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**Joint ICTP-IAEA School of Nuclear Energy Management**

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# Establishing the Safety Infrastructure for a Nuclear Power Programme

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# Establishing the Safety Infrastructure for a Nuclear Power Programme

## IAEA/ICPT School of Nuclear Energy Management

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*16 August 2011*

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# Contents

- Why a safety guide
- Roles of safety guide
  - Actions to gradually apply the IAEA Safety Standards
  - Self Assessment and Safety Review Services
  - Training framework and safety packages for embarking countries
- Considerations with safety infrastructure

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# Some important issues for Member States Considering the Introduction of Nuclear Power

- Many countries in early phases of infrastructure development
- Significant, broad set of issues that need to be addressed to safely introduce nuclear power
- Countries getting help from various sources
- Obvious need for coordination and communication among:
  - *domestic participants*
  - *foreign participants*
- Underestimation of the time, resources and commitment for the implementation of a nuclear infrastructure sustaining long term safety
- Need for improving international confidence and trust regarding nuclear safety

  → Goal to have key safety infrastructure elements adequately addressed before invitation of bids with a plan for long term sustainability.

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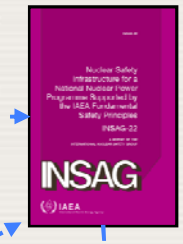
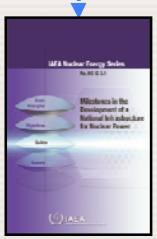
# The central role of Safety Infrastructure Guide SSG-16

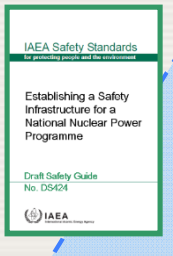
IAEA Nuclear Power Support Group's BROCHURE


International Nuclear Safety Group's REPORT-22



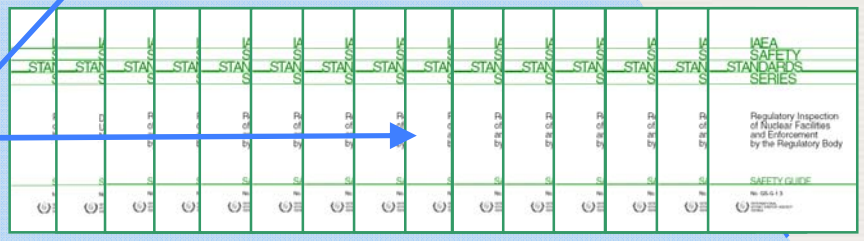
"Milestones" document IAEA NG-G-3.1





FUNDAMENTALS


REQUIREMENTS




GUIDES

IAEA SAFETY STANDARDS

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# Relationship between SSG-16 and "Milestones"

- SSG-16 uses concept of "3 phases" presented in Milestones document.
- SSG-16 focuses on safety infrastructure and is drawn from IAEA Safety Standards collection and INSAG-22 inputs.
- SSG-16 addresses safety issues in a detailed manner.
- SSG-16 covers activities that have not been explicitly addressed in the "Milestones" (e.g. design safety, regulatory approach, safety assessment, safe transport, preparation for commissioning, etc.), but does not cover all of the 19 issues in the Milestones (e.g., electrical grid and procurement).
- SSG-16 is structured in accordance with the Safety Standards.
- SSG-16 identifies actions to be taken by the different organizations (government, regulator, and operating organization).
- SSG-16 has been formally approved by international consensus.

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# Relationship between SSG-16 and "Milestones"

| # | Milestones document's 19 issues | Safety Infrastructure Guide's 20 elements | Main IAEA Safety Requirements |
|---|---|---|---|
| 1 | 1. National position<br>2. Nuclear safety<br>5. Legislative framework | 1. National policy and strategy<br>2. Global nuclear safety régime<br>3. Legal framework | **GS-R-1*** |
| | 7. Regulatory framework | 4. Regulatory framework | |
| | 11. Stakeholder involvement | 5. Transparency and openness | |
| | 4. Funding and financing | 6. Funding and financing | |
| 2 | 10. Human resources development | 9. Human resources development | **GS-R-1***<br>**GS-R-3**<br>**NS-R-2*** |
| 3 | 3. Management | 8. Leadership and management for safety<br>15. Operating organization<br>18. Preparation for commissioning | **GS-R-3**<br>**NS-R-2*** |
| 4 | 8. Radiation protection<br>13. Environmental protection | 11. Radiation protection | **BSS-115*** |
| 5 | 12. Site and supporting facilities | 16. Site survey, site selection and evaluation | **NS-R-3** |
| 6 | 16. Nuclear fuel cycle<br>17. Radioactive waste | 13. Safety of radioactive waste, spent fuel management and decommissioning | **NS-R-5**<br>**GSR Part 5**<br>**WS-R-5**<br>**SSR 5 (to be published, DS354)** |

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# Relationship between SSG-16 and "Milestones"

| | | | |
|---|---|---|---|
| **7** | 14. Emergency planning | 14. Emergency preparedness and response | **GS-R-2** |
| **8** | 9. Electrical grid<br>18. Industrial involvement<br>19. Procurement | 7. External support organizations and contractors | **GS-R-1***<br>**GS-R-3**<br>**NS-R-1***<br>**NS-R-2*** |
| **9** | *Not addressed in the Milestones document.* | 17. Design safety<br>12. Safety assessment<br>10. Research for safety and regulatory purposes | **GSR Part 4**<br>**NS-R-1***<br>**NS-R-2*** |
| **10** | *Not addressed in the Milestones document.* | 19. Transport safety | **TS-R-1** |
| **11** | 15. Security and physical protection | 20. Interfaces with nuclear security | **[SF-1]** |

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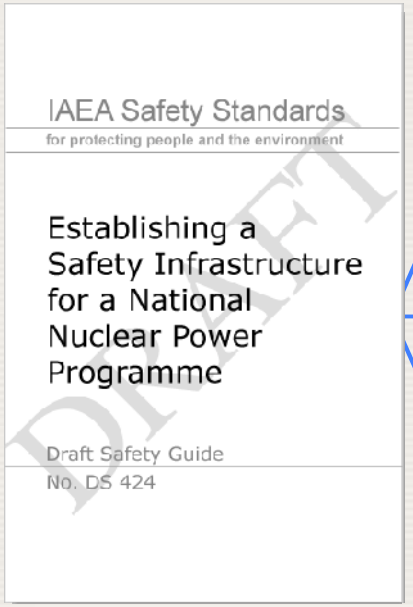
# The main 3 roles of SSG-16 [formerly DS424]




1. Actions to gradually apply the IAEA Safety Standards.

2. Self Assessment and Safety Review Services.

3. **Safety packages and assistance for embarking countries.**

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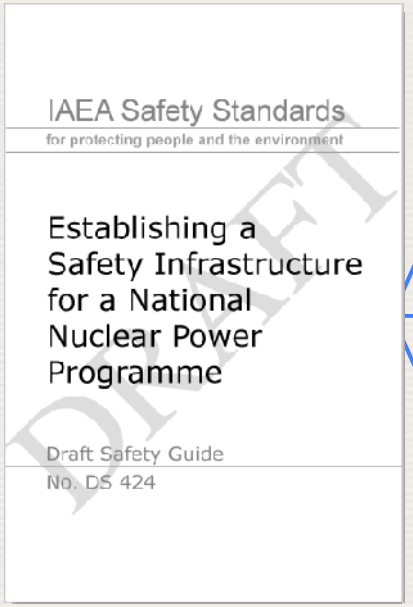


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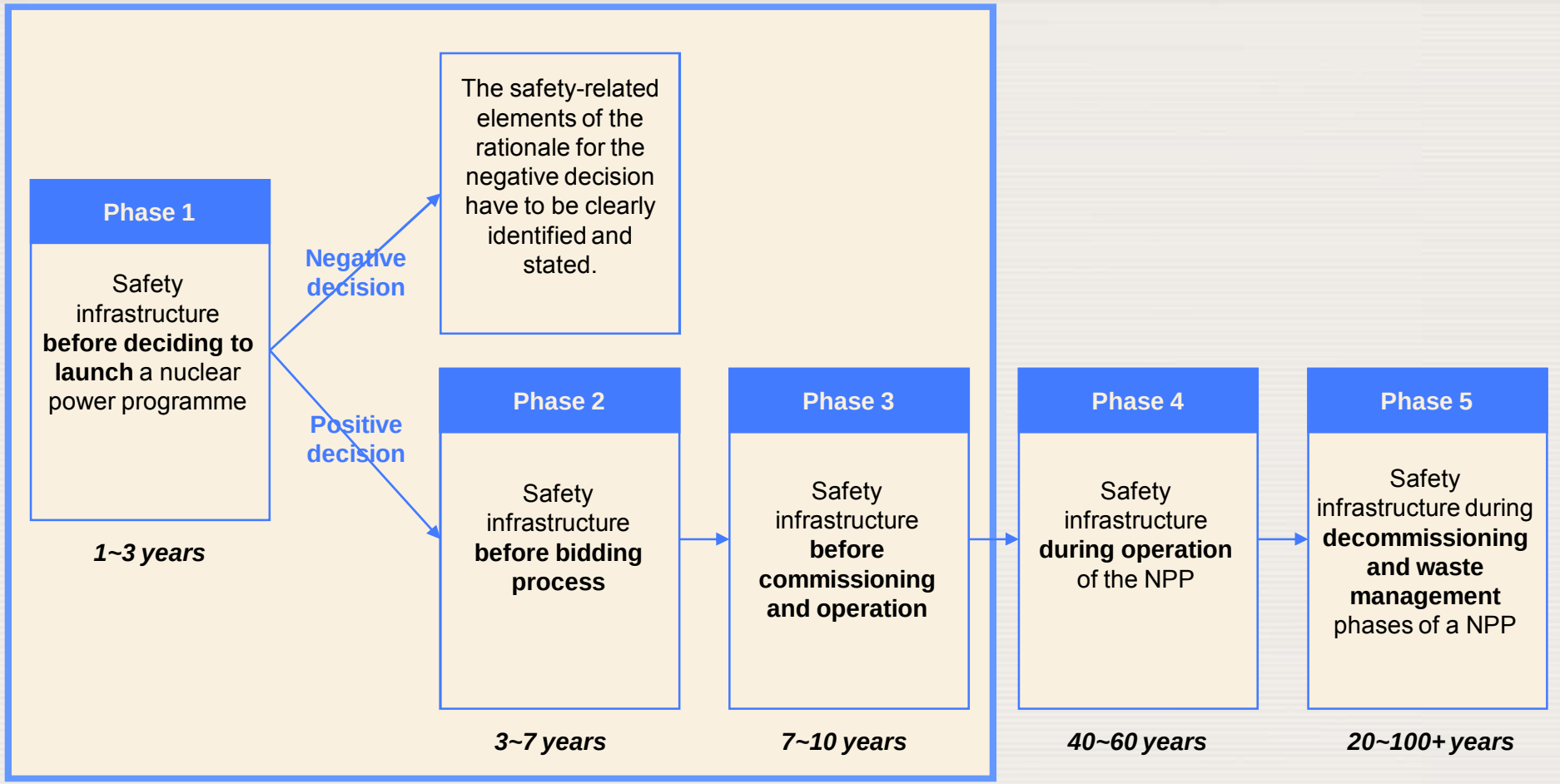
# Main phases of the safety infrastructure development in the lifetime of a nuclear power plant

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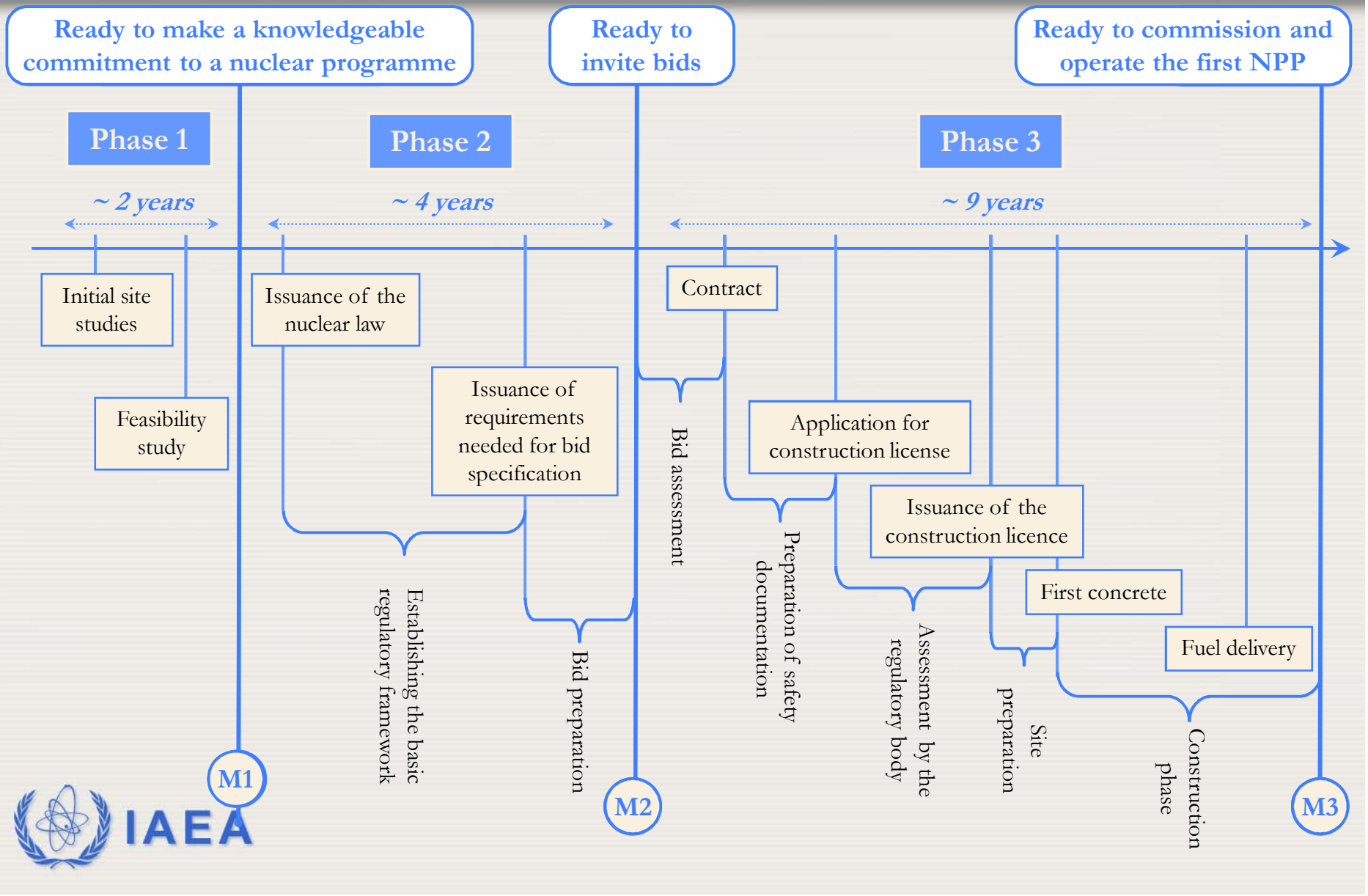
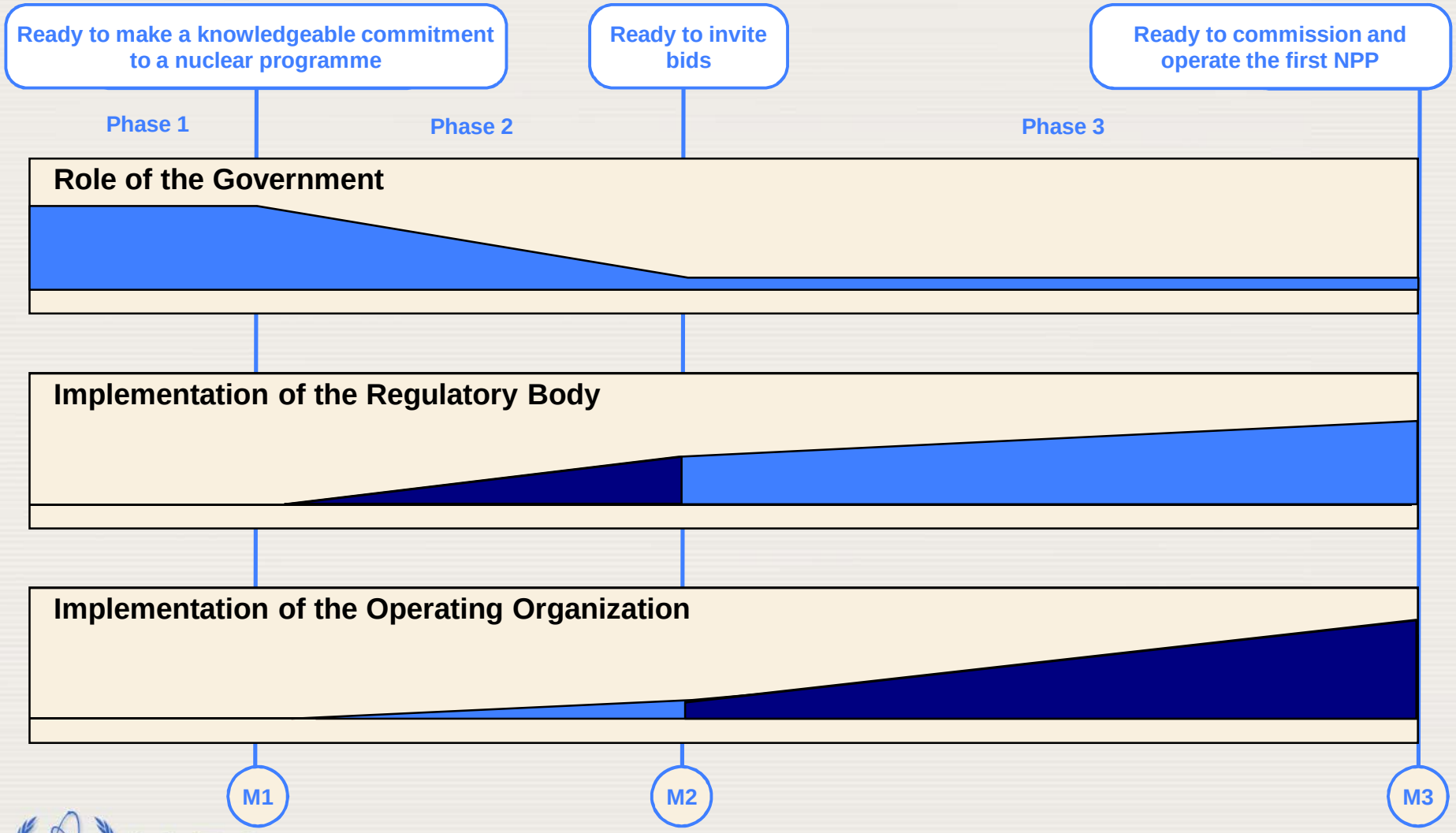
**Safety Infrastructure Guide contains actions to apply the IAEA safety principles and requirements progressively during Phases 1, 2 and 3 of the implementation of a nuclear power programme. (Phases based on Milestones and INSAG-22)**

# Some steps important to safety in the implementation of a national nuclear power programme



# Role of the main entities throughout the establishment of the National Safety Infrastructure

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# Text format for each Phase

- Phase 1:
  - IAEA Safety Requirements identified
  - Actions ("should statements") are listed and numbered

    o Action 10: The Government should …

    o Action 11: The Operating Organization should …

    o Action 12: The Regulatory Body should …

    o *Others actions…*

  - additional text provides:
    - *Rationale for the should statements;*
    - *Additional guidance to satisfy the actions.*
- Phase 2: same structure
- Phase 3: same structure

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# Examples of “Phased” Actions (1)

## LEGAL FRAMEWORK

- Phase 1
  - Action 20. The government should identify all necessary elements of a legal framework for the safety infrastructure, and should plan how to structure it and develop it.
  - Action 21. The government should consider the process that should be employed to license nuclear facilities in the later stages of the programme
- Phase 2
  - Action 22. The government should enact and implement the essential elements of the legal framework for the safety infrastructure.
- Phase 3
  - Action 23. The government should ensure that the legal framework for the safety infrastructure is fully in place and that the legislation is complied with by the relevant organizations.

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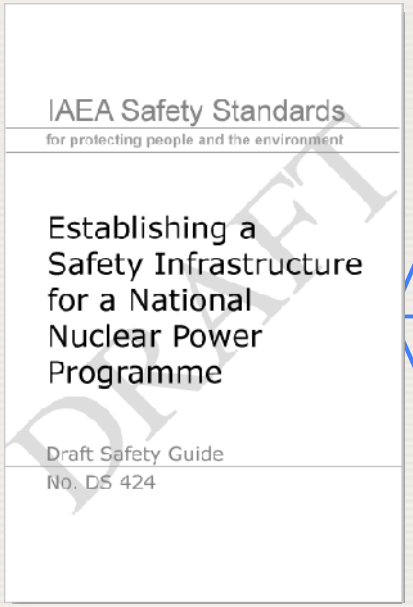
# The main 3 roles of SSG-16 [formerly DS424]




1. **Actions to gradually apply the IAEA Safety Standards.**

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# Self Assessment on Safety Infrastructure

- Self assessment facilitates planned and progressive improvement of the legislative and governmental infrastructure for safety and enhances the effectiveness of regulatory activities
- IAEA encourages every Member State to implement the programme as an integral part of its national regulatory body's management system for measuring, assessing and improving regulatory performance.
- For status of safety infrastructure development, Member State to perform self assessment using SSG-16 and self assessment tools (currently being developed)
- Working to ensure compatibility with evaluation of milestones

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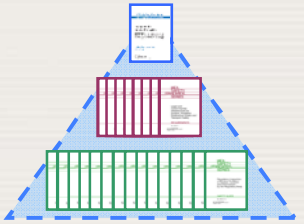
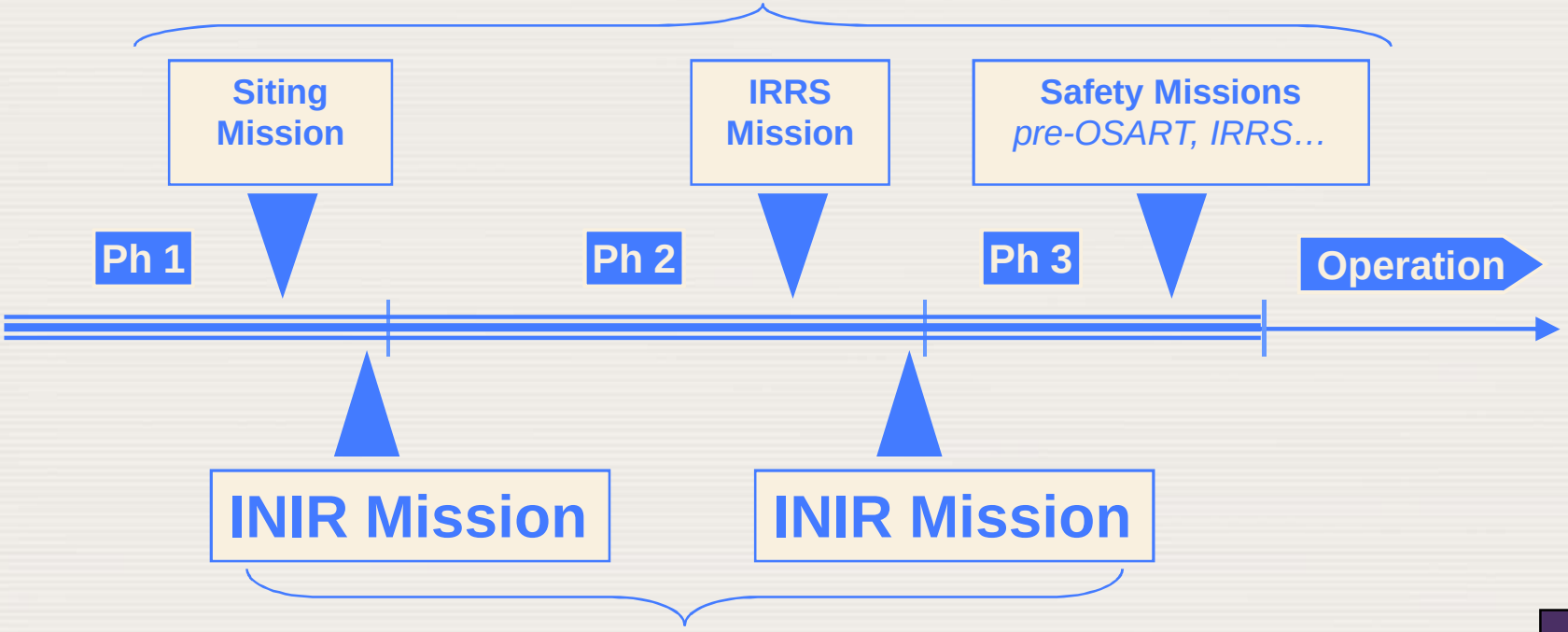
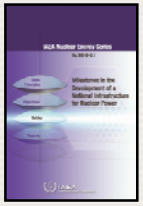
# Coordinating Safety reviews (NS) and Holistic reviews (NE)

**Existing safety peer reviews against the Safety Standards**
**(to address the safety-related infrastructure)**






**Holistic reviews against the Milestones**
**(Integrated Nuclear Infrastructure Review)**



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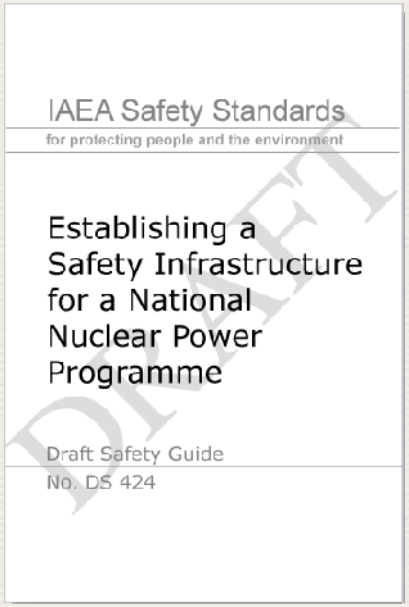


1. **Actions to gradually apply the IAEA Safety Standards.**

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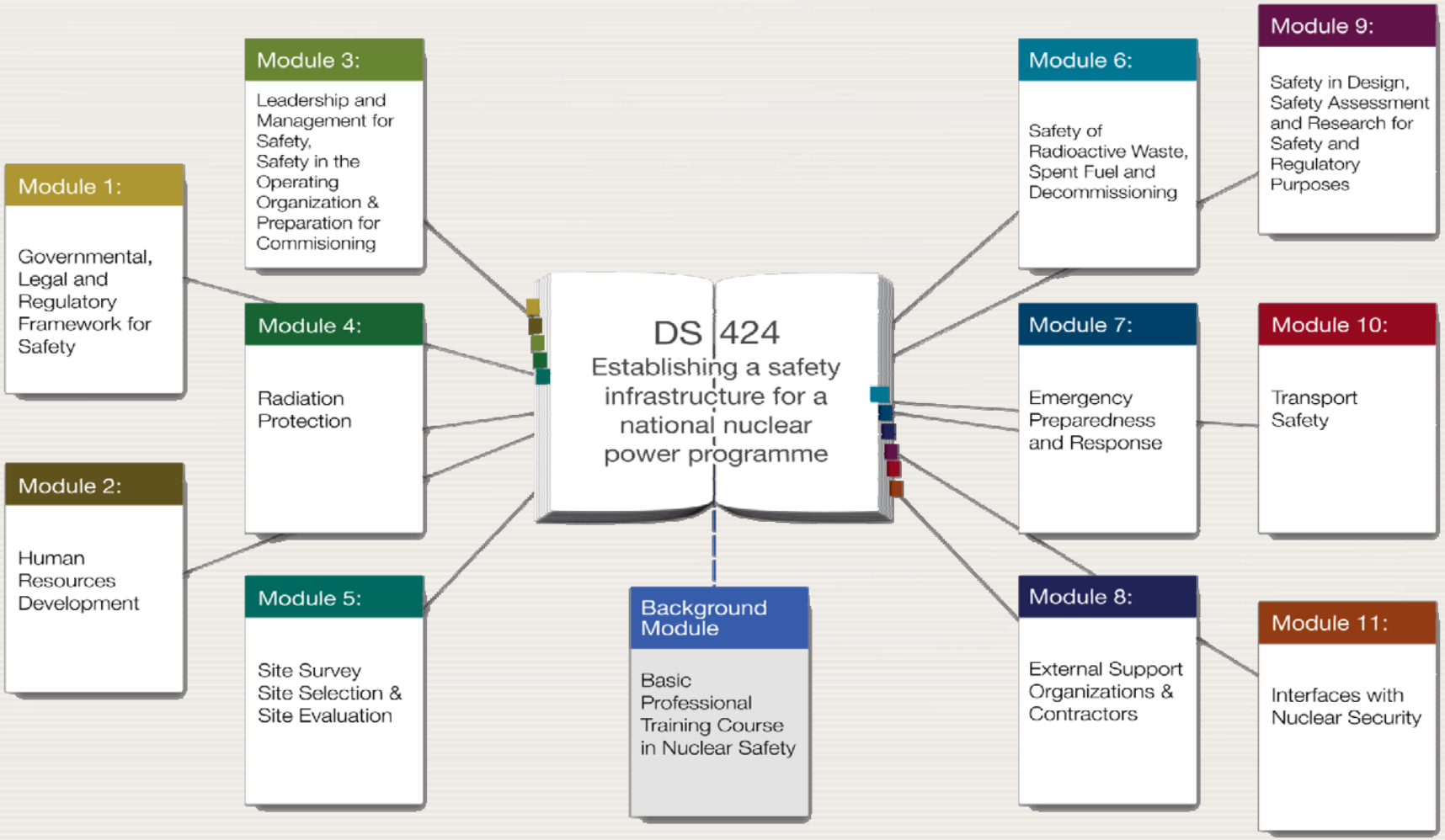
# Safety Modules

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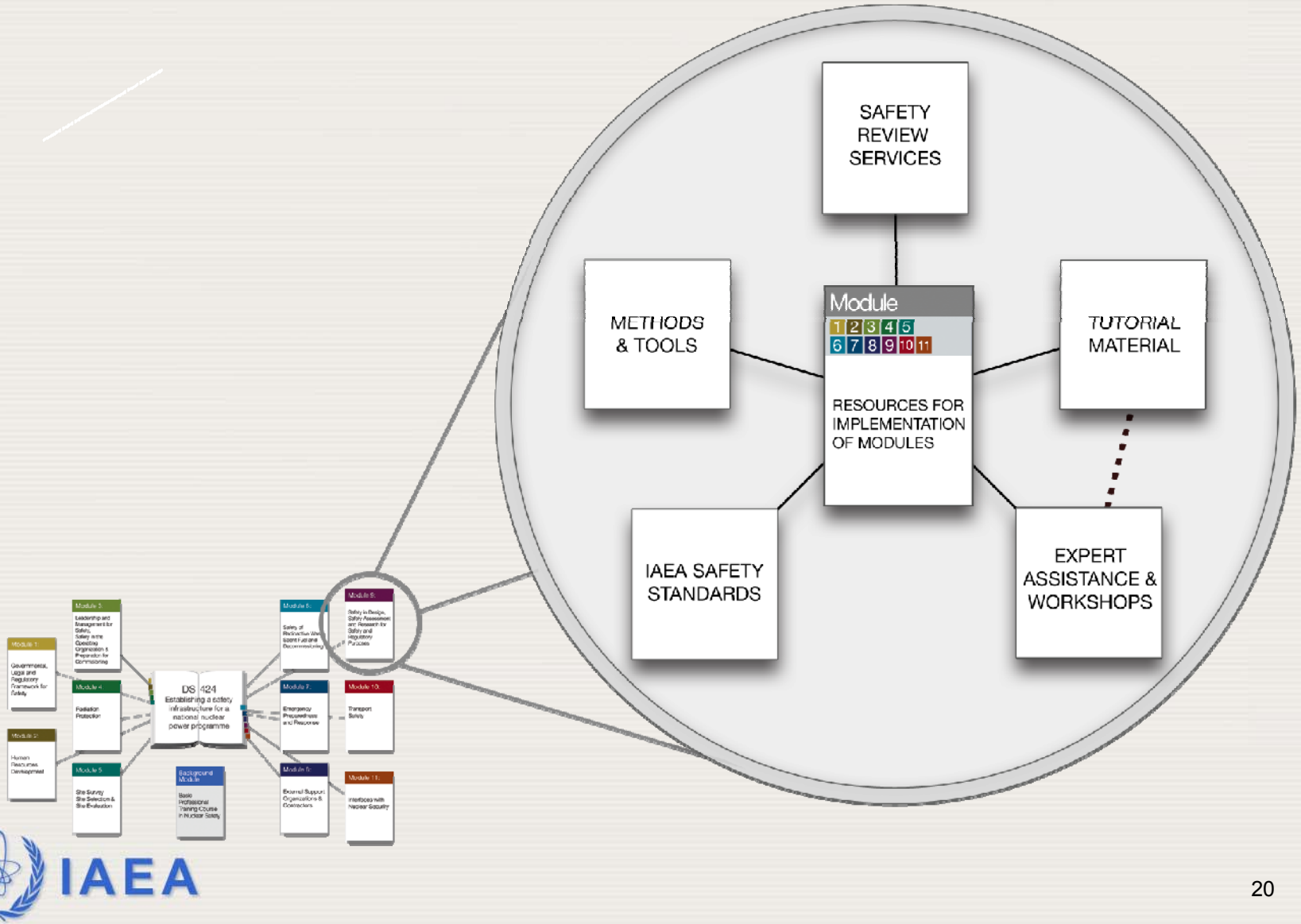
http://www-ns.iaea.org/tech-areas/safety-infrastructure/default.asp

# Safety Modules

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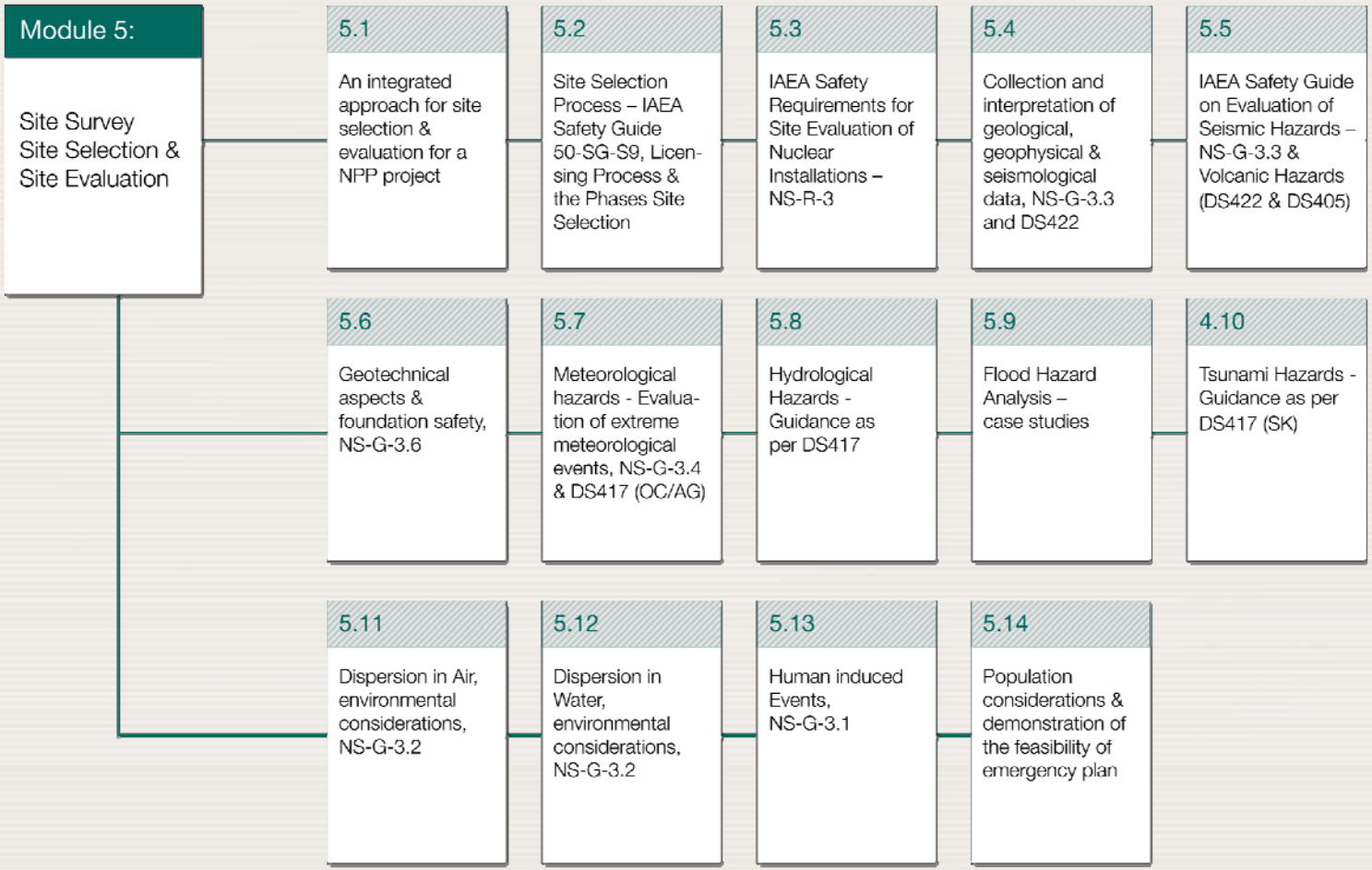
# NPP siting module

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# Assistance for Embarking Countries

## Specific Workshops

- Workshop on Developing National Infrastructure Including Governmental, Legal and Regulatory Infrastructure for Safe and Secure Implementation of the Nuclear Power Programme
- Workshop on Developing the Regulatory Framework
- Workshop on Regulatory Approaches and Development of Safety Regulations
- Workshop on Licensing Process for Nuclear Installations
- Workshop on Safety Review and Assessment
- Workshop on Regulatory Inspection and Enforcement
- Workshop on Communication and Involvement of Interested Parties, including the Public, in the Regulatory Process
- Workshop on Management System for the Regulatory Body
- Workshop on Staffing of the Regulatory Body and Development of the Competence for Conduct of the Regulatory Functions

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# Specific Workshops

| Title |
| --- |
| Type of Assistance |
| Duration |
| Objective of Assistance |
| Milestones Issues (based on NG-G-3.1 formulation) |
| Safety Package Modules |
| Elements of the Safety Infrastructure (based on DS424 formulation) covered in Assistance |
| Leading Division/Section |
| Technical Support |
| Target Country/Countries |
| Target Audience/Participants |
| Format and Content of Assistance |
| Reference Documents |
| Tutorial Materials |
| Recent Examples |

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# Regulatory Approaches

- Impact on the decision making process
- Several Strategies/Approaches
- Benefits and difficulties with regard to the different strategies
- National context, culture, legal system and administrative work
- prescriptive, case-based, outcome-based, risk-based, process-based, and self-assessment strategies

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# Assistance for Embarking Countries

## Expert Missions

licensing/authorization process for NPPs (sub-topic of W4)

- development of safety regulations and guides (sub-topic of W3)
- planning and conducting safety review and assessment of a nuclear installation by the regulatory body, including workforce planning (sub-topic of W5)
- planning and performing regulatory oversight and regulatory enforcement (sub-topic of W6)
- communication with public and involvement of interested parties in the regulatory process (subject of W7)
- management system of the regulatory body (subject of W8)
- staffing and competence of the regulatory body (subject of W9)

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# Outreach/ Delivery mechanisms

- TC Projects
- Other Extra budgetary Programmes
- Regulatory Coordination Forum
- ANSN

# Regulatory Coordination Forum - RCF

- Established in June 2010
- ToR include the RCF Core Group, 15 members - 7 recipient and 8 provider MS. Core Group serves RCF steering committee.
  - ✓Identify relevant regulatory requirements and gaps at the initial process;
  - ✓Promote coordination and collaboration and fill these gaps;
  - ✓Develop, plan, implement, monitor, and evaluate the results of RCF activities and feed them back to the RCF for continuous improvement;
  - ✓Share and mutually learn regulatory experience and utilize lessons learned; and
  - ✓Promote and advise on the regulatory peer reviews (e.g. IRRS) and advisory services for capacity building and infrastructure development

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# Challenges for Safety Infrastructure from 5th Review Meeting of Convention on Nuclear Safety

## Countries Embarking on Nuclear Power Plant Programmes

- Importance of strong early governmental support was emphasized in connection with the establishment of the regulatory body.

## Emergency Preparedness and Response

- Multilateral and bilateral agreements and coordination of emergency preparedness measures with neighbouring countries.
- Some CPs proposed to harmonize the approach for decision making in emergency situations, including with their neighbours.

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# Challenges for Safety Infrastructure from 5th Review Meeting of Convention on Nuclear Safety

## Regulatory Framework

- Challenges of providing regulatory assessment of new designs and oversight of construction and commissioning of NPPs
- Harmonization of CPs' national safety standards with the IAEA Safety Standards

## Siting

- Issues related to consulting CPs in the vicinity of a proposed NP – on the provisions of necessary information upon their request.
- With many CPs planning new nuclear power plants, there is a need to review the adequacy of site selection requirements according to IAEA safety standards, as appropriate. In particular, CPs should better take into account natural disasters.

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***Thank you for your attention***

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