

# The scramble for Africa's gas

## Introduction

A US\$245 billion planned expansion of gas infrastructure is underway in Africa, representing an enormous stranded asset risk especially as much of this gas is intended to correct for Europe's short-term energy crisis resulting from Russia's invasion of Ukraine.

The war has [precipitated](#) increased investment plans in African gas [across](#) the upstream and midstream value chains, with countries such as Mozambique, Nigeria, and Tanzania on the brink of making major investments in gas export infrastructure. But these multi-billion dollar bets risk being driven by Europe's [renewed](#) but temporary interest in natural gas, which will likely lead to stranded assets and a [failure](#) to invest as strongly as necessary in Africa's domestic generation capacities and renewable energy future.

Planned investment in gas pipeline and LNG export infrastructure competes with domestic demand for gas and much needed renewable energy investment for Africa to realize universal access to clean, affordable, and reliable energy.

This report describes existing and planned LNG terminals, gas pipelines, and gas plant projects, including the use of gas in Africa's electricity generation. The key takeaways from the report are:

- **Investments in planned LNG export terminals dwarf planned investment in gas plants to power Africa.** Estimated capital expenditure for in-development LNG terminals is US\$103 billion; 92% would be for LNG export terminals. This total estimated investment would increase the region's 79.3 million tonnes per annum (mtpa) of LNG export capacity by 111%, while doing little to improve electrification on the continent. Nigeria and Mauritania have the greatest in-development export capacities at 24 and 20 mtpa, respectively.
- **Much of the continent's gas pipeline buildout has yet to secure investment.** The planned gas pipeline buildup in Africa would require US\$89 billion in investment. Only US\$4 billion is attributed to projects under construction, while US\$85 billion is attributed to proposed projects. Nigeria leads planned regional gas pipeline development with 1,427 kilometers (km) in construction. South Africa and Mozambique lead in proposed gas pipelines, with 4,792 km and 4,352 km, respectively.
- While Africa has an estimated 23,932 km of gas pipelines in development, most projects remain in the proposal stage with only 1,872 km currently under construction.
- **Regional imbalances in gas plant generation persist.** The planned gas plant buildout in Africa would require US\$62 billion in investment. Yet only US\$9.7 billion is attributed to projects under construction, while US\$52.3 billion is attributed to proposed projects. Nigeria and South Africa have the greatest estimated

required investment with US\$21.2 billion and US\$16.3 billion, respectively.

- 109.2 gigawatts (GW) of operating gas-fired power plants exist in Africa, much of which is in North and West Africa. 64.1 GW of gas power plant capacity is in development, of which

only 10.5 GW is under construction, 17.3 GW is in pre-construction and 36.4 GW has been announced. Nigeria and South Africa have 22.5 GW and 16.6 GW of in-development gas plants, respectively, and while both are gas producing countries, each faces inadequate installed electricity generation capacity.

## 1. LNG terminal developments

GEM data show that only Egypt and Senegal have operating LNG import terminals in Africa, with a combined capacity of 5.8 mtpa (Table 1). Egypt accounts for much of the operating LNG import terminal capacity with 5.7 mtpa. Egypt is Africa's largest gas consumer, with a domestic demand almost at par with its [gas production](#).

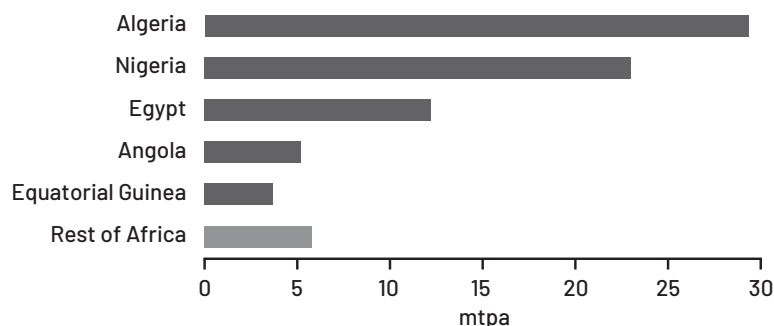
Operating LNG export terminals in Africa have a total capacity of 79.3 mtpa. Three of the continent's largest LNG exporters account for 82% of the operating LNG export terminal capacity. According to the African Energy Commission, the development of LNG export terminal infrastructure has allowed Nigeria and Angola to become major exporters and created new market opportunities for Algeria and Egypt.

**Table 1: Operating LNG import terminal capacity in Africa**

Country	Operating LNG import terminal capacity (mtpa)
Egypt	5.7
Senegal	0.1
Rest of Africa	0
<b>Total</b>	<b>5.8</b>

Source: Global Energy Monitor, Global Gas Infrastructure Tracker

**Figure 1: Operating LNG export terminal capacity in Africa**



Source: Global Energy Monitor, Global Gas Infrastructure Tracker

The 2022 BP statistical review of modern energy [shows](#) that in 2021, 61% of total gas exports from Africa were LNG exports (Figure 2). Algeria and

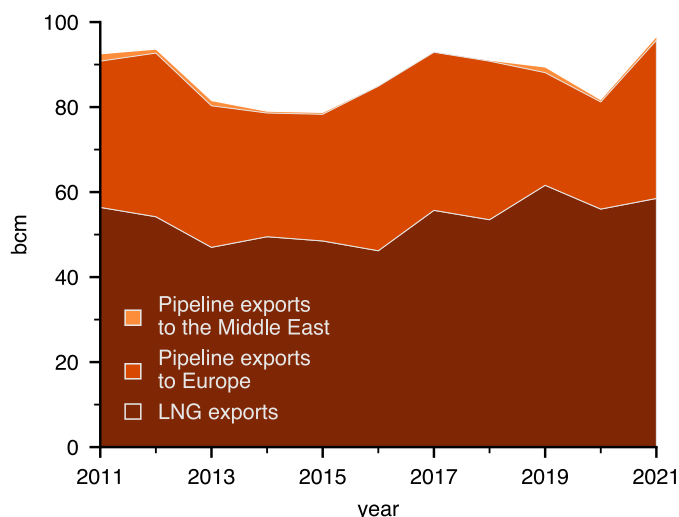
Nigeria [drove](#) Africa's LNG exports, with the former exporting to France and Turkey, and the latter to Spain, Portugal, and France.

### Planned LNG terminal development

Nigeria leads LNG export terminal development with 24 mtpa proposed or under construction (Figure 3). Gas supply and infrastructure challenges resulted in a 20% [decline](#) in Nigerian LNG exports in 2021. LNG projects in development include the seventh

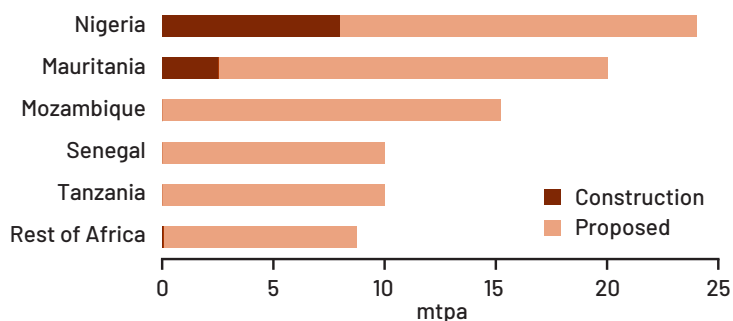
liquefaction train of a [Nigeria LNG Limited](#) (NLNG) plant, which is [expected](#) to add about 11 billion cubic meters (bcm) of capacity by the second half of this decade.

**Figure 2: Pipeline and LNG exports from Africa in billion cubic meters (bcm)**



Source: BP Statistical Review of World Energy, 2022

**Figure 3: LNG export capacity by country (mtpa)**



Source: Global Energy Monitor, Global Gas Infrastructure Tracker

## Estimated investment for planned LNG import and export terminals

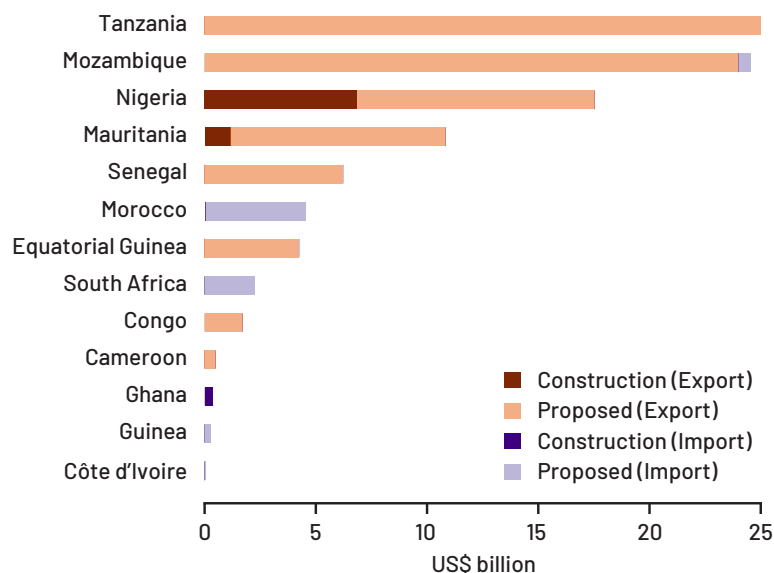
The total estimated capital expenditure for in-development LNG terminals is US\$103 billion (Figure 4). Of this, 92% would be for LNG export terminals and 8% would be for import terminals. Tanzania, Mozambique, and Nigeria have the highest estimated investment for proposed LNG terminals with US\$30 billion, US\$25 billion, and US\$18 billion respectively.

At COP 27, Tanzania [announced](#) plans to sign agreements for a planned US\$40 billion LNG export project with oil giants including Equinor ASA and Shell

plc. In Tanzania, only [40%](#) of the population has access to electricity. In Nigeria, [51%](#) of the population has access to electricity, while Mozambique has an even lower electricity access level of [31%](#).

Banking on what could well be a short-lived European interest in Africa's gas leaves these countries with both stranded asset risks and a potential lack of investment in renewable energy infrastructure to power the growth of their own countries.

**Figure 4: Estimated investment for planned LNG export terminal infrastructure (US\$ billions)**



Source: Global Energy Monitor, Global Gas Infrastructure Tracker<sup>1</sup>

1. Gas plant costs are estimated using the August 2022 [Global Gas Plant Tracker](#) database. The estimate for African countries is based on CCGT capital costs (\$1000/kW) for Europe from [IEA World Energy Model](#) inputs. CCGT technology is assumed for gas plants with technology type that is not available. OCGT capital costs are estimated to be 74.4% of CCGT costs, based on a comparison of costs for "Combustion Turbine H Class, 1100-MW Combined Cycle" to "Combustion Turbine F Class, 240-MW Simple Cycle," as detailed in the [2020 EIA Report](#). GEM estimated regional investment in pipelines and LNG terminals in development by summing projected capital expenditures for each project within the region. Where reported project cost data are not available from secondary research, GEM produces its own cost estimates based on global and regional averages. North Africa and Sub-Saharan Africa pipeline and terminal costs are estimated differently when there are sufficient data to support a regional average; otherwise, cost estimates are inherited from global averages. For pipelines, estimated capital expenditure costs are US\$3.92 million per km for Sub-Saharan Africa and US\$2.22 million per km for North Africa. For LNG import terminals, estimated costs are US\$269.7 million per mtpa for onshore facilities and US\$134.7 million per mtpa for floating facilities. For LNG export terminals, estimated costs are US\$544.8 million (for North Africa) and US\$623.6 million (for Sub-Saharan Africa) for onshore facilities, and US\$567.5 million per mtpa for floating facilities.

## 2. Africa's gas pipelines

Africa has an estimated 31,555 km of operating gas transmission pipelines. Algeria has the longest network of operating gas pipelines with 13,630 km, followed by Libya with 6,243 km. With the exception of Nigeria, the top 5 countries with the longest operating gas pipeline networks are in North Africa (Table 2).

**Figure 5: In-development and operating gas pipeline infrastructure in Africa**



Source: Global Energy Monitor, Global Gas Infrastructure Tracker

**Table 2: Operating gas pipelines in Africa**

Country	Operating gas pipeline (km)
Algeria	13,630
Libya	6,243
Egypt	3,545
Nigeria	3,200
Tunisia	1,105
Rest of Africa	3,832
<b>Total</b>	<b>31,555</b>

Source: Global Energy Monitor, Global Gas Infrastructure Tracker

## Regional pipeline buildout

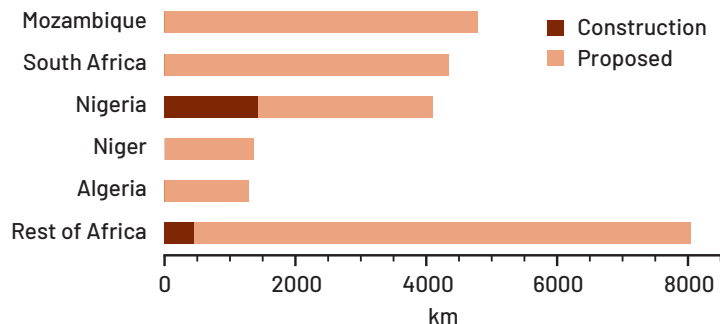
Africa has a total of 23,932 km of in-development gas transmission pipeline infrastructure (Figure 6). However, much of what is in development has yet to be constructed, with most projects in the proposal stage and only 1,872 km currently under construction. Nigeria leads the regional gas pipeline construction with 1,427 km in construction.

Major pipeline projects under construction include the [Trans Nigeria Gas Pipeline](#), which upon completion will run from the Qua Iboe gas terminal to a gas terminal in Kano, Nigeria, and from there, will connect to the proposed [Trans-Sahara Gas Pipeline](#) aimed at natural gas export to Europe. Phase one of the project, the 614 km Ajaokuta–Kaduna–Kano pipeline, is under construction and is set to cost US\$2.9 billion. In 2020, the Nigerian government announced a sovereign debt guarantee for US\$2.5 billion in financing for the pipeline's construction. The project is financed by a US\$2.6 billion [loan](#) from the Bank of China and an equity investment of US\$434 million

from the Nigerian Gas Company. Algeria, Niger, and Nigeria have also [revived](#) talks on the development of the Trans-Sahara gas pipeline. In June 2022, the three countries set up a task force for the project and designated an entity to carry out a feasibility study.

The top five countries by proposed pipeline length are Mozambique, South Africa, Nigeria, Niger, and Algeria. Nearly two-thirds of this proposed buildout would serve natural gas exports to Europe, with the remainder for meeting domestic gas needs or in some cases refining and petrochemical manufacturing that could also provide exports. South Africa leads in the number of proposed gas pipelines in Africa, much of which is intended for domestic gas use, with major proposed pipelines that would connect the country to Mozambique and Namibia. The South African government has laid out strategic gas pipeline corridors for the proposed [Phased Gas Pipeline Network](#).

**Figure 6: In development gas pipelines (km)**



Source: Global Energy Monitor, Global Gas Infrastructure Tracker

Planned projects also include the [Africa Renaissance Gas Pipeline](#), which if constructed would have a capacity of 13.2 mtpa and a length of 2,600 km, connecting to TotalEnergies SE and ExxonMobil Corp natural gas extraction projects. The onshore pipeline would run through eight provinces in Mozambique for 2,175 km and two provinces in South Africa for a further 425 km. Earlier this year, chemicals and energy company SASOL [backtracked](#)

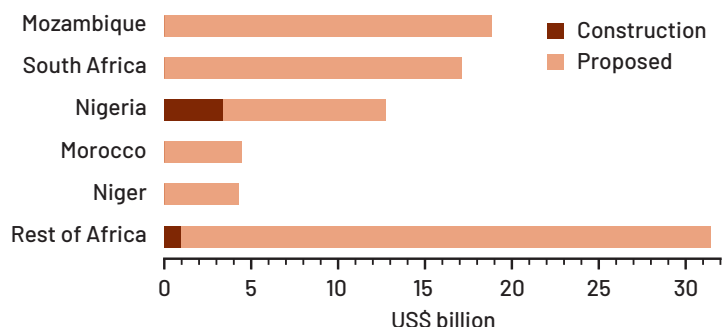
on a prior commitment to the project amid concerns over being locked into stranded assets as the world progresses with the energy transition. Nonetheless, major Chinese banks have since expressed interest in [funding](#) the project, which is expected to begin construction in 2024. These include the Industrial and Commercial Bank of China, China Development Bank, and China Construction Bank.

### A hefty price to pay: cost estimates for planned gas pipeline buildup

GEM estimates that the planned gas pipeline buildup in Africa would require US\$89 billion in investment (Figure 7). Of this total capital expenditure estimate, only US\$4 billion is attributed to projects under

construction, while US\$85 billion is attributed to proposed projects. Mozambique and South Africa have the highest capital expenditure estimate with US\$19 billion and US\$17 billion, respectively.

**Figure 7: Estimated investment for planned pipeline infrastructure (US\$ billions)**



Source: Global Energy Monitor, Global Gas Infrastructure Tracker

## Trends in gas-pipeline ownership

The companies leading the planned gas pipeline buildout in Africa are a combination of state-owned and private companies (Table 3). State-owned companies lead in terms of estimated in-development gas pipeline length. The state-owned Nigerian National

Petroleum Corporation has 6,135 km of gas pipeline in development, 1,427 km of which is already under construction. In South Africa, state-owned enterprise Transnet has 3,949 km of proposed gas pipeline infrastructure.

**Table 3: Top 15 companies leading Africa's in-development gas pipeline buildout**

Owner	Headquarters Country	Proposed (km)	Construction (km)	In Development (Proposed + Construction) (km)
Nigerian National Petroleum Corporation	Nigeria	4,708	1,427	6,135
Transnet	South Africa	3,949		3,949
Moroccan National Board of Hydrocarbons and Mines	Morocco	2,646		2,646
Empresa Nacional de Hidrocarbonetos de Mozambique	Mozambique	1,950		1,950
Niger Ministry of Petroleum, Energy and Renewable Energies	Niger	1,376		1,376
Sonatrach	Algeria	1,376		1,376
Gigajoule International	South Africa	1,300		1,300
GCL-Poly Natural Gas Group Holdings Co., Ltd.	China	767		767
Profin Consulting	South Africa	650		650
Progas Investment Group	South Africa	650		650
China National Petroleum Corporation	China	650		650
Axxela	Nigeria	510		510
Israel Natural Gas Lines (INGL)	Israel	430		430
Genser Power USA, LLC	United States	185	155	340

Source: Global Energy Monitor, Global Gas Infrastructure Tracker



### 3. The use of gas-fired power plants in Africa's energy generation

With 43% of the total population (600 million people) lacking access to electricity, achieving universal access to clean, affordable, and reliable electricity is a top priority for Africa. Despite abundant renewable energy resource potential, only [2%](#) of global renewable energy investments in the last two decades were made in Africa. Excluding South Africa, average electricity [consumption](#) per person in sub-Saharan Africa is only 185 kilowatt-hours (kWh) a year. The stark contrast with about 6,500 kWh in Europe and 12,700 kWh in the U.S. illustrates the link between electricity access and economic development.

Africa's generation mix is dominated by natural gas, which [reportedly](#) comprised 40% of total power generation in 2020. GEM data shows a total of

109,242 MW in operating gas-fired power plants in Africa. Much of the operating gas-fired power plants are in North Africa (Table 4). In 2021, the African Energy Commission [reported](#) that, with the exception of Angola, all African gas-producing countries were using gas for electricity generation.

Egypt is the continent's largest gas consumer, with 51,608 MW in operating gas-fired power plants. Nigeria holds Africa's largest natural gas reserves and is among the top three gas consuming countries on the continent. The country has 10,968 MW in operating gas power plants. However, gas supply and infrastructure constraints have [caused](#) significant repressed gas demand in Nigeria's power sector.

**Table 4: Top 5 countries with operating gas plants in Africa**

Country	Operating gas plants (MW)
Egypt	51,608
Algeria	22,247
Nigeria	10,968
Libya	10,163
Tunisia	5,633
Rest of Africa	8,623
<b>Total</b>	<b>109,242</b>

Source: Global Energy Monitor, August 2022 Global Gas Plant Tracker

## Trends in gas plant ownership

Power generation in Africa is dominated by state-owned utilities. State-owned utilities own much of the operating gas power plants in the top 5 countries

with the largest share of operating gas plants in Africa (Table 5).

**Table 5: Ownership of operating gas plants in top five African countries**

Country	Operating gas plants (MW)	State-owned utility	State-owned operating gas plants (MW)
Egypt	51,608	Egyptian Electricity Holding Company	48,909
Algeria	22,247	Société Nationale de l'Electricité et du Gaz (Sonelgaz)	18,718
Nigeria	10,968	Niger Delta Power Holding Company (NDPHC)	4,796
Libya	10,163	General Electricity Company of Libya	9,656
Tunisia	5,633	Tunisian Company of Electricity and Gas	5,153

Source: Global Energy Monitor, August 2022 Global Gas Plant Tracker

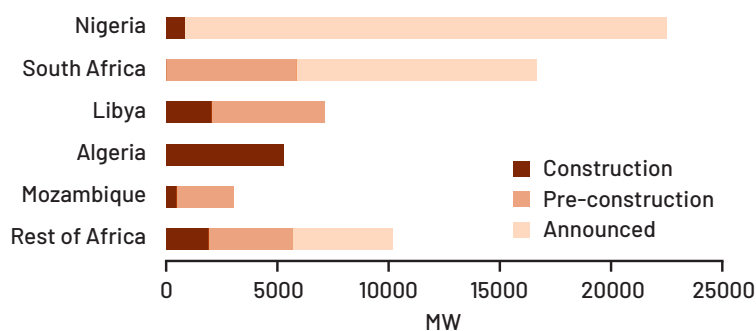
## What is in development?

With rapid urbanization and an increasing population, Africa's electricity demand is expected to grow. The [Africa Energy Outlook 2022](#) explores a Sustainable Africa Scenario (SAS) in which Africa achieves universal access to modern energy services by 2030 and net zero emissions by 2050. The SAS anticipates a continued increase in gas-fired generation in the short term, largely driven by countries with large domestic resources such as Nigeria and Mozambique.

GEM data show that there is 64.2 GW of in-development gas power plant capacity. Of this, only 10.5 GW is in construction, while 17.3 GW is in pre-construction and 36.4 GW has been announced.

Nigeria and South Africa have 22.5 GW and 16.6 GW of in-development gas plants, respectively. Both are gas producing countries and are faced with inadequate installed electricity generation capacity, according to the IEA. In Mozambique, construction is underway for the 450 MW [Temane combined cycle gas plant](#), which is expected to be completed in 2024.

**Figure 8: In-development gas power plants in Africa (MW)**



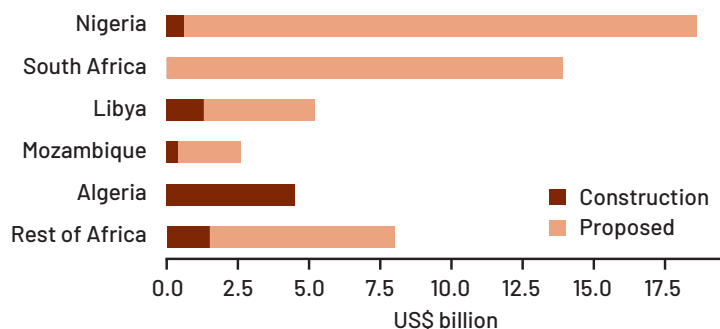
Source: Global Energy Monitor, August 2022 Global Gas Plant Tracker

## Estimated investment for planned gas plant infrastructure

GEM estimates that the planned gas plant buildup in Africa would require US\$62 billion in investment (Figure 9). Of this total capital expenditure estimate, only US\$9.7 billion is attributed to projects under

construction, while US\$52.3 billion is attributed to proposed projects. Nigeria and South Africa have the greatest estimated required investment with US\$21.2 billion and US\$16.3 billion, respectively.

**Figure 9: Estimated investment for planned gas plant infrastructure by country (US\$ billions)**



Source: Global Energy Monitor, August 2022 Global Gas Plant Tracker

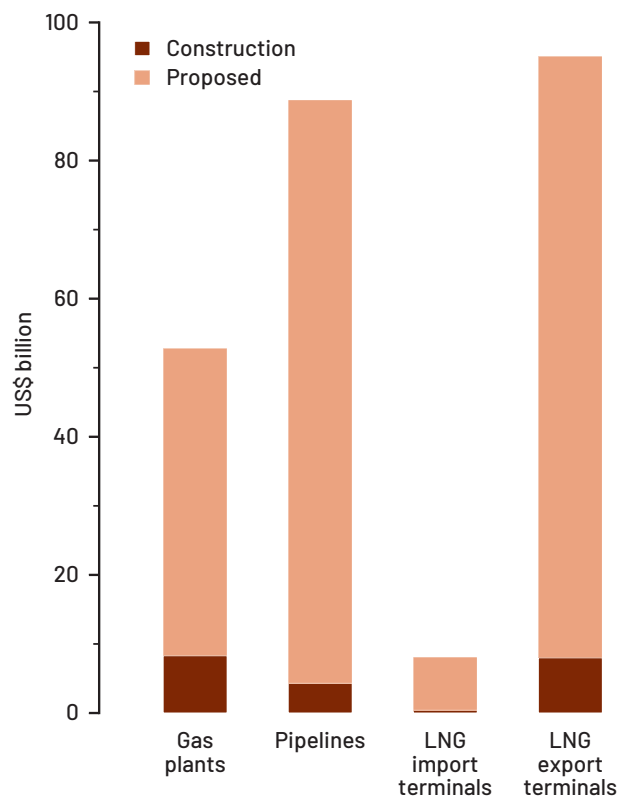
## Conclusion

Investment requirements for planned LNG export terminals and gas pipelines dwarf planned investment in gas plants to power Africa (Figure 10).

Europe's reduced reliance on Russian gas has led to a renewed interest in African gas. However, planned projects still face financing challenges, with many of them yet to begin construction. Without long-term financing and off-take agreements, these assets are likely to become stranded in the very near future once the European energy crisis abates.

Repurposing these projects for domestic consumption would still require significant additional infrastructure to enable domestic consumption. Mozambique, Nigeria, and Tanzania seem bent on developing new LNG export terminals, yet like many African countries, they have low levels of electricity access. Planned investment in gas pipeline and LNG export infrastructure competes with domestic demand for gas and much needed renewable energy investment for Africa to realise universal access to clean, affordable, and reliable energy.

**Figure 10: Estimated investment for planned gas plant infrastructure by type (US\$ billions)**



Source: Global Energy Monitor, August 2022 Global Gas Plant Tracker

## Methodology

Global Energy Monitor is a nonprofit research organisation developing information on energy projects worldwide. In 2022, Global Energy Monitor launched its Africa Gas Tracker (AGT). The tracker is an online database that identifies and maps major gas transmission pipelines, gas-fired generating units (50 MW and larger), LNG terminals, and gas extraction sites. Following our latest update, the tracker now includes 64 GW of gas plants in development, 75 mtpa LNG terminal capacity in development, 22,600 km of gas pipelines in development, and 23 gas extraction areas in development. The AGT uses footnoted wiki

pages to document each pipeline, gas-fired power plant, LNG terminal, and extraction site and is updated biannually.

For further details see the tracker [landing page](#) and [methodology](#) overview. Visit the [Download Data](#) page to obtain primary data from the AGT.

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## Acknowledgements

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