Growth without emissions?

Is carbon needed for Africa's development goals & economic growth?

MO IBRAHIM FOUNDATION

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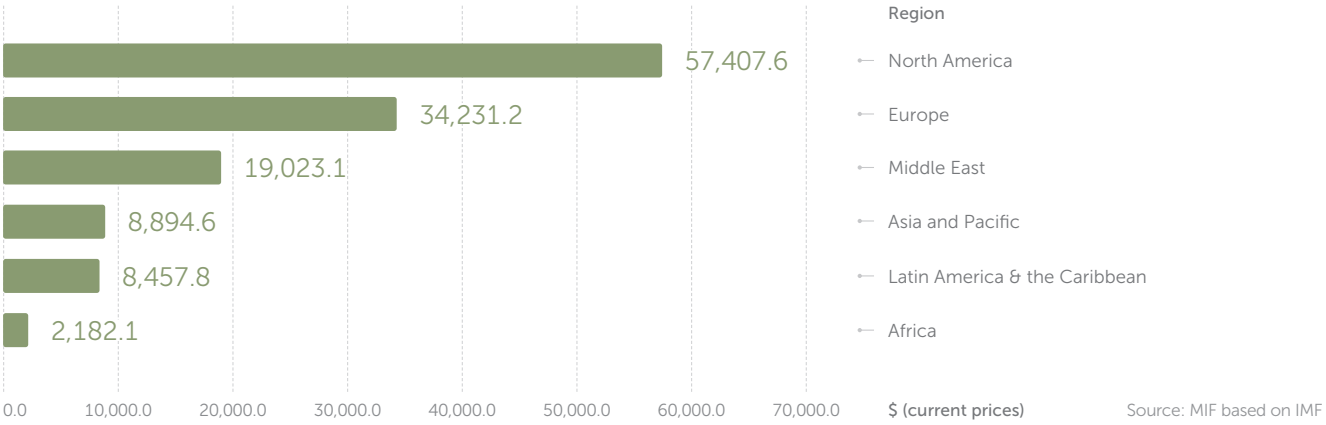
In order to realise the continent's development agenda's such as Agenda 2063 and the Sustainable Development Goals, delivering public services and economic growth will be a pre-requisite. But African countries face the challenge of growing their economies, providing public services, and lifting millions out of poverty in an environment where global emissions must be cut. No other region has been presented with such a challenge.

Africa's carbon footprint is among the lowest globally. It has the lowest per capita emissions of any region, while it is also home to crucial carbon sinks, with the Congo Basin Rainforest absorbing more carbon per year than the continent produces. The continent also has the lowest GDP per capita of any world region. It's share of global GDP was only 2.8% in 2019, much lower than the 17.9% of the global population the continent accounts for.

The Congo Basin forest absorbs 4% of global carbon emissions every year, offsetting more than the whole African continent's annual emissions

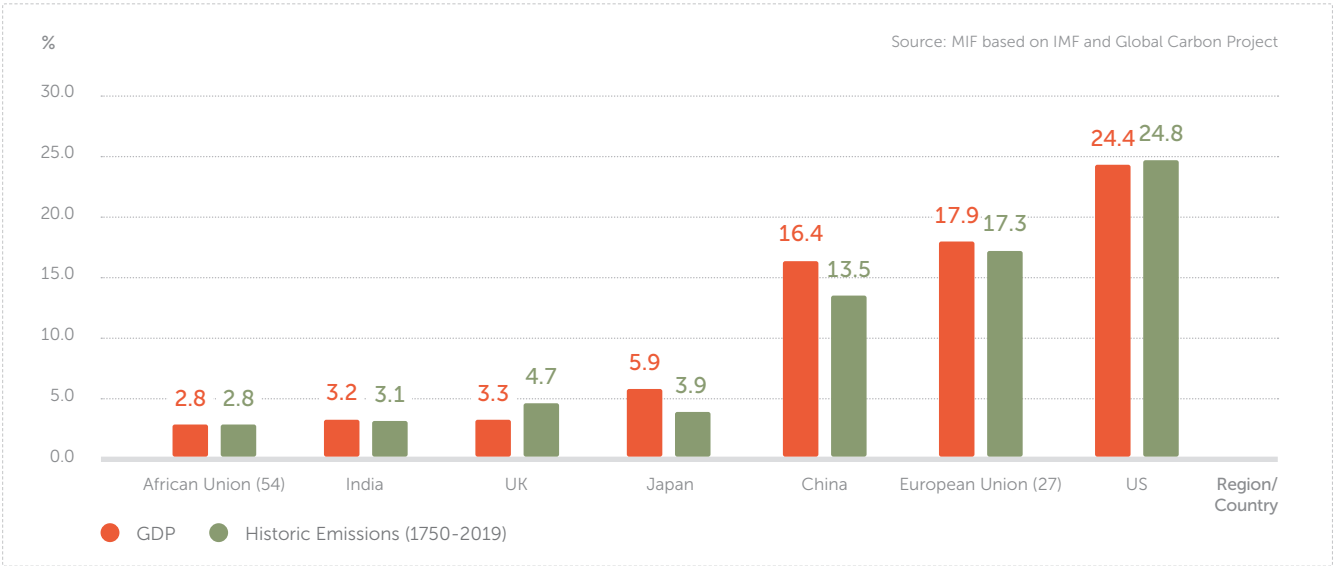
World regions: GDP per capita (2022)



Source: MIF based on IMF

This poses a key question. To what extent should, and can, African countries grow their economies and achieve their development goals, while totally avoiding the fossil-fuel driven growth experienced by Europe, North America, and parts of Asia? There is no question that the continent's economic development path can and must be greener than the North's. But we do not yet live in a world where Africa can turn it's back on fossil fuels entirely.

Selected world regions/countries: share of historic emissions against share of GDP (2019)



Data suggest there is a link between historic emissions and current share of global GDP

All 54 African countries only accounted for 2.8% of carbon emissions between 1750 and 2019. This mirrors the continents 2019 share of global GDP (2.8%).

On the other hand, the US, which accounted for almost one quarter (24.4%) of GDP alone in 2019, accounts for almost one quarter (24.8%) of emissions since 1750.

As of 2019, eight of the ten countries with the highest share of GDP globally were also among the top ten historic emitters.

Country	Global GDP % (2019)	GDP Global Rank	Historic CO2 Emissions % (1750-2019)	Historic CO2 Emissions Global Rank
United States	24.4	1	24.8	1
China	16.4	2	13.5	2
Japan	5.9	3	3.9	6
Germany	4.4	4	5.5	4
United Kingdom	3.3	5	4.7	5
India	3.2	6	3.1	7
France	3.1	7	2.3	8
Italy	2.3	8	1.5	12
Brazil	2.1	9	0.9	18
Canada	2.0	10	2.0	9

Source: MIF based on IMF and Global Carbon Project

The relationship between growth and CO2 emissions is beginning to break down – in wealthy countries

In the light of technological progress, some are suggesting that African countries can 'leapfrog' and pursue a different path, driven exclusively by green growth, absolutely decoupled from carbon emissions.

Indeed, progress has been made, and data show that the relationship between GDP and current emissions isn't as strong as it once was.

Within some economies, emissions are now even falling while GDP is simultaneously rising.

- Between 1970 and 2019, GDP in the EU has almost trebled while emissions have come down by 12.6%, while in the UK, GDP has almost trebled while carbon emissions have almost halved.
- Since 2005, as many as 32 countries have seen carbon emissions decline while GDP has grown.

However, this comes with an important caveat. There are very few examples of low- or middle-income countries simultaneously experiencing growth and declining carbon emissions to date.

- There are no cases of absolute decoupling among low-income countries with a population over 1 million.

Globally, one dollar of GDP accounts for less than half the carbon emissions that it did in 1971.

There are no cases of absolute decoupling among low-income countries with a population over 1 million

- Since 2005, only one lower-middle-income country (El Salvador), and four upper-middle-income-countries (Belarus, Bulgaria, Jamaica, Mexico) have experienced absolute decoupling of emissions and GDP.

Decoupling has primarily occurred in wealthier countries whose economies tend to be driven by lower-energy information technology and service sectors.

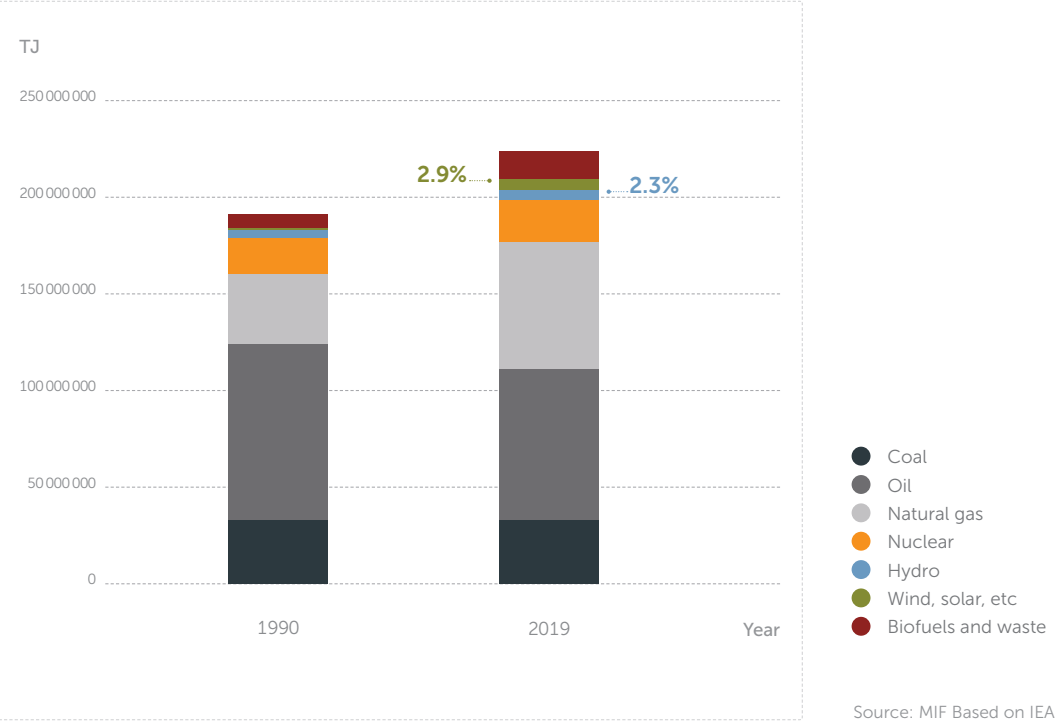
- 94.4% of Africa's population live in low or lower-middle income countries.

Renewables alone are not driving decoupling in wealthy countries: coal for gas substitutions and carbon offshoring play a big part

The supply of renewable energy has increased among the OECD nations compared to 1990, but in 2019 wind and solar still only accounted for 2.9% of their total energy supply, up from 0.6% in 1990, while hydro still only accounts for 2.3% in 2019. Fossil fuels still make up over three quarters of the energy supply, and in absolute terms fossil fuel use has increased by over 10%, due to increased use of natural gas.

OECD: wind & solar less than 3% of total energy supply in 2019

OECD: total energy supply by source (1990 - 2019)

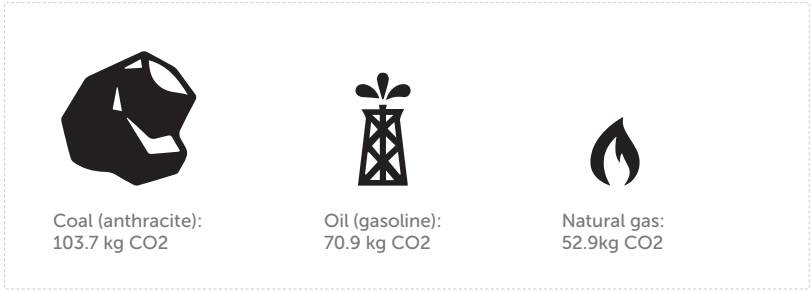


Source: MIF Based on IEA

In fact, natural gas has played a large part in emissions reductions. Decoupling in the global north is in no small part the result of substituting high polluting coal for less-polluting natural gas rather than abandoning fossil fuels for renewables. Lower CO2 emissions from US electric power have largely resulted from coal-to-gas shifts, while emissions reductions from the EU's emissions trading scheme have also overwhelmingly been due to coal-to-gas shifts.

- Coal use in OECD countries declined by -28.9% between 1990 and 2019, while gas use in the energy supply increased by +83.5% over the same time period.
- Between 2010 and 2018 and the US saved 255 Mt CO2 from coal-to-gas switching, while Europe saved 66 Mt CO2.

CO2 emissions by fuel: kg emitted per million units of energy

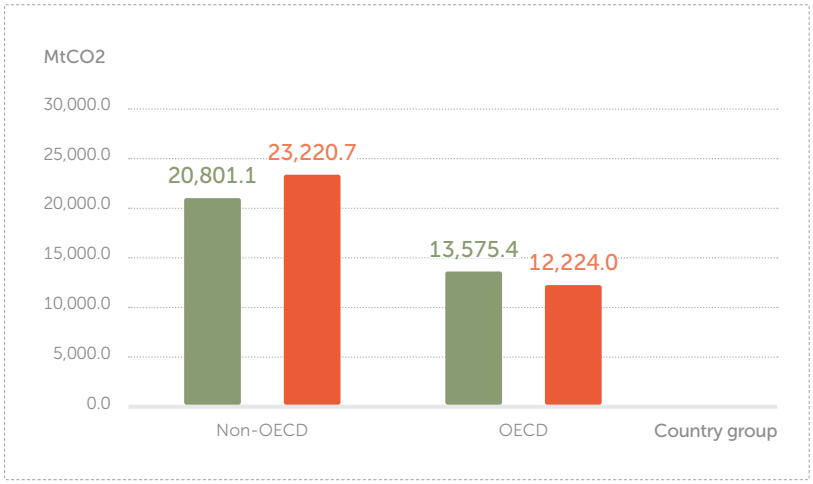


Source: MIF based on United States Energy Information Administration

Additionally, offshoring of carbon intensive sectors within supply chains, and carbon leakage - the process by which policies to reduce emissions in one jurisdiction leads to carbon intensive processes moving to another with no reduction in overall emissions, has at least partly contributed to the decoupling of growth and emissions among some OECD countries.

- In 2019, the carbon emissions from products consumed within OECD countries outweighed the total emissions produced within the territory of OECD countries. For non-OECD countries the reverse is true.

OECD & non-OECD: consumption based emissions vs territorial emissions (2019)



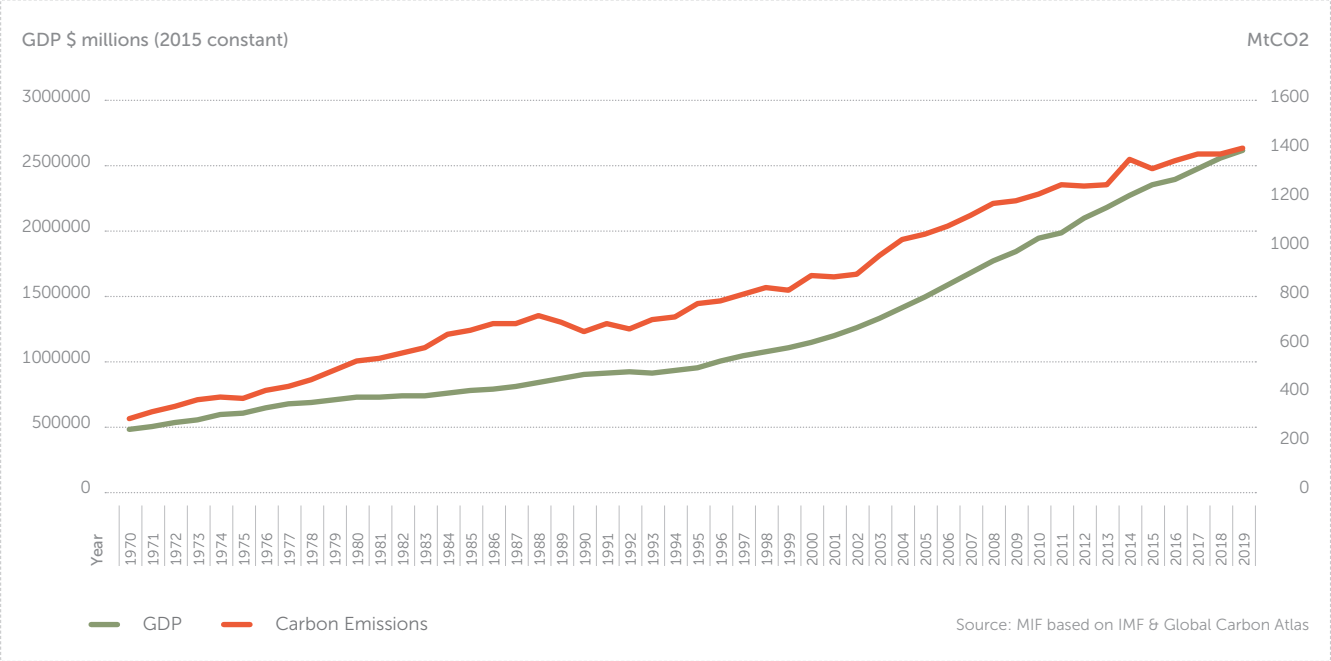
Source: MIF based on Global Carbon Atlas

Completely and immediately separating economic growth and emissions in Africa is unrealistic

Emulating the decoupling seen in some higher-income countries is unrealistic for Africa, where the relationship between emissions and GDP growth remains strong.

- Between 1970 and 2019, GDP on the continent increased more than five-fold while carbon emissions increased more than four-fold.

Africa: GDP vs carbon emissions (1970 - 2019)



This trend is shared with other developing regions.

- South America's GDP in 2019 is almost four times as large as in 1970, and its CO2 emissions increase are just over three times as large.
- India's GDP is more than 13 times as large in 2019, while its CO2 emissions are just over 14 times as large.

Starting from a low-emissions base makes cutting emissions far more challenging. A rich country switching a highly polluting coal run power plant that already provides energy to the local population, to a low polluting gas run power plant will be registered as an emissions cut. Whereas an African country that builds a new gas-powered plant to provide energy to a population that previously lacked access, or even to provide backup for wind and solar, will be registered as having added to emissions.

Different demographic trends mean different imperatives for growth

Shifting demographics also provide favourable conditions for a green transition in rich industrialised countries, allowing for easier political commitments.

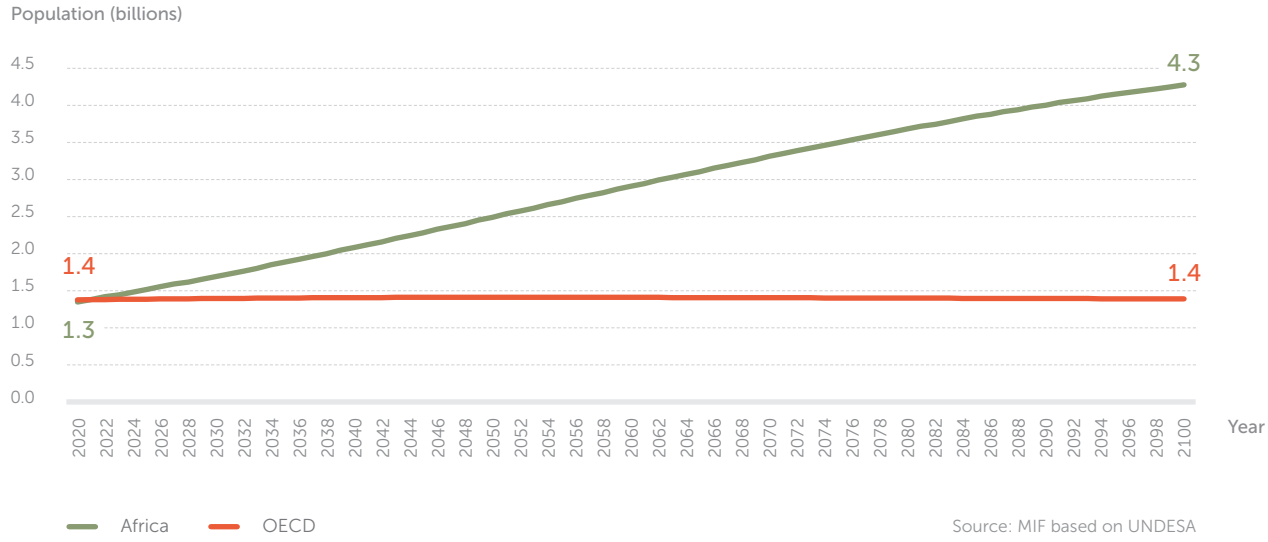
While the total population of OECD countries is projected to stagnate, Africa's population is projected to almost double by 2050 and increase three-fold by

2100. This will require continued increase in the size of the economy and scale of public services.

For wealthier countries with declining populations, continuing economic growth at the rates seen throughout the 20th century may not be necessary or possible, and from a planetary perspective, desirable. The former taboo of 'de-growth' for already wealthy countries has even been gaining traction.

Africa's population is expected to double by 2050.

Africa & OECD: population (2020-2100)



Striking the balance: Africa can adopt a greener path, but cannot turn its back on fossil fuels entirely

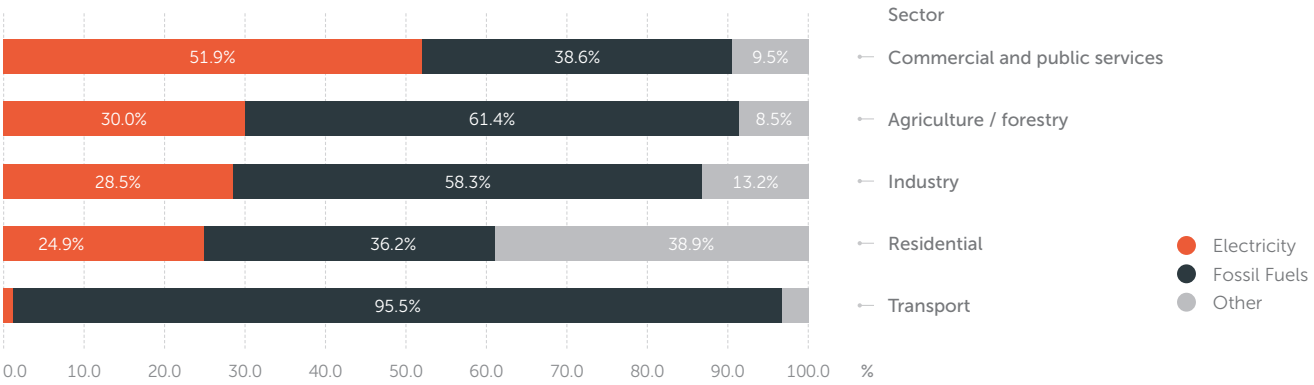
The imperative for growth does not mean African countries cannot accelerate the use of renewables and green technologies. There are many cases where African countries can deploy renewables to 'leapfrog', particularly for the purpose of electricity generation. The lack of legacy infrastructure in the electricity sector can be seen as an advantage to going green, as African countries do not face the cost and disruption of replacing existing systems (though intermittent renewables may still need backup fuels).

- Five of the ten countries at the global level with the potential to generate the most energy per solar panel are in Africa: Namibia (1st), Egypt (4th), Lesotho (8th), Libya (9th), Botswana (10th).
- Full mobilisation of technical wind potential would increase electricity capacity more than 30-fold in Chad, Mauritania, Niger, and Mali.
- The Grand Inga Dam in DR Congo could produce up to 40,000 MW of electricity, twice the power generation capacity of the world's current largest dam, China's Three Gorges.

However, this will require realisation of existing climate finance pledges from rich countries and the mobilisation of more finance for the continent. Currently, less than 6% of global public climate finance goes to sub-Saharan Africa.

‘Leapfrogging’ is more challenging for sectors dependent on non-electric energy

World: total final energy consumption by sector and source (2019)



'Fossil Fuels' refer to direct use. Fossil fuels used for electricity generation are included within 'Electricity'. 'Other' includes biofuels and waste, heat, and non-electric uses of renewables.

Electricity only accounts for around one fifth of all energy consumed globally:

- Electricity is only 1.2% of all energy used for transport.
- Electricity is less than one quarter (24.9%) of all energy used for residential purposes such as cooking and heating.
- Electricity is less than one third (28.5%) of all energy used for industry.

Some sectors such as cooking, heating, and light-transportation, have the potential to be electrified. In transport, electric cars are gaining traction, but are still a long way from dominating the market.

- Electric vehicles only account for around 1% of the global fleet and even less in Africa. While some models suggest electric vehicles could account for 40% of African vehicles by 2050, transport will need fuel in the meantime.

Electricity can be used for cooking, but such use is currently very limited.

For many sectors electrification may not be possible at all. The Director of the EU’s GCC Clean Technology Network has claimed that with effort half the globe’s energy use could be electrified, but for the other half going electric will be very difficult.

Africa faces pressing deficits in transport infrastructure, housing, hospitals, and schools, that must be addressed if the continent is to realise its development goals. This will require large volumes of steel and cement, that remain hard to electrify, carbon intensive sectors.

Replacing fossil fuels with renewable technologies for producing cement and steel, key in themselves for building renewable infrastructure, is not possible in the short-term.

- The International Energy Agency (IEA) report that producing zero emissions cement will require the development and deployment of technology that is not currently available.
- Many of the technologies required for near zero-emissions steal production are not currently available on the market today and need to be developed at commercial scale.

Technologies to produce zero-emissions cement or steel are not available at scale.

Electricity accounts for less than 20% of primary cooking fuels or technologies in every world region, with every region but Africa and Western Pacific predominantly cooking with gas.

Green hydrogen: an opportunity for Africa but no silver bullet

Green hydrogen technology has been touted as a replacement for fossil fuels in hard to abate sectors such as cement and steel, in addition to offering a low carbon alternative in fertilizers, plastics and transport. Africa is expected to be a preferred location for the green hydrogen economy due to its growing penetration in renewable energy, greater land availability, easy access to water sources and port facilities. Many countries are already seeking to tap this potential, with Namibia aiming to produce 300,000 tonnes of green hydrogen per year by 2026, and Egypt planning three green hydrogen projects with a combined capacity of 300 megawatts.

However, green hydrogen is not a silver bullet, and as it stands comes with major problems. There are concerns that green hydrogen projects could divert already scare water supplies, under pressure from climate change, away from drinking water and agriculture on the continent.

Even if the water scarcity issue could be solved, the technology remains in its infancy. There is scepticism over its efficiency and whether enough can be made using renewable electricity or carbon capture technology at a commercially viable price, and at a scale the world would need in the short-term. While in the long-term green hydrogen presents an opportunity for Africa, to suggest that African economies can deploy green hydrogen technology at the scale and speed required to fully deliver on their development agendas and immediate energy needs is fanciful.

COP27 requires a reassessment of responsibilities for the climate crisis

Responding to calls to entirely cease the financing of all new fossil fuel projects, donor countries and international financial institutions, have in recent years blocked Africa's path to developing fossil fuels, while failing to take similarly bold action domestically. While Africa cannot and should not replicate the mistakes of Europe, North America, and more recently Asia, it should not be constrained by the same restrictions as those who are responsible for the crisis.

Natural gas, the least polluting fossil fuel, can act as a suitable transition fuel to balance Africa's development and climate goals. Partners in the North should no longer seek to obstruct gas developments on the continent that would supply energy to African markets.

- According to the IEA, gas should account for half of all fuel supply investment and 10% of newly installed power capacity up until 2030 in Africa, if universal access to modern energy services and the continent's climate goals are to be achieved.
- Natural gas is needed to provide a key back-up to intermittent renewables and a source of process heat for high-energy industries like cement or steel.

There are considerable opportunities for green technologies to deliver energy and spur growth for many African countries. But the continent cannot afford to turn its back on fossil fuels entirely and forego economic development to carbon finance the north, and nor should they be expected to. The rich countries must shoulder the burden for the crisis they have caused. At COP27, a reassessment is needed of the distribution of responsibilities when it comes to the climate crisis, as well as a more nuanced approach needed to Africa's energy needs.

> "If we make a list of the top 500 things we need to do to be in line with our climate targets, what Africa does with its gas does not make that list.
>
> Fatih Birol, Executive Director of the IEA

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