
Topical issues in international nuclear law

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Section one: Challenges for the development of legal infrastructure for nuclear new build

Challenges for the development of legal infrastructure for nuclear new build

- ▶ Concept of “nuclear new build” in countries without existing capacity/culture: building entirely from scratch
- ▶ Generating international confidence
 - Cooperating with the international nuclear community
 - Non-proliferation and nuclear security: for example, UAE and US 123 Agreement
- ▶ Political stability and political will
- ▶ Stable, comprehensive and transparent legal framework
- ▶ Human resources: recruiting, training and educating for industry and regulators
- ▶ Cooperating with regional bodies

Are appropriate frameworks being developed?

- ▶ Is engagement with the international nuclear community sufficient?
- ▶ Is the IAEA equipped to cope with the level of support requested or required?
- ▶ Is an appropriate safety culture being developed?
- ▶ Are some countries going too far in their commitments, eg., to not enrich uranium? What is the impact of this on the rest of the region and countries that do want to utilise uranium resources?
- ▶ Is the development of legal frameworks in isolation the right approach or are opportunities for regional cooperation being missed?

Bringing common regulatory regimes to the region

- ▶ An exclusive/isolationist approach is not possible for matters of nuclear law – engagement with the international nuclear community is required and necessary so as to attract the participation of the international supply chain
- ▶ An unprecedented opportunity exists for regional cooperation by emerging nuclear countries
- ▶ Regional cooperation could be sought in relation to key aspects of domestic legal frameworks:
 - Licensing and permitting
 - Nuclear liability
 - Emergency preparedness
 - Waste management
 - Transport and logistics

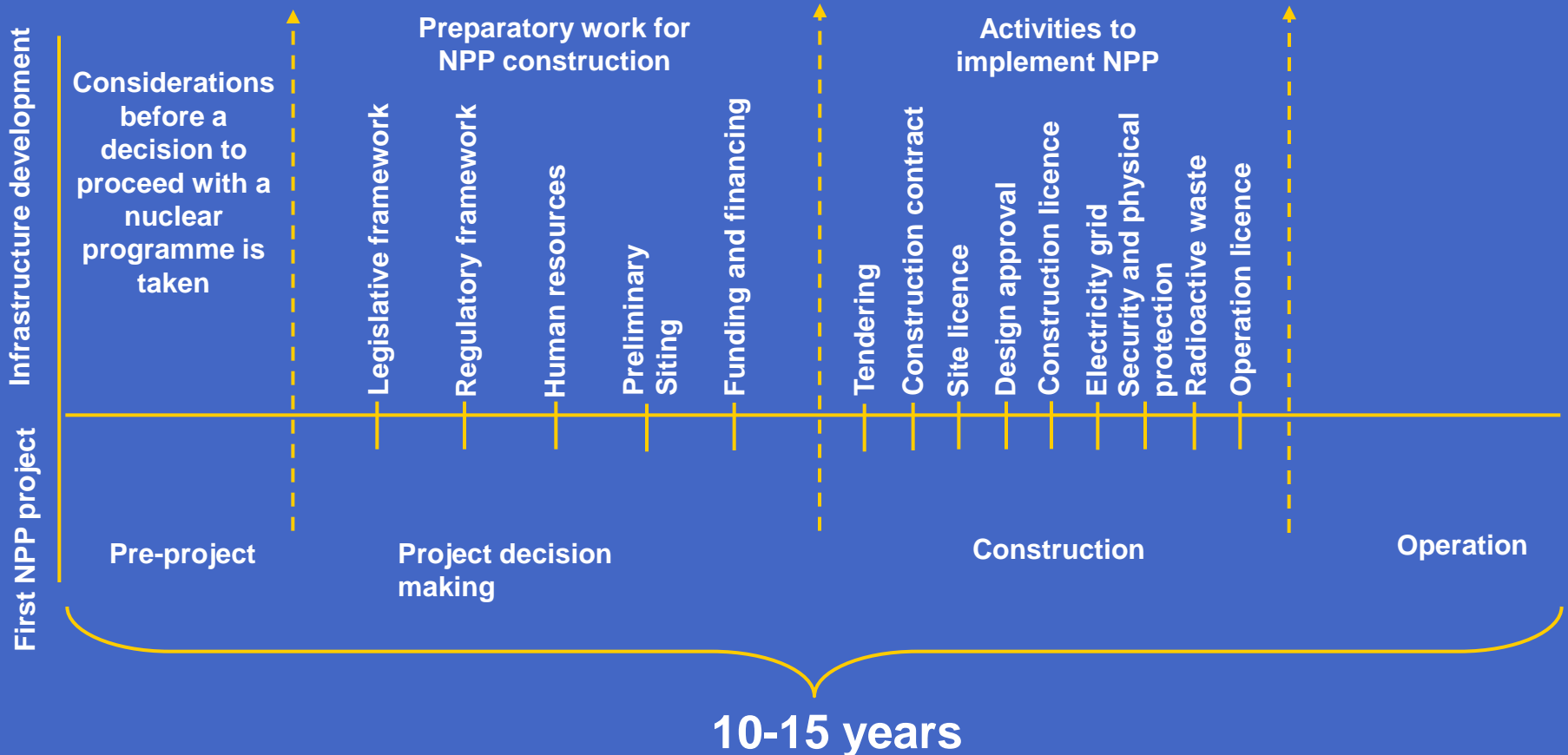
Section two: Legal infrastructure for nuclear new build

IAEA milestones

Milestone 1: ready to make a knowledgeable commitment to a nuclear power programme

Milestone 2: ready to invite bids for first NPP

Milestone 3: ready to commission and operate first NPP

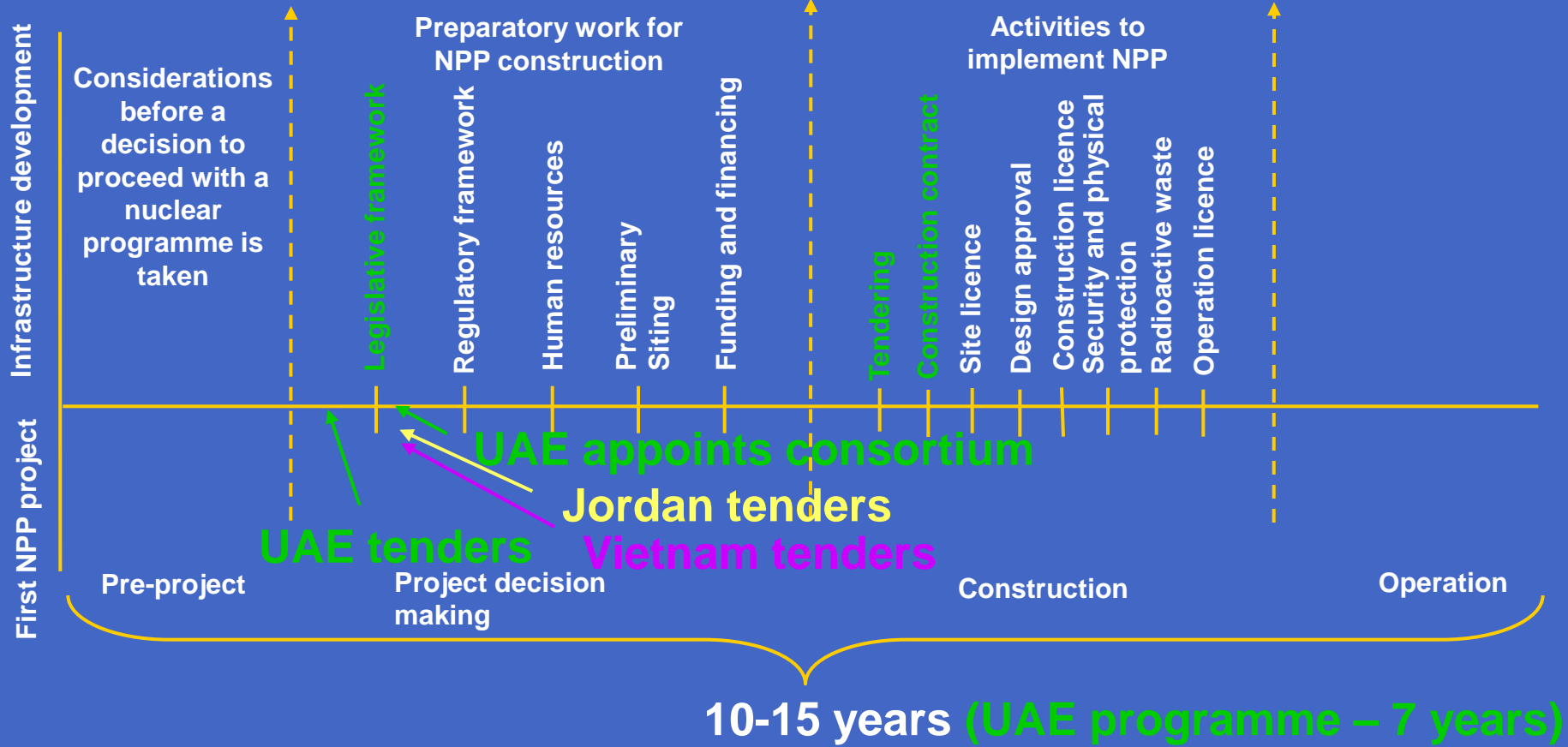


IAEA milestones: the paradigm shift

Milestone 1: ready to make a knowledgeable commitment to a nuclear power programme

Milestone 2: ready to invite bids for first NPP

Milestone 3: ready to commission and operate first NPP



Legal infrastructure for nuclear new build

Three interrelated layers:



Key aspects of the international legal regime: liability for third party nuclear damage

- ▶ Often the last component of the international regime to be considered by states
- ▶ Affects operators, suppliers, component part suppliers, carriers, civil works contractors, lenders, insurance industry, regional inter–state relations
- ▶ Key principles
 - The operator of a nuclear installation is **exclusively** liable for nuclear damage (the “channelling principle”)
 - Strict (no fault) liability is imposed on the operator (subject to limited exceptions)
 - Liability is limited in amount: a minimum amount is set and each state may set a maximum amount and liability is limited in time
 - Operator must maintain insurance or other financial security covering an amount equal to its liability
 - Security to cover minimum liability of the operator
 - Exclusive jurisdiction is granted to the courts of the installation state

National legal infrastructure: key provisions of a national nuclear law

- ▶ Establishment of the national nuclear regulatory authority
- ▶ Licensing and permitting regime
- ▶ Enforcement, assessment and inspection
- ▶ Security and safeguards
- ▶ Physical protection and safety
- ▶ Emergency preparedness and response
- ▶ Transport of radioactive material
- ▶ Import and export controls
- ▶ Waste management and spent fuel management
- ▶ Decommissioning
- ▶ Civil liability for nuclear damage
- ▶ Criminal and civil offences and penalties

National legal infrastructure: drafting a national nuclear law

Is there an international model?

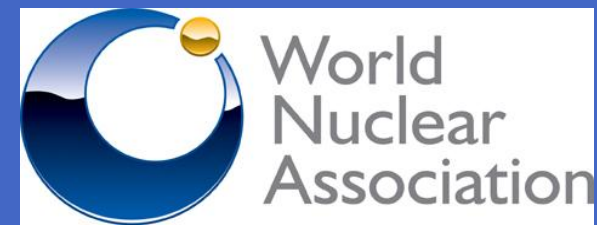
- ▶ IAEA Handbook on Nuclear Law: guidance on core content
- ▶ IAEA model law expected but not yet published
- ▶ Other established jurisdictions
 - UK – fractured in different laws; currently undergoing revision
 - US – complicated and extensive; own liability regime (not a party to Vienna/Paris but is a party to the CSC)
 - France – fractured and inappropriate
 - Canada – good basis but judicial role of Commission inappropriate
- ▶ Best approach – a mix of the preferred aspects of each
- ▶ No model will deal with national-specific requirements

National legal infrastructure: the regulatory scheme

Regulations to be adopted by the regulatory authority include:

- ▶ Licensing and permitting regime
- ▶ Enforcement, assessment and inspection
- ▶ Physical protection and safety (including basic safety standards)
- ▶ Emergency preparedness and response
- ▶ Transport and packaging of radioactive material and nuclear substances
- ▶ Import and export controls
- ▶ Waste management and spent fuel management
- ▶ Decommissioning

World Nuclear Association project



Project to develop implementing regulations for emerging nuclear countries:

- ▶ Project undertaken by the WNA through Nuclear Law and Contracting working group (includes representation of nuclear regulatory authorities and international agencies)
- ▶ First step is the development of a model licensing regime
- ▶ Key rationale: ensure more efficient use of existing human resources - regulatory authorities in emerging markets otherwise need to undertake everything "from scratch"
- ▶ NLC has linked with WNA's CORDEL working group on certain topics e.g. acceptance of reactor design certification in one country by another country
- ▶ Freshfields is preparing a position paper and draft set of regulations for the licensing of nuclear new build
- ▶ The ultimate goal is a comprehensive set of model regulations

Section two: Nuclear new build in the Middle East and Africa

Emerging nuclear markets: nuclear new build in the Middle East

KUWAIT

- ▶ Currently considering a site study
- ▶ Cooperation agreement with France

BAHRAIN

- ▶ Considering nuclear energy option
- ▶ Commencing site evaluation

TURKEY

- ▶ Proposals to build 10 to 12 reactors by 2020
- ▶ Agreement with Russia for first NPP

SYRIA

- ▶ Partly constructed reactor reportedly destroyed in 2007
- ▶ IAEA monitoring

JORDAN

- ▶ Advanced plans to build first NPP
- ▶ Has established a development corporation and a regulatory authority
- ▶ Shortlisted Canadian, Russian and French/Japanese JV
- ▶ KEPCO research reactor



IRAN

- ▶ Bushehr NPP nearing completion
- ▶ Second NPP envisaged on same site

QATAR

- ▶ Considering nuclear energy option
- ▶ Undertaking a site study

UAE

- ▶ Appointed Kepeco to construct 4 light water reactors, first operational by 2017
- ▶ Envisages a fleet of approximately 14 NPPs; 4 operational plants by 2020

OMAN

- ▶ Part of the Global Nuclear Energy Partnership
- ▶ Has a preparatory committee for nuclear energy

SAUDI ARABIA

- ▶ Nuclear and renewable city to be developed

GCC

- ▶ Joint programme to build a NPP

Emerging nuclear markets: nuclear new build in Africa

Freshfields Bruckhaus Deringer LLP

ALGERIA

- ▶ Plans to build first NPP by 2020
- ▶ Proposal to build new unit every 5 years

TUNISIA

- ▶ Feasibility study completed in 2006
- ▶ National programme in place

LIBYA

- ▶ Tender process for technical consultant
- ▶ Activating cooperation agreements with France, Russia, the US and Ukraine

MOROCCO

- ▶ Plans to build first NPP by 2020
- ▶ Has commenced revising legislative framework

NIGERIA

- ▶ Has sought the support of the IAEA to commence a nuclear power programme
- ▶ Leads the Forum of Nuclear Regulators in Africa

GHANA

- ▶ Announced in 2007 plans to introduce nuclear power
- ▶ Joined the Global Nuclear Energy Partnership in 2007
- ▶ Has a research reactor

NAMIBIA

- ▶ Policy commitment to introduce nuclear power
- ▶ Has 2 significant uranium mines



SUDAN

- ▶ Signed a framework agreement with the IAEA in 2009 to develop a nuclear power programme
- ▶ Has submitted a draft national nuclear law to the IAEA

EGYPT

- ▶ Plans to build first NPP
- ▶ Project management contract concluded

UGANDA

- ▶ 2008 Atomic Energy Bill provides a framework to develop nuclear power
- ▶ Has an agreement with the IAEA

SOUTH AFRICA

- ▶ Currently has 2 nuclear reactors in operation
- ▶ Proposal to build a number of new nuclear power plants

Section four: Case study on Jordan

Jordan's nuclear power programme to date

Development corporation



Jordan Atomic Energy Commission

Regulatory authority



Jordan Nuclear Regulatory Commission

Jordan's nuclear power programme to date (continued)

- ▶ JAEC shortlisted the following suppliers:
 - Atomic Energy of Canada Limited – Enhanced Candu-6 PHWR (700MW)
 - AtomStroyExpert – AES-92 model of VVER-1000
 - Atmea: joint venture between Areva and Mitsubishi Heavy Industries – Atmea-1 PWR (1100MW)
- ▶ KEPCO awarded contract to construct a nuclear research reactor by 2014
- ▶ Consultants: Worley Parsons (overall project consultants); Tractebel Engineering (site studies); and Norton Rose (legal)

Status of international instruments in Jordan

Instruments currently in force:

| Instrument | In force |
|---|----------|
| Agreement on the Privileges and Immunities of the IAEA | 1982 |
| Convention on Early Notification of a Nuclear Accident | 1988 |
| Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency | 1988 |
| Revised Supplementary Agreement concerning the Provision of Technical Assistance by the IAEA | 1988 |
| Co-operative Agreement for Arab States in Asia for Research, Development and Training Related to Nuclear Science and Technology | 2002 |
| Treaty on the Non-Proliferation of Nuclear Weapons (NPT) | 1978 |
| Safeguards Agreement: Application of Safeguards in Connection with the NPT | |
| Protocol Additional the Safeguards Agreement | |
| Convention of Nuclear Safety | 2009 |
| Convention of the Physical Protection of Nuclear Material | 2009 |

Status of international instruments in Jordan

Instruments that need to be ratified:

| Instrument | Status | Ratification required |
|---|-----------|-----------------------------------|
| Vienna Convention on Civil Liability for Nuclear Damage Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention Convention on Supplementary Compensation for Nuclear Damage | Non-Party | ✓ ✓ ✓ Recommended |
| International Convention on the Suppression of Acts of Nuclear Terrorism | Non-Party | ✓ |
| Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management | Non-Party | ✓ |
| Amendment to the Convention on the Physical Protection of Nuclear Material | Non-Party | ✓ |
| Co-operative Agreement for Arab States in Asia for Research, Development and Training Related to Nuclear Science and Technology | Non-Party | |

National nuclear legislation

- ▶ National nuclear legislation is currently contained in two primary laws:
 - National Energy Law No. 42 of 2007 relating to the jurisdiction of the Jordan Atomic Energy Commission
 - Nuclear Safety and Security Radiation Protection Law No. 43 of 2007 establishing the Jordan Radiation and Nuclear Regulatory Commission (**JNRC**)
- ▶ The laws set out a broad framework for regulation of the nuclear sector but do not provide a comprehensive coverage of the necessary contents of a national nuclear law

The regulatory regime

- ▶ Suite of 11 implementing regulations anticipated
- ▶ Focus of the regulations is radiation protection, rather than the development, construction and operation of nuclear power plants

| Regulation | Regulation recommended | Envisaged by Law 43 of 2007 |
|--|------------------------|-----------------------------|
| Mining and milling of uranium | ✓ | ✓ |
| Licensing and permitting | ✓ | |
| Safety of nuclear installations | ✓ | ✓ |
| Physical protection | ✓ | |
| Enforcement, assessment and inspection | ✓ | |
| Emergency preparedness | ✓ | |
| Transport and packaging | ✓ | ✓ |
| Import and export | ✓ | |
| Radiation protections | ✓ | ✓ |
| Radioactive waste management | ✓ | ✓ |
| Spent fuel management | ✓ | ✓ |
| Decommissioning | ✓ | |

Key issues for potential suppliers in Jordan

- ▶ Ability to joint venture and bring equity
- ▶ Ability to bring support from:
 - Key sub-contractors
 - Component part supply
 - Fuel supply
 - Operation and maintenance
- ▶ Jordan is a “have not” so a key concern is financing: export credit agency support; project structure unknown; level of government support unknown (government debt cannot be more than 60% of GDP)
- ▶ Legislative/regulatory process yet to be comprehensively developed (consider third party nuclear liability and licensing and permitting process in particular)

Section five: Case study on Vietnam

Vietnam's nuclear power programme to date

- ▶ Master Plan to implement the Strategy for the Peaceful Use of Atomic Energy (2007 by the Prime Minister)
- ▶ Strategy for Energy Development to 2020, with a vision to 2050 (2007 by the Prime Minister)
 - Electricity demand 201bill KWh in 2020, 327bill KWh in 2030 – anticipated shortfall of 36bill KWh by 2020 and 119bill KWh by 2030
 - First NPP to have a capacity of 2000MW – 4000MW constituting 5% - 9% of national power capacity by 2020
 - Increasing contribution of nuclear power to 11% by 2025 and 25-30% by 2040/50

Vietnam's nuclear power programme to date (continued)

Procurement has commenced

- ▶ December 2009 first plant awarded to Rosatom
 - 2000MW pressurised water reactor
 - Construction to commence in 2014; operational by 2020
- ▶ Next plants – strong interest from Japan and US

Status of international nuclear instruments in Vietnam

Instruments currently in force

| Instrument | In force |
|--|----------|
| Treaty on the Non-Proliferation of Nuclear Weapons (the <i>NPT</i>) | Yes |
| Safeguards Agreement - Application of Safeguards in Connection with the NPT | 1990 |
| Convention on Early Notification of a Nuclear Accident | 1987 |
| Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency | 1987 |
| Agreement on the Privileges and Immunities of the IAEA | 1967 |
| Revised Supplementary Agreement concerning the Provision of Technical Assistance by the IAEA | 1983 |

Status of international nuclear instruments in Vietnam

Instruments that need to be ratified

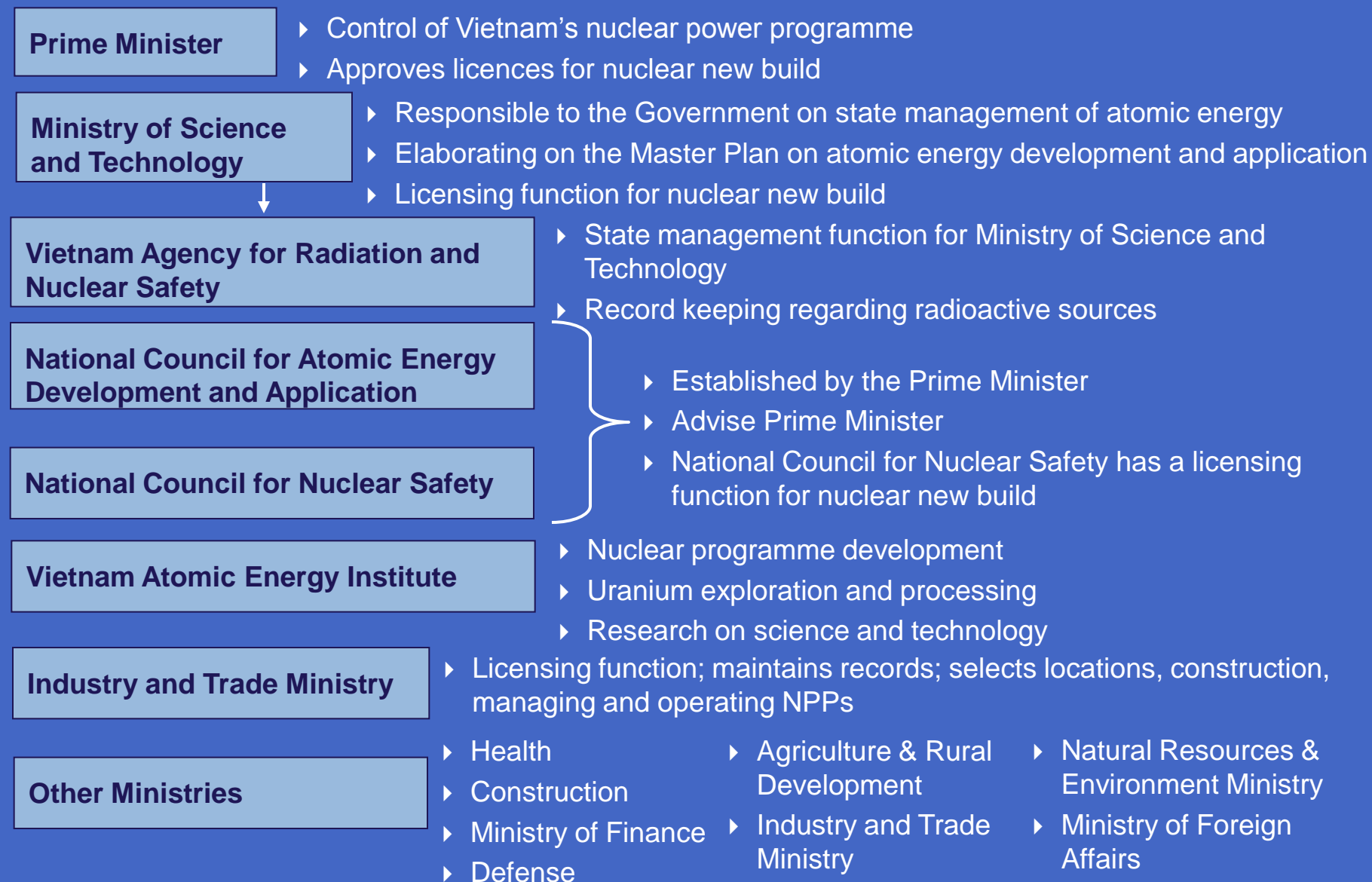
| Instrument | Status | Ratification required? |
|---|------------|------------------------|
| Protocol Additional the Safeguards Agreement | Not signed | ✓ |
| Convention of the Physical Protection of Nuclear Material and Amendment | Non-Party | ✓ |
| Convention of Nuclear Safety | Non-Party | ✓ |
| Vienna Convention on Civil Liability for Nuclear Damage | Non-Party | ✓ |
| Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage | Non-Party | Recommended |
| Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention | Non-Party | Recommended |
| Convention on Supplementary Compensation for Nuclear Damage | Non-Party | Recommended |
| International Convention on the Suppression of Acts of Nuclear Terrorism | Non-Party | ✓ |
| Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management | Non-Party | ✓ |

National nuclear law

Legal infrastructure

- ▶ Atomic Energy Law 2008
- ▶ Government decrees:
 - Administrative Punishment in the Field of Nuclear Energy 2009
 - Implementation of some Articles in Atomic Energy Law 2010
 - Nuclear Power Plants (anticipated)

Ministries and entities involved in Vietnam's Nuclear Power Programme



Implementing regulations anticipated by the Atomic Energy Law

| Key regulations | Anticipated? |
|--|--------------|
| Licensing and permitting | ✓ |
| Enforcement, assessment and inspection | |
| Physical protection and safety (including basic safety standards) | |
| Emergency preparedness and response | |
| Radiation protection | ✓ |
| Transport and packaging of radioactive material and nuclear substances | ✓ |
| Import and export controls | |
| Radioactive waste and spent fuel management | ✓ |
| Decommissioning | |

Licensing process for nuclear new build under Vietnam Atomic Energy Law

Location Approval

- ▶ Prime Minister approval
- ▶ Ministry of Science and Technology controls content of application
- ▶ Submitted by?

Contents

- ▶ General report on site
- ▶ Preliminary design
- ▶ EIA
- ▶ Preliminary safety analysis report
- ▶ Safety assessment report
- ▶ Radiation plan
- ▶ Report of State Evaluation Council
- ▶ Resolution of Provincial-level Peoples' Council

Construction Investment License

- ▶ Prime Minister approval
- ▶ Submitted by investors

Contents

- ▶ Detailed design
- ▶ EIA
- ▶ Safety analysis report
- ▶ Decommissioning plan
- ▶ Waste and spent fuel management plan
- ▶ Report of State Evaluation Council

Operation License

- ▶ Obtained prior to fuelling
- ▶ Valid for 10 years – may be extended
- ▶ Evaluated by Radiation and Nuclear Safety Agency
- ▶ Industry and Trade Ministry issues license for official operation after reaching agreement with Science and Technology Ministry and National Council for Nuclear Safety

Other Licenses to Perform Radiation Jobs

- ▶ Disposal of radioactive waste/spent fuel
- ▶ Exploit/explore/process radioactive cores
- ▶ Transport radioactive materials
- ▶ Import/export radioactive materials and nuclear equipment

Section five: Conclusions

Conclusions

- ▶ The paradigm shift in emerging nuclear markets: “fast-tracking” of programmes – focus on procurement before legislative/regulatory infrastructure
- ▶ Concern over project development in the absence of comprehensive legislative/regulatory infrastructure
 - Will the international community respond?
 - Are opportunities for cooperation being lost?
 - Can projects actually be structured and financed without comprehensive legislative/regulatory infrastructure?