

# Q&A: Ghana is planning its first nuclear energy plant—what's behind the decision?

July 10 2024, by Seth Kofi Debrah

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Nuclear power is gaining popularity among African countries. Credit: Wikimedia Commons

Ghana is [considering](#) bids from five companies for the construction of what would be its first nuclear power plant. The companies are: France's [EDF](#), US-based [NuScale Power and Regnum Technology Group](#); [China National Nuclear Corporation](#); [South Korea's Kepco](#) and its subsidiary [Korea Hydro Nuclear Power Corporation](#); and [Russia's Rosatom](#). The Conversation Africa's Godfred Akoto Boafo interviewed [Seth Kofi](#)

[Debrah](#), director, Nuclear Power Institute, [Ghana Atomic Energy Commission](#), on the pros and cons of adding nuclear power to the country's power mix, and why Ghana needs to diversify and identify new energy sources.

## **What makes the nuclear option attractive to Ghana?**

The country's industrialization ambitions, fuel constraints, limited resources, climate conditions and international commitments to [climate change mitigation](#) are among the factors driving Ghana to include nuclear power in the energy mix.

Nuclear power is available all year round, making it reliable. The [nuclear power plant](#) is expected to operate as a baseload plant (the production facility used to meet some or all of an area's continuous energy demand), with a capacity factor of about 92%. A conventional nuclear power plant typically [operates](#) for 92% of a calendar year as compared to [54% for natural gas](#) power plants, [24% for solar and 34%](#) for wind power plants.

Demand for electricity is growing across the nation. Currently, [84% of the population](#) have access to electricity but may not be connected to the [electrical grid](#). This means the power is available in their area but they may be unconnected due to personal circumstances.

Electricity demand [is expected to grow rapidly](#) on the back of electrification projects planned by successive governments, like the [rural electrification project](#) (which aims at supplying electricity to all communities with a population of 500 or greater) and industrialization initiatives (such as developing the manufacturing, alumina and iron industries).

Another reason for choosing nuclear power is that Ghana sees it as a way of supporting its industrial ambitions in the sub-region.

For example, Ghana aims to become a net exporter of electricity in the region through the [West African Power Pool](#), a specialized agency of the Economic Community of West African States. It covers 14 of the 15 Ecowas countries and is intended to supply them with reliable energy at a competitive cost.

According to the World Bank, the [average electrification rate in west Africa](#) is about 42%, which means that almost half of the region's population has no access to electricity. Ghana has an 84% electrification rate.

Ghana believes nuclear power can help it achieve its industrial ambitions while fighting climate change.

As a [signatory to the Paris Agreement](#), Ghana has an international obligation to reduce greenhouse gas. Nuclear power does not produce any of the greenhouse gases.

Ghana's electricity sector is dominated by thermal plants that use natural gas—a fossil fuel. [Fossil thermal plants](#) make up 64% of the current energy mix. This is an over-dependence on a single fuel source. Natural gas has competing uses in different sectors, so there are frequent fuel shortages. And the price of natural gas is set by international markets, which leads to price volatility.

Ghana has its own source of natural gas. But these reserves are expected to start [declining](#) by 2028.

## **How dependable is the country's current energy mix?**

Ghana's current energy mix is made up of [1,584MW installed capacity](#) of hydro, [3,758MW of thermal power plants](#) (mostly powered by natural gas) and [112MW of solar generation](#). But the dependable capacity (the

total amount of electricity that the facility can produce and deliver to the power grid) of renewables is non-existent since the source of their power generation is variable.

The dependable capacity of the energy mix of a country matters a great deal. The energy mix must have strong baseload capacity (the minimum amount of electric power needed to be supplied to the electrical grid at any given time) before renewables are considered, to ensure reliability.

No industrialised nation developed its economy based on variable generation of electricity. They needed a reliable backbone that could be depended on at all times. European countries used [natural gas](#), coal, hydro or nuclear as their baseload capacity and added on variable renewables.

If Ghana wants to exploit its natural resources and become an industrial giant, it needs sustainable, reliable and affordable baseload electricity. That can be found in a source like nuclear.

## **What's the government's case for nuclear?**

Ghana doesn't have many other energy options. It has good sources of hydro but most have already been exploited.

Potential small dams are being affected by climate change or variability and illegal mining. And the economic justification for more small hydro plants is in doubt.

Ghana started its nuclear power journey as far back as the early 1960s but the idea was never realized. The nuclear power program was [restarted](#) in 2007 under former president John Agyekum Kufuor. The program has followed the International Atomic Energy Agency's [three-phase approach](#). Ghana is now at phase 2: vendor selection and site

preparation.

The plant, which is expected to be constructed along the coast of the country, is planned to come online in early 2030.

## **Given Ghana's financial constraints, is nuclear power a good idea?**

Nuclear power plants have proven to be among the [cheapest sources](#) of electricity around the world. Even though nuclear has a huge upfront financial burden, its long lifespan (over 60 years) and low running cost makes it one of the cheapest baseload sources of electricity.

Around the world, advanced countries [seek financial support](#) for their nuclear projects. There are various [models](#) to finance nuclear power plant procurement, including the option of a public private partnership.

## **How about nuclear waste and the cost of dealing with it?**

Ghana already operates one of the few [radioactive waste storage facilities](#) in Africa. This means that when Ghana builds a nuclear power plant it will already have capacity in nuclear waste management.

Radioactive waste management, which deals with nuclear waste, is an issue that needs to be addressed in the early stages of planning a nuclear plant. This is evident in the [International Atomic Energy Agency milestone approach](#) which most countries follow to develop a nuclear program. It shows all the 19 infrastructure issues that need to be addressed throughout the three-phased approach.

It is the only power plant that is responsible in dealing with its waste

after its lifetime. In effect, it is the only power plan that plans and pays for its waste management during operation and post operation with dedicated funds for waste management.

The costs of managing [nuclear waste](#) and the nuclear power plant's decommissioning at the end of its operating life are included in the nuclear power plant tariff. This is a safety requirement as enshrined in the [International Atomic Energy Agency safety standards](#). Furthermore, the country of origin has strict regulations about decommissioning which have to be adhered to by nuclear power plant owners.

One of the major concerns by the public is the treatment or storage of the high level spent fuel that is sometimes referred to as "waste." High level spent fuel is the fuel that has been used up through irradiation. These used fuels usually have over [90% usable fuel](#) that can be re-used through reprocessing.

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