



African Continental Nuclear Institutions: A Review

JO-ANSIE VAN WYK YARIK TURIANSKYI & ISABEL BOSMAN

Executive summary

Nuclear energy is expected to play an increasingly important role in Africa's energy programmes. At least 16 countries are looking at ways to include nuclear as part of their energy mix, with emphasis on electrification and energy security. Current use includes medicinal and agricultural applications, with the potential to play a much larger role in the continent. Still, major concerns exist around the safety and security of nuclear projects. Disasters such as those witnessed in Chernobyl and Fukushima must be avoided, and nuclear materials must be protected from theft by terrorists. For these reasons and more, nuclear energy is highly regulated. Many African states are already members of international regimes on nuclear disarmament, safety and security, and non-proliferation. The focus of this paper is on four main African institutions and legal frameworks, which are reviewed in a global context. The first is the 1996 Treaty of Pelindaba, which establishes Africa and its surrounding islands as a Nuclear Weapons-Free Zone (NWFZ). The second is the treaty's implementation body, the African Commission on Nuclear Energy (AFCON). The third is the Forum of Nuclear Regulatory Bodies in Africa (FNRBA). The fourth is Africa Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA).

Introduction

South Africa is the only African country currently operating a nuclear power reactor, with an active nuclear programme. Across the continent, many others are considering adding nuclear power to their energy mix as a proven, clean and affordable technology. At time of publication, 16 other African countries are looking to establish nuclear programmes: Algeria, Angola, Burundi, Democratic Republic of Congo (DRC), Egypt, Ethiopia, Ghana, Kenya, Morocco, Rwanda, Sudan, Tunisia, Tanzania, Uganda, Zambia and Zimbabwe. Egypt is closest to joining South Africa's ranks, as construction of its nuclear power plant is already underway.¹ Nuclear power is therefore expected to play an increasingly important role in improving energy supply and security and mitigating climate change on the African continent. Currently, nuclear and other radioactive materials and nuclear-derived technology are used across Africa in agriculture, research, manufacturing, non-destructive testing and mineral exploration. Many tertiary care hospitals in Africa also use radioisotopes (a form of nuclear technology) for diagnostic and therapeutic applications.

Nuclear materials produce radioactive waste, which needs to be carefully managed to prevent negative outcomes on people and the environment. The dangerous side of nuclear power has been well-documented in the Chernobyl and Fukushima nuclear disasters. Safety and security of new and existing nuclear programmes, as well as nuclear

¹ Pamela Largue, 'Russia Starts Equipment Production for Egypt's El-Dabaa Nuclear Plant,' *Power Engineering International*, August 6, 2021, <https://www.powerengineeringint.com/nuclear/russia-starts-equipment-production-for-egypts-el-dabaa-nuclear-plant/>.

waste products, is paramount. Additionally, nuclear materials can also be used for military purposes by countries or for terrorism by non-state actors. Unauthorised access to nuclear materials therefore remains a challenge to global safety and security.

Global nuclear regimes oblige member states to make legally binding commitments on matters related to nuclear disarmament, safety and security, and non-proliferation. Many African states are members through international treaties, multilateral organisations, initiatives, networks, and monitoring, verification and compliance systems. The most important of these are the 1970 Treaty on the Non-Proliferation of Nuclear Weapons (the Nuclear Non-Proliferation Treaty, or NPT) and the International Atomic Energy Agency (IAEA). Specific to Africa, the 1996 Treaty of Pelindaba establishes the continent and its surrounding islands as a NWFZ, with the African Commission on Nuclear Energy (AFCONE) as its oversight and implementation body. Additionally, the FNRBA and the Africa Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA) play an important role in Africa's nuclear policies.

This paper is a review of African nuclear institutions and their legal frameworks. It begins by examining the current status of the NPT in a global context, more than 50 years after its adoption. It then reviews the role of the IAEA in Africa, with emphasis on member state cooperation. African continental nuclear institutions and instruments are then examined, including the Pelindaba Treaty, AFCONE, FNRBA and AFRA. The conclusion provides practical recommendations on how African institutions could be strengthened to pursue the goals of nuclear non-proliferation and nuclear energy for development.

International dimension: legal and governance framework

As signatories to international legal and governance frameworks on nuclear energy, African states are obliged to comply with these regulations. Many African states are bound to at least three major international legal frameworks on nuclear energy. This includes the 1970 Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and the 2021 Treaty on the Prohibition of Nuclear Weapons (TPNW or Ban Treaty). The NPT provides the guiding principles and governance framework for the IAEA's work. The IAEA has been instrumental in directing peaceful applications of nuclear energy in Africa, especially through AFRA.

African states are bound to at least three major international legal frameworks on nuclear energy

Treaty on the Non-Proliferation of Nuclear Weapons

The NPT's aim is to prevent the spread of nuclear weapons and technology, while promoting the peaceful use of nuclear energy globally.² All African states³, with the exception of South Sudan, are party to the NPT.

Despite wide support for the NPT, some concerns remain. It is widely acknowledged that progress has been slow, as the NPT regime has not ended the proliferation of nuclear weapons or led to global nuclear disarmament. Second, Article IV of the NPT envisages the universal peaceful use of nuclear energy by referring to the 'inalienable rights' of states to 'develop research, production and use of nuclear energy for peaceful uses' and encourages states to exchange knowledge, equipment and materials on nuclear energy.⁴ Article V operationalises this by obliging states that currently benefit from the peaceful use of nuclear energy to share insights with non-nuclear states.⁵ This Article is significant for non-nuclear weapon states, especially African states, and would be beneficial for the medical, agricultural and industrial sectors.

African states remain concerned about the NPT's discriminatory nature. There is a clear divide between the nuclear *haves* and the *have nots*. States which possess nuclear weapons (the *haves*) have repeatedly called for nuclear non-proliferation but make few efforts to diminish their own nuclear arsenals. Promotion of the use of nuclear energy for peaceful development and the pursuit of a nuclear weapons-free world are twin goals that need to remain firmly entrenched in the international agenda. Africa has done a commendable job of explicitly supporting these principles through the Pelindaba Treaty and its implanting agency, AFCONE (discussed later in this paper).⁶

International Atomic Energy Agency

The IAEA is an organisation of the UN, created in 1957 to co-ordinate international cooperation for the regulation and use of nuclear technology. Through its three main pillars – technical cooperation in nuclear science and technology, nuclear safety, and nuclear safeguards and verification – the IAEA has contributed to Africa's peaceful use of nuclear energy. The IAEA seeks to improve development through atomic energy and ensure that

2 United Nations Office for Disarmament Affairs (UNODA), *Treaty on the Non-Proliferation of Nuclear Weapons*, Fact Sheet, July 2014, https://s3.amazonaws.com/unoda-web/wp-content/uploads/2014/07/NPT_Factsheet_July-2014.pdf.

3 South Sudan is not currently a States Party but this is for practical and not ideological reasons.

4 International Atomic Energy Agency (IAEA), *Treaty on the Non-Proliferation of Nuclear Weapons*, INFCIRC/140 (April 22, 1970), <https://www.iaea.org/sites/default/files/publications/documents/infcircs/1970/infcirc140.pdf>.

5 IAEA, "Treaty on the Non-Proliferation of Nuclear Weapons."

6 Jo-Ansie Van Wyk and Yarik Turianskyi, "Nuclear Non-Proliferation Treaty 50 years on: Where does Africa Stand?", (SAIIA, March 5, 2020), <https://saiia.org.za/research/nuclear-non-proliferation-treaty-50-years-on-where-does-africa-stand/>.

it is not diverted for military purposes.⁷ The Agency administers international safeguards to verify that non-nuclear weapon States party to the NPT fulfil their non-proliferation commitments, 'with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices'.⁸ The IAEA also plays a central role under the treaty in areas of technology transfer for peaceful purposes as envisaged in terms of Articles IV and V of the NPT. As a global forum for scientific and technical cooperation of nuclear technology and power for peaceful purposes⁹, the IAEA is important for African member states as it allows them to access nuclear knowledge, training and equipment.

Specifically, at a bilateral level (between the IAEA and member states) the IAEA assists countries considering the establishment of nuclear power programmes through its Milestones Approach method. This involves three phases of clearly defined guidelines, covering infrastructure development and legislation. Member states must complete each phase and achieve specific milestones before embarking on the next phase. Countries in the Milestones Approach receive visits from IAEA Integrated Nuclear Infrastructure Review (INIR) teams for continued monitoring of progress and feedback as well as facilitate exchange of knowledge.¹⁰ As African states develop their nuclear programmes, the Milestone Approach may play an important role. Once nuclear programmes have been established, African states should report regularly and transparently on their nuclear activities to the IAEA. Ghana has set an example of best practice on the continent by working closely with the IAEA, which has so far conducted two missions to review the country's nuclear infrastructure.¹¹ The IAEA has also conducted INIR Missions to South Africa, Nigeria, Kenya, Morocco, Niger, and Egypt.¹²

Ghana has set an example of best practice on the continent by working closely with the IAEA, which has so far conducted two missions to review the country's nuclear infrastructure

7 Mohamed ElBaradei, "Safe and Peaceful Use of Nuclear Energy, An IAEA Perspective" (IAEA, April 17, 1998), <https://www.iaea.org/newscenter/statements/safe-and-peaceful-use-nuclear-energy-iaea-perspective>.

8 IAEA, "Treaty on the Non-Proliferation of Nuclear Weapons", 2.

9 UN, 'Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons', <https://www.un.org/en/conf/npt/2015/pdf/IAEA%20factsheet.pdf>.

10 IAEA, "Milestones in the Development of a National Infrastructure for Nuclear Power" (Nuclear Energy Series NG-G-3.1 [Rev.1], IAEA, Vienna, 2015, 5).

11 Hubert Foy and Isabel Bosman, "Nuclear Energy in Ghana," (SAIIA Special Report, March 2021), <https://saiia.org.za/research/nuclear-power-and-governance-frameworks-egypt-ghana-and-south-africa/>.

12 Charles Kofi Klutse, Nuclear Power Programme in Africa: Current Status and Challenges, PowerPoint Presentation, 10 December 2020, AFCONE web conference, <https://www.afcone.org/wp-content/uploads/2020/12/07-Dr-Charles-KLUTSE-Ghana-Nuclear-Power-Programme-in-Africa-Final-15-12-20201.pdf>.

The Africa Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology

AFRA entered into force on 4 April 1990. It was established with the goal of creating ‘a framework for African Member States to intensify their collaboration through programmes and projects focused on the specific shared needs of its members.’¹³ AFRA is deeply dependent on member state cooperation for the success of its operations, and 10 African states have signed AFRA: Algeria, Benin, Burundi, Djibouti, Ghana, Mauritius, Morocco, Niger, Uganda and Zimbabwe.

AFRA focuses on sustainable development at the regional level and works to promote the ‘utilisation of available infrastructure and expertise in Africa in the field of nuclear science and technology’ as well as ‘regional self-sufficiency in peaceful applications of nuclear techniques.’¹⁴ This is done through the enhancement of the ‘necessary infrastructure, coordinating intellectual and physical resources and disseminating innovative methods and practices cost-efficiently.’¹⁵ Lastly, AFRA is dedicated to ‘deepen the commitment of Member States to the application of nuclear science and technology for their socio-economic development through sustained funding’.¹⁶

AFRA is committed to enhancing the role of nuclear science and technology on the African continent across seven thematic areas: human health; food and agriculture; water resources; sustainable energy development; industrial applications; radiation safety and nuclear security; and human resource development.¹⁷ Over the years, it has achieved significant milestones in these areas, including: the upgrading of 40 radiotherapy centres in 18 African countries; the training of more than 250 medical professionals, and improved cancer management and nuclear medicine across Africa.¹⁸

In the area of food and agriculture, AFRA offers its member states assistance with ‘the application of appropriate selection criteria for genetically improved livestock.’¹⁹ It has assisted 17 member states with the improvement of ‘neglected crops’ or ‘traditional crops

13 IAEA, Regional/Cooperative Agreements, African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA), <https://www.iaea.org/about/partnerships/regional/cooperative-agreements/african-regional-cooperative-agreement-for-research-development-and-training-related-to-nuclear-science-and-technology-afra>.

14 African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA), ‘Mandate’, <http://www.afra-web.org/who-we-are>.

15 AFRA, “Mandate.”

16 AFRA, “Mandate.”

17 IAEA, African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology: Fostering Nuclear Science and Technology for African Development, (IAEA, Vienna, May, 2017), <https://www.iaea.org/sites/default/files/19/01/afra-nuclear-science.pdf>.

18 IAEA, “Fostering Nuclear Science and Technology for African Development”, 11.

19 IAEA, ‘Supporting improvements in food and agriculture through AFRA’, <https://www.iaea.org/sites/default/files/documents/tc/AFRA-Food-Agric.pdf>.

which have not yet benefitted from conventional breeding techniques.’²⁰ AFRA member states have created ‘sustainable national and regional capabilities in the use of Information and Communication Technologies (ICT) for training and education’ in nuclear science and technology geared specifically towards its use in ‘agriculture, human health, environmental monitoring, water resource management, nuclear instrumentation’ and related fields.²¹ Together with the South Africa Atomic Energy Corporation, AFRA developed the Borehole Disposal for Sealed Radioactive Sources system, ‘designed to provide safe and secure disposal of disuse sealed radioactive sources.’²²

AFRA was originally valid for a period of five years, subject to extensions,²³ and the fifth extension expired on 3 April 2020.²⁴ To overcome limitations posed by the five-year terms, such as not being able to contribute if membership was not renewed, this arrangement was replaced by a revised agreement of indefinite duration.

African Nuclear-Weapon-Free Zone Treaty (Treaty of Pelindaba)

The Treaty of Pelindaba was approved by African heads of state on 23 June 1995 and entered into force in July 2009.²⁵ The treaty declared Africa a zone free from nuclear weapons and provides for the promotion of cooperation in the peaceful uses of nuclear energy. It calls for complete nuclear disarmament by African states and aims to enhance both regional and global peace and security. As of October 2021, it has been signed by 52 African states and ratified by 42. The treaty is seen as an important example of Africa’s commitment to a world free from nuclear weapons while promoting the peaceful use of nuclear energy. The treaty’s significance was marked by its 25th anniversary celebrations

The treaty is seen as an important example of Africa’s commitment to a world free from nuclear weapons while promoting the peaceful use of nuclear energy

20 IAEA, “Fostering Nuclear Science and Technology”, 11.

21 IAEA, “Fostering Nuclear Science and Technology”, 12.

22 IAEA, “Fostering Nuclear Science and Technology for African Development”, 13.

23 IAEA, African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA), 2020, https://www.iaea.org/sites/default/files/20/11/afra_status.pdf.

24 IAEA, Status: African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA), Registration Number: 2007, https://www.iaea.org/sites/default/files/20/11/afra_status.pdf.

25 This NWFZ covers the entire African continent as well as the following islands: Agalega Islands, Bassas da India, British Indian Ocean Territory (commonly referred to as the Chagos Archipelago, including Diego Garcia), Canary Islands, Cape Verde, Cardagos Carajos Shoals, Comoros, Europa Island, Juan de Nova, Madagascar, Mauritius, Mayotte, Prince Edward and Marion Islands, Réunion, Rodrigues Island, Sao Tome and Principe, Seychelles, Tromelin Island and the Zanzibar Archipelago.

on 12 April 2021. Due to COVID-19, celebrations were delayed and replaced with a webinar titled, '25th Commemoration of the Pelindaba Treaty Opening for Signature' run by AFCONE.

The AU, under whose auspices the treaty was signed, affirmed its commitment to global disarmament and non-proliferation during the first Ordinary Session of the Assembly of the Organisation of African Unity in 1964, with the adoption of the Cairo Declaration on the Denuclearisation of Africa.²⁶ This Declaration formed the basis and origin of efforts that culminated in the adoption of the Treaty of Pelindaba.

African states that sign and ratify the treaty agree to renounce all nuclear weapons and commit not to host such weapons and devices on the continent or associated islands. Signatory states also commit to prohibiting the testing of nuclear weapons and dumping of nuclear waste on their territories. The treaty also requires member states to improve the protection and safeguarding of nuclear materials in Africa, and promote the peaceful use of nuclear energy. Finally, the treaty prohibits armed attacks on nuclear installations, research and power reactors.²⁷

It is also noteworthy to mention the Additional Protocols to the treaty, which provide 'negative security assurances'. These are meant to ensure that states outside the continent respect Africa's status as a Nuclear-Weapon-Free Zone and pledge not to use nuclear weapons against African countries.²⁸ These were signed by existing nuclear powers: China, France, the Russian Federation, UK and US. However, the US is yet to ratify Protocol II, which calls on nuclear weapons states not to test or assist or encourage the testing of nuclear explosive devices in the Pelindaba Zone. Protocol III, applying treaty provisions to territories for which parties are de jure or de facto responsible, was also not signed or ratified by Spain.²⁹

African Commission on Nuclear Energy

In line with Article 12 of the Treaty of Pelindaba, member states established AFCONE to ensure compliance with the basic principles of the treaty. Article 12 outlines AFCONE's mandate as:³⁰

- reporting and exchanging information;
- consulting and meeting with state parties on 'any matter arising from the implementation of the Treaty';

26 Organisation of African Unity, 'Resolutions Adopted by the First Ordinary Session of the Assembly of Heads of State and Government Held in Cairo, UAR, From 17 to 21 July 1964', https://au.int/sites/default/files/decisions/9514-1964_ahg_res_1-24_i_e.pdf.

27 Noel Stott, Verifying the African Nuclear-Weapon-Free Zone, <https://www.vertic.org/2019/04/verifying-the-african-nuclear-weapon-free-zone/>.

28 UN, Protocols to the Nuclear-Weapons-Free-Zone Treaties, 2021, <https://www.un.org/nwzf/fr/content/protocols-nuclear-weapon-free-zone-treaties>.

29 Nuclear Threat Initiative, African Nuclear-Weapon-Free Zone Treaty, <https://www.nti.org/learn/treaties-and-regimes/african-nuclear-weapon-free-zone-anwzf-treaty-pelindaba-treaty/>.

30 African Commission on Nuclear Energy, The Abridged Medium Term Strategic Plan of AFCONE 2021-2025, 2021, <https://www.afco-ne.org/wp-content/uploads/2021/07/AFCONE-Abridged-Mid-Term-STRATEGIC-PLAN-2021-2025-Vers-Feb-20211.pdf>, 13.

- reviewing peaceful nuclear activities in terms of the IAEA safeguards;
- establishing a complaints procedure for state parties;
- encouraging regional and sub-regional cooperation programmes in the peaceful uses of nuclear science and technology; and
- promoting international cooperation with extra-zonal States on the peaceful uses of nuclear science and technology.

Moreover, AFCONE's priorities include human health, radioactive waste management, nuclear safety and security, verification, information processing and monitoring nuclear science and technologies. It also aims to establish a continental legal and institutional framework for nuclear security and safety, and promote African and international partnerships.³¹

Operating from offices in Pretoria, South Africa, AFCONE's Secretariat is headed by an Executive Secretary, currently Messaoud Baaliouamer, an experienced nuclear physicist from Algeria.³² Twelve member states are elected as commissioners based on equitable geographical distribution and are represented by 'professionals with experience in the area of nuclear science and technology, diplomacy and security'.³³

Since its establishment, AFCONE has made 'progress in the operationalisation' of the Commission after an initial impasse.³⁴ It has positioned itself as Africa's specialised nuclear agency by working with various AU Commission departments and specialised Technical Committees.³⁵ AFCONE has thus become an integral part of the African Peace and Security Architecture, as well as a contributor to the achievement of the AU Agenda 2063, the continental socio-economic development blueprint.

Besides its cooperation with the AU, AFCONE has entered into several cooperation agreements with agencies including the IAEA, the Preparatory Commission of the Comprehensive Nuclear Weapons Test Ban Treaty Organisation, Rosatom, and the implementing agencies of other nuclear weapons-free zones. The latter includes OPANAL, the implementing agency of the Treaty on the Prohibition of Nuclear Weapons in Latin

31 Messaoud Baaliouamer, 'Statement to the 63rd Annual General Conference of the IAEA', (Vienna, 16-19 September 2019), <https://www.iaea.org/sites/default/files/19/09/gc63-african-union.pdf>, 3.

32 The Host Agreement between the Government of the Republic of South Africa and the AU on the establishment of AFCONE Headquarters was signed on 4 November 2015 in Addis Ababa.

33 African Union, African Commission on Nuclear Energy (AFCONE), June 2014, <https://www.peaceau.org/en/article/african-commission-on-nuclear-energy-afcone>.

34 African Union Peace and Security Council, Communique, PSC/PR/COMM, PSC/PR/COMM(DCCCXXXVII), April 4, 2019, https://www.afcone.org/wp-content/uploads/2020/04/psc.837.comm_disarmament.nuclear.weapons.4.4.2019.pdf

35 Messaoud Baaliouamer, 'Statement to the 12th Commemoration of the Pelindaba Treaty Entry Into Force', July 15, 2021, <https://www.afcone.org/wp-content/uploads/2021/07/AFCONE-ES-Statement-12th-Anniversary-Entry-into-Force-of-the-PT-15-July-2021-FINAL.pdf>.

America and the Caribbean. A similar agreement with the Central Asia Nuclear Weapons-Free Zone is under review.³⁶ Apart from its international agreements, AFCONE also cooperates with AFRA and the FNRBA.³⁷

Forum of Nuclear Regulatory Bodies in Africa

The FNRBA was established on 26 March 2009 and falls under the Global Nuclear Safety and Security Network of the IAEA.³⁸ The FNRBA was established for the ‘enhancement, strengthening and harmonisation of the radiation protection, nuclear safety and security regulatory infrastructure and framework among its members’.³⁹ The FNRBA cooperates closely with the IAEA, especially since the parties signed a cooperation agreement in 2013.⁴⁰ This relationship was further bolstered following formal recognition of the FNRBA as an IAEA regional intergovernmental organisation in 2019.⁴¹ Compared to AFRA, the FNRBA, with 34 members, is a much larger organisation.⁴²

The FNRBA aims to improve nuclear safety and security infrastructure in Africa.⁴³ FNRBA focuses its work on six main areas: legislative and regulatory Infrastructure, radiation and waste safety, nuclear safety infrastructure, emergency preparedness and response, transport safety infrastructure, and nuclear security infrastructure. Within these areas, it has five main priorities:⁴⁴

- 1 activity coordination and awareness raising;
- 2 human resource development, enhancement of regional cooperation and harmonisation of IAEA methodologies and national strategies;
- 3 rigorous standards for nuclear safety and security and radiation protection;
- 4 the enhancement of regional and national capacity for radiation protection, nuclear safety and security starting at the regulatory level; and
- 5 the synergy between ‘national plans for emergency preparedness response, transport and security’ according to international standards of knowledge-exchange.

36 Baaliouamer, “Statement”.

37 Baaliouamer, “Statement”.

38 IAEA, Factsheet, ‘Forum of Nuclear Regulatory Bodies in Africa’, https://www.irdp-online.org/sites/default/files/FNRBA_factsheet.pdf.

39 IAEA, Global Nuclear Safety and Security Network, ‘Welcome to Forum of Nuclear Regulatory Bodies in Africa’, <https://gnssn.iaea.org/main/FNRBA/Pages/default.aspx>.

40 IAEA, “Factsheet”; Khammar Mrabit, ‘Nuclear Security Systems in Africa: From Culture to NSSCs Development and Managing Response to Events’, (Presentation to AFCONE webinar on Nuclear Security Systems in Africa, June 24, 2021), <https://www.afcone.org/wp-content/uploads/2021/07/PPT-FNRBA-Nuclear-Security-Systems-in-Africa-with-AFCONE-PDF.pdf>.

41 IAEA, Forum of Nuclear Regulatory Bodies in Africa, 2020, <https://www.iaea.org/sites/default/files/20/10/fnrba.pdf>.

42 IAEA, “Forum”.

43 IAEA, “Factsheet”.

44 IAEA, Forum of Nuclear Regulatory Bodies in Africa Strategic Action Plan 2016-2021, (International Atomic Energy Agency, Vienna), [FNRBA SP_final.pdf \(iaea.org\)](#), 8-9.

Since its establishment, the FNRBA has hosted several successful training workshops across Africa.⁴⁵ These have covered topics including the control of radioactive sources, professional training, emergency preparedness, and safety protocols for uranium mining.⁴⁶ The FNRBA has also produced a number of technical reports on subjects ranging from legal frameworks and safety protocols to nuclear infrastructure.⁴⁷ The 2021/2022 Action Plan of the FNRBA focuses on overseeing the safety and security of radioactive material, the development of regulations for securing these sources, including a transport security exercise, FNRBA working group meetings, a regional workshop on a nuclear security culture, and a survey on the status of the radioactive material of FNRBA members.⁴⁸

Something is to be said for the precise institutional nature of the FNRBA. As a forum specifically, the FNRBA is uniquely positioned to facilitate widespread knowledge-exchange and networking between its member states. It therefore creates an opportunity for member states to 'learn from their peers' and experts alike, resulting in a well of knowledge and experience from which members can readily draw.⁴⁹

Conclusion

Africa is on the cusp of its nuclear energy age, as it aims to achieve the development goals of the AU and UN. The continent's successes regarding the peaceful uses of nuclear energy include the universalisation of the norms and values of the NPT, the TPNW and the Pelindaba Treaty. Africa has benefitted from international cooperation, especially under the umbrella of the IAEA, on peaceful applications of nuclear energy. Further gains were realised with the Pelindaba Treaty and the operationalisation of its implementation agency, AFCONE. The latter has in recent years emerged as the continent's specialised technical agency on nuclear energy. AFCONE has established formal cooperative agreements with, amongst others, the IAEA, AFRA, OPANAL and Rosatom.

Africa is on the cusp of its nuclear energy age, as it aims to achieve the development goals of the AU and UN

45 IAEA, Forum of Nuclear Regulatory Bodies in Africa, 2020

46 Karim Ben Ouaghrem, 'FNRBA: The Forum of Nuclear Regulatory Bodies in Africa', (Global Nuclear Safety and Security Network, IAEA), https://gnssn.iaea.org/main/Activity%20Documents/09th%20GNSSN%20Steering%20Committee%20Meeting,%2019-20th%20Dec%202016,%20IAEA,%20Vienna/05%20FNRBA-TSO%20Forum%20achievements-IAEA_KBO.pdf.

47 Ben Ouaghrem, 'FNRBA'

48 Khammar Mrabit, 'Regulating Nuclear Security: FNRBA Programme, Activities and Prospects', (Presentation to webinar on Nuclear Security Systems in Africa: From Culture to NSSCs Development and Managing Response to Events, AFCONE, 24 June 2021), <https://www.afcone.org/wp-content/uploads/2021/07/PPT-FNRBA-Nuclear-Security-Systems-in-Africa-with-AFCONE-PDF.pdf>.

49 IAEA, "Factsheet", 1.

Despite these positive developments, Africa's main nuclear institutions face significant challenges. AFRA, like its other continental counterparts, remains deeply dependent on cooperation from its member states for the success of its operations. At present only 10 states are party to the revised agreement.⁵⁰

In its Strategic Action Plan 2016–2021, the FNRBA, identifies several challenges: limited finances and skilled human resources, 'inadequate implementation of domestic legislative and regulatory frameworks' by individual member states, differences in terms of domestic regulatory infrastructure development, and insufficient coordination between the FNRBA and other regional organisations such as AFCONE and AFRA.⁵¹

As the continent's emerging specialised nuclear agency, AFCONE remains overshadowed by the continent's conflicts and development requirements. However, AFCONE has made some inroads onto the continental peace and security agenda. The position and status of the Commission will be determined through, amongst other issues, the full and efficient implementation of the Kagame Reforms of the AU. The AFCONE Secretariat should therefore be fully empowered through essential enablers, such as a secured and predictable budget, adequate human resources and suitable processes and procedures. This includes the implementation of AFCONE Long Term Organogram, which foresees the full manning of the AFCONE Secretariat by 2020/21.

50 AFRA, "Mandate."

51 IAEA, "Strategic Action Plan," 5.

Recommendations

AFCONE

- Should be strengthened to ensure nuclear governance compliance and oversight at national and continental level, including the allocation of additional human resources to the Secretariat, such as ICT personnel to complete and maintain its website.
- All State Parties to the Pelindaba Treaty are urged to honour their financial obligations towards the budget of AFCONE, as adopted by the 4th Conference of States Parties (March 2018), including clearing of the arrears backlog.
- All 55 African Union members should sign and ratify the Pelindaba Treaty without delay, with emphasis on the 12 states that have signed but not ratified the Treaty.
- The UN Security Council P5 and Spain are urged to sign and ratify Protocols I, II and III (where not already done) without any reservations and without further delay.
- All State Parties to the Pelindaba Treaty should support AFCONE Secretariat in implementing its vision and programme of work, through timely submissions of mandatory annual reports, and sharing of national expertise and infrastructure on nuclear science and technology.
- Cooperation between AFCONE and the IAEA should be strengthened beyond the existing Practical Arrangements. The workplan that is currently being prepared is a welcome step.
- Cooperation between AFCONE and the FNRBA should be strengthened, as per the current discussions between these institutions and IAEA, to jointly ensure implementation of the Pelindaba Treaty provisions related to radiation and nuclear safety.
- AFCONE and AFRA should, as soon as possible, sign the Memorandum of Understanding, as discussed and decided during the 31st Technical Working Group Meeting in July 2020, to ensure cooperation and optimise available resources.
- AFCONE should, in partnership with the Pan-African Parliament and the AU, develop a public education and awareness programme on the peaceful uses of nuclear energy and technology.
- The Conference of Parties to the Pelindaba Treaty should fully commit to financial and technical support to AFCONE.
- AFCONE should consider a conference of the Pelindaba Treaty to review the status and appropriateness of the treaty in the context of developments since its entry into force.

AFRA

- AFRA should increase cooperation with regional and international bodies for the enhancement of nuclear science and technology.
- Continue to promote nuclear safety and security alongside the developmental aspects of nuclear science and technology.
- Encourage all IAEA member states on the continent to also become AFRA members.

FNRBA

- Assist FNRBA Member States in updating their national nuclear regulatory frameworks to align with FNRBA goals.
- Continue to promote nuclear safety and security alongside developmental benefits of nuclear science and technology
- Increase cooperation with other regional bodies dedicated to the safe and secure use of nuclear science and technology.
- Invest in training programmes to enhance the capacity of the FNRBA workforce.

TABLE 1 STATUS OF AFRICAN UNION STATES IN AFRA, FNRBA AND THE PELINDABA TREATY

AU Member State	AFRA member (as at August 2021)	Deposited on	FNRBA member (as at August 2021)	Status of Pelindaba Treaty
Algeria	✓	10/02/2020	✗	Ratified - 1997
Angola	✗		✓	Ratified - 2014
Benin	✓	17/07/2020	✓	Ratified - 2007
Botswana	✗		✓	Ratified - 1999
Burkina Faso	✗		✓	Ratified - 1998
Burundi	✓	05/10/2020	✗	Ratified - 2009
Cabo Verde	✗		✗	Ratified - 2019
Cameroon	✗		✓	Ratified - 2009
Central African Republic	✗		✗	Signed only - 1996
Chad	✗		✓	Ratified - 2011
Comoros	✗		✗	Ratified - 2012
Congo-Brazzaville	✗		✗	Ratified - 2013
Congo, Democratic Republic of	✗		✓	Signed only - 1996
Côte d'Ivoire	✗		✓	Ratified - 1999
Djibouti	✓	19/08/2020	✗	Signed only - 1996
Egypt	✗		✓	Signed only - 1996
Equatorial Guinea	✗		✗	Ratified - 2002
Eritrea	✗		✗	Signed only - 1996
Ethiopia	✗		✓	Ratified only - 2008
eSwatini	✗		✗	Ratified - 1996
Gabon	✗		✓	Ratified - 2007
Gambia, The	✗		✗	Ratified - 1996
Ghana	✓	02/03/2020	✓	Ratified - 2011
Guinea	✗		✗	Ratified - 2011
Guinea-Bissau	✗		✗	Ratified - 2011
Kenya	✗		✓	Ratified - 2000
Lesotho, Kingdom of	✗		✗	Ratified - 2002
Liberia	✗		✗	Signed only - 1996
Libya	✗		✗	Ratified - 2005
Madagascar	✗		✓	Ratified - 2003

AU Member State	AFRA member (as at August 2021)	Deposited on	FNRBA member (as at August 2021)	Status of Pelindaba Treaty
Malawi	✗		✓	Ratified - 2009
Mali	✗		✓	Ratified - 1999
Mauritania	✗		✓	Ratified - 1998
Mauritius	✓	14/07/2020	✓	Ratified - 1996
Morocco	✓	01/07/2020	✓	Signed only - 1996
Mozambique	✗		✓	Ratified - 2008
Namibia	✗		✓	Ratified - 2012
Niger	✓	10/06/2020	✓	Ratified - 2016
Nigeria	✗		✓	Ratified - 2000
Rwanda	✗		✓	Ratified - 2007
São Tomé and Príncipe	✗		✗	Signed only - 1996
Senegal	✗		✓	Ratified - 2006
Seychelles	✗		✓	Ratified - 2014
Sierra Leone	✗		✓	Signed only - 1996
Somalia	✗		✗	Signed only - 2006
South Africa	✗		✓	Ratified - 1998
South Sudan	✗		✗	No action
Sudan	✗		✓	Signed only - 1996
Tanzania	✗		✓	Ratified - 1998
Togo	✗		✗	Ratified - 2000
Tunisia	✗		✓	Ratified - 2009
Uganda	✓	25/02/2020	✓	Signed only - 1996
Zambia	✗		✓	Ratified - 2010
Zimbabwe	✓	21/09/2020	✓	Ratified - 1998

Source: compiled by Isabel Bosman

Authors

Jo-Ansie van Wyk

is a Professor of International Politics in the Department of Political Sciences, at the University of South Africa (UNISA). She also leads the South African Institute of International Affairs' (SAIIA) Atoms for Africa's Development project. A Fulbright alumna and the winner of UNISA's 2014 Leadership in Research Women Award, her research interests include South African foreign policy, diplomacy and international relations, and nuclear diplomacy.

Yarik Turianskyi

is the Deputy Programme Head for African Governance and Diplomacy at SAIIA. He is the author of over 12 research papers focused on governance, technology and gender, and over 30 opinion pieces on various governance themes. He has conducted research in 10 African countries and is the co-editor of *African Accountability: What Works and What Doesn't*.

Isabel Bosman

completed a Master of Arts in Political Studies at Wits University in 2020, with her thesis focusing on biometrics and how it is changing the way we define 'the people'. Her research interests include electronic voting and election technologies, biometrics, theoretical concepts, and the nexus between technology, politics, and energy governance as part of her role in the Atoms 4 Development project.

Acknowledgement

SAIIA is grateful to the Norwegian Ministry of Foreign Affairs for supporting the 'Atoms for Africa's Development' project.

About SAIIA

SAIIA is an independent, non-government think tank whose key strategic objectives are to make effective input into public policy, and to encourage wider and more informed debate on international affairs, with particular emphasis on African issues and concerns.

SAIIA's policy insights are situation analysis papers intended for policymakers, whether in government or business. They are designed to bridge the space between policy briefings and occasional papers.

Cover image

Egyptian President Hosni Mubarak waves at African delegates at the beginning of the signing of the landmark Pelindaba Treaty on April 11, 1996 in Cairo. Forty-nine of the continent's nations signed the nuclear-free pact (Amr Nabil/AFP via Getty Images)

All rights reserved. Copyright is vested in the South African Institute of *International Affairs* and the authors, and no part may be reproduced in whole or in part without the express permission, in writing, of the publisher.

Please note that all currencies are in US\$ unless otherwise indicated.



Jan Smuts House, East Campus, University of the Witwatersrand
PO Box 31596, Braamfontein 2017, Johannesburg, South Africa
Tel +27 (0)11 339-2021 · Fax +27 (0)11 339-2154
www.saiia.org.za · info@saiia.org.za