

General Conference

GC(66)/RES/9

Date: September 2022

General Distribution

Original: English

Sixty-sixth regular session

Item 16 of the agenda

(GC(66)/17)

Strengthening the Agency's activities related to nuclear science, technology and applications

Resolution adopted on 29 September 2022 during the seventh plenary meeting

A.

Non-power nuclear applications

1.

General

The General Conference,

- (a) Noting that the Agency's objectives as outlined in Article II of the Statute include "*to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world*",
- (b) Noting also that the statutory functions of the Agency as outlined in Article III of the Statute, paragraphs A.1 to A.4, include encouraging research and development and fostering the exchange of scientific and technical information and the training of scientists and experts in the field of peaceful uses of atomic energy, with due consideration for the needs of developing countries,
- (c) Noting that the United Nations General Assembly, in resolution 64/292, called upon States and international organizations to provide financial resources, capacity building and technology transfer, through international assistance and cooperation, in particular to developing countries, in order to scale up efforts to provide safe, clean, accessible and affordable drinking water and sanitation for all,

- (d) Noting that the United Nations General Assembly, in resolution 66/288, endorsed the outcome document of the United Nations Conference on Sustainable Development, entitled “The future we want”, which recognized the importance of strengthened national, scientific and technological capacities for sustainable development, and to this end, supported building science and technology capacity, with both women and men as contributors and beneficiaries, including through collaboration among research institutions, universities, the private sector, governments, non-governmental organizations and scientists,
- (e) Appreciating the adoption of the 2030 Agenda for Sustainable Development by the United Nations General Assembly of 2015 (A/RES/70/1), and welcoming the Secretariat activities that contribute to fostering sustainable development and protecting the environment,
- (f) Noting that the United Nations General Assembly Resolution 71/312 endorsed the declaration entitled “Our ocean, our future: call for action” which calls upon all stakeholders to conserve and sustainably use the oceans, seas and marine resources for sustainable development,
- (g) Noting that for the ten-year period from 2021–2030, the United Nations General Assembly has proclaimed a Decade of Ocean Science for Sustainable Development (Resolution 72/73), and a Decade on Ecosystem Restoration (Resolution 73/284),
- (h) Stressing the importance of the Paris Agreement adopted under the United Nations Framework Convention on Climate Change,
- (i) Noting the Medium Term Strategy as noted by the Board of Governors,
- (j) Taking note of the *Nuclear Technology Review 2022* (document GC(66)/INF/4),
- (k) Stressing that nuclear science, technology and applications address and contribute to a wide variety of basic socio-economic human development needs of Member States, in such areas as health, nutrition, food and agriculture, water resources, environment, industry, materials, and energy, and noting that many Member States, both developing and developed, benefit from the application of nuclear techniques in all the above areas,
- (l) Recognizing the success of science and technology studies in enhancing scientific communication and their contribution to training the trainer,
- (m) Acknowledging that the IAEA Collaborating Centres scheme supports the Agency in its mandate to encourage research and development and foster the exchange of scientific and technical information and the training of scientists and experts in the field of peaceful uses of atomic energy, with due consideration for the needs of developing countries and noting that, at the end of 2021, the Agency had 56 active Collaborating Centres in 29 Member States, 40 of which are in fields related to non-power nuclear applications,
- (n) Acknowledging the need for increasing the capacity of Member States for using advanced nuclear techniques at all stages of management of communicable and non-communicable diseases, including cancer, and aware of the need to develop performance indicators for measuring such capacity, including access, quality and outcomes,
- (o) Acknowledging that the Agency, as a member of the United Nations Crisis Management Team for COVID-19¹ and in coordination with the World Health Organization (WHO), continues

¹ World Health Organization (lead organization), United Nations Development Coordination Office, United Nations Office for the Coordination of Humanitarian Affairs, International Maritime Organization, United Nations Department of Safety and Security, United Nations Children’s Fund, International Civil Aviation Organization, World Bank, World Food Programme,

to provide assistance to States² in fighting COVID-19 through the provision of equipment and training during the COVID-19 pandemic,

- (p) Recognizing the Agency's maintenance and development work in databases that provide Member States with information on the international distribution of radiotherapy and nuclear medicine technologies, such as the Directory of Radiotherapy Centres (DIRAC), the Nuclear Medicine Database (NUMDAB), the IAEA Medical Imaging and Nuclear Medicine Global Resources Database (IMAGINE), the IAEA/World Health Organization (WHO) Network of Secondary Standards Dosimetry Laboratories (SSDL Network) services, dosimetry audit networks, and the Doubly Labelled Water database,
- (q) Recognizing that independent external peer reviews, forming part of a comprehensive quality assurance programme, are an effective tool for quality improvement of the radiation medicine practice, and appreciating the Secretariat's efforts in developing the peer-review mechanisms in nuclear medicine, diagnostic radiology and radiotherapy,
- (r) Aware of the innovative use of IT tools in capacity building and educational tools in human health through the well-developed IAEA Human Health Campus, and welcoming e-learning tools in the area of strategic planning, forensic science and site remediation,
- (s) Noting the increasing demand from Member States in nuclear applications for human health and recognizing the importance of the continued Agency-wide collaboration with the WHO,
- (t) Noting the events sponsored by the IAEA Nobel Peace Prize Cancer and Nutrition Fund and aware of an increase in requests from Member States for cooperation and capacity building in the field of infant and young child nutrition, micronutrient nutrition and prevention of obesity related non-communicable diseases, and welcoming the signing of Practical Arrangements with the British Nutrition Society, the Federation of African Nutrition Societies, and the Federation of European Nutrition Societies,
- (u) Aware of the need of the Agency to increase the capacity of Member States in the field of medical radiation dosimetry, and welcoming the continued support provided to the harmonization of radiotherapy dosimetry worldwide through the IAEA/WHO postal dosimetry audit service,
- (v) Recognizing the Agency's successes at establishing traditional and non-traditional partnerships and expecting further efforts from the Agency to improve partnerships with relevant partners and donors, including regional and multilateral organizations, as well as development agencies and other entities and successful significant funding with non-conventional partners, notably in human health,
- (w) Recognizing the efforts of the Agency to promote the education and training of radiation medicine specialists, including medical physicists and the success of the International Centre for Theoretical Physics (ICTP) Master of Advanced Studies programme in Medical Physics, based on Agency guidelines,
- (x) Recognizing the role of the Agency in supporting Member States to tackle the burden of non-communicable diseases, especially cardiovascular diseases and neurodegenerative conditions,

Food and Agriculture Organization of the United Nations, United Nations Department of Global Communications, Executive Office of the Secretary-General, Department of Political and Peacebuilding Affairs/Department of Peace Operations, Department of Operational Support.

² In accordance with GOV/2810 and GOV/2818.

- (y) Stressing the importance of continued assistance to Member States, in collaboration with external partners, in the fight against cancer, particularly cancers affecting women and children,
- (z) Recognizing the close collaboration with WHO and the United Nations Interagency Task Force on the Prevention and Control of Non-Communicable Diseases (UNIATF) and noting the continuing activities within the UN Joint Global Programme on Cervical Cancer Prevention and Control as well as participation in the WHO-led initiative for cervical cancer prevention and control and the Global Initiative for Childhood Cancer,
- (aa) Welcoming the Rays of Hope initiative launched on the margins of the 35th African Union Summit 2022, which aims to integrate the breadth of the Agency's expertise to support Member States in the diagnosis and treatment of cancer using radiation medicine,
- (bb) Recognizing the contribution of public-private partnerships and resource mobilization in providing support for educational activities and Coordinated Research Projects (CRPs),
- (cc) Noting that the Dosimetry Laboratory services have been expanded to enhance dosimetry in hospitals and the development of education and training activities, and noting the opening of the linear accelerator (LINAC) facility in Seibersdorf in June 2019 that increases the Agency's capacity to provide dosimetry services,
- (dd) Acknowledging the long-term benefits of CRPs and their resulting publications in the development and practical application of nuclear technologies for peaceful uses and their possible positive impact on the Technical Cooperation programme, while recognizing their differences, and urging the Secretariat to further ensure benefits from possible synergies and avoid duplication in this regard,
- (ee) Further recognizing the successful cooperation and significant results being achieved by the Food and Agriculture Organization of the United Nations (FAO) and the Agency through the Joint FAO/IAEA Centre for Nuclear Techniques in Food and Agriculture and its associated FAO/IAEA Agriculture and Biotechnology Laboratories in Seibersdorf, including in the area of Climate Smart Agriculture for resilient and sustainable adaptation to climate change in food and agriculture in developing countries,
- (ff) Welcoming the support of the Joint FAO/IAEA Centre to control certain disease and pest outbreaks in Africa, Latin America and the Caribbean, Asia and Europe,
- (gg) Recognizing the need for preventive measures and the importance of addressing the challenges posed by climate change and the rise in disease and pest outbreaks that harm human, animal and plant health,
- (hh) Further recognizing the success of the sterile insect technique (SIT) in the suppression or eradication of populations of insect pests, that can harm human, animal and plant health,
- (ii) Aware of the activities of the Latin American and Caribbean Analytical Network (RALACA), composed of 69 national food safety laboratories/institutes in 21 countries in Latin America and the Caribbean, and the African Food Safety Network (AFoSaN) of 102 national food safety laboratories/institutes in 43 African countries, to address food contamination issues and improve environmental and food safety with health, trade and economic benefits; and the 77 laboratories of the Veterinary Disease Diagnostic Laboratories Network (VETLAB Network) of 46 African countries and 19 Asian national animal disease diagnostic laboratories to disseminate the use of nuclear techniques for the diagnosis and control of transboundary animal and zoonotic diseases, as well as the Plant Mutation Breeding Network (MBN) of 13 countries in

the Asia Pacific Region to promote R&D activities and foster regional cooperation in the field of plant mutation breeding, related biotechnology and mutant germplasm exchange in the region,

(jj) Recognizing the work conducted at the Agency's Nuclear Applications (NA) Laboratories in performing applied and adaptive R&D, developing standards, protocols and guidelines, as well as providing training and specialized services to benefit Member States, and welcoming the commissioning of the deuterium–deuterium based neutron generator as part of the Neutron Science Facility (NSF) in Seibersdorf, allowing the Agency to offer training and diverse practical applications using neutrons, such as neutron activation analysis, neutron radiography/tomography, delayed neutron counting, and neutron detection experiments,

(kk) Welcoming the ongoing modernization of the NA Laboratories in Seibersdorf including the ReNuAL 2 project contributing to R&D activities and supporting access to nuclear applications to Member States and the Agency's effort in building traditional and non-traditional partnerships to mobilize resources for these projects,

(ll) Noting that the Agency has compiled and disseminated isotope data on aquifers and rivers worldwide and is addressing links between climate change, rising food and energy costs and the global economic crisis, with the aim of assisting decision-makers in adopting better management practices for integrated water resources management and planning, especially for surface water related to agricultural use,

(mm) Noting ongoing cooperation and partnership between the United Nations Environment Programme (UN Environment) and the Agency, particularly in the context of marine pollution and the Regional Seas Programme, and the increasing demand from Member States in nuclear applications for environmental management, and further noting that the Agency hosted the 48th annual session of the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), held virtually in September 2021,

(nn) Recognizing the Agency's unique capabilities in contributing to global efforts to protect the environment, including terrestrial, riverine, coastal and marine ecosystems, and aware of the significant contribution nuclear science can make to addressing environmental challenges such as climate change, coastal and ocean pollution, microplastics, threatened habitats, and endangered species,

(oo) Recognizing the Nuclear Technology for Controlling Plastic Pollution (NUTEC Plastics) initiative, which builds on the Agency's efforts to assist Member States deal with plastic pollution through recycling using radiation technology and marine monitoring using isotopic tracing techniques,

(pp) Noting with appreciation the work of the Agency over many decades to assist analytical laboratories and research facilities in Member States to improve their analytical performance by organizing regular proficiency tests, inter-laboratory comparisons, and producing certified reference materials from a wide range of environmental matrices,

(qq) Aware of the ALMERA network of Analytical Laboratories for the Measurement of Environmental Radioactivity providing accurate measurement for monitoring radioactivity in the environment, represented with 195 laboratories from 90 Member States,

(rr) Acknowledging the important contribution of the Ocean Acidification International Coordination Centre at the IAEA Marine Environment Laboratories to the coordination of activities supporting a better understanding of the global effects of ocean acidification, and welcoming the significant support for the Centre provided by a number of Member States,

(ss) Recognizing the increasing use of radioisotopes and radiation technology in healthcare practices, sanitation and sterilization, industrial process management, environment remediation, food preservation, crop improvement, new materials development and analytical sciences, and in assessing the impacts of climate change,

(tt) Noting the importance of molybdenum-99 availability for medical diagnosis and treatment, and acknowledging with appreciation the efforts made by the Agency, in coordination with other international organizations, Member States and relevant stakeholders, to facilitate a reliable supply of molybdenum-99 by supporting the development of Member States' abilities to generate, for their indigenous needs and for export, the non-HEU-based production of molybdenum-99 and technetium-99m, where technically and economically feasible, including research into the accelerator-based alternative production of technetium-99/molybdenum-99,

(uu) Aware of the new cooperative initiatives that have emerged to provide reactor irradiation services, of the significant advances reported in the development of new molybdenum-99 production facilities and the expansion of existing facilities, and of the continued interest of many countries in establishing non-HEU-based molybdenum-99 production facilities to meet domestic needs, for export and/or to serve as a partial reserve capacity,

(vv) Noting the expanding use of positron emission tomography/computed tomography (PET-CT) and therapeutic radiopharmaceuticals and acknowledging the efforts taken by the Secretariat in planning appropriate activities to address the needs for production of hospital prepared therapeutic radiopharmaceuticals and their use following the applicable national regulatory requirements,

(ww) Noting the role of the Agency in assisting Member States in establishing and strengthening the personalized medicine approach using nuclear techniques including diagnostic radiology, nuclear medicine and radiotherapy,

(xx) Recognizing the role of ion beam accelerators and synchrotron radiation sources in research and development in material science, environmental science, bio- and life sciences and cultural heritage, and welcoming the convening of the International Conference on Accelerators for Research and Sustainable Development: From Good Practices Towards Socioeconomic Impact and of the Second International Conference on Applications of Radiation Science and Technology by the Agency in Vienna, in May and August 2022 respectively,

(yy) Aware of the problems of pollutants arising from urban and industrial activities and the potential of radiation treatment to address some of them, including industrial wastewaters, and noting the initiative taken by the Agency to explore the use of radiation technology for waste water treatment and the remediation of pollutants in Member States through coordinated research activities (CRAs),

(zz) Taking note of the high potential of electron beams as a source of radiation for the treatment of materials and pollutants, and the attenuation of bio-hazard materials and of pathogens for the development of vaccines and acknowledging the encouraging results produced through the related CRPs,

(aaa) Noting the potential areas for application of artificial intelligence, machine learning and data science in various fields of nuclear science, technology and applications,

(bbb) Recognizing the importance of nuclear instrumentation in the monitoring of nuclear radiation and nuclear materials in the environment and noting with appreciation the development of instruments for monitoring surface radioactivity and the provision of services to requesting Member States for the mapping of their land,

(ccc) Acknowledging the multiple uses of research reactors, also within national research nuclear centres and universities, as valuable tools for, inter alia, education and training, research, radioisotope production and materials testing and also as a learning tool for Member States that are considering the introduction of nuclear power,

(ddd) Aware that greater regional and international cooperation, including regional research reactor coalitions and International Centres based on Research Reactors (ICERs), will be needed to ensure broad access to research reactors, owing to the fact that older research reactors are being replaced by fewer multi-purpose reactors, resulting in a drop in the number of operational reactors and noting with appreciation the Secretariat's integrated and systematic support to countries embarking on their first research reactor project and the recent efforts to promote support for optimizing utilization of research reactors through the Integrated Research Reactor Utilization Review (IRRUR) mission,

(eee) Acknowledging that the peaceful use of fusion energy can be advanced through increased international efforts and with the active collaboration of interested Member States and international organizations, such as the International Thermonuclear Experiment Reactor (ITER) project group, in fusion-related projects, appreciating the efforts taken in leading the demonstration fusion power plant (DEMO) and noting the first four meetings of the Nuclear Fusion Coordination Committee to manage cross-cutting activities related to fusion,

(fff) Confirming the important role of science, technology and engineering in enhancing nuclear and radiation safety and security, and the need to resolve the issues of managing radioactive waste in a sustainable manner,

(ggg) Noting with appreciation the on-going efforts of the Secretariat, together with Member States, under the programme and budget for 2022–2023, to allocate sufficient resources to renovate the Agency's NA Laboratories at Seibersdorf with facilities and equipment that are fully fit-for-purpose and to ensure that maximum benefits in terms of capacity building and technology enhancement are made available to Member States, particularly developing countries, and

(hhh) Welcoming the progress of the IAEA Marie Skłodowska-Curie Fellowship Programme (MSCFP) with the objective to encourage women to pursue a professional career in the field of peaceful uses of nuclear sciences and technology and non-proliferation, as well as the support offered by various Member States to the MSCFP,

1. Requests the Director General, in conformity with the Statute, to continue to pursue, in consultation with Member States, the Agency's activities in the areas of nuclear science, technology and applications, with special emphasis on supporting the development of nuclear applications in Member States with a view to strengthening infrastructures and fostering science, technology and engineering for meeting sustainable growth and development needs of Member States in a safe manner;
2. Requests the Secretariat to fully utilize the capacities of Member State institutions through appropriate mechanisms in order to expand the extent to which nuclear sciences and applications are utilized to achieve socio-economic benefits and looks forward to the Agency's contribution to Member States' implementation of the 2030 Agenda for Sustainable Development (A/RES/70/1), as well as the Paris Agreement on climate change;
3. Underlines the importance of facilitating effective programmes in the areas of nuclear science, technology and applications aimed at pooling and further improving the scientific and technological capabilities of Member States through CRPs within the Agency and between the Agency and Member States and through direct assistance, and urges the Secretariat to further strengthen capacity building for Member States, particularly through interregional, regional and national training courses and fellowship

training in the areas of nuclear science, technology and applications, and expanding the scope and outreach of CRAs and relying on the IAEA Collaborating Centres scheme;

4. Urges the Secretariat to communicate the benefits of various applications of nuclear technologies for development that could benefit Member States and to address the needs for human resource training in these applications;

5. Requests the Secretariat to commence consultations with Member States towards convening a follow up to the 2018 Ministerial Conference on nuclear science, technology and applications and the Technical Cooperation Programme in 2024 with a view to convening every four years thereafter;

6. Urges the Secretariat to continue implementing efforts that contribute to greater understanding and a well-balanced perspective of the role of nuclear science and technology in sustainable global development, including the relevant commitments, and future efforts on climate change mitigation, monitoring and adaptation;

7. Welcomes all contributions announced by Member States, institutions and the private sector, including through the IAEA Peaceful Uses Initiative, as extra budgetary and in-kind contributions to the Agency;

8. Calls upon the Secretariat to continue to address identified priority needs and requirements of Member States in the areas of nuclear science, technology and applications, such as:

- i. use of radioisotopes and radiation in human health, including through enhancing access and quality,
- ii. nuclear applications related to food and agriculture, such as climate-smart agriculture, land and water management, food safety and security, and crop improvement and management in light of climate change,
- iii. use of the SIT to establish tsetse-free zones and fruit fly free and low prevalence areas, and to combat mosquitoes transmitting diseases including dengue, malaria, chikungunya and zika,
- iv. application of nuclear-derived techniques for early, rapid diagnosis and control of transboundary animal and zoonotic diseases,
- v. measurement of environmental radioactivity and radiation,
- vi. unique applications of isotopes to track the global uptake of carbon dioxide by the oceans and the resulting acidification effects on marine ecosystems,
- vii. use of radioisotopes and stable isotopes to assess risks to seafood safety, including heavy metals, persistent organic pollutants, microplastics and biotoxins,
- viii. use of isotopes in the protection of threatened habitats and endangered species,
- ix. use of isotopes in groundwater management,
- x. use of cyclotrons, research reactors and accelerators for the production of affordable radiopharmaceuticals, and
- xi. use of radiation technology for development of novel materials, in the treatment of waste water, flue gases and other pollutants resulting from industrial activities, as well as for the preservation of cultural heritage;

9. Requests the Secretariat to continue to support Member States through CRPs and to encourage appropriate resource mobilization to support these efforts;

10. Encourages strengthening mutual cooperation between Member States to exchange information on relevant experiences and good practices on water resources management in synergy with the UN system organizations dealing with water resources management;
11. Urges the Secretariat to continue strengthening the IAEA–UN Environment partnership, in close consultation with Member States to further explore the possibility for a formalized cooperation, such as a joint programme between the IAEA and UN Environment to increase access to beneficial projects and information bearing in mind the need to avoid duplication;
12. Takes note with appreciation of the continued efforts of the Secretariat with Member States party to a Regional Cooperative Agreement (RCA) for Research, Development and Training Related to Nuclear Science and Technology and encourages the Secretariat to develop and disseminate IT tools in various areas of nuclear applications;
13. Urges the Secretariat to continue to strengthen the IAEA–WHO partnership;
14. Requests the Secretariat to assist Member States upon request in their activities to mitigate the impact of cancer, particularly female and childhood cancers, with proper prevention, diagnosis, treatment and symptom management mechanisms;
15. Encourages Member States to make use of the existing peer-review mechanisms in radiation medicine to strengthen quality diagnosis and patient treatment;
16. Calls for the support of the Agency in setting guidelines for the adoption of advanced techniques and equipment in radiation medicine in Member States;
17. Recognizes the success of the Agency’s laboratory Networks, such as VETLAB, ZODIAC, RALACA, AFoSaN and MBN, in prompting R&D activities on nuclear science and applications, disseminating the use of nuclear techniques for food and agriculture and facilitating the international cooperation in nuclear applications, including through south–south and triangular partnerships, and therefore requests the Secretariat to further increase the support to strengthen and expand these Networks enabling them to fully and effectively undertake technology transfer, capacity building in R&D activities and emergency response for the benefit of Member States;
18. Requests the Secretariat to continue to provide to interested Member States, upon request, technical assistance regarding production and transport of medical isotopes and radiopharmaceuticals;
19. Requests the Secretariat to continue providing assistance to Member States with capacity building for the development, production and quality control of new generations of therapeutic radiopharmaceuticals (such as alpha emitters);
20. Requests the Secretariat to continue providing assistance with capacity building for quality assurance in radiopharmaceutical development and the use of radiation technology in industries and disseminating radiation technology guidelines based on international quality assurance standards;
21. Urges the Secretariat to continue to implement activities that will contribute to securing and supplementing the molybdenum-99/technetium-99m production capacity, including in developing countries, in an effort to ensure the security of supplies of molybdenum-99 to users worldwide and further urges the Secretariat to continue its cooperative work towards this goal with related initiatives undertaken by other international organizations such as the OECD Nuclear Energy Agency;
22. Requests the Secretariat, upon request from interested Member States, when technically and economically feasible, to provide technical assistance to emerging national and regional efforts to establish non-HEU based molybdenum-99 production capabilities, and to provide technical assistance to transition existing production capabilities to utilize non-HEU-based methods and facilitate training

activities such as workshops to support Member States in their efforts to achieve self-sufficiency in local production of medical radioisotopes and radiopharmaceuticals;

23. Urges the Secretariat to continue exploring the use of accelerators for various radiation technology applications and to facilitate demonstrations and training for interested Member States;

24. Requests the Secretariat to make efforts together with Member States in developing industrial irradiation facilities such as electron accelerators and their accessories for use in, inter alia, healthcare practices, crop improvement, food preservation, industrial applications, sanitization and sterilization, and further requests the provision of technical support for the use of research reactors in the production of radiopharmaceuticals and industrial radioisotopes;

25. Requests the Secretariat, in collaboration with interested Member States, to continue with the development of appropriate instruments and to make available, to requesting Member States, services for the rapid and economic mapping of radioactivity on the Earth's surface;

26. Requests the Secretariat to strengthen the Agency's activities in the area of fusion science and technology in view of the advances in nuclear fusion research at ITER and worldwide and to continue the DEMO activities, expanding the scope and participation to the extent possible, taking into further consideration, the need to coordinate the involvement of various stake holders to address the different aspects of fusion facilities;

27. Requests the Secretariat to foster regional and international efforts in ensuring wide access to existing multi-purpose research reactors to increase research reactor operations and utilization, through regional research reactors coalitions, ICERRs and formalization of IRRUR missions as an IAEA review service, and further requests the Secretariat to facilitate safe, effective and sustainable operation of these facilities;

28. Urges the Secretariat to continue to assist Member States considering their first research reactor with systematic, comprehensive and appropriately graded infrastructure development and to provide guidelines on the applications of research reactors to help Member State organizations make informed decisions that ensure the strategic viability and enduring sustainability of these projects;

29. Recognizing the underpinning nature of reliable nuclear data for all activities related to nuclear sciences and engineering, expresses its appreciation to the Secretariat for the provision of reliable nuclear data to the Member States for over 50 years as well as the development of an application for accessing nuclear data through mobile phones, and encourages the expansion of such applications to other types of nuclear data to continue the service in future;

30. Requests the Secretariat to assist interested Member States in developing safety infrastructure and in establishing regional training and education centres in their regions, where they do not exist, for the specialized training of nuclear and radiological experts, and requests the Secretariat to take advantage of qualified instructors from developing countries in this regard;

31. Encourages the Secretariat to continue cooperating with the World Nuclear University (WNU) in the biennial School on Radiation Technologies and to enhance its support for the participation of applicants from developing countries;

32. Requests also that the actions of the Secretariat called for in this resolution be undertaken subject to the availability of resources; and

33. Recommends that the Secretariat report to the Board of Governors and to the General Conference at its sixty-seventh (2023) regular session on the progress made in the areas of nuclear science, technology and applications.

2.

Support to the African Union's Pan African Tsetse and Trypanosomosis Eradication Campaign (AU-PATTEC)

The General Conference,

- (a) Recalling its previous resolutions on support to the African Union's Pan African Tsetse and Trypanosomosis Eradication Campaign (AU-PATTEC),
- (b) Recognizing that the main objective of AU-PATTEC is to eradicate tsetse flies and trypanosomosis by creating sustainable tsetse- and trypanosomosis-free areas, using various suppression and eradication techniques, while ensuring that the reclaimed land areas are sustainably and economically exploited and hence contributing to poverty alleviation and food security and thus supporting Member States' efforts to achieve the Sustainable Development Goals,
- (c) Recognizing that tsetse fly and trypanosomosis (T&T) control programmes that include a sterile insect technique (SIT) component are complex and logistically demanding activities that require flexible, innovative and adaptable approaches in the provision of technical support,
- (d) Recognizing that tsetse flies and the trypanosomosis problem which they cause constitute one of the greatest constraints on the African continent's socio-economic development, affecting the health of humans and livestock, limiting sustainable rural development, and thus causing increased poverty and food insecurity,
- (e) Recognizing that although the new reported cases of Human African Trypanosomosis (HAT) are now below 1000 per year and are currently at the lowest level in several decades, animal trypanosomosis still affects millions of livestock every year and remains one of the root causes of hunger and poverty, and hence a constraint to rural development for tens of millions of people in rural communities in 37 African countries, most of which are Agency Member States,
- (f) Recognizing the importance of the development of more efficient livestock production systems in rural communities affected by tsetse flies and trypanosomosis in order to reduce poverty and hunger and to form the basis for food security and socio-economic development,
- (g) Recalling decisions AHG/Dec.156 (XXXVI) and AHG/Dec.169 (XXXVII) of the Heads of State and Government of the then Organization of African Unity (now African Union) to free Africa of tsetse flies and on a plan of action for implementing AU-PATTEC,
- (h) Recognizing the upstream work of the Agency under its Joint FAO/IAEA Programme of Nuclear Techniques in Food and Agriculture in developing the SIT against tsetse flies and providing assistance through field projects, supported from the Agency's Technical Cooperation Fund, on integrating tsetse SIT into Member States' efforts to address the T&T problem in a sustainable manner,
- (i) Cognizant that the SIT is a proven technique for the creation of tsetse-free zones when integrated with other control techniques and when applied within an area-wide integrated pest management (AW-IPM) approach,
- (j) Welcoming the continuing close collaboration of the Secretariat with AU-PATTEC, in consultation with other mandated specialized United Nations organizations, in raising awareness regarding the T&T problem, organizing regional training courses, strengthening regional capacities and providing, through the Agency's Technical Cooperation programme and Regular Budget programme, operational assistance to field project activities, as well as advice regarding

project management and policy and strategy development in support of national and sub-regional AU-PATTEC projects,

(k) Welcoming the progress made by AU-PATTEC in increasingly involving — besides international organizations such as the Agency, the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) — also non-governmental organizations and the private sector in addressing the T&T problem and to foster sustainable agriculture and rural development,

(l) Welcoming the progress made in the Agency-supported tsetse eradication project in the Niayes Region of Senegal, thanks in part to the provision of tsetse pupae by the Insectary of Bobo-Dioulasso (IBD), in Burkina Faso, which has improved food security and increased farmers' incomes in a highly cost-effective way,

(m) Appreciative of the contributions made by various Members States and United Nations specialized agencies in support of addressing the T&T problem in West Africa, especially the contributions made by the United States of America for the last 10 years through the Peaceful Uses Initiative (PUI) in support of projects for T&T control in Senegal,

(n) Acknowledging the continued close collaboration of the Secretariat and the International Centre of Research and Development for Livestock in Subhumid Zones (CIRDES) in Bobo-Dioulasso, Burkina Faso, the first IAEA Collaborating Centre in Africa for the 'Use of the Sterile Insect Technique for Area-Wide Integrated Management of Tsetse Fly Populations',

(o) Acknowledging the close technical collaboration of the Insectarium de Bobo-Dioulasso – Campagne d'Eradication de la Mouche Tsé-Tsé et de la Trypanosomose (IBD-CETT) in Burkina Faso, recently designated as an IAEA Collaborating Centre for the 'Operational programmes against Tsetse flies with a Sterile Insect Technique component' in Africa for the period 2021–2024,

(p) Welcoming the efforts made by the Agency's Department of Technical Cooperation and the Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture in support of AU-PATTEC,

(q) Welcoming the efforts made by the Secretariat to address and eliminate obstacles to applying the SIT against tsetse flies in African Member States through applied research and methods development, both in-house and through the Agency's coordinated research project mechanism,

(r) Acknowledging the need for increasing capacity building on all levels for affected Member States in using advanced nuclear techniques in eradicating the aforementioned-disease, and

(s) Acknowledging the continued support given to AU-PATTEC by the Agency as outlined in the report submitted by the Director General in document GC(66)/9, Annex 2,

1. Urges the Secretariat to further intensify the efforts in advocating at the national, regional and international levels in order to sensitize on the burden imposed by the T&T, and to continue assigning high priority to agricultural development in Member States, and to redouble its efforts to build capacity and further develop the techniques for integrating the SIT with other control methods in creating tsetse-free zones in sub-Saharan Africa;

2. Calls upon Member States to strengthen the provision of technical, financial and material support to African States in their efforts to create tsetse-free zones, while stressing the importance of a needs

driven approach to applied research and methods development and validation to support operational field projects;

3. Requests the Secretariat, in cooperation with Member States and other partners, to maintain funding through the Regular Budget and the Technical Cooperation Fund for consistent assistance to selected operational SIT field projects and to strengthen its support for R&D and technology transfer to African Member States in order to complement their efforts to create and subsequently expand tsetse-free zones;

4. Requests the Secretariat to support Member States through technical cooperation projects on baseline data collection, development of project proposals and implementation of operational tsetse eradication projects underpinned by on-site based experts, with priority given to genetically isolated tsetse populations;

5. Encourages the Agency's Department of Technical Cooperation and the Joint FAO/IAEA Centre to continue supporting and working closely with AU-PATTEC in the agreed areas of collaboration as specified in the Memorandum of Understanding between the African Union Commission and the Agency signed in November 2009 and expanded through the Practical Arrangements (AUC/IAEA) signed in February 2018;

6. Stresses the need for continued harmonized, synergetic efforts by the Agency and other international partners, particularly FAO and WHO, with the aim of supporting the African Union Commission and Member States through the provision of guidance and quality assurance in planning and implementing sound and viable national and sub-regional AU-PATTEC projects;

7. Requests the Agency and other partners to strengthen capacity-building in Member States for informed decision-making regarding the choice of efficient strategies to control T&T and the cost-effective integration of SIT operations in AW-IPM campaigns;

8. Urges the Secretariat and other partners to increase their efforts in providing capacity building and to explore the possibilities of private-public partnership for the establishment and operation of tsetse mass rearing facilities for providing cost-effectively large numbers of sterile male flies to different SIT field programmes;

9. Encourages the countries that have selected a T&T strategy with an SIT component to focus initially on the field activities, including releases of sterile males imported from mass production centres as in the case of the eradication project in Senegal;

10. Encourages the Agency's Department of Technical Cooperation and the Joint FAO/IAEA Centre to continue supporting sub-regional mass production and distribution of sterile tsetse flies through strengthened support to the Insectary of Bobo-Dioulasso; and

11. Requests the Director General to report on the progress made in the implementation of this resolution to the Board of Governors and to the General Conference at its sixty-seventh (2023) regular session.

3.

Renovation of the Agency's Nuclear Applications Laboratories at Seibersdorf

The General Conference,

(a) Recalling paragraph 9 of resolution GC(55)/RES/12.A.1, in which the General Conference called upon the Secretariat to make efforts, together with Member States, to modernize the

Agency's Nuclear Applications (NA) Laboratories at Seibersdorf, thus ensuring maximum benefits to Member States, particularly developing ones,

(b) Further recalling additional resolutions requiring that the NA Laboratories at Seibersdorf be fully fit-for-purpose (such as resolution GC(56)/RES/12.A.2, concerning the development of the sterile insect technique for the eradication and/or suppression of disease-transmitting mosquitoes; resolution GC(57)/RES/12.A.3, concerning support to the African Union's Pan African Tsetse and Trypanosomosis Eradication Campaign (AU-PATTEC); resolution GC(56)/RES/12.A.4, on strengthening the support to Member States in food and agriculture; resolution GC(57)/RES/9.13, regarding nuclear and radiological incident and emergency preparedness and response; and resolution GC(57)/RES/11, relating to the strengthening of the Agency's technical cooperation activities),

(c) Recognizing the growing applications, with economic and environmental benefits, of nuclear and radiation technologies in a wide variety of areas, the vital role that the NA Laboratories at Seibersdorf play in the demonstration and development of new technologies and in their deployment in Member States, and the dramatic increase in associated training courses and provision of technical services during recent years,

(d) Acknowledging with appreciation the worldwide leading role of the NA Laboratories at Seibersdorf in the establishment of global laboratory networks in several areas, such as the animal disease control networks supported through the Peaceful Uses Initiative (PUI), the African Renaissance and International Co-operation Fund (ARF) initiative and numerous other initiatives,

(e) Further recognizing that the four remaining NA Laboratories at Seibersdorf are in need of modernization in order to respond to the evolving range and complexity of the requests submitted to them and the growing demands of Member States and to keep pace with increasingly rapid technological developments,

(f) Emphasizing the importance of fit-for-purpose laboratories that comply with health and safety standards and that have the appropriate infrastructure,

(g) Supporting the Director General's initiative regarding the modernization of the NA Laboratories at Seibersdorf, announced in his statement at the 56th regular session of the General Conference,

(h) Recalling resolution GC(56)/RES/12.A.5, and specifically paragraph 4, in which the General Conference requested the Secretariat "to develop a strategic overarching plan of action for the modernization of the NA Laboratories at Seibersdorf, provide a concept and methodology for the short-, medium- and long-term modernization programme and outline the vision and future role for each of the eight NA laboratories",

(i) Further recalling the report of the Director General to the Board of Governors (GC(57)/INF/11), mapping out activities and services of the NA Laboratories at Seibersdorf aimed at benefiting Member States and other stakeholders, quantifying projected future needs of and demands by Member States and identifying current and anticipated future gaps,

(j) Welcoming the Director General's report to the Board of Governors on the Strategy for the Renovation of the Nuclear Sciences and Applications Laboratories in Seibersdorf as contained in GOV/INF/2014/11, which outlines the necessary elements and resource requirements for assuring fit-for-purpose laboratories, known as the ReNuAL project, to be implemented from 2014–2017 within a €31 million target budget, and the Addendum to the Strategy as contained in GOV/INF/2014/11/Add.1, which provides an update to the Strategy defining the additional

elements as contained in paragraph 15 of the Strategy, known as ReNuAL Plus (ReNuAL+), and the Agency's consideration to establish its own Biosafety Level 3 (BSL3) laboratory capabilities,

(k) Noting GOV/INF/2017/1, "The Renovation of the Nuclear Applications Laboratories Project (ReNuAL)", which provided an update to Member States on progress, resource requirements and the scope of ReNuAL+,

(l) Noting the Director General's technical briefing of September 3, 2020, providing plans for completing the final phase of Seibersdorf Nuclear Applications laboratory modernization, informally called ReNuAL 2, to include: construction of a new laboratory building to house the Nuclear Science and Instrumentation Laboratory, the Plant Breeding and Genetics Laboratory and the Terrestrial Environment Laboratory; refurbishment of the Dosimetry Laboratory; and replacement of the Laboratory greenhouses,

(m) Further welcoming the Director General's report in GC(66)/9, Annex 3, to the Board of Governors on progress made in implementing the ReNuAL project since the 65th General Conference,

(n) Welcoming the achievements and progress made under ReNuAL and ReNuAL+, including the beginning of operations in June 2019 of the Dosimetry Laboratory's new linear accelerator facility and in August 2019 of the new Insect Pest Control Laboratory (IPCL),

(o) Welcoming the opening for operations in June 2020 of the Yukiya Amano Laboratories (YAL), housing the Animal Production and Health Laboratory, the Food and Environmental Protection Laboratory, and the Soil and Water Management and Crop Nutrition Laboratory, and further development of the site infrastructure, which includes an Energy Centre that services the environmental condition needs for both the IPCL and the YAL,

(p) Recognizing the importance of the Agency's BSL3 capabilities to support Member States' efforts to control transboundary animal and zoonotic diseases, and appreciating the good cooperation with Austrian authorities, in particular the Austrian Agency for Health and Food Safety (AGES), which began providing full access and use of its new BSL3 facility at Mödling, thereby enhancing the Agency's ability to provide increased assistance to Member States in controlling transboundary animal and zoonotic diseases, and further noting the Austrian Government's offer of a package of land, infrastructure and technical services that it values at €2 million towards the Agency establishing its own BSL3 capabilities at the same facility in Mödling,

(q) Welcoming that over €39 million in extrabudgetary funds were raised for ReNuAL and ReNuAL+, including over €18.5 million for ReNuAL+, and that seven first-time donors and 21 repeat donors are among Member States that have contributed approximately €19.9 million so far to ReNuAL 2,

(r) Further welcoming the financial and in-kind contributions and cost-free experts for the implementation of the ReNuAL project, which have been provided by 50 Member States to date, including the latest contributions by Ghana, Ireland, Malta, Mexico, Saudi Arabia, Slovakia, Slovenia and the United States of America as well as the contributions received from the Food and Agriculture Organization of the United Nations (FAO) and the African Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (AFRA), and six private contributors,

(s) Recognizing the efforts of the informal group of Member States known as the 'Friends of ReNuAL' which are actively facilitating the mobilization of resources for the project and

encouraging all Member States that are in a position to do so, to make resources available to support the renovation of the NA Laboratories at Seibersdorf,

(t) Further noting the Agency's Budget Update for 2023 to appropriate an amount of €1.55 million for the capital portion of the Regular Budget expenses of the Agency in 2023 to Major Programme 2 – Capital Project ReNuAL 2,

(u) Taking note of the Director General's call in September 2020 for an additional €14.8 million in extrabudgetary contributions to achieve full funding for construction of the new laboratory building, expected to begin in early 2022,

(v) Welcoming the joint pledge of eight Member States (Australia, Kuwait, Mexico, Nigeria, Qatar, Slovakia, Slovenia and the United States of America) announced at the Board of Governors meeting on 7 March 2022 to provide the remaining €6.7 M in extrabudgetary funding expected on the basis of initial estimates to be required to begin construction on the Flexible Modular Laboratory building in Seibersdorf, Austria, as a demonstration of their commitment to the peaceful uses of nuclear energy,

(w) Acknowledging the efforts and progress made in seeking partnerships and contributions from non-traditional donors, particularly with regard to equipment needs, and further acknowledging with appreciation the establishment of agreements with non-traditional partners for the provision of equipment to the laboratories, and

(x) Noting the Secretariat's 6 September 2022 informal technical briefing to Member States on adjustments to the expected ReNuAL 2 project budget and timeline driven by continuing price escalation and volatility in the construction market and acknowledging its ongoing efforts to hold down costs,

1. Stresses the need, in conformity with its Statute, for the Agency to continue pursuing adaptive research and development activities in the areas of nuclear science, technology and applications where the Agency has a comparative advantage, and to retain its focus on capacity-building initiatives and the provision of technical services so as to meet the basic sustainable development needs of Member States;

2. Requests the Secretariat to strive to ensure that, commensurate with the prominence of the NA Laboratories at Seibersdorf within the Agency, the urgent needs and projected future demands of Member States as regards the services of those laboratories are met in the most cost-effective and sustainable way;

3. Calls on the Secretariat to continue to pursue a project specific resource mobilization strategy seeking resources from Member States, institutions, foundations and the private sector, encourages partnerships including through utilization of the UN Global Marketplace and further encourages the Secretariat to consider devoting financial resources from savings or efficiency gains to the project, in consultation with Member States;

4. Further calls on the Secretariat to continue to develop targeted resource mobilization packages that will match the interest of the potential donors with the needs of the overall ReNuAL initiative, prioritizing the remaining elements to be completed in the final project phase, ReNuAL 2;

5. Encourages the Secretariat to keep Member States apprised of planning related to the remaining requirements of the NA laboratories;

6. Requests the Secretariat to provide information on the financial resources required for upcoming implementation and to indicate where resources are needed to match implementation schedules;

7. Encourages the Secretariat to continue efforts to manage costs in the face of escalating prices and to implement the remaining elements of ReNuAL 2 as expeditiously as practicable;
8. Invites Member States to make financial commitments and contributions, as well as in-kind contributions, in a timely manner, as well as to facilitate cooperation with other partners, as relevant, including institutions, foundations and the private sector, to provide for the enhancement of the core infrastructure of the NA laboratories;
9. Encourages the ‘Friends of ReNuAL’ under the co-chairmanship of South Africa and Germany, and all Member States to continue to support the implementation of the project with a focus on mobilizing resources in a timely manner to allow for implementation of the remaining elements of the project; and
10. Requests the Director General to report on progress made in the implementation of this resolution to the General Conference at its sixty-seventh (2023) session.

4.

Zoonotic Disease Integrated Action (ZODIAC) Project

The General Conference,

- (a) Recalling resolution GC(65)/RES/11.A.4 adopted at its sixty-fifth regular session,
- (b) Taking note of the Director General’s report, as contained in document GC(66)/9 Annex 7 submitted to the Board of Governors,
- (c) Noting the information provided by the Secretariat on ZODIAC including through regional ZODIAC progress meetings and bilateral meetings as well as the launch of the ZODIAC portal in May 2022,
- (d) Appreciating the convening of the 2021 IAEA Scientific Forum, held on the margins of the 65th regular session of the General Conference, which focused on the role of nuclear science in detecting zoonotic diseases, and on the Agency’s support to its Member States in strengthening their preparedness for, and ability to respond in a timely manner to, zoonotic outbreaks,
- (e) Recognizing the role that the Agency continues to play in assisting Member States to achieve the UN’s Sustainable Development Goals (SDGs), including Good Health and Well-being (SDG 3), Life on Land (SDG 15) and Partnerships (SDG 17),
- (f) Appreciating the longstanding role of the Agency, in line with its mandate, in assisting Member States to access nuclear science, technology and applications with the aim of addressing a wide variety of socio-economic human development needs, including in human health, food and agriculture, animal health and zoonotic diseases,
- (g) Recognizing that the Agency has a long-standing practice of cooperation with other relevant international organizations and specialized agencies, and further recognizing the importance of complementing the respective mandates of such organizations, as well as longstanding protocols that guide cooperation such as the Taking a Multisectoral, One-Health Approach: A Tripartite Guide to Addressing Zoonotic Diseases in Countries (the Tripartite Zoonoses Guide),
- (h) Taking note of the importance of new partnerships with the Preventing Zoonotic Disease Emergence (PREZODE) initiative and the Institut Pasteur de Dakar,

- (i) Taking note of the establishment of the ZODIAC Ad-Hoc Scientific Panel (ZOSP), which is composed of independent scientists and experts,
- (j) Noting that zoonotic diseases such as COVID-19, including vector-borne diseases such as malaria, yellow fever, chikungunya virus, and dengue fever, have a significant and long-term implications on human health and the socio-economic development of Member States,
- (k) Recognizing the importance of nuclear science, technology and applications to detect, trace and control emerging pathogens that could develop into diseases and pandemics and further recognizing the importance of making these technologies available to all Member States,
- (l) Welcoming that ZODIAC builds upon existing, relevant Agency nuclear science and technology applications and structures, such as the Veterinary Disease Diagnostic Laboratories (VETLAB) Network, and other delivery mechanisms such as Coordination Research Projects and the Technical Cooperation Programme under project INT5157 and that they form part of the Agency's support to Member States in combatting zoonotic diseases and preventing future pandemics,
- (m) Acknowledging that by May 2022 ZODIAC included ZODIAC National Laboratories (ZNLs) in 125 Member States and ZODIAC National Coordinators (ZNCs) nominated by their national authorities in 149 Member States,
- (n) Welcoming the prompt response of the Secretariat in organizing the “ZODIAC Workshop on Monkeypox and Lassa Fever Infections in Animal Reservoirs and the Risks for Public Health Transmission”, while leveraging the ZNLs network, following the outbreak of monkeypox on three continents and of Lassa fever in Africa,
- (o) Noting that ZODIAC could support Member States to enhance their preparedness to address emerging and re-emerging zoonotic diseases, through the use of molecular biology nuclear and nuclear-derived methods, by enhancing capacity in Member States to detect, trace and respond to emerging pathogens that could develop into zoonotic diseases and pandemics,
- (p) Recognizing the establishment in cooperation with Food and Agriculture Organization of the United Nations (FAO) in 2013 of the VETLAB Network as an example of the support the Agency provides to Member States, and further recognizing that this network continues to fulfil a crucial role in enabling Member States to fight zoonotic diseases, through building capacity and enabling cross-boundary collaborations, which have significantly improved responses to transboundary animal and zoonotic diseases, as well as the role of the network in enabling the Agency to rapidly respond to the COVID-19 pandemic,
- (q) Recalling the expansion of the Revised Arrangement between the Agency and the FAO in 2021 to include the “improvement of monitoring and controlling of transboundary animal, zoonotic and plant diseases” as a key area, integrating the Joint FAO/IAEA Centre laboratories' capacities into FAO's work on One Health,
- (r) Acknowledging that ZODIAC aims to build on the existing partnership between the Agency and the FAO, to include coordination with the United Nations Environmental Programme (UNEP), the World Health Organization (WHO), and the World Organisation for Animal Health (WOAH),
- (s) Noting the invitation extended by WHO and accepted by the Agency to join Global Strategic Preparedness Network (GSPN) for country health emergency preparedness capacity building which will begin its work in October 2022,

- (t) Appreciating that, as of July 2022, the Secretariat mobilized resources from 14 Member States amounting to €10.4 million received and/or pledged,
- (u) Appreciating that a total of €7.21 million has been allocated to date to capacity building and that, by leveraging information and communication technologies, training courses and workshops implemented under ZODIAC have reached over 1000 participants from 95 Member States, and further appreciating that procurement of critical equipment has been carried out for 25 Member States, while being initiated for another 13 Member States, and
- (v) Recognizing the importance of the Agency's use of the Biosafety Level 3 (BSL3) capabilities provided by the Austrian Government to support Member States' efforts to control transboundary animal and zoonotic diseases, and appreciating the good cooperation with Austrian authorities, in particular the Austrian Agency for Health and Food Safety (AGES) on access to and use of its BSL3 facility,
1. Stresses the need for the Agency, in accordance with its Statute, to respond to the needs and priorities of States and to continue the implementation of all its programmatic activities in a balanced manner and in consultation with Member States;
 2. Further stresses the need for the Agency to continue pursuing adaptive research and development activities in the areas of nuclear science, technology and applications, where the Agency has a comparative advantage, so to support Member States, in particular developing Member States, upon their request, and in conformity with its Statute in building their capabilities to identify, characterize and accurately detect, diagnose, control and manage zoonotic diseases through the use of nuclear and nuclear-derived techniques;
 3. Requests the Secretariat to continue presenting Member States and the Board of Governors with information on ZODIAC, including inter alia on prioritization of tasks in the context of the amount of extrabudgetary resources mobilized, an updated project plan for the implementation of ZODIAC, and the proposed time frame;
 4. Requests the Secretariat to concentrate its efforts on utilizing nuclear and nuclear-derived technologies in relation to ZODIAC, and to ensure equal access to ZODIAC planning and implementation, as well as to training materials and relevant information, including through the ZODIAC portal for all interested Member States;
 5. Further requests the Secretariat to ensure efficiencies and effectiveness, to avoid duplication and to build and expand upon existing Agency delivery mechanisms and networks in its implementation of ZODIAC;
 6. Urges the Secretariat to continue updating ZODIAC's programme design based on the experiences gained and lessons learned from its response to COVID-19 and the outbreaks of other zoonotic diseases;
 7. Takes note of the longstanding collaboration of the Agency with the FAO, the WOA and the WHO, and stresses that coordination, consultation and collaboration with these international organizations with complementary expertise and mandates would be instrumental to avoiding duplication and to the successful development and implementation of ZODIAC;
 8. Calls on the Secretariat to assist Member States to develop sustainable capacity of national laboratories to enable Member States to obtain the necessary nuclear and nuclear-derived tools and capabilities to more effectively respond to emerging zoonotic diseases;

9. Further calls on the Secretariat to expand coordination with relevant international and regional organizations as required without duplicating existing mandates, and to also utilize existing delivery mechanisms, such as the VETLAB Network, collaborating centres and CRPs in strengthening the capacity of Member States in combating zoonotic diseases and preventing pandemics through the use of nuclear and nuclear-derived techniques;
10. Recommends the Secretariat to strengthen its resource mobilization efforts, including by seeking project-specific extrabudgetary funding for the implementation of ZODIAC, in particular building on its previous experience in mobilizing non-traditional and private sector donors;
11. Requests the Secretariat to consult with Member States and relevant international organizations, including through technical meetings, on the principles, procedures and modalities of planning and implementation of ZODIAC, and provide periodic reports to Member States and the Board of Governors on developments; and
12. Requests the Director General to report on the progress made in the implementation of this resolution to the Board of Governors and the General Conference at its sixty-seventh (2023) regular session.

5.

Use of isotope hydrology for water resources management

The General Conference,

- (a) Appreciating the work of the Agency in the area of isotope hydrology in response to resolution GC(63)/RES/10.A.3,
- (b) Taking note of the United Nations International Decade for Action, Water for Sustainable Development, 2018–2028, which focuses on the sustainable development and integrated management of water resources,
- (c) Aware that the United Nations continue to recognize the need for greater and concerted action in the area of water and that water is critical for sustainable development and the eradication of poverty and hunger,
- (d) Recognizing that the Sustainable Development Goals (SDGs) emphasize the need for increased availability of freshwater and expanded capacity-building efforts, which continue to be the primary objectives of the Agency's Water Resources Programme,
- (e) Noting the United Nations 2023 Water Conference being held in New York in March 2023 to accelerate efforts for the achievement of SDG6 "Water and Sanitation for All",
- (f) Noting that to facilitate the completion of SDG6 five 'accelerators' have been identified for SDG6, namely governance, financing, capacity building, data and information, and innovation,
- (g) Aware that a lack of comprehensive mapping of water resources, and groundwater vulnerability and related human capacity, adversely impacts the ability of Member States to increase water availability and use,
- (h) Recognizing that the Agency has continuously demonstrated the importance of isotope techniques for water resources development and management, particularly for groundwater management in arid and semi-arid regions and for improved understanding of the water cycle,

- (i) Noting that initiatives of the Agency, as mentioned in document GC(66)/9, Annex 6, are addressing national priorities and have resulted in a wider use of isotope techniques for water resources and environmental management,
 - (j) Appreciating the fact that the initiatives taken by the Agency, particularly in conjunction with bilateral and other international agencies, including the development of a new series of isotope hydrology outreach materials and the holding of joint training workshops, by the United Nations Commission on Sustainable Development and by the World Water Forum, have significantly raised awareness of the Agency's work on water resources,
 - (k) Appreciating the Agency's efforts in providing easier access for Member States to isotope hydrology analytical facilities through laser-based stable isotope analysers and tritium measurement systems,
 - (l) Recognizing the Agency's efforts in strengthening Member States' capacities for performing standardized and high-quality isotope measurements, including through the development of software for the operation and performance assessment of laboratories engaged in the routine analysis of stable isotopes, noble gases and their isotopes, and tritium in water samples,
 - (m) Noting that, under the pilot phase of the IWAVE (IAEA Water Availability Enhancement) Project, the Agency assisted Member States in increasing the availability and sustainability of freshwater based on comprehensive assessments of national water resources, and welcoming the steps being taken to expand the IWAVE Project to other Member States,
 - (n) Welcoming the announcement of the 16th International Symposium on Isotope Hydrology by the Agency, to be held in Vienna in July 2023,
 - (o) Noting the role of isotope hydrology in assessing the environmental impact of mining,
 - (p) Noting the longstanding relevance and role of the IAEA's Global Network of Isotopes in Precipitation (GNIP) in cooperation with World Meteorological Organization (WMO), which was reaffirmed through the signing of a new memorandum of understanding to manage GNIP, and the Global Network of Isotopes in Rivers (GNIR) used for the assessment of water resources, inter alia through the use of isotope hydrology tools, hydrological mapping, water balance modelling, forecasting the impacts of climate change, drought management and water pollution assessments, and welcoming the increased global coverage of these efforts through enhanced collaboration with Member States, along with renewed collaboration with the United Nations Educational, Scientific and Cultural Organization (UNESCO), and reinforcing the collaboration with UN Water, and
 - (q) Noting the efforts of the Secretariat to assist Member States to better manage water resources, including its work aimed at improving expertise and collaboration among participating Member States in the use of environmental isotopes to better assess nitrogen pollution and eutrophication of lakes and rivers for optimal water resources management and remediation strategies,
1. Requests the Secretariat, subject to the availability of resources:
- i. to further strengthen efforts to fully exploit the potential of isotope and nuclear techniques for water resources development and management in interested countries through appropriate programmes, by enhancing awareness and assisting Member States in building national capacities through increased collaboration with national and international organizations dealing with water resources management,

- ii. to continue to help Member States obtain easy access to isotopic analysis by upgrading selected laboratories, developing formal network structures between supported laboratories, providing methods and guidance for quality control of isotope data, conducting global as well as region- and country-specific interlaboratory proficiency tests and by assisting Member States in adopting new and less expensive analytical techniques based on recent advances in relevant technologies, including laser-based ones,
- iii. to further strengthen the Isotope Hydrology Laboratory at the Agency's headquarters in Vienna to ensure that it can provide the necessary support and guidance to Member States and support training and technology transfer programmes that assist Member States with water resources management,
- iv. to expand activities related to the IWAVE Project and to groundwater management, particularly the assessment and management of fossil groundwater resources, including in arid and semi-arid areas, as well as to the safety and sustainability of these resources, in collaboration with regional and other international organizations, and to develop tools and methodologies for the improved mapping of water resources,
- v. to provide easier access for Member States to new techniques for the use of noble gas isotopes in determining the full spectrum of groundwater residence time from very young to very old water,
- vi. to provide easier access for Member States to improvements in analysis of tritium in the hydrological cycle in order to understand the connections and transit times between different water reservoirs as well as the risk of contamination and pollution,
- vii. to strengthen activities that contribute to the understanding of climate and its impact on the water cycle and which are aimed at better prediction and mitigation of water-related natural calamities, including extreme droughts and floods, along with improved understanding of how changes in the cryosphere will impact Member State water resources management, and to contribute to the success of the International Decade for Action, Water for Sustainable Development, 2018–2028,
- viii. to expand the use of geochemical and isotope tools to enhance hydrological models in mining areas, including for the assessment of the environmental impact of mining,
- ix. to expand the use of N-15 and other isotopes for water quality studies addressing water quality concerns, analytical requirements to adopt such isotopes and to carry out international intercomparison exercises, to ensure the readiness of laboratories in Member States,
- x. to further strengthen efforts to enhance the temporal and spatial coverage of the Agency's global isotope monitoring programmes for precipitation, rivers and other water bodies as well as related mapping, database and modelling products, through increased collaboration with Member States, particularly in methods and approaches to evaluating a holistic picture of groundwater vulnerability to the combined issues of water quality and water quantity and the projected impacts of climate change on both, and
- xi. to consider participating in high-level international conferences related to water resources management, including the United Nations 2023 Water Conference being held in New York in March 2023 to accelerate efforts for the achievement of SDG6 "Water and Sanitation for All";

2. Requests the Agency to continue, along with other relevant United Nations agencies and with relevant regional agencies, to develop human resources in isotope hydrology through appropriate courses, at universities and institutes in Member States, through the use of advanced communication techniques and educational tools and at regional training centres, designed to provide practicing hydrologists with the ability to use isotope techniques; and
3. Further requests the Director General to report on achievements in implementing this resolution to the Board of Governors and to the General Conference at its sixty-eighth (2024) session under an appropriate agenda item.

6.

Development of the sterile insect technique package for the management of disease-transmitting mosquitoes

The General Conference,

- (a) Recalling its resolution GC(44)/RES/24 on “Servicing Immediate Human Needs” and its resolution GC(62)/RES/9 on “Development of the sterile insect technique package for the management of disease-transmitting mosquitoes”,
- (b) Taking note of the decisions taken by the Summit of the African Union at its Fifteenth Ordinary Session, held in Kampala, Uganda, on 25–27 July 2010, on the five-year review of the Abuja Call for Accelerated Action Towards Universal Access to HIV/AIDS, Tuberculosis and Malaria Services in Africa, reaffirming the commitments undertaken at the Special Summit on HIV/AIDS, TB and Malaria, as well as under the Millennium Development Goals (MDGs) and the Decade for Roll Back Malaria, and deciding to extend the Abuja Call for Accelerated Action Towards Universal Access to HIV/AIDS, Tuberculosis and Malaria Services (the Abuja Call) to 2015 to coincide with attainment of the MDGs,
- (c) Welcoming the adoption of the 2030 Agenda for Sustainable Development, especially the relevant targets under Sustainable Development Goal 3 to ensure healthy lives and promote wellbeing for all, at all ages,
- (d) Appreciating the important role of nuclear applications in addressing human needs,
- (e) Conscious that the work done by the Agency in the field of nuclear sciences and applications in the non power sector contributes to sustainable development, especially with programmes aimed at enhancing the quality of life in various ways, including improving human health,
- (f) Recognizing the success of the area-wide integrated pest management application of the sterile insect technique (SIT) in the eradication and/or suppression of tsetse flies, moths, fruit flies and other insects of economic importance,
- (g) Noting with concern that about 3.98 billion people remain at risk of malaria and that the number of cases and deaths caused by malaria continue to rise worldwide with an estimated 241 million new cases of malaria and 627,000 deaths in 2020, predominantly in Africa, thus constituting a major obstacle to poverty eradication and development in Africa,
- (h) Noting that the malaria parasite has continued to develop resistance to drugs and that mosquitoes have continued to develop resistance to insecticides, and that it is envisaged that the SIT would be used under specific conditions as an adjunct to other technologies, conforming to the World Health Organization’s (WHO’s) roll-back strategy, including integrated vector management, and to not relying on any single approach to malaria management,

- (i) Noting with serious concern that mosquito-transmitted dengue, now the world's most common mosquito-borne disease has become a major international public health concern with an incidence growing more than 30-fold during the last 50 years, that dengue is estimated to infect around 400 million people per year, and over half of the world's population is at risk of the disease, and that insecticide-treated bed nets are not effective in combating dengue as the mosquito vectors are active during the day and other control tactics are urgently required,
 - (j) Noting with concern the effective transmission of mosquito-transmitted chikungunya in the Latin American and the Caribbean regions, and that currently there is no treatment available for this mosquito-borne disease,
 - (k) Noting with concern the Zika virus outbreak in the Americas, which has been strongly linked to babies born with severe neurological disorders, such as congenital microcephaly, and which led to the declaration of a public health emergency of international concern by the WHO on 1 February 2016, and that so far there are no drugs nor effective global vaccines available to treat or prevent Zika,
 - (l) Noting that the Thematic Plan for the Development and Application of the Sterile Insect Technique (SIT) and Related Genetic and Biological Control Methods for Disease Transmitting Mosquitoes, which was revised in October 2019, recommended that the Agency invests in supporting the management of the mosquito vector species through continuous funding of the development of the SIT and other related genetic and environment-friendly methods,
 - (m) Noting that the suppression of disease-transmitting mosquitoes using the SIT will be suitable mostly in urban areas, where aerial spraying with insecticides is prohibited or not indicated, and that an area-wide approach is required, which represents a novel and potentially powerful supplement to existing community-based programmes,
 - (n) Welcoming the fact that laboratory R&D and field project driven research on malaria and other disease-transmitting mosquitoes continued in the last biennium,
 - (o) Welcoming the establishment of a Memorandum of Understanding in July 2019 with WHO to intensify research and development on the use of SIT to fight disease-transmitting mosquito vectors,
 - (p) Appreciating the prioritization of the renovation of the Insect Pest Control Laboratory in Seibersdorf within the ReNuAL Strategy — Strategy for the Renovation of the Nuclear Sciences and Applications Laboratories in Seibersdorf (GOV/INF/2014/11),
 - (q) Noting with appreciation the interest shown by some donors in and their support for R&D and technology transfer on the SIT for combating malaria-, dengue-, Zika- and other disease-transmitting mosquitoes, and
 - (r) Acknowledging with appreciation the support given by the Agency to the development of the SIT for the management of mosquitoes that transmit arthropod borne diseases as outlined in the report by the Director General in document GC(66)/9, Annex 4,
1. Requests the Agency to continue and strengthen, through the activities mentioned above, the research, both in the laboratory and in the field, required to be able to refine and validate the use of the SIT for the integrated management of malaria-, dengue-, Zika- and other disease-transmitting mosquitoes;

2. Requests the Agency to increasingly involve developing Member States' scientific and research institutes in the research programme in order to ensure their participation, leading to ownership by the affected countries;
3. Requests the Agency to increase efforts to continue developing and transferring more efficient sex separation systems, including genetic sexing strains, that allow complete removal of the female mosquitoes in production facilities and to develop cost-effective methods to release and monitor sterile males in the field;
4. Further requests the Agency to allocate adequate resources and to attract extrabudgetary funds so as to continue the recently expanded mosquito research programme, laboratory/office space and staffing;
5. Requests the Agency to continue strengthening capacity building and networking in Latin America, Asia and the Pacific, and Africa through regional TC projects and to continue supporting field projects against *Aedes* and *Anopheles* mosquitoes through national TC projects for assessing the potential of the SIT as an efficient control tactic for disease-transmitting mosquitoes;
6. Invites the Agency to act upon the recommendation made by the experts of the revised Thematic Plan for the Development and Application of the Sterile Insect Technique (SIT) and Related Genetic and Biological Control Methods for Disease Transmitting Mosquitoes to invest in supporting the management of the mosquito vector species through continuous funding of the development of the SIT and related methods;
7. Invites the Agency to continue strengthening its collaboration with the WHO, and to provide guidance to field projects to assess entomological and epidemiological impacts;
8. Supports the Agency's continued efforts to strengthen its cooperation and collaboration with Member States, the Food and Agriculture Organization of the United Nations (FAO) and other relevant partners in the development, application and monitoring of SIT to help ensure sustainable agriculture and food security;
9. Requests the Secretariat to continue to solicit extrabudgetary resources, including through the IAEA Peaceful Uses Initiative, so as to enable increased efforts to be made in validating in the field the SIT package for disease-transmitting mosquitoes through operational projects in the field; and
10. Requests the Director General to report on the progress made in the implementation of this resolution to the General Conference at its sixty-eighth session (2024).

7.

Plan for producing potable water economically using small and medium-sized nuclear reactors

The General Conference,

- (a) Recalling resolution GC(62)/RES/9.A.4, Plan for producing potable water economically using small and medium-sized nuclear reactors, and previous General Conference resolutions on strengthening the Agency's activities related to nuclear science, technology and applications,
- (b) Recognizing that sufficient and clean potable water supplies for all humankind are of vital importance, as emphasized in the United Nations Conference on Sustainable Development (Rio +20), held in June 2012 in Rio de Janeiro, Brazil, and most recently, in Goal 6 of the 2030 Agenda for Sustainable Development, as well as through the discussion towards implementing the Paris Agreement adopted at the COP 21 United Nations Climate Change Conference in December 2015, and the Rabat Call 'Water for Africa' outcome document of the International Conference

on Water and Climate: “Water Security for Climate Justice”, which sought to ensure stronger integration of water in the climate agenda ahead of the COP 22 United Nations Climate Change Conference, which took place in Morocco in November 2016, and other United Nations Climate Change Conferences, i.e. COP23 COP24, COP25 and COP26, related to climate change,

(c) Recognizing the Standing Advisory Group on Nuclear Energy (SAGNE) recommendation VII-3.7 on strengthening the efforts of the Nuclear Energy Department and of the Agency-wide Platform on SMRs and their Applications (IAEA SMR Platform) in the area of non-electric applications of nuclear energy, including supporting Member States in developing plans for producing potable water economically using small and medium or modular reactors (SMRs),

(d) Noting that potable water shortages are of growing concern in many regions of the world, due to population growth, increased urbanization and industrialization and the effects of climate change,

(e) Underlining the urgent need for regional and international cooperation in helping to solve the serious problem of potable water shortages, particularly through the desalination of seawater,

(f) Recognizing that a number of Member States have expressed their interest in participating in activities relating to seawater desalination using nuclear energy,

(g) Noting that seawater desalination using nuclear energy has been successfully demonstrated through various projects in some Member States both for drinking water and for plant operated service water and is generally cost-effective, while recognizing that the economics of implementation will depend on site-specific factors,

(h) Taking note with appreciation of the different activities carried out by the Secretariat in cooperation with interested Member States and international organizations, as outlined in the report of the Director General contained in document GC(66)/9,

(i) Taking note of the enhanced scope of the Technical Working Group on Nuclear Desalination (TWG-ND), to encompass integrated water resources management and more specifically the efficient use of water in nuclear facilities,

(j) Acknowledging with appreciation the launch of the IAEA SMR Platform to ensure a cross departmental approach and to provide consistent and integrated support to Member States on all aspects of their development, deployment and oversight, and noting that the Agency has a dedicated project to support non-electric application of nuclear power,

(k) Noting with appreciation that the Agency is in the position to assist Member States with workshops and expert missions in the area of nuclear desalination, including with SMRs,

(l) Noting that the Agency is organizing a Workshop and an Expert Mission on Nuclear Desalination using SMRs through the Agency’s technical cooperation programme,

(m) Taking note of the technical meetings that were held in 2019, 2020, 2021 and 2022 on topics related to nuclear cogeneration and nuclear desalination, including the Workshop on Non-electric Applications including Desalination in Prague, in February 2019,

(n) Noting that the Agency launched in 2022 a Coordination Research Project (CRP) on assessing the role of nuclear cogeneration (including desalination) within the context of sustainable development, in response to the recommendations of the members of the TWG-ND in 2019 and of follow-on dedicated meetings, and

- (o) Noting that the Secretariat issued in September 2019 the Guidance on Nuclear Energy Cogeneration (IAEA Nuclear Energy Series No. NP-T-1.17) and is developing a publication on vendor and user responsibilities in nuclear cogeneration projects, in response to resolution GC(60)/RES/12/4.4.b to address the request to the Director General to “issue a technical report addressing responsibilities of vendors and users involved in nuclear desalination projects, and assessing different scenarios for cogeneration”,
1. Requests the Director General to continue consultations and strengthen interactions with interested Member States, the competent organizations of the United Nations system, regional development bodies and other relevant intergovernmental and non-governmental organizations in activities relating to seawater desalination using nuclear energy;
 2. Encourages the TWG-ND to continue its functions as a forum for advice and review on nuclear desalination and integrated water resources management activities;
 3. Stresses the need for continued strengthening of international cooperation in the planning and implementation of nuclear desalination demonstration programmes through national and regional projects open for the participation of any interested country;
 4. Requests the Director General, subject to the availability of resources, to:
 - (a) Continue to hold regional training workshops and technical meetings and to use other available mechanisms for disseminating information on nuclear desalination and water management using SMRs and to undertake further activities aimed at better establishing how existing reactors may offer options for nuclear desalination;
 - (b) Issue a revised version of the existing document NG-G-3.1 (Rev.1), Milestones in the Development of a National Infrastructure for Nuclear Power, to address aspects of nuclear cogeneration projects including desalination,
 - (c) Continue to develop the Agency’s activities in assessing the role of nuclear desalination within the context of sustainable development and climate change mitigation,
 - (d) Continue to increase the Agency’s activities related to training, capacity building and disseminating information on nuclear desalination using SMRs;
 5. Invites the Director General to raise funds from extrabudgetary sources in order to catalyse and contribute to the implementation of all Agency activities relating to nuclear desalination and cogeneration, and the development of innovative SMRs;
 6. Requests the Director General to note the high priority given by a growing number of interested Member States to the nuclear desalination of seawater in the process of preparing the Agency’s Programme and Budget; and
 7. Further requests the Director General to report on the progress made in the implementation of this resolution to the Board of Governors and to the General Conference at its sixty-seventh (2023) regular session under an appropriate agenda item.

8.

Strengthening the support to Member States in food and agriculture

The General Conference,

- (a) Recalling its resolutions GC(62)/RES/9.A.5, GC(60)/RES/12.A.5, GC(58)/RES/13.A.5, GC(56)/RES/12.A.4, GC(54)/RES/10.A.4 and GC(52)/RES/12.A.5 on “Strengthening the

support to Member States in food and agriculture” and its resolution GC(51)/RES/14 on “Strengthening the Agency’s activities related to nuclear science, technology and applications”,

(b) Recognizing the central role of agricultural development in accelerating progress towards several Sustainable Development Goals (SDGs), in particular to end hunger, achieve food security and improved nutrition and promote sustainable agriculture for the socioeconomic benefits of all Member States,

(c) Recognizing that the major global trends that will frame agricultural development over the medium term include: rising food demand, lingering food insecurity, malnutrition, epidemics and pandemics caused by zoonotic diseases, and the impact of climate change,

(d) Noting that the Paris Agreement on Climate Change recognizes the fundamental priority of safeguarding food security and ending hunger, and the particular vulnerabilities of food production systems to the adverse impacts of climate change,

(e) Noting that, according to the Food and Agriculture Organization of the United Nations (FAO) publication “The State of Food Security and Nutrition in the World 2022”, up to 828 million people in the world, corresponding to 10.5% of the world population, faced hunger in 2021 and that about the number of people affected by hunger rose by 150 million in the wake of the COVID-19 pandemic,

(f) Noting the benefits from the peaceful application of nuclear techniques in food and agriculture, and the importance of making appropriate technologies available, particularly to developing Member States to improve sustainable and resilient agriculture and food security and, in some cases, to enhance public health and environmental outcomes through One Health approaches,

(g) Appreciating the efforts of the Secretariat to further strengthen its partnership with FAO and to adjust and adapt its technology development, capacity building and technology transfer services in response to Member States’ demands in food and agriculture,

(h) Expressing appreciation for the support of the FAO Council, during its 164th Session in 2020, to upgrade the Joint FAO/IAEA Division to the Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture.

(i) Appreciating the work of the Joint FAO/IAEA Centre in the development and application of nuclear and related techniques in food and agriculture, and welcoming the reaffirmation by the Directors General of the FAO and the Agency of their commitment to expand the long-standing partnership between the two organizations through the signing of revised arrangements regarding the work of the Joint FAO/IAEA Centre in 2021,

(j) Affirming the synergy and contribution of this unique partnership through the Joint FAO/IAEA Centre to global food security and sustainable agriculture development,

(k) Recalling the new Strategic Framework 2022–2031 of the FAO, which seeks to support the 2030 Agenda through more efficient, inclusive, resilient and sustainable agri-food systems and which streamlines priorities, results and resource allocation to accelerate the eradication of hunger, malnutrition, poverty and the sustainable use of natural resources,

(l) Expressing appreciation for the work undertaken by the FAO/IAEA Agriculture and Biotechnology Laboratories in Seibersdorf, including the use of isotopes in climate-smart agriculture and development of innovative techniques for measuring emissions of agricultural greenhouse gases, the provision of food traceability, authenticity and contaminant control, the

research on irradiated animal vaccines for improvement and development of vaccines; the development of radiation hybrid maps for animal breeding; the enhancement of animal disease diagnostic applications; the development of novel testing procedures for the detection and surveillance of SARS-CoV2 in animal populations; and improving the efficiency of mutation induction techniques for crop improvement using modern biotechnologies,

(m) Acknowledging the crucial role of the FAO/IAEA Agriculture and Biotechnology Laboratories in meeting the needs and expectations of Member States relating to the successful deployment of nuclear science, technology and applications in food and agriculture, including to provide a very responsive in-house research and development resource,

(n) Recognizing the importance of the Agency's Biosafety Level 3 (BSL3) capabilities to support Member States' efforts to detect and control transboundary animal and zoonotic diseases, and appreciating the good cooperation with Austrian authorities, in particular the Austrian Agency for Health and Food Safety (AGES) on access to and use of its BSL3 facility, and welcoming the Agency's consideration to establish an IAEA owned extension to the existing facility,

(o) Noting the efforts made by the Secretariat to combat emerging and re-emerging animal and zoonotic diseases such as peste des petits ruminants, swine fever, foot-and-mouth disease, Ebola virus disease, avian influenza, Crimean-Congo haemorrhagic fever, Rift Valley fever, bluetongue and lumpy skin disease in Africa, Asia, Europe, Latin America and the Caribbean, as well as the COVID-19 pandemic and the monkeypox outbreak,

(p) Recognizing that emerging and re-emerging animal diseases are severely affecting livestock productivity and food security, and further recognizing the importance of the development of more efficient and healthy livestock production systems in rural communities in improving socio-economic development,

(q) Recognizing the success of the Veterinary Disease Diagnostic Laboratories Network (VETLAB Network), in adapting its structure to accommodate most transboundary and zoonotic diseases, including COVID-19, and currently involving 46 African Member States plus 19 Asian Member States, as well as recent initiated networks in 17 Latin America and the Caribbean, and 27 European and Central Asian Member States,

(r) Further recognizing the significant and expanding role the VETLAB Network fulfils in assisting these Member States in improving human and animal health as well as food safety and food security and in enhancing the quality of food production thus contributing towards Member States' efforts to achieve the SDGs, and address COVID-19 and other zoonotic diseases through the ZODIAC project.

(s) Further recognizing the increased support for preparedness for and rapid response to animal and zoonotic disease outbreaks, through capacity building in more than 40 Member States including through the VETLAB network.

(t) Noting recent successes resulting from the efforts made by the Secretariat in the development of new, improved and climate smart crop varieties, by using nuclear techniques and biotechnologies,

(u) Commending the Secretariat on the further enhancement of laboratory networks to strengthen capacity building of Member States, in particular for food safety and quality, for crop improvement and molecular marker development, and to strengthen support for the timely diagnosis, control and eradication of transboundary animal and zoonotic diseases,

- (v) Commending the Secretariat on its continued efforts in development and application of nuclear and related analytical techniques to detect agrochemical residues/contaminants and both zoonotic and non-zoonotic pathogens in food, to combat food fraud and to improve food safety and control systems, so as to protect consumers and enhance competitiveness of foodstuffs on the international market,
- (w) Noting the efforts made by the Secretariat to build national and regional capacity in animal genetic characterization targeting especially animal breeding for sustainable development in the context of disease resistance and tolerance to harsh environmental conditions due to climate change,
- (x) Noting the efforts made by the Secretariat in identification and inclusion of lesser known, non-conventional feeds and forages, crop residues and industrial by-products for sustainably increasing animal-origin food production,
- (y) Noting the efforts by the Secretariat to establish a network of national agriculture research systems in the Asia-Pacific region, the Mutation Breeding Network (MBN), to improve the efficiency of crop mutation breeding by encouraging and facilitating the exchange of mutant germplasm for breeding purposes, accelerating mutant trait discovery and marker development for agronomically important traits, and developing molecular markers for mutant traits,
- (z) Noting the efforts made by the Secretariat to introduce coffee mutation breeding as a new approach for genetic improvement of coffee varieties for fighting important diseases such as coffee leaf rust,
- (aa) Commending the Secretariat on its effective assistance to Member States in quickly and effectively identifying and characterizing transboundary animal and zoonotic diseases,
- (bb) Commending the Secretariat on its work on eradication of fruit flies in Latin America and the Caribbean using the Sterile Insect Technique (SIT), resulting in a very significant socio-economic impact in the region and, in particular, on its exemplary support towards the successful eradication of the Mediterranean fruit fly in the Dominican Republic in 2017 and in the State of Colima in Mexico in 2022,
- (cc) Applauding the support provided by the Agency to the African Union's Pan African Tsetse and Trypanosomosis Eradication Campaign (AU-PATTEC), which is making excellent progress in eradicating tsetse flies from the Niayes region of Senegal and is fostering the suppression of tsetse flies and the disease they transmit in several affected Member States,
- (dd) Commending the Secretariat on the support to the development of a harmonized International Guideline on Establishing and Maintaining Pest Free Areas and on the review of postharvest treatment submissions by Member States on food irradiation on the framework of the International Plant Protection Convention (IPPC), to help limit the spread of fruit fly pests, which in turn will help reduce poverty as farmers will have a higher yield, less loss and increased opportunity to trade,
- (ee) Noting the laudable efforts of the Joint FAO/IAEA Centre in developing crop resistance to ravaging diseases and pests, notably the development of Striga resistant sorghum mutant lines and Fusarium wilt resistant mutant lines of banana,
- (ff) Commending the Agency and FAO for the rapid action and initiation of a specific project in Latin America to combat the devastating banana disease TR4 that was reported from the second country in the region in 2021,

- (gg) Commending the Agency and FAO on jointly providing awards to plant breeders and institutes in Member States for exceptional achievements in mutation breeding and their contributions to global food security through 11 Outstanding Achievement Awards, 10 Women in Plant Mutation Breeding Awards, and 7 Young Scientist Awards during the 65th IAEA General Conference in 2021,
- (hh) Commending the Agency on its key role in the post-rinderpest era, including its contributions to the sequestration of the rinderpest virus from diagnostic and vaccine production and storage facilities and to the maintenance of global diagnostic capabilities and expertise, and on its support in building national and regional capacity, improving epidemiological studies and data management and setting up pertinent networks to combat and eliminate other livestock and zoonotic diseases,
- (ii) Commending the Agency on its exemplary role in the enhancement of nuclear emergency response in the field of food and agriculture and on its adaptation of nuclear and related technologies in that connection,
- (jj) Applauding the commencement of new demand-driven R&D work at the FAO/IAEA Agriculture and Biotechnology Laboratories in Seibersdorf on the development of the SIT for disease-transmitting mosquitoes, the use of isotopic techniques in soil erosion control, land and water management, climate-smart agriculture, greenhouse gas emission reduction, food forensics, traceability and contaminant control to improve food safety and quality, the investigation of irradiated animal vaccines, the application of stable isotopes as tracing technologies and in enhancing animal disease diagnostic applications, and the use of whole genome sequencing techniques and bioinformatics in the development of robust molecular markers for mutation breeding,
- (kk) Applauding the support of the Secretariat to 94 African, Asian, European and Latin American countries in the development of soil conservation strategies using fallout radionuclide (FRN) techniques to ensure sustainable agricultural production and to mitigate the impacts of climate change,
- (ll) Welcoming the demand-driven research activities on the development of communication tools to improve decision-making in agricultural water management in Africa, and the new visualization platform for nuclear and radiological emergency preparedness and response for food and agriculture,
- (mm) Recognizing that the demand from Member States for technical assistance in the area of nuclear applications in food and agriculture remains high, as evidenced by the scientific and technical support of the Joint FAO/IAEA Centre to more than for 286 national, regional and interregional technical cooperation projects and 38 coordinated research projects, and
- (nn) Appreciating the contributions made by Member States, the FAO and other stakeholders in support of the ReNuAL+ and ReNuAL 2 Project, including a new fit-for-purpose greenhouse, and, inter alia, the food and agriculture programme of the Agency, and commending the Secretariat on securing extra-budgetary funding of its crucial research including into the development of an SIT package against *Aedes* mosquitoes, and
- (oo) Welcoming the International Symposium on Managing Land and Water for Climate-Smart Agriculture, organized by the Agency in cooperation with FAO in July 2022 in Vienna,
1. Urges the Secretariat to further expand, in an integrated and holistic manner, its efforts to address, inter alia, food insecurity in Member States and to further increase its contribution to raising agricultural

productivity and sustainability, reducing poverty and hunger, and improving farmers' incomes, through the development and integrated application of nuclear science and technology;

2. Encourages the Secretariat, and in particular the Joint FAO/IAEA Centre, to continue its unique role in strengthening the capacity of Member States in the use of nuclear and related techniques to improve food security and sustainable agriculture through international cooperation in research, training and outreach activities;

3. Urges the Secretariat to address the impacts of climate change on food and agriculture through the use of nuclear technologies, with priority on adaptation to and mitigation of the effects of climate change, including through the development of tools and technology packages, and invites the Secretariat to carry out activities for addressing climate change challenges under the thematic heading of 'climate-smart agriculture';

4. Urges the Joint FAO/IAEA Centre to further increase its focus on the sustainable intensification of agricultural productivity through climate-smart agricultural practices that ensure water quality, strengthen food safety and quality, improve water use efficiency, minimize land degradation, maximize crop yield and quality, improve crop resilience, and optimize livestock feeds and other agricultural practices to reduce greenhouse gases, reduce pollution caused by an overload of nutrients, agricultural plastics and antibiotic resistant bacteria and antibiotic resistance genes, while promising better adaptation to and mitigation of climate change in agriculture;

5. Urges the Agency to further increase its focus on development of crops adapted to the negative effect of climate change by using mutation induction techniques with different sources of radiation including electron beam, ion beam, cosmic radiation (as in space breeding), as well as biotechnology and other modern technologies for marker development to assist and accelerate crop breeding;

6. Encourages the Joint FAO/IAEA Centre to assist Member States, upon request, to develop irradiation technologies such as X rays and high-energy electron beam machines to treat plant pathogens and insect pests for sanitary and phytosanitary purposes;

7. Invites the Secretariat, in view of the global trend in antimicrobial resistance (AMR) and its impact on animal and human health, to continue to follow international developments in efforts to establish possible applications where nuclear/isotopic methods/tools may provide comparative advantages;

8. Encourages the Joint FAO/IAEA Centre to further strengthen its pivotal role in the establishment, coordination and support of new global and regional technical/scientific laboratory networks in order to further strengthen regional and global partnerships among institutions in Member State striving to achieve the UN SDGs, and urges the Joint FAO/IAEA Centre to take the lead in establishing, sustaining and managing such networks;

9. Furthermore, encourages the Joint FAO/IAEA Centre to persist in its ongoing endeavours to further strengthen and expand existing networks, including the VETLAB Network, the Latin American and Caribbean Analytical Network (RALACA), the Asia and Oceania Association of Plant Mutagenesis (AOAPM), the African Food Safety Network (AFoSaN), the Food Safety Asia network, the Tephritid Workers Database (TWD) Network, the Mutation Breeding Network (MBN) for the Asia Pacific region, and the Coffee Mutation Network (CMN), with the participation of multiple stakeholders to strengthen national programmes;

10. Further encourages the Joint FAO/IAEA Centre to expand its support to Member States, through the VETLAB Network, in establishing and developing capabilities in identifying, diagnosing, surveillance and monitoring and responding to veterinary and zoonotic diseases, and acknowledges the efficient processes, which lead to quick detection, diagnosis, response and action to diseases that have

the ability to threaten human and animal health as well as food safety, food security and the quality of food production ultimately affecting socio-economic development;

11. Also urges the Joint FAO/IAEA Centre to continue to build on its achievements in this regard by identifying opportunities for expansion to other regions, as requested by Member States and relevant regional organizations;

12. Encourages the Secretariat to continue its work on coffee mutation breeding and to promote development of network of research institutes in coffee growing countries;

13. Requests the Secretariat to strengthen capacity building for Member States, including in addressing those transboundary animal and zoonotic diseases that pose a bio-threat to people and their livelihoods, in case of accidental or deliberate release to the environment, and encourages the Agency, in consultation with Member States, to pursue its consideration of an IAEA owned extension of the existing BSL3 laboratory of the AGES in order to promote and strengthen capacity building for Member States to address these global threats;

14. Encourages the Joint FAO/IAEA Centre, including the FAO/IAEA Agriculture and Biotechnology Laboratories in Seibersdorf, to continue its valuable work in the provision of demand driven training and services and in applied R&D;

15. Requests the Secretariat to work towards the renewal of the FAO/IAEA Agriculture and Biotechnology Laboratories in Seibersdorf, in conjunction with the other programmatic entities of the laboratories of the Department of Nuclear Sciences and Applications, in order to ensure that fit-for purpose laboratories and the controlled-environment modular greenhouses will also in future be optimally positioned to assist Member States' research and development activities;

16. Urges the Secretariat to continue strengthening its activities in the area of food and agriculture through interregional, regional and national capacity building initiatives and through better north-south and south-south collaboration and harmonization, and to further expedite the sustainable transfer of technology to developing Member States;

17. Encourages Member States to contribute, particularly through the Peaceful Uses Initiative, to food and agriculture activities, and to continue supporting these activities by funding projects that will further enhance agricultural productivity while protecting increasingly scarce natural resources and addressing greenhouse gas emissions;

18. Urges the Secretariat to further strengthen its efforts to seek extrabudgetary funding for infrastructure and equipment improvement and modernization of the Seibersdorf Laboratories and fit-for-purpose greenhouses, especially the FAO/IAEA Agriculture and Biotechnology Laboratories, to enable these to meet the growing and continuously evolving needs of Member States, and specifically encourages Member State contributions in support of the ReNuAL 2 initiative;

19. Urges the Secretariat, in its resource mobilization efforts for the ReNuAL 2 project, to draw on the extensive experience of the FAO in mobilizing extrabudgetary resources, and encourages the Secretariat to have relevant FAO staff work closely with Agency staff in these efforts;

20. Encourages the Secretariat to further strengthen its partnership with the FAO and to continue adjusting and adapting its technology development, capacity building and technology transfer services in response to Member States' demands and needs in food and agriculture, especially considering the FAO Strategic Objectives;

21. Appreciates the continuing activities of the Secretariat in relation to nuclear and radiological emergency preparedness and response, especially in the areas of agricultural countermeasures and

remediation strategies to mitigate immediate and longer-term effects arising from radionuclide contamination, and urges the Secretariat to develop technologies, manuals, protocols, decision support systems and guidance to strengthen the capacity of Member States to deal with radionuclide contamination in food and agriculture;

22. Encourages the Joint FAO/IAEA Centre to continue responding to the major global trends framing agricultural development in order to ensure to the maximum extent possible an increased resilience of livelihoods to threats and crises in agriculture, including the adaptation to and mitigation of the effects of climate change;

23. Urges the Secretariat to further strengthen its effort to seek extrabudgetary funding for strengthening its research activities in the preparedness and response to nuclear and radiological emergencies affecting food and agriculture; and

24. Requests the Director General to report on the progress made in the implementation of this resolution to the Board of Governors and the General Conference at its sixty-eighth (2024) regular session.

B.

Nuclear power applications

1.

Introduction

The General Conference,

- (a) Recalling resolution GC(65)/RES/11 and previous General Conference resolutions on strengthening the Agency's activities related to nuclear science, technology and applications,
- (b) Noting the Agency's objectives as outlined in Article II of the Statute include "to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world",
- (c) Noting also that the Agency's statutory functions include "to encourage and assist research on, and development and practical application of, atomic energy for peaceful uses", "to foster the exchange of scientific and technical information" and "to encourage the exchange and training of scientists and experts in the field of peaceful uses of atomic energy", and "to make provision, in accordance with this Statute, for materials, services, equipment, and facilities to meet the needs of research on, and development and practical application of, atomic energy for peaceful purposes, including the production of electric power", with due consideration for the needs of developing countries,
- (d) Stressing that the use of nuclear power must be accompanied at all stages by commitments to and ongoing implementation of the highest standards of safety and security throughout the life of the power plants, and effective safeguards, consistent with Member States' national legislation and respective international obligations, and welcoming the Agency's assistance in these areas,
- (e) Recognizing that the establishment of a robust safety, security and non-proliferation infrastructure in States considering introducing nuclear power programmes, as well as maintaining and expanding such programmes, is vital for any nuclear programme, and welcoming the Agency's assistance in these areas,

- (f) Stressing that primary responsibility for nuclear safety and security rests with States, in particular licensees and operating organizations, supervised by regulatory bodies, in order to achieve the protection of the public and environment, and that a strong infrastructure is necessary to execute this responsibility,
- (g) Recalling that launching new, as well as maintaining and expanding existing nuclear power programmes, requires the development, implementation and continuous improvement of appropriate infrastructure to ensure the safe, secure, efficient and sustainable use of nuclear power, and implementation of the highest standards of nuclear safety, taking into account relevant Agency standards and guidance and relevant international instruments, lessons learned from the Fukushima Daiichi accident, as well as a strong and long-term commitment of national authorities to creating and maintaining this infrastructure,
- (h) Welcoming the progress of the IAEA Marie Skłodowska-Curie Fellowship Programme (MSCFP) with the objective to encourage women to pursue a professional career in the field of nuclear sciences, technology and non-proliferation as well as the support offered by various Member States to the MSCFP and acknowledging its successful two years of implementation, resulting in 210 selected students from 93 Member States studying in 53 countries,
- (i) Noting the success of nine Nuclear Energy Management (NEM) Schools and Nuclear Knowledge Management (NKM) Schools conducted in 2021, including the two held annually at the International Centre for Theoretical Physics (ICTP) in Trieste and the highly-valued continuous cooperation between the IAEA and the ICTP,
- (j) Recalling the importance of human resource development, education and training, knowledge management and promotion of gender equality and diversity, stressing the Agency's unique expertise and capacity to assist Member States in building their national capacities to support the safe, secure and efficient use of nuclear power and its application, *inter alia* through its Technical Cooperation Programme, and acknowledging the important role the Agency plays in assisting Member States in the establishment, preservation and enhancement of nuclear knowledge and in implementing effective knowledge management programmes,
- (k) Noting the continued value of Integrated Work Plans (IWPs), which provide an operational framework for the delivery of tailored and optimized Agency assistance, notably through its Technical Cooperation Programme, to support Member States with new and expanding nuclear programmes,
- (l) Noting that significant concerns related to energy resource availability, the environment, energy security, climate change and its impacts, which have been reflected in the Sustainable Development Goals (SDGs) by the Member States of the United Nations in September 2015, suggest that a wide variety of energy options need to be addressed in a holistic manner to promote access to competitive, clean, safe, secure and affordable energy and support sustainable economic growth, and welcoming the proactive approach of the Secretariat to identify relevant areas of activities among the 17 SDGs,
- (m) Conscious of the potential contribution of nuclear power to meet the growing energy needs in the 21st century and mitigating climate change and noting that nuclear power does not produce either air pollution or greenhouse gas emissions during normal operation, which makes it one of the low carbon technologies available to generate electricity, and therefore acknowledging the participation of some Member States in the Nuclear Innovation: Clean Energy Future initiative (NICE Future) under the Clean Energy Ministerial, which calls attention to the interest, on the part of some Member States, in including nuclear power in national and international clean energy and climate discussions and engages nuclear expertise to explore how innovative uses of nuclear

technologies, including systems that integrate nuclear power and renewable sources together in reliable clean energy systems, can accelerate progress toward clean air and climate objectives,

- (n) Noting the work of the IAEA on projections on the future use of nuclear power worldwide, in particular with the annual publication Energy, Electricity and Nuclear Power Estimates for the Period up to 2050,
 - (o) Acknowledging that each State has the right to decide its priorities and establish its national energy policy in accordance with its national requirements, taking into account relevant international obligations, and highlighting the support provided by the IAEA to Member States that are considering developing nuclear power, in the field of energy planning and energy systems assessment taking into account environmental and economic aspects,
 - (p) Recognizing the challenges in obtaining a large amount of financing to construct nuclear power plants as a viable and sustained option in meeting energy needs, and taking into account appropriate financing schemes, which could involve investors from not only the public sector but also the private sector where it is available,
 - (q) Taking note of the Nuclear Technology Review 2022 (GC(66)/INF/4), as well as of the report Strengthening the Agency's Activities related to Nuclear Science, Technology and Applications (GOV/2022/30-GC(66)/9) prepared by the Secretariat, and
 - (r) Noting with appreciation the launch of the Advisory and Peer Review Services Committee (APReSC) established within the Department of Nuclear Energy with the objective to harmonize and improve, as well as monitor, the efficiency and effectiveness of the advisory and peer review services,
1. Commends the Director General and the Secretariat for their work in response to previous relevant General Conference resolutions as reported in document GC(66)/9;
 2. Affirms the importance of the role of the Agency in facilitating the development and use of nuclear energy for peaceful purposes, in fostering international cooperation among interested Member States, and in disseminating well-balanced information on nuclear energy to the public;
 3. Requests the Director General to keep Member States informed on the progress of the implementation of the MSCFP and encourages Member States in a position to do so, to provide support for the Programme;
 4. Encourages the Agency to continue its support to interested Member States in building their national capacities in the operation of nuclear power plants and their nuclear power infrastructure when embarking on new nuclear power programmes;
 5. Encourages the Secretariat to support initiatives in the areas of knowledge management, including capacity building activities for senior management and the development of e-learning materials, and to facilitate participation in regional NEM Schools for qualified students, in particular those from developing countries through regional funding or cooperation mechanisms;
 6. Encourages the Agency to maintain and strengthen the assistance and peer review and advisory services provided to Member States embarking on a nuclear power programme or expanding such programmes, including the coordination and integration of such services, and calls on those Member States to voluntarily use these services when planning the possible introduction or expansion of a nuclear energy capacity in their national infrastructures and energy mix;
 7. Encourages Member States that are considering developing nuclear power to voluntarily use the support provided by the Agency to Member States on energy planning and assessment of energy systems

in relation to environment, climate and economic factors and requests the Agency to continue its services to help interested Member States in this regard;

8. Welcomes the Agency's release of the first Nuclear Energy Series Guide-level publication, Stakeholder Engagement in Nuclear Programmes (IAEA Nuclear Energy Series No. NG-G-5.1), aimed at supporting national efforts to engage stakeholders groups throughout the life cycle of nuclear facilities;

9. Commends the Secretariat's efforts in providing comprehensive information on nuclear energy's potential as a low carbon energy source and its potential to contribute to mitigating climate change, during the COP26 conference in Glasgow, United Kingdom in November 2021, encourages the Secretariat to continue these efforts in its preparations for the upcoming COP27, to be held in November 2022 in Sharm El Sheikh, Egypt, and COP28 to be held in the United Arab Emirates in November 2023, and encourages the Secretariat to work directly with Member States upon request and to continue to extend its activities in these areas, including in the context of the Paris Agreement;

10. Looks forward to the 5th International Ministerial Conference on Nuclear Power in the 21st Century, to be held from 26-28 October 2022, in Washington, DC, the United States of America, and emphasizes the importance of an inclusive approach to participation of all interested Member States;

11. Acknowledges the importance of the Agency's Technical Cooperation projects for assisting Member States in energy analysis and planning, including to develop pathways towards net zero emissions through energy system modelling, and in establishing the infrastructure required for the safe, secure and efficient introduction and use of nuclear power, and encourages interested Member States to consider how they can further contribute in this field by enhancing the Agency's technical assistance to developing countries, and highlights the importance of active and balanced stakeholder engagement in the development or expansion of nuclear power programmes;

12. Encourages the Secretariat to continue to enhance interested Member States' understanding of funding requirements for nuclear power infrastructure and potential approaches to financing nuclear power programmes, including management of radioactive waste and spent fuel, and encourages interested Member States to work with the relevant financial institutions towards addressing financial issues related to the introduction of enhanced safety design and technologies for nuclear power;

13. Encourages the Secretariat to analyse the technical and economic cost drivers for economic sustainability of nuclear power operation, especially with regard to decisions of Member States concerning the long-term operation of nuclear power plants, to determine the value of nuclear power in the energy mix considering environmental conditions and, inter alia, climate objectives;

14. Stresses the importance, when planning, deploying, or decommissioning nuclear energy facilities, including nuclear power plants and related fuel cycle activities, of ensuring the highest standards of safety and emergency preparedness and response, security, non-proliferation, and environmental protection, of being informed of the best available technologies and practices, of continuously exchanging information on R&D addressing safety issues, of strengthening long-term research programmes to learn about severe accidents and related decommissioning activities, and of enabling continuous improvement in this regard, and values the role of the IAEA in fostering exchange of expertise and discussions within the international nuclear community on such issues;

15. Welcomes the continuation of the IAEA Peaceful Uses Initiative and all contributions announced by Member States or regional groups of States, and encourages Member States and groups of States, in a position to do so, to contribute, including with 'in-kind' contributions; and

16. Welcomes the establishment of the Technical Working Group (TWG) on Nuclear Power in Low-Carbon Energy Systems, and encourages the Secretariat to consider establishing a TWG on Nuclear Fuel Cycle Facilities' Operation, which will include ageing and upgrade challenges.

2.

IAEA communication, cooperation with other agencies and stakeholder engagement

The General Conference,

- (a) Recalling the importance of involving the Member States in the drafting and publication process of important publications on nuclear energy,
 - (b) Welcoming the Secretariat's contributions to international discussions addressing global climate change, such as at the Conferences of the Parties to the United Nations Framework Convention on Climate Change (COP), and taking note of the participation of the Agency in the Intergovernmental Panel on Climate Change (IPCC),
 - (c) Commending the proactive approach of the Secretariat to identify relevant areas of activities among the 17 SDGs adopted by the United Nations in 2015,
 - (d) Stressing the importance of appropriate and applicable engineering and industrial national and international codes and standards for the safe, timely and cost-effective deployment of nuclear technology,
 - (e) Acknowledging that it is important for Member States that opt to use nuclear power to engage the public in a science based and transparent dialogue, recognizing the utmost importance of active and balanced stakeholder engagement in Member States that operate nuclear power plants or that are considering and planning for the introduction or expansion of nuclear power, and
 - (f) Noting the Agency's efforts to enhance its work on stakeholder engagement and public information, including the establishment of the Nuclear Energy Stakeholder Engagement Coordination Committee (NESECC) to further enhance the programmatic delivery of the Department of Nuclear Energy in this area, and encouraging the Secretariat to report on the work of this committee,
1. Welcomes efforts of the Secretariat to introduce mechanisms for Member States to participate in the preparation of Nuclear Energy Series publications and the sharing of information on drafts under preparation, and further encourages the Secretariat to continue consolidating the drafting and review of Nuclear Energy Series publications to establish a single, systematic, and transparent process and to report to the Member States on this matter;
 2. Encourages the Secretariat to improve the timeliness of information available during the publication process, welcomes the revision of the Nuclear Energy Series structure, and encourages the Secretariat to continue to develop Nuclear Energy Series documents as a more integrated, comprehensive and clearly organized set of publications to be maintained up-to-date by clearly marking which publications are most current and which have been superseded, in order to enhance accessibility and navigation among these documents;
 3. Welcomes the development of the IAEA website in all official languages of the IAEA and encourages the Secretariat to include more content relevant to policy makers and experts involved in IAEA activities, such as organizational charts and activities of expert groups, and to make access to Agency guidance documents and TECDOCs easier;

4. Encourages the Agency to seek efficiencies in the development and management of digital information systems, to ensure and improve long-term accessibility and public access to these tools and databases, as relevant, and to anticipate the needs to update and maintain these tools on the long term;
5. Requests the Secretariat to continue cooperation with international initiatives such as UN-Energy, and to explore the possibility of cooperation with Sustainable Energy for All (SE4All), stressing the importance of ongoing, transparent communications about the risks and benefits of nuclear power in operating and embarking countries;
6. Requests the Secretariat to continue cooperation with international initiatives such as UN-Energy to ensure that the IAEA's capacity building in energy planning can be widely recognized within UN system as an important contributor to SDGs, in particular SDG 7;
7. Encourages the strengthening of mutual cooperation between Member States by exchanging information on relevant experiences and good practices with respect to nuclear power programmes, through international organizations such as the IAEA, OECD Nuclear Energy Agency (NEA), the International Framework for Nuclear Energy Cooperation (IFNEC), the World Nuclear Association (WNA) and the World Association of Nuclear Operators (WANO);
8. Encourages the Secretariat to work further with the OECD/NEA, in particular, on capacity building issues and in the preparation of key IAEA publications such as the "Status and Trends in Spent Fuel and Radioactive Waste Management" and the next edition of the 'Red Book' on Uranium: Resources, Production and Demand;
9. Encourages the Secretariat to cooperate with national and international industrial organizations for standardization, such as the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC), with regard to their development of appropriate engineering and industry codes and standards in order to better respond to the needs of the Member States;
10. Recommends that the Secretariat continue to explore opportunities for synergy between the Agency's activities (including the International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO)) and those pursued under other international initiatives in areas relating to international cooperation in peaceful uses of nuclear energy, safety, proliferation resistance and security issues and, in particular, supports collaboration among INPRO, the Generation IV International Forum (GIF), IFNEC, the European Sustainable Nuclear Industrial Initiative (ESNII) and the International Thermonuclear Experimental Reactor (ITER) with regard to innovative and advanced nuclear energy systems;
11. Takes note of the Secretariat's cooperation with IFNEC, in areas of nuclear infrastructure, the back end of the nuclear fuel cycle, and sustainable delivery chains, as well as advanced reactors and small and medium or modular reactors (SMRs); and
12. Encourages the Secretariat to continuously assist Member States in enhancing public awareness and understanding of peaceful uses of nuclear energy, including by publishing reports on stakeholder engagement and public information as well as organizing conferences, technical meetings and workshops, among other mechanisms.

3. Nuclear fuel cycle and waste management

The General Conference,

- (a) Noting the increasing number of requests from Member States for advice on the exploration of uranium resources and on mining and milling for safe, secure and effective uranium production while minimizing the environmental impact and acknowledging the importance of the Agency's assistance in this field,
- (b) Noting the importance of identifying undiscovered uranium or secondary uranium resources, while underlining the necessity of safe and effective uranium mine remediation, as part of a sustainable nuclear programme,
- (c) Noting the functioning of the Low Enriched Uranium (LEU) Bank project, in Oskemen, Kazakhstan, with the completion of LEU supply to the bank by France and Kazakhstan,
- (d) Noting also the functioning of the LEU Guaranteed Reserve in Angarsk, Russian Federation, comprising 120 tons of LEU under the aegis of the Agency, and aware of the availability of the American Assured Fuel Supply, a bank of approximately 230 tons of LEU, for responding to supply disruptions in countries pursuing peaceful civilian nuclear programmes,
- (e) Recognizing the role that the effective management of spent fuel and radioactive waste should play in avoiding imposing undue burdens on future generations, and recognizing that, while each Member State should dispose of the radioactive waste it generates, in certain circumstances the safe and efficient management of spent fuel and radioactive waste might be fostered through agreements among Member States to use facilities in one of them for their mutual benefit, and stressing the importance of Agency safety standards on this issue related to the management of radioactive waste and spent fuel and the benefits of strong cooperation with relevant international organizations,
- (f) Emphasizing the need to ensure effective management of spent fuel which, for some Member States, includes reprocessing and recycling, as well as of radioactive waste, including its transport, storage and disposal, in a safe, secure and sustainable manner, and confirming the important role of science and technology in continuously addressing these challenges, particularly through innovations,
- (g) Welcoming progress made in the field of deep geological disposal of spent fuel and high-level radioactive waste, and further recognizing the need for Member States to evaluate and manage the financial commitments that are necessary for planning and implementing radioactive waste and spent fuel management programmes, including disposal,
- (h) Recognizing the continuing efforts and good progress that have been made on the Fukushima Daiichi site, and noting the important and complex decommissioning, environmental remediation and radioactive waste management challenges that remain,
- (i) Recognizing that the growing number of shutdown reactors and an anticipated growing number of shutdown fuel cycle and research facilities increase the need for developing adequate methods and techniques for decommissioning, environmental remediation and managing of all forms of radioactive waste resulting from the decommissioning of facilities, legacy practices and radiological or nuclear accidents and sharing lessons learned in that regard,
- (j) Welcoming ongoing activities of the Agency's project entitled "Global Status of Decommissioning",

- (k) Commending the continuous efforts of the Secretariat to help support the safe, secure and effective borehole disposal of disused sealed radioactive sources, based on expertise from interested Member States, and
- (l) Welcoming the increased use of the Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Radiation (ARTEMIS) peer review missions and encouraging Member States to make further use of these IAEA services,
1. Recognizes the importance of assisting Member States interested in uranium production to improve and maintain safe and sustainable activities through appropriate technology, infrastructure and stakeholder engagement, including Indigenous engagement where Member States deem it appropriate, and the development of skilled human resources;
 2. Encourages the Agency to finalize the publication of the guidance document on a step by step approach for countries considering or initiating a uranium production programme, and encourages interested Member States to use the IAEA review mission in this field, which is based on the analysis and promotion of practical know-how and innovative knowledge regarding environmental aspects of uranium exploration, mining and site remediation;
 3. Welcomes the Secretariat's efforts in pursuing activities for enhancing Member State capabilities in modelling, predicting and improving the understanding of the behaviour of current and advanced nuclear fuel in normal operation and under accident conditions;
 4. Encourages the Secretariat to assist interested Member States in analysing the technical challenges that may hinder the sustainable operation of nuclear fuel cycle facilities, such as ageing management issues;
 5. Encourages the Secretariat to analyse the potential technical challenges that may affect the transportability of spent fuel after long storage;
 6. Encourages the Secretariat to keep Member States informed of the status of the LEU Bank;
 7. Encourages discussion among interested Member States on the development of multilateral approaches to the nuclear fuel cycle, including possible mechanisms for nuclear fuel supply assurance and possible schemes for the back end of the fuel cycle and disposal of radioactive waste, recognizing that any discussion on these matters should take place in a non-discriminatory, inclusive and transparent manner and be respectful of the rights of each Member State to develop national capabilities;
 8. Requests the Secretariat to continue and strengthen its efforts relating to the fuel cycle, spent fuel, and radioactive waste management, and to assist Member States to develop and implement adequate programmes, in accordance with relevant safety standards and security guidance;
 9. Encourages the Secretariat to promote information sharing to better integrate approaches to the back end of the fuel cycle that impact processing, transport, storage, and recycling of spent fuel and radioactive waste management, for example through the coordination of research projects and to provide more information on all stages of radioactive waste management, including waste pre-disposal management and disposal, and thereby assisting Member States, including those embarking on nuclear power programmes, to develop and implement adequate disposal programmes, in accordance with relevant safety standards and security guidance;
 10. Encourages the Secretariat to continue its activities on 'Status and Trends in Spent Fuel and Radioactive Waste Management' by publishing a series of reports on global inventories on radioactive waste and spent fuel and on advanced planning for their management in cooperation with the OECD/NEA and the European Commission;

11. Encourages further strengthening of Agency safety standards as well as strong cooperation with international and regional organizations, such as through the Spent Fuel and Radioactive Waste Information System (SRIS) and the joint reporting tool Spent Fuel and Radioactive Waste Information Tool (SWIFT);
12. Welcomes the organization by the IAEA of the International Conference on Nuclear Decommissioning: Addressing the Past and Ensuring the Future, to be held in May 2023 in Vienna, Austria;
13. Requests the Agency to formulate guidance documents on decommissioning and action plans to support decommissioning, with a view to promoting the safe, secure, efficient, and sustainable execution of these activities, and to facilitate the systematic review of these guidance documents based on recent developments, as appropriate;
14. Encourages the Secretariat to formulate recommendations on practical enablers of end-state definition, controls and long-term stewardship for decommissioning and contaminated sites, including compliance demonstration and stakeholder engagement aspects;
15. Encourages the Agency to further strengthen its activities in the area of environmental remediation, in close collaboration between the Department of Nuclear Energy and the Department of Nuclear Safety and Security;
16. Encourages the Secretariat to further promote the ARTEMIS peer review service, explaining its benefits as a means of encouraging Member States to invite such peer reviews where appropriate, and requests the Secretariat to enhance the effectiveness and efficiency of this service, including combined and back-to-back Integrated Regulatory Review Service (IRRS)-ARTEMIS missions, through cooperation and coordination, between the Department of Nuclear Energy and the Department of Nuclear Safety and Security;
17. Supports Member States in the adoption of best practices for managing naturally occurring radioactive material (NORM) residue/wastes (including inventory determination, reuse, recycle, storage, and disposal options) and to remediate NORM contaminated sites and notes the recommendations of the International Conference on Management of Naturally Occurring Radioactive Materials (NORM) in Industry held in October 2020 in Vienna, Austria; and
18. Encourages the Agency to further strengthen its activities in support of the effective management of disused sealed radioactive sources (DSRS) through, inter alia, the development of Qualified Technical Centres for DSRS management and cooperative efforts to strengthen supporting information on the borehole disposal of DSRS, with a view to enhancing safety and security of DSRS in the long term.

4.

Research reactors

The General Conference,

- (a) Recognizing the role that safe, secure, reliably operated, and well utilized research reactors can play in national, regional, and international nuclear science and technology programmes, including support of R&D in the fields on neutron science, fuel and material testing, and education and training, and
- (b) Commending the Secretariat for the continued support provided for the implementation and promotion of the International Centres based on Research Reactors (ICERR),

1. Requests the Secretariat to continue its efforts, in consultation with interested Member States, to utilize existing research reactors to pursue the Agency's activities in the area of nuclear science and technology, including nuclear power applications, in Member States, with a view to strengthening infrastructure, including safety and security, and fostering science, technology, engineering and capacity building;
2. Encourages the Secretariat to continue to foster regional and international collaboration and networking that expands access to research reactors, such as international user communities;
3. Encourages the Secretariat to inform Member States considering the development or installation of their first research reactor of the issues related to utilization, cost-effectiveness, environmental protection, safety and security, nuclear liability, proliferation resistance, the application of comprehensive safeguards, and radioactive waste management associated with such reactors, and, on request, to assist Member States that are pursuing new reactor projects following the Agency-developed Specific Considerations and Milestones for a Research Reactor Project, including systematic, comprehensive and appropriately graded infrastructure development;
4. Urges the Secretariat to continue to provide guidance on all aspects of the research reactor life cycle, including the development of ageing management programmes at all research reactors, to ensure continuous improvements in safety and reliability, sustainable long-term operation, the sustainability of fuel supply, exploration of efficient and effective disposition options for spent fuel and radioactive waste management, and the development of a knowledgeable customer capability in Member States decommissioning research reactors;
5. Acknowledges the Agency peer review service Integrated Nuclear Infrastructure Review for Research Reactors (INIR-RR), implemented in Thailand, and encourages the Agency to continue to provide this service to interested Member States;
6. Acknowledges the implementation of an Operations and Maintenance Assessment for Research Reactors (OMARR) mission in Chile, and encourages Member States to make further use of this IAEA service;
7. Requests the Secretariat to foster regional and international efforts in ensuring wide access to existing multi-purpose research reactors to increase research reactor operations and utilization, through regional research reactor coalitions and ICERRs;
8. Acknowledges the formalization of Integrated Research Reactor Utilization Review (IRRUR) missions as an IAEA review service aiming at supporting interested Member States to improve the utilization of their research reactors, and requests the Secretariat to provide assistance in facilitating safe, effective and sustainable operation of these facilities;
9. Acknowledges with appreciation the engagement of the Secretariat in the promotion of ICERR, calls on willing Member States to apply for designation, and encourages already designated facilities and expected unique facilities to cooperate through ICERR-Net or other international networks and research programmes on relevant activities of interest to Member States;
10. Acknowledges the expansion of the IAEA Internet Reactor Laboratory project in Asia-Pacific, Europe and Africa regions, and encourages the Secretariat to further strengthen its efforts to support capacity building based on research reactors; and
11. Calls on the Secretariat to continue to support international programmes working to minimize the civilian use of HEU, for example through the development and qualification of LEU high density fuel for research reactors, where such minimization is technically and economically feasible.

5. Operating nuclear power plants

The General Conference,

- (a) Stressing the essential role the Agency plays as an international forum for the exchange of information and experience on nuclear power plant operation and for continuous improvement of this exchange among interested Member States,
 - (b) Recognizing the role that operating nuclear power plants will play, for Member States with nuclear power programmes, in the transition to sustainable energy systems through the supply of reliable, low-emission electricity and heat,
 - (c) Noting the growing importance, for some Member States, of long-term operation of existing nuclear power plants and underlining the need to share relevant lessons learned from long-term operations including safety aspects, for the benefit of new programmes that may have nuclear power plants capable of operating beyond 60 years, and
 - (d) Stressing the importance of adequate human resources for ensuring, inter alia, the safe and secure operation and the effective regulation of a nuclear power programme, and noting the increasing need, worldwide, for trained and qualified personnel to implement nuclear energy related activities during construction, commissioning and operation including long-term operation, performance improvement, effective management of radioactive waste and spent fuel and decommissioning through focusing on the optimization of training programmes for operating organizations,
1. Requests the Secretariat to promote collaboration among interested Member States for strengthening excellence for the safe, secure, efficient, and sustainable operation of nuclear power plants;
 2. Acknowledges the work of the Secretariat on nuclear leadership, management systems, and quality assurance and control for the nuclear industry and the whole life cycle of facilities and activities, including while nuclear power plants are in permanent shutdown, or in transition to decommissioning;
 3. Requests the Secretariat to continue this work through experience sharing and identification and promotion of best practices, and taking into account quality assurance and control activities related to nuclear construction, component manufacturing, and modifications, with respect to fitness for service issues and independent nuclear training accreditation;
 4. Requests the Secretariat to continue its support to interested Member States, in particular through strengthening their knowledge, experience, and capacity in management of ageing and plant life management;
 5. Encourages the Secretariat to support interested Member States in their activities to improve the safe, secure and economical operation of existing nuclear power plants throughout their operational lifetime;
 6. Acknowledges the growing interest in the application of advanced instrumentation and control (I&C) systems and encourages the Agency to provide further support to interested Member States, by means of sharing best practices and strategies used in the justification of commercial industrial I&C equipment for nuclear power plant applications and I&C aspects of human factors engineering as well as for discussing the challenges and issues that need to be resolved in this area;

7. Recognizes the need to enhance the support for grid and nuclear power plant interfaces, grid reliability, and cooling water usage, and recommends that the Secretariat collaborate on these matters with Member States that have operating nuclear power plants;
8. Encourages the Secretariat to share best practices and lessons learned with respect to procurement, supply chain, engineering, and related issues in the delivery of large, capital-intensive nuclear engineering projects, to promote and disseminate them through publications, training courses and web-based tools with respect to supply chain management, and to identify opportunities that may exist to enhance supply chain resilience;
9. Encourages the nuclear owner/operating organizations of Member States to share their experience and knowledge related to methods and strategies for the implementation of post-Fukushima actions at nuclear power plants;
10. Encourages the Secretariat to analyse the status and future challenges of human resources in the nuclear power industry; and
11. Encourages the Secretariat to support interested Member States in their activities to utilize nuclear power plants for non-electrical applications, including gathering and quantifying data, and to identify best practices and lessons learned.

6.

Agency activities in the development of innovative nuclear power technology

The General Conference,

- (a) Recalling its previous resolutions on the Agency's activities in the development of innovative nuclear technology,
- (b) Noting the progress achieved in a number of Member States in the development of innovative nuclear energy system technologies and the high technical and economic potential of international collaboration in the development of such technologies and highlighting the need for transition from the R&D and innovation stage to proven technology stage,
- (c) Acknowledging the importance of fostering increased international collaboration in research on advanced nuclear power technologies and alternative non-electric nuclear energy systems and their applications,
- (d) Welcoming Uzbekistan as a new INPRO member, and noting that the membership of INPRO has reached a total of 44 members comprising 43 IAEA Member States plus the European Commission, and acknowledging that the coordination of INPRO-related activities is achieved through the Agency's Programme and Budget and the INPRO Subprogramme Plan,
- (e) Noting also that the Agency fosters collaboration among interested Member States on selected innovative technologies and approaches to nuclear power through Coordinated Research Projects and INPRO Collaborative Projects,
- (f) Noting that the INPRO Subprogramme Plan identifies activities in areas of global and regional nuclear energy scenarios, innovations in nuclear technology and institutional arrangements and in this area including: the final reports of the INPRO Methodology for Sustainable Assessment of Nuclear Energy Systems for Waste Management and Safety Aspects; collaborative efforts in safeguards by design resulting in new INPRO publications (final reports of the collaborative projects ASENES, ROADMAPS, PROSA and ENV) and a new version of

the Nuclear Energy System Economics Support Tool (NEST) which compares the economics of different technologies for electricity generation,

(g) Noting that the scope of INPRO includes activities to support interested Member States in developing national long-range sustainable nuclear energy strategies and related nuclear energy deployment decision making, including nuclear energy system assessments (NESAs) using INPRO methodology, the INPRO Dialogue Forum, the INPRO School and regional training on nuclear energy system modelling, including collaborative scenarios, and a new INPRO initiative with universities to create a model master's degree programme curriculum on strategic planning for nuclear energy development,

(h) Noting that the INPRO collaborative project on Comparative Evaluation of Nuclear Energy System Options (CENESO) has been completed and the service package "Analysis Support for Enhanced Nuclear Energy Sustainability" (ASENES) has been developed, and welcoming the start of the collaborating projects on the application of ASENES: "Sustainable deployment scenarios for small modular reactors" (ASENES SMR) and "ASENES pilot study on potential of innovative nuclear installations to support multi-recycling of fuel in a nuclear energy system" (STEP FORWARD),

(i) Recognizing that a number of Member States are planning to license, construct and operate prototypes or demonstrations of fast neutron systems, high temperature reactors, and other innovative reactors and integrated systems, noting the latest technology developments in the area of molten salt and molten-salt cooled reactors and encouraging the Secretariat to foster these developments through the provision of international fora for the exchange of information, thus supporting interested Member States to develop innovative technology with enhanced safety, proliferation resistance, and economic performance,

(j) Recognizing that a number of Member States are planning to construct and operate prototypes or demonstrations of thermonuclear fusion reactors, noting the latest developments in fusion technologies and regulatory frameworks, and encouraging the Secretariat to foster these developments through the provision of international fora for the exchange of information, thus supporting interested Member States to develop innovative technology with enhanced safety, and proliferation resistance, and

(k) Welcoming the increased effort of the Secretariat in exploring synergies between fusion and fission technologies, and recognizing the new activities on knowledge transfer to facilitate transition from science activity in the sphere of fusion to industrial scale,

1. Commends the Director General and the Secretariat for their work in response to the relevant General Conference resolutions, in particular the results achieved to date within INPRO;
2. Emphasizes the important role that the Agency can play in assisting interested Member States in building long-term national nuclear energy strategies and in long-term sustainable nuclear energy deployment decision-making through NESAs, based on the INPRO methodology, and nuclear energy scenario analyses and comparative evaluations of nuclear energy system and scenario options based on the approaches and tools developed by INPRO;
3. Encourages the Secretariat to consider further opportunities to develop and coordinate the services it provides on these subjects focusing on transition to sustainable nuclear energy systems using, inter alia, the analytical approaches, tools and services developed by INPRO;
4. Encourages the Secretariat to consider further use of web based tools for implementing the INPRO Collaborative Project: Analytical Framework for Analysis and Assessment of Transition

Scenarios to Sustainable Nuclear Energy Systems, an approach for comparative evaluation of nuclear energy system options based on key indicators and multi-criteria decision analysis methods;

5. Encourages interested Member States to use methods and tools developed by the Agency for nuclear energy evolution scenario modelling, nuclear energy system economic assessments, comparative evaluation of nuclear energy system or scenario options, and road mapping, including ASENES service and its applications;

6. Encourages interested Member States and the Secretariat to apply the ROADMAPS templates for national case studies, including case studies based on cooperation among technology holder and technology user countries, and for national and regional long-term energy planning to enhance sustainability of nuclear energy systems;

7. Requests the Secretariat to promote collaboration among interested Member States in developing innovative, globally sustainable nuclear energy systems and to support the establishment of effective collaboration mechanisms to exchange information on relevant experiences and good practices;

8. Requests the Secretariat to promote further application of multi-criteria decision analysis methods for comparative evaluation of plausible nuclear energy system options by interested INPRO Members states to support decision analysis and prioritization in national nuclear energy programmes;

9. Encourages the Secretariat to study cooperative approaches to the back end of the nuclear fuel cycle with a focus on the drivers and institutional, economic, and legal impediments to ensure effective cooperation among countries towards the long-term sustainable use of nuclear energy and requests the Secretariat to facilitate discussion among developers of advanced reactors (e.g. SMRs, Generation IV reactors) on the challenges and technologies related to decommissioning and radioactive waste and spent fuel management at the earliest stage of their design thinking;

10. Notes the Agency's efforts in developing innovative infrastructure approaches for future nuclear energy systems and invites Member States and the Secretariat to examine the role that technological and institutional innovations can play in improving nuclear power infrastructure and enhancing nuclear safety, security, and non-proliferation and to exchange information, including through the INPRO Dialogue Forum;

11. Invites all interested Member States to join, under the aegis of the Agency, in the activities of INPRO in considering issues of innovative nuclear energy systems and institutional and infrastructure innovations, particularly by continuing assessment studies of such energy systems and their role in national, regional, and global scenarios for the further use of nuclear energy, and also by identifying common topics of interest for possible collaborative projects;

12. Encourages the Secretariat to further its efforts on distance learning/training on development and evaluation of innovative nuclear technology for students and staff of universities and research centres, and to further develop tools supporting this activity that supports efficient delivery of services to Member States;

13. Encourages the Secretariat and interested Member States to complete the revision of the INPRO methodology and to publish its overview, while noting updates to the INPRO manuals dealing with infrastructure, economics, depletion of resources, environmental stressors, radioactive waste management and safety of nuclear reactors and nuclear fuel cycle facilities;

14. Encourages the Secretariat to continue, through activities on innovative nuclear technologies and their underlying science and technology, to exchange knowledge and experience in the area of innovative, globally sustainable nuclear energy systems;

15. Notes the role of research reactors in supporting the development of innovative nuclear energy systems and invites interested Member States to share access to unique research reactors and facilities, currently operated and being constructed, for development of innovative nuclear technologies;
16. Calls upon the Secretariat and Member States in a position to do so to investigate new reactor and fuel cycle technologies with improved utilization of natural resources, and proliferation resistance, including technologies for the recycling of spent fuel and its use in advanced reactors under appropriate controls and for the long-term disposition of remaining waste materials, taking into account economic, safety, and security factors;
17. Recommends that the Secretariat continue to explore, in consultation with interested Member States, innovative nuclear technologies, such as alternative fuel cycles (e.g. thorium, recycled uranium and plutonium), associated back-end management capabilities, and innovative nuclear energy systems including fast neutron systems, supercritical water-cooled, high-temperature gas cooled, molten salt nuclear reactors, as well as continuing to explore thermonuclear fusion experimental reactors, with a view to strengthening and fostering infrastructure, safety, security, science, technology, engineering, and capacity building via the use of experimental facilities and material testing reactors, to facilitate licensing, construction, and operation of these technologies;
18. Acknowledges the outcome of the 28th IAEA Fusion Energy Conference, held virtually in May 2021 in cooperation with France and ITER, highlighting that fusion faces new technology and infrastructure challenges, and looks forward to the 29th IAEA Fusion Energy Conference to be held in London, the United Kingdom, in October 2023,
19. Notes the outcome of the International Conference on Fast Reactors and Related Fuel Cycles: Sustainable Clean Energy for the Future (FR22), held from 19-22 April 2022, and encourages the Secretariat to duly consider its recommendations;
20. Encourages the Secretariat to study the legal and institutional aspects of fusion facilities deployment and to work on identification and development of the basic framework to support the pre-feasibility study of a fusion demonstration plant; and
21. Welcomes the extra budgetary funds provided to the Secretariat's activities for the development of innovative nuclear technology and encourages Member States in a position to do so to consider how they can further contribute to the Secretariat's work in this area.

7.

Approaches to supporting nuclear power infrastructure development

The General Conference,

- (a) Recognizing that the development, implementation, and maintenance of an appropriate infrastructure to support the successful introduction of nuclear power and its safe, secure, and efficient use is an issue of great importance,
- (b) Commending the Secretariat's effort to provide support in the areas of human resource development, which continues to be a high priority to Member States that are considering and planning for the introduction of nuclear power in a safe, secure, and efficient manner,
- (c) Recognizing the continued value of the Agency's Integrated Nuclear Infrastructure Review (INIR) missions, which provide expert and peer-based evaluations, in helping requesting Member States to determine their nuclear infrastructure development status and needs, welcoming the Agency's efforts to share lessons learned from INIR missions and noting the 34 INIR and follow-up INIR missions performed since 2009 at the request of 24 Member States, most recently INIR

Phase 1 missions to Uganda in November/December 2021 and to Sri Lanka in April 2022, and that additional countries considering embarking on or expanding a nuclear power programme are considering requesting INIR missions,

- (d) Recognizing the finalization of the evaluation methodology for Phase 3 INIR missions, (IAEA Nuclear Energy Series No. NG-T-3.2 (Rev. 2), preprint 2021), with input from all relevant Departments and taking into account feedback from the first Phase 3 INIR missions, and welcoming that, for each phase of nuclear power programme development, evaluation methodologies and guidelines are now available to support Member States' self-evaluation and to conduct INIR missions,
 - (e) Noting the importance of coordination of activities, including the integrated and tailored Agency support to Member States for nuclear infrastructure development, through the Nuclear Power Support Group and the Infrastructure Coordination Group,
 - (f) Noting the increasing number of Technical Cooperation projects, including the provision of assistance to Member States planning to introduce or expand nuclear power generation in conducting energy studies to evaluate future energy options, especially in the scope of their Nationally Determined Contributions (NDCs), taking into account the highest standards of safety and planning for appropriate nuclear security frameworks,
 - (g) Recognizing the importance of encouraging effective workforce planning for operating and expanding nuclear power programmes, worldwide, and the increasing need for trained personnel,
 - (h) Taking note of other international initiatives focusing on support for infrastructure development,
 - (i) Recognizing the importance of effective management systems for new nuclear power programmes and the need to strengthen senior management understanding and execution of their leadership role and responsibilities in this regard, and
 - (j) Recognizing the growing interest of Member States in the Agency's reactor technology assessment methodology for near term deployment in embarking or expanding countries within the Milestones approach, and noting the increasing number of requests from embarking Member States to receive training to use this tool,
1. Encourages the Nuclear Infrastructure Development Section to pursue its activities integrating the Agency's assistance provided to Member States embarking on or expanding nuclear power programmes;
 2. Emphasizes the necessity for Member States to ensure the development of the appropriate legal and regulatory frameworks, which are necessary for the safe introduction of nuclear power;
 3. Encourages Member States interested in or embarking on new or expanding nuclear power programmes to make use of the Agency services related to nuclear infrastructure development and to conduct a self-evaluation based on IAEA Nuclear Energy Series No. NG-T-3.2 (Rev. 2) to identify gaps in their national nuclear infrastructure and to invite an INIR mission and other relevant peer review missions, including site and design safety reviews, prior to commissioning the first nuclear power plant, and to make public their INIR and follow-up INIR mission reports in order to promote transparency and to share best practices;
 4. Supports the Milestones approach (IAEA Nuclear Energy Series No. NG-G-3.1 (Rev. 1)) as the leading document for use by Member States in the development of new nuclear power programmes and in the establishment of corresponding IWPs, and welcomes the initiation of the revision of the

publication to further incorporate lessons learned, and to include considerations for SMRs and advanced reactors;

5. Requests the Secretariat to continue to incorporate lessons learned from INIR missions and to enhance the effectiveness of such INIR activities, including based on the TECDOC on 10 years of INIR missions (IAEA TECDOC Series No. 1947);

6. Urges Member States to develop and keep updated action plans to address the recommendations and suggestions provided by the INIR missions, encourages them to participate in the development of their Member State-specific IWPs, to implement these IWPs to plan and integrate the IAEA support, to use the Country Nuclear Infrastructure Profiles (CNIPs) as a tool for monitoring and reporting progress, and to make use of INIR follow-up missions for each phase of the programme to assess progress and determine whether recommendations and suggestions were successfully implemented;

7. Encourages the Secretariat to be prepared to perform INIR missions in all UN official languages, to allow the highest level of information exchange during the missions, and to expand the panel of related experts, especially in countries using one of these languages other than English as a working language, while ensuring that the use of such experts does not constitute a conflict of interest or convey commercial advantage;

8. Encourages Member States to use the competency framework and requests the Secretariat to continue to update the nuclear infrastructure bibliography, as useful tools to help Member States plan technical cooperation and other assistance for the development of their national nuclear power programmes such as training needs for capacity building;

9. Invites all Member States that are considering or planning for the introduction or expansion of nuclear power to provide, as appropriate, information and/or resources to enable the Agency to apply its full spectrum of tools in support of nuclear infrastructure development, and encourages the strengthening of activities undertaken by Member States, both individually and collectively, to cooperate on a voluntary basis in nuclear infrastructure development;

10. Encourages the Secretariat to facilitate, where possible, international coordination, including through consultations with Member States that are providing financial support for nuclear infrastructure development activities, to improve efficiency and reduce overlap and duplication of multilateral and bilateral assistance to Member States, provided it avoids all conflicts of interest and excludes areas which are commercially sensitive;

11. Encourages the Agency to review and adapt the evaluation methodology, taking into account the work being coordinated and carried out under the Agency-wide Platform on SMRs and their Applications (IAEA SMR Platform) and the activities being undertaken under the SMR Regulators' Forum and the newly established Nuclear Harmonization and Standardization Initiative (NHSI);

12. Welcomes the extra budgetary funds provided to the Secretariat's activities for infrastructure development support to Member States and encourages Member States, in a position to do so, to consider further contribution to the Secretariat's work in this area;

13. Encourages the Agency to continue to organize workshops on management systems and the leadership roles and responsibilities of senior management in the context of a new nuclear power programme;

14. Encourages the Secretariat to finalize the reactor technology assessment methodology to incorporate the lessons learned in seven years of its application with embarking countries, and to expand the methodology to be relevant to advanced reactor technology, including SMRs, and non-electric applications; and

15. Welcomes the continued development of a gradual comprehensive capacity building programme for embarking countries using introductory e-learning modules, interregional TC training programmes and tailor-made national training events delivered through the IAEA matrix structure and covering all aspects of nuclear power programme development.

8.

Small and medium-sized reactors or small modular reactors — Development and deployment

The General Conference,

- (a) Welcoming the launch of the IAEA SMR Platform to ensure a cross departmental approach and to provide integrated support to Member States on all aspects of their development, deployment and oversight, and noting the launch of the NHSI;
- (b) Recognizing the interregional Technical Cooperation project Supporting Member States' Capacity Building on Small Modular Reactors and Micro-reactors and their Technology and Applications as a Contribution of Nuclear Power to the Mitigation of Climate Change, the Medium Term Strategy for SMRs and the launch of the SMR Coordination and Resource Portal for Information Exchange, Outreach and Networking (SCORPION),
- (c) Noting that the Agency has a dedicated project to support technology development and deployment of SMRs, highlighting their potential as an option for enhancing energy availability and supply security both in expanding and embarking countries and to address economics, environmental protection, safety and security, reliability, proliferation resistance, regulation, technology development, decommissioning, and waste management issues,
- (d) Recognizing the role that SMRs could play in the transition to sustainable energy systems and recognizing that smaller reactors could be better suited to the small electrical grids of many developing countries with less developed infrastructure, and that for some developed countries they could be one way to replace, in line with goals to reduce greenhouse gas emissions, obsolete, ageing, or high-carbon-emitting power sources, but acknowledging that the size of nuclear reactors is a national decision that each Member State takes on the basis of its own needs and the size of its electrical grid,
- (e) Noting that SMRs could play an important role in the future in appropriate markets with cogeneration such as district heating, desalination, and hydrogen production systems, and their potential for innovative integrated energy systems,
- (f) Acknowledging the two ongoing projects on Generic User Requirements and Criteria and Codes and Standards for SMRs, which are aimed at fostering harmonization and standardization at the international level,
- (g) Acknowledging that the Secretariat has published every two years a booklet on Advances in Small Modular Reactor Technology Developments, which represents an international reference document on status of development and deployment of SMRs, as well as various TECDOCs and Nuclear Energy Series reports on SMRs including the Nuclear Energy Series report on Technology Roadmap for SMR Deployment, which provides Member States with a set of generic roadmaps that can be used in the deployment of SMRs,
- (h) Acknowledging that the Secretariat has launched a new Coordinated Research Project on Technologies Enhancing the Competitiveness and Early Deployment of Small Modular Reactors, which will lead to development of methodology, identification of enabling generic technologies and identification of gaps and opportunities,

- (i) Noting the outcomes of the 17th INPRO Dialogue Forum on Opportunities and Challenges in small modular reactors, and
 - (j) Recognizing the role that innovative technologies can play in developing SMRs, noting the ongoing initiative from INPRO of a collaborative project The INPRO Case Study for the Deployment of a Factory Fuelled Small Modular Nuclear Reactor, and noting the launch of NESAs using INPRO methodology for SMR projects,
1. Takes note that there are ongoing projects to construct and deploy SMRs;
 2. Encourages the Secretariat to continue its efforts to facilitate support to Member States in a consistent and coordinated manner, including through the tools and activities developed in the framework of the IAEA SMR Platform, and encourages Member States to use these tools as well as INPRO tools and services for assessment of SMR deployment sustainability;
 3. Requests that the Secretariat ensures coordination between the IAEA SMR Platform and the newly launched NHSI and reports back to Member States in this regard;
 4. Encourages the Secretariat to take into account Member States' expertise on SMR-related issues, and to consider how to best engage Member States across newly created initiatives in this regards;
 5. Encourages the Secretariat to continue taking appropriate measures to assist Member States, particularly embarking countries, engaged in the process of preparatory actions with regard to demonstration projects, and encouraging the development of safe, secure, economically viable SMRs with proliferation resistance and comprehensive strategies for decommissioning and radioactive waste and spent fuel management;
 6. Calls upon the Secretariat to continue to promote effective international exchange of information on options with regard to SMRs available internationally by organizing technical meetings and workshops, as appropriate, and to produce relevant status and technical reports;
 7. Invites the Secretariat and Member States that are in a position to offer SMRs to foster international cooperation in undertaking studies of the social and economic impacts of SMR deployment in developing countries, their potential integration with renewables, and their non-electric applications;
 8. Encourages the Secretariat to continue consultations and interactions with interested Member States, the competent organizations of the United Nations system, financial institutions, regional development bodies, and other relevant organizations regarding advice on the development and deployment of SMRs;
 9. Encourages the Secretariat to continue working on defining indicators of safety performance, operability, maintainability, and constructability so as to assist countries in assessing advanced SMR technologies, and developing guidance for SMR technology implementation;
 10. Encourages the Secretariat to continue providing guidance for technology development and deployment, safety, security, economics, licensing, and regulatory reviews of SMRs of various designs and to foster collaboration among interested Member States working to license and deploy SMRs;
 11. Looks forward to additional reports from the SMR Regulators' Forum;
 12. Encourages the Secretariat to continue developing generic user requirements and criteria as well as codes and standards for SMRs, in the framework of the newly created NHSI and in cooperation with Member States and relevant stakeholders;
 13. Invites the Director General to raise appropriate funding from extra budgetary sources in order to support the activities under the IAEA SMR Platform and to contribute to the implementation of Agency

activities relating to the sharing of experience and lessons learned from the development and deployment of SMRs; and

14. Requests the Director General to continue to report on:
 - i. the activities coordinated and carried out by the IAEA SMR Platform, and progress made on the newly created NHSI, and
 - ii. progress made in the research, development, demonstration and deployment of SMRs in interested Member States intending to introduce them.

9.

Implementation and reporting

The General Conference,

1. Requests that the actions of the Secretariat called for in this resolution be undertaken as a priority subject to the availability of resources; and
2. Requests the Director General to report on progress made in the implementation of this resolution to the Board of Governors as appropriate and to the General Conference at its sixty-seventh (2023) session.

C.

Nuclear knowledge management

The General Conference,

- (a) Recalling its previous resolutions on nuclear knowledge management,
- (b) Noting the importance of establishing and strengthening governance processes to advance knowledge management within organizations and having systems in place to measure the success of knowledge management programmes,
- (c) Emphasizing the increasing importance of the role of the Agency in providing information and good practices in the safe and efficient utilization of nuclear technology for peaceful purposes including information and knowledge for the general public,
- (d) Recognizing that preserving and enhancing nuclear knowledge and ensuring the renewed availability of qualified human resources are vital to the continued safe, economic and secure utilization of all nuclear technologies for peaceful purposes,
- (e) Recognizing that nuclear knowledge management involves both education and training for succession planning as well as the preservation or growth of existing knowledge in nuclear science and technology,
- (f) Aware of the value of diversity and inclusion in fostering innovation and increased performance of the nuclear industry, and, in this regard, of the need to encourage more women to join the nuclear field,
- (g) Noting the important role that the Agency plays in assisting Member States in the establishment, preservation and enhancement of nuclear knowledge and in implementing effective knowledge management programmes at national and organizational levels,

- (h) Recognizing the importance of knowledge management in all areas of the Secretariat's activities and programmes, and the cross-cutting inter-disciplinary and inter-departmental nature of many knowledge management issues and initiatives,
 - (i) Acknowledging the importance of adequate nuclear knowledge in understanding and applying safety principles in the design, construction, licensing, operation, life extension, closure and decommissioning of nuclear facilities,
 - (j) Acknowledging the importance of mitigating risks of knowledge loss for operating facilities and relevant organizations,
 - (k) Aware of the benefits of utilizing nuclear knowledge management approaches to support long-term, safe and secure operation of nuclear facilities, disposal of radioactive waste, decommissioning projects, environmental remediation projects, and the need to improve learning from incidents and events,
 - (l) Noting the increased interest of Member States in the development and use of modern plant information models and guidelines to support nuclear knowledge management, including design knowledge, throughout the entire life cycle of facilities and projects,
 - (m) Acknowledging the utility of collaborations towards development and adoption of integrated national and regional strategic planning approaches to strengthen and make sustainable university nuclear education programmes,
 - (n) Recognizing the benefits of collaboration between the Agency, universities, industry, national laboratories and government institutes, and the role that international and national human resource and knowledge development (HRKD) networks play in facilitating this collaboration,
 - (o) Recognizing the useful role of international coordination and cooperation in facilitating exchanges of information and experience and in implementing actions to help address common problems, and also in benefitting from opportunities relating to education and training and to nuclear knowledge preservation and enhancement,
 - (p) Noting the efforts of the OECD/NEA in maintaining the Nuclear Education, Skills and Technology (NEST) Joint Undertaking, to foster the next generation of nuclear science and technology practitioners, and to establish networks and information sharing among the future workforce in pursuit of concrete research objectives, and the value of the Agency's cooperation with the OECD/NEA in this regard,
 - (q) Noting the success of the programme of NEM Schools and NKM Schools, held via regional schools across Member States and also annually at the ICTP in Trieste, and noting the highly-valued continuous cooperation between the IAEA and the ICTP and Member State institutions in this regard, and
 - (r) Further noting the sustainable outcomes of the regional NEM Schools held since September 2018, and most recently the NEM Schools held in Japan, China and Uzbekistan in 2021 and in Canada, Russia, South Africa and Japan in 2022, and welcoming the continued interest of other Member States in hosting regional NEM Schools,
1. Commends the Director General and the Secretariat for their significant, interdepartmental efforts in addressing issues of preservation and enhancement of nuclear knowledge, in response to relevant General Conference resolutions;

2. Commends the Secretariat for its support to Member States in applying a comprehensive methodology and guidance for managing nuclear knowledge, including through nuclear knowledge management assistance visits and seminars in Member States;
3. Further commends the Secretariat for fostering nuclear knowledge management as a vital component of an integrated management system;
4. Encourages the Director General and the Secretariat to continue to strengthen their current and planned efforts in this area, in a holistic, interdepartmental manner, while consulting and engaging Member States and other relevant international organizations, and to further increase the level of awareness of efforts in managing nuclear knowledge, and in particular:
 - i. Requests the Secretariat to assist Member States, at their request, in their efforts to ensure the sustainability of nuclear education and training in all areas of the peaceful use of nuclear energy, including its regulation, inter alia by taking advantage of, and supporting, the activities of the regional networks in Asia (ANENT), Latin America (LANENT) Africa (AFRA-NEST), and Eastern Europe and Central Asia (STAR-NET) as well as associated educational networks in Europe (ENEN), Canada (UNENE) and the United Kingdom (NTEC);
 - ii. Notes in particular the needs of developing countries or those considering or launching a nuclear power programme and in this regard, encourages Member States in a position to do so to participate in and support networking, and underlines the importance of the Technical Cooperation Programme in that context;
 - iii. Requests the Secretariat, in consultation with Member States, to further develop and disseminate guidance and methodologies for planning, designing, implementing and evaluating nuclear power programmes, including programmes for sustaining nuclear knowledge;
 - iv. Acknowledges with appreciation the publication of the 'NE Useful Terms and Definitions' on the Nuclear Knowledge Management Hub (NKMH) and encourages the Secretariat to continue efforts to harmonize the use of terms and definitions in its publications across the Agency, with an ultimate goal to develop and publish a glossary on nuclear science, technology and applications;
 - v. Requests the Secretariat to continue to make available to Member States training programmes of the NEM School and the NKM School at the ICTP in Trieste, and through regional NEM and NKM Schools;
 - vi. Requests the Secretariat to review the broad range of education and training programmes established by the Department of Nuclear Energy and other departments of the Secretariat, as appropriate, in order to develop the most cost-effective and sustainable combination of events to maximize effectiveness and minimize unnecessary duplication among Agency offerings;
 - vii. Requests the Secretariat to further develop and utilize e-learning material, relevant content and technologies to make nuclear education and knowledge more broadly available in a modern, effective and efficient manner, including collaboration with Member State organizations and the further development and effective use of the IAEA's CLP4NET and CONNECT platforms as e-learning repositories; and
 - viii. Encourages the Secretariat to promote the use of state of the art knowledge management technologies, including those related to the application of modern plant information models and guidelines to support knowledge management, including design knowledge, throughout

the entire life cycle of facilities and projects, and support interested Member States in their further development;

5. Requests the Secretariat to continue to gather, and make available to Member States, nuclear data, information and knowledge resources on the peaceful use of nuclear energy, including the International Nuclear Information System (INIS) and other valuable databases as well as the IAEA Library and the International Nuclear Library Network (INLN);
6. Calls on the Secretariat, to continue to focus, in particular, on activities aimed at helping interested Member States assess their human resource needs and to identify ways to address those needs, inter alia by encouraging the development of new tools and opportunities to gain practical experience through fellowships;
7. Invites the Secretariat, in consultation with Member States, to further develop and disseminate guidance and methodologies for planning, designing, implementing, and evaluating nuclear knowledge management programmes and practices in nuclear operator, regulatory and research organizations;
8. Supports the Agency's continued programme of NEM and NKM Schools, and looks forward to the Fourth International Conference on Nuclear Knowledge Management and Human Resources Development, and requests that the Secretariat continue to develop activities, tools and services in the areas of knowledge management and human resources development in an integrated manner, with a particular focus on capacity building;
9. Requests the Secretariat to promote gender equality and diversity in the context of nuclear knowledge management activities and encourages Member States to establish an inclusive workforce within their nuclear industry, including ensuring equal access to education and training in nuclear knowledge management;
10. Requests the Secretariat to ensure effective coordination among the Agency's Major Programmes, given the cross-cutting, inter-departmental nature of knowledge management issues and activities;
11. Encourages the Secretariat to continue to facilitate the establishment of and maintain effective human resource and knowledge management (HRKM) networks in developing countries, and where appropriate in collaboration with other United Nations organizations and with the support of existing such networks in developed countries;
12. Requests the Director General to take into account the continuing high level of interest of Member States in the range of issues associated with nuclear knowledge management when preparing and carrying out the Agency's programme; and
13. Requests the Director General to report on progress made in the implementation of this resolution to the Board of Governors and to the General Conference at its sixty-eighth (2024) session under an appropriate agenda item.