Nuclear Energy Outlook Report for Africa

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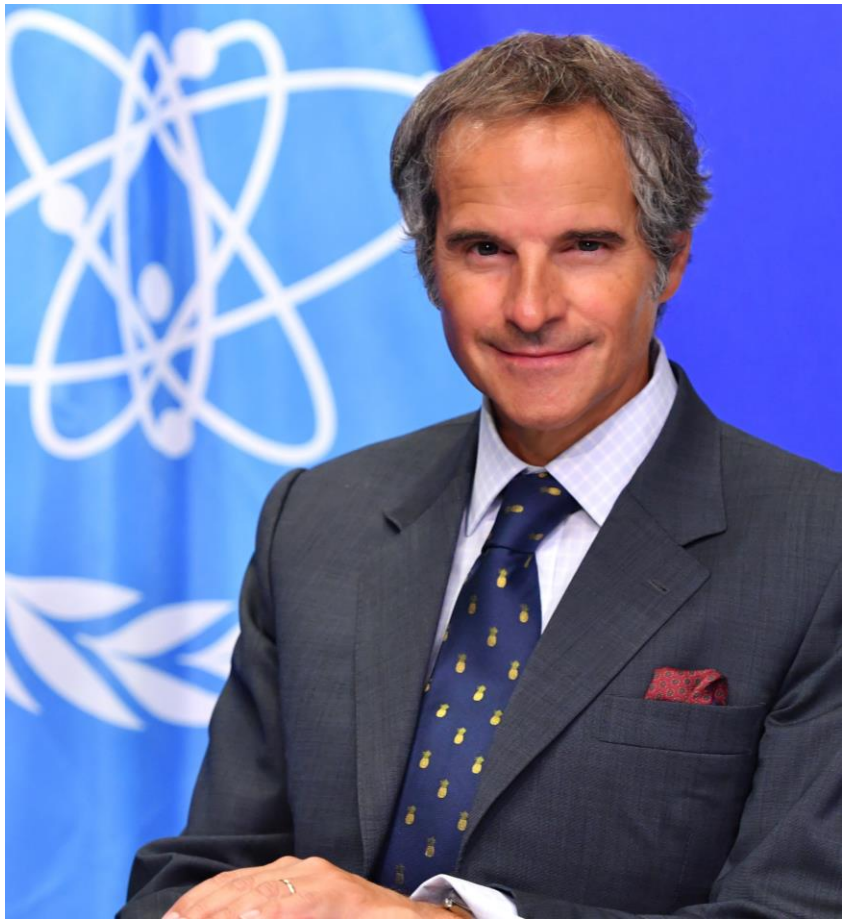
Background

- Most countries in Africa continue to experience shortages of energy, as approximately half a billion people lack access to electricity.
- As African countries make efforts to increase access and production of electricity, they continue to express their interest in using nuclear power and are working to integrate this technology into their energy mix.
- This integration could help to achieve energy security, reduce emissions and improve reliability and sustainability.
- Currently, **South Africa** is the only country on the continent operating a nuclear power plant (NPP).
- **Egypt** is constructing an NPP with four large units, and the first unit is expected to be operational in 2028.

Energy Projections

- The projected total electrical generating capacity in African countries projects an increase of 47% by 2030 and an almost sevenfold increase by 2050.
- In the high case scenario, the nuclear electrical generating capacity is expected to more than triple by 2030 and to increase more than tenfold by 2050 compared with the 2022 total capacity.
- In terms of investment, reaching the high case scenario is likely to require more than US $100 billion.
- Alternatively, for the low case scenario, the nuclear electrical generating capacity is expected to approximately double by 2030 and to increase fivefold by 2050 compared with the 2022 capacity.

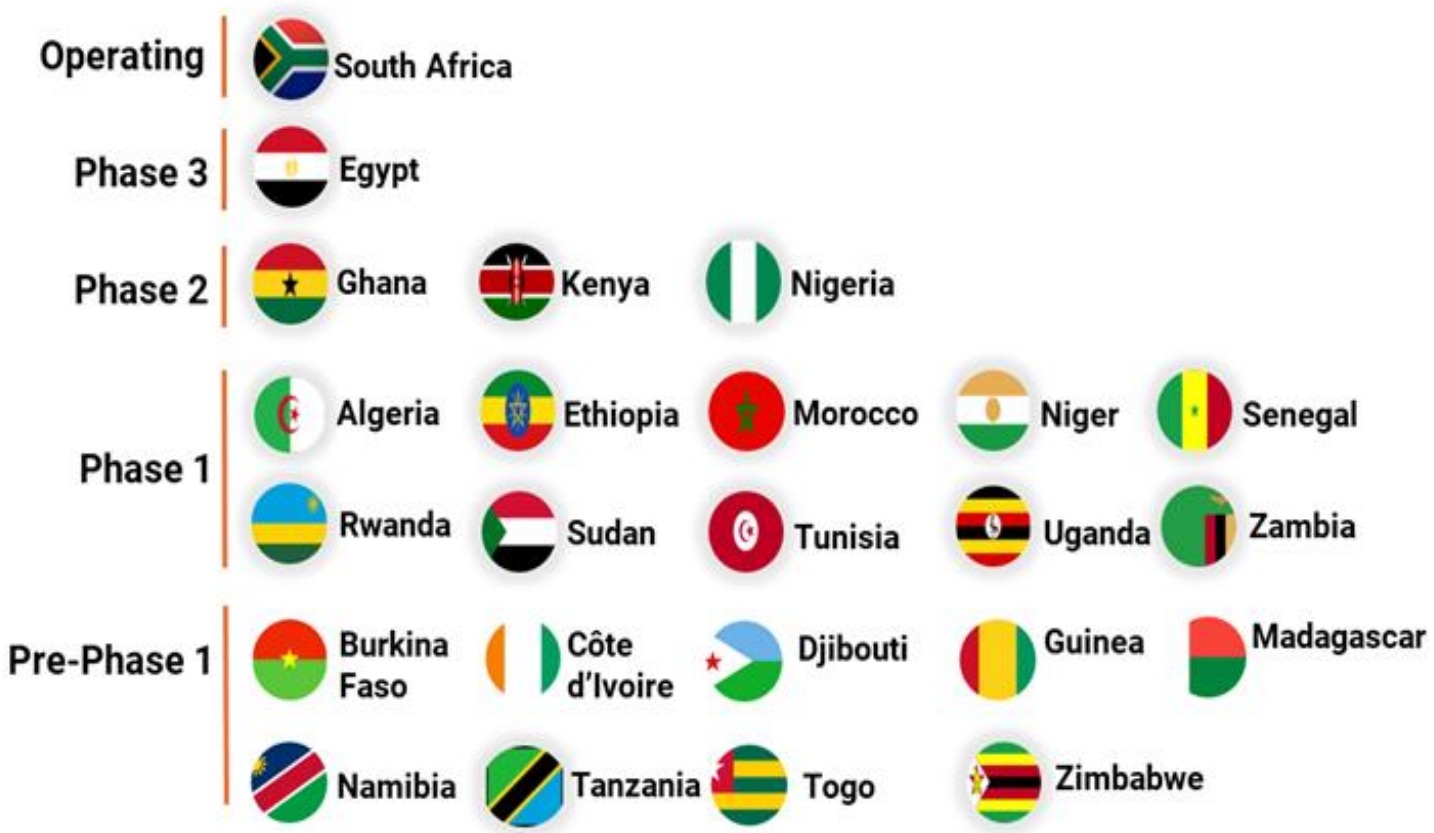
“With the growing interest in nuclear power in Africa and the recent decision by the World Bank to re-engage with nuclear energy for development, in partnership with the IAEA, countries now have a critical opportunity to access an expanding pool of global resources and support for their nuclear power ambitions.”



RAFAEL MARIANO GROSSI
IAEA Director General

Nuclear Power Prospects

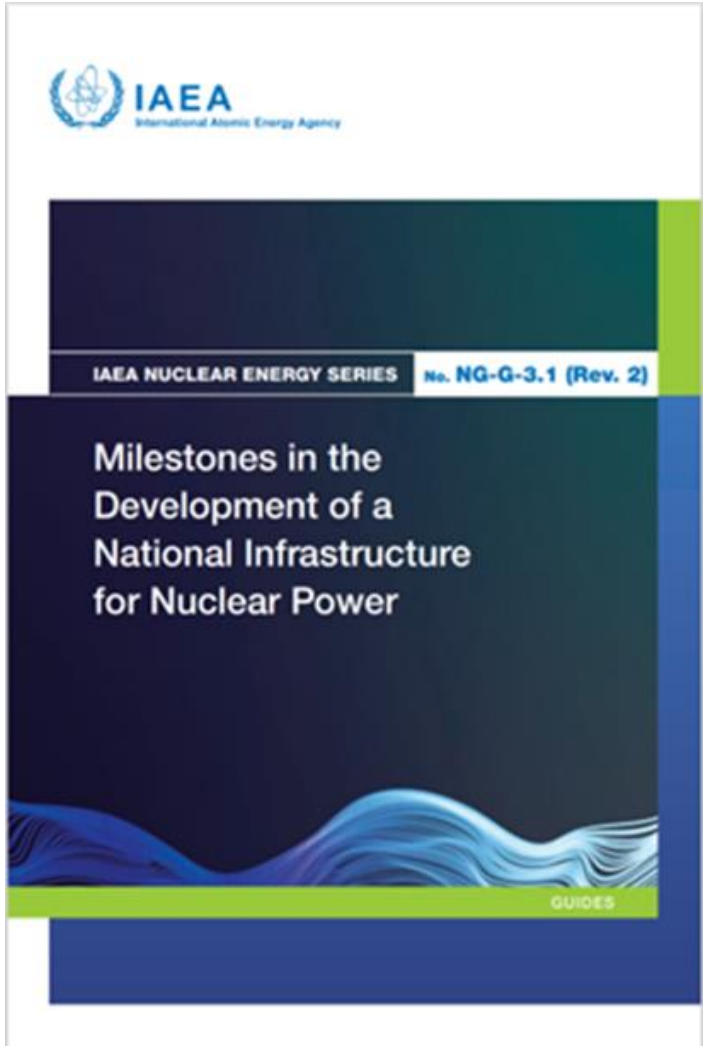
- The nuclear power prospects of African countries are gaining momentum, as several countries explore the nuclear power.
- Almost half of the newcomer countries seeking to add nuclear power to their generation mix are African countries.



The IAEA Milestone Approach

- The Milestones Approach is a comprehensive and phased *management guide* for developing the national infrastructure for a nuclear power programme, which is relevant whether a country is considering large NPPs or SMRs.

- The publication describes **19 infrastructure issues** to be considered when developing the national nuclear power infrastructure, three phases to be completed for developing this infrastructure and three milestones to be reached at the end of each phase



19 Infrastructure Issues

- Soft infrastructure issues
- Hard infrastructure issues
- National level with some international elements
- Some are interrelated
- All needs certain actions in each phase of the nuclear power programme

South Africa

- Currently, South Africa is the only African country with an operational nuclear power plant.
- The Koeberg Unit 1 Long Term Operation licence was granted in 2024, allowing the Koeberg Nuclear Power Station to extend the unit's operational life by 20 years.
- In addition, South Africa's Department of Mineral Resources and Energy (DMRE) Integrated Resource Plan of 2023 aims to add 2500 MW(e) of new nuclear capacity including SMRs after 2030, which has been approved by the National Energy Regulator of South Africa (NERSA).

Egypt

- The Government of Egypt is constructing a four-unit, 4.8 GW NPP.
- The first concrete pouring for Unit 4 was completed during the first quarter of 2024.
- In 2023, the core catchers for both Unit 1 and Unit 2 were installed. Construction of the inner containment building for Unit 1 is ongoing, while work on the inner containment building of Unit 2 began in 2024.
- In 2025, the regulatory authority granted permission to establish a spent fuel storage facility.
- The first unit of the four-unit NPP facility is expected to be completed by 2028.

Kenya

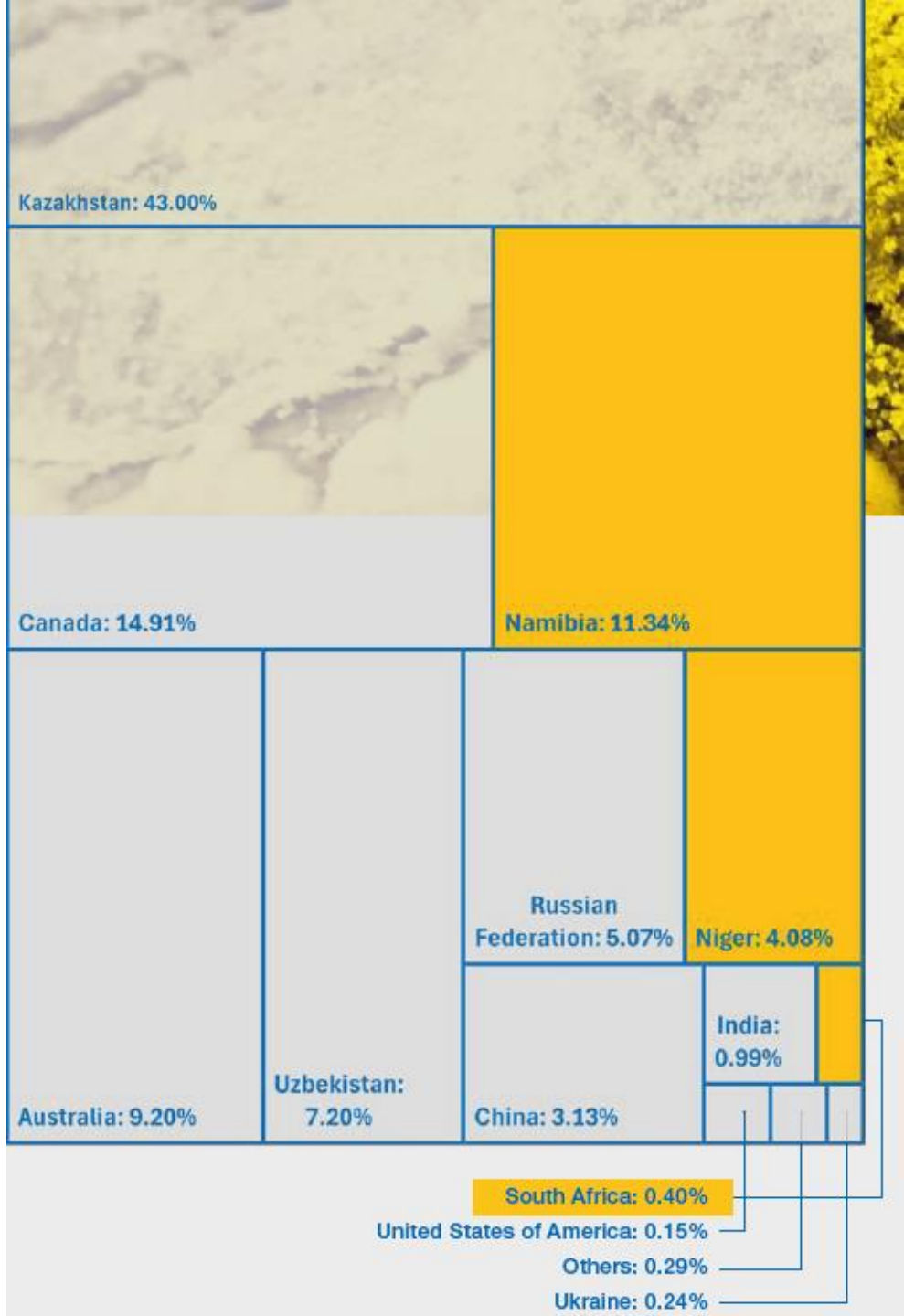
- In 2012, Kenya established the Nuclear Energy Programme Implementing Organization (NEPIO) to evaluate the potential introduction of nuclear energy.
- In 2020, the Kenyan Nuclear Regulatory Authority (KENRA) was established as an independent regulatory body, responsible for regulating nuclear and radiological material in the country.
- In 2022, Kenya re-evaluated its roadmap and announced that the commercial operation of the first NPP would start in 2038.
- The country is seeking to establish the future owner/operator organization soon.

Ghana

- Ghana established the Ghana Nuclear Power Programme Organization (GNPPO) under the Ministry of Energy in 2012 as the country's NEPIO to study the possibility of introducing nuclear power.
- The GNPPO is supported by the Nuclear Power Institute of the Ghana Atomic Energy Commission.
- Subsequently, in 2015, Ghana established the Nuclear Regulatory Authority (NRA), the regulatory body with the responsibility for nuclear safety, security, safeguards and civil liability.
- In 2018, Ghana established Nuclear Power Ghana, which has been designated as the future owner/operator for the first NPP.

Resources

- Expenditures on uranium exploration and mine development in Africa made up approximately 9% of the global expenditure in 2023.
- In 2022, Namibia ranked third among countries that produced the world's uranium.
- Niger and South Africa are ranked seventh and tenth, respectively



Nigeria

- Nigeria’s NEPIO is represented by the Nigeria Atomic Energy Commission (NAEC).
- The Nigerian Nuclear Regulatory Authority (NNRA), which was established by the amended Nuclear Safety, Physical Security and Radiation Protection Act 19 of 1995, is empowered to regulate all practices related to safety, security and safeguards for nuclear power.
- The country has made significant strides in their nuclear programme but is yet selected a vendor for the construction of the first NPP

Regional Nuclear Power Concept

- It is assumed that developing a single electricity market can accelerate the various nuclear power programmes, as there is a huge demand to be met.

- African power systems are broadly divided into five sub-regions or power pools based on economic blocs.

- The Africa Single Electricity Market (AfSEM) is a targeted intervention aimed to facilitate sustainable development of the African electricity sector through the integrated continental electricity market.

- Creation of a single electricity market coupled with increased interconnectivity can catalyze the deployment of all available and sustainable power supply options in Africa including nuclear power

Financing Nuclear Power in Africa

- Financing nuclear power projects in African countries remains a major challenge.
- Clean energy investments on the continent account for approximately 2% of the global total
- African countries are exploring diverse financing models such as the utilization of state loans.

- Currently, **Egypt's** El Dabaa project receives significant concessional loans from its supplier, the Russian Federation, with a favourable interest rate and a favourable repayment period.

- Recently, the Just Energy Transition Partnership (JETP) has been set up between **South Africa** and the International Partners Group (IPG), committing US $8.5 billion, including US $329.7 million in grants and US $5.325 billion in sovereign concessional finance for clean energy transition.

- Other African countries, such as **Senegal** and **Nigeria**, have also expressed their interest in such financing mechanisms, which can enable investments in the development of nuclear energy in African countries.

Conclusions

- South Africa is the only nuclear operating country on the continent while Egypt has begun construction and seek in generate power from nuclear by 2028.
- **22** other African countries are working toward the inclusion of nuclear power into their energy mix within the next decade.
- The IAEA provides a structured management guide for the development of a nuclear programme.
- There is the need to consider different approaches in financing nuclear projects on the continent.

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THANK YOU