

June 2022

# Africa's LNG import prospects in an era of high volatility and uncertainties

## Introduction

Africa to date has primarily been a natural gas exporting continent. An African country, Algeria, pioneered the international trade of liquefied natural gas (LNG) when Algerian LNG supplies arrived at the UK's Canvey Island LNG import terminal in October 1964. Other African LNG exporters emerged in the decades that followed. Libya in 1970<sup>1</sup> and much later Nigeria, Egypt, Equatorial Guinea, Angola and recently Cameroon. Africa has been a source of natural gas supplies to the rest of the world for almost sixty years and new African natural gas export projects are being developed in new gas provinces in Mozambique and Mauritania/Senegal.

But African LNG exporting sources are limited to a few subregions of Africa. Most African countries are far from being endowed with large proven natural gas reserves or could easily switch to the consumption of natural gas. Nevertheless, several African economies have increased their domestic use of natural gas. This resulted in rapid gas demand growth rates and, in some countries, it led to gas imports, especially through cross-border gas pipelines.

From 2000 to 2020, total natural gas consumption in Africa grew at an average annual rate of 5 percent. However, this does not show the large disparities in gas use among countries or groups of countries where a few North and West African countries account for over 90 percent of the continent's present consumption of natural gas. This concentration of natural gas use in a limited number of areas reflects key differences in hydrocarbon endowment; infrastructure availability; economic structure and development; access to financing; and population sizes, *inter alia*.

Although most of Africa's existing gas consuming countries rely on their own indigenous gas supplies, over the next ten to fifteen years only a small number of them could potentially remain or become net large exporters of natural gas. This is due to the decline of production in old fields; limited indigenous natural gas reserves and lack of upstream investments; and rapidly growing domestic gas demand in several African countries. In fact, some of these countries have already been importing or are planning to import gas. Interestingly all new gas import plans are focused on LNG imports rather than imports through existing cross-border gas pipelines or new intra-regional gas pipeline projects.

During the last decade and until recently, over a dozen new LNG import projects were planned and proposed in Africa and are or were at different planning stages with only one project completed. Several factors have driven this African enthusiasm for LNG imports, including previous low international gas

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<sup>1</sup> Libya's small LNG plant at Marsa El Brega was shut down in 2011.

hub prices; increasing domestic gas demand; security of gas supply concerns; and emergence of flexible floating LNG facilities.

However, in an era of new challenging international market conditions - persistent high gas hub price volatility and uncertainties emerging from the unavoidable march towards a decarbonized world - can these same drivers continue to stimulate, slowdown or stop altogether the development of new LNG import markets in Africa? This paper explores some of the main aspects of this fundamental question of energy supply in developing economies, such as Africa's, by focusing on the impact of these key drivers on potential African LNG imports and the lessons that could be learned for other developing countries.

The paper includes the following sections:

- Africa's energy mix and gas balance
- Key LNG import drivers
- Addressing evolving risks
- Conclusions

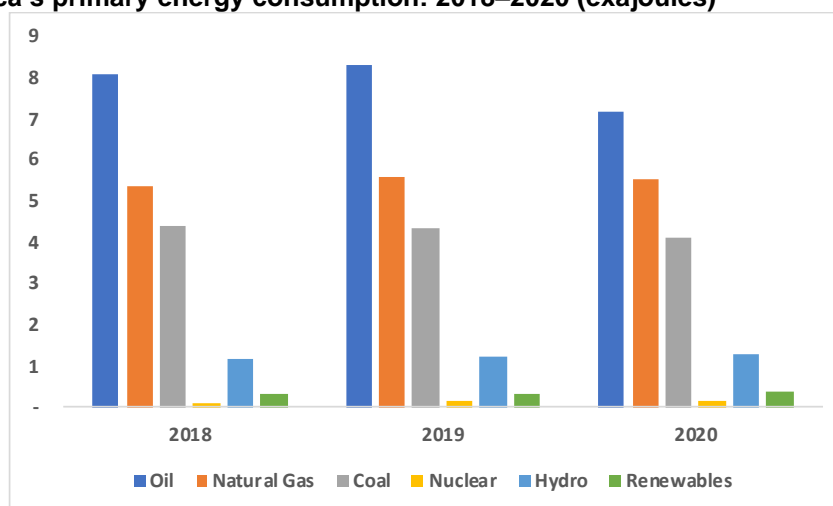
## Africa's Energy Mix and Gas Balance

### Energy mix

The structure of Africa's primary energy consumption reflects mainly the level of endowment in energy resources and degree of economic development, including energy infrastructure investments, in each of the continent's subregions or groups of countries.

Figure 1 presents an aggregated illustration of the structure of energy consumption in Africa, where fossil fuels account for ninety percent of total primary energy use. Oil is consumed widely in all the countries and accounts for about forty percent of Africa's present primary energy use. Consumption of natural gas and coal is concentrated in a few African subregions. Coal is consumed essentially in southern Africa. South Africa accounts for 85 percent of the coal presently consumed in Africa, the rest is consumed essentially in Morocco, Zimbabwe, and Botswana. Natural gas has been the fastest-growing source of electricity generation in Africa. Over the last decade, its use as a generating fuel grew on average well above 4 percent per year, whilst total electricity generation, during the same period, grew at an annual average of close to 3 percent.<sup>2</sup>

**Figure 1: Africa's primary energy consumption: 2018–2020 (exajoules)<sup>3</sup>**



Source: bp statistical review of world energy, 2021

<sup>2</sup> <https://www.iea.org/regions/africa>

<sup>3</sup> 10<sup>18</sup> joules.

## Renewable energy: a challenging scaling up

The share of renewable energy in Africa's total primary energy consumption remains very limited, as illustrated in Figure 1. In 2020, variable sources of renewable energy (solar and wind) accounted for only 7 percent of Africa's total installed electricity generation capacity, with about 90 percent of renewable capacity located in a few Northern and Southern African countries.<sup>4</sup>

Over the last decade, there has been a significant surge in renewable energy investments in Africa. Around US\$ 55 billion were invested, but in a very limited number of countries.<sup>5</sup> 75 percent of this total was invested in four countries, South Africa, Morocco, Egypt, and Kenya (IRENA, 2022). Even in these countries with a relatively more advanced renewable energy program, installed renewable capacity is not expected to exceed 40 or 50 percent of the total installed power mix before 2030. The exception among these four countries will be Kenya, which is expected to get closer to 100 percent renewables by 2030.<sup>6</sup>

Investments in African renewable energy projects have increased at one of the highest growth rates in the world, but the level and country coverage of these investments are still very far from what would be required for Africa to attain a satisfactory energy transition consistent with sustainable development goals. There is an urgent need for a scaling up of the financing of renewable projects in Africa. The market conditions of several African countries continue to present challenging high commercial, legal and political risks, that prevent larger renewable energy investments (IRENA 2022). Moreover, to effectively implement a much wider scaling up of renewable energy, the issue of intermittency and energy storage would need to be addressed. This scaling up would also require significant investments in power transmission capacity. Thus, Africa's passage to an effective and sustainable scaled up renewable energy capacity will take time and is unlikely to be achieved before 2030.

Nevertheless, renewable energy projects will continue their rapid development in African countries with an already developed renewable energy program and increase the share of renewable energy in their energy mix. Countries endowed with indigenous natural gas resources or close to sources of natural gas imports (e.g., Egypt and Ghana) will have both natural gas and renewable energy at the centre of their energy transition efforts.

## Skewed natural gas balance

The bulk of Africa's natural gas production and consumption remain highly concentrated in a few subregions, as shown in Table 1.

In 2020, North and West Africa accounted for over 90 percent of Africa's marketed production of natural gas. During the last five years, Central Africa's gas production increased significantly with most of the gas produced (mainly in Angola) being exported outside the African continent.

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<sup>4</sup> IRENA (2022). "Renewable Energy Market Analysis: Africa and its Regions", January. <https://www.irena.org/publications/2022/Jan/Renewable-Energy-Market-Analysis-Africa>

<sup>5</sup> This excludes large hydro projects of over 50 MW.

<sup>6</sup> Kenya Presidency (2021). "Kenya to Fully Transition to Clean Energy by 2030, President Kenyatta Says", 02 November <https://www.president.go.ke/2021/11/02/kenya-to-fully-transition-to-clean-energy-by-2030-president-kenyatta-says/>

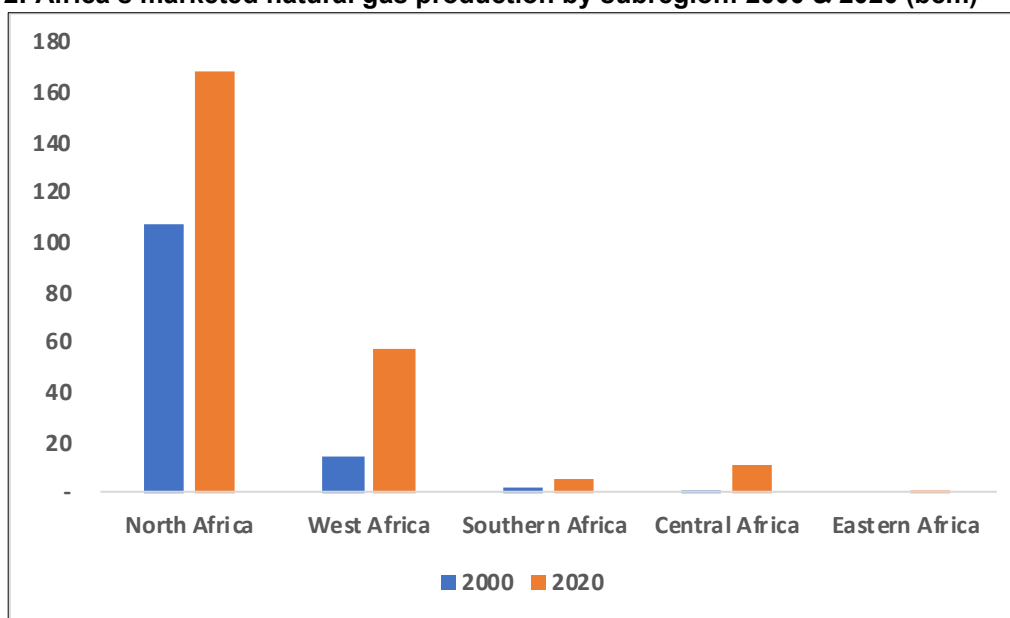
**Table 1: Africa's 2020 marketed natural gas production and consumption (bcm<sup>7</sup>)**

Subregion	Marketed Production	Consumption
North Africa	169	127
West Africa	58	28
Central Africa	11	3
Eastern Africa	1	1
Southern Africa	6	6

*North Africa: Algeria, Egypt, Libya, Morocco, Tunisia*  
*West Africa: Nigeria, Ghana, Equatorial Guinea, Cote d'Ivoire, Benin, Togo, Senegal*  
*Central Africa: Angola, Cameroon, Gabon, Congo*  
*Eastern Africa: Tanzania*  
*Southern Africa: Mozambique, South Africa*

Source: IEA, 2021

**Figure 2: Africa's marketed natural gas production by subregion: 2000 & 2020 (bcm)**



Source: IEA, 2021

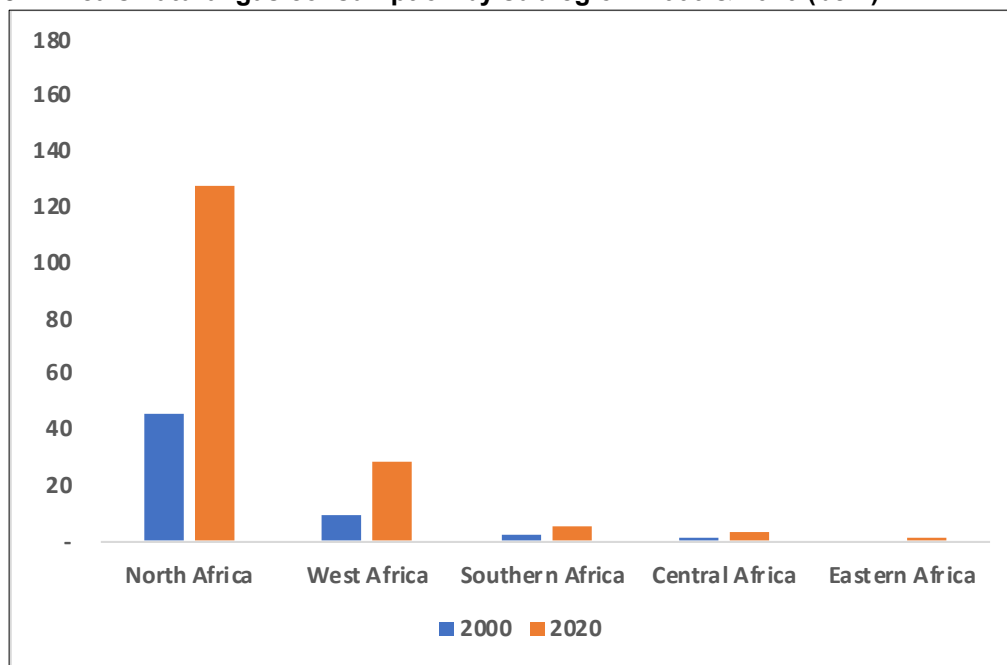
Africa's gas demand mirrors its highly skewed gas supply location profile. Over the last two decades, despite the emergence of new gas consuming countries, essentially in Sub-Saharan Africa, natural gas use remained concentrated in a couple of African subregions, as shown in Figure 3. North Africa (mainly Egypt and Algeria) currently account for about 80 percent of all the natural gas consumed in Africa. West Africa (principally Nigeria distantly followed by Ghana and Cote d'Ivoire) is the continent's second largest gas consuming area with well over 15 percent of the total.

As illustrated in Figure 3, Southern and Eastern Africa have presently limited natural gas consumption levels, but South Africa's planned switch away from coal and the future development of the large natural gas reserves of Mozambique and possibly Tanzania could potentially lead to increased gas use in there.

<sup>7</sup> billion cubic metres

However, it should be noted that in Africa's few coal-consuming areas, the switch away from coal to natural gas could initially be commercially challenging and would be slow to take place.

**Figure 3: Africa's natural gas consumption by subregion: 2000 & 2020 (bcm)**



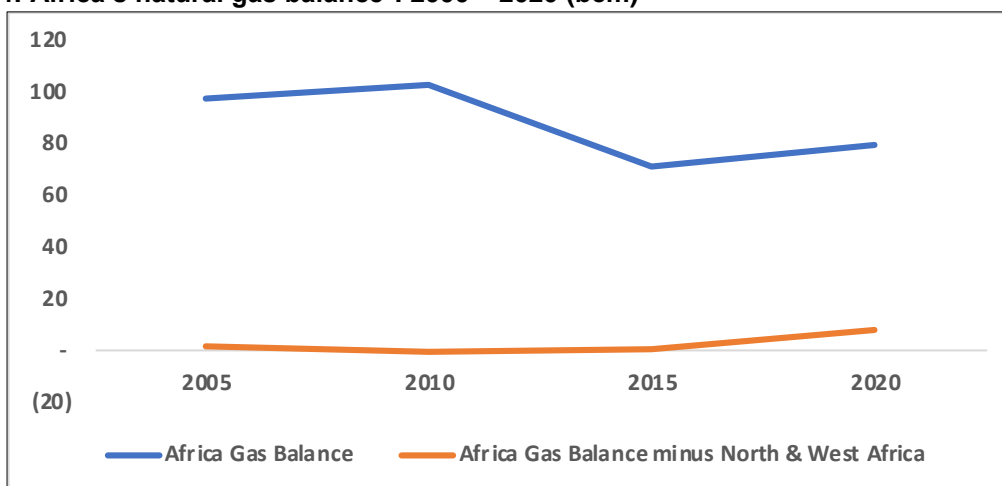
Source: IEA, 2021

Throughout 2000 – 2020, Africa's aggregated natural gas balance recorded surpluses (see Figure 4) reflecting the continent's gas exports to the rest of the world and a relatively low level of domestic gas use. Despite the continent's large natural gas reserves, intra-regional gas trade within Africa is extremely limited.

The regionally aggregated balance does not show the major differences in natural gas resource endowment and lack of gas infrastructure in Africa's subregions. If we exclude the main gas producing and consuming subregions of North and West Africa, we see that the gas surplus is very low, or close to zero, in the rest of Africa. This shows the dominant position of Africa's key gas producing subregions, but it could also indicate a potentially repressed level of gas demand and an undeveloped indigenous gas supply potential in several African countries, mainly in Sub-Saharan Africa.

Before addressing the question of Africa's potential natural gas imports and their underlying challenges, it is important to identify Africa's key gas consuming sectors and its future gas demand prospects.

**Figure 4: Africa’s natural gas balance<sup>8</sup>: 2000 – 2020 (bcm)**

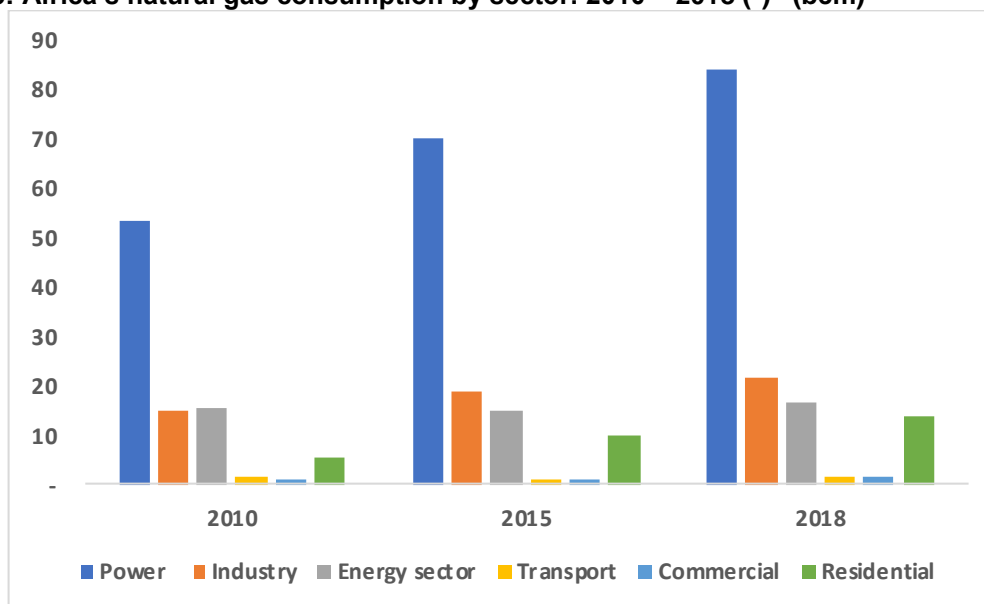


Source: IEA, 2022

### Structure of gas consumption

In Africa, as in many regions of the world, the power sector accounts for the largest share of natural gas use, as shown in Figure 5. Industry and the energy sector are the second and third largest users of natural gas, respectively. These three sectors account for 80 percent of all the gas consumed in the African continent.

**Figure 5: Africa’s natural gas consumption by sector: 2010 – 2018 (\*) (bcm)**



Source: IEA

(\*): There are no recent disaggregated data publicly available yet, but it is unlikely that the structure of Africa’s gas consumption has changed much.

<sup>8</sup> Gas supply minus gas demand



According to the International Energy Agency (IEA), industry is expected to become a key driver of natural gas demand growth in emerging market and developing economies.<sup>9</sup> This could be the case of Africa's largest economies as they expand their existing industries and develop new ones. However, in several Sub-Saharan African countries, the industrial sector remains a relatively small part of their economies. Industrialization prospects will vary between African subregions and will involve different trajectories and time horizons, "depending on resource endowments and initial policy configurations related to industrial development."<sup>10</sup>

In a continent where almost 580 million people, mainly in Sub-Saharan Africa, do not have access to electricity<sup>11</sup>, addressing the issues of energy access and energy poverty remain top priorities for most African energy policymakers. Therefore, the power sector will continue to be the main driver of natural gas demand growth, at least during the next ten to fifteen years, in several non-coal rich African economies. Coal imports were previously considered by some African countries when coal prices were relatively cheap, but even before the present stricter international decarbonization measures, the funding of coal-fired projects and their required import and transport infrastructure was already challenging. With China – a potential energy financing source - announcing last year that it would stop funding overseas coal-fired projects,<sup>12</sup> African countries will find it even more complicated to finance such projects.

In industry, natural gas demand will eventually increase, but at a slower growth rate than gas use for electricity generation and will be limited to a selected number of African countries or areas.

### Gas demand prospects

Africa's domestic gas markets are presently small and concentrated in a few subregions, (see Figure 3). In 2020, Africa's gas consumption was estimated at 164 bcm or the equivalent of 30 percent of Europe's gas consumption and 4 percent of the world's total use of natural gas. With a fifth of the world's population and only 3 percent of its electricity demand, Africa has the potential to expand its electricity generation capacity substantially.<sup>13</sup> Presently, natural gas-fired electricity production accounts for over 40 percent of all the electricity generated in the African continent.

Unlike several Asian countries, where coal will continue to dominate their energy scene, in Africa, only a handful of countries (mainly in Southern Africa) use and could continue to use coal to generate electricity. Therefore, in the absence of a significantly scaled up renewable energy capacity the options to rapidly address the vexing issue of persistent low electrification rates in Sub-Saharan African economies, will include natural gas and oil product fired electricity generation. Large hydropower capacity expansion is presently limited to a small number of countries, such as Ethiopia and Tanzania.

There are several programs or plans to develop variable renewable energy or VRE (solar and wind) projects in Africa. These are actively supported by multilateral and regional development banks, national aid agencies from OECD countries and international institutions such as the International Renewable Energy Agency (IRENA). The main African countries that are currently planning large VRE capacity additions expected to come on stream by the end of this decade include Egypt, Morocco, South Africa, Kenya, and smaller capacity additions in Nigeria, Cote d'Ivoire, Senegal and Togo.<sup>14</sup>

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<sup>9</sup> International Energy Agency (2021). "World Energy Outlook 2021", November. <https://www.iea.org/reports/world-energy-outlook-2021>

<sup>10</sup> Abreha, Kaleb *et al.* (2021). "Industrialization in Sub-Saharan Africa: Seizing Opportunities in Global Value Chains", The World Bank, November. <https://openknowledge.worldbank.org/handle/10986/36465>

<sup>11</sup> International Energy Agency. "Access to electricity." <https://www.iea.org/reports/sdg7-data-and-projections/access-to-electricity>

<sup>12</sup> Schiermeier, Quirin (2021). "China's pledge on overseas coal — by the numbers", *Nature*, 29 September. <https://www.nature.com/articles/d41586-021-02645-w>

<sup>13</sup> IRENA (2022). "Renewable Energy Market Analysis: Africa and its Regions", January. <https://www.irena.org/publications/2022/Jan/Renewable-Energy-Market-Analysis-Africa>

<sup>14</sup> International Energy Agency, IEA (2021a). "Renewables 2021: Analysis and forecast to 2026", December. <https://www.iea.org/reports/renewables-2021>

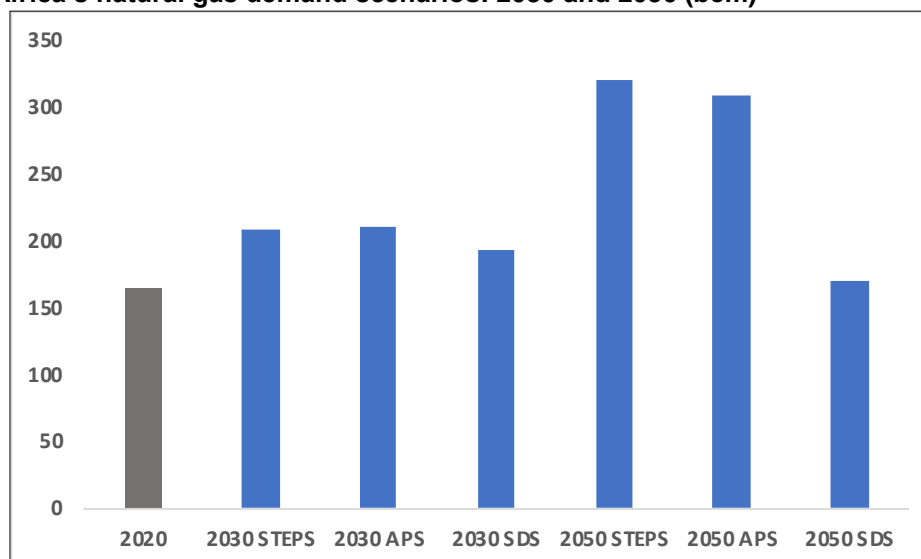
But these variable renewable energy and hydro capacity additions would not be sufficient to substitute for existing fossil fuel-based electricity generation capacity, meet capacity growth needs, and enable the electrification of new areas. Furthermore, in many African countries there is insufficient power grid infrastructure to link new renewable energy production sites to the national power transmission grid or to main electricity consumption centres.

In recent years, public policy announcements, from within Africa and internationally, have become more pressing about the urgent need to switch away from fossil fuels. However, these calls remain to be backed with adequate funding to allow for any realistic implementation of this critical energy switch. It will take time and financial resources to transition Africa’s energy balance away from fossil fuels to meaningfully scaled up sources of renewable energy. As the scaling up of these clean energy sources gradually increases their share of Africa’s energy mix, it is not unrealistic to consider that natural gas use for the generation of electricity will continue to grow in several African countries until at least 2030 and beyond.

The aim of this paper is not to produce forecasts of the future demand for natural gas in Africa’s economies. But it is useful to present natural gas demand scenarios formulated by international institutions, like the International Energy Agency, to understand the order of magnitude of Africa’s future gas market prospects.

In its last World Energy Outlook, the IEA estimated that Africa’s natural gas demand would increase from 164 bcm in 2020 to between 193 and 210 bcm by 2030, depending on the scenario considered<sup>15</sup>, as shown in Figure 8.<sup>16</sup> The IEA scenarios assume relatively moderate average annual gas demand growth rates ranging from less than 2 percent to 2.5 percent over the period to 2030 and an average of 2 percent per year beyond 2030 for the non-sustainable development scenario.

**Figure 6: Africa’s natural gas demand scenarios: 2030 and 2050 (bcm)**



Source: IEA, 2021

The Gas Exporting Countries Forum (GECF) foresees a slightly higher average growth rate of about 3 percent during the next three decades, predicting that “Africa will witness the highest growth rate in natural gas demand among all regions”.<sup>17</sup> Given the very long-term horizon of these scenarios and the

<sup>15</sup> Three scenarios were considered: Stated Policies (STEPS); Announced Policies (APS) and Sustainable Development (SDS).

<sup>16</sup> IEA (2021b) “World Energy Outlook 2021”, Paris, October. <https://www.iea.org/reports/world-energy-outlook-2021>

<sup>17</sup> Gas Exporting Countries Forum (2022). “GECF Global Gas Outlook 2050, GECF, February. <https://www.gecf.org/insights/global-gas-outlook?d=2022&p=1>



on-going volatility and uncertainties that are affecting all segments of the world's economy, it is very difficult to identify which scenario could potentially be relevant. However, based on the scenario assumptions, Africa is expected to consume just over 200 bcm/year of natural gas by 2030.

In theory, this natural gas demand level could be met by the continent's existing and to be developed indigenous natural gas supplies.<sup>18</sup> This would assume that intra-African gas trade could be expanded rapidly and substantially beyond its existing low level, a very challenging assumption if we consider the history of the limited gas exchanges between African countries. So far, these exchanges have been carried out through just two cross-border gas pipelines, the West African Gas Pipeline (WAGP)<sup>19</sup>, which supplies Nigerian gas to Benin, Togo, and Ghana and the Republic of Mozambique pipeline company or Rompco<sup>20</sup> transporting gas supplies from Mozambique's Pande and Tema fields to South Africa. Algeria's cross-border gas pipelines to Italy and Iberia supply\supplied small gas volumes to North African transit countries (Tunisia and Morocco) *en route* to Europe. African energy policymakers seeking natural gas supplies have also looked at the option of importing liquefied natural gas (LNG) supplies from within and outside Africa.

## Key LNG Import Drivers

### Previous LNG import enthusiasm

Since the mid 2010s until 2020, over a dozen projects were announced to import LNG supplies into various subregions of Africa. These included projects in Ghana; Cote d'Ivoire; Benin; Senegal; Mozambique (2 projects); South Africa (3 projects)<sup>21</sup>; Morocco; Kenya; Namibia; Sudan and Mauritius. These projects are or were at different stages of planning and implementation. The first to be implemented is Ghana's Tema LNG import project, but no LNG imports have taken place yet. Shell is expected to supply LNG to this project under a long-term contract.<sup>22</sup> Senegal received a Floating Storage Regasification Unit (FSRU) last year, but the status of this project is still not clear (see below). Several other African LNG import schemes are on hold and some may have been cancelled altogether, although no announcements have been made about their status.

A number of factors drove these African countries' keen interest in LNG imports during the last decade. These included a combination of supply and demand side drivers, such as low international gas prices, constrained indigenous gas supply and a rising demand for gas in the power sector. Despite the global climate change focus, especially after the Paris Accord of 2015, African enthusiasm to switch away from oil and coal use to LNG imports was not primarily driven by climate change considerations. The following drivers, not necessarily listed in order of importance, triggered the enthusiasm of energy policymakers in relevant African countries:

- Africa's continued rapid electricity demand growth and increased demand for gas-fired generation, including both new power capacity and to substitute for oil-fired generation and in some countries, coal-fired generation.
- Lack of or limited indigenous natural gas supplies in the relevant African countries or need to procure gas supplies temporarily whilst new indigenous gas resources were being developed

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<sup>18</sup> The IEA's scenarios estimate that by 2030, Africa's natural gas balance would have a supply surplus of about 100 bcm, i.e., after meeting its domestic gas demand (IEA, 2021b).

<sup>19</sup> <https://www.wagpco.com/>

<sup>20</sup> <http://rompco.co.za/>

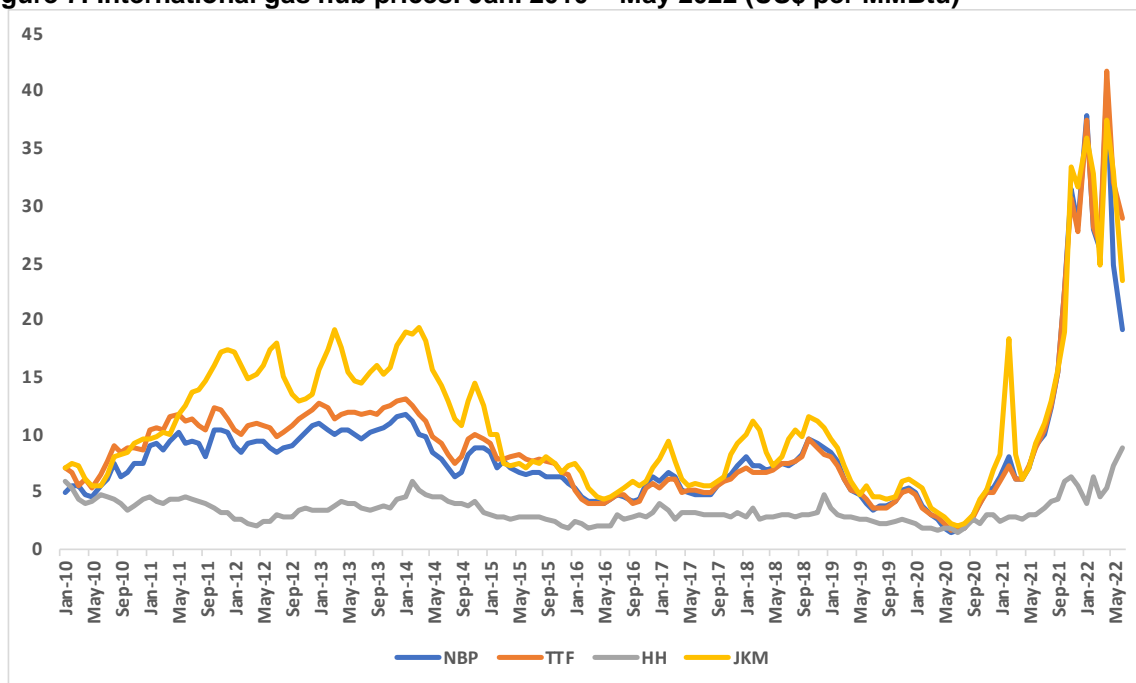
<sup>21</sup> It should be noted that South Africa has been considering LNG imports since the early 2000s, but has yet to implement any project.

<sup>22</sup> S&P Global, *Platts* (2021). "Ghana set to receive first LNG cargo at end of May", 05 May.

<https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/050521-ghana-set-to-receive-first-lng-cargo-at-end-of-may>

- A slowdown in Asia’s gas demand in the mid-2010s that led to an oversupply of LNG, downward pressure on international gas prices, and sellers’ search for alternative new LNG markets<sup>23</sup>
- Low gas hub prices until the summer of 2020 (see Figure 6), especially when compared to the costs of supplying indigenous gas supplies in some African countries’ domestic markets
- High costs of petroleum products (fuel oil and diesel) relative to the then low gas hub prices
- Emergence and increasing use of floating LNG import facilities (FSRU, FSU, FRU and other

**Figure 7: International gas hub prices: Jan. 2010 – May 2022 (US\$ per MMBtu)**



Source: Argus, Platts, CME

Today, some of the drivers listed above, especially international gas price levels, have moved in sharply opposite and adverse directions and represent extremely difficult challenges for potential LNG imports into Africa. In addition to this unprecedented and volatile change in gas prices, the following fundamental barriers faced by potential African LNG importers remain relevant, and some have even worsened since the mid-2010s.

- Gas price affordability
- Offtakers’ creditworthiness and payment issues
- Small size domestic markets
- Lack of natural gas infrastructure
- Constrained financing sources
- Absence of or limited adequate legal and regulatory framework

<sup>23</sup> Corbeau, Anne-Sophie (2016). “LNG for Africa”, KAPSARC, November. <https://datasource.kapsarc.org/explore/dataset/lng-for-africa/>

There are no current imports of LNG supplies into Africa. There was a short period between 2015 and 2018, when Egypt was forced to import LNG due to a severe gas supply deficit.<sup>24</sup> Egypt's gas balance has however improved significantly since the late 2010s and it is currently exporting increasing volumes of LNG. However, it is also importing natural gas from Israel through a cross-border gas pipeline. Ghana's 1.7 mtpa<sup>25</sup> or 2.3 bcma Tema LNG import terminal is the only LNG import infrastructure that has been built and completed in Sub-Saharan Africa, but no LNG supply has yet been delivered to Ghana. This could be because Ghana, presently, does not need LNG imports<sup>26</sup> and/or because of the impact of high international gas prices.

In Senegal, there is a temporary scheme to supply natural gas from an FSRU vessel to a floating power plant owned and operated by the Turkish company Karpowership.<sup>27</sup> The FSRU has been moored in the Dakar area since May 2021,<sup>28</sup> but has not received any LNG cargo yet (apart from a commissioning cargo). According to GIIGNL, "the start of operations has been delayed due to the high spot LNG prices."<sup>29</sup> It should be noted that the Senegal FSRU project is planned to cover a short period until Senegal develops its own indigenous gas supplies during this decade.

There is therefore no African LNG import experience to draw from for the potential development of new African projects. Nevertheless, the following selected key drivers or factors are critical to the formulation and implementation of LNG import projects in Africa's challenging environment.

- Price of LNG imports
- Domestic gas market size and credit worthy offtake
- Financing of gas infrastructure development
- Security of natural gas supply

### Challenging price of LNG supplies

Gas price affordability is a key issue for potential LNG importers in Africa. Thus, the present and future movements of the price of LNG supplies in international markets have a definite impact on the decision to import and score high in the decision-making process. Given the economic, financial, social, and energy resource endowment disparities between various countries or subregions of Africa, the levels of gas price affordability vary from one area to another.

Figure 7 shows that Africa's wholesale gas prices vary significantly between countries. The International Gas Union's (IGU's) latest available global gas price survey shows that in 2020<sup>30</sup>, domestic gas prices in Africa varied from US\$0.25 per MMBtu<sup>31</sup> in Equatorial Guinea to US\$6.50 per MMBtu in Morocco. Most of the countries represented consume indigenously produced natural gas supplies. Five countries

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<sup>24</sup> Ouki, Mostefa (2018). "Egypt – a Return to a Balanced Gas Market", Oxford Institute for Energy Studies (OIES), June. <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2018/06/Egypt-a-return-to-a-balanced-gas-market-NG-131.pdf>

<sup>25</sup> million tonnes of LNG per annum

<sup>26</sup> Fulwood, Mike (2021). "Does Ghana need LNG?", OIES, July. <https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2021/07/Does-Ghana-Need-LNG.pdf>

<sup>27</sup> Karpowership has floating power plants operating in several African countries. <https://karpowership.com/en/>

<sup>28</sup> *Maritime Executive* (2021). "First LNG FSRU Arrives in Senegal for KARMOL Powership Project", 18 June. <https://www.maritime-executive.com/article/first-lng-fsru-arrives-in-senegal-for-karmol-powership-project>

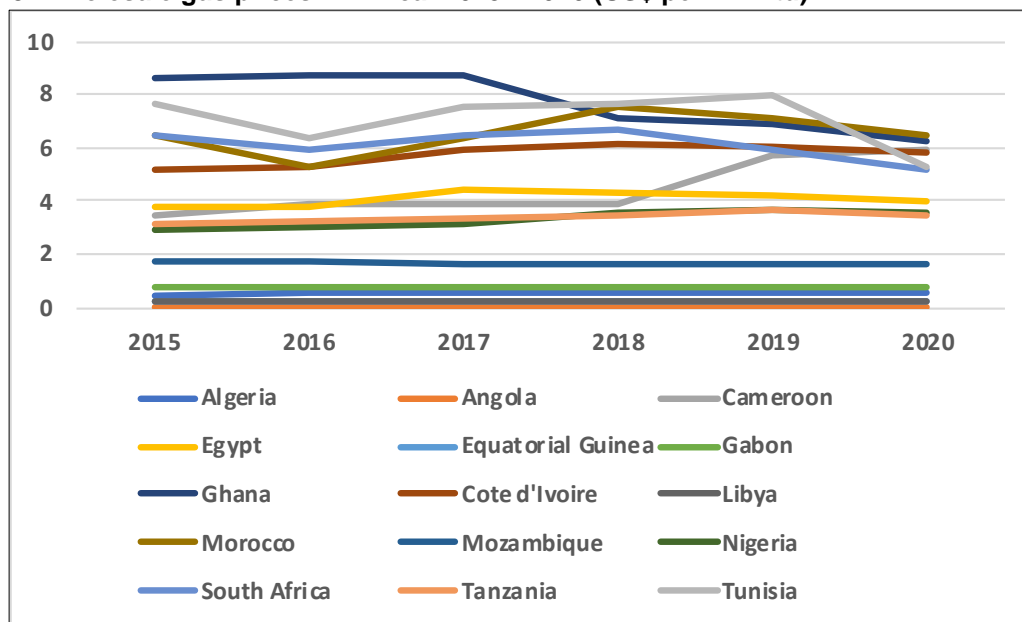
<sup>29</sup> GIIGNL (2022). "GIIGNL Annual Report 2022, 05 May. [https://giignl.org/wp-content/uploads/2022/05/GIIGNL2022\\_Annual\\_Report\\_May5.pdf](https://giignl.org/wp-content/uploads/2022/05/GIIGNL2022_Annual_Report_May5.pdf)

<sup>30</sup> International Gas Union (2021). "Global Wholesale Gas Price Survey 2021", IGU, July. <https://www.igu.org/resources/global-wholesale-gas-price-survey-2021/>

<sup>31</sup> Gas is reportedly sold in Libya at US\$ 0.20 per MMBtu. But given the country's current conflict situation, this price level may not be a true reflection of how much consumers would pay under normal conditions.

import gas through cross-border pipelines (Egypt, Ghana, Morocco<sup>32</sup>, South Africa, and Tunisia), whilst two countries (Egypt and Ghana) both produce and import pipeline gas supplies.<sup>33</sup>

**Figure 8: Wholesale gas prices in Africa: 2015 - 2020 (US\$ per MMBtu)**



Source: IGU, 2021

In many African gas consuming countries, end-user gas prices are subsidized by the state. According to the International Gas Union, over 60 percent of natural gas consumed in Africa is presently set at prices below the cost of gas supply.<sup>34</sup> Only 20 percent of the gas used domestically is set at prices that reflect the cost of service. Nevertheless, it is important to stress that the subsidized domestic gas prices do not necessarily reflect all the consumers' gas price affordability levels. Ability to pay is not always translated into willingness to pay. Some consumer groups and industries that could afford to pay non-subsidized gas prices lobby governments for price subsidies, putting forward the argument of supporting the country's economic growth, industrialization and therefore employment.

If we look at the few African countries that are currently importing natural gas, we see that in 2020, domestic gas prices reached a wholesale price level of about US\$5.5 per MMBtu on average. The average domestic gas price for the remaining African countries was just above US\$2 per MMBtu. Although, the domestic pricing of gas in these countries is not directly linked to international prices, it should be stressed that 2020 was a year that recorded a steep decline in international gas prices, with some international gas hub prices dropping to a level of less than US\$2 per MMBtu (see Figure 6).

The present high levels of gas hub prices in Europe and the Asian LNG marker (JKM) are well above what African energy markets were paying (or are still paying) as illustrated in Figure 7. Even oil-indexed LNG imports could be very challenging with today's crude oil prices fluctuating around US\$100+ per barrel. The consequences of the war in Ukraine could lead to even higher gas price levels over the next few years. Also, if the European Union (EU) member states and other European countries can significantly reduce their imports of Russian gas and secure alternative sources of gas supplies in an

<sup>32</sup> Due to a non-renewal of the contract for the transport of Algerian gas supplies to the Iberian Peninsula through the Gaz Maghreb Europe cross-border gas pipeline via Morocco, imports of Algerian gas into Morocco stopped on 31<sup>st</sup> October 2021.

<sup>33</sup> Tunisia, South Africa, and Morocco also produce natural gas but in small volumes.

<sup>34</sup> International Gas Union (2021).



already tight international natural gas market environment,<sup>35</sup> the upward pressure on international gas prices would continue unabated until a supply side adjustment takes place.

It is obvious that these extraordinary high international gas prices are very unlikely to revive Africa's past enthusiasm for LNG imports. However, the planning of LNG import projects in Africa takes time, even with the relatively faster and more flexible option of floating import facilities compared to onshore LNG import terminals. Consequently, potential new African LNG import projects need to be considered within a time framework beyond the next two or three years or even longer.

According to OIES analysis of LNG project final investment decisions (FIDs), global LNG production capacity is expected to increase by almost 60 percent by the end of this decade compared to 2021. Although LNG capacity cannot necessarily be interpreted as gas supply availability, the high level of investment/financing commitment behind these FIDs indicates that large additional volumes of LNG supplies could become available by the end of this decade. This includes the coming on stream of Qatar's LNG expansion program, new US LNG projects and Mozambique's LNG export schemes. Thus, the pressure on international prices of LNG supplies could ease off and LNG trade could be boosted. Also, if we assume that more Russian gas would be supplied to China, presently the world's largest LNG importer, less price pressure would be exerted by Asian markets.

In the long term, Mozambique's large LNG export projects could drive a growing intra-African gas trade, something that failed to materialize through the very few existing African cross-border gas pipelines. For example, there is the Matola LNG project planned to supply Mozambican gas to both South Africa and the southern region of Mozambique. Mozambican gas supplies from the Rovuma basin, in the northern part of the country, are expected to replace declining supplies from the southern Mozambique Pande and Tema fields currently supplying the South African market. This cross-border LNG project is expected to boost gas trade between these two neighbouring African countries.

Some international oil and gas companies have put forward scenarios showing significant global LNG supply deficits starting in 2030.<sup>36</sup> This is to be contrasted with the International Energy Agency's scenarios that present a significant drop in natural gas demand in Europe, one of the world's largest LNG import regions, after 2030.<sup>37</sup> The intense pressure on European governments to decarbonize their economies is expected to result in a noticeable decline in Europe's natural gas demand starting in 2030. This would reduce Europe's needs for LNG imports and should increase global LNG supply availability.

Russia's growing international isolation because of the war in Ukraine, could also make Russian LNG supplies available to potential African LNG importers. Russia tried to develop zones of influence in Africa well before the Ukraine war.<sup>38</sup> Though it is unlikely to match China's presence and influence in Africa, it could possibly provide LNG supplies to African countries under relatively attractive terms and conditions to secure influence in Africa and new export markets for its gas. Russian gas supplies could also be part of gas-to-power integrated projects, especially in Sub-Saharan African countries. However, this would depend on the extent of international sanctions on Russia<sup>39</sup> and how they would affect the financing of African import and transport infrastructure linked to potential Russian LNG imports.

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<sup>35</sup> Fulwood, Mike; Anouk Honoré; Jack Sharples; and Matthew Hall (2022). "The EU plan to reduce Russian gas imports by two-thirds by the end of 2022: Practical realities and implications", OIES, March. <https://www.oxfordenergy.org/publications/the-eu-plan-to-reduce-russian-gas-imports-by-two-thirds-by-the-end-of-2022-practical-realities-and-implications/>

<sup>36</sup> Shell (2022). "Shell LNG Outlook", February. [https://www.shell.com/promos/energy-and-innovation/v1/lng-outlook-2022-report/\\_jcr\\_content.stream/1645378179742/3399fc5b65329ddf5fda80ad6cf2f6eab2abd9e5/shell-lng-outlook-2022.pdf](https://www.shell.com/promos/energy-and-innovation/v1/lng-outlook-2022-report/_jcr_content.stream/1645378179742/3399fc5b65329ddf5fda80ad6cf2f6eab2abd9e5/shell-lng-outlook-2022.pdf)

<sup>37</sup> International Energy Agency (2021).

<sup>38</sup> Siegle, Joseph (2021), "Russia and Africa: Expanding Influence and Instability," in *Russia's Global Reach: A Security and Statecraft Assessment*, ed. Graeme P. Herd (2021), George C. Marshall European Center for Security Studies. <https://www.marshallcenter.org/en/publications/marshall-center-books/russias-global-reach-security-and-statecraft-assessment/chapter-10-russia-and-africa-expanding-influence-and>

<sup>39</sup> *LNG Journal* (2022). "New EU sanctions threaten Russia's LNG expansion plans", 28 April. <https://lngjournal.com/index.php/shipping-news-old/item/105602-new-eu-sanctions-threaten-russia-s-lng-expansion-plans>



We should keep in mind that all the above-mentioned alternative import options are just possible scenarios. Unexpected events of a geopolitical, economic, social, or sanitary nature could completely disrupt the logic of these scenarios.

Nonetheless, the future movement of the price of LNG supplies remains a key driver for Africa's potential LNG imports, but not the only factor. Potential new African LNG importers would need to mobilize funding to develop a natural gas infrastructure to receive and transport imported gas supplies to consumption centres. This funding would depend on the size of the domestic gas markets targeted, among other things.

### Niche LNG markets

Last decade, when global LNG markets were oversupplied due mainly to a slowdown in Asian gas demand, potential alternative LNG markets, such as Africa's, were considered by some LNG exporters and traders as possible niche markets.<sup>40</sup> International gas markets are today in a completely opposite situation with consuming entities and even European governments frantically searching for incremental LNG supplies to displace Russian gas supplies.

Assuming that by the end of this decade this unusually severe supply tightness eases, with new LNG supplies entering the market and decarbonization measures reducing Europe's gas demand, how big would Africa's prospective LNG import market be? Africa's potential LNG import needs are not comparable to those of Europe or Asia's LNG import markets. By 2030, Africa's LNG import capacity could reach about 16 bcm and is located in few countries.

**Table 1: Potential African LNG import capacity by 2030**

Country	Capacity (bcm) <sup>41</sup>	Start Date
Ghana	2.3	Q2 2022 (commercial operation)
South Africa	5.4	2 <sup>nd</sup> half of 2020s
South Africa/Mozambique	5.5	2024
Morocco	2	2025
Benin	0.7	2 <sup>nd</sup> half of 2020s

Source: various trade press articles, ministry website, and author's estimation

Capacity utilization would depend on potential LNG import demand. OIES gas market scenarios under favourable and unfavourable conditions, estimate that Africa's potential LNG import demand by 2030 would vary between 5 and 12 bcma. This is equivalent to between 4 and about 11 percent of Europe's 2020 LNG imports. Or between 1 and about 4 percent of total LNG imports into Asia-Pacific also in 2020.

The potentially largest LNG import markets in Africa would be South Africa, followed by Morocco. South Africa has been considering LNG imports since the early 2000s<sup>42</sup>, but has not progressed to final investment decision for any project yet. The recent focus on the role of natural gas in South Africa's path to net-zero emissions has strengthened the country's interest in LNG imports.<sup>43</sup> Gas demand scenarios for 2030 range from 6 to 15 bcm.<sup>44</sup> Morocco has been planning to import LNG since the late

<sup>40</sup> Corbeau, Anne-Sophie (2016). "LNG for Africa", KAPSARC, November. <https://datasource.kapsarc.org/explore/dataset/lng-for-africa/>

<sup>41</sup> bcm per annum

<sup>42</sup> CSIR (2004). "Coega Integrated Power Project: Environmental Screening Study", South Africa, February. [http://fred.csir.co.za/project/CIP\\_EIA/pages/ESS\\_ch3.pdf](http://fred.csir.co.za/project/CIP_EIA/pages/ESS_ch3.pdf)

<sup>43</sup> National Business Initiative (2022). "The Role of Gas in South Africa's Path to Net-Zero", Sandton, South Africa, February. <https://www.nbi.org.za/reports/the-role-of-gas-in-south-africas-path-to-net-zero/>

<sup>44</sup> Idem

2010s.<sup>45</sup> Initially, it was focusing on a large onshore LNG-to-power integrated project. More recently, it issued a tender for LNG imports through FSRU facilities.<sup>46</sup> According to the tender specifications, Morocco's potential demand for gas is estimated at 1.7 bcm by 2030 and 3 bcm by 2040.

The small size of Africa's potential LNG import markets, especially at the country level, is a daunting challenge for policymakers and private sector project developers. But some developers argue that these potential niche LNG markets could be expanded sub-regionally to supply more than one country. It is the case for Ghana's Tema LNG import project which is planning a hub and spoke approach to supply gas to nearby West African countries (Sierra Leone, Liberia, and Burkina Faso) by small scale LNG vessels and road trucks.<sup>47</sup> This gas supply aggregation strategy could allow for some additional LNG market growth and has been proposed for small island markets, such as those of the Caribbean Islands.<sup>48</sup> Nevertheless, today's high gas prices could make it extremely difficult to consider this break-bulk approach.

There is also the possibility to expand the potential LNG import markets in a subregion by trading electrons rather than natural gas molecules. The so-called "gas-by-wire" approach would consist of exports of electricity supply produced (mainly) from gas-fired power plants and transmitted to neighbouring countries through existing subregional power pools.<sup>49</sup> Normally, this approach would be easier than having to develop a new cross-border gas infrastructure or to rely on a commercially challenging small-scale LNG shipping approach to dispatch imported LNG supplies to smaller markets. However, trading electricity supplies in Africa has also its own complications.

First, in subregions where power consumption peaks are coincident, the exporting country would need to make available additional power capacity above the required national reserve margin level. This is a financially and politically challenging proposition unless there is already enough surplus electricity generation capacity that can be used for exports. Second, some segments of the African power pools would need significant reinforcement and/or new transmission lines would be required. Third, different regulatory frameworks; contractual and legal difficulties, diverging national interests and lack of trust between countries could slow down the cross-border power trading process and opportunities.<sup>50</sup>

With time, the barriers to cross-border trade of LNG supplies and/or electricity could be reduced with more favourable energy price conditions, increased infrastructure funding and convergence of interests among different power pool members. However, even with the additional potential subregional demand growth, Africa's LNG import markets would remain relatively small over the next ten years compared to other regional LNG markets. But they would provide useful trade opportunities when global LNG markets become oversupplied again, especially when stricter decarbonization measures start seriously to affect energy markets in Europe and some parts of Asia.

## Financing gas infrastructure

Stakeholder enthusiasm, favourable pricing conditions, and acceptable import market sizes are not sufficient to develop an LNG import project, unless the funding of all the relevant gas infrastructure segments is secured. The financing of most energy infrastructure projects in Africa has always been a protracted and complicated process, especially in Sub-Saharan Africa. In these countries, financing has

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<sup>45</sup> Reuters (2018). "Morocco preparing tender for \$4.5 bln LNG project – minister", 01 October. <https://www.reuters.com/article/morocco-lng-idUSL8N1WH485>

<sup>46</sup> Cockayne, James (2021). "Morocco Reboots LNG Import Plans", MEES, 28 May. <https://www.mees.com/2021/5/28/power-water/morocco-reboots-lng-import-plans/f6a22150-bfb0-11eb-8c17-4fc648b3d595>

<sup>47</sup> Dontoh, Ekow (2022). "Ghana plans to become West Africa's gas hub with import terminal", *Bloomberg News*, 19 January. <https://www.bnnbloomberg.ca/ghana-plans-to-become-west-africa-s-gas-hub-with-import-terminal-1.1709792>

<sup>48</sup> Idea Gomes and Lambert, Martin (2017). "The potential market for LNG in the Caribbean and Central America", OIES, November. <https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2017/12/The-potential-market-for-LNG-in-the-Caribbean-and-Central-America-NG-124.pdf>

<sup>49</sup> Fulwood, Mike (2019). "Opportunities for gas in sub-Saharan Africa", OIES, January. <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2019/01/Opportunities-for-Gas-in-Sub-Saharan-Africa-Insight-44.pdf>

<sup>50</sup> Alfonso Medinilla, Bruce Byiers and Karim Karaki (2019). "African power pools - regional energy, national power", ecdpm, February. <https://ecdpm.org/wp-content/uploads/DP-244-African-Power-Pools-1.pdf>

usually been provided or facilitated mainly by multilateral development banks and export credit agencies (ECAs). The involvement of such multilateral financial institutions and ECAs has in certain cases drawn the interests of commercial banks to join project funding groups or syndicates.

It is important to indicate that in most cases, especially in Africa, potential financial institutions and investors would not limit their due diligence assessment to the LNG import facilities and nearby gas supply infrastructure. They would be looking at the viability and reliability of the whole energy chain supplied by these facilities. This includes relevant gas transmission pipelines and the profiles of end-users such as power plants owned and operated by national electric utilities that very often have creditworthiness and payment issues.

International decarbonization restrictions on the financing of fossil fuel projects could render the process of funding African LNG import projects even more difficult. These would lead to more financing directed towards the development of renewable energy capacity rather than natural gas-fired power capacity. Although these restrictions are initially expected to be focused on oil and coal projects and upstream hydrocarbon investments, the case of midstream and downstream natural gas projects is not clear. Furthermore, at the last Conference of the Parties on climate change (COP26) in Glasgow, a decision by a group of twenty countries to stop the financing of fossil fuel projects by the end of 2022, specifies that these restrictions would only apply to the “unabated fossil fuel energy sector”, with some exemptions allowed for unspecified “limited” circumstances.<sup>51</sup>

Despite the numerous calls to stop the financing of fossil fuel projects, recent geopolitical events in Europe have added another level of uncertainty and confusion about such financing.<sup>52</sup> As a result of the Russian invasion of Ukraine, EU member states are actively seeking alternative sources of non-Russian gas supply. Some European countries are even considering partnerships to develop natural gas supply projects in potential new natural gas provinces, like Senegal.<sup>53</sup>

The already fragile investment risk profiles of several potential African LNG importing countries, the uncertainties arising from future international decarbonization measures, and the recent new mixed messages about the financing of gas projects, could slow down and at some stage restrict the funding of African LNG import schemes. Could the new geopolitics (or realpolitik) of gas supply allow the financing of new African gas supply projects, and for how long, if the reduction of the carbon footprint of these projects is adequately and rapidly addressed?

### Security of natural gas supply

Another key factor that drove African countries' keen interest in LNG import projects is the sensitive issue of security of gas supply, worsened by subregional political tensions, and lack of trust among trading partners. The security of supply aspect relates to the dependence on cross-border gas pipeline supplies from neighbouring gas producing countries. This concern arose not only in Africa, but also in other regions of the world, such as the Middle East, where the switch to LNG imports through FSRUs had to take place in some countries.<sup>54</sup> The LNG option offers diversification of gas supply sources through flexible floating gas importing facilities.

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<sup>51</sup> Abnett, Kate and Simon Jessop (2021). “U.S., Canada among 20 countries to commit to stop financing fossil fuels abroad”, *Reuters*, 04 November. <https://www.reuters.com/business/cop/19-countries-plan-cop26-deal-end-financing-fossil-fuels-abroad-sources-2021-11-03/>

<sup>52</sup> Mathiesen, Karl and Zia Weise (2022). “The G7 wants to dump natural gas ... but not yet”, *Politico*, 27 May. <https://www.politico.eu/article/the-g7-fossil-fuels-us-germany-russia-natural-gas/amp/>

<sup>53</sup> Kulovic, Nermina (2022). “Germany striving to develop gas field with Senegal amid supply uncertainties”, *Offshore Energy*, 23 May. <https://www.offshore-energy.biz/germany-striving-to-develop-gas-field-with-senegal-amid-supply-uncertainties/>

<sup>54</sup> Ouki, Mostefa (2020). “MENA – Could intra-regional gas trade be refocused as a result of the ongoing global crises?”, Oxford Institute for Energy Studies, May. <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2020/05/MENA-Could-intra-regional-gas-trade-be-refocussed-as-a-result-of-the-ongoing-global-crises-.pdf>

Though political issues tend to dominate news headlines, natural gas supply deficits and/or constrained gas supply infrastructure issues have been the main cause of cross-border gas pipeline trade restrictions or interruptions. For example, cross-border gas supplies of Nigerian gas to Ghana through the West African Gas Pipeline have never reached their contractual levels because of gas supply and gas transportation issues in Nigeria.











The security of supply driver also includes situations where gas buyers attempt to secure cheaper (or perceived to be cheaper) gas supplies through LNG imports. This happened during the previous period of low gas hub prices when import gas prices were compared to the cost of indigenously produced natural gas supplies or even cross-border pipeline gas imports. This approach to assessing the cost competitiveness of gas supplies could be challenging in non-mature gas markets, where gas supplies (indigenous and imported) are procured through long-term contracts with strict take or pay clauses and payments being ultimately guaranteed by the state's treasury.

The security of supply element was a strong incentive for African energy policy decision-makers planning LNG import projects. Despite the huge differences in gas market sizes and structures between Europe and Africa, the fallout from the present Ukraine war reinforces the keen interest of these policy decisionmakers in gas supply diversification. Thus, security of gas supply remains a critical driver in favour of African LNG imports.

### Project drivers' impact

To complete our review of the key drivers that underlie the development of prospective African LNG import projects, we summarize in Table 3 the favourable, unfavourable and uncertain impacts of each of these main factors on LNG import schemes and how they have evolved and could evolve over this decade.

**Table 3: Suggested drivers' impact on potential African LNG import projects**

Drivers	Mid-2010s	2022 - 2025	2026 - 2030
Price of LNG supplies			
Africa's potential LNG market size			
Financing of infrastructure			
Security of energy supply			

-  Favourable
-  Unfavourable
-  Uncertain

Table 3 suggests that during the first half of this decade, the development of LNG import projects in Africa could be very challenging and project developers would face adverse conditions. The final investment decision (FID) of the Matola LNG import project is expected to be taken this year with a planned start-up date in 2024.<sup>55</sup> This decision, if announced as scheduled, would be an encouraging step towards intra-regional gas trade during a very challenging period.

<sup>55</sup> Goosen, Matthew (2021). "LNG Import Terminal in Matola on Track for Gas Supply by 2024", *Energy Capital & Power*, 02 November. <https://energycapitalpower.com/lng-import-terminal-in-matola-on-track-for-gas-supply-by-2024/>



However, decisions about other previously announced African LNG import projects are unlikely to be taken this year or perhaps even next year for the majority. This should give sufficient planning time for project developers still interested in LNG imports to prepare import strategies addressing potential changes in the project drivers mentioned above and their relevant risks.

It should also be noted that the security of energy supply factor remains very relevant over the selected three periods shown in the table above. The on-going war in Ukraine and its fallouts in Europe's natural gas markets, is increasingly focusing the minds of African energy policymakers on the critical importance of gas supply diversification.

## Addressing Evolving Risks

The previous section presented a review of some of the key factors that drove the initial interest of potential African LNG importers and outlined the challenges that they presently pose for them. A response to these challenges could be to accelerate Africa's switch away from fossil fuels, including natural gas, to renewable energy. But, as explained earlier, Africa's adequate and realistic transition to a scaled up renewable energy capacity will be a long and complicated journey.

In the meantime, and over the next ten years or so, several African countries would have insufficient non-fossil fuel choices to fully meet the energy needs of their growing economies and populations. In existing or potential natural gas producing and consuming countries, the passage to a decarbonized economy would be through natural gas<sup>56</sup>, whether produced locally or imported. This view is strongly and consistently put forward by several African energy policy decision-makers, regional organizations (including the African Development Bank), and other relevant energy stakeholders in Africa.<sup>57,58, 59</sup> There is even an "African Coalition for Trade and Investment in Natural Gas" that has been created recently to boost investments in the "African gas value chain."<sup>60</sup>

With respect to LNG imports, prospective African importers would need to develop risk mitigating strategies to address the evolving challenges and risks. In what follows we consider what some of these risk mitigation approaches may include.

## Gas price movements

In less than three years, European gas hub prices and the Asian LNG marker price (JKM) fluctuated between significantly low and high price levels over prolonged periods. Procuring new LNG supplies at today's very high gas hub prices would not be a realistic proposition. But hoping that gas prices could return to lasting low levels could be unrealistic too. Although it is difficult to predict how long the present high levels of price volatility will last, the critical question is whether this unprecedented situation is a short-term one or indeed a sign of a profound structural market change? Since "volatility is a measure

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<sup>56</sup> Interestingly, even in Europe, natural gas is becoming part of this passage. The European Union's taxonomy has very recently added natural gas and nuclear energy as energy sources to accelerate Europe decarbonization, though under some conditions. See, European Union (2022). "EU taxonomy: Complementary Climate Delegated Act to accelerate decarbonisation", 02 February. [https://ec.europa.eu/info/publications/220202-sustainable-finance-taxonomy-complementary-climate-delegated-act\\_en](https://ec.europa.eu/info/publications/220202-sustainable-finance-taxonomy-complementary-climate-delegated-act_en)

<sup>57</sup> African Energy Commission (2021). "Natural gas in the African energy landscape", July. <https://energychamber.org/gas-to-power-an-opportunity-that-africa-cant-toss-away-after-cop26/>

<sup>58</sup> Ayuk, NJ (2021). "Gas-To-Power – An Opportunity that Africa Can't Toss Away after COP26", African Energy Chamber, 04 November. <https://energychamber.org/gas-to-power-an-opportunity-that-africa-cant-toss-away-after-cop26/>

<sup>59</sup> Hadjam, Zhor (2022). "Transition énergétique africaine: «Le gaz, une ressource fondamentale» selon le président de la BAD", *El Watan*, 24 May. <https://elwatan-dz.com/transition-energetique-africaine-le-gaz-une-ressource-fondamentale-selon-le-president-de-la-bad>

<sup>60</sup> Elliott, Stuart (2021). "New African initiative launched to advocate for gas across value chain", *S&P Global Platts*, 03 November. <https://www.spglobal.com/commodity-insights/en/market-insights/latest-news/natural-gas/020321-new-african-initiative-launched-to-advocate-for-gas-across-value-chain>



of market uncertainty”<sup>61</sup>, we should expect volatility episodes to continue and more frequently because of increasing uncertainties about how different energy transition pathways will be implemented (or imposed) in different parts of the world; the impact of regional political and military conflicts; and how more extreme weather conditions could affect economies; *inter alia*.

Potential African LNG importers would need to manage this price volatility, as much as they can.<sup>62</sup> Identifying a fixed target range of “acceptable” gas prices for LNG supplies to Africa, like the old \$6 to \$8 per MMBtu price range proposition,<sup>63</sup> could no longer be relevant. In fact, this range or sort of “equilibrium” price bracket could increase (or could have already increased) reflecting structural changes in Africa’s energy markets. Moreover, in African countries with more than one source of natural gas supplies (e.g., Ghana), the cost of imported LNG supplies would be incorporated in a weighted average cost of gas (WACOG) pricing approach.<sup>64</sup> Depending on the prevailing price of LNG supplies at the time of procurement and the share of these imported supplies in the total volume of gas consumed, this pricing mechanism could reduce – to a certain extent - the impact of relatively higher priced LNG supplies paid by end-users, especially the power sector.

Although, it is unlikely that the previously announced African LNG import projects envisaged a spot procurement for all their imported LNG supplies, African energy policy decision-makers were focused on capturing the benefits of low gas hub prices then. A fundamental lesson (though an obvious one) of the present extraordinary gas price rises is the simple fact that in fully liberalized gas (or energy) markets, prices go up and down at magnitudes that reflect events affecting the relevant markets. However, developing markets, like Africa’s, need price structures that mitigate that volatility.

The current very high gas hub prices are triggering calls for a return to long term gas contracts. Last October, the IEA indicated that “large long-term contracts with a fixed destination have made a comeback in 2020 and 2021”<sup>65</sup>, and potential European buyers are discussing long-term contracts with key LNG exporters.<sup>66</sup> However, under the presently volatile and high price environment, a long-term contract would not necessarily mean that buyers are able to secure LNG cargoes at contractually agreed pricing mechanisms, as some Asian importers found out to their detriment, according to news reports.<sup>67</sup>

Therefore, potential African LNG importers need to carefully formulate their LNG supply procurement strategies. They would have to focus on the impact of all the terms and conditions of the contractual framework being considered under different international gas market scenarios. This also implies the need to take into consideration the likely realistic timing of their first potential import cargoes.

## Evolving domestic gas markets

The previous section outlined the risks and challenges of Africa’s limited potential LNG import market size, especially when viewed under current tight international market conditions. But it is important to

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<sup>61</sup> Heather, Patrick (2022). “A Series of Unfortunate Events - Explaining European Gas Prices in 2021: The role of the traded gas hubs”, OIES, March. <https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2022/03/Insight-111-Explaining-European-gas-prices-in-2021-the-role-of-the-traded-gas-hubs.pdf>

<sup>62</sup> Of course, certain situations, like the current unprecedented stratospheric trajectory of European gas hub prices, would be extremely difficult to manage.

<sup>63</sup> Stern, Jonathan (2017). “Challenges to the Future of Gas: unburnable or unaffordable?” OIES, December. <https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2017/12/Challenges-to-the-Future-of-Gas-unburnable-or-unaffordable-NG-125.pdf>

<sup>64</sup> Fulwood, Mike (2021).

<sup>65</sup> International Energy Agency (2021). “Gas Market Report Q4-2021 including Global Gas Security Review 2021”, October. <https://iea.blob.core.windows.net/assets/261043cc-0cb6-498b-98fa-a1f48715b91f/GasMarketReportQ42021.pdf>

<sup>66</sup> Steitz, Christoph (2022). “RWE is working with Qatar, U.S. on long-term LNG deals”, *Reuters*, 21 April. <https://www.nasdaq.com/articles/rwe-is-working-with-qatar-u.s.-on-long-term-lng-deals>

<sup>67</sup> Mustafa, Khalid (2022). “No let-up in gas crisis: LNG firms renege on commitment to provide cargoes”, *The News*, 17 February. <https://www.thenews.com.pk/print/934321-no-let-up-in-gas-crisis-lng-firms-renege-on-commitment-to-provide-cargoes>

reiterate the relevant time framework for prospective African LNG import projects. Under the right conditions, these projects could realistically be fully operational only during the second half or end of this decade. Then, it is expected that international gas markets would have evolved to less volatile levels because of a potential surge in LNG supplies and a possible gradual decline in Europe's gas demand due to decarbonization policies.

Some may consider Africa's LNG import markets similar to that of India, with a very gas price-sensitive characteristic favouring cheap LNG supplies, when available. However, there are fundamental differences between the African and Indian gas markets. Africa's potential gas import market is much smaller than India's. Africa is a niche market region. Furthermore, India's renewable energy potential is considerably more developed than Africa's and it has a large renewable energy program that is being implemented. Finally, India has a significant coal-fired electricity generation capacity, as an alternative to natural gas.

In the longer term, Africa's latent domestic demand for natural gas could offer gas market expansion opportunities, especially in Sub-Saharan Africa. Latent demand is assumed to be repressed demand due mainly to domestic energy price distortions and lack or insufficient energy (gas and electricity) infrastructure. The current energy regulatory framework of several African countries does not provide sufficient incentives to expand their domestic gas markets. It should be stressed that this situation existed long before the awareness of the adverse impact of climate change started to manifest itself in Africa. Today there is international pressure on African policymakers to intensify the switch away from fossil fuels to renewable sources of energy. This could affect how governments prioritize and manage their energy transition, including the role of natural gas.

Therefore, first, it is important that African countries seriously reform their energy markets and relevant legal and regulatory frameworks. Second, the clear sequencing of energy transition priorities needs to reflect not only decarbonization commitments (or pressure), but also the realities on the ground in Africa, especially the financing constraints, over the next ten to fifteen years. Uncertainties about both the future role of natural gas and renewable energy in the energy mix of relevant African countries, and consequently the potential size of these countries' domestic gas markets, will limit their attractiveness as potential LNG import markets.

### Financing uncertainties

As indicated earlier, multilateral development banks and export credit agencies have in the past played a very important role in the funding of energy infrastructure projects in Africa. Presently, with the accelerated decarbonization measures being announced, the future role of such institutions in financing or enabling financing of LNG import schemes is unclear. As a result of these uncertainties, African stakeholders have been looking for alternative sources of funding, not only to finance LNG import projects, but all categories of projects along the hydrocarbon chain.

Although there are several African financial organizations, like the African Development Bank and the African Export Import Bank (Afreximbank), that participate in the financing of energy projects in Africa<sup>68</sup>, there are calls within the African continent for more African financial institutions to get involved and for new ones to be set up.<sup>69</sup> In May 2022, Afreximbank signed a memorandum of understanding with the African Petroleum Producers Organization (APPO) to create an energy bank in Africa.<sup>70</sup>

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<sup>68</sup> Afreximbank and the African Finance Corporation, another African financial institution, are part of a syndicate financing Nigeria's NLNG Train 7 project. <https://www.whitecase.com/publications/insight/africa-focus-autumn-2020/nigerias-lng-train-7-project-breaks-new-ground>

<sup>69</sup> Ayuk, NJ. "Pourquoi nous avons a présent besoin des banques énergétiques africaines", African Energy Chamber, 02 January. <https://energychamber.org/pourquoi-nous-avons-a-present-besoin-des-banques-energetiques-africaines/>

<sup>70</sup> *CEO Business Africa* (2022). "Afreximbank signs MoU with APPO to create energy bank in Africa", 17 May. <https://ceobusinessafrica.com/afreximbank-signs-mou-with-appo-to-create-energy-bank-in-africa/>

African national oil and gas companies (NOCs) and large African industrial conglomerates have also been mentioned as potential sources of funding. But how realistic are these propositions given the high capital-intensity of hydrocarbon development projects, their risk levels, and the fragile financial situation of some of these NOCs? Additionally, it is unlikely that the risk appetite and risk assessment of relevant African financial institutions would be that different from other international financial organizations. Moreover, several African banks are signatories of the Equator Principles – “A financial industry benchmark for determining, assessing and managing environmental and social risk in projects.”<sup>71</sup> Some banks have also become members of the newly launched Net Zero Banking Alliance<sup>72</sup> or preparing for Net Zero Emission commitments.

It should be mentioned that Sub-Saharan Africa’s first completed LNG import project, Tema LNG in Ghana, is reportedly funded by African financial sources, such as Afreximbank.<sup>73,74</sup> But there is no publicly available information about the funding structure of the project, financing sources, and the share of each financing source. In southern Africa, the planned Matola and Nacala FSRU projects to supply Mozambican gas to both South Africa and Mozambique’s domestic markets, if both go ahead, are likely to be funded at least partially by African financial institutions.

Asian and Arab financial institutions have also been considered as potential sources of financing. Some are already involved in African hydrocarbon projects, but only in upstream and LNG export projects.<sup>75</sup> To the best of our knowledge, none of them have expressed interest in investing in African LNG import projects yet. Though some could potentially be involved in exports of LNG supplies to Africa and the sale of gas infrastructure equipment and LNG vessels (FSRU/FSU).

New sources of financing will probably emerge, or existing ones will expand their share in the funding of African natural gas projects, including LNG import schemes. However, given the magnitude of the financing requirements of these projects (and related infrastructure) and their complexities, traditional financial institutions would continue to be solicited. To bring back or keep these traditional funding sources involved along with new ones, African policymakers and project developers would need to:

- reform their energy markets, especially domestic energy pricing policies
- introduce more transparency in project structure and transactions; and,
- address the new decarbonization measures, such as the reduction of gas projects’ carbon footprints and ultimately the development of abated gas projects.

The Conference of the Parties (COP) on climate change is returning this year to the African continent. The 27<sup>th</sup> session of the COP or COP27 will be held this coming November in Egypt, Africa’s largest consumer of natural gas. This African COP will undoubtedly put the focus and pressure on Africa’s decarbonization policies, commitments, and actions. However, for a continent that accounts for less than 4 percent of total global greenhouse gas emissions<sup>76</sup>, it will be difficult to convince African governments to undertake rapid, drastic, and costly decarbonization actions, especially in the absence of or with insufficient international financial support.

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<sup>71</sup> <https://equator-principles.com/members-reporting/>

<sup>72</sup> <https://www.unepfi.org/net-zero-banking/members/>

<sup>73</sup> Elliott, Stuart (2021). “Ghana gears up for sub-Saharan Africa’s first LNG imports”, *S&P Global*, 05 March.

<https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/030521-ghana-gears-up-for-sub-saharan-africas-first-lng-imports>

<sup>74</sup> (Afreximbank (2022). “Afreximbank’s Fund for Export Development in Africa (FEDA) invests in Ecow-Gas to promote LNG distribution in West Africa”, Press Release, 02 March. <https://www.afreximbank.com/afreximbanks-fund-for-export-development-in-africa-feda-invests-in-ecow-gas-to-promote-lng-distribution-in-west-africa/>

<sup>75</sup> Asian companies (especially Chinese companies) are actively involved in other segments of several African economies.

<sup>76</sup> <https://www.cdp.net/en/research/global-reports/africa-report>

The growing use of natural gas in several African economies will continue to be the target of severe criticism by some parties. The narrative stating that natural gas is more environmentally friendly than other fossil fuels has become obsolete and insufficient to make the case for natural gas, especially in some regions like Europe that is attempting to accelerate its decarbonization agenda. Though the Ukraine war switched Europe's immediate attention to non-Russian gas, this is just a short to medium term unexpected situation. Europe's long-term priorities are likely to continue to be solidly focused on the significant decarbonization of its economies.

Over the next ten years or so most African countries will have very limited possibilities to transit quickly to large scaled-up renewable sources of energy and feedstock. Wherever it is commercially feasible the passage through natural gas remains a realistic energy transition option in Africa, along with the ongoing development of renewable energy capacity. Nevertheless, in the long term, the way natural gas is produced, transported, transformed, and consumed in Africa will have to change significantly with increasing pressure on the reduction of carbon footprints and eventually natural gas abatement measures. COP27 will certainly be reiterating and reinforcing this message.

## Conclusions

Africa has been a source of LNG exports for several decades, but only six African countries are presently exporting LNG. Most of the countries in the African continent do not hold large proven natural gas reserves and very few of them account for the bulk of the continent's total gas production and consumption. However, energy scenarios formulated by different international institutions suggest that over the next decades Africa is expected to have one of the highest rates of gas demand growth. This could raise questions about the sustainability of the African countries' potential choice to continue to consume fossil fuel sources of energy at a time of rising global concern about the very adverse impact of climate change on developing economies, like theirs.

A pertinent question that is frequently put forward is why focus on natural gas? How about Africa's large renewable energy potential? The key word here is "potential" and how and when this potential (e.g., the continent's high level of solar irradiance) could realistically be leveraged to supply electricity to the millions of African households that still do not have access to electricity. The present share of renewable energy in Africa's total primary energy consumption remains very low. Because of the numerous challenges they face in increasing this share, most African countries are unlikely to satisfactorily transition to large scaled up renewable sources of energy within the next ten years or even longer. Therefore, in several African countries, where it is feasible, the decarbonization pathway will include natural gas use, whether gas supplies are indigenously produced or imported. This will evolve along with the development of renewable energy capacity, something which is already happening in some countries.

During the last decade there was a keen African interest in importing LNG supplies mainly to fuel power stations. Over a dozen African LNG import projects were announced, but only one project<sup>77</sup> has been implemented and the infrastructure built, but no LNG has been delivered to this import facility yet. Some of the drivers that triggered this African enthusiasm for LNG imports were the low gas hub prices that prevailed then, concerns about security of gas supply issues, and the emergence of more flexible floating LNG import facilities. Presently, prospective African LNG importers are still faced with the same market size and infrastructure financing challenges and the present volatile and uncertain global energy market conditions are not making these barriers any easier to overcome.

The extremely high present levels of Europe's gas hub prices and the Asian LNG marker (JKM) are very unlikely to revive African interest in LNG imports. But import projects take time to plan and develop, especially in Africa, and the impact of gas price movements would depend on the period when these projects would be expected to come on stream. It is difficult to predict how long this present high price volatility will last and whether this situation is a short-term episode or the beginning of a significant

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<sup>77</sup> This excludes temporary projects, such as Senegal's FSRU scheme.



structural market change. In any case, potential African LNG importers would need to mitigate potential price risks by carefully formulating their LNG supply procurement strategies and assessing their potential impact under different international gas price scenarios and contractual structures.


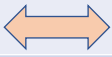


The limited size of Africa’s potential LNG import markets has always been a serious barrier for governments or project developers planning LNG import projects, especially during tight international gas market conditions like the present situation. In the long term, repressed domestic demand for natural gas could offer gas market expansion opportunities, especially in Sub-Saharan Africa. However, for this demand to materialize, African policymakers would need to seriously reform their energy markets and relevant legal and regulatory frameworks. Moreover, to avoid adverse uncertainties about the future role of natural gas and renewables, wherever it is relevant, a clear sequencing of energy transition priorities needs to reflect not only decarbonization commitments (or pressure), but also the realities on the ground in Africa, especially the financing constraints that African energy projects continue to face.

Until recently, multilateral development banks and export credit agencies played a very important role in the financing of energy infrastructure projects in Africa. Internationally, the increased pressure of decarbonization measures to move away from fossil fuel projects has resulted in uncertainties about the future involvement of such key institutions in the funding of LNG import schemes. In fact, it is increasingly challenging to mobilize funding sources for oil and gas projects. Could the new geopolitics (or realpolitik) of gas supply allow the financing of new African gas supply projects, and for how long, if the reduction of the carbon footprint of these projects is adequately and rapidly addressed?

African stakeholders are currently seeking alternative sources of funding to finance not only LNG import projects, but a series of projects along the hydrocarbon chain. African governments should not be focusing only on identifying alternative sources of financing for their hydrocarbon projects but should also seek to improve the “financeability” of these projects. This includes reform of their energy sector; project transparency; and implementation of project decarbonization measures, *inter alia*. In the short to medium term, these actions could be formidable challenges for some African countries to overcome, but they are unavoidable in the long-term.

Table 4 presents the directional impact of each of the key drivers under current energy market conditions and energy transition uncertainties compared to Africa’s previous keen interest in LNG imports. Interestingly, the security of energy supply driver is the only factor that could favourably increase interest in multi-source LNG imports, as opposed to cross-border gas pipeline imports. Europe’s current Russian gas pipeline import problems are likely to focus the minds of public and private sector African energy policy decisionmakers more on the question of security of gas supply.

**Table 4: Summary impact of some key drivers on Africa’s potential LNG imports**

Drivers	Impact of current high gas price volatility and energy transition uncertainties compared to previous African enthusiasm for LNG imports
Price of LNG supplies	
Africa’s potential LNG market size	
Financing of infrastructure	
Security of energy supply	

It should be stressed that international high gas price volatility and energy transition uncertainties started before the Russia\Ukraine war broke out. This war has worsened the situation and its adverse fallout will last possibly a few years. Nonetheless, it is important to point out that the potential development of new African LNG import projects needs to be considered within a timescale beyond the next two or three years or even longer.



Africa's prospective LNG import markets would be much smaller than existing European and Asian markets. But in the long term, they could provide useful growing LNG trade opportunities when global LNG markets become oversupplied again, especially when stricter decarbonization measures start seriously to affect energy markets in Europe and some parts of Asia.

There is no doubt that the current gas price volatility and energy transition uncertainties have dampened Africa's enthusiasm for LNG imports. In the short-term, decisions to import LNG supplies are likely to be postponed or abandoned. But some African countries' interest in LNG imports, such as South Africa and Morocco, is unlikely to disappear altogether. International energy market developments over the next two or three years will have a critical impact on future African LNG imports.

Finally, the return this year of the climate change Conference of Parties to the African continent with the holding of COP27 in Egypt, Africa's biggest natural gas user, will certainly reiterate the message that Africa will need to seriously reduce the carbon footprint of its fossil fuel operations and eventually engage in CO<sub>2</sub> natural gas abatement actions. This will certainly be met by Africa strongly restating its request for urgent financial support to address the adverse impact of climate change, which is already gravely affecting several African subregions