

Roadmap Action Plan

Here is the proposed Roadmap Action Plan which explains what is needed to be done, when and by whom in order to achieve the targets by 2050:

| No. | Description | Milestones | Actors |
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| 1 | ACTIONS LED BY GOVERNMENTS AND OTHER PUBLIC BODIES | | |
| 1.1 | Policy Support: | | |
| 1.1.1 | Provide clear and sustained political support for a nuclear energy programme, as part of a national strategy to meet energy and environmental policy objectives. | In place in several major countries; For other countries pursuing a nuclear programme, by 2015. | <ul style="list-style-type: none"> Government leaders, Energy/Environment Departments. |
| 1.1.2 | Communicate with stakeholders and the public to explain the role of nuclear energy in national energy strategy, seeking to build public support through involvement in the policy-making process. | Ongoing, as nuclear programmes are launched or re-activated. | <ul style="list-style-type: none"> Political Leaders, Energy Departments. |
| 1.1.3 | Work with the nuclear and electricity industries to ensure a co-ordinated approach to overcoming obstacles to nuclear development, especially where nuclear energy is being used for the first time or after a long period with no new nuclear capacity. | Ongoing, as nuclear programmes are launched or re-activated. | <ul style="list-style-type: none"> Energy Departments, Industry Departments. |
| 1.1.4 | Given that nuclear power plants require very large investments with long pay-back periods, consider providing some form of government support or guarantee for private sector investment in new nuclear plants, where the risk reward ratio would otherwise deter potential investors. | For relevant countries, by 015. | <ul style="list-style-type: none"> Energy Departments, Finance Departments. |
| 1.1.5 | Encourage investment in low-carbon electricity sources, including new nuclear capacity, through policies and measures designed to reduce CO ₂ emissions, such as carbon trading schemes, carbon taxes or mandates on electricity suppliers to use low-carbon sources. The eventual aim should be to encourage the most cost-effective emissions reductions through technology neutral measures. | For countries pursuing a nuclear programme, by 2015-20. | <ul style="list-style-type: none"> Energy Departments, Environment Departments, Legislators. |
| 1.1.6 | Put in place policies and measures to ensure adequate long term funding for management and disposal of radioactive wastes and for decommissioning, and establish the necessary legal and organisational framework for the development and timely implementation of plans for radioactive waste management and disposal. | Implemented in many countries with nuclear energy; for other countries pursuing a nuclear programme, in advance of reactor operation, by 2015-20. | <ul style="list-style-type: none"> Energy Departments, Environment Departments, Legislators. |

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| 1.2 | Legal and Regulatory Frameworks: | | |
| 1.2.1 | For countries with existing nuclear programmes, ensure that the system of nuclear energy-related legislation and regulatory oversight provides an appropriate balance between protecting the public and the environment while providing the certainty and timeliness required for investment decisions, and make reforms if required. Where applicable, this should extend to uranium mining and nuclear fuel cycle facilities. | Reforms introduced in some countries; others may need to follow by 2015. | <ul style="list-style-type: none"> • Energy Departments, • Legal Departments, • Legislators, • Nuclear Regulators. |
| 1.2.2 | For countries launching new nuclear programmes, observe international best practice in developing the necessary nuclear energy legislation and regulatory institutions, to ensure that they are both effective and efficient. | For relevant countries, by 2015-20. | <ul style="list-style-type: none"> • Energy Departments, • Legal Departments, • Legislators, • Nuclear Regulators. |
| 1.2.3 | Ensure that the structure of electricity markets and, where appropriate, carbon markets supports the large, long-term investments required in nuclear power plants, providing sufficient confidence that income achieved will provide an adequate return on investment. | As nuclear programmes are launched, by 2015-20. | <ul style="list-style-type: none"> • Energy Departments, • Legal Departments, • Legislators, • Market Regulators. |
| 1.2.4 | To the extent possible, facilitate the construction of standardised designs for nuclear power plants worldwide by harmonising regulatory design requirements. In particular, countries introducing new nuclear programmes should avoid imposing unique requirements. | Common requirements should be established from 2020. | <ul style="list-style-type: none"> • Energy Departments, • Legal Departments, • Legislators, • Nuclear Regulators. |
| 1.3 | Industrial Development, Education, and Training | | |
| 1.3.1 | For countries launching or re-activating nuclear programmes, ensure that suitably qualified and skilled human resources are available to meet the anticipated needs of the nuclear programme, including in government, electricity utilities, industry, and regulatory agencies. Countries with major nuclear industries will also need sufficient human resources to support nuclear exports. | Action by 2015 to ensure a significant increase before 2020. | <ul style="list-style-type: none"> • Education Departments, • Employment Departments, • Universities. |
| 1.3.2 | For countries without an existing nuclear industry, provide support to domestic industry in developing capacities and expertise to participate effectively as sub-contractors and component suppliers in nuclear power plant projects both at home and abroad. Given the global nature of supply chains for nuclear construction, almost all countries will require the participation of foreign suppliers. | For relevant countries, by 2015-20. | <ul style="list-style-type: none"> • Energy Departments, • Industry |

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| 1.4 | Technology Development and Deployment: | | |
| 1.4.1 | Develop where necessary and implement plans for the long term management and disposal of all types of radioactive wastes, in particular for the construction and operation of geological repositories for spent fuel and high-level waste. This includes providing support for required RD&D activities. | The first repositories to be in operation by 2020, with other major nuclear countries following before 2030. | <ul style="list-style-type: none"> • Energy Departments, • Environment Departments, • Radioactive Waste Management Agencies, • Waste Generators. |
| 1.4.2 | Continue to support RD&D of advanced nuclear technology (reactors and fuel cycles) to capture its long-term potential to provide sustainable energy with improved economics, enhanced safety and reliability, and stronger proliferation resistance and physical protection. | Demonstrate the most promising next generation nuclear systems by 2030, with full commercialisation after 2040. | <ul style="list-style-type: none"> • Energy Departments, • Research Departments, • Nuclear Research Institutes |
| 2 | ACTIONS LED BY THE NUCLEAR AND ELECTRICITY SUPPLY INDUSTRIES | | |
| 2.1 | Managing the Existing Nuclear Fleet: | | |
| 2.1.1 | While continuing to operate existing nuclear plants safely and efficiently, invest in upgrading and preparing for extended lifetimes where feasible. To this end, ensure that lessons learned are widely disseminated among nuclear plant operators. | Ongoing, with significant investment needed by 2015. | <ul style="list-style-type: none"> • Electricity Utilities, • Nuclear Suppliers. |
| 2.2 | Deploying New Nuclear Capacity by 2020: | | |
| 2.2.1 | Fully establish the latest nuclear power plant designs by constructing reference plants in a few countries around the world, to refine the basic design and any regional variants, and build up global supply chains and capacities. | Several new designs now under construction will be in operation by 2015; others to follow in the next few years. | <ul style="list-style-type: none"> • Nuclear Suppliers, • Supply chain Industries, • Electricity Utilities. |
| 2.2.2 | Go on to demonstrate that these new designs can be reliably built on time and within expected costs, making continuous efforts to reduce construction times and control costs by using standardised designs to the extent possible, refining the construction process and further strengthening supply chains. | Demonstrate the ability to build standardised designs on time and to cost by 2020. | <ul style="list-style-type: none"> • Nuclear Suppliers, • Supply Chain Industries, • Electricity Utilities. |
| 2.3 | Capacity Building for Rapid Expansion after 2020: | | |
| 2.3.1 | Invest in building up industrial capacities in the nuclear and related engineering industries worldwide to increase the global capability to build nuclear power plants, broadening supply chains while | Significant investment needed by 2015 if global capacity is to double from present levels by | <ul style="list-style-type: none"> • Nuclear Suppliers, • Supply Chain Industries, |

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| | maintaining the necessary high quality and safety standards. A commensurate increase in skilled human resources will also be needed. | 2020. | <ul style="list-style-type: none"> • Banks and other Investors. |
| 2.3.2 | Expand uranium production and the capacity of nuclear fuel cycle facilities in line with the growth of nuclear generating capacity, including the deployment of more efficient advanced technologies where available. | Major capacity expansion needed by 2015-20 and beyond. | <ul style="list-style-type: none"> • Nuclear Fuel Suppliers, • Banks and other Investors. |
| 2.4 | Technology Development and Deployment: | | |
| 2.4.1 | While capturing the benefits of replicating standardised designs to the extent possible, continue the evolutionary development of reactor and nuclear fuel designs to benefit from experience gained in building reference plants and from technological advances, to ensure that nuclear power remains competitive. | Lessons learned from reference plants will be available from 2015; major changes to standardised designs unlikely before 2020. | <ul style="list-style-type: none"> • Nuclear Suppliers, • Electricity Utilities. |
| 2.4.2 | In co-operation with nuclear research institutes, participate in the development of next generation nuclear systems (reactors and fuel cycles), to ensure that the designs selected for demonstration are those most suitable for eventual commercialisation. | Demonstrate the most promising systems by 2030, with full commercialisation after 2040. | <ul style="list-style-type: none"> • Nuclear Suppliers, • Electricity Utilities. |
| 3 | ACTIONS LED BY OTHER STAKEHOLDERS | | |
| 3.1 | Financing Nuclear Power Plants: | | |
| 3.1.1 | Enhance the ability of the global financial community to assess the investment risks involved in nuclear power projects, to develop appropriate financing structures, and to provide suitable financial terms for nuclear investments. Participation in the financing of early nuclear construction projects will help strengthen nuclear expertise in the financial sector | Develop increased expertise by participating in nuclear projects by 2020. Increase the availability of private sector finance after 2020. | <ul style="list-style-type: none"> • Banks and Financial Services Companies, • Export Credit Agencies, • Multilateral Development Banks/Agencies. |
| 3.2 | International Cooperation: | | |
| 3.2.1 | Maintain and strengthen where necessary international cooperation in areas such as institution-building in countries planning new nuclear programmes, harmonisation of regulatory requirements, radioactive waste management and disposal, development of advanced reactor and fuel cycle technologies, non-proliferation and nuclear law, physical protection of nuclear facilities and materials, and security of nuclear | Important issues need to be addressed in the 2015-20 timeframe if nuclear expansion is to become sufficiently broad-based after 2020. | <ul style="list-style-type: none"> • Intergovernmental Nuclear and Energy Agencies (notably the International Atomic Energy Agency and the OECD Nuclear Energy |

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fuel supply.

- Agency),
- International Non-Governmental Industry and Policy Organisations.