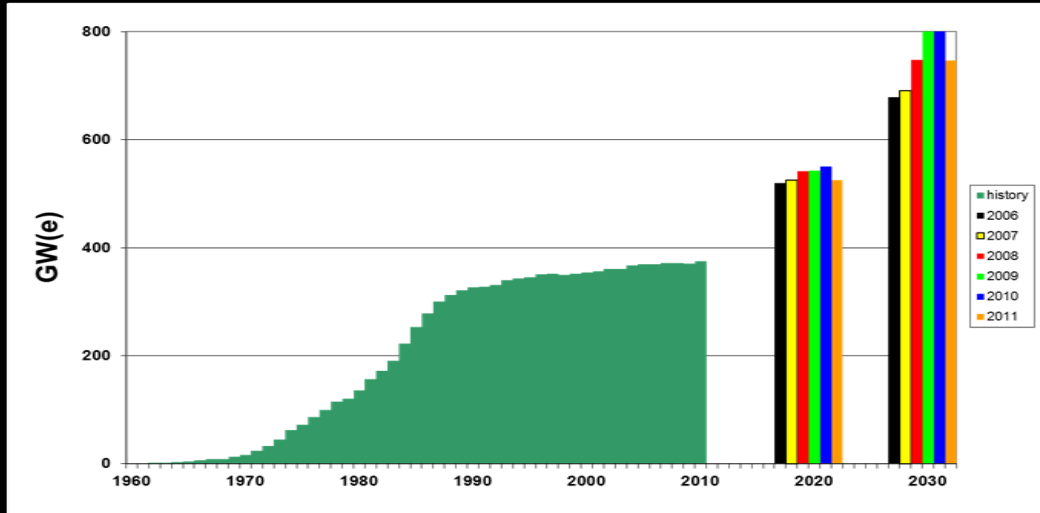


*NUCLEAR POWER AND COMPETENCE BUILDING – THE NEXT
CHALLENGES*

**HARMONIZATION OF NUCLEAR
HUMAN RESOURCE
DEVELOPMENT**

Prof. Dr. Yanko Yanev*, *International
Institute for Nuclear Knowledge
Management, Vienna,*
Y.YANEV@NUCLEAR-KM.ORG
IAEA NKM Section*

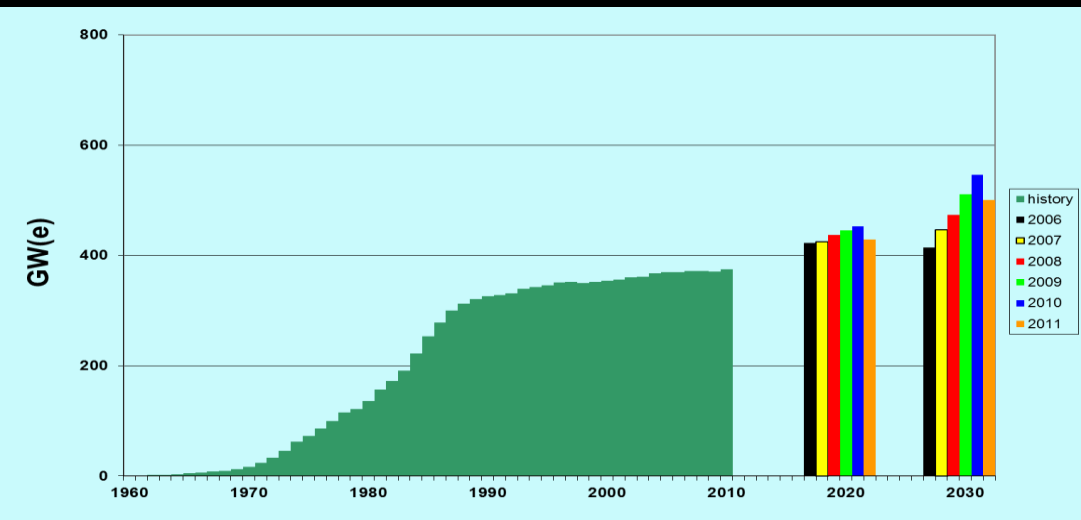
Nuclear Power perspective



- Nuclear Power development requires very specific competences, based on *knowledge* and *understanding* as well as on *skills* and *behavior*.

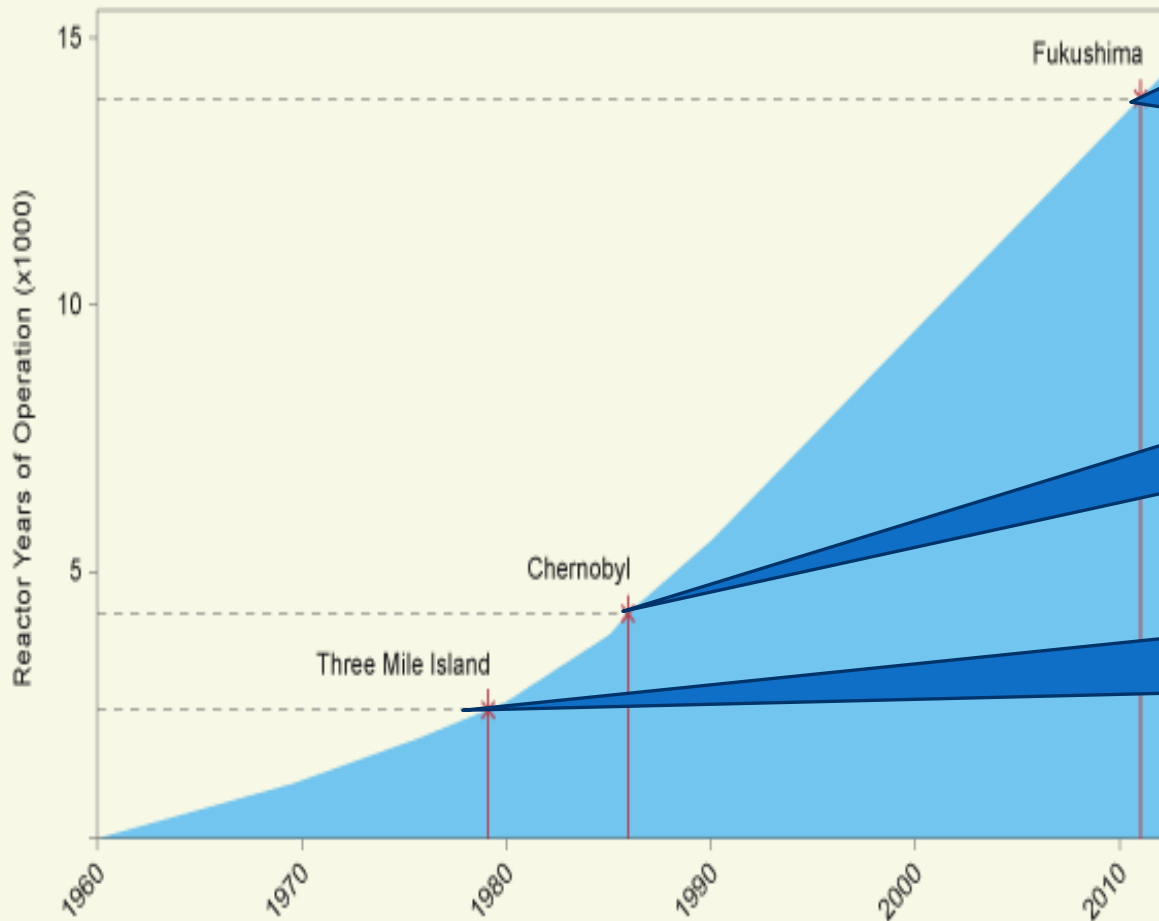
- Nuclear power needs strong nuclear safety culture world-wide.

- With new countries establishing programs for introducing nuclear power the demand for harmonization becomes ever more important.



Evolution of Nuclear Power

Cumulative Reactor Years of Operation

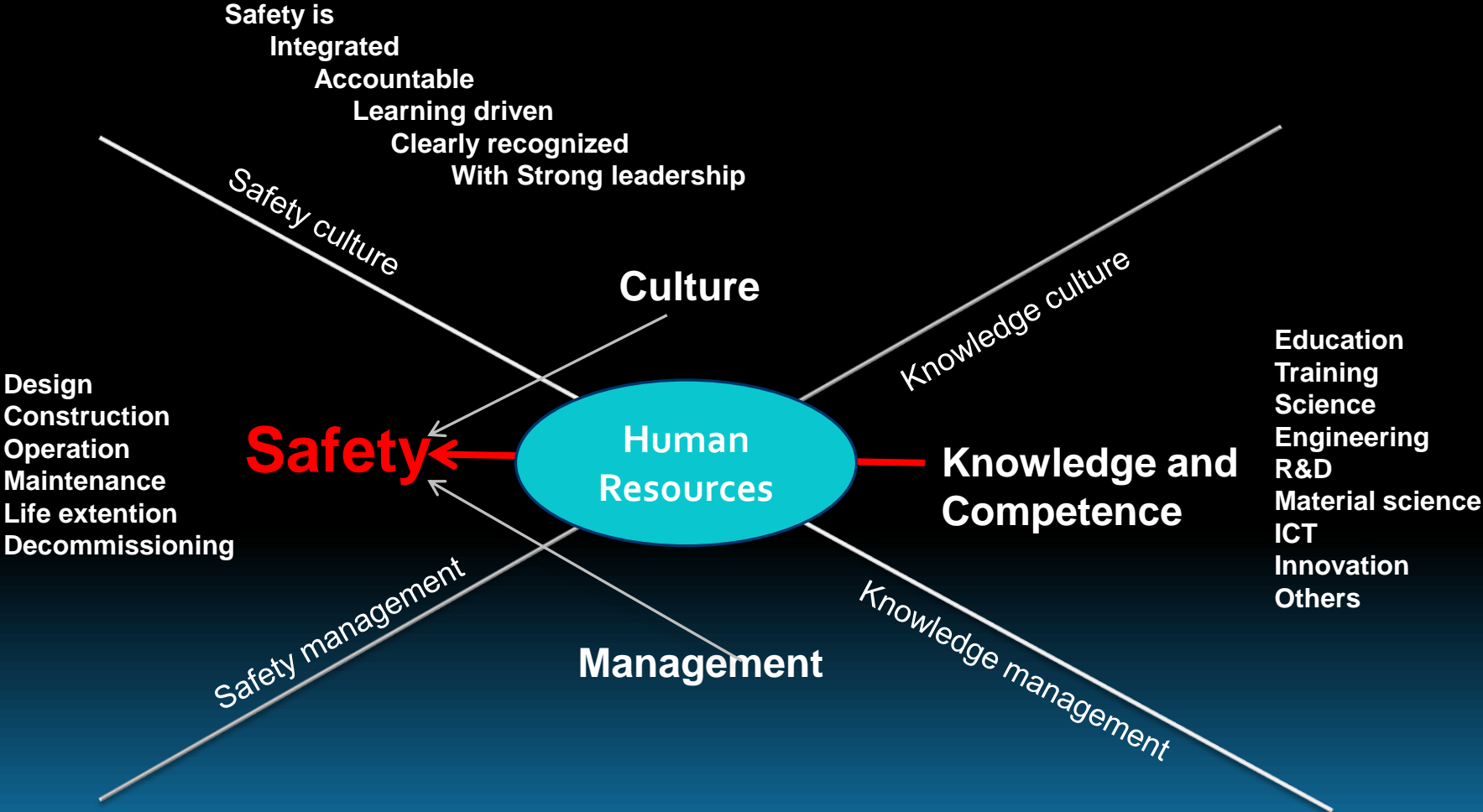


CATASTROPHIC EXTERNAL EVENTS
Design deficiency?
Safety Management?
Safety Culture?
Knowledge Management?

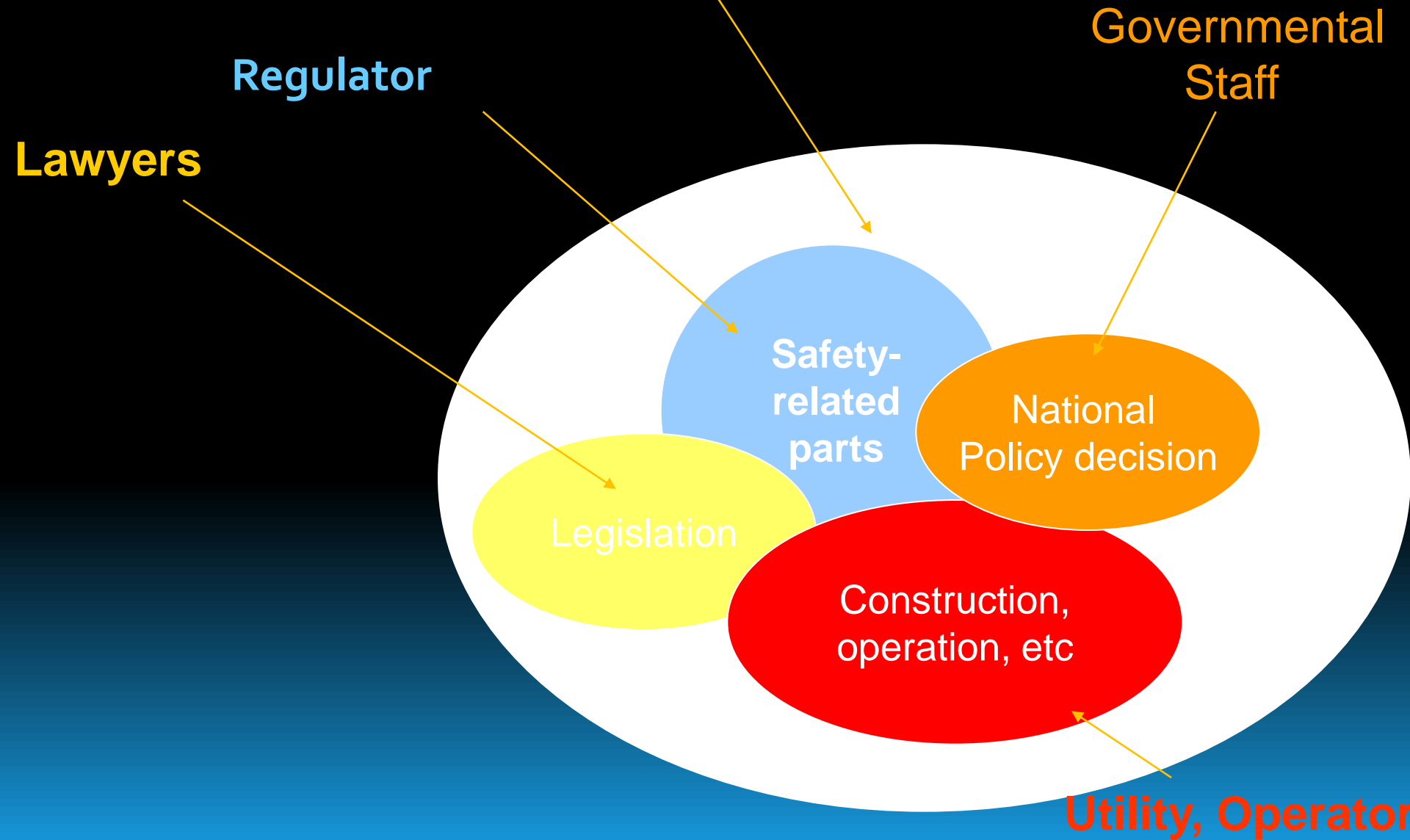
SAFETY CULTURE Recognized!

Design deficiency?
DEFENCE IN DEPTH, T & Q,

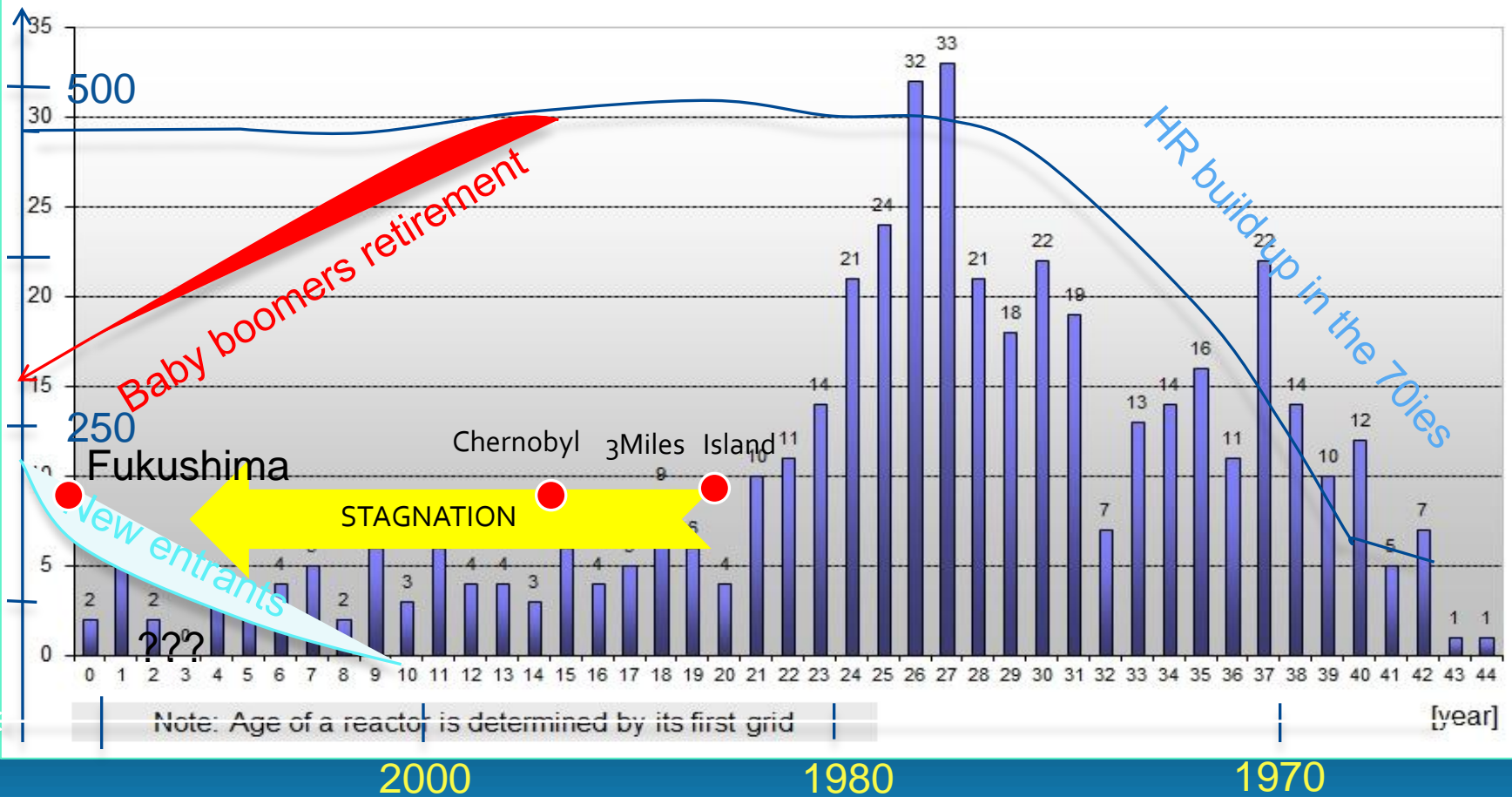
Interfaces



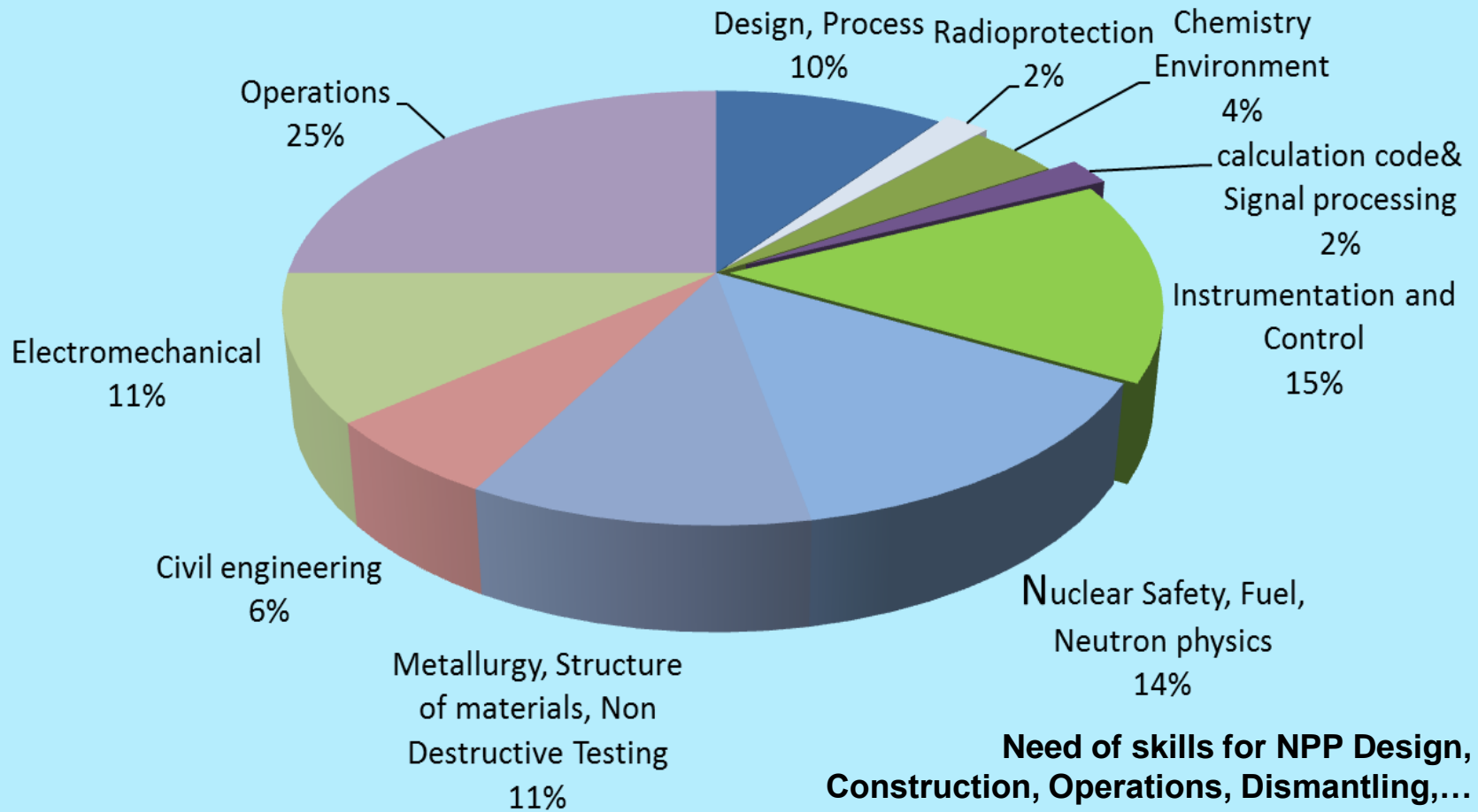
Human Resources for National Nuclear Programme



Global Nuclear Human Resource?

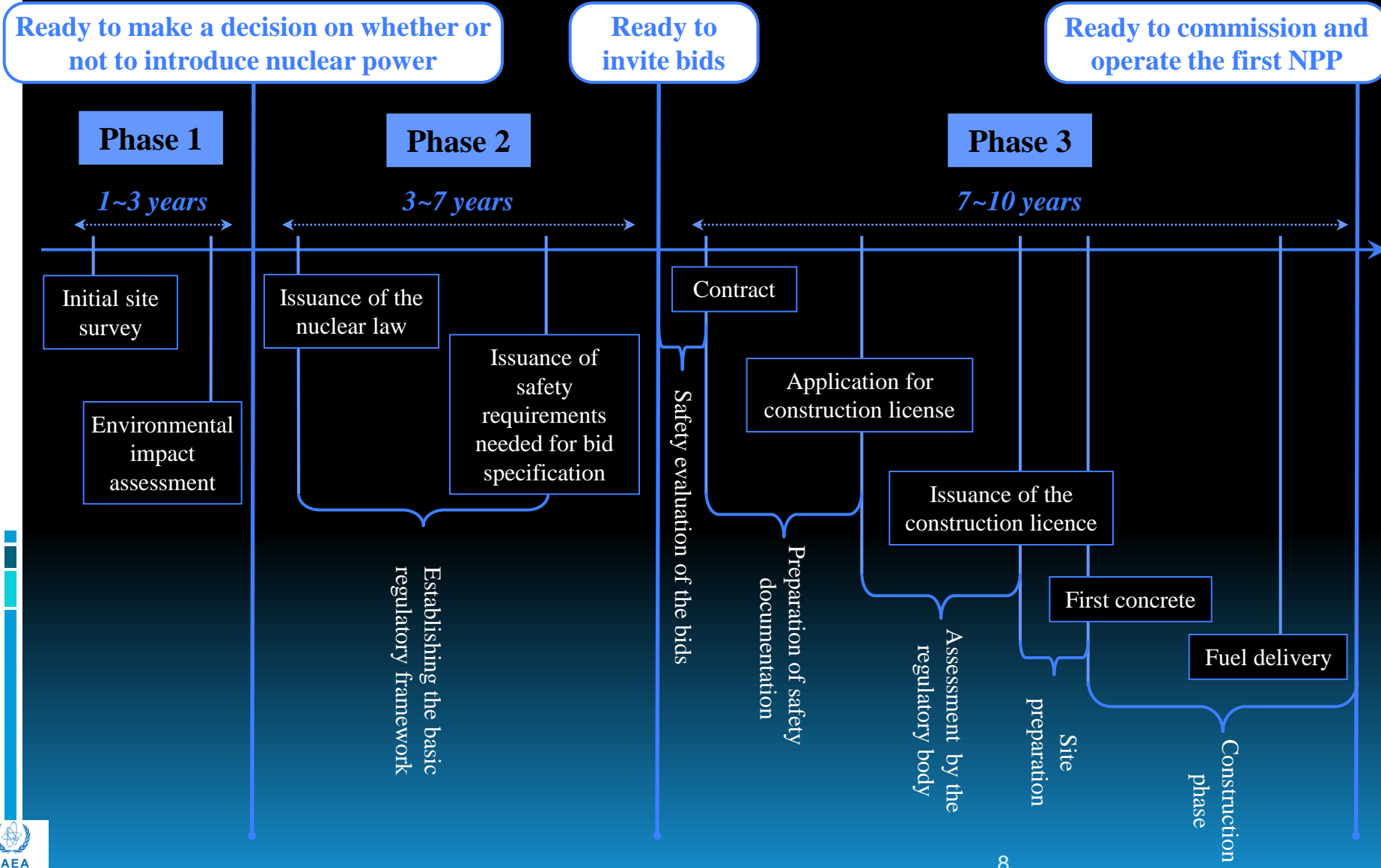


Expected Distribution of jobs by fields of activity

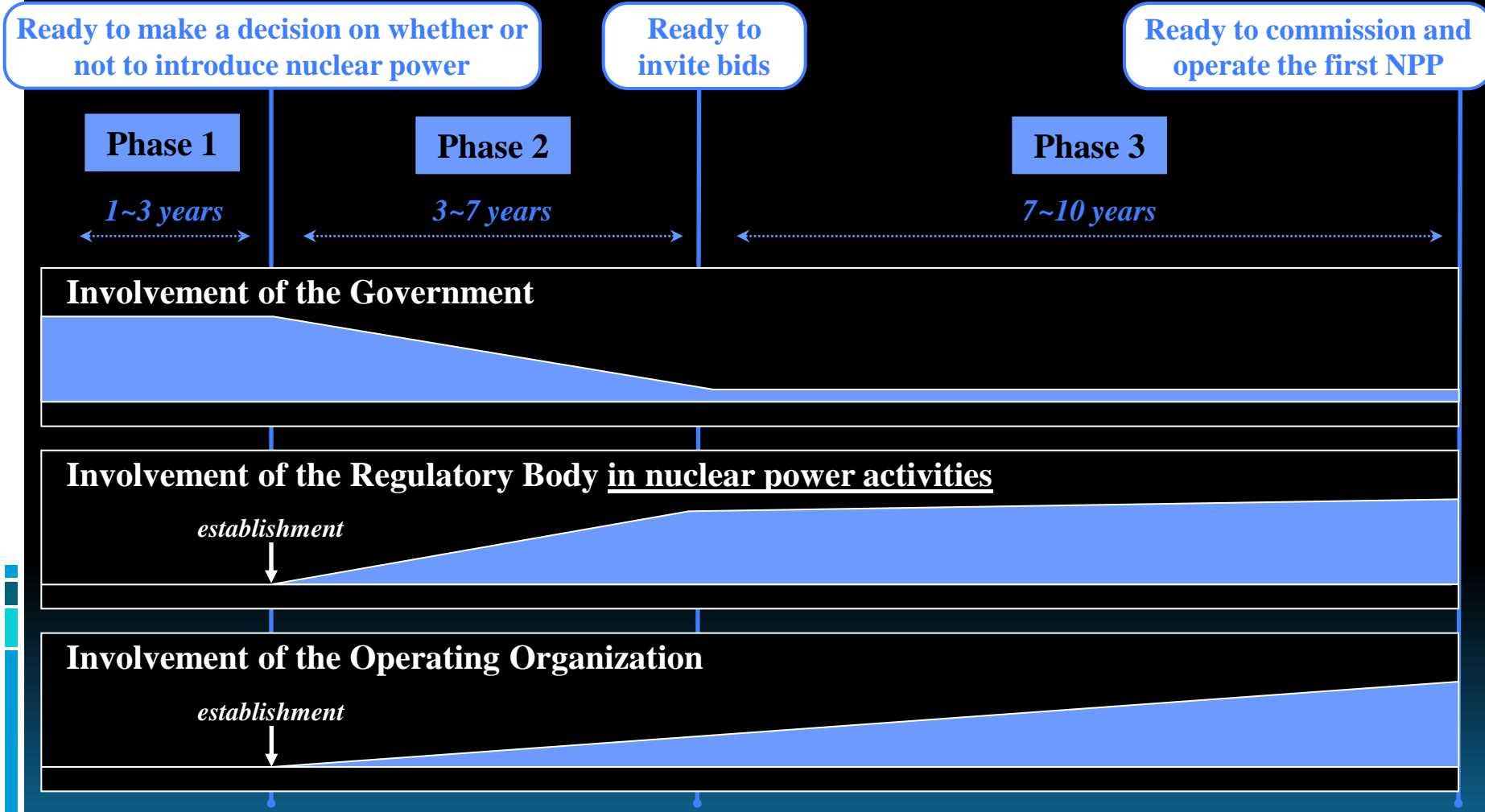


Need of skills for NPP Design, Construction, Operations, Dismantling,...
goes beyond pure nuclear education and training

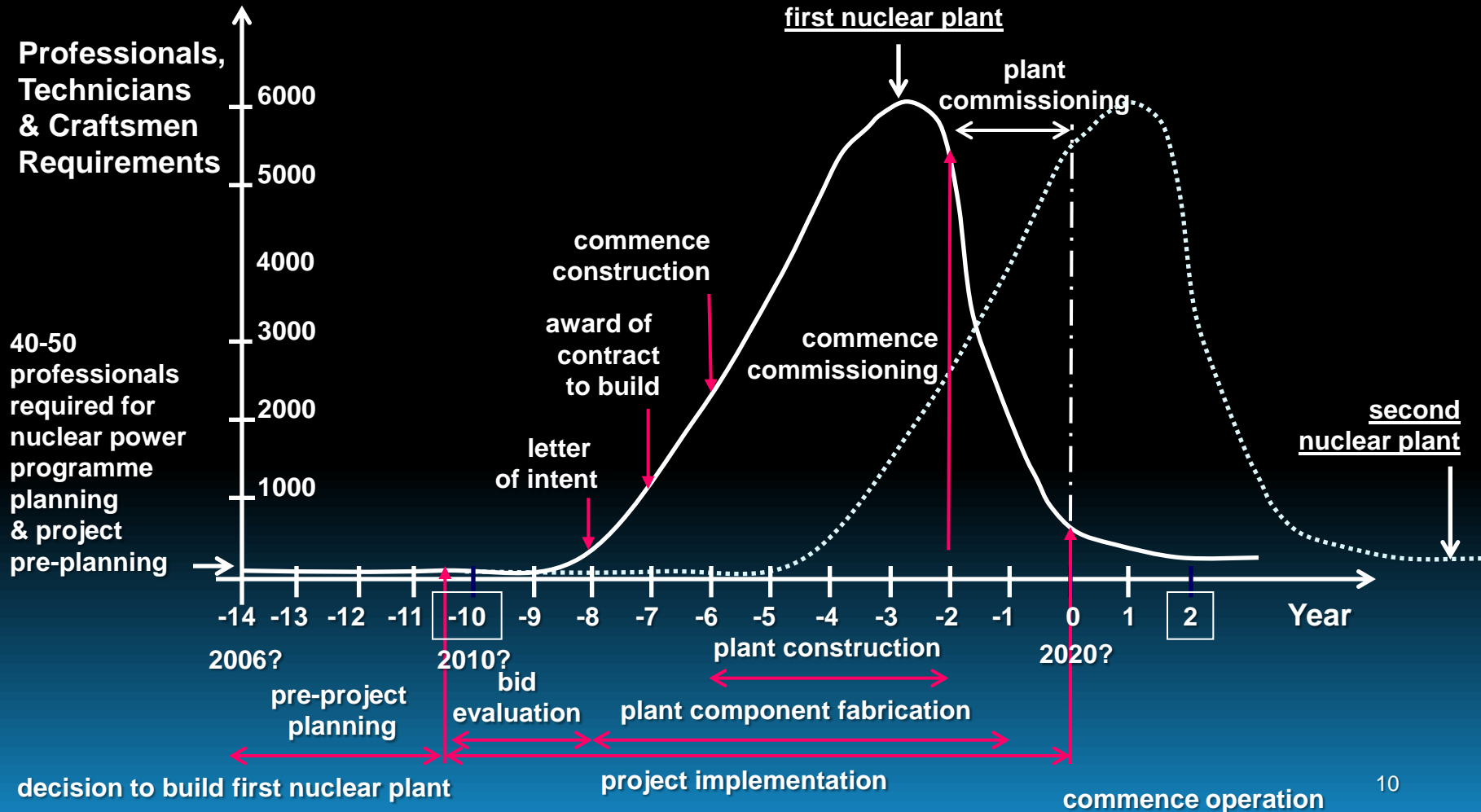
Milestones and competence needed



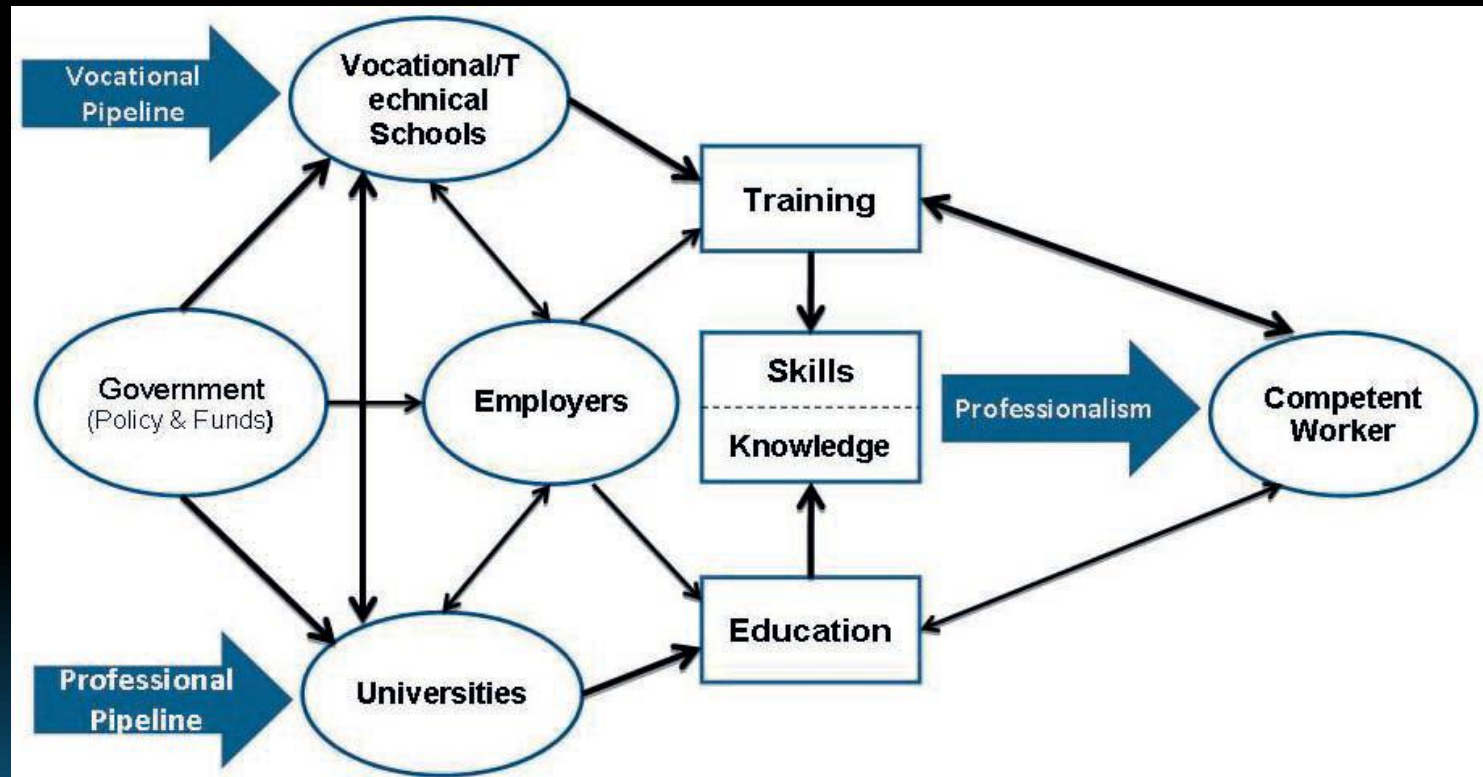
Involvement of organizations



HUMAN RESOURCES FOR NPP

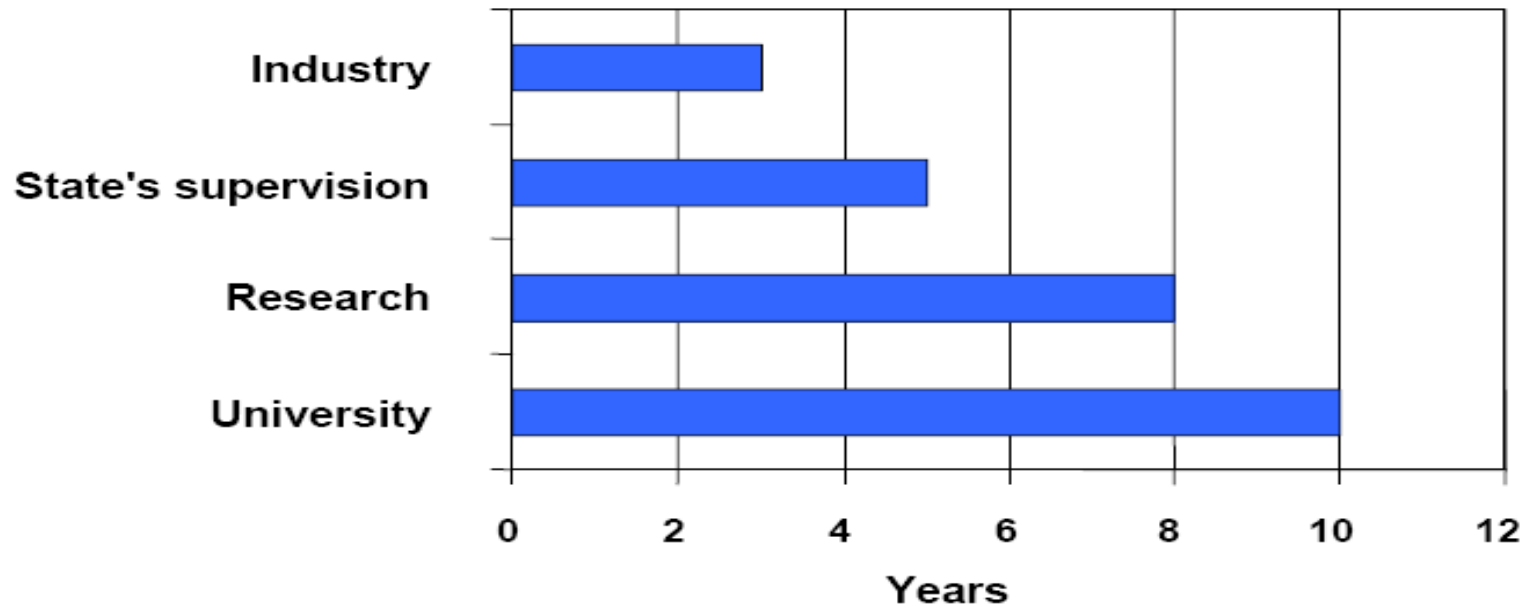


Government–university–industry interaction to produce competency



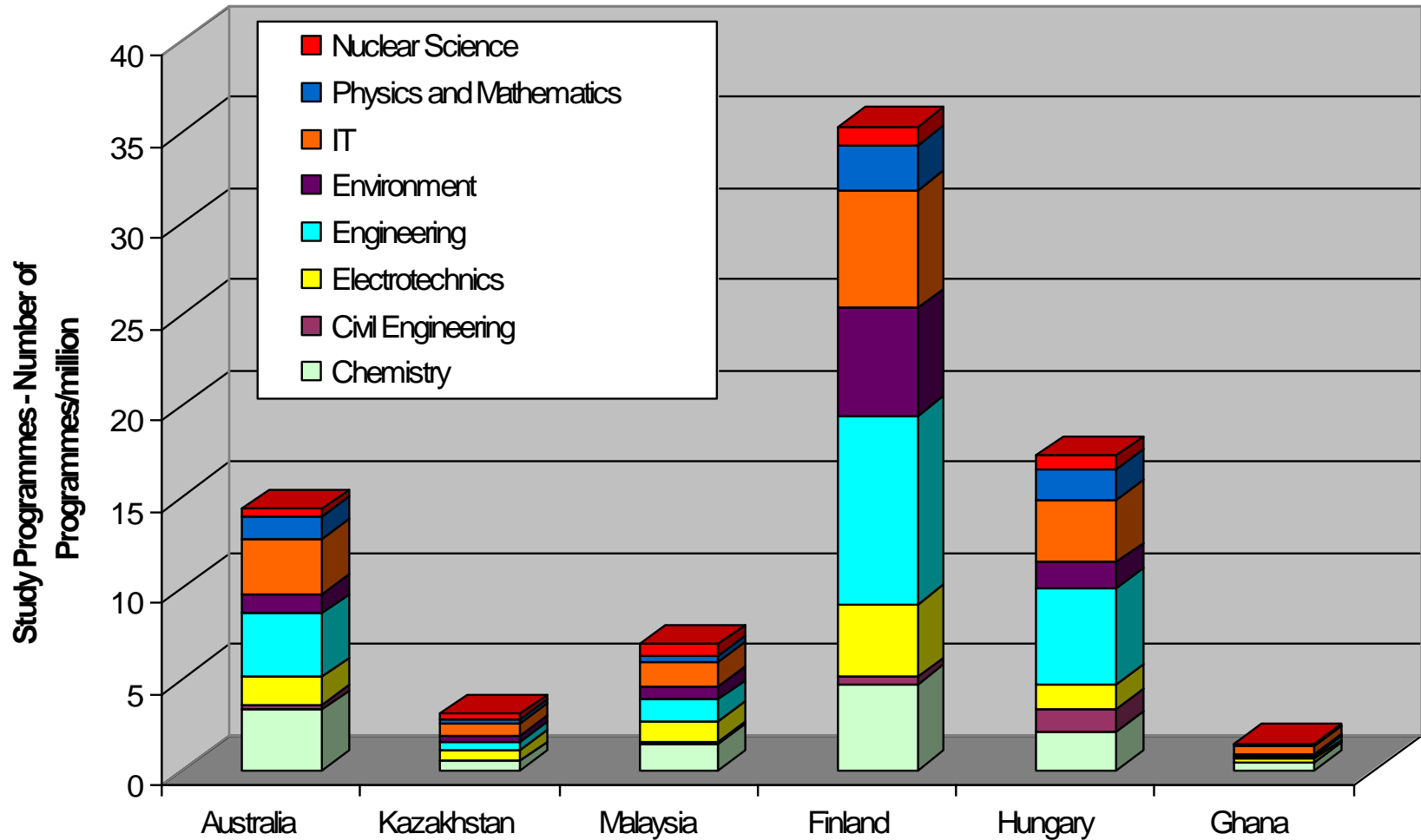
Time to build competence

Times for establishing nuclear engineering competence



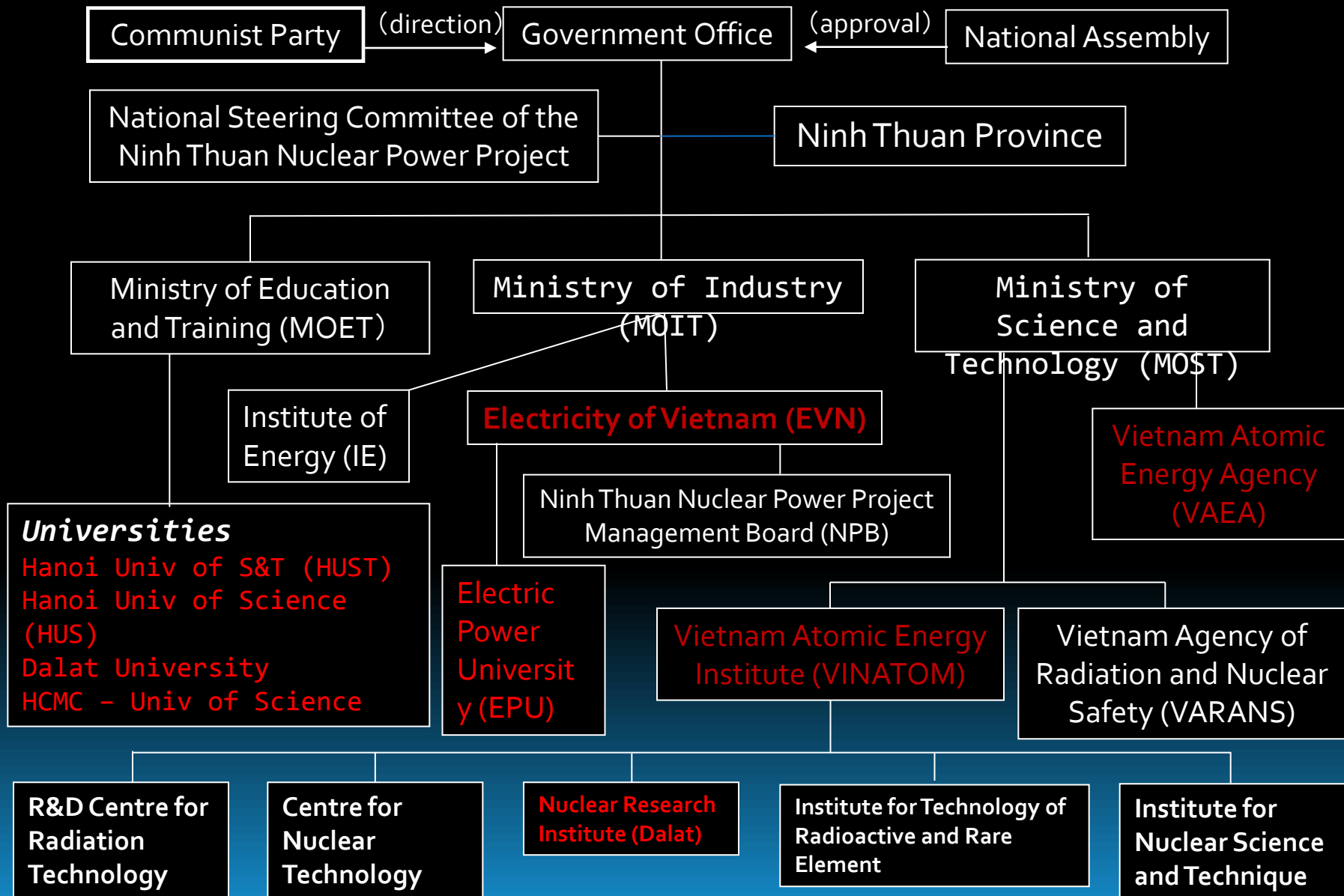
Source: S. Griffiths, J. Royen: „Assuring future nuclear safety competence“, NEA News 2000 - No. 18.1

Benchmarking Educational Capacity



The case of Vietnam

organizations involved



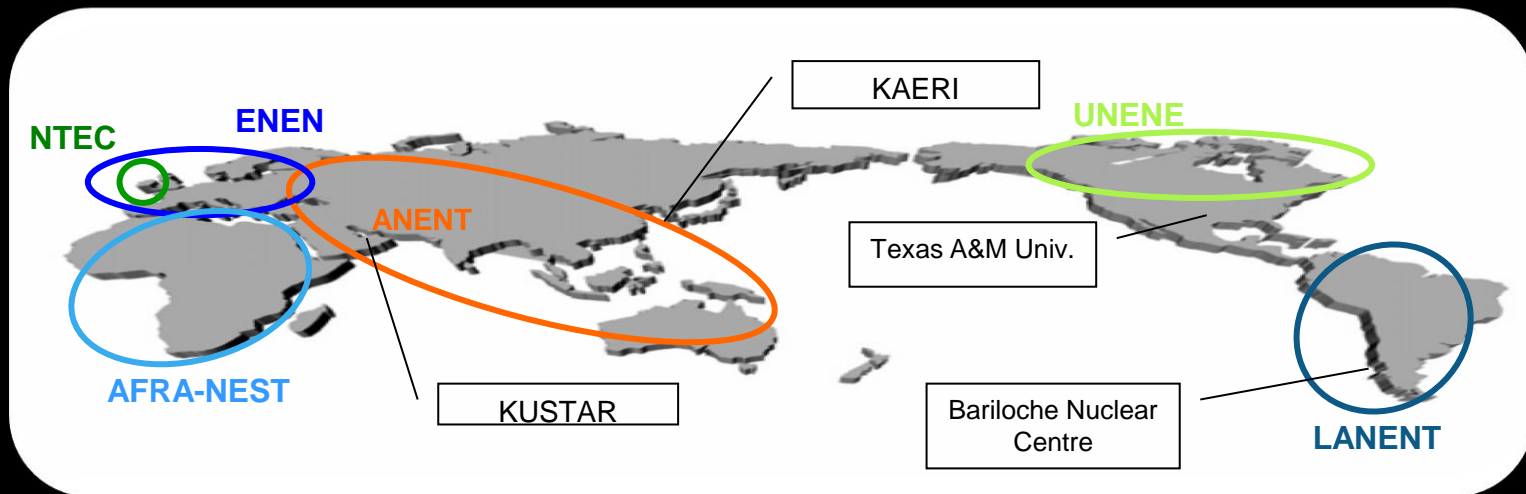
Harmonization



- "**Harmonization**" is the name given to the effort by industry to replace the variety of product standards and other regulatory policies adopted by nations in favor of uniform global standards.(Wikipedia)
- Considered in the case of IAEA **Harmonization** of E&T will stand for comparison(benchmarking) of nuclear educational standards, learning objectives, curricula, training materials, methodology, regulatory practices and requirements etc. with IAEA recommendations and guidance and providing a uniform global educational approach between the vendor countries.

Networking Nuclear Education

“...Networking education should be further made more efficient by interlinking networks and sharing best practices on a global scale...” SAGNE, 2010



To provide a forum to exchange the policy and strategies for nuclear education and training and to facilitate the regional and interregional cooperation to share educational experiences and resources:

- The Asian Network for Education in Nuclear Technology (ANENT)
- The European Nuclear Education Network Association (ENEN)
- The Nuclear Technology Education Consortium (NTEC)
- The University Network of Excellence in Nuclear Engineering (UNENE)
- African Regional Cooperative Agreement – Network for Education in Nuclear Science and Technology (AFRA-NEST)
- Regional Cooperative Agreement in Latin America and the Caribbean (ARCAL) – Bariloche Nuclear Centre in Argentina

What needs to be done

- Initiate together with IAEA an international project on harmonization in human resource development and capacity building,
- Develop a harmonized approach in education and training of safety responsible personnel in regulation, licensing, operation and maintenance,
- Invite all vendor countries to participate and drive the project.



THANK YOU