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CB2I: a new capacity-building international initiative to promote the peaceful uses of nuclear energy

Working paper submitted by France

In order to strengthen the objective of the third pillar of the Non-Proliferation Treaty and promote the peaceful uses of nuclear energy, France, in coordination with the International Atomic Energy Agency (IAEA) and its Department of Nuclear Sciences and Applications, would like to support a new multilateral initiative, CB2I (capacity-building international initiative), aimed at bolstering skills development, which remains a central component of capacity-building for countries wishing to access nuclear science and technology. This initiative would bring together both countries seeking to develop infrastructures on their national territory and countries willing to give them access to cutting-edge technologies. The initiative would support developing countries and the use of advanced research infrastructures.

While an attractive option, access to nuclear science and technology often entails significant capacity-building challenges

Thanks to IAEA and its Department of Nuclear Sciences and Applications and technical cooperation programme, the benefits of nuclear science and technology are widely recognized. Nuclear technologies have become essential in numerous fields, in particular energy, health, environment and the food industry. Nuclear science and technology require a well-trained and highly skilled workforce

For many countries, capacity-building remains a bottleneck that prevents them from developing nuclear applications as well as other advanced technologies on their national territory. Beyond the financial means required to build research infrastructure, the main challenge often lies in human resources, in skills development and in attracting and retaining talent. The CB2I initiative aims to address this issue by assisting counterparts to become knowledgeable users.



A new initiative could bring together interested countries, creating a community of mutual benefit

In complementarity with existing structures, France proposes the creation of a community of countries with a common interest in developing access to nuclear science and technology. Participating countries would be both countries wishing to develop nuclear science and technology and countries willing to share their knowledge of these cutting-edge technologies. Together with France, other Member States are invited to join this initiative and ensure its practical implementation.

Participating countries would find a forum to share best practices as a valuable input for their own domestic scientific roadmaps. The initiative would foster the definition of projects based on common needs, thus providing a framework to facilitate the circulation and networking of managerial and technical human resources.

The CB2I initiative would provide key elements to provide assistance to participating countries in optimizing the use of their resources for scientific development, and contribute to their decision-making process. The procurement and construction of research infrastructures is beyond the scope of the CB2I initiative.¹

Optimization of infrastructure utilization is a high-value outcome of this. Instead of a number of one-of-a-kind facilities and projects, the development of families of facilities with similar functional specifications would favour synergies between programmes.

Each family/group of facilities would foster an international technical and scientific community that would be an asset to attract and educate the new generations.

Based on its longstanding experience, IAEA could provide the necessary framework for developing this international sustainable capacity-building initiative – CB2I –

The CB2I front-end phase starts by inviting interested Member States to exchange information and agree on shared functional specifications for a family of key infrastructures such as research reactors, compact accelerator-based neutron sources (CANS) or high-performance computing. This critical starting phase will confirm the benefit of creating a CB2I community dynamic around similar domestic infrastructures (both existing and still to be established).

The development of sound experimental, training, and industrial applications will be another critical phase that will benefit from the CB2I community dynamic under the IAEA umbrella. Previous experiences have proven that using a newly established infrastructure is often a challenge. Increased exchanges within the CB2I community will address this challenge through the circulation of scientists, experimental technologies, programme feedback experience and innovations. Similar domestic infrastructures developed within this CB2I initiative is a key condition for its success.

The CB2I initiative would also benefit from existing IAEA instruments and in particular, the IAEA international centres based on research reactors. Indeed, it makes experienced and advanced laboratories and related facilities accessible to

¹ As is always the case, each Member State manages its own procurement process through a bilateral agreement with suppliers, in a way compliant with its own regulation framework and procurement modalities.

participating countries. This partnership between top-level infrastructures and future domestic infrastructures, as fostered by CB2I, is an essential factor for success.

The IAEA framework and support will be decisive to foster within the CB2I community the shared functional specifications for the domestic infrastructures to be developed.

Three complementary sets of research infrastructures and related technical activities are proposed for consideration as CB2I pillars.

The infrastructures proposed for consideration in the CB2I initiative share the following criteria:

- They are key for nuclear science and technology and create value in a wide range of academic, research and development, and industrial activities
- They require limited investment and affordable operational costs for a wide range of countries
- They are based on cutting-edge modern but not necessarily off-the-shelf technologies
- They could be developed into a family of facilities, allowing further cross-fertilization benefits within the CB2I community as discussed above.

The first family to be considered is the low-power research reactor, which is already acknowledged as an asset in itself.

The second family includes accelerator facilities, and in particular the CANS-type, which have made significant progress in the last decade and are now drawing the attention of the worldwide scientific community.

The third family targets crosscutting capabilities that support a broad range of applications in nuclear science. High-performance computing infrastructure is one of these capabilities, which has always been at the heart of nuclear science and technology.
