



Energy

Energy on the Current Path forecast

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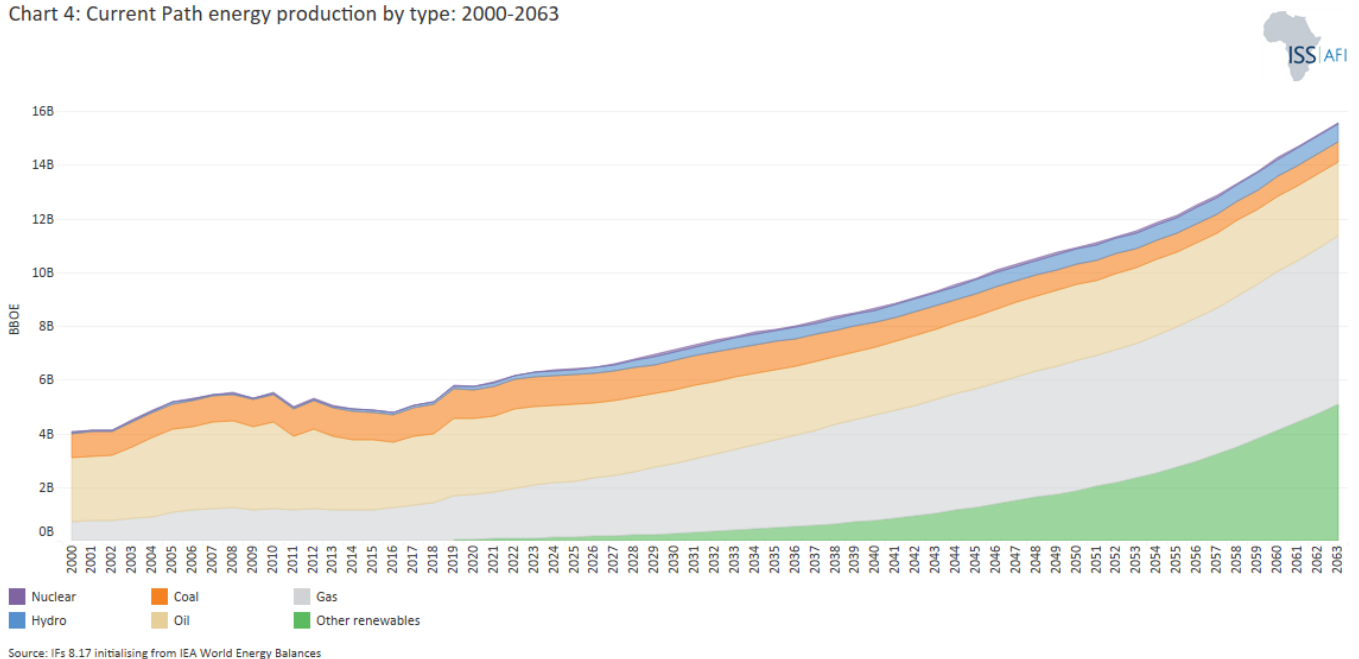
Energy on the Current Path forecast

- Energy production to 2063
- Energy demand per person: Global comparisons to 2063

Energy production to 2063

Chart 4 presents a picture of production by energy type since 2000, with the Current Path forecast to 2063. The data in BBOE is available for various global groups, key countries, African regions and all African countries, utilising the drop-down menu. The user can also choose to display production in BBOE or as a per cent of the total.

Chart 4: Current Path energy production by type: 2000-2063



In this forecast, global gas production overtakes coal production in 2026 and oil in 2031. Globally gas production steadily increases until reaching a plateau in 2046, followed by a slow decline. At the global level, the combined energy production from solar, wind, and geothermal (that we term 'other renewables') will overtake nuclear energy in 2024, coal in 2040, oil in 2044, and gas in 2049. Coal production is forecast to decline steadily across the forecast horizon.

In recent years **hydrogen** has additionally emerged as a potential energy source that could decarbonise sectors such as long-haul transport, chemicals, and steel production, and is included in the 'other renewable' energy category. Its future at scale is still uncertain, however given current low levels of adoption in sectors such as transport, buildings and power generation. Currently most hydrogen is produced using fossil fuels but enthusiasm for green hydrogen is growing.

Africa's energy production profile differs from the global profile, with the more rapid increase in gas production that only peaks at around 2068 before declining. In the Current Path forecast, gas plays a larger role in Africa's energy future than in comparable regions such as South Asia and South America. Oil production in Africa is also higher than in these regions implying that Africa is particularly dependent upon fossil fuel production, gas and oil in particular, more so than other regions. In the Current Path forecast, coal production in Africa is set to decline as international pressure to reduce fossil fuel production and use mounts and is in line with the various countries' National Determined Contributions (NDC's). Gas production in Africa overtakes oil production in 2028, and other renewables are larger than hydro in 2033 and coal in

2042. The result is that Africa's production of non-fossil fuels as a per cent of the total is significantly lower than the global average.

Much of this is exported from a handful of African countries, meaning that if global coal, oil and gas demand declines, it will affect their exports. Still, it does imply that the continent needs to aim for an early transition from fossil fuels to avoid being trapped with stranded assets.

Alternative energy resources have the potential to play a pivotal role in this transition. Africa has vast capacities for boosting renewables, especially hydropower. Yet, they are currently largely underutilised. In the Current Path forecast, hydro will contribute 5.2% of the continent's production in 2050, equivalent to less than 0.57 BBOE, with several large hydroelectric schemes currently under construction.

Population growth is an essential reason for the increase in Africa's future energy demand. In 2023, Africa's population surpassed that of India and China. By 2063, Africa (at 3.1 billion people) will have almost double the population of India (which will be at almost 1.7 billion). India will, in turn, have a much larger population than China (at 1.2 billion).

Contrary to the situation with these two large countries, Africa's population numbers will continue to increase beyond the end of the century and as prosperity increases, so will its energy demand and its associated carbon emissions unless the continent embarks upon a different energy future than its current trajectory that imitates the fossil-dependent pathway of richer regions and countries.

The Current Path forecast aligns with the IEA Stated Policies Scenario (STEPS) as presented in their [2023 World Energy Outlook](#), which would see global demand for coal, oil and natural gas peak before 2030 and their combined share edge downward. Emerging markets, particularly Asia, will take an ever-growing share of demand. Globally, coal is also subject to increased levels of fuel substitution as countries switch to the use of fossil fuels with lower carbon emissions, particularly gas.

The war in Ukraine temporarily created a tight LNG market, resulting in record-high prices in 2022 and a European rush for imports, although 2023 prices were significantly lower. In time, a significant gas supply will come to the market due to the European scramble for alternative supply and the steady increased US production, potentially creating an oversupply towards the end of the decade. Gas is less carbon intensive than coal or oil, but low gas prices may delay the shift to renewables.

There is much attention on renewables, yet the IEA estimates the value of 2022 fossil fuel subsidies at US\$1 trillion, which is still much more than renewable energy financing. Thus 'subsidies for natural gas and electricity consumption [in 2022] more than doubled compared with 2021, while oil subsidies rose by around 85%. The subsidies are mainly concentrated in emerging markets and developing economies, and more than half were in fossil-fuel exporting countries.'

Because China has an outsized role in shaping global energy trends, forecasts for trends for its economy will largely shape future energy demand and carbon emissions. In the last decade, it accounted for almost two-thirds of the rise in global oil use, nearly one-third of the increase in natural gas, and has been the dominant player in coal markets, yet has emerged as a powerhouse in renewables, accounting for around half of wind and solar additions and over half of global electric vehicle (EV) sales. According to the IEA, two-thirds of global wind manufacturing expansions planned for 2025 will occur in China, primarily for its domestic market. Hence, the general view is that China will drive global renewable energy deployment to global benefit.

However, the IEA forecast of China's growth at just below 4% per annum to 2030 is conservative. Although its growth rate is declining, China may grow more rapidly, emitting substantially more carbon.

While things are also changing rapidly in the US, given its presidential politics, its model is quite different and turbulent. In 2022, fossil fuels accounted for 81% of US primary energy production, nuclear for 8% and renewables including hydro for only 13%. Total energy production in the US has exceeded annual energy consumption since 2019 - a remarkable turnaround for a country previously dependent on oil from the Middle East. Instead of debating energy import dependence, policymakers are seized with decisions for large investments in LNG terminals to export natural gas.

While many high-income countries have enacted policies and laws specific to renewable energy, only half of least developed countries (LDCs) and a third of small island and developing states (SIDS) have done so, finds UNCTAD. Efforts to develop comprehensive legal and regulatory frameworks to advance clean energy technologies are limited mainly to developed and large emerging economies. Instead, countries like Gabon, Tanzania, Liberia, Kenya, Zambia and Angola engage with carbon credit arrangements that do little to reduce emissions. Through a carbon credit scheme, a polluter can buy a carbon credit typically worth one metric ton of carbon dioxide (CO₂), with the money paid towards carbon-lowering projects such as protecting natural ecosystems and wildlife resources, planting trees, and generating renewable electricity. Roughly 23% of global emissions are now covered by some form of carbon credit pricing, with the newly established Africa Carbon Markets Initiative (ACMI) aiming to unlock US\$6bn in revenue to create 30 million jobs by 2030. These forecasts need to be treated with care, however. The UAE-based Blue Carbon, the company leading most efforts, was, in 2023, barely a year old without any track record in the area (see theme on Climate Futures).

A similar story holds for private investment promotion in renewable energy policies, which is much higher in developed and emerging economies. With limited state resources and amidst competing demands, poor countries struggle to invest in the efforts required to unlock a different pathway to the fossil-fueled example set by others. These findings underpin UNCTAD's calls for the international community to help developing countries urgently attract sufficient investment to transition to clean energy. The associated estimation is that developing countries face a US\$2.2 trillion annual investment gap for an energy transition to renewables.

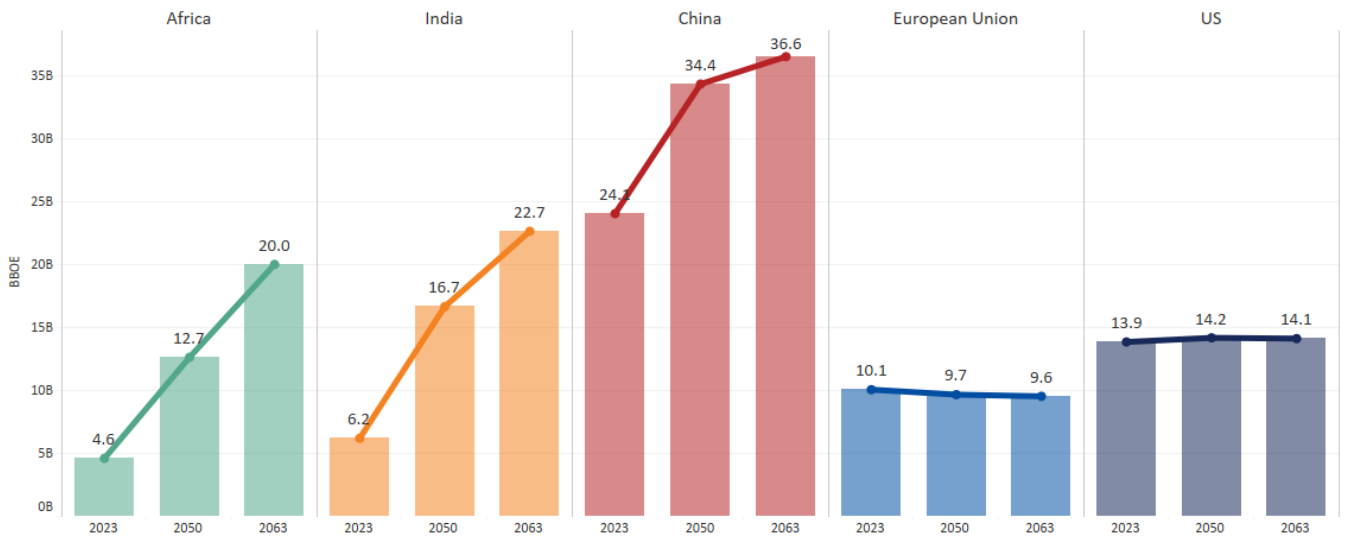
Global nuclear power generation is experiencing a renaissance, with significant additional plants being commissioned and planned in the medium to long-term future as countries search for secure energy baseload whilst reducing their carbon emissions. At the 2023 UN COP28 climate summit in Dubai, more than 20 countries agreed to triple global nuclear power capacity by 2050. Initially, much of the growth in nuclear power generation will come from new reactors in China and India and the return of plants in France shut down for maintenance in 2023.

China now accounts for 16% of global nuclear generation, and Russia's influence in the sector is growing, with the two countries providing the technology for 70% of the reactors under construction.

Energy demand per person: Global comparisons to 2063

Chart 5 presents the total energy demand at global and regional levels. Annual energy demand (consisting of consumption and unmet demand) in Africa for 2023 differs between countries. It ranges from Libya (18.6 BOE per person) and Mauritius (16.1) to the Central African Republic (0.6) and Burundi (0.5). On the Current Path forecast, Africa's energy demand will increase to 4.9 barrels per person in 2050 and to 6.4 barrels in 2063, less than a third of the average of the rest of the world. Africa's energy demand is lower than South America and South Asia, the two other developing regions against which we typically benchmark Africa. The Current Path forecast is that its relative energy poverty (demand per person compared to these two regions) will increase over time as energy production in South America and South Asia ramps up more rapidly than in Africa.

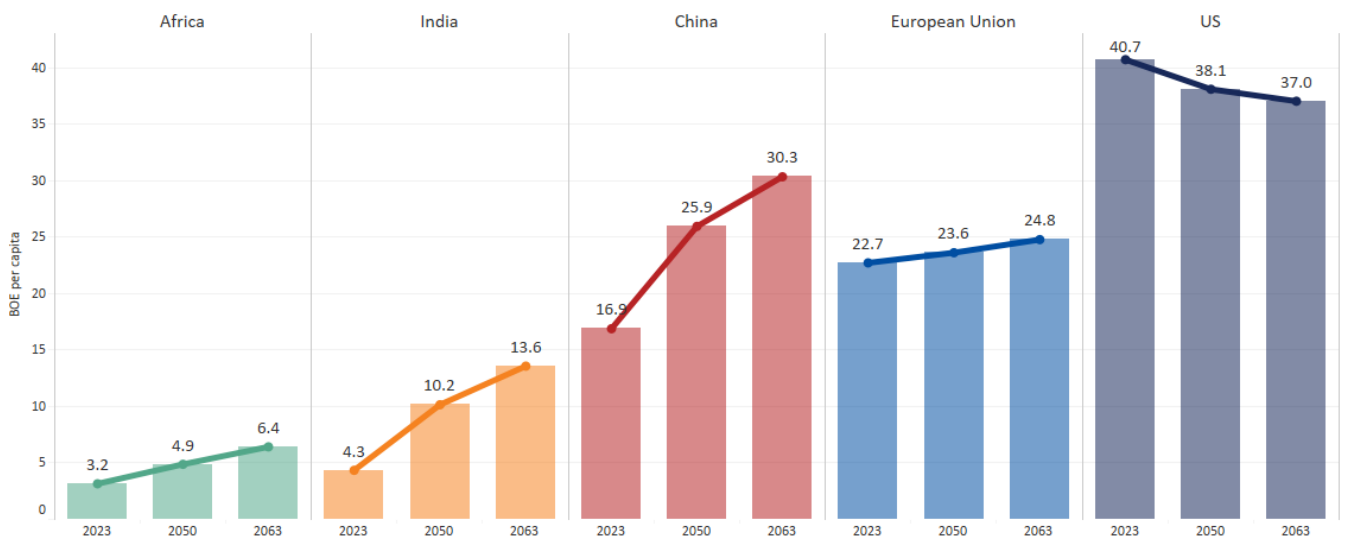
Chart 5: Forecast of energy demand, 2023-2063



Source: IFS 8.17 initialising from IEA World Energy Balances

In comparison, the demand from the average American is 40.7 barrels of oil equivalent in 2023, and an Indian 4.3 barrels. By 2050, average US demand will decline to 38.2 barrels, reflecting modest improvements in energy efficiencies. Demand in Africa will then only be slightly higher than India's currently. By 2063, four decades into the future, Africa's average energy use per person will be only a fifth of the current demand in the US, 40% of that of South America and 55% of South Asia.

Chart 6: Energy demand per person, 2023, 2050 and 2063



Source: IFS 8.17 initialising from IEA World Energy Balances

Despite its slow per capita energy demand growth, Africa's growing population, expanding economy and low energy efficiencies imply that the continent's portion of the world's energy demand will increase from 4.9% in 2023 to 13% by 2063. On the Current Path forecast, Africa's total energy demand will overtake the EU27 in 2043, the USA in 2052, and, by 2065, India. With its much larger population, Africa's energy demand is already larger than South America's and should

overtake South Asia's before 2047. By around 2083, Africa's energy demand will be larger than China's, pointing to the need to change its current energy mix to unlock a less carbon-intensive future in its own, and global, interest.

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About the authors

Dr Jakkie Cilliers is the ISS's founder and former executive director. He currently serves as chair of the ISS Board of Trustees and head of the African Futures and Innovation (AFI) programme at the Pretoria office of the Institute. His 2017 best-seller *Fate of the Nation* addresses South Africa's futures from political, economic and social perspectives. His three most recent books, *Africa First! Igniting a Growth Revolution* (March 2020), *The Future of Africa: Challenges and Opportunities* (April 2021), and *Africa Tomorrow: Pathways to Prosperity* (June 2022) take a rigorous look at the continent as a whole.

Ms Alize le Roux joined the AFI in May 2021 as a senior researcher. Before joining the ISS, she worked as a principal geo-informatics researcher at the CSIR, supporting various local and national policy- and decision-makers with long-term planning support. Alize has 14 years of experience in spatial data analysis, disaster risk reduction and urban and regional modelling. She has a master's degree in geographical sciences from the University of Utrecht, specialising in multi-hazard risk assessments and spatial decision support systems.

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Scenarios and forecasting can help Africa identify and respond to opportunities and threats. The work of the African Futures & Innovation (AFI) program at the Institute for Security Studies aims to understand and address a widening gap between indices of wellbeing in Africa and elsewhere in the world. The AFI helps stakeholders understand likely future developments. Research findings and their policy implications are widely disseminated, often in collaboration with in-country partners. Forecasting tools inspire debate and provide insights into possible trajectories that inform planning, prioritisation and effective resource allocation. Africa's future depends on today's choices and actions by governments and their non-governmental and international partners. The AFI provides empirical data that informs short- and medium-term decisions with long-term implications. The AFI enhances Africa's capacity to prepare for and respond to future challenges. The program is headed by Dr Jakkie Cilliers.