HUMAN RESOURCE DEVELOPMENT FOR AN INNOVATIVE NUCLEAR PROGRAM IN AN EMERGING COUNTRY

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International Conference on Human Resources Development for Introducing and Expanding Nuclear Power Programmes
United Arab Emirates, Abu Dhabi, 14-18 March, 2010
An Innovative Nuclear Power Program
(a variant to IAEA’s approach for infrastructure development)

Key Concept: TRANSFER OF TECHNOLOGY

Science (knowledge) may be transferred

BUT

Technology is not transferable,
Technology is developed.
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**Key Concept:** TECHNOLOGICAL CAPACITY BUILDING

Technological capacity building is enhanced by an effective participation in the development of an innovative nuclear reactor

(i.e. a reactor that contributes to sustainable energy development - Gen.IV International Forum and the INPRO project / IAEA).
IAEA’s approach for infrastructure development

When sufficient capacity is available
NESA using INPRO

NPP Operation

Preparations (Phase 2)

Construction (Phase 3)

Consider NP (Phase 1)

Milestones’ Approach

Energy Planning

Time

NESA - Nuclear Energy System Assessment
INPRO - International Project on Innovative Nuclear Reactors and Fuel Cycles
Preparing for assuming commitments & obligations

Infrastructure development program

1st. NPP Project

MILESTONE 1
Ready to make a knowledgeable commitment

MILESTONE 2
Ready to invite bids for the first NPP

MILESTONE 3
Ready to commission and operate the first NPP

PHASE 1
Considerations before a decision to launch a nuclear power programme is taken

PHASE 2
Preparatory work for the construction of a NPP after a policy decision has been taken

PHASE 3
Activities to implement a first NPP

Maintenance and continuous infrastructure improvement

Pre project
Project decision making
Construction
Operation / decommissioning

Feasibility study
Bidding process
Commissioning

~ 10 – 15 years

Nuclear power option included within the national energy strategy

IAEA's Milestone approach
An Innovative Nuclear Power Program
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Key concepts:

- **Technology** is not transferable but **developed**, 
- Work on the development of an innovative nuclear reactor **enhances** human resource capacity building.

Distinctive features:

- Development of R&D capabilities in parallel with the development of nuclear infrastructure, and

- Early participation in the development of an innovative nuclear reactor (e.g., Fixed Bed Nuclear Reactor, FBNR).
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Guidelines for establishing a HR development program

• Develop training courses in INPRO assessment methodology,

• Get involved in the R&D of non-nuclear components of an innovative nuclear reactor concept of national interest,

• Develop training courses in-house & abroad on nuclear engineering to qualify technicians, engineers and other professionals, in order to build a minimum human resource capability,

• Get involved in the R&D of nuclear components of the innovative nuclear reactor concept of interest as soon as the minimum nuclear infrastructure, including human resources, is available.
FBNR Nuclear Reactor for Developing Countries

An innovative small, simple in design, inherently safe and environmental friendly reactor

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