IAEA 60 Years
Atoms for Peace and Development

IAEA SUPPORT ON INFRASTRUCTURE DEVELOPMENT FOR A NEW NUCLEAR POWER PROGRAMME

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IAEA and Newcomer Countries

"It is each country's sovereign decision whether to add nuclear power to its energy mix"

"The Agency has a key role to play in ensuring that expansion in nuclear power takes *place in an efficient, responsible and sustainable manner."*

"*Assistance to newcomers, especially those which are most advanced on the road to having operational reactors, will remain a high-priority issue."*

Yukiya Amano

IAEA Director General

Countries Embarking on Nuclear Power

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Number of Member States at different stages of decision making and planning for nuclear power in 2012–2016 according to their official statements

	2012	2013	2014	2015	2016
First nuclear power plant started construction/under construction	1	2	2	2	2
First nuclear power plant ordered	2	1	1	1	2
Decided to introduce nuclear power and started preparing the appropriate infrastructure	6	6	7	7	6
Active preparation for a possible nuclear power programme with no final decision	6	5	5	6	6
Considering nuclear power programme	13	19	18	11	11*

* Another 17 countries expressed interest in nuclear power during 2015 at the IAEA General Conference or in high level bilateral meetings

Drivers for Nuclear Energy

Drivers for consideration of nuclear have not changed:

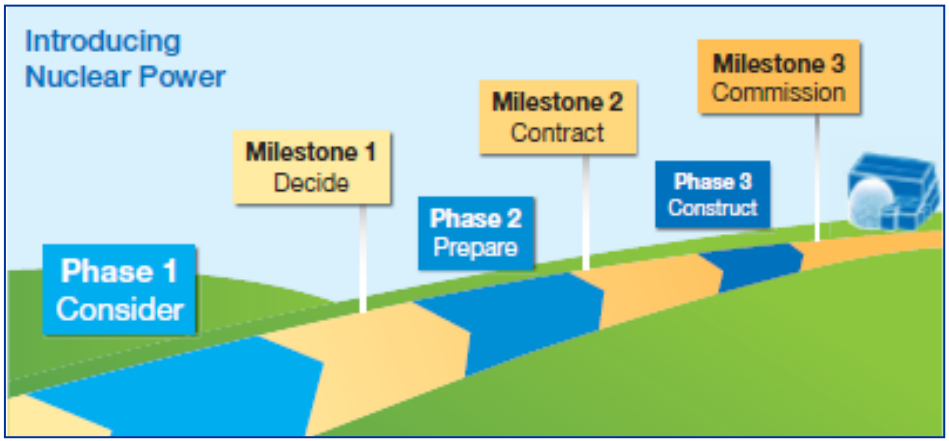
- Energy independence
- Volatile fossil fuel prices
- Climate change
- Increased demand for energy

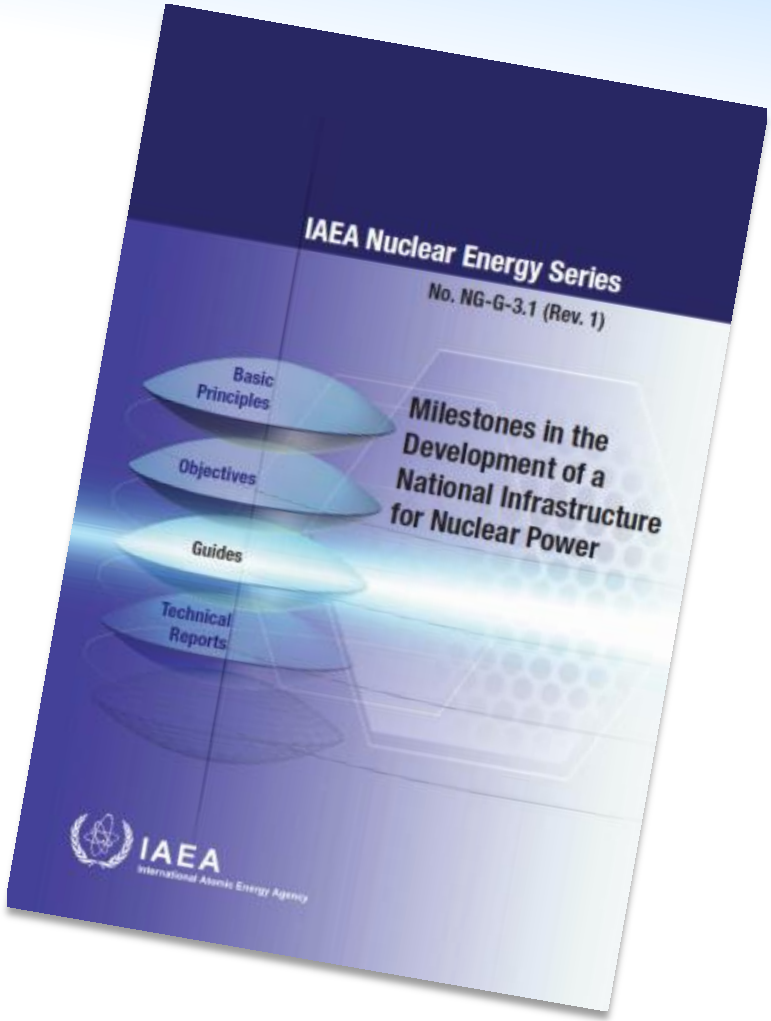
Hurricane Sandy

picture from National Post
http://news.nationalpost.com/2012/10/29/hurricane-sandy-strengthens-remains-on-course-to-hit-canada-monday-bringing-7-metre-waves-to-great-lakes/

The IAEA Milestones Approach for Nuclear Power Infrastructure Development

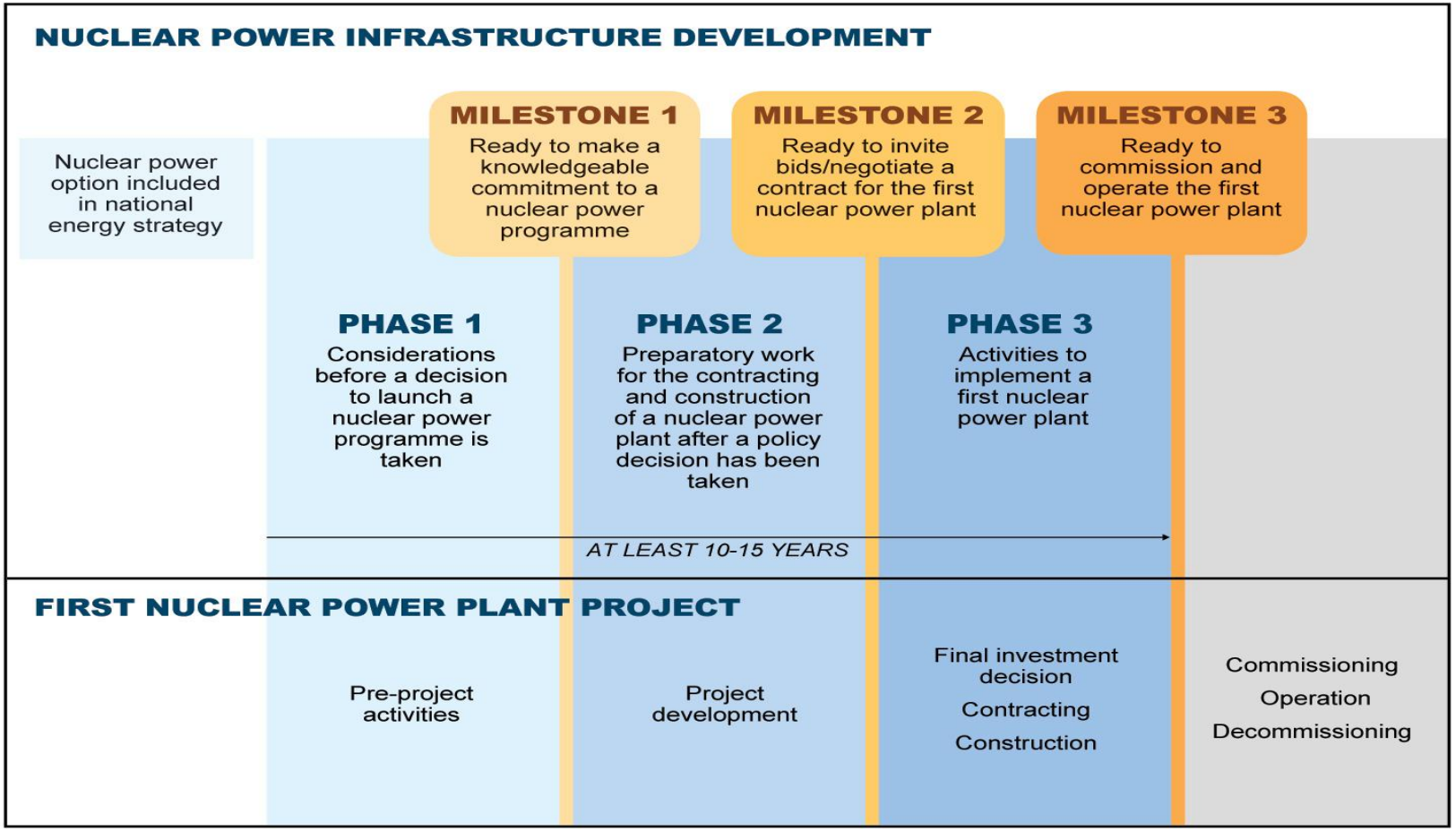
The Milestones Approach is holistic and considers 19 specific infrastructure issues





NG-G-3.1 issued in 2007
Updated in 2015

Milestones in the Development of a National Infrastructure for Nuclear Power (NG-G-3.1 Rev 1)



Milestones in the Development of a National Infrastructure for Nuclear Power (NG-G-3.1 Rev 1)

1. National position
2. Nuclear safety
3. Management
4. Funding and financing
5. Legal framework
6. Safeguards
7. Regulatory framework
8. Radiation protection
9. Electrical grid
10. Human resource development
11. Stakeholder involvement
12. Site and supporting facilities
13. Environmental protection
14. Emergency planning
15. Nuclear security
16. Nuclear fuel cycle
17. Radioactive waste management
18. Industrial involvement
19. Procurement

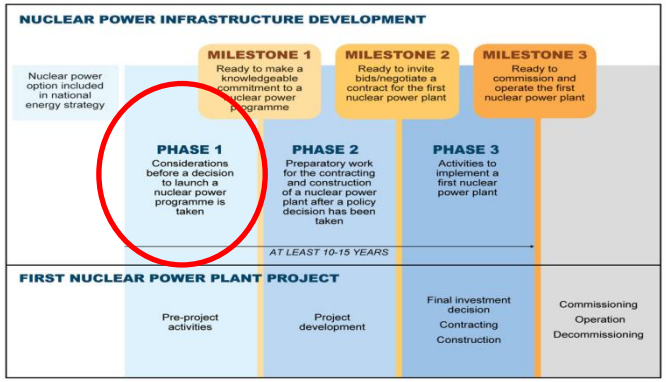
The Milestones Approach

Phase 1:
Decide!

Phase 2:
Prepare!

Phase 3:
Construct!

Milestone 1: Ready to Make a Knowledgeable Decision



Prefeasibility study

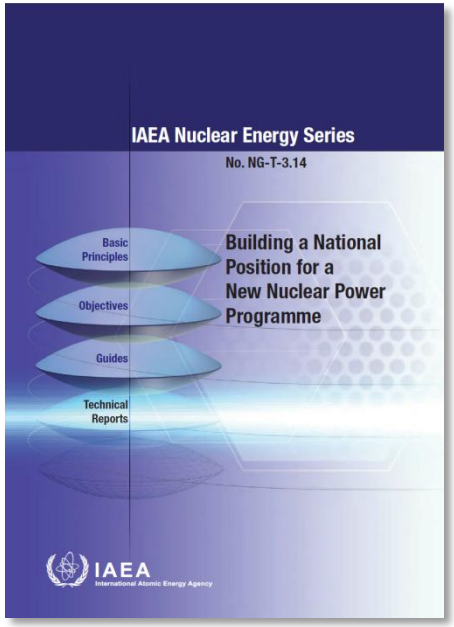
- Reviews required infrastructure and feasibility of a nuclear power programme

Comprehensive report

- Comprehensive examination of all 19 infrastructure issues

National Strategy

- Should the comprehensive report recommend a positive national decision, a national strategy is defined

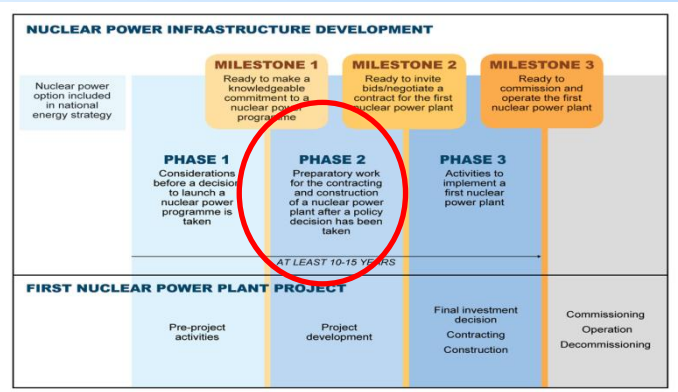


Phase 1: Coordination

Nuclear Energy Programme Implementing Organization (NEPIO)

"…a mechanism (which may involve high level and working level committees) to coordinate the development of the nuclear infrastructure development within a Member State."

Milestone 2: Ready to Invite Bids or Negotiate a Contract



Owner-Operator

Regulatory Body (ies)

Government (NEPIO)

Phase 2: Building Institutions

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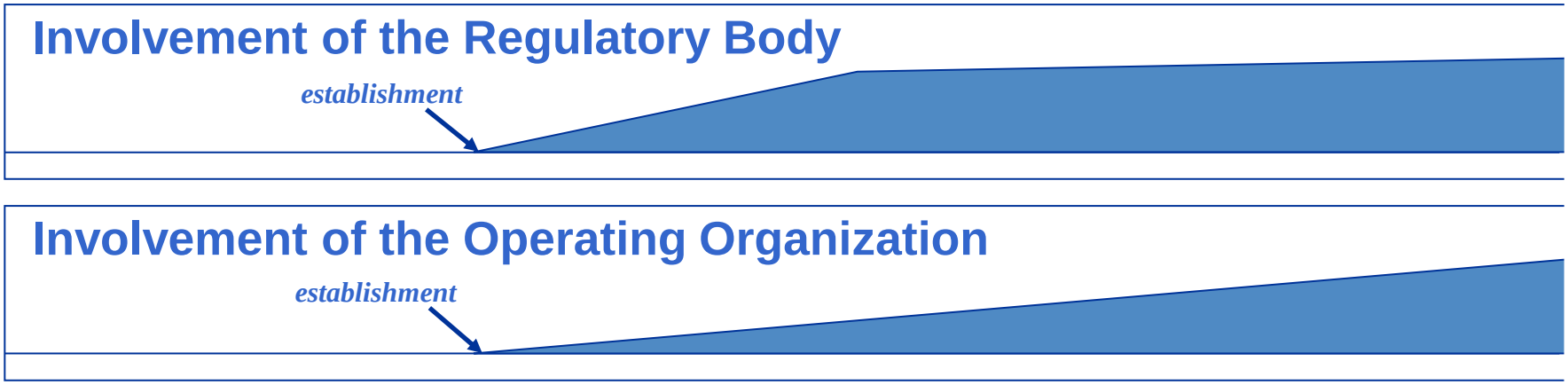
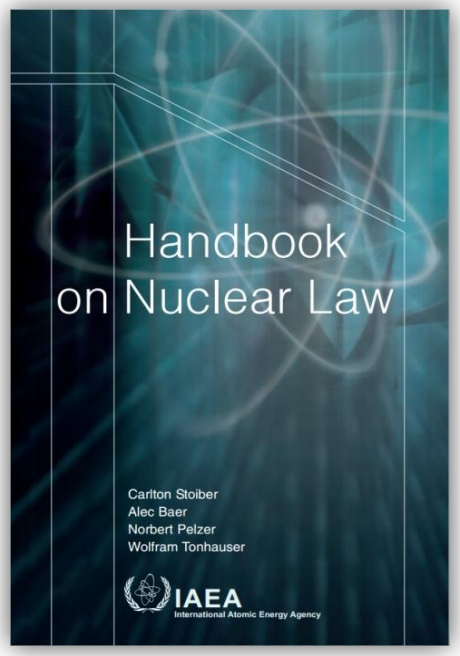
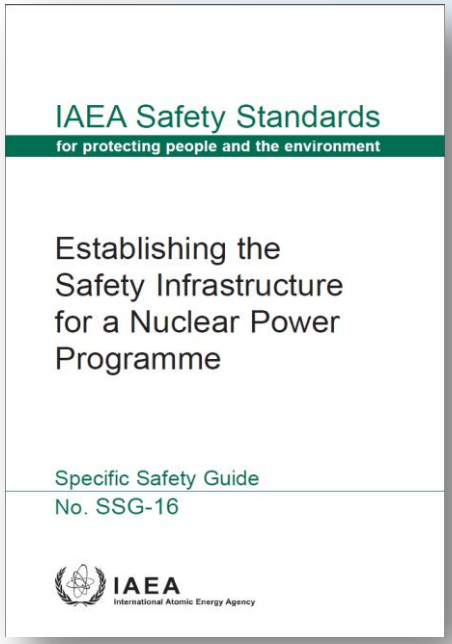
Phase 1	Phase 2	Phase 3
Ready to make a knowledgeable commitment to a nuclear power programme	Ready to invite bids/negotiate a contract for the 1st NPP	Ready to commission and operate the first NPP
1~3 years	*3~7 years*	*7~10 years*



Phase 2: Establishing the Legal and Regulatory Framework



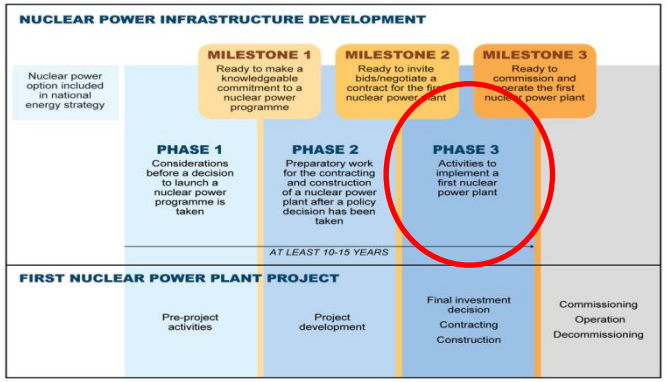
The Legal Framework is the foundation of the nuclear power programme



Regulatory body

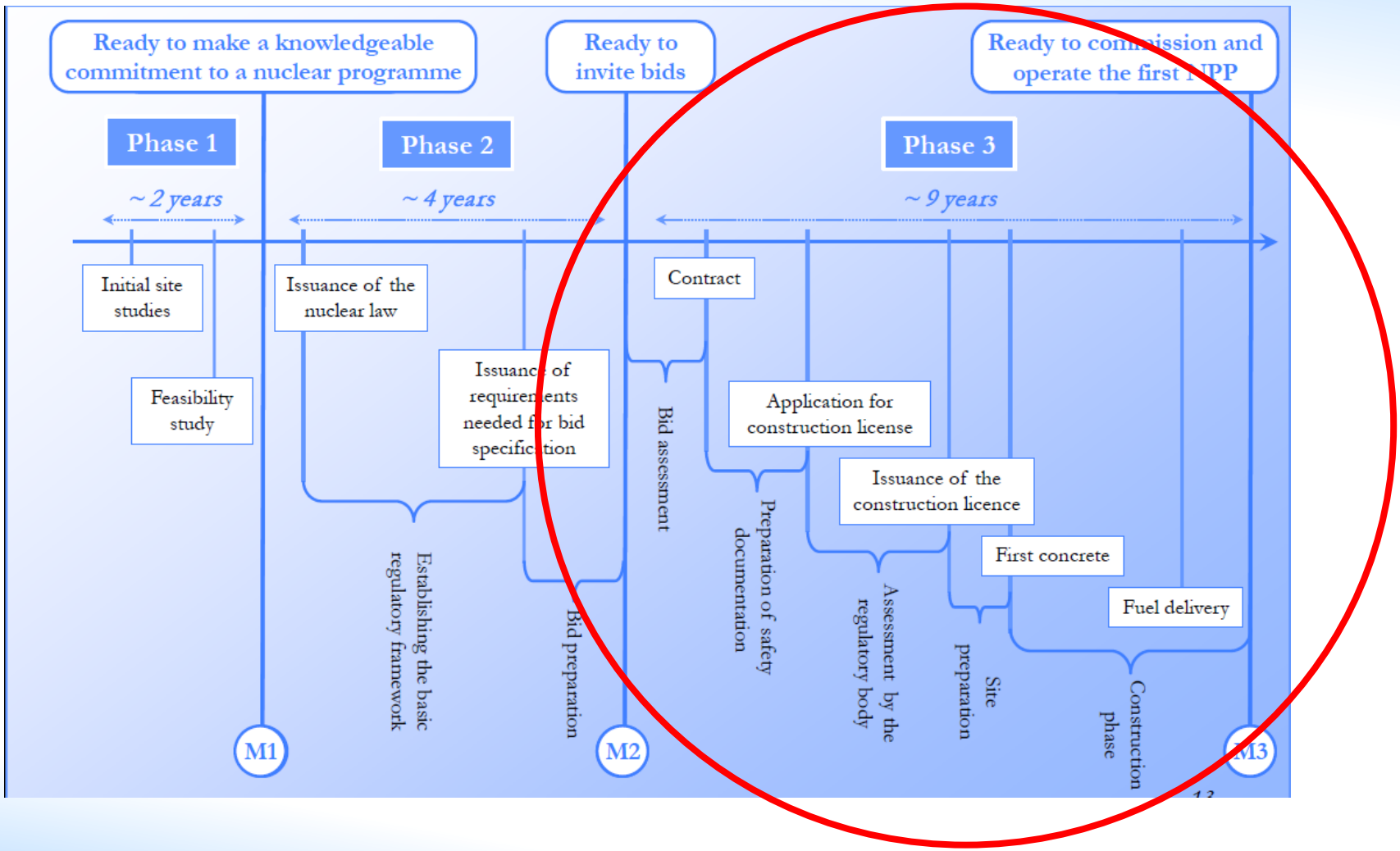
- ✓ **Strong**
- ✓ **Independent**
- ✓ **Competent**

Milestone 3: Ready to Commission and Operate the 1st NPP

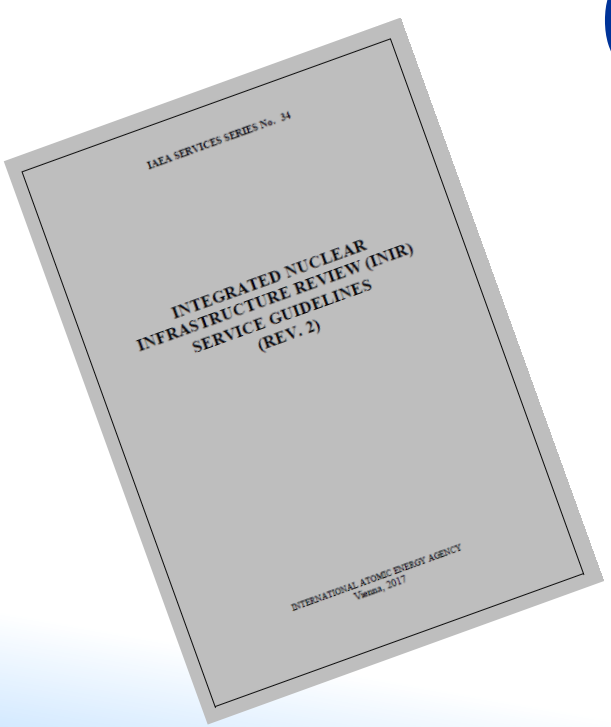


UAE, Barakah (2017)

Phase 3: Licensing and Construction



INTEGRATED NUCLEAR INFRASTRUCTURE REVIEW (INIR)

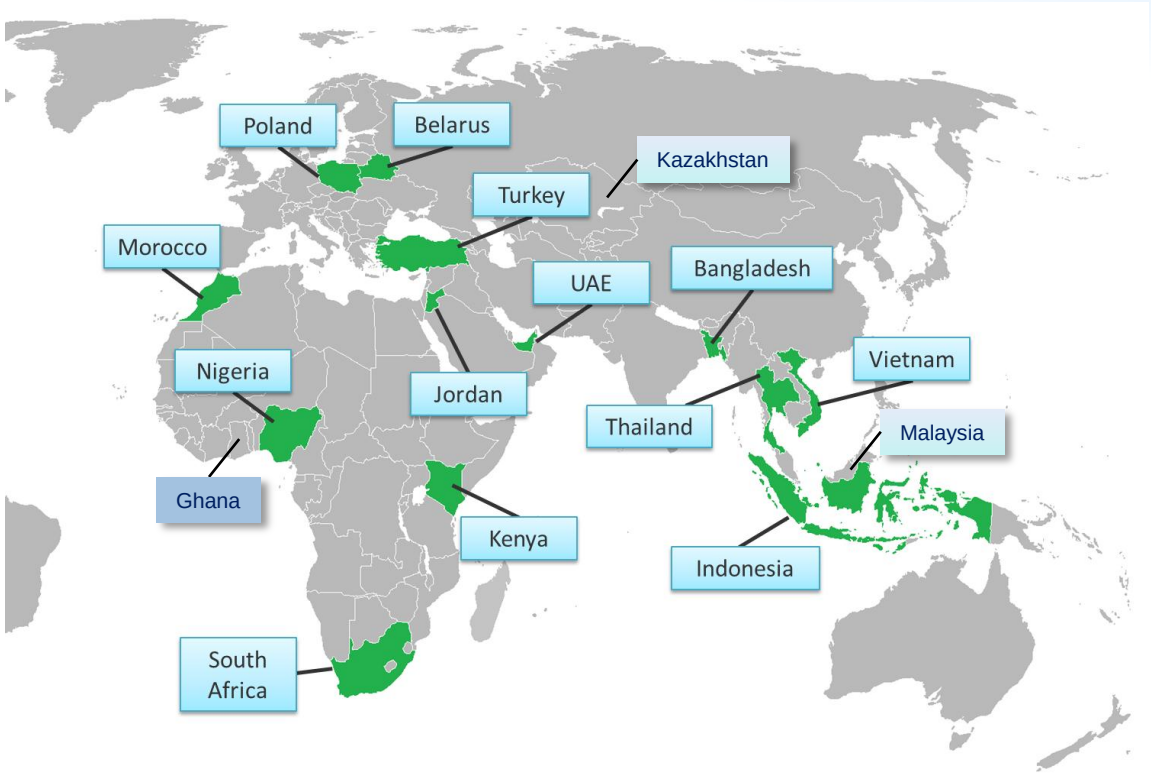


Integrated Nuclear Infrastructure Reviews (INIR)

- Based on the Milestones Approach:
  19 Infrastructure Issues
  3 Phases, 3 Milestones
- International expert peer review led by a high level IAEA manager
- Identifies areas for further action and makes suggestions and recommendations
- Requested by Member State government results are delivered to government

INIR Missions 2009-2016

1.	**Jordan**	2009
2.	**Indonesia**	2009
3.	**Vietnam**	2009
4.	**Thailand**	2010
5.	**UAE (Phase 2)**	2011
6.	**Bangladesh (Phase 1&2)**	2011
7.	**Jordan follow-up**	2012
8.	**Belarus (Phase 1&2)**	2012
9.	**Vietnam (Phase 2)**	2012
10.	**Poland**	2013
11.	**South Africa (Phase 2)**	2013
12.	**Turkey (Phase 2)**	2013
13.	**Jordan (Phase 2)**	2014
14.	**Vietnam follow-up**	2014
15.	**Nigeria (Phase 2)**	2015
16.	**Kenya**	2015
17.	**Morocco**	2015
18.	**Bangladesh follow-up**	2016
19.	**Poland follow-up**	2016
20.	**Malaysia (phase 1)**	2016
21.	**Kazakhstan (Phase 1)**	2016
22.	**Ghana (phase 1)**	2017



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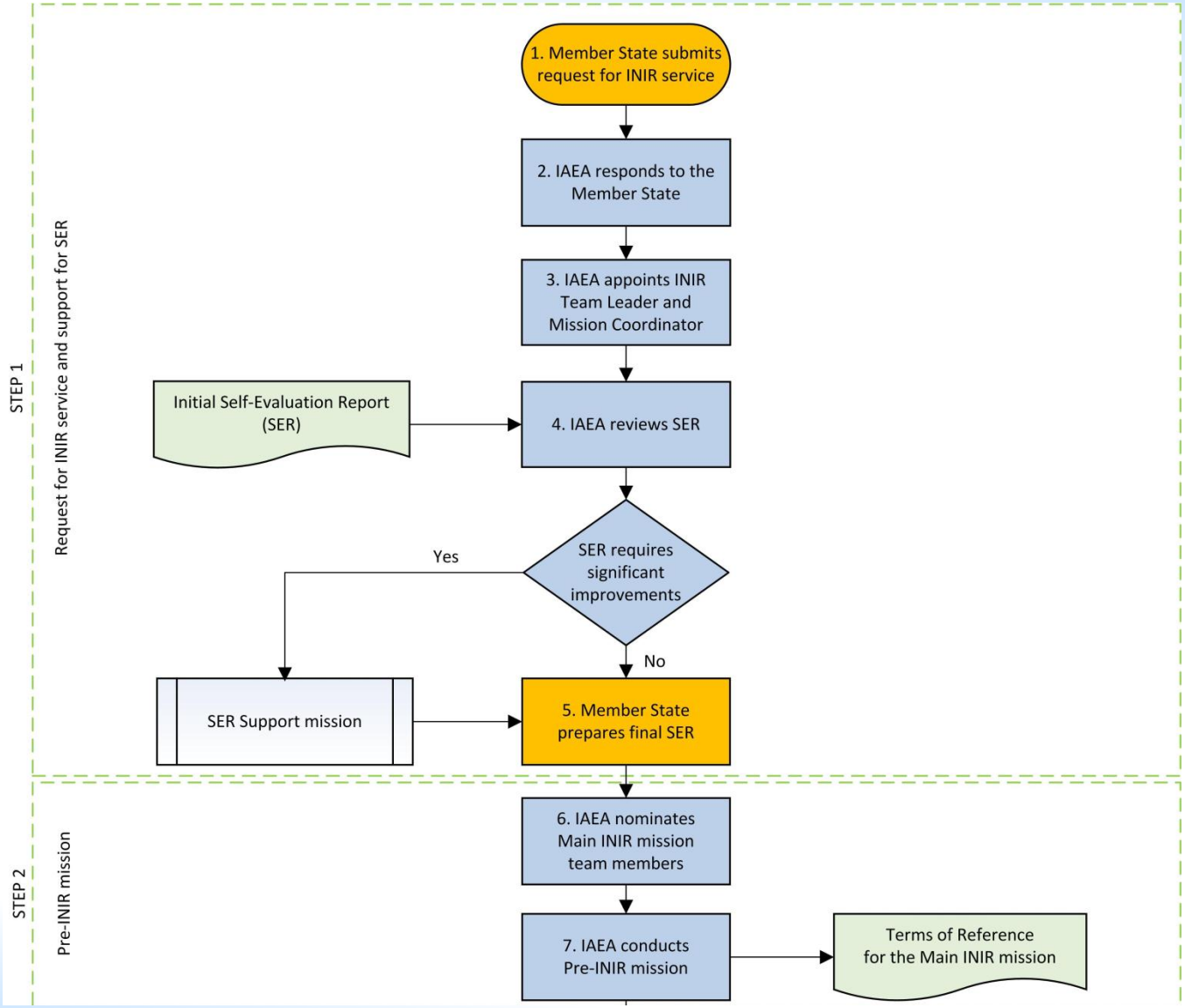
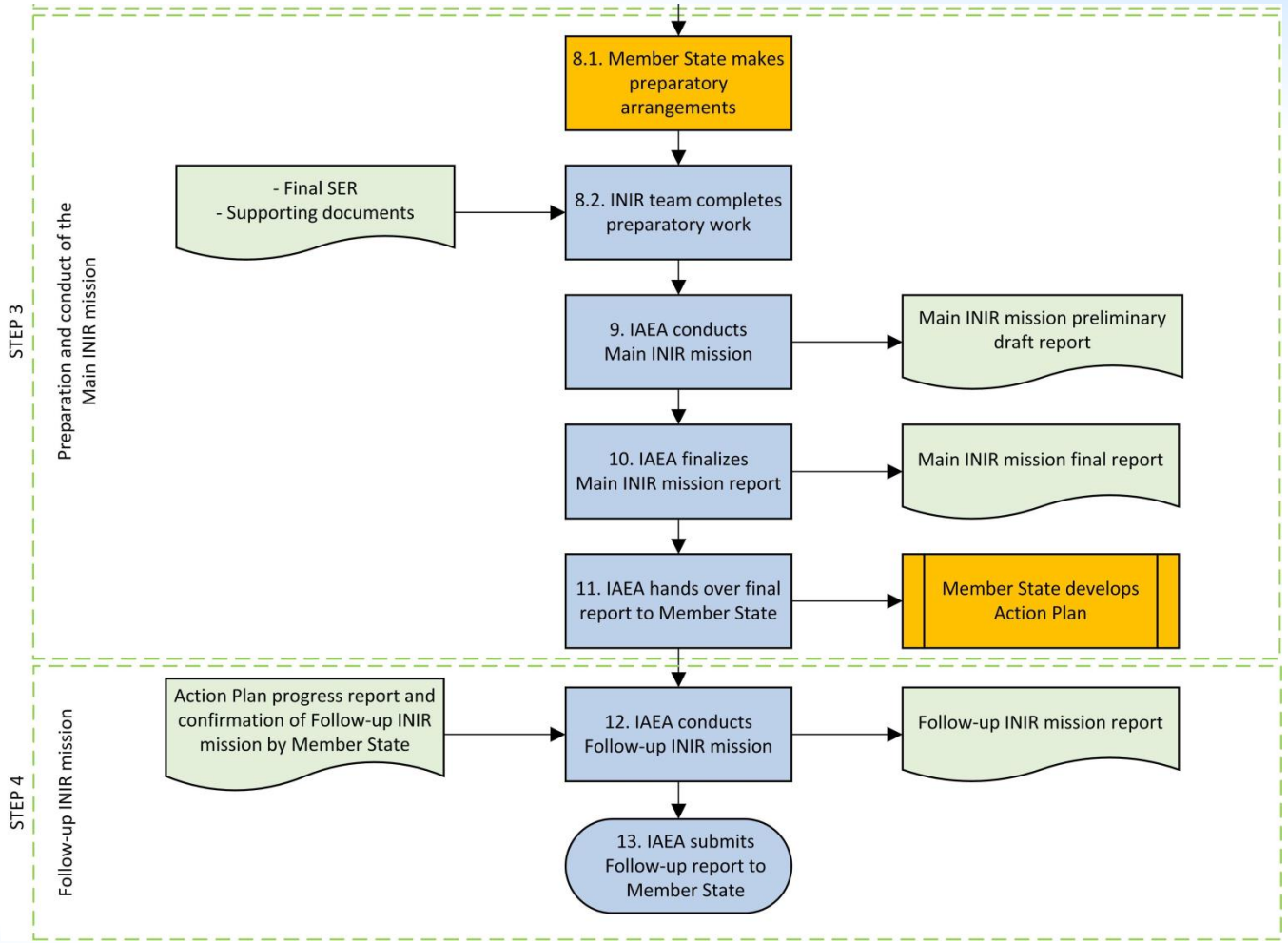
INIR Process for Philippines (1)



INIR Process for Philippines (2)

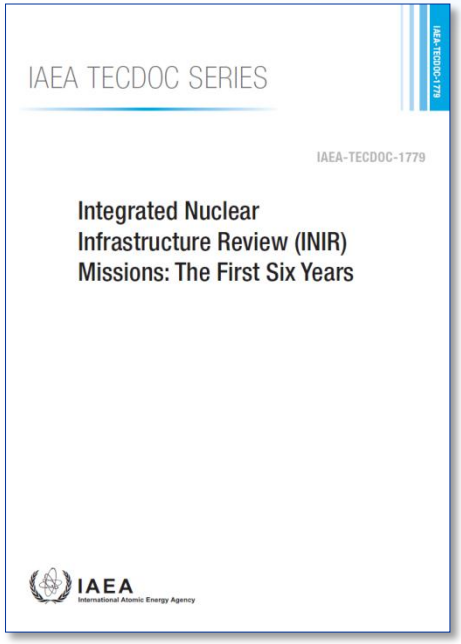


INIR missions: The First Six Years

Phase 1 and Phase 2 missions

The infrastructure issues where deficiencies were identified more frequently are:

- 1. National Position
- 3. Management
- 5. Legal Framework
- 7. Regulatory Framework
- 10. Human resource development



IAEA Assistance to Newcomer Countries

Small but strategic: wide range of IAEA products and services to support the introduction or expansion of nuclear power:

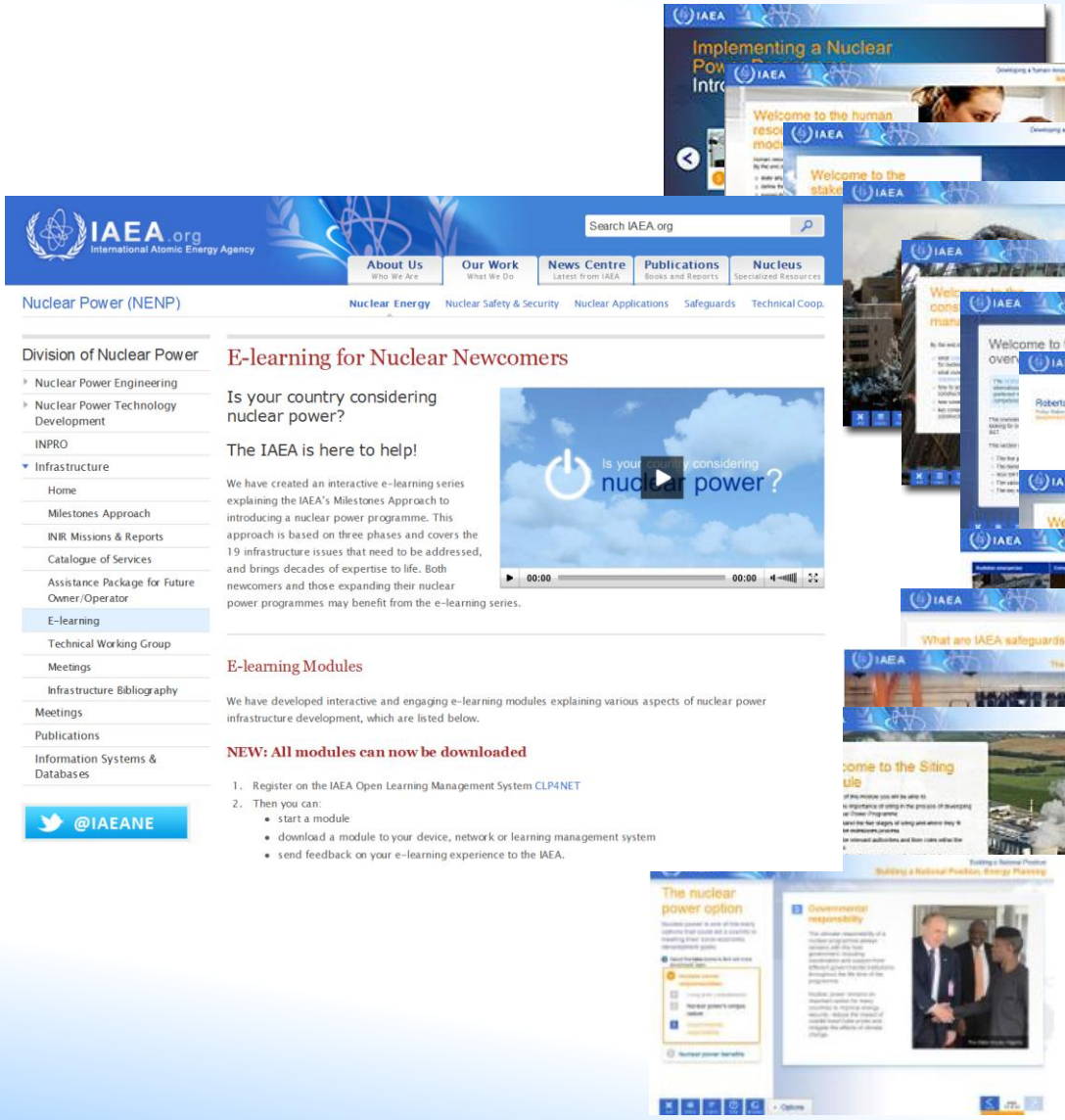
- Documentation; e-Learning modules; Networks
- Technical Workshops; Technical Meetings; Training Courses
- Review and Expert missions; Peer Reviews; Advisory Services

Nuclear Power Infrastructure Bibliography

- Key and supporting documentation exists for the **19 Infrastructure Issues**

www.iaea.org/NuclearPower/Infrastructure

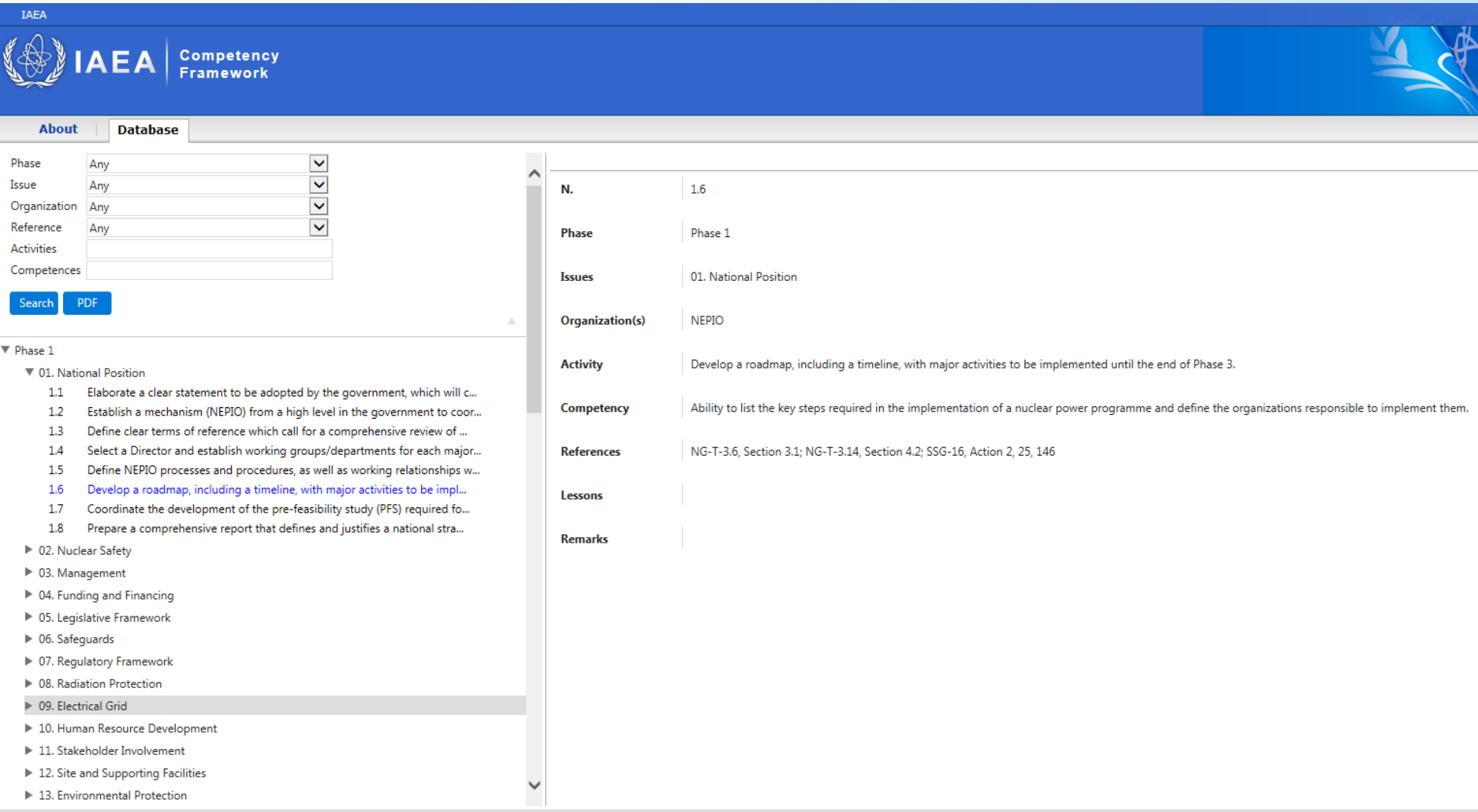
E-Learning Modules



1. Introduction and overview
2. Human resource development
3. Stakeholder involvement
4. NP programme management
5. Construction management
6. Systematic approach to training
7. Feasibility study
8. Management systems
9. Safety infrastructure
10. Emergency preparedness and Response
11. Safeguards
12. Spent Fuel and Radioactive Waste Management
13. Siting
14. Legal framework – coming soon
15. National position

Further modules are under development

Competency Framework



https://nucleus.iaea.org/competency-framework/

Thank you!