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Nuclear Power Applications

1.

General

(a) *(a)* Recalling resolution GC(58)/RES/13 and previous General Conference resolutions on strengthening the Agency’s activities related to nuclear science, technology and applications,

(b) *(b)* Noting that the Agency’s objectives as outlined in Article II of the Statue include “to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world”,

(c) *(c)* Noting also that the Agency’s statutory functions include “to encourage and assist research on, 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”, including the production of electric power, with due consideration for the needs of developing countries,

(d) *(d)* Stressing that the availability of energy and access to it are vital to human development, while noting that the health of the planet’s environment is a serious concern that must be regarded as a priority by all governments, including taking actions to reduce pollution and waste, and to address the risk of global climate change, and recognizing that Member States pursue different ways to achieve energy security and climate protection goals,

(e) *(f)* Noting that significant concerns over energy resource availability, the environment and energy security suggest that a wide variety of energy options needs to be addressed in a holistic manner in order to ensure that they are competitive, environmentally benign, safe, secure and affordable, so as to support sustainable economic growth in all countries,

(f) *(g)* Taking note that nuclear power does not produce either air pollution or greenhouse gas emissions during normal operation, which makes it one of the lowest-carbon technologies available to generate electricity, and recalling the introduction of the third Conference on Energy and Nuclear Power in Africa, organized by the Agency and the International Framework for Nuclear Energy Cooperation in April 2015 that, “access to secure, sustainable and affordable energy is of prime importance for socio‐economic development, that nearly every aspect of development, from reducing poverty to raising living standards, from improving health care to increased agricultural productivity, requires reliable access to modern energy sources and that better access to clean energy is also critical to mitigate the continuing environmental degradation caused by the poor management of natural resources”,

*(g)* (i) 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 to use diverse portfolios of energy sources when pursuing its own way to achieving its energy security and climate protection goals,

(h) *(h)* Recognizing that the accident that occurred on 11 March 2011 at TEPCO’s Fukushima Daiichi Nuclear Power Station, triggered by an extraordinary natural event, has shown the need for further improvements in nuclear safety, and as brought out in the Director General’s report on the Fukushima Daiichi accident,

(i) *(h’)* Recognizing the continuing efforts and good progress that have been made on the Fukushima Daiichi site, whilst noting the enormous Decommissioning, Environmental Remediation & Radioactive Waste Management challenges which remain,

(j) *(j)* Noting that following Fukushima Daiichi accident, most States engaged in nuclear power programmes and newcomer countries embarking on nuclear power programmes continue to pursue their programmes, as they consider nuclear energy to be a viable option in meeting their energy needs and addressing climate change, while a few States , based on their own national assessments, decided to phase out their nuclear power programmes or to continue not to use nuclear power,

(k) *(j’)* Acknowledging that actions have been taken by the Secretariat and Member States with nuclear power, in response to the lessons learned from the Fukushima Daiichi accident towards enhancement of the robustness of Nuclear Power Plants, as well as human and organizational effectiveness, and emphasizing the need for ensuring competent technical support at every stage of a nuclear power plant lifecycle for safe and reliable operations,

(l) *(p’)* Noting the continued value of Integrated Work Plans (IWPs) which provide an operational framework for the delivery of Agency assistance in support of national nuclear programmes, thereby facilitating optimized assistance by the Agency to embarking and expanding countries

(m) *(p’’)* Acknowledging the value of the contribution of the Secretariat and its Nuclear Infrastructure Development Section in providing a coordinated approach to supporting Member States in the area of nuclear infrastructure,

(n) *(k)* Recalling that the development of innovative fast neutron systems, closed fuel cycles, and alternative fuel cycles (e.g. thorium, recycled uranium) are regarded by many as steps towards a long-term sustainable energy supply, that can extend the lifetime of nuclear fuel resources and contribute to effective solutions to nuclear waste management,

(o) *(ff’)* Recognizing the growing interest in a number of Member States in Next Generation reactor designs,

(p) *(n)* Encouraging interested Member States, including both technology users and holders, to consider jointly the improving of innovations in nuclear reactors, fuel cycles and institutional approaches, such as in the framework of the International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO),

(q) *(t)* 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 obsolete, ageing or high-carbon-emitting small and medium-sized 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,

(r) *(u)* Noting that small and medium-sized [or modular] reactors (SMRs) could play a significant role in district heating, desalination and hydrogen production systems in the future, and their potential for use in innovative energy systems,

(s) *(r)* Noting also the organization of workshops by the Agency on vital topics related to nuclear power, such as technologies and economics, the competitiveness of nuclear power and other energy technologies, regional cooperation to support transitioning to sustainable nuclear energy, the development of the required infrastructure for the safe, secure and efficient use of nuclear power, desalination and other non-electrical uses of nuclear energy, advanced waste management approaches among which are partitioning and transmutation, the role of research reactors in the development of nuclear power programmes, in support of the operating and future power plants and in the training of many professionals from Member States through various regional and national courses,

(t) *(s)* Recognizing the difficulties in obtaining financing arising from the high capital costs of large NPPs and the obstacles they create in making nuclear power a viable and sustained option in meeting energy needs, in particular for developing countries,

(u) *(m)* Recalling the importance of human resource development, education and training and knowledge management and stressing the Agency’s unique experience and capacity to assist Member States including those that are considering and planning for the introduction of nuclear power with assessments of infrastructure needs, taking into account relevant economic, social and policy considerations, to support the safe, secure and efficient use of nuclear power, in accordance with the requests of Member States, *inter alia* through the Agency’s Technical Cooperation Programme,

(v) *(o’)* 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 and confirming the important role of Nuclear Knowledge Management programmes in strengthening nuclear education, training and networking capabilities,

(w) *(p)* Recalling that launching, maintaining and expanding nuclear power programmes requires the development, implementation and continuous improvement of appropriate infrastructure to ensure the safe, secure and efficient use of nuclear power in a sustained manner, and implementation of the highest standards of nuclear safety, taking into account relevant Agency standards and guidance and relevant international instruments, as well as a strong and long-term commitment of national authorities to creating and maintaining this infrastructure,

(x) *(q)* 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 and in establishing appropriate technical, human, legal, regulatory and administrative infrastructure, and acknowledging the Agency’s role in facilitating the safe, secure, sustainable and efficient use of nuclear power,

(y) *(v)* 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,

(z) *(v’)* Stressing the importance of effective utilization of Research and Development in nuclear safety, technology and engineering, and the organization of International Expert Meetings to analyze all relevant technical aspects and to learn lessons from the Fukushima Daiichi accident,

(aa) *(v’’)* Commending the Secretariat for the first International Center based on Research Reactors announced during the 59th General Conference

(bb) *(l)* 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 States’ national legislation and respective international obligations, as well as the need to resolve the issues of managing spent fuel and radioactive waste, decommissioning and remediation in a safe and sustainable manner, and confirming the important role of science and technology in continuously addressing these challenges, particularly through innovations,

(cc) *(w)* Recognizing the role that the management of spent fuel and radioactive waste should avoid imposing undue burdens on future generations, and recognizing further that, while each State should, as far as is compatible with the safety of management of such material, 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 States to use facilities in one of them for the benefit of all of them,

(dd) *(x)* Recognizing that the growing number of shut down reactors increases the need for collecting experience and developing adequate methods and techniques for decommissioning, environmental remediation and managing large volumes of radioactive waste, including contaminated water, resulting from legacy practices and radiological or nuclear accidents,

(ee) *(x’)* Acknowledging progress made in the field of deep geological disposal of Spent Nuclear Fuel or Highly Radioactive Waste, and further acknowledging the vital importance of involvement of National Authorities including regulatory bodies in order to enhance stakeholders engagement,

(ff) *(y)* Recognizing also the need for Member States to evaluate and manage the financial commitments that are necessary for planning and implementing radioactive waste management programmes, including disposal,

(gg) *(y’)* Acknowledging the importance of IAEA safety standards related to the management of nuclear waste and spent fuel and strong co-operation with international organizations,

(hh) *(z)* Noting the Agency’s integrated peer review service (ARTEMIS) for radioactive waste and spent fuel management, decommissioning and remediation programmes,

(ii) *(z’)* Recognizing the success of the Scientific Forum at 58th General Conference (Radioactive Waste: Meeting the Challenge) and welcoming the organization of the International Conference on Advancing Global implementation of Decommissioning & Environmental Remediation, that will be held in Madrid in May 2016,

(jj) *(aa)* 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,

(kk) *(bb)* Welcoming the conclusion of a Host State Agreement between the IAEA and Kazakhstan and a Transit Agreement between the IAEA and the Russian Federation to support the implementation,

(ll) *(cc)* Noting also the remaining challenges faced by the Secretariat in the administrative, financial legal and technical aspects of the LEU bank;

(mm) Noting also the functioning of the LEU reserve in Angarsk, Russian Federation, comprising 120 tons of LEU under the aegis of the Agency,

(nn) *(dd)* 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,

(oo) *(ee)* Taking note of the “Nuclear Technology Review 2015” (GC(59)/INF/4) and its supplements, as well as of the report “Strengthening the Agency’s Activities related to Nuclear Science, Technology and Applications” (GC(59)/18), prepared by the Secretariat, and

(pp *(ff)* 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 organizations in fusion-related projects, such as the International Thermonuclear Experimental Reactor (ITER) project and welcoming the latest biennial IAEA Fusion Energy Conference in St Petersburg,

1. (*1.)* Affirms the importance of the role of the Agency in facilitating through international cooperation among interested Member States, the development and use of nuclear energy for peaceful purposes, including the specific application of the generation of electric power, in assisting these Sates in that regards, in fostering international cooperation and in disseminating to the public well-balanced information on nuclear energy;

2. (*6.)* Takes note of the success of the Ministerial Conferences on global nuclear power, status and future development with a particular focus on nuclear power including safety aspects, organized by the Agency in Paris, Beijing and St. Petersburg, respectively in 2005, 2009 and 2013, and welcomes the offer by the UAE to host the next such Ministerial Conference in 2017 and encourages interested Member States to participate in this important event;

3. *(13.)* Commends the Agency for the assistance and review services it provides to countries embarking on new or expanding nuclear power programmes and encourages these countries to use this assistance and these review services when planning and assessing the economics/socio-economics of their energy programmes, developing their national infrastructures for nuclear power and defining their long-term strategies for sustainable nuclear energy;

4. *(13 bis.)* Further commends the Secretariat for fostering nuclear knowledge management as a vital component of an integrated management system;

5. *(14.)* Encourages the Nuclear Infrastructure Development Section (NIDS) to pursue its activities integrating the Agency’s assistance provided to countries embarking on new nuclear power programmes, such as the Integrated Nuclear Infrastructure review (INIR) missions, and welcoming the publication of the revised Milestones in the Development of a National Infrastructure for Nuclear Power (IAEA Nuclear Energy Series NG-G-3.1, 2015);

6. *(14.bis)* Encourages the Secretariat to explore the need for closer collaboration in technology development for advanced reactor lines by hosting a workshop, in consultation with interested Member States, with the aim of considering launching a new project on sharing information about Next Generation reactor development;

7. *(34.)* Recommends that the Secretariat continue to pursue, in consultation with interested Member States, activities in the areas of innovative nuclear technologies with a view to strengthening infrastructure, safety and security, fostering science, technology, engineering and capacity building via the utilization of existing and planned experimental facilities and material test reactors, as well as the development and validation of advanced modelling and simulation tools, and with a view to strengthening the efforts aimed at creating an adequate and harmonized regulatory framework so as to facilitate the licensing, construction and operation of these innovative reactors;

8. *(11.)* Encourages the Secretariat to continue to enhance Member States’ understanding as they seek to identify potential approaches to financing nuclear energy programmes, including radioactive waste management in a changing international financial landscape, 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;

9. *(9.)* Requests the Secretariat to continue to pursue, in consultation with interested Member States, the Agency’s activities in the areas of nuclear science and technology for nuclear power applications in Member States, with a view to strengthening infrastructures, including safety and security, and fostering science, technology and engineering, including capacity building via the utilization of existing research reactors;

10. *(9’.)* Encourages the Agency to continue its support to interested Member States in building their national capacities in the operation of nuclear power plants and in embarking on new nuclear power programs;

11. *(9’’’.)* Encourages the development of programmes and initiative such as the Capacity Building Initiative, in close relationship with the Agency, to improve and promote the potential of all Member States;

12. *(16.)* Encourages the Agency to continue to organize capacity building workshops on vital topics related to nuclear power to understand and implement, in an integrated way, the requirements of effective management systems to ensure the safety, effectiveness and sustainability of nuclear power programmes,

13. *(10.)* Acknowledge the importance of the Agency’s technical cooperation projects for assisting Member States in energy analysis and planning, and in establishing the infrastructures 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 cooperation with developing countries ; and noting the importance of active stakeholder involvement in the development or expansion of new nuclear power programmes;

14. *(7.)* Encourages the Secretariat to facilitate effective programmes in the areas of nuclear science technology and applications related to nuclear power, aimed at pooling and further improving the scientific and technological capabilities of interested Member States through cooperation and coordinated research and development;

15. *(8.)* Stresses the importance, when planning and deploying nuclear energy, including nuclear power and related fuel cycle activities, of ensuring the highest standards of safety and emergency preparedness and response, non-proliferation, and environmental protection for example through the promotion of a platform for the international nuclear community to continuously exchange information on R&D addressing safety issues highlighted by the Fukushima Daiichi accident, as well as the strengthening of long term research programmes to learn about severe accidents and related decommissioning activities;

16. *(17.)* Encourages the Secretariat to continue to foster regional and international collaboration and networking that expands access to research reactors, such as international user communities,

17. *(18.)* Encourages the Secretariat to inform Member Sates considering their first research reactor of the utility, economics, environmental protection, safety and security, reliability, proliferation resistance and waste management issues associated with such reactors and about international alternatives, and, on request, to assist decision makers in pursuing new reactor projects systematically and on the basis of robust, utilization-based strategic plans ;

18. *(19.)* 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 both new and older research reactors, to ensure continuous improvements in safety and reliability, the sustainability of fuel supply and exploration of disposition options for spent fuel and waste management

19. *(19. Bis)* Encourages the Secretariat to promote the International Centers based on Research Reactors and call on willing Member States to apply for it, in order to build a comprehensive network comprising different nuclear operating techniques, worldwide and different languages,

20. *(20.)* Calls on the Secretariat to continue to support international programmes working to minimize the civilian use of highly enriched uranium (HEU), for example through the development and qualification of low enriched uranium (LEU) high density fuel for research reactors, where such minimization is technically and economically feasible;

21. *(25.)* Welcomes the Secretariat’s efforts in pursuing activities for enhancing Member State capabilities in modelling, predicting and improving the understanding of the behavior of nuclear fuel under accident conditions,

22. *(28.)* Requests the Secretariat to continue and strengthen its efforts relating to nuclear power, fuel cycle and radioactive waste management, focusing particularly on technical areas where the needs for improvement, advances and enhanced international collaboration are greatest,

23. *(31.)* Respectful of the rights of each Member Sate for the developing national capabilities, encourages discussion, in a non-discriminatory, inclusive and transparent manner, on the development of multilateral approaches to the nuclear fuel cycle, including possibilities of creating mechanisms for assurance for nuclear fuel supply as well as possible schemes for the back-end of the fuel cycle;

24. *(32.)* Encourages international cooperation in the safe management of spent fuel and radioactive waste, as well as in exploring multinational approaches to storage and disposal

25. *(29.)* Stresses in this connection that the safe management of spent fuel; which for some countries includes reprocessing and recycling, as well as the safe management and/or disposal of radioactive waste are of great importance, inter alia for sustainable, safe and secure development of nuclear science and technology, including nuclear power and to avoid imposing undue burdens on future generations;

26. *(26.)* Encourages the Secretariat to continue the preparation of safety and technical guides on the management of large amounts of waste generated after a nuclear or radiological accident and on the implementation of post-accident decommissioning and environmental remediation projects,

27. *(27.)* Encourages the Secretariat to promote the ARTEMIS peer review service concept, explaining its benefits as a means of encouraging Member States to invite such peer reviews where appropriate;

28. *(27. bis)* Encourages further strengthening of IAEA safety standards and strong co-operation with international organizations, such as Net-Enabled Waste Management Database

29. *(30.)* Welcomes the Agency’s efforts to provide more detailed information on designing, constructing, operating and closing a radioactive waste disposal facility, and thereby assisting Member States, including those embarking on nuclear power programmes, to develop and implement adequate disposal programmes;

30. *(33.)* Recognizes the importance of assisting Member States interested in uranium production to develop and maintain sustainable activities through appropriate technology, infrastructure and stakeholder involvement and the development of skilled human resources and encourages the Agency to cooperate with the OECD/NEA for the publication of the 26th edition of the Red Book on Uranium Resources, Production and Demand,

31. *(35.)* Welcomes the continuation of the IAEA Peaceful Uses Initiative and all contributions announced by Member States and the European Union, and encourages Member States and Groups of States in a position to do so to contribute ;

32. *(36.)* Requests that the actions of the Secretariat called for in this resolution be undertaken as a priority subject to the availability of resources; and

33. *(37.)* Requests the Secretariat to report to the Board of Governors as appropriate and to the General Conference at its sixtieth (2016) session on developments relevant to this resolution.

2. *(1bis.)*

*Communication* and IAEA cooperation with other Agencies

(a) *(e)* Taking note of the Secretariat’s contributions to international discussions addressing global climate change, such as at the 20th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP-20), held in November 2014 in Lima Peru, and in the Intergovernmental Panel on Climate Change (IPCC), and

(b) *(ff)* 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 organizations in fusion-related projects, such as the International Thermonuclear Experimental Reactor (ITER) project and welcoming the latest biennial IAEA Fusion Energy Conference in St Petersburg,

1. *(2.)* 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 with the goal of enhancing acceptance of nuclear power in operating and newcomer countries

2. *(3.)* Urges the Secretariat’s efforts in providing balanced and objective information on nuclear energy’s potential contribution to mitigating climate change, in advance of the United Nations Climate Change Conference, COP21, to be held in Paris in 2015, and encourages the Secretariat to work directly with Member States upon request and to continue to extend its activities in these areas;

3. *(4.)* Encourages the Secretariat to continue efforts that enhance general understanding and a balanced perspective of the role of nuclear energy in mitigating climate change and in global sustainable development, including the post-2020 UNFCCC agreement and the related national commitments to address climate change in implementing the new UN Sustainable Development Goals to be defined by the General Assembly in September 2015, and

4. *(5.)* Encourages the Agency to consider senior level representation at COP 21 and other major international forums where there will be debate and decisions regarding climate change and the potential role of nuclear energy,

3. *(1ter)*

Operating existing Nuclear Power Plants

(a) *(o)* Stressing the essential role the Agency plays as an international forum for the exchange of information and experience on nuclear power plant (NPP) operation and for continuous improvement of this exchange among interested Member States, *inter alia* through the Nuclear Operator Organization Cooperation Forum held during regular sessions of the General Conference, while recognizing both the role of international organizations such as the OECD Nuclear Energy Agency, and multinational networks among operators, such as the World Association of Nuclear Operations (WANO), and the need to further strengthen the cooperation between the Agency and these organizations,

1. *(o’’)* Stresses 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 personnel;

2. *(17’)* Encourages the Secretariat to organize periodic meetings or conferences of groups of nuclear operators for the promotion of networking, as experience sharing in the field of nuclear power plant operation is an effective tool to enhance safety and to promote effectiveness of operating organizations;

3. *(21.)* Acknowledges the growing interest in Nuclear Plants life extension programmes, request the Secretariat to continue its support to interested Member States to strengthen their knowledge, experience and capacity in ageing and plant life management;

4. (22.) Encourages the Secretariat to disseminate, through guidance, best practices and experience with respect to leadership and management, including the need to maintain appropriate organizational structure while NPPs are in long-term shutdown, or in transition to decommissioning;

5. (23.) Encourages the Secretariat to identify and promote, through Technical Documents and Guides, best practices and lessons learned, with respect to procurement and supply chain issues, including bidding and contract evaluation processes, and also to support experience sharing related to quality control and quality surveillance activities related to nuclear construction, component manufacturing, and modifications.

4. *(2.)*

Agency activities in the development of innovative nuclear technology

The General Conference,

(a) Recalling its previous resolutions on the Agency’s activities in the development of innovative nuclear technology,

(b) Conscious of the need for sustainable development and of the potential contribution of nuclear power to meeting the growing energy needs in the 21st century,

(c) Referring to the Declaration by the IAEA Ministerial Conference on Nuclear Safety held in June 2011, in Vienna, which notes the role of innovative technologies in addressing improved nuclear safety, which in turn resulted in Action 12 of the IAEA Action Plan on Nuclear Safety,

(d) 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,

(e) Noting that the membership of the Agency’s International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO), which was launched in 2000, is continuing to grow and now comprises 40 Member States and the European Commission,

(f) Noting also that the Agency fosters collaboration among interested Member States on selected innovative technologies and approaches to nuclear power through INPRO Collaborative Projects, Technical Working Groups (TWGs) working on facilitating innovations for advanced reactors and nuclear fuel cycle options, and Coordinated Research Projects, and acknowledging that the coordination of INPRO-related activities is achieved through the Agency programme and budget and the INPRO Action Plan,

(g) Noting that the INPRO Action Plan identifies activities in areas of global and regional nuclear energy scenarios, innovations in nuclear technology and institutional arrangements including such key collaborative projects as *Synergistic Nuclear Energy Regional Group Interactions Evaluated for Sustainability* (SYNERGIES), *Roadmaps for a Transition to Globally Sustainable Nuclear Energy Systems* (ROADMAPS), the project on *Key Indicators for Innovative Nuclear Energy Systems* (KIND) and other collaborative projects on specific issues of interest related to innovative nuclear reactor and fuel cycle concepts and designs,

(h) 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 and regional training on nuclear energy system modelling, including collaborative scenarios, and sustainability assessment using the INPRO methodology,

(i) Noting the progress of other national, bilateral and international activities and initiatives, and their contributions to joint research and development work on innovative approaches to nuclear energy deployment and operation,

(j) Recognizing that a number of Member States are planning to license, construct and operate prototypes or demonstrations of innovative fast neutron systems and high temperature reactors within the next decades, and noting that the Secretariat is fostering this process 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, and

(k) Noting with appreciation the Director General’s report on Agency activities in the development of innovative nuclear technology contained in document GOV/2015/39-GC(59)/5;

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;

3. Encourages the Secretariat to consider further opportunities to develop, coordinate and integrate the services it provides to Member States, including broad energy planning and long-range nuclear energy planning, economic analysis and technico-economic assessments, NESAs and assessments of transition scenarios to sustainable nuclear energy systems using, inter alia, the analytical framework developed by the INPRO Section;

4. Encourages interested Member States, the Secretariat, and the INPRO Section in particular, to further develop and evaluate various nuclear energy scenarios and roadmaps, based on synergistic collaboration among involved countries, that could lead to sustainable nuclear energy development in the 21st century, and to help define collaborative pathways to such development;

5. 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;

6. Encourages the Secretariat to articulate summary key indicator sets, consistent with the INPRO methodology, to further examine the application of multi-criteria decision analysis to develop comparative evaluation approaches to consider benefits and associated costs and potential risks in nuclear energy system performance that may be achievable using innovative nuclear energy technologies.

7. 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;

8. Invites Member States, the Secretariat, specifically the INPRO Section, 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;

 9. 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;

10. Encourages the Secretariat to further its efforts on distance learning/training on development 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;

10bis. Notes the role of research reactors in supporting the development of innovative nuclear energy systems

11. Encourages the Secretariat and interested Member States to complete the revision of the INPRO methodology in the light of the Fukushima Daiichi accident, taking into account the results of NESAs performed in Member States, while noting updates to the INPRO manuals dealing with infrastructure, economics and depletion of resources;

12. Recognizes ongoing efforts by the Secretariat and interested Member States to conduct case studies for deployment of factory-fueled small modular reactors as follow on to the already published preliminary study on transportable nuclear power plants (TNPPs);

13. Recommends that the Secretariat continue to explore opportunities for synergy between Agency’s activities (including INPRO) and those pursued under other international initiatives in areas related to international cooperation in peaceful uses of nuclear energy, safety, proliferation resistance and other security issues and, in particular, supports collaboration among INPRO, appropriate TWGs, other UN organizations, the Generation IV International Forum (GIF), the International Framework for Nuclear Energy Cooperation (IFNEC) and the European Sustainable Nuclear Industrial Initiative (ESNII) with regard to innovative and advanced nuclear energy systems;

14. Invites interested Member States that have not done so to consider joining INPRO and to contribute to innovative nuclear technology activities by providing scientific and technical information, financial support, or technical and other relevant experts and by contributing to joint collaborative projects on innovative nuclear energy systems;

14 bis. Welcomes coordinated research projects launched by the Secretariat after the Fukushima Daiichi accident to address the R&D support requested actions of the IAEA Action Plan on Nuclear Safety,

14 ter. Encourages Agency’s activities on advanced nuclear fuel cycle relating to fast reactors for potential waste burden minimization.

16. Encourages the Secretariat to continue, through the consolidation of available resources and additional assistance from interested Member States, regular training and workshops 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;

17. 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 enhanced proliferation resistance, including those needed 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, inter alia, economic, safety and security factors;

18. Recommends that the Secretariat continue to pursue, in consultation with interested Member States, activities in the areas of innovative nuclear technologies, (such as alternative fuel cycles (e.g., thorium, recycled uranium) and Generation IV systems including fast neutron systems,  supercritical water-cooled  and high-temperature nuclear reactors, with a view to strengthening infrastructure, safety and security, fostering science, technology, engineering and capacity building via the utilization of existing and planned experimental facilities and material test reactors, and with a view to strengthening the efforts aimed at creating an adequate and harmonized regulatory framework so as to facilitate the licensing, construction and operation of these innovative reactors; and

19. 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 sixtieth (2016) regular session under an appropriate agenda item.

5. *(3.)*

Approaches to supporting nuclear power infrastructure development

(a) *(a)* Recognizing that the development and implementation 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, especially for countries that are considering and planning for the introduction of nuclear power,

(b) *(b)* Recalling its previous resolutions on approaches to supporting nuclear power infrastructure development,

(c) *(b’)* Stressing that prime responsibility for nuclear safety and security rest with States and their regulatory agencies, licensees and operating organizations in order to achieve the protection of the public and environment, and that a strong infrastructure is necessary to execute this responsibility,

(d) *(b’’)* Encouraging the Secretariat to develop stronger support for the creation and development of a knowledgeable future owner/operator,

(e) *(c)* Commending the Secretariat for the support provided 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 with assessments of infrastructure needs, taking into account relevant economic, social and policy considerations, to support the safe, secure and efficient use of nuclear power, and noting the Agency’s increasing activities in this area, in accordance with the requests of Member States,

(f) *(c’)* Commending the Secretariat for the support provided in the area of stakeholder involvement which continues to be of outmost importance to Member States that are considering and planning for the introduction of nuclear power,

(g) *(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,

(h) *(c’’’)* Welcoming the INIR missions in 2013-2015 to Turkey, Jordan, Nigeria and Kenya, and welcoming also the follow-up INIR mission to Viet Nam, and noting that additional countries thinking of extending their nuclear power programmes are considering requesting INIR missions,

(i) *(f)* Further welcoming the establishment of Integrated Work Plans (IWPs) which provide an operational framework for the delivery of Agency assistance in support of national nuclear programmes, thereby facilitating optimized assistance by the Agency to embarking countries,

(j) *(g)* Noting the publication of Nuclear Energy Series documents and the organization of a wide range of conferences, technical meetings and workshops on topics related to infrastructure development,

(k) *(h)* Recognizing the Nuclear Energy Management School and other training courses on management and leadership and on construction management, and mentoring programmes implemented under the Agency’s auspices, in China, Czech Republic, France, the Republic of Korea, the Russian Federation, Sweden, United Kingdom and the United States of America, and in particular the creation of the “International Nuclear Leadership Education Program” at the Massachusetts Institute of Technology, as effective platforms for leadership development,

(l) *(i)* Noting the joint efforts of the Nuclear Infrastructure Development Section (NIDS) and INPRO in developing innovative infrastructure approaches for future nuclear energy systems,

(m) *(i’)* Commending the Technical Work Group on Nuclear Power Infrastructure (TWG-NPI), that provides guidance to the Agency on approaches, strategy, policy and implementing actions for the establishment of a national nuclear power programme,

(n) *(l’’)* Recognizing the importance of encouraging effective workforce planning for operating and expanding nuclear power programmes, worldwide, and the increasing need for trained personnel, and

(l) *(l)* Taking note of other international initiatives focusing on support for infrastructure development,

1. *(1.)* Commends the Director General and the Secretariat for their efforts in implementing resolution GC(55)/RES/12.B.4 as reported in document GC(57)/9 and welcomes the upcoming publication by the Secretariat of important documents such as “Milestones in the Development of a National Infrastructure for Nuclear Power” which has involved active consultations with Member States during its revision and, in this context, ensure enhanced consistency among related nuclear power infrastructure publications and multimedia products (web sites, e-learning modules, *etc*.);

2. *(f’)* Encourages the Secretariat to facilitate broad international participation at all technical meetings, workshops, training courses and conferences sponsored by in kind support from Member States;

3. *(2 bis.)* Encourages its Member States to ensure the development of the appropriate legislative and regulatory frameworks, which are necessary for the safe introduction of nuclear power;

4. *(4.)* Encourages Member States launching a nuclear power programme to invite an INIR mission and relevant peer review missions, including site design safety reviews, prior to commissioning the first nuclear power plant and to make public their INIR mission reports in order to promote transparency and to share best practices;

5. *(5.)* Commends the Secretariat’s implementation of the Nuclear Infrastructure Development Section and its internal coordination and holistic approach to nuclear infrastructure development, and encourages the Secretariat to strengthen and tailor the services provided to countries introducing new nuclear power programmes; while taking into account the results of assessments of infrastructure requirements, such as INIR mission outcomes;

6. *(5 bis.)* Invites Member States to make use of INIR follow-up missions to assess progress and determine whether recommendations and suggestions were successfully implemented;

7. *(6.)* Requests the Secretariat to continue to learn lessons from INIR missions and to enhance the effectiveness of its activities;

8. *(6 bis.)* Encourages Member States to develop Action Plans to address the recommendations and suggestions provided by the INIR mission and takes note that a Technical meeting on lessons learned from INIR missions will be held in November 2015;

9. *(6 ter.)* Encourages the Secretariat to finalize the development of Phase 3 (before commissioning) INIR missions, taking into account the synergy with other Agency review services;

10. *(8.)* Welcomes the development of the catalogue of services as a useful tool to help Member States plan technical cooperation and other assistance;

11. *(9.)* Welcoming the Secretariat’s efforts in the production of a series of e-learning modules supporting both countries embarking on new nuclear programmes and countries expanding their nuclear programmes,

12. *(10.)* Encourages the Secretariat to continue providing training related to the development of the “Knowledgeable Customer” concept;

13. *(11.)* 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;

14. *(12.)* Takes note of the Secretariat’s cooperation with the International Framework for Nuclear Energy Cooperation (IFNEC) on the development of a workforce planning modelling tool for countries launching nuclear power programmes;

15. *(13.)* Calls on the Secretariat to facilitate, as necessary, “soft coordination” among Member States for the more efficient implementation of multilateral and bilateral assistance to countries considering or planning for the introduction or expansion of nuclear power;

16. *(14.)* Welcomes the activities undertaken by Member States, both individually and collectively, to cooperate on a voluntary basis in nuclear infrastructure development and encourages further such cooperation;

17. *(14 bis.)* Welcomes the activities undertaken by the Secretariat to encourage dialogue between countries newly embarking on nuclear power programmes and those with expanding programmes; and

18. *(15.)* 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 sixtieth (2016) session under an appropriate agenda item.

6. *(4.)*

**Small and medium-sized nuclear reactors – Development and deployment**

The General Conference,

(a) Recalling its previous resolutions on small and medium-sized nuclear reactors – development and deployment,

(b) Noting that the Agency has a dedicated project, to support small and medium or modular reactors (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 and waste management issues,

b (bis) Aware of activities in some of the member states, related to the development and deployment of small modular reactors, that produce electric power up to 300 MW(e), and can be manufactured as modules in factory setting and transportable to utilities for installation

(bter) Aware also of the work of the International Framework for Nuclear Energy Cooperation on SMRs, in particular its June 2014 workshop on pratical deployment issues and approaches, with participation by the IAEA, and a report of the workshop available on IFNEC.org,

(c) 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 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,

(d) Noting that SMRs could play a significant role in cogeneration such as district heating, desalination and hydrogen production systems in future, and their potential for innovative energy systems

d (bis) Acknowledging that the Secretariat in 2013 – 2014 has published Nuclear Energy Series reports “Approaches for Assessing the Economic Competitiveness of SMRs (NP-T-3.7)” and “Options to Enhance Proliferation Resistance of Innovative SMRs (NP-T-1.11)”, technical document “Progress in Methodologies for the Assessment of Passive Safety System Reliability in Advanced Reactor (IAEA-TECDOC-1752)”, and technical booklet “Advances in Small Modular Reactor Technology Developments”, a supplement to IAEA Advanced Reactors Information System (ARIS), “Instrumentation and Control Systems for Advanced Small Modular Reactors” (NP-T-3.19)

(f) Noting the outcomes of the 6th INPRO Dialogue Forum on “Licensing and Safety Issues for Small and Medium Sized Reactors” and the meeting on “Incorporating Lessons Learned from the Fukushima Daiichi Accident in SMR Technology Assessment for Design of Engineering Safety Systems” and the consequent agreement to organize a Small Modular Reactor Regulators’ Forum on a two year pilot basis and the first meeting of the Forum held in March 2015,”

(g) Recognizing the role that innovative technologies can play in developping SMRs and improving nuclear safety, and noting the new initiative from INPRO on Collaborative Project “Case Study for the Deployment of a Factory Fuelled SMR”, and

(h) Noting with appreciation the Director General’s report entitled “Small and Medium-Sized Reactors (SMRs) - Development and Deployment” contained in document GC(59)/9,

1. Commends the Director General and the Secretariat for their work in response to previous relevant General Conference resolutions;

2. 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 enhanced proliferation resistance;

3. Calls upon the Secretariat to continue to promote effective international exchange of information on options as regards SMRs available internationally for deployment and on topics such as technology roadmaps for SMR development and deployment, infrastructure requirements for countries embarking on new nuclear power programmes, operational performance, maintainability, safety and security, waste management, constructability, economics, and proliferation resistance, by organizing technical meetings and workshops, as appropriate, and to produce relevant status and technical reports;

4. Invites the Secretariat and the 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;

5. 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;

6. 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, and looks forward to upcoming reports on enhancing energy supply security and approaches to environmental impact assessment;

7. Also encourages the Secretariat to continue providing guidance for regulatory reviews of SMRs of various designs;

8. Encourages the Secretariat to foster collaboration among interested Member States with the objective of facilitating the licensing of SMRs;

9. Encourages the Secretariat to facilitate capacity building in embarking countries as regards SMR technology assessment

9 (bis) Encourages the Secretariat to finalize the publication of the Nuclear Energy Series reports, “Technology Roadmap for SMR Deployment” “Status of Environmental Impact Assessment for SMR Deployment”, and the technical document, “Options to Enhance Energy Supply Security using Hybrid Energy Systems using SMRs – Synergizing Nuclear and Renewable Energies” and “Considerations to Enhance the Defence in Depth Design and Operability of Water-Cooled Small Modular Reactors in coping with Extreme Natural Hazards”, which contributes to the IAEA Nuclear Safety Action Plan item 12 on Utilizing Effective Research and Development;

10. Encourages the Secretariat to continue the activities of the Regular Budget project “Common Technologies and Issues for SMRs” on both the development of key enabling technologies and the resolution of key infrastructure issues for innovative SMRs of various types, which is complementary to INPRO;

11. Invites the Director General to raise appropriate funding from extrabudgetary sources in order to contribute to the implementation of all Agency activities relating to the sharing of construction and operating experience for the development and deployment of SMRs; and

12. Requests the Director General to continue to report on:

i. the status of the programme initiated to assist developing countries interested in SMRs,

ii. progress made in the research, development, demonstration and deployment of SMRs in interested Member States intending to introduce them, and

iii. progress made in the implementation of this resolution to the Board of Governors and to the General Conference at its sixty first (2017) regular session under an appropriate agenda item.