The Abdus Salam
International Centre
for Theoretical Physics

2473-16

Joint ICTP-IAEA School on Nuclear Energy Management

15 July - 3 August, 2013

Lecture Notes

M.Lipar
IAEA, Vienna, Austria

The ICTP/IAEA School of Nuclear Energy Management School, Trieste, 18 July 2013

Safety Infrastructure

Miroslav Lipár
Head, Operational Safety Section
M.Lipar@iaea.org +43 1 2600 22691

IAEA
International Atomic Energy Agency

Outline

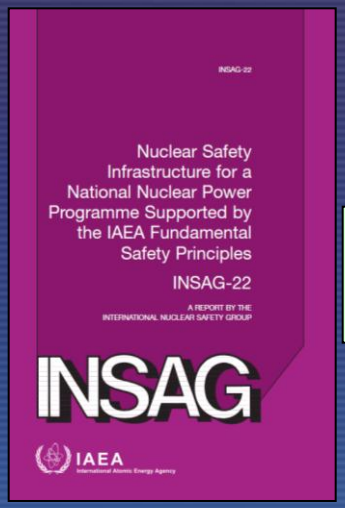
- National infrastructure development
- Regulatory infrastructure
- IAEA Safety Standards
- Structure of GSR Part 1
- Activities and organization of regulatory body

IAEA

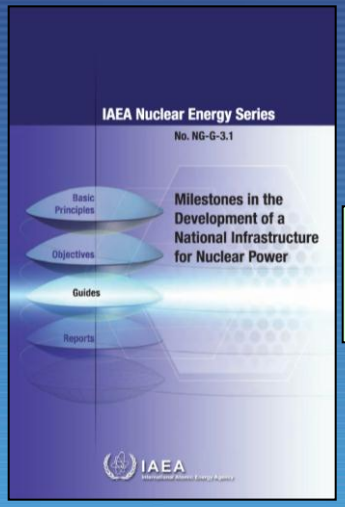
National Infrastructure Development (1)

Up to 100 years or more

Phased Approach

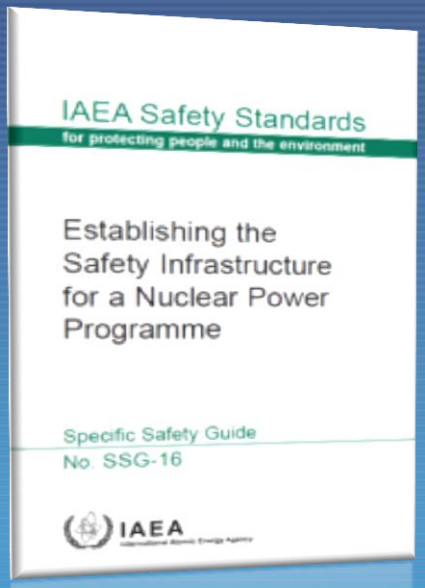


Considerations before decision to launch → **Prep work for construction** → **Construction** → **Operation** → **Decommissioning**

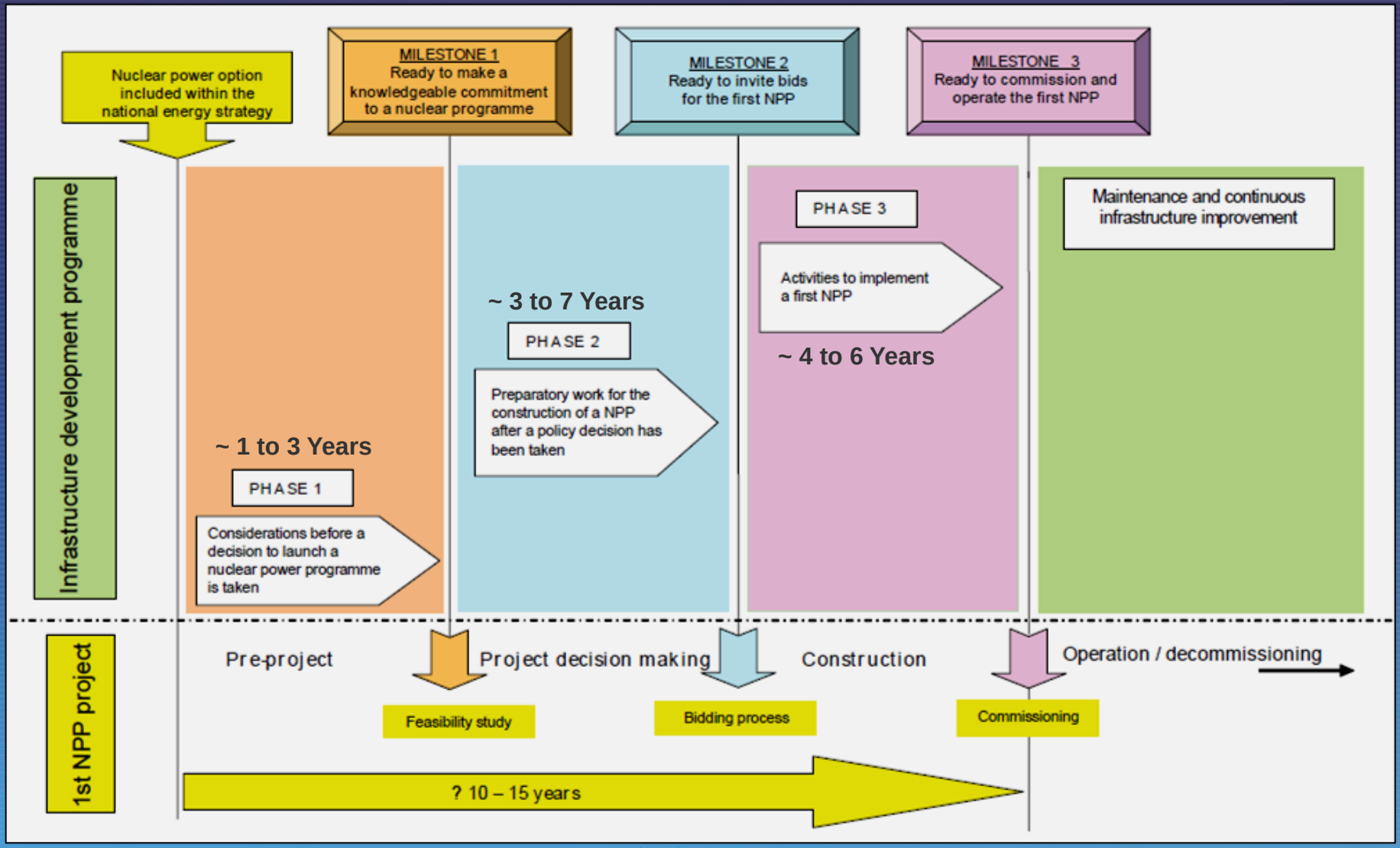


Considerations before decision to launch → **Prep work for construction** → **Activities to implement NPP**

IAEA
International Atomic Energy Agency



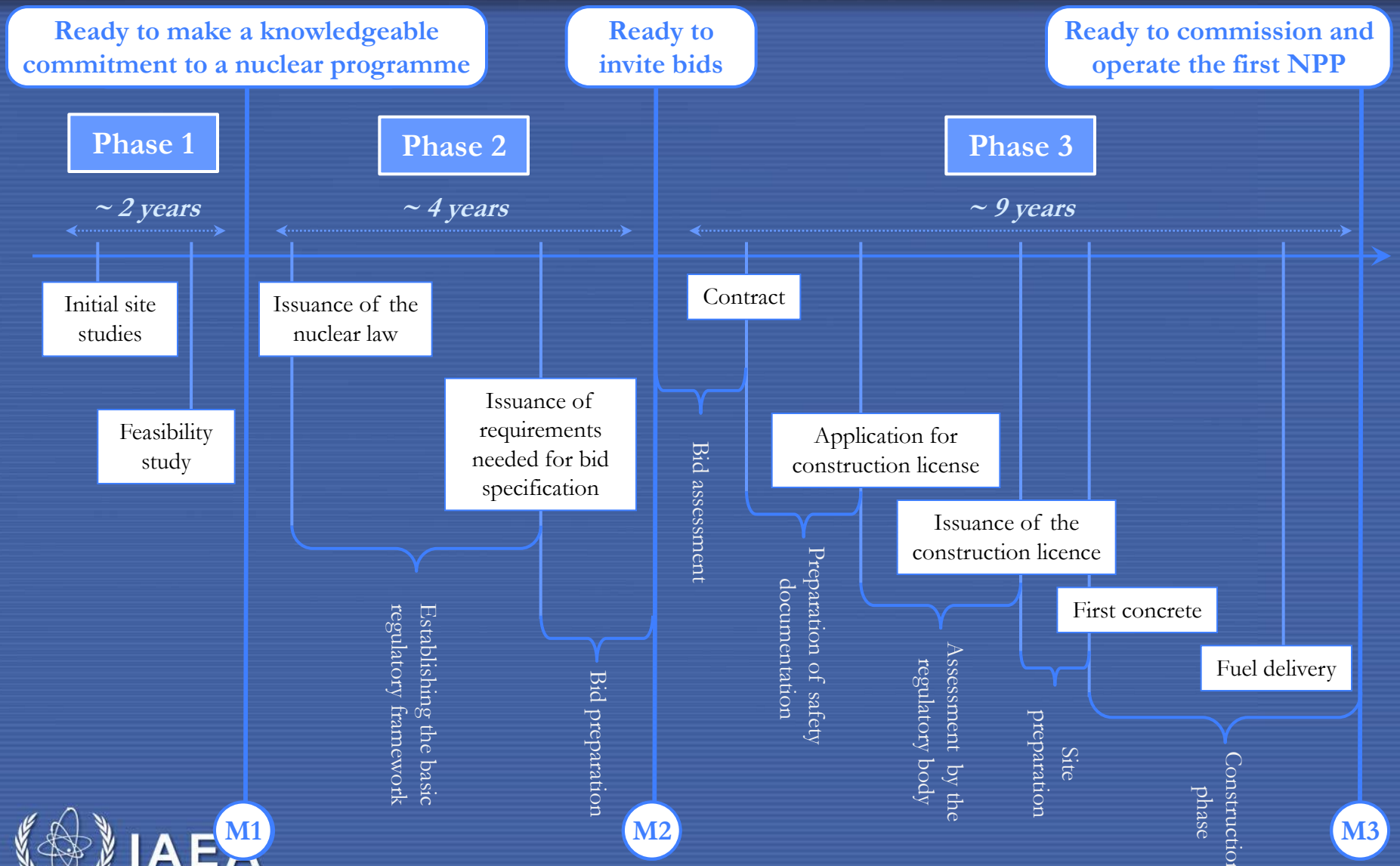
National Infrastructure Development (2)



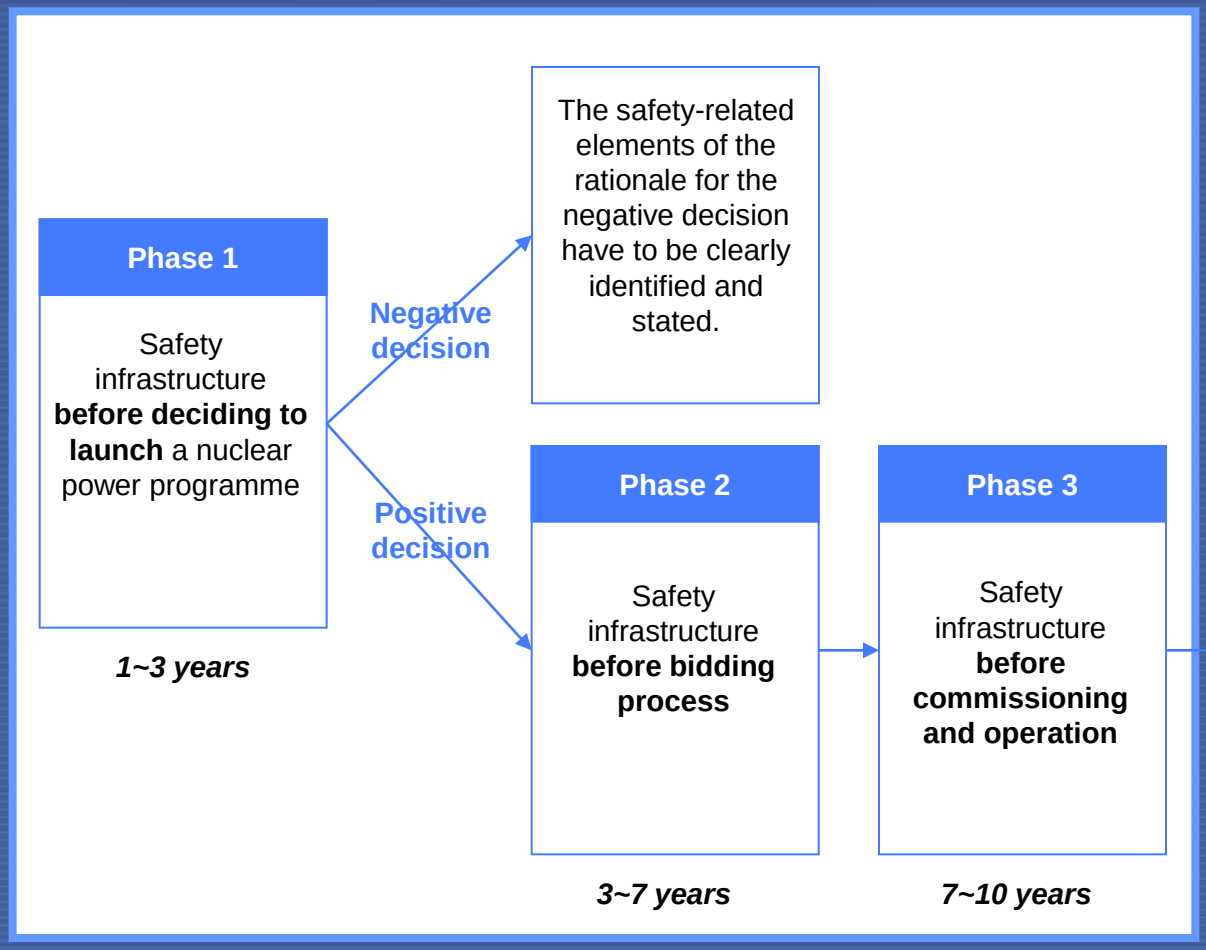
Source: Milestones in the Development of a National Infrastructure for Nuclear Power, IAEA Nuclear Energy Series No. NG-G-3.1

IAEA
International Atomic Energy Agency

Important steps in nuclear power programme development



Main phases of safety infrastructure development



SSG-16 contains actions to apply the IAEA safety principles and requirements progressively during Phases 1, 2 and 3 of the implementation of a nuclear power programme. (Phases based on Milestones and INSAG-22)

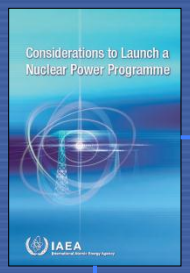
IAEA

Establishing a Regulatory Infrastructure

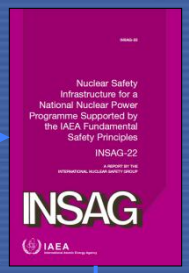
- IAEA Safety Guide SSG-16 (DS-424)
  - Why a safety guide?
  - Roles of the safety guide
    - Actions to gradually apply the IAEA Safety Standards
    - Self Assessment and Safety Review Services
- http://www-pub.iaea.org/MTCD/publications/PDF/Pub1507_Web.pdf

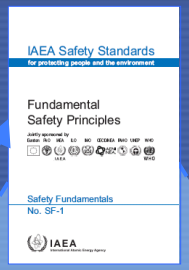
The Central Role of SSG-16

IAEA Nuclear Power Support Group's Brochure



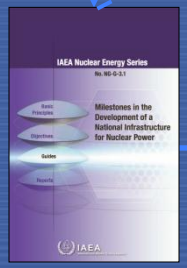
International Nuclear Safety Group's Report-22





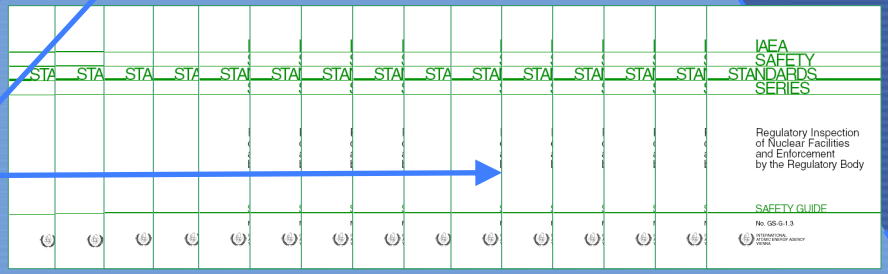
FUNDAMENTALS

REQUIREMENTS



IAEA publication NG-G-3.1

SSG-16 Establishing the Safety Infrastructure for a Nuclear Power Programme

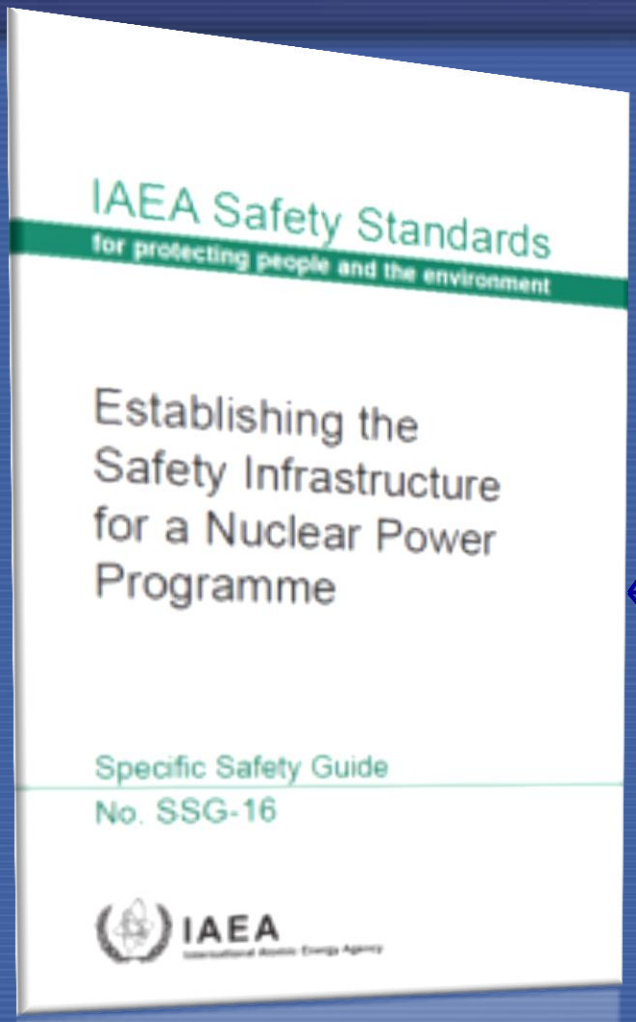


GUIDES

IAEA SAFETY STANDARDS

IAEA

NEW SAFETY GUIDE FOR PROGRESSSIVE IMPLEMENTATION OF SAFETY STANDARDS SSG-16



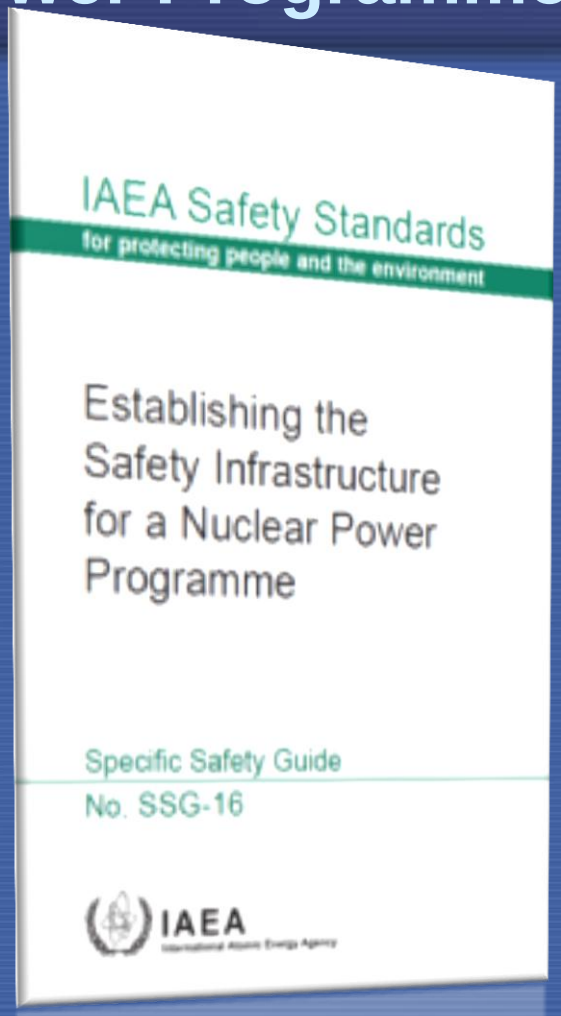
1. Road-map to gradually apply the IAEA Safety Standards

2. Terms of reference to tailor the Safety Review Services

3. Training framework for embarking countries

IAEA

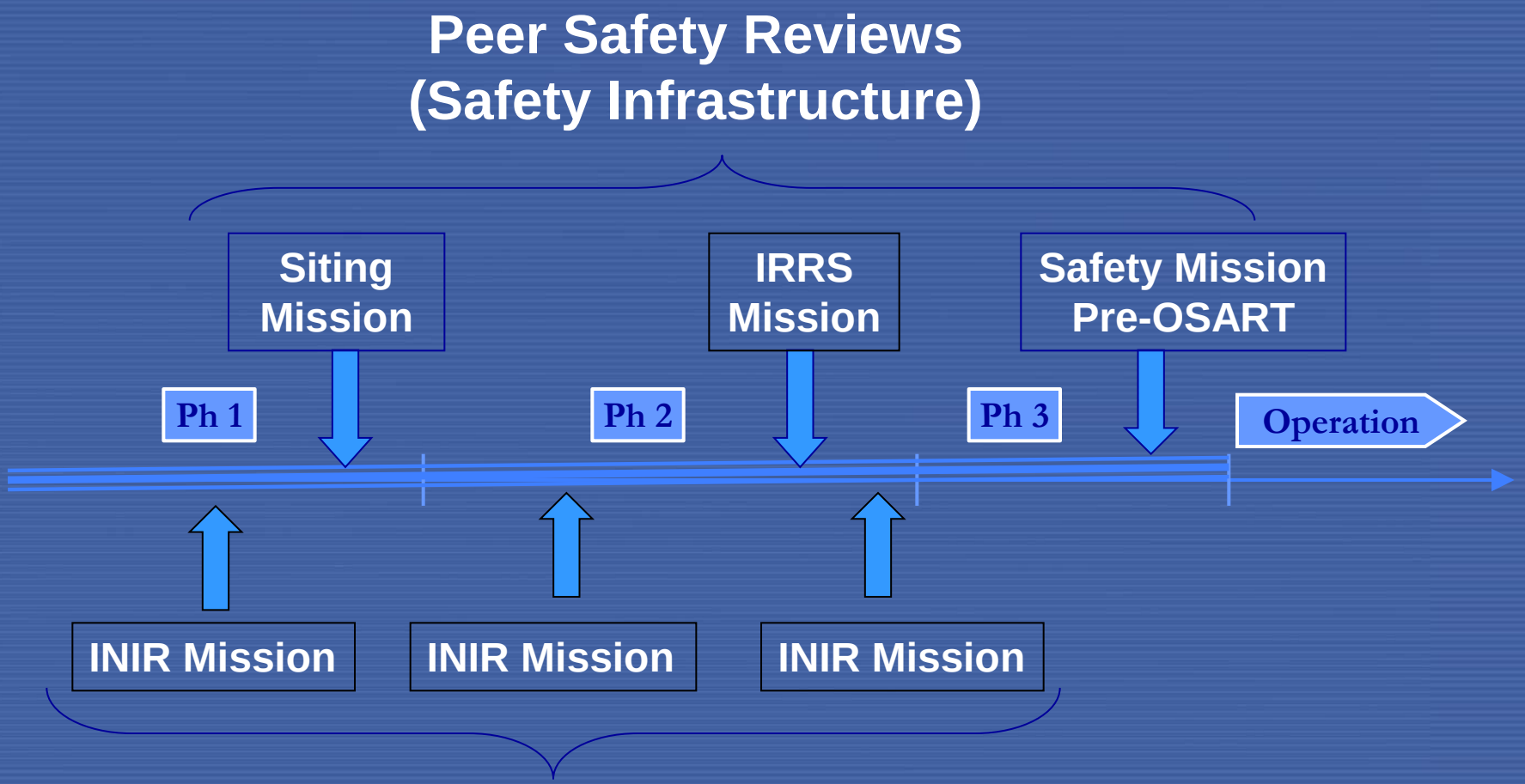
Establishing the Safety Infrastructure for a Nuclear Power Programme—Specific Safety Guide 16



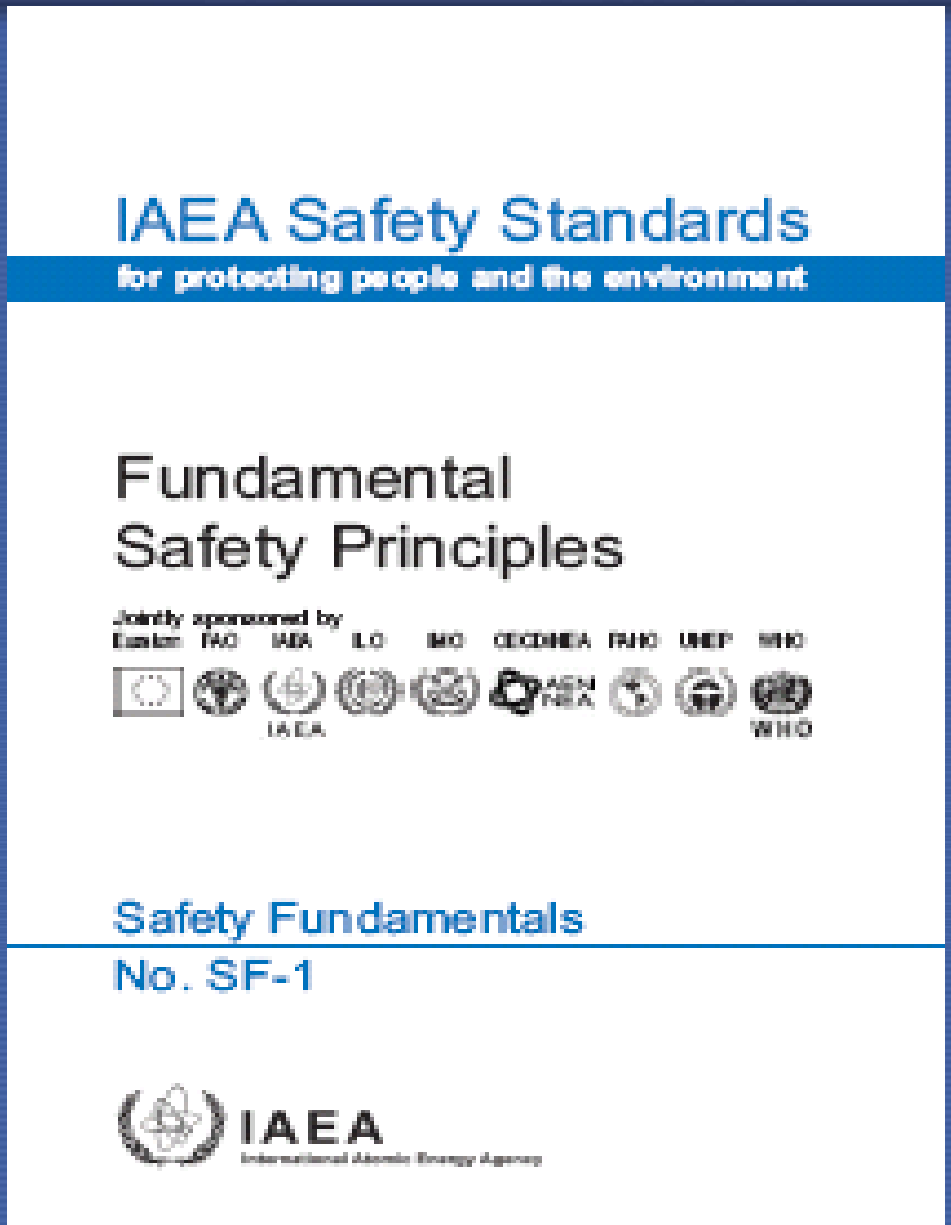
- IAEA's resource for regulatory body development
- Covers 200 actions to be taken by the government, regulatory body and the operating organization for NPP development
- Provides guidance on how to apply the IAEA Safety Standards in the development of a nuclear power programme
- Provides recommendations, presented in the form of sequential actions, on meeting safety requirements progressively during Phases 1, 2 and 3 of the development of the safety infrastructure (Road-map)

IAEA

Establishing the Safety Infrastructure – Peer Reviews



Fundamental Safety Principles



IAEA

Principle 1: Responsibility for Safety

The prime responsibility for safety must rest with the person or organization responsible for facilities and activities that give rise to radiation risks.

The licensee retains the prime responsibility for safety and this responsibility cannot be delegated. Other groups, such as designers, manufacturers and constructors, employers, contractors, and consignors and carriers, also have legal, professional or functional responsibilities with regard to safety.

IAEA

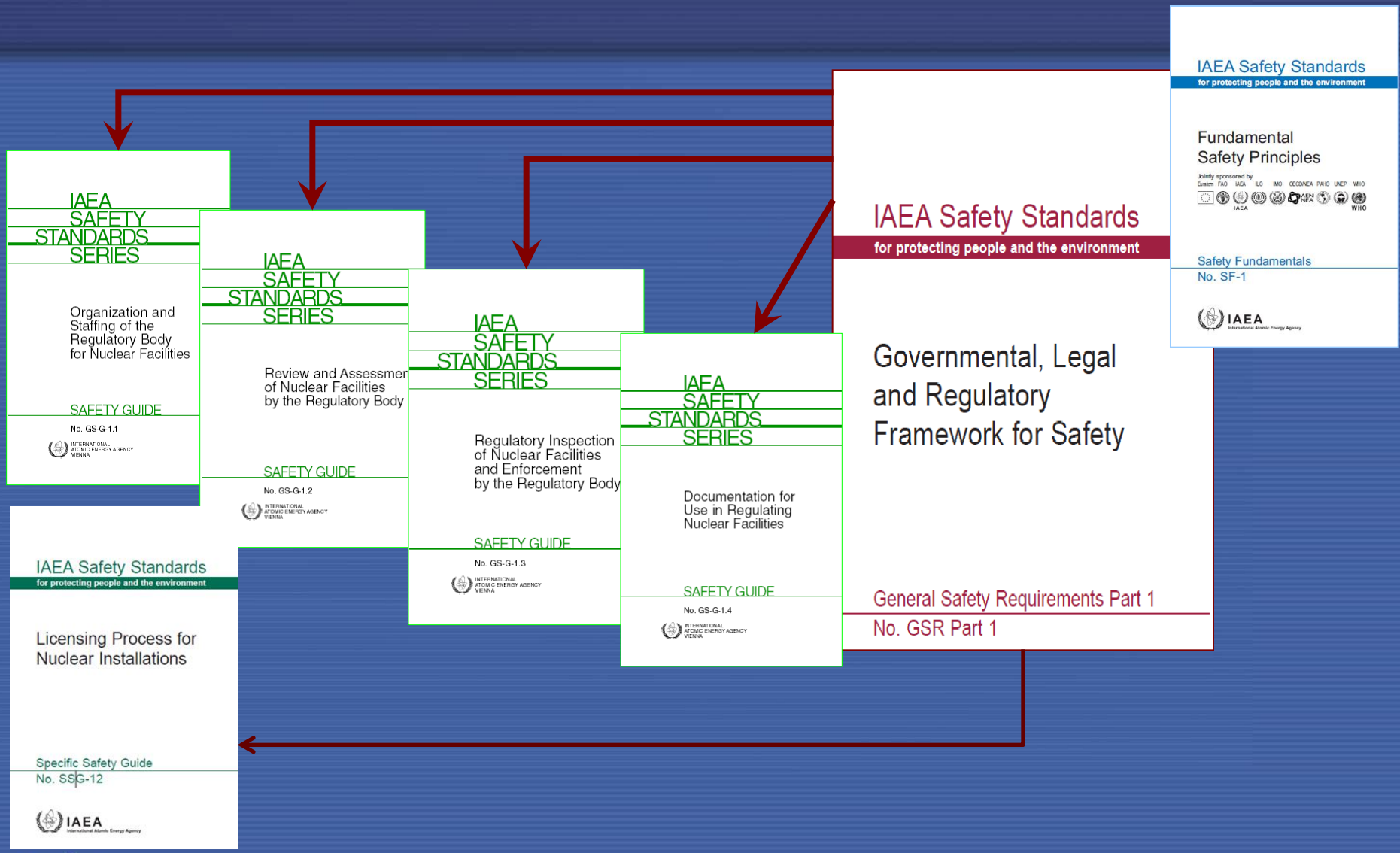
Principle 2: Role of government

An effective legal and governmental framework for safety, including an independent regulatory body, must be established and maintained.

"The government is responsible for the adoption within its national legal system of such legislation, regulations, and other standards and measures as may be necessary to fulfil all its national responsibilities and international obligations effectively, and for the establishment of an independent regulatory body."

IAEA

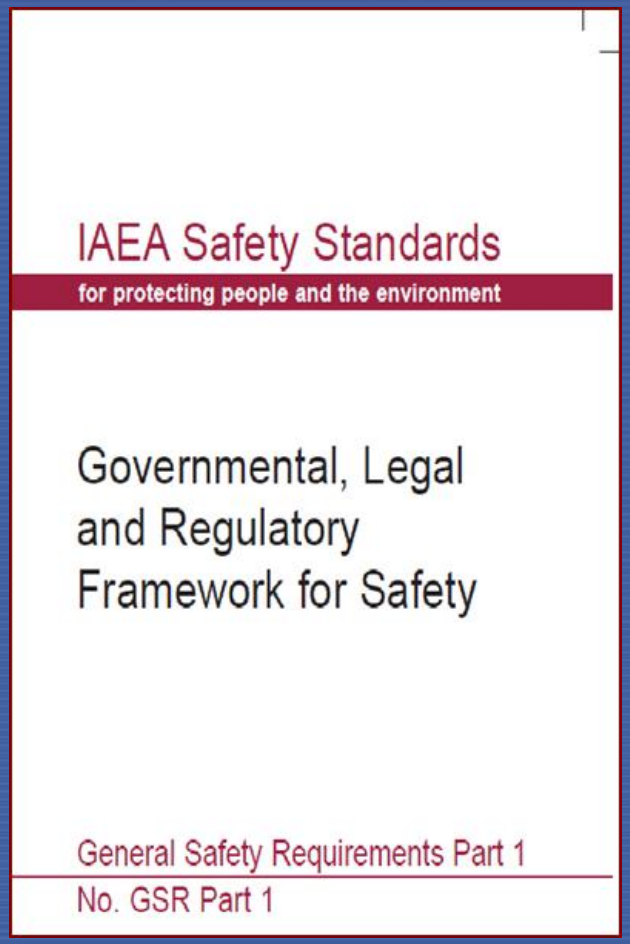
IAEA Safety Standards for Regulators



IAEA


Well, its our legal pyramid.
It became so heavy that it sank!

Structure of GSR Part 1



- RESPONSIBILITIES AND FUNCTIONS OF THE GOVERNMENT
- THE GLOBAL SAFETY REGIME
- RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY

IAEA

Basic mission of nuclear safety regulatory authority

Effective protection of the public health and safety, security, and of the environment.

RESPONSIBILITIES AND FUNCTIONS OF THE GOVERNMENT (1)

- Establish a national policy and strategy for safety
- Establish and maintain appropriate governmental, legal, and regulatory framework for safety
- Establish effectively independent regulatory body
- Assign prime responsibility of safety to the organization responsible for the activity
- Ensure effective coordination between governmental organizations
- Make provisions for emergency preparedness

IAEA

Regulatory Independence

Elements of Regulatory Independence

- ***Political***
- ***Legislative***
- ***Financial***
- ***Competence***
- ***Information to the Public***
- ***International***

COMPETENCIES

RESPONSIBILITIES AND FUNCTIONS OF THE GOVERNMENT (2)

- Establish system for protective actions to reduce undo radiation risks from unregulated sources
- Make provisions for safe decommissioning of facilities; management and disposal of radioactive waste; and management of spent fuel
- Make provisions for building and maintaining competence of all parties having responsibilities for safety
- Ensure arrangements established for interfaces of safety with nuclear security and with Safeguards
- Make provisions for technical services related to safety such as personal dosimetry and environmental monitoring

IAEA

RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY

- Organization, effective independence, and competence to discharge its responsibilities
- Establish and implement management system
- Obtain technical advice as necessary
- Establish communications with authorized parties
- Ensure stable and consistent regulatory control
- Make provisions for establishing, maintaining, and retrieving adequate records for safety of facilities and activities

ACTIVITIES OF THE REGULATORY BODY (1)

- **Development of regulations and guides**
  - Domestic legal system
  - Nature and extent of regulated activities
  - Regulatory approach selected
- **Authorization (also called licensing)**
  - Safety has to be demonstrated
  - Graded approach (registration - multi-stage authorization process)
  - Guidance on format and content of the documents

ACTIVITIES OF THE REGULATORY BODY (2)

- **Review and assessment**
  - Principles and criteria being used should be available to the operators
  - Information - complete, accurate, verifiable
  - Programme of review and assessment
  - Periodic safety re-assessment

ACTIVITIES OF THE REGULATORY BODY (3)

- **Inspection and enforcement**
  - Facilities, equipment
  - Documents
  - Persons
  - Timely identification and correction of deficiencies/deviations
  - Distribution of lessons learned – feedback process

ACTIVITIES OF THE REGULATORY BODY (4)

- **Inspection**
  - Systematic programme
  - Planned, reactive
  - Inspection report
- **Enforcement**
  - graded approach: warning letter→withdrawal of license
  - All enforcement decisions are in written form

IAEA

ORGANIZATION OF THE REGULATORY BODY (1)

- Influenced by many factors - no single model
- Structure should correspond to the extent and scope of the regulated activities
- Effectiveness and efficiency
- Resources, authority, independence, communication lines

IAEA

There is no single model for a Regulatory body.

ORGANIZATION OF THE REGULATORY BODY (2)

- If the regulatory body consists of more authorities (definition of responsibilities, co-ordination)
- Outside technical support (technical support organization, university, private consultant, expertise, independence)


I guess it's better to have the regulators fighting with each other than with me
OPERATOR

Conclusions

- Safety is an enabling condition for a sustainable nuclear power programme
- Safety is an integral in all infrastructure issues
- Safety cannot be outsourced
- A strong leadership and safety culture are essential components
- Weak links need to be identified and eliminated

IAEA

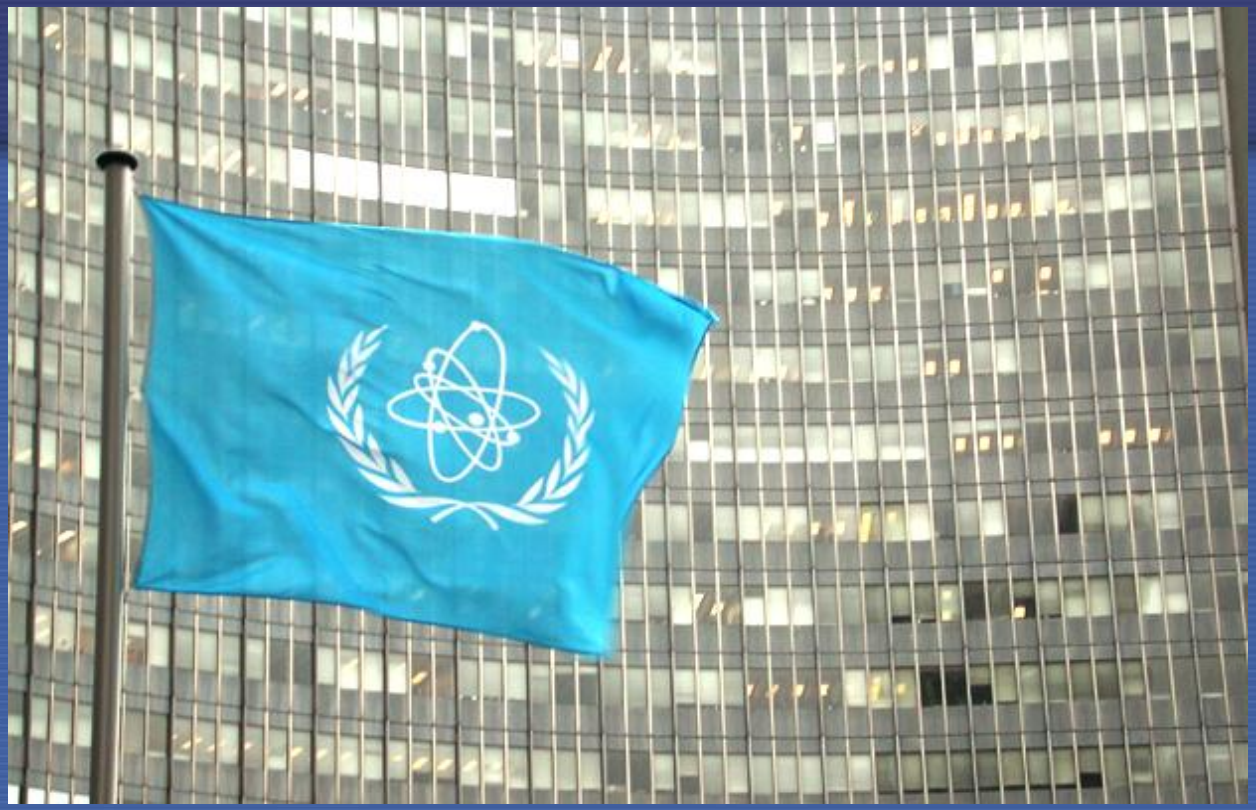
Conclusions

- **Development of a nuclear power programme is a monumental national undertaking with many international implications**

- **Incorporation of safety elements from the VERY BEGINNING of nuclear programme development is essential to a safe and sustainable programme, and should continue after start of operation**

IAEA


There are advantages to being the youngest! You can move fast!



…Thank you for your attention

http://www.iaea.org

IAEA