



# FUTURE IAEA ROLES IN SUPPORT OF SUSTAINABLE NUCLEAR ENERGY

Roberto Cirimello  
Argentina

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## Genesis and early development

### **Main driving forces characterizing early development of NE:**

- Defence or military purpose for R & D projects supported the original technologies of NPP and NFC plants
- No cost limits and governmental financing in general
- Little or no consideration for anticipating environmental impact and final disposal of RW
- Autonomous and domestic objectives for the economic scale of the plants and no major concern about technology proliferation.

## IAEA roles in the early stage of development of NE

**IAEA faced dramatic changes in its structure and efficiency with a final positive result of developing a capability adapted to the diversified demands of its stakeholders.**

The main activities that can be mentioned as an achievement of the IAEA in that period are, among others:

- Technical cooperation and assistance in nuclear engineering and support to the activities of research centres
- Forums where the knowledge in topical matters were openly and widely shared
- Technical documents that summarized the “state of the art” applications for safe and efficient use of nuclear power
- Increased level of quality in its studies and consultancy capability to help MS in developing its infrastructure,

## Main reason for NE renaissance

***No other technologies are available to supply the necessary amount of clean energy needed in the short and medium terms as nuclear energy can do in a sustainable manner.***

## New era of NE characteristics

Characteristics of the new era of nuclear energy:

- Existence of new systems with generating power ranging from 350 to 1750 MWe, with passive safety systems, more economic and competitive than other relevant sources of energy
- A consensus at the international level on the requirement of maintaining a safe and accident free operation for future and present plants
- Need of a clear message to the society that the technology of RW management is available and in use in the world and not a danger

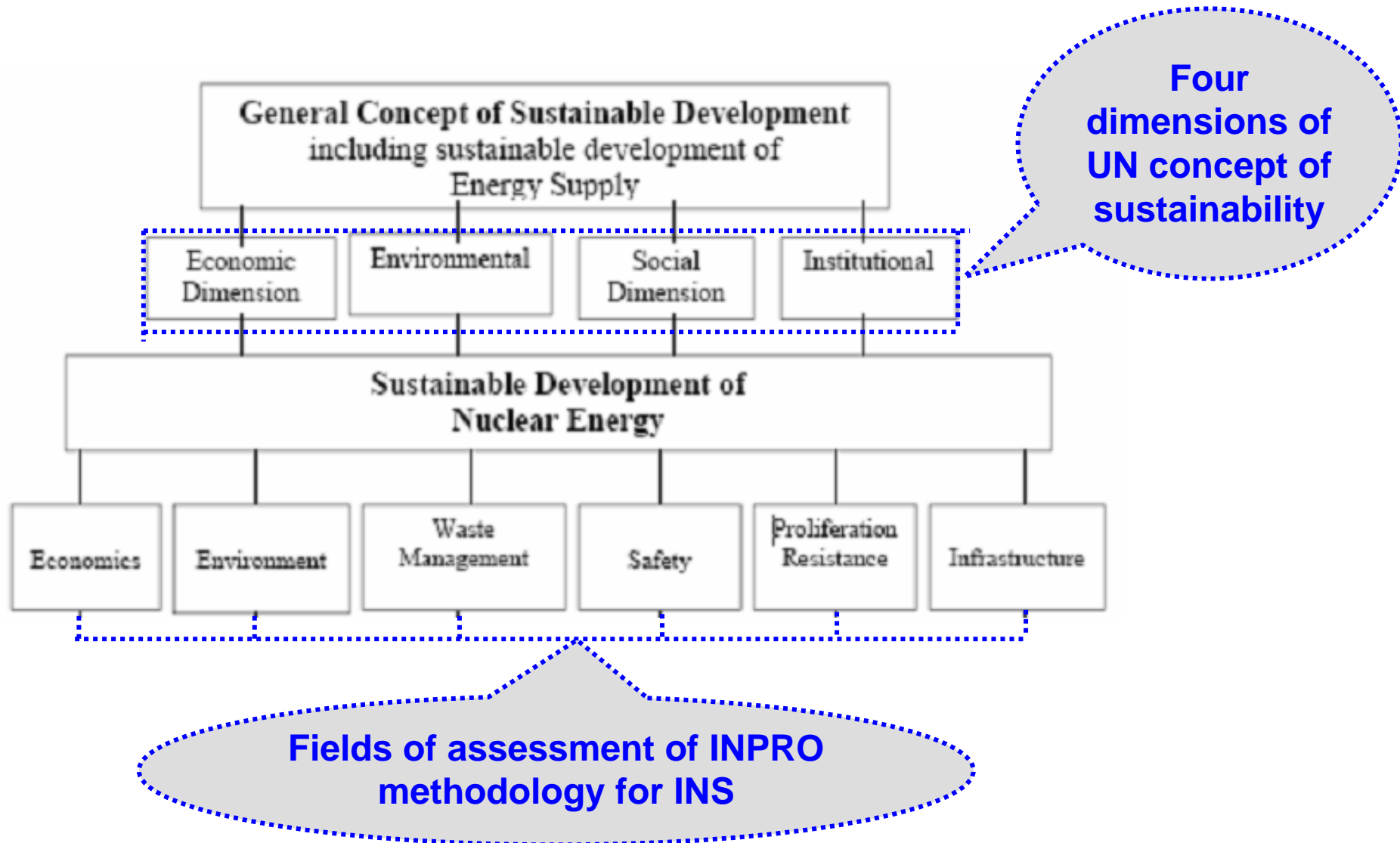
## New era of NE characteristics

Characteristics of the new era of nuclear energy (cont.):

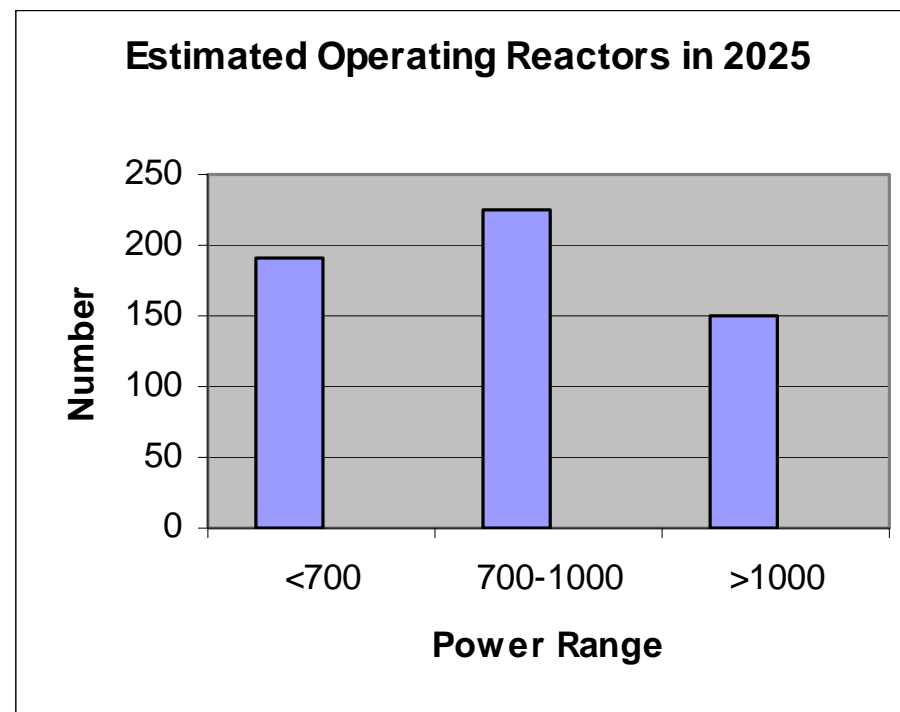
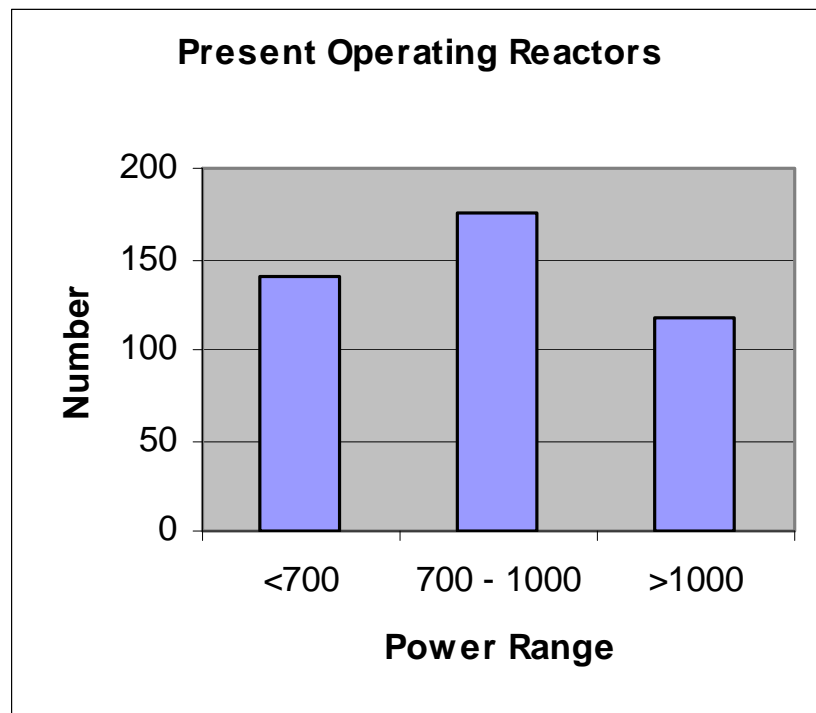
- Recognition that nuclear energy can be expanded if the AFS is granted
- Urgent and dramatic need of a new generation of well trained manpower in all areas of the activity before the eldest is gone
- Need that the nuclear research centres can recuperate their capability for technical support in the nuclear areas.

## Sustainability definition

*“development that meets the needs of the present without compromising the ability of future generations to meet their own need”*



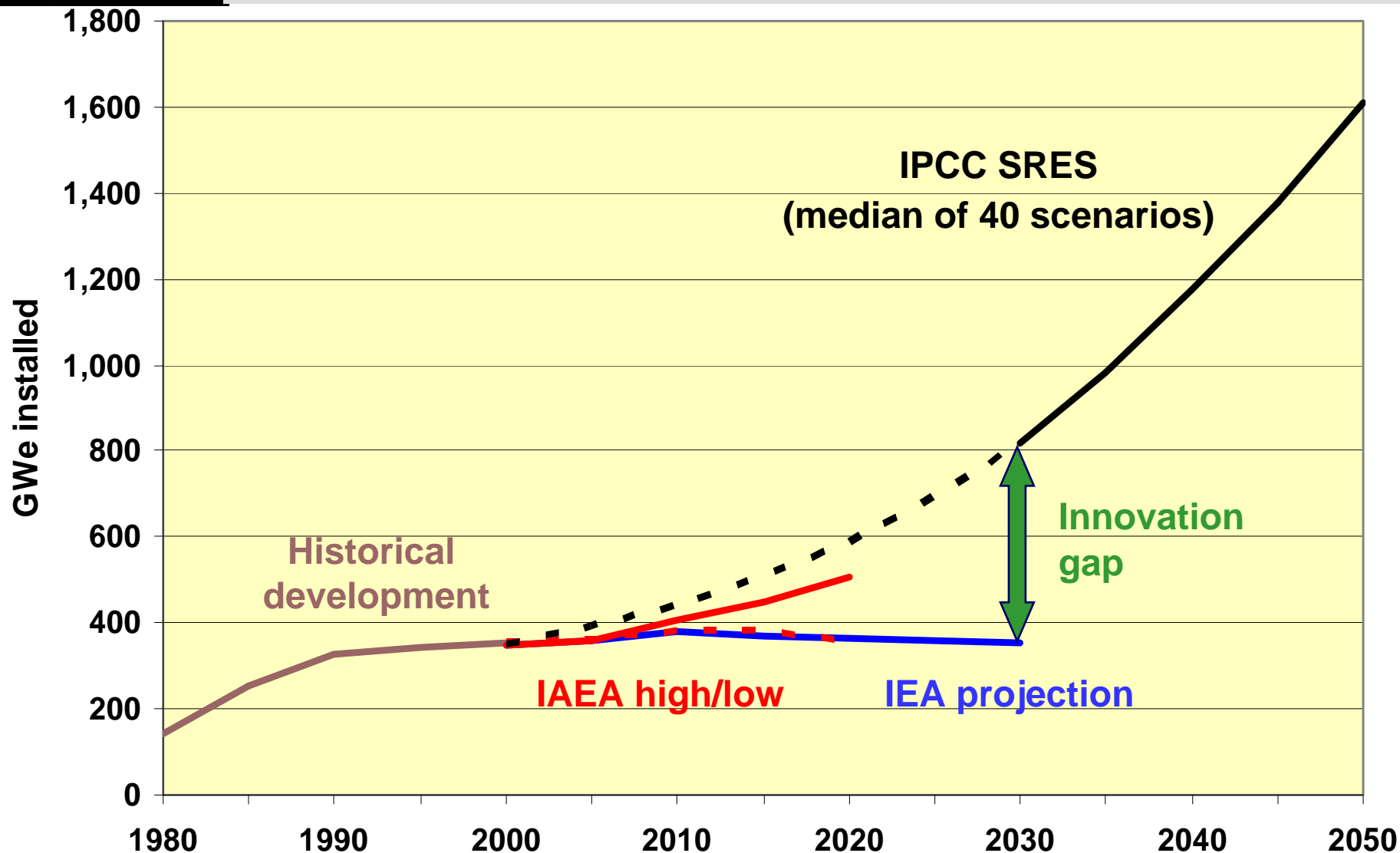
## Need to keep nuclear energy as sustainable energy option Room for new modules





# Need to keep nuclear energy as sustainable energy option

## A Discontinuity for Nuclear Power: The Case of innovation



## Need to keep nuclear energy as sustainable energy option Innovative technologies

**Innovative technology will be a challenging issue for the nuclear community in the next 20 years in order to define new concepts based on the new paradigm**

- ❖ INPRO as Methodology for assessments and catalyzer for international cooperation
- ❖ GIF as a main executor of developments

**“Demand driven innovation” against “technology driven innovation”**

IAEA should pursue in connecting the “demand” (i.e. newcomer countries and future users) with the technology developers (i.e. today’s mature nuclear countries) in order to help for the R,D & D investments.

## Need to keep nuclear energy as sustainable energy option Technologies for short and medium terms

**Proven technologies will dominate the short and medium terms providing:**

- economic competitiveness
- passive safety systems
- efficient use of the fuel by introducing longer cycles
- less HLW based in the reached high burnup
- less human intervention resulting in a significant reduction of man-dose

**Within IAEA it was coined the expression “one size doesn’t fit all”. This reflects the fact that a variety of modules will be demanded for satisfy the different sizes of countries electric grids along the world. Old and new suppliers should take into account this and also that a module optimized for one size cannot be simply adapted for another**

## Need to keep nuclear energy as sustainable energy option Diversity of scenarios for IAEA's role

**A challenging aspect of the future role of the IAEA will be the need to adapt its activities to the different regional approach and level of development needed**

The scenarios of diverse nuclear level of development of these regions of the world that IAEA will face are:

- Advance programs with own and high level of nuclear technology including sophisticated level of technology in the countries
- Program for a huge amount of energy required for the development of countries that amount one third of the world population
- Modest programs of nuclear energy expansion in countries already operating NPP with a medium level of associated technology
- Newcomers with a firm commitment in implementing the use of nuclear energy in the near future with small or poor surrounding technology level.

## Need to keep nuclear energy as sustainable energy option IAEA's response to the new scenarios

The IAEA will intervene with a great success if it can help in the internationalization of standards, system management and a network of information on operation and construction events

In the second scenario the IAEA may help in looking for fail or “near missed” piece of projects that may jeopardize the schedule or the final quality that may affect the performance.

In the third the IAEA may advise on how to strengthen the required infrastructure in those countries that need to increase the level of human competence and available human resources, associated technology or legal framework in accordance with the scope developed by the Agency

In addition, MS introducing nuclear energy for the first time will increasingly demand Agency support activities to provide a timely assistance and response to the clear schedule of Milestones for infrastructure development.

## Need to keep nuclear energy as sustainable energy option Financing Nuclear Power in developing countries



Financing organizations  
including governments  
and WB



NUKE BANK

Financing of nuclear power projects will need a creative way of implementation and the IAEA may help in seeking new ways such as fiduciary funding, a “nuclear bank”, or to succeed in modifying the WB position for supporting nuclear power projects in the developing world.

## Need to keep nuclear energy as sustainable energy option IAEA's response to the new demands

### IAEA should:

- **Coordinate developing countries assistance by expertise provided by countries as own contribution (not charged to IAEA's budget)**
- **Pursue with a proactive action towards acceptance of NE as an option by its active presence in Climate Change Forums**
- **Organize forums where technology holders and users are convened to discuss the appropriated technology for their programs**
- **Support the revival of Nuclear Research Centers for the assistance to the efficient, safe and sustainable operation of nuclear power systems**
- **Strengthen the program on Knowledge Management including the support to the initiative of the WNU.**



## Need to keep nuclear energy as sustainable energy option IAEA's response to the new demands

### **IAEA should also continue to:**

- **Assist developing countries that like to established or expand nuclear power in electricity planning, economic studies, legal requirements and licensing, hard infrastructure and facilitating human resource training**
- **Disseminate knowledge on waste management technology and the analysis of stressors that will impact the environment will also a continue requirement to the Agency concern in a sustainable view of NE expansion**
- **Support any initiative on the regionalization of the knowledge for implementing nuclear power including the establishment of regional owned plants as a way of assurance of supply both for components of NPP and NFC services**
- **Promote international cooperation, partnership and collective actions as part of the concept of sustainability**

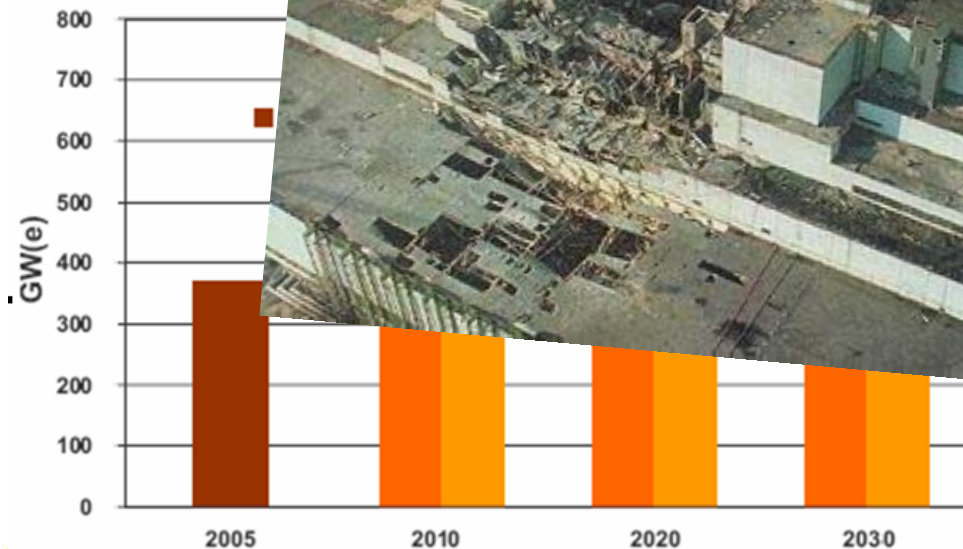


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## Need to keep nuclear energy as sustainable energy option The challenging legacy



**“A serious accident anywhere would impair any prospect for large-scale global growth of nuclear energy”**. Independent commission Report on The Role of the IAEA to 2020 and beyond, May 2008.



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**Thank you very much**

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