

**International Atomic Energy Agency Technical Cooperation Project INT/4/142
“Promoting Technology Development and Application of
Future Nuclear Energy Systems in Developing Countries”**

INPRO Dialogue Forum on Nuclear Energy Innovations

IAEA, 1– 4 February 2010

Welcome and Overview

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IAEA

International Atomic Energy Agency

The IAEA and its Mission



INPRO
International Project on
Innovative Nuclear Reactors
and Fuel Cycles

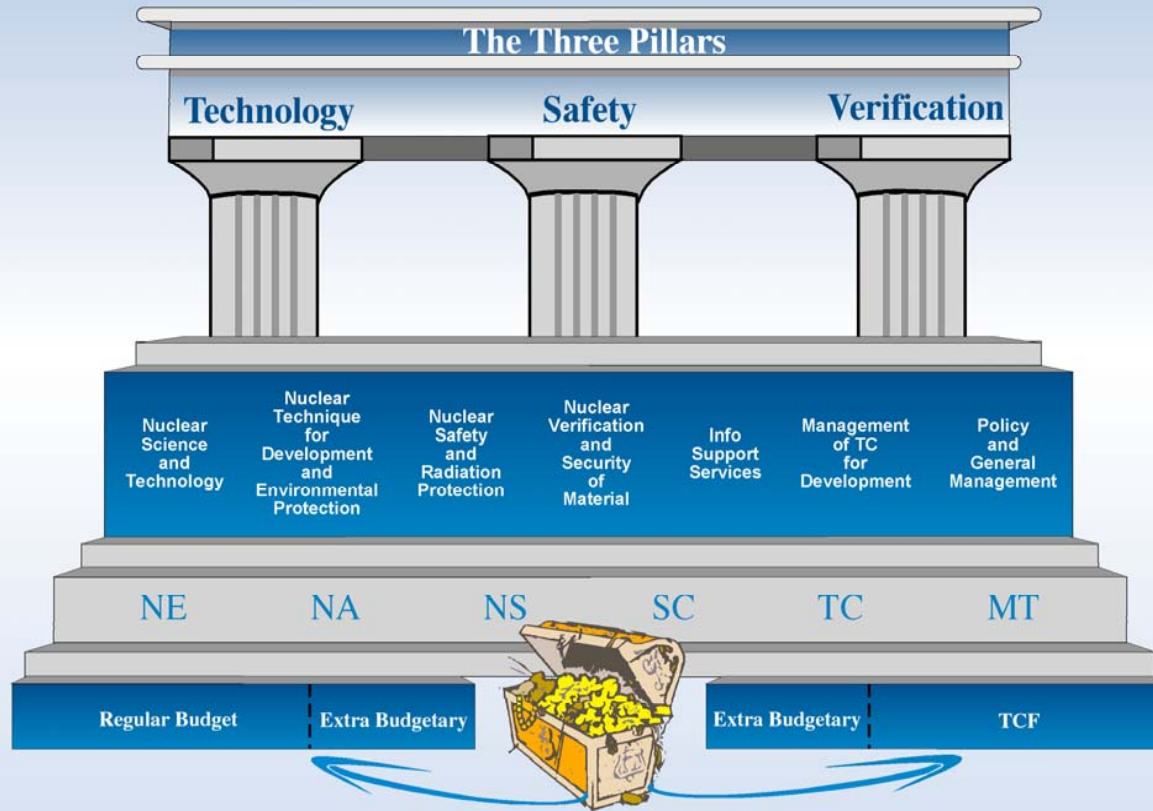
*Maximizing
the contribution of nuclear technology to the world
while
verifying its peaceful use*



Three “Pillars” of the IAEA



RELATIONSHIP BETWEEN MANDATE (GOALS, PILLARS)
STRUCTURE OF THE SECRETARIAT, PROGRAMME AND BUDGET



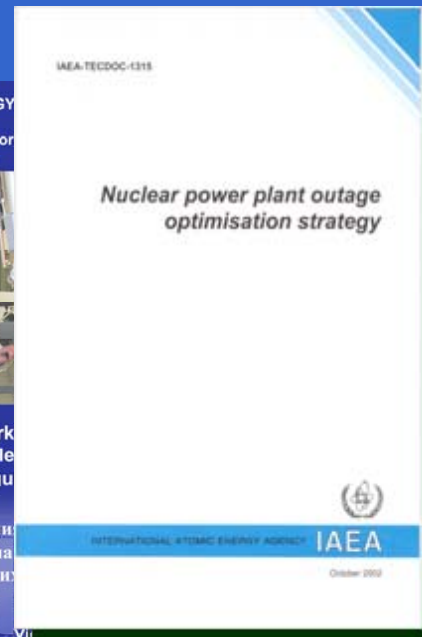
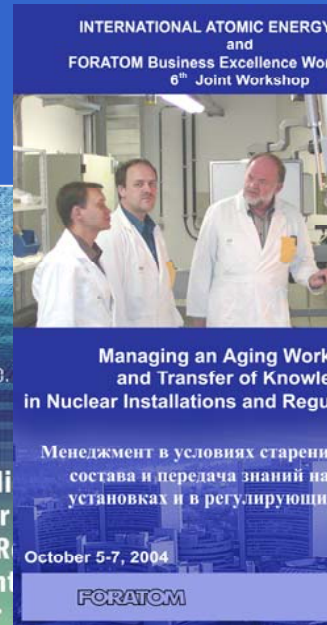
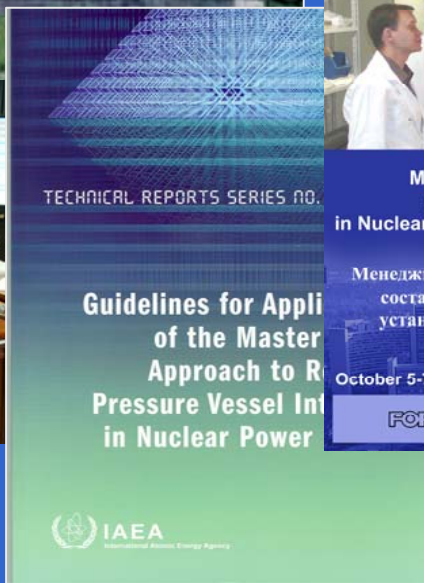
Nuclear Energy Department Activities



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Mission

1. Support to existing Nuclear Power for excellence
2. Catalysing of innovation for sustainable development
3. Support knowledge management, capacity building



Basic Principles of NP Peaceful Use

Beneficial

Benefits outweigh costs and risks

Open/transparent communication of all facets

Responsible

People and environment are protected

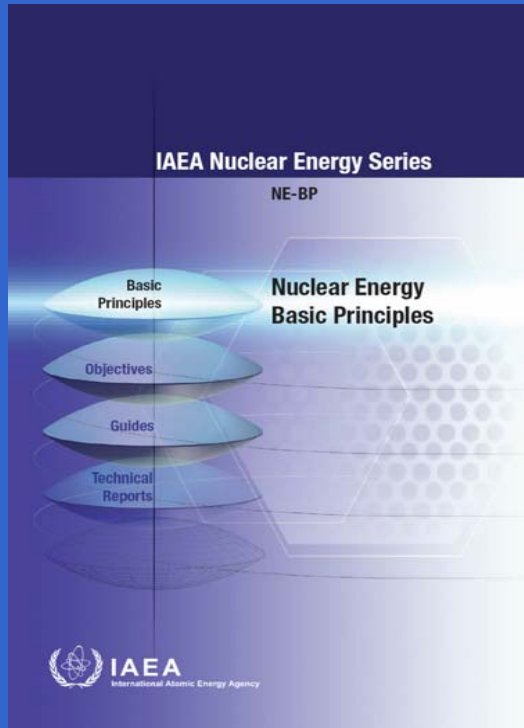
Limit risk of proliferation and malicious use

Sustainable

Long-term commitment

Efficient in using resources

Continuous improvement in technology



Lessons from Experience and Mistakes



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Three stages before nuclear electricity in the grid:

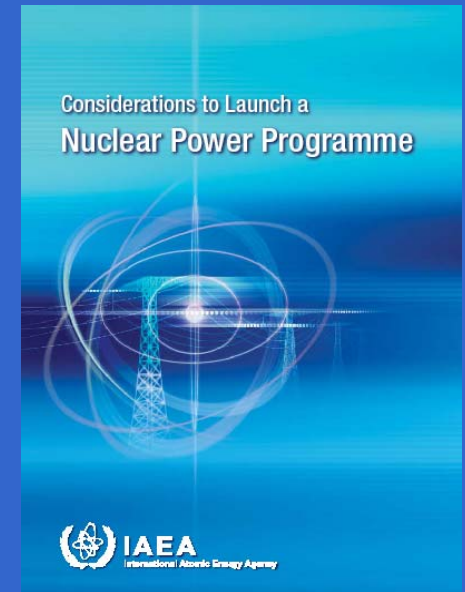
- **Considerations** before a decision is taken
- **Nuclear Infrastructure preparation**
- **Implementation of the first NPP**

Infrastructure Milestones

Milestone 1: **Understanding** of the commitments

Milestone 2: Ready to **request bid** for the first NPP

Milestone 3: Ready to **commission and operate** the first NPP

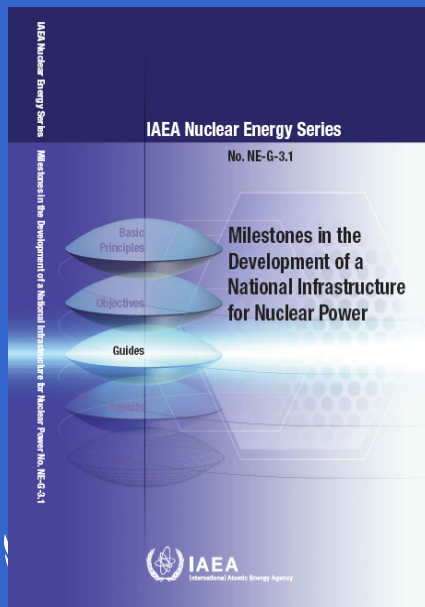


Infrastructure Elements

National Position
Regulatory Framework
Financing
Safeguards
Emergency Planning
Nuclear Waste
Nuclear Safety
Stakeholder Involvement
Management

Legal Framework
Radiation Protection
Human Resources
Security
Nuclear Fuel Cycle
Environmental Protection
Site selection
Electrical Grid
Industrial Involvement

**Comprehensive
approach!**



Seeing Nuclear Programme in Perspective



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N E S A

NUCLEAR ENERGY SYSTEM
ASSESSMENT

Holistic Approach

INPRO Methodology



Assistance to
Member States

Strategic Planning

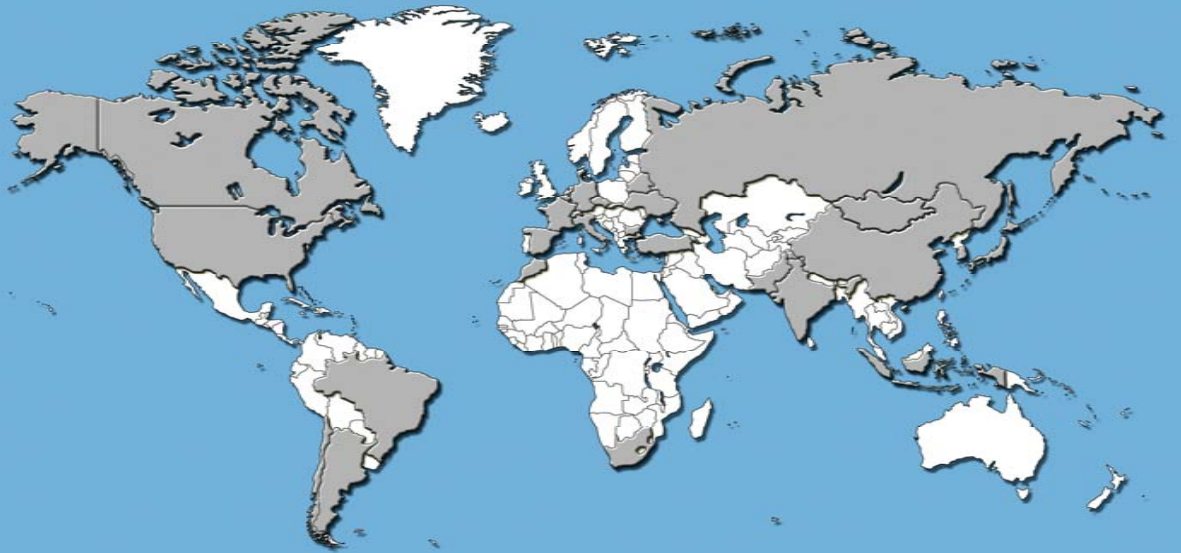
Decision Making



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INPRO objectives:

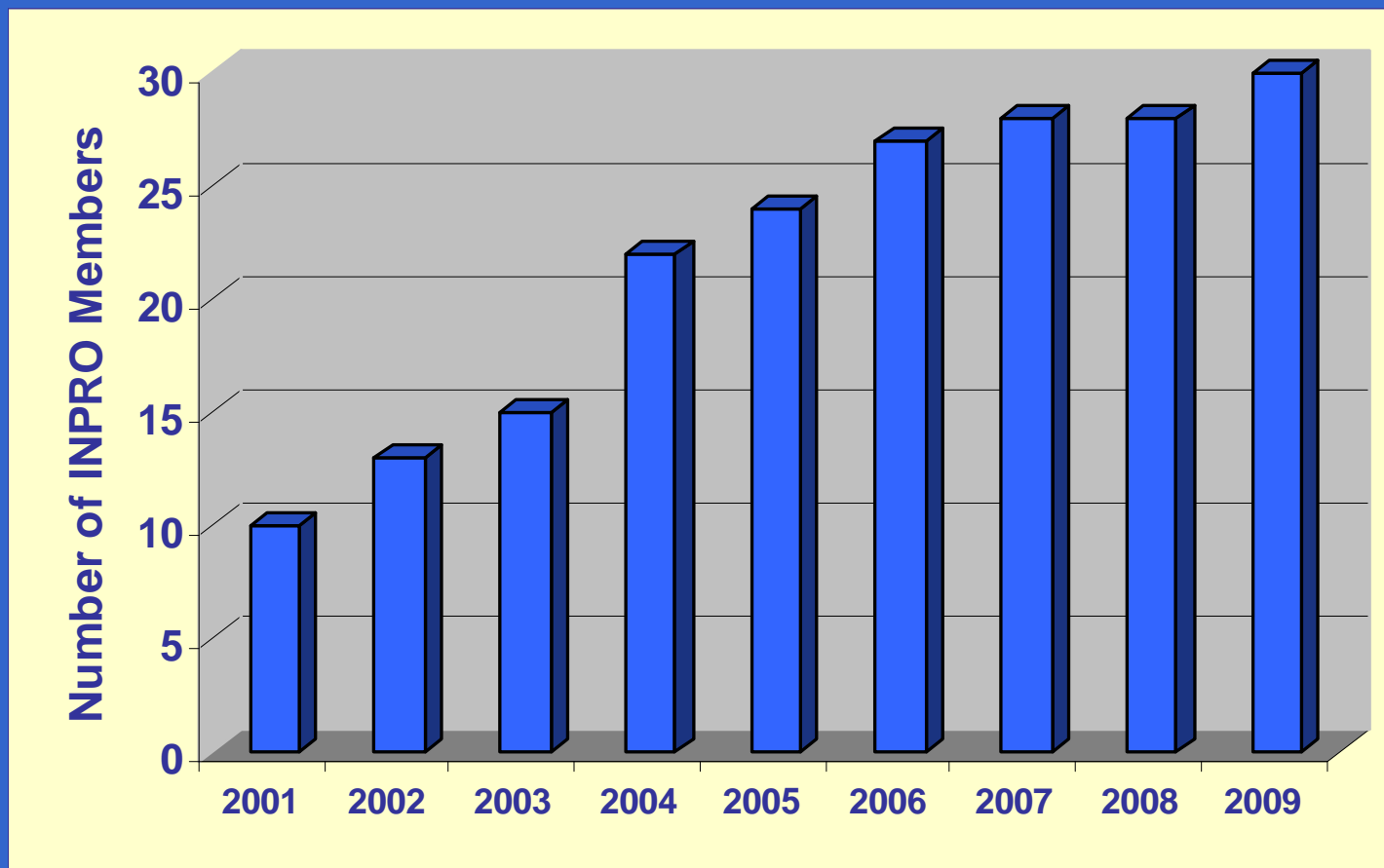
To ensure that NES contributes to **sustainable energy needs** of the 21st century;
Technology holders and users consider jointly desired innovations in nuclear reactors and fuel cycles



INPRO membership



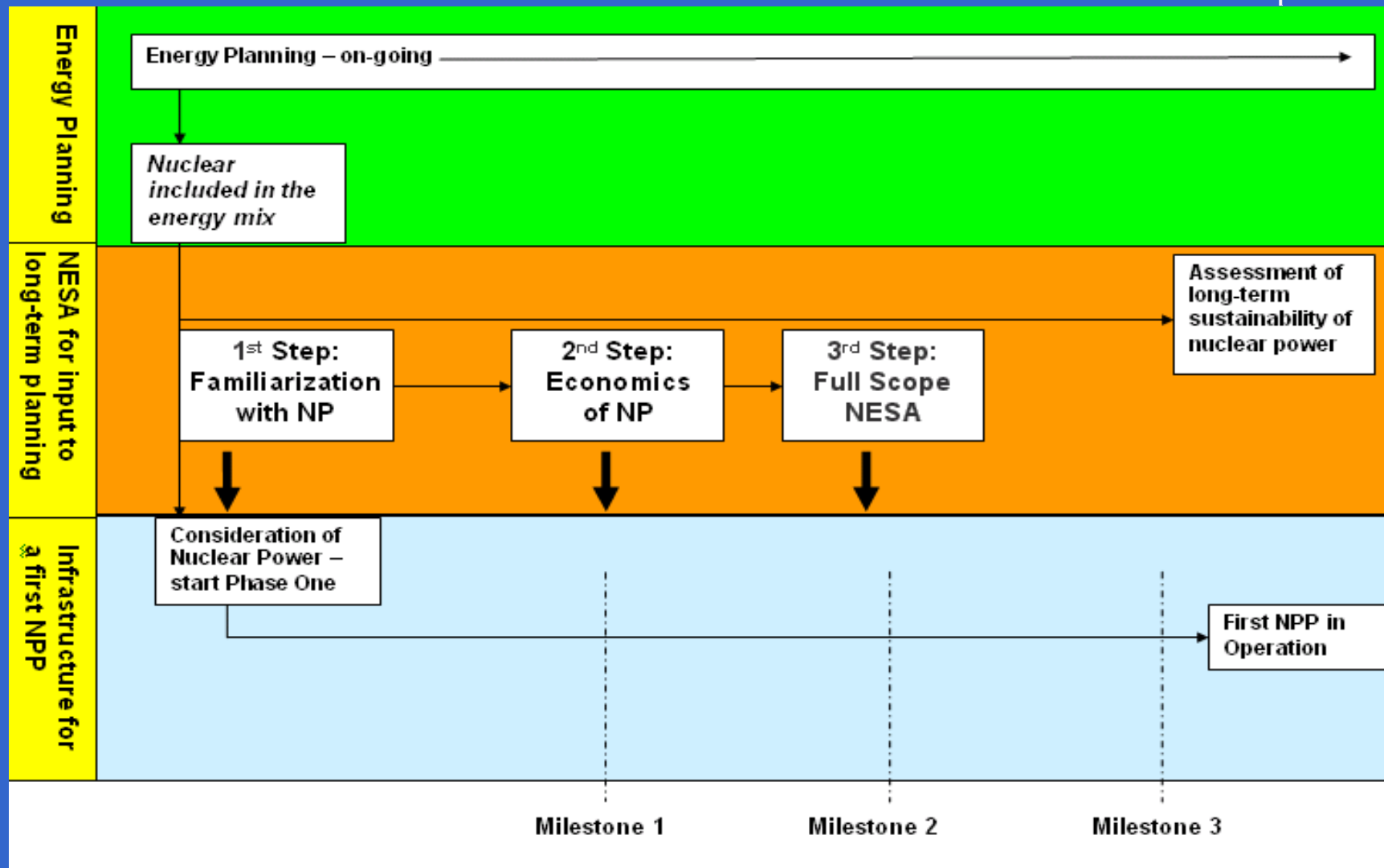
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- **One of several tools** developed by the IAEA
- Supports long-term strategic planning
 - **Assessment of a given NES** in terms of long-term sustainability
 - Identification of gaps
- Can be used by **technology holders and users**, including newcomer countries
- **Leads to joint actions** needed to address sustainability gaps
 - Innovations (technology, institutional arrangements, etc)

- Member States requesting assistance
 - to consider introduction or expansion of nuclear energy in the national energy mix get support for **energy planning studies** from NE/PESS
 - for building **nuclear infrastructure** leading to a first **NPP** get support through NE/NPES (milestones document and INIR missions)
 - with assessing long term sustainability of nuclear energy systems which supports **strategic national nuclear energy planning** get support from NE/INPRO (NESA using INPRO methodology)

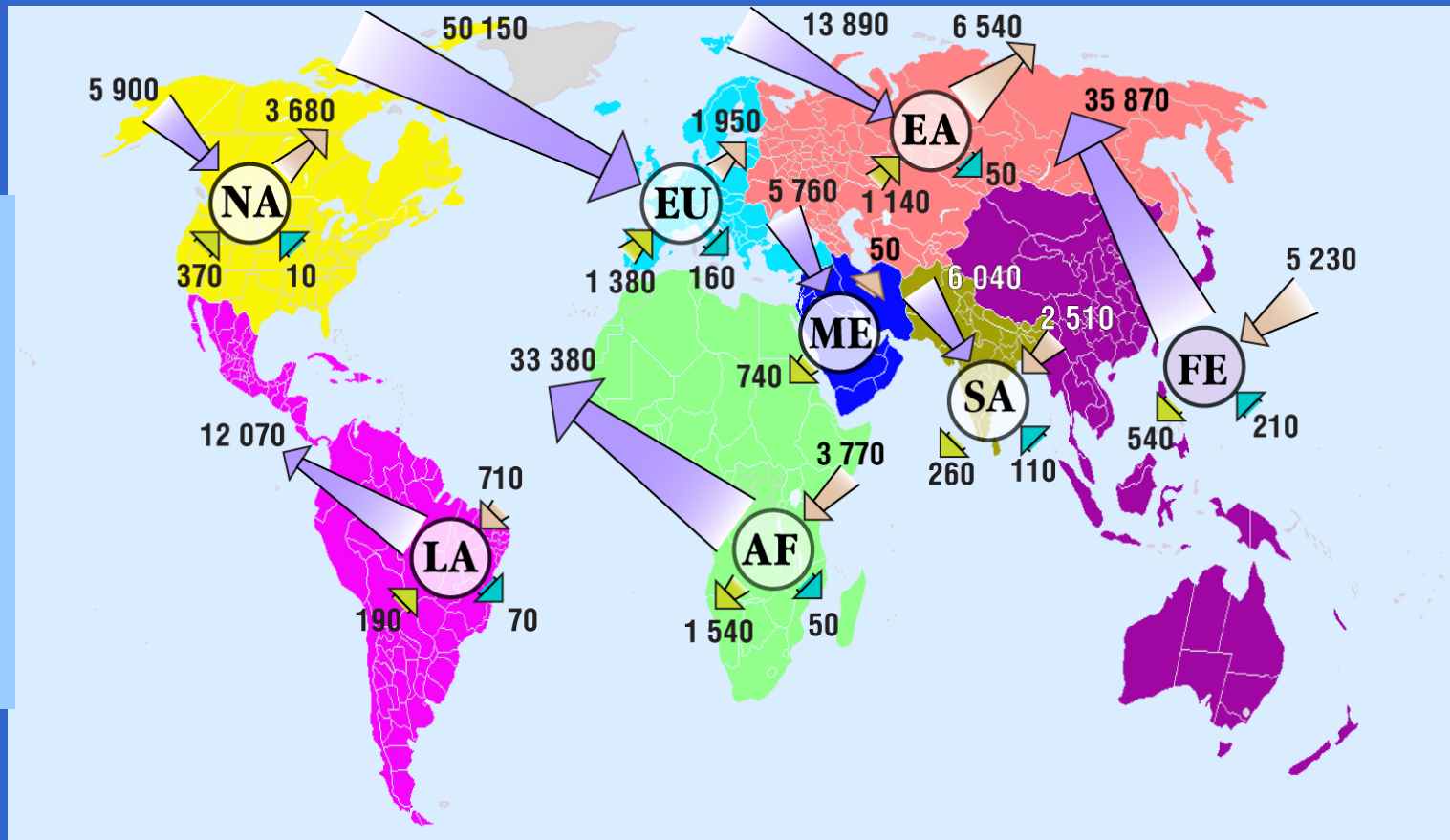
Integrated Member States Support



Interregional Flows of Material



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INPRO study:

High scenario (2050)

2030 700 GWe
2050 2000 GWe
2100 10000 GWe

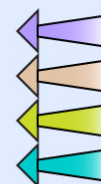
World production, t/y

U - 231500

F - 27800

SNF - 24700

MOX - 1630



U - natural uranium flows for enrichment, t/y

F - nuclear fuel flows, t/y

SNF - spent nuclear fuel flows for reprocessing, t/y

MOX - MOX fuel flows, t/y

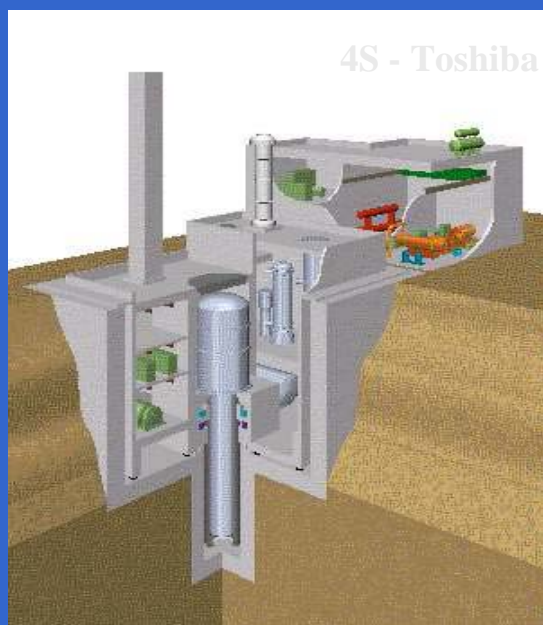


IAEA

Transportable NPPs: new opportunities



1. Fully **Pre-fabricated plant**
 - "Ready-to-operate" supply
 - High quality of fabrication



2. **Operational Support from Supplier (BOO)**
3. **Nuclear "Battery":** long time core, lease
4. **Flexibility:** Relocation, Investments
5. **Institutional Innovations.**

- INPRO Dialogue Forum is a key mechanism to **bring together technology holders and users** and other stakeholders to facilitate joint actions that support INPRO objectives:
 - Contribution of NE to **sustainable** energy needs
 - **Innovations** needed for sustainability



Thank you!

- Department of Nuclear Applications
- ***Department of Nuclear Energy***
- Department of Nuclear ***Safety*** and Security
- Department of Safeguards
- Department of ***Technical Cooperation***
- Department of Management

Dept. of Nuclear Energy



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The Department fosters the efficient and safe use of nuclear power by *supporting* existing and new nuclear programmes around the world, *catalyzing* innovation and *building* indigenous capability in energy planning, analysis, and nuclear information and knowledge