a proven international partner able to deliver digital technologies and automation, together with traditional instrumentation and controls, across the entire energy value chain. This further supports the backward integration of skills and technical competence in Nigeria's limited skilled workforce. (quoted in *Premium Times*, 21 August 2017)

In contrast to established producer countries, where those attempting to engage with and mitigate the effects of the changes to energy markets considered here must contend with existing energy industry dynamics and dysfunctions including the powerful path dependencies that they have given rise to (Scholvin 2014), emerging producers are meanwhile faced with what is both a challenge and an opportunity—namely the tabula rasa on which their energy industries must be constructed. Uganda is anticipating the commencement of oil production by 2020, following the discovery in its territory of 6.5 billion barrels of crude oil—1.4 billion of which are currently economically recoverable (Magona and Angom 2017). This might still make Uganda the first East African country to export crude oil, although such exports from Kenya are now imminent.

A World Bank memorandum on Uganda is, despite the very low oil price at the time of its publication, enthusiastic about future production there having 'a major influence on the country's economic and fiscal performance', while cautioning that experience elsewhere in Africa 'shows that large-scale production of oil [. . .] offers great opportunities, but also presents major challenges' (2015: x). Rwengabo draws on lessons from Ecuador's oil industry to suggest that Uganda 'can learn from earlier entrants [. . .] in order to exploit a good-starter advantage' (2017: xii). For the World Bank as well as other commentators on Uganda's nascent oil industry, the ability to ensure that production revenues contribute to economic diversification and the upgrading of value chains will be key to any future success. Consequently a legal framework is being put in place by the Government of Uganda for the country to benefit broadly from production, including local content and possibly a refinery—to allow for the upgrading of value chains from the mere extraction of crude oil (Magona and Angom 2017).

A 1445-kilometre pipeline, at a cost of USD 3.5 billion, from the Hoima District to coastal Tanga in Tanzania, just south of the Kenyan border, has meanwhile been

agreed between the Tanzanian and Ugandan governments. This pipeline is expected to see a flow of about 216,000 barrels of oil a day. Notably, however, a final deal for investment in a refinery has not yet been closed, as negotiations between the Ugandan government and Russia's RT Global Resources and, thereafter, South Korea's SK Engineering failed to result in agreement either time (Magona and Angom 2017). A consortium led by General Electric now looks most likely to build and operate a USD 4 billion refinery, which would eventually be able to process 60,000 barrels of oil a day (Bloomberg 2017b). This would allow Uganda to upgrade energy value chains from their inception by combining upstream (production) and downstream (refining) activities.

As with all newcomers in the oil and gas industry, production networks have to be built from scratch—including what is necessarily the long-range goal of producing local suppliers capable of contributing to a complex modern industry (Neuman et al. 2017). Accomplishing this will require the Ugandan government to strike a mutually beneficial deal with international oil companies that have been granted production licences; the key actors being London-based Tullow Oil, the China National Offshore Oil Corporation and France's Total (Magona and Angom 2017). Evidence from this bargaining process suggests that Uganda's wider ruling coalition—that is, government and key economic stakeholders—has, so far, managed to ensure that the national interest—meaning the oil industry contributing to wider developmental goals—is asserted in the evolving legal and economic framework for its oil industry (Hickey and Izama 2017).

At the same time, early success in these negotiations could yet yield to the subsequent deterioration of any development-oriented framework—as has been the experience with emergent oil industries elsewhere in Africa previously, for instance in Chad (Andreasson 2018b). Hickey and Izama argue that: 'The dynamics of Uganda's political settlement raise serious doubts as to whether the impressive levels of elite commitment and bureaucratic capacity displayed to date will withstand the intensifying pressures that will accompany the eventual commencement of oil flows' (2017: 163). Other research suggests even steeper challenges ahead for Uganda, in terms of managing governance issues following the discovery of oil (Doro and Kufakurinani 2017).

## 5 Conclusion

In the end, the overarching question is whether the generally marginal and highly exposed situation of Africa's energy producers is likely to change in the foreseeable future. Might it be the case that new entrants into the region's energy markets, together with exports that are gradually being reoriented towards the emerging markets of the Global South, will create unprecedented opportunities for upgrading value chains? With new—including African—companies entering these markets, this is a possibility if contracts with external actors can be improved so that they contribute to creating backward and forward linkages in the producer

countries—which, in turn, will have positive effects on development therein. As the discussion of Uganda has suggested, however, this is by no means a foregone conclusion. Previous experiences, such as the difficulties experienced by Chad's emerging oil industry in attempting to avoid the mistakes associated with mature ones elsewhere on the continent, do not suggest that new producers will face less obstacles or find success more easy to come by (Andreasson 2018b).

Or, will what changes merely be the cumulative amount of revenues that can be extracted from the continent's energy resources—but with such revenues ending up being used for much the same purposes and with the same detrimental effects as in the past? If this is the case, then the pessimistic prognostics of the resource-curse literature will seem vindicated and there are, indeed, preciously few roads from extractive industries like oil and gas towards sustained development. Just like the notion of 'Africa rising' waxed and waned (Taylor 2016), so might the one of a window of opportunity for resource-led development be considered rapidly and irretrievably closing. This may point to the conclusion that any real opportunities for upgrading value chains in energy industries lie in a different direction, namely the transition away from fossil fuels towards renewables. In other words, the greening of Africa rather than mere improvements along established fossil-fuel value chains offers genuine possibilities for sustained development (Death 2016). But that green path, too, will be difficult to fully embark upon given the importance of entrenched fossil-fuel industries—and the fact that they will not be rendered obsolete in the short or likely medium term either. In that sense, they simply cannot be ignored in the name of looking ahead to the coming era of renewable energy (Collier 2010).

Whatever the case eventually may be, energy demand across Africa is not only rapidly increasing but manifestly also changing. This in the context of the ongoing transformation of global energy markets, including also the transition towards renewables (Ouedraogo 2017). In that sense, the imperative of considering new directions—including moving away from fossil fuels and towards renewables—rather than merely aspiring to (incremental) improvements along well-trodden tracks must become a core aim in the efforts of Africa's producer countries—who need desperately to generate improved prospects for their hitherto elusive pathways to development.

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