

ADVANCING NUCLEAR ENERGY IN AFRICA:

POTENTIAL REGIONAL COOPERATION AND THE SHARING OF INFORMATION AND RESOURCES

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PRESENTATION OUTLINE

- ❖ The need for Nuclear Power
- ❖ Framework for Regional Cooperation
- ❖ Areas for Cooperation
- ❖ Conclusion

The need for Nuclear Power

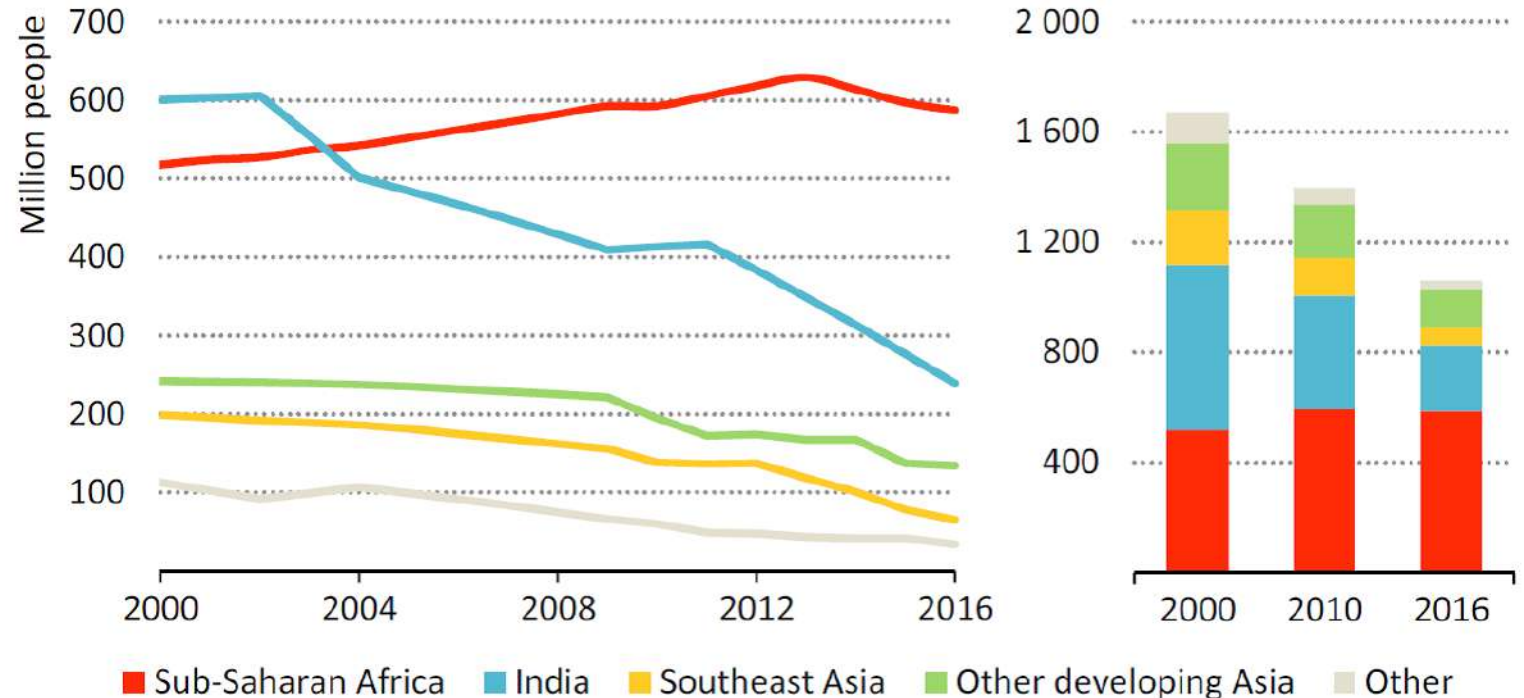


THE NEED FOR NUCLEAR POWER

❖ Africa is rich in energy resources, but starved of electricity whether we look at energy access, installed capacity, or overall consumption.

➤ Progress on electricity access is being made in all parts of the world **except Africa**.

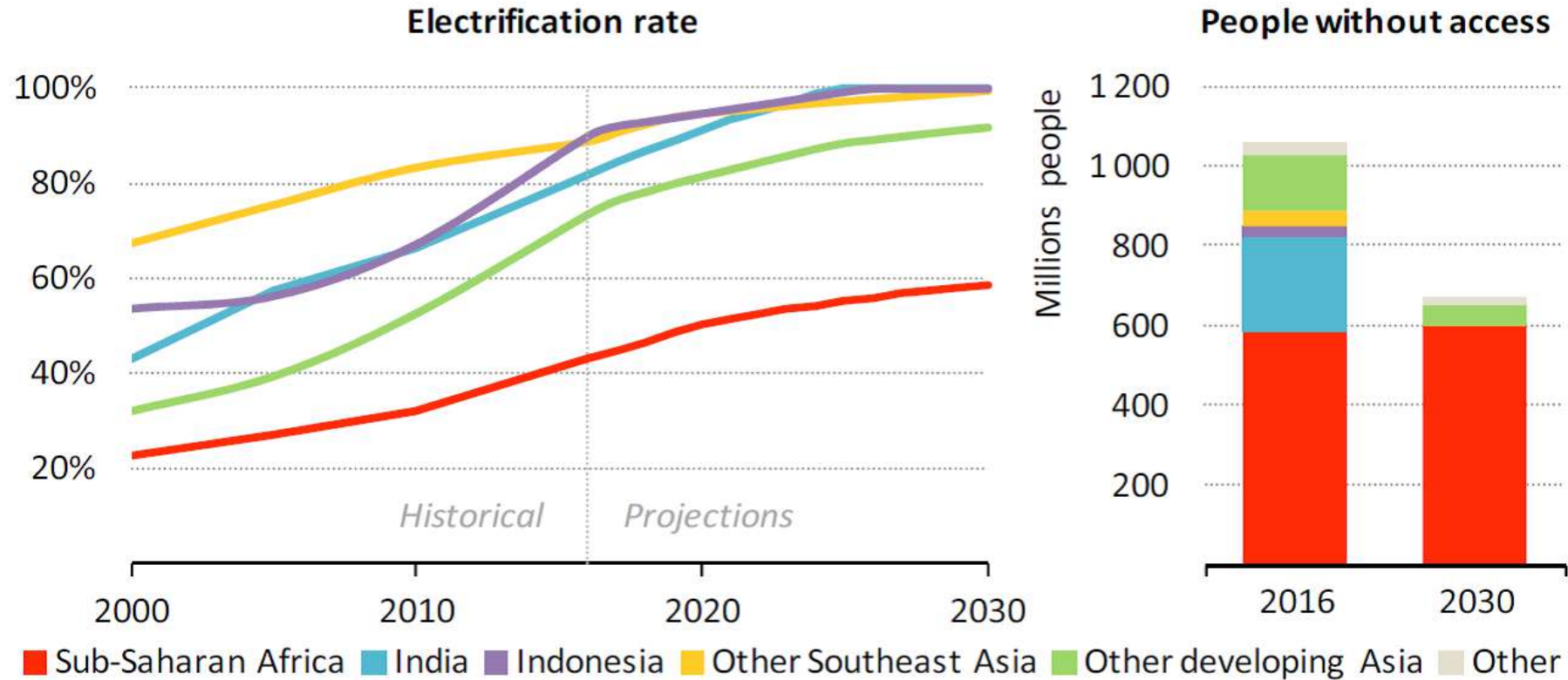
➤ 588 million people without access in 2016 compared to 518 million in 2000 (IEA, 2017)



Population without access to electricity by region

Source: International Energy Agency, World Energy Outlook 2017

THE NEED FOR NUCLEAR POWER



Electricity access rate and population without electricity by region in the New Policies Scenario

Source: International Energy Agency, World Energy Outlook 2017

THE NEED FOR NUCLEAR POWER

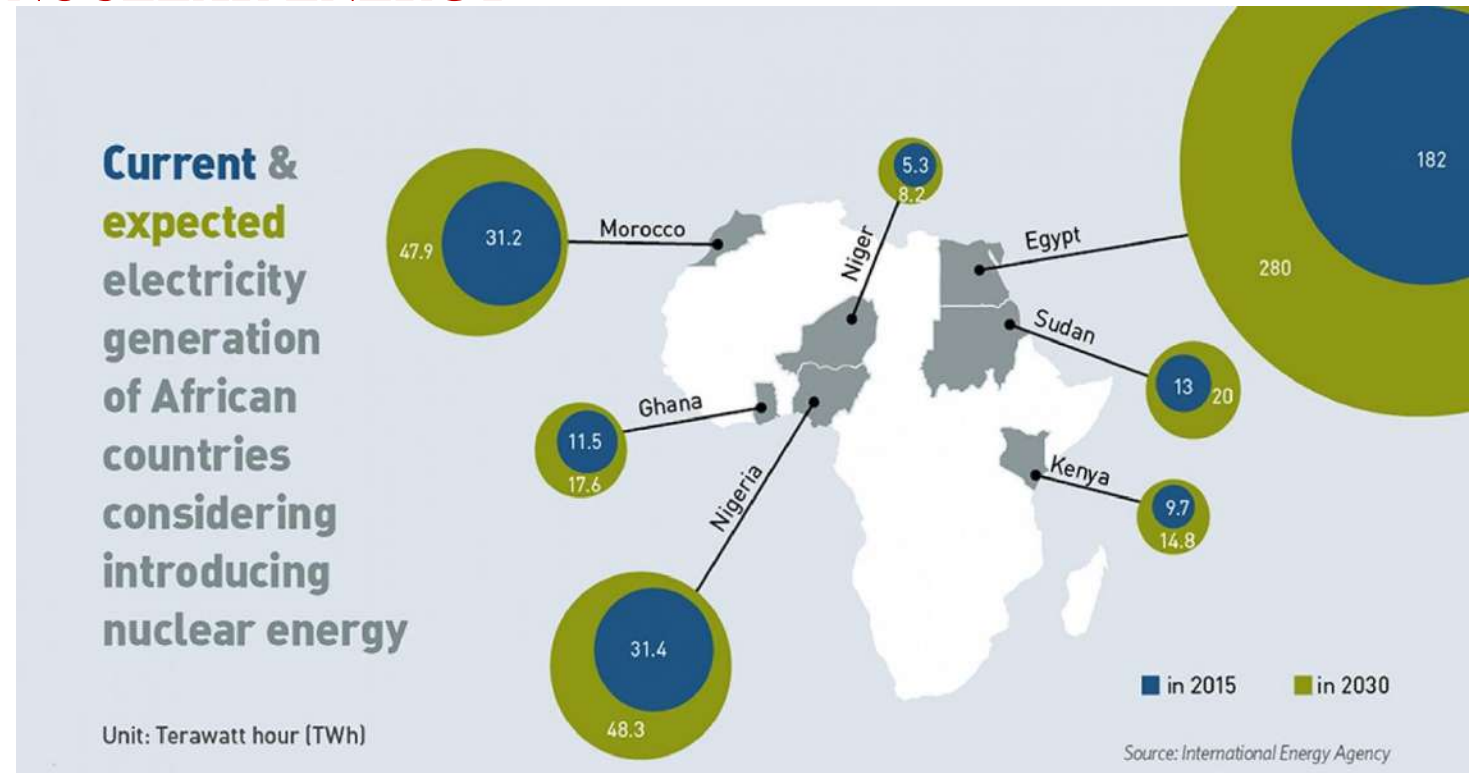
- ❖ The average annual consumption per capita is around 515 kWh in Africa. For some African countries, this rate is as low as 50 kWh/year compared to a world average of 2326 kWh/year.
- ❖ Further, about 40% is consumed by the northern region, 40% by South Africa, and the remaining 20% by all the other African countries
- ❖ The challenges facing the energy sector in Africa are many and greatly affect the region's overall performance against social and economic indicators.
- ❖ The energy/electricity requirements for achieving the SDGs are enormous, and nuclear power can contribute to the provision of low carbon energy/electricity supply.

THE NEED FOR NUCLEAR POWER

- ❖ By 2030, nine-out-of-ten people without access to electricity would be in sub-Saharan Africa (IEA, 2017)
- ❖ Rising population, growing middle class and growing urbanisation would mean more energy is needed for domestic and industrial purposes
- ❖ **Prioritise Reliability**
 - Access rate alone should not be the sole measure of progress
 - If quality and reliability continue to be poor, there could still be a significant strain on economic growth

THE NEED FOR NUCLEAR POWER

❖ Combination of a growing population, the need for socioeconomic development and escalating environmental challenges driving some African countries to look into possible options to secure sustainable and reliable energy supplies, including **NUCLEAR ENERGY**



THE NEED FOR NUCLEAR POWER

❖ Different Countries in the Sub-Region face different demands and have different opportunities. For nearly all of them, the best energy strategy involves a mix of different energy sources, and for nearly all of them the best mix is different.

- Many emerging economies have turned to nuclear power to meet energy deficits
- Nuclear power has the potential to meet Africa's sustainable energy future for reliable, affordable and clean electricity

Framework for Regional Cooperation



FRAMEWORK FOR REGIONAL COOPERATION

❖ **Nuclear power programmes are capital intensive, deterring developing countries from entering into nuclear power**

❖ **Successful introduction of nuclear power would largely depend on a network of infrastructural development**

- Human Resource Development
- Grid Infrastructure
- Security and Physical Protection
- Management of Radioactive Waste
- Funding and Financing
- Legislative and Regulatory Framework, etc.

FRAMEWORK FOR REGIONAL COOPERATION

❖ If cooperation could be achieved, the infrastructure burden and experiences could be shared among Member States and economic benefits gained by several countries acting jointly at Regional level



FRAMEWORK FOR REGIONAL COOPERATION

❖ **For effective cooperation, a number of issues would need to be addressed (1 of 4):**

➤ POLITICAL WILLINGNESS

- ✓ Strong political will, political stability and intergovernmental relationships are needed
- ✓ Awareness among the decision-makers and other stakeholders about the challenges posed by nuclear power infrastructure planning, development and management
- ✓ Building strong National and Regional position on Nuclear Energy and to have strong support from all stakeholders
- ✓ Strong commitment of each Member State to effectively participate in the Regional cooperation programme

FRAMEWORK FOR REGIONAL COOPERATION

❖ **For effective cooperation, a number of issues would need to be addressed (2 of 4):**

➤ REGULATION/LEGAL FRAMEWORK

- ✓ Development of National and Regional Legal Framework and international agreements;
- ✓ Establishment of National and Regional Nuclear Regulatory body and Environmental Regulatory Authority;
- ✓ The promotion and establishment of a common regulatory and legal framework as well as rules, standards and practices within Member States

FRAMEWORK FOR REGIONAL COOPERATION

❖ **For effective cooperation, a number of issues would need to be addressed (3 of 4):**

➤ TECHNICAL REQUIREMENTS

- ✓ Promote self-sustaining and regional interconnected nuclear power infrastructure through localisation, research and development;
- ✓ Establishment of a reliable and adequate electric power generation, and transmission interconnections
- ✓ Fostering adequate support by national industries to ensure targeted level of local industry participation

FRAMEWORK FOR REGIONAL COOPERATION

❖ **For effective cooperation, a number of issues would need to be addressed (4 of 4):**

➤ SAFEY AND SECURITY

- ✓ Member States commitment to nuclear safety, security and safeguards
- ✓ Empowering existing Regional bodies (AFCONE, FNRBA, RASCA) to provide controls and ensure international standards are met
- ✓ A comprehensive nuclear safety and security strategy for the Region to ensure the security of nuclear materials.
- ✓ Engage African Union on nuclear safety and security issues to promote more ‘buy-in’
- ✓ Close Cooperation with all Regional organisations and networks to promote a responsible Nuclear Power Programme in Africa

Areas for Cooperation



AREAS FOR COOPERATION

❖ Cooperation in the establishment and sharing of:

➤ Physical facilities

✓ R&D facilities;

➤ Common programmes

✓ Environment impact assessment;

✓ Transboundary movement of spent fuel;

✓ Emergency preparedness and response;

✓ R&D programmes

AREAS FOR COOPERATION

❖ Cooperation in the establishment and sharing of:

➤ Knowledge management

- ✓ Education and training for human resource development
- ✓ Codes and standards;
- ✓ Legal framework;
- ✓ Regulatory standards
- ✓ Peer reviews
- ✓ Technical support and exchange; and
- ✓ Professional and technical development
- ✓ exchange of information and good practices among all nuclear utilities
- ✓ Benchmarking against international best practice

REGIONAL AGREEMENTS AND NETWORKS - FNRBA

❖ Forum of Nuclear Regulatory Bodies in Africa (FNRBA): **Established in 2009**

- To strengthen and harmonise radiation and nuclear safety and security regulatory infrastructures
- Serve as an effective platform for the exchange of regulatory experiences and practices among the nuclear regulatory bodies.

❖ FNRBA technical areas working groups comprises:

- | | |
|--|---|
| <ul style="list-style-type: none">❖ Education, Training and Knowledge Management❖ Nuclear and Radiation Safety in Research Reactors❖ Regulatory Framework for the Licensing of Nuclear Power Plants❖ Radiation Safety in Uranium Mining and Milling❖ Safety in Radioactive Waste Management Infrastructure | <ul style="list-style-type: none">❖ Emergency Preparedness and Response❖ Nuclear Security Infrastructure❖ Radiation Safety in Radiotherapy❖ Transport Safety❖ Legislative and Regulatory Infrastructure |
|--|---|

REGIONAL AGREEMENTS AND NETWORKS - AFRA

❖ The African Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology (AFRA)

❖ Five goals

- To enhance the sustainable contribution of nuclear science and technology to meet the developmental needs and interests of Member States
- Entrench the culture of mutual assistance and regional cooperation in the effective utilization of available nuclear expertise and infrastructure
- Deepen the culture of nuclear safety and security at regional and national levels in the gainful exploitation of nuclear science and technology
- Continuously interact and create awareness amongst decision makers, civil society, users and the public on the benefits of peaceful application of nuclear science and technology
- Institute good governance and excellence in management of the activities in the region

REGIONAL AGREEMENTS AND NETWORKS - AFCONE

❖ **AFCONE: Treaty of Pelindaba established the African Commission on Nuclear Energy (AFCONE) to:**

❖ Play key role in advancing the peaceful application of nuclear science and technology in Africa

❖ Bring much-needed support to States Parties to fully benefit from nuclear sciences and technology applications in the areas of health, agriculture and energy

AFCONE Strategic Pillars	<ol style="list-style-type: none">1. Denuclearisation of Africa,2. Nuclear Security, Disarmament and Development,3. Prevention of Nuclear Proliferation,4. Integration, Cooperation and Partnership in Peaceful Nuclear Energy,5. Capacity Building, Research, Production and Communication in Nuclear Science and Technology for Peaceful Purposes,6. Prevention Pollution from Radioactive Wastes and Other Radioactive Matters,7. Radiological and Nuclear Safety8. Stabilising and Strengthening the Organisation
Overall Goal	To ensure safety, security and socio-economic progress in Africa through (a) coordinating, strengthening and developing continental nuclear peaceful applications programs and (b) playing a dynamic role in disarmament & non proliferation affairs, driven by an accountable, efficient and responsive AFCONE.

REGIONAL AGREEMENTS AND NETWORKS - AFCONE

❖ AFCONE Plan of Action:

- ❖ Promote the Peaceful Nuclear Applications, including Nuclear Power (NPP)
- ❖ Contribute to Capacity Building in Africa, in the Fields of Nuclear Energy, Safety, Security and Safeguards,
- ❖ Support, in Close Coordination and Synergy, the Regional and Continental Programmes, Projects and Activities in the Field of Nuclear Energy,
- ❖ Develop Partnership with Nuclear Power Plant Technology Providers,
- ❖ Establish an African Roster of Experts in the Fields,
- ❖ Identify Regional Infrastructure of Excellence (Centers, Institutes, Industry...),
- ❖ Follow Up, with the Regional and International Partners, of the Development Status in the Specific Fields of Activities and Contribute to Regional Prospects Studies,
- ❖ Organise Periodic Regional Events, with all the Stakeholders, to Assess the Evolution of the Needs & Support the Appropriate Response

CONSLUSION



CONCLUSION

- ❖ The interest across Africa for nuclear power is not surprising

- ❖ The stakes are enormous and fulfilling regional cooperation in the development of a Nuclear Power programme in the Sub-Region will be challenging

- ❖ Planning for African Network for Enhancing Nuclear Power Programme Development was initiated in 2015 and with representative from major African countries interested in nuclear power
 - The network should be strengthened for information sharing and learning

- ❖ There's the need to ensure political and economic stability in the Region for effective cooperation

CONCLUSION

- ❖ Important to seek optimal synergy and maximum cooperation with Regional and International partners for both regulatory bodies and operating organisations

- ❖ Need for close cooperation with all regional organisations and networks to promote a responsible nuclear power programme in Africa

- ❖ Need to establish technical working groups among regional bodies (Regulatory and Operating Organisations) aimed at:
 - ❖ Promoting the exchange of information and good practices on safety, security and safeguards
 - ❖ Human Resource Development (professional and technical development)
 - ❖ Emergency preparedness and response
 - ❖ Maintaining evaluation and peer reviews

**Thank You for Your
Attention!**

