

Zambia's Nuclear Energy Program and Prospects for Floating Nuclear Power Plants

Presentation Made to the Technical Meeting: 24th INPRO Dialogue Forum on the Sustainable Deployment of Floating Nuclear Power Plants for Transitioning to Net Zero

Kangwa Chisha – MoE

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2/9 Presentation Outline

- Introduction
- Policy and Institutional Framework
 - Strategic Partnerships
- Floating Nuclear Power Plants (FNPPs)
 - Challenges and Way Forward

3/9 Introduction

Capital City : Lusaka

Population : 18 million

Area : 752,614 km²



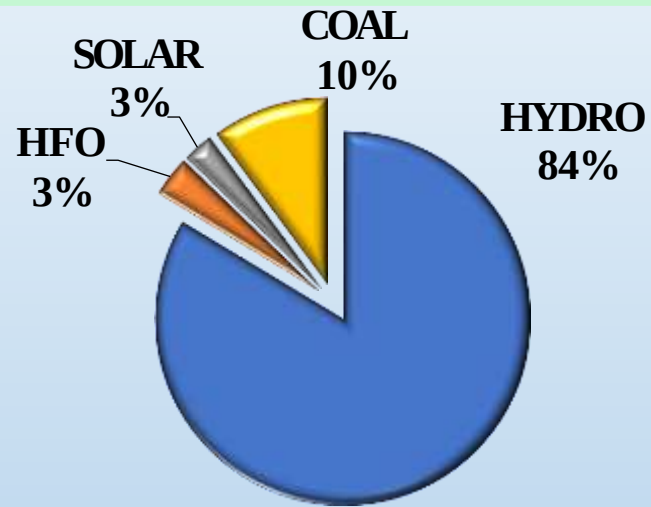
Hydro Potential

6,000 MW



Energy_Mix

Installed Capacity: 2,928 MW @ 2019



**Projected Demand – 2030
(Population: 23.6 million)**

27,427.56 MW

**Projected Demand – 2060
(Population: 56.8 million)**

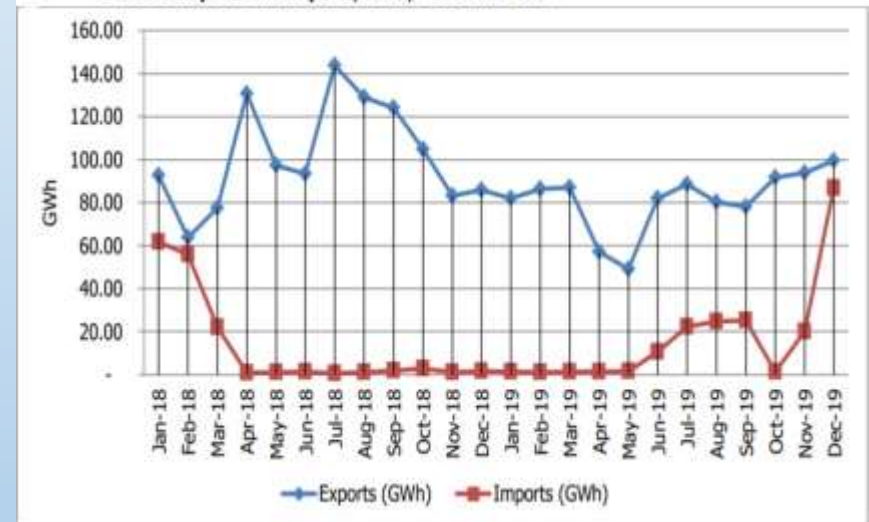
54,855.12 MW

2015/16

Power Deficit due to poor rainfall: 1,000 MW

**Unbudgeted electricity import:
≈ \$ 440,000,000.00**

ZESCO's Imports and Exports, 2017, 2018 and 2019



2018/19

Power Deficit due to poor rainfall : 872 MW

**Unbudgeted electricity import :
≈ \$ 41,000,000.00**



4/9 Introduction

Why Nuclear?

Zambia is pursuing nuclear energy as a long-term, reliable, and clean energy source to meet growing demand, reduce reliance on hydropower, and support industrialization.

Energy and Development Context:

Over 80% of Zambia's electricity comes from hydropower, making it vulnerable to climate-induced droughts.

Zambia's Integrated Resource Plan forecasts a sharp rise in electricity demand by 2030. Diversifying the energy mix is critical to ensure energy security, economic resilience, and low-carbon growth.



5/9 Policy and Institutional Framework

National Nuclear Policy (2020) Approved by Cabinet in November 2020.

- ✓ Defines Zambia's commitment to the peaceful use of nuclear technology.
- ✓ Aligns with Vision 2030, emphasizing energy security, economic transformation, and scientific advancement.

Institutional Architecture in Progress

I. Zambia Atomic Agency

- ✓ Will serve as the owner/operator of nuclear facilities and will be responsible for implementation and project coordination.

II. Nuclear Safety and Protection Authority (NSPA)

- ✓ Evolving from the Radiation Protection Authority (RPA).
- ✓ Will function as the independent regulator, ensuring nuclear safety, security, and compliance.



6/9 Strategic Partnerships

International Partnerships

I. Russia (ROSATOM)

- ✓ Signed Project Development Agreement (2017) for feasibility studies and long-term cooperation.
- ✓ Includes plans for a Nuclear Power Plant and the Centre for Nuclear Science and Technology (CNST).

II. United States (IP3/Allied Nuclear Partners)

- ✓ Technical cooperation and strategic advisory in nuclear energy systems and innovation.

III. South Korea (KAERI)

- ✓ Collaboration on research and development, human capital, and technical exchange.



6/9 Strategic Partnerships

Key Achievements

- ✓ Established National Nuclear Policy (2020)
- ✓ Cabinet endorsed continuation of the nuclear programme
- ✓ Training and participation in IAEA forums and workshops



7/9 Floating Nuclear Power Plants

Floating Nuclear Power Plants (FNPPs): A Flexible Option for Zambia's Net-Zero Transition

What Are FNPPs?

- ✓ Mobile, marine-based nuclear reactors deployed on floating platforms.
- ✓ Provide 30 –100+ MW of continuous, low-carbon power.
- ✓ Designed for remote areas, industrial zones, and grid-deficient locations.
- ✓ Already operational: e.g., Russia's Akademik Lomonosov.

7/9 Floating Nuclear Power Plants

Why FNPPs for Zambia?

1. Grid Flexibility & Resilience : Can Act as reliable baseload complement to hydropower and solar.
2. Climate Independence: Immune to droughts—ensures stable power generation despite rainfall variability.
3. Bridge to Large-Scale Nuclear: Offers a quicker deployment timeline compared to land-based NPPs
4. Supports Net-Zero Goals



8/9 Challenges and Way Forward

Key Challenges

I. Landlocked Geography

- ✓ FNPP deployment requires coastal access, transit security, and international coordination.

II. Regulatory Capacity Gaps

- ✓ Need for legal instruments covering mobile/floating reactors, nuclear liability, and transport safety.

III. Human Capital Limitations

- ✓ Shortage of trained professionals for nuclear operations, safety regulation, and emergency response.

IV. Public Awareness & Confidence

- ✓ Need to build trust in nuclear energy through education and transparency.



8/9 Challenges and Way Forward

Way Forward

1. Finalize and Enact a Nuclear Bill

- ✓ Strengthen legal and regulatory framework aligned with IAEA standards.

2. Advance Implementation of CNST and Pre-Feasibility Studies

- ✓ Continue groundwork for both land-based NPPs and potential FNPP deployment.

3. Engage in Regional Cooperation

- ✓ Develop transit agreements with coastal countries for FNPP logistics.

Advocate for nuclear infrastructure harmonization in SADC.

4. Expand IAEA and Bilateral Training Opportunities

- ✓ Focus on regulators, engineers, legal drafters, and emergency response teams.

5. Pilot FNPP Feasibility Assessments

- ✓ Identify candidate sites and evaluate operational, environmental, and logistical factors.

8/9 Regional Cooperation & Logistics for FNPPs

Question

As a landlocked country, Zambia would rely on regional access to coastal ports for FNPP deployment .Have other countries established regional protocols or intergovernmental agreements for nuclear logistics that we could learn from?



9/9 Zambia's Nuclear Programme

THANK YOU