

NATIONAL & REGIONAL OPPORTUNITIES AND CHALLENGES IN NEWCOMER COUNTRIES ON NUCLEAR ENERGY DEVELOPMENT — THE CASE OF ZAMBIA

by

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OUTLINE

- ❑ Introduction
- ❑ Zambia's current position in developing nuclear energy
- ❑ National and regional opportunities and challenges
- ❑ Nuclear energy's potential contribution to economic growth and environmental protection
- ❑ Recommended strategies for Zambia

INTRODUCTION

- ❑ Installed Electricity capacity of 3,800 MW against peak demand of 2,400 MW
- ❑ 80% power generated is hydropower.
- ❑ Nuclear energy is being explored to provide stable baseload power and reduce carbon emissions.

CURRENT NUCLEAR STATUS

- ❑ Government approved the Zambia atomic energy agency (ZAMATOM) under the atomic energy act (2011)
- ❑ 2017 agreement with Russia for a 2,000 MW plant, starting with a nuclear research centre in Chongwe
- ❑ Zambia developed a National Nuclear Policy (2020) which establishes a framework for the peaceful use of nuclear science and technology
- ❑ Zambia collaborated with the IAEA to host a regional training on uranium exploration/mining in June 2025 with participants from 19 African countries
- ❑ IAEA Integrated Nuclear Infrastructure Review (INIR) mission conducted in 2025 noted strong political commitment
- ❑ Studies ongoing on land-based and Small Modular Reactor (SMR) options.

NATIONAL OPPORTUNITIES

- ❑ **Energy diversification**: reduce reliance on hydropower.
- ❑ **Industrialization support**: reliable power for mining and manufacturing.
- ❑ **Job creation & skills**: STEM and engineering sectors grow.
- ❑ **Scientific innovation**: boosts research and technological development.
- ❑ **Energy security**: low dependence on imported fuels.

REGIONAL OPPOTURNITIES

- ❑ **Regional Power Pool (SAPP):** enables trade in surplus electricity.
- ❑ **Harmonized nuclear regulation:** through SADC cooperation.
- ❑ **Shared infrastructure & expertise:** training centres, waste management.
- ❑ **Potential for regional SMR deployment:** flexible, modular design fits smaller grids

NATIONAL CHALLENGES

- ❑ **Regulatory & legal gaps**: need comprehensive nuclear bill.
- ❑ **Human resource constraints**: limited nuclear engineers, operators, and regulators.
- ❑ **Financing**: high upfront costs, long payback period.
- ❑ **Grid Capacity**: needs reinforcement to integrate new generation sources.
- ❑ **Public perception**: concerns about safety and radioactive waste

REGIONAL CHALLENGES

- ❑ Lack of harmonized nuclear legislation across SADC.
- ❑ Limited regional financing mechanisms for large nuclear projects.
- ❑ Security and waste transport logistics for landlocked states.
- ❑ Unequal technical capacity between member states

ECONOMIC CONTRIBUTIONS

- ❑ **Reliable power supply**: enhances productivity and investment confidence.
- ❑ **Energy exports**: possible via SAPP interconnections.
- ❑ **Industrial growth**: enables mineral beneficiation and manufacturing.
- ❑ **Employment creation**: construction, operation, regulation, and education.
- ❑ **Technology transfer**: development of local expertise and industries.

ENVIRONMENTAL CONTRIBUTIONS

- ☐ Low greenhouse gas emissions during operation.
- ☐ Reduces deforestation by replacing biomass and diesel generation.
- ☐ Promotes climate resilience compared to hydropower's drought sensitivity.
- ☐ Requires strict environmental management for waste and decommissioning.

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RECOMMENDED STEPS

- ☐ Enact a comprehensive nuclear bill aligned with IAEA standards.
- ☐ Strengthen independent regulatory authority and institutional capacity.
- ☐ Expand human resource development through IAEA fellowships and partnerships.
- ☐ Develop financing models like PPP, Concessional loans, multilateral support etc.
- ☐ Engage the public and stakeholders early to build confidence.

CONCLUSION

- ❑ Nuclear power can enhance Zambia's energy security and economic competitiveness.
- ❑ Opportunities outweigh risks if proper safeguards and planning exist.
- ❑ Regional collaboration within SADC and IAEA frameworks is key.
- ❑ Zambia must proceed gradually and responsibly, ensuring strong public trust.



Questions and Clarifications