

# **Study of Feasible and Sustainable Multilateral Nuclear Approach on Nuclear Fuel Cycle**

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# Benefit and Incentive on MNA

1. Formulation of no discriminatory framework can be primary incentive to make states join MNA. Recent criteria-based approach of export of sensitive technologies in NSG would help create a framework taking into account NPT Article IV.
2. Nevertheless, the number of enrichment and reprocessing facilities can be limited from the viewpoints of their needs (capacities) and nuclear nonproliferation.
3. Services on spent nuclear fuels, take-back, take-away, storage, reprocessing etc, should systematically be assured. Recipient countries can enjoy such services in NMA framework.
4. It is also expected that the host country in MNA would be discouraged to divert nuclear materials and misuse of the related technologies because of the multilateral control of the fuel cycle facilities.
5. To minimize proliferation risk on SFs: Accumulation of spent fuels, e.g., in power reactor user countries, comes to be a serious issue in the world. Leaving such spent fuel in individual countries, there is also a certain level of risk to make such countries change the policy, i.e., to have incentive to try reprocessing.
6. It may be expected for the proposed NMA framework that infrastructure support such as nuclear safety and security (2Ss) be involved. It involves application of international standards/guidelines on nuclear safety/security.
7. Host countries may be able to expand their nuclear fuel cycle business capabilities further more although facilities are expected to be controlled under/by MNA.

**Needs on  
Frontend Services  
Backend Services**

**Asian Nuclear  
Developed &  
Emerging States**

**Equality**

**Compatibility  
Peaceful Use and  
Non-proliferation**

**Regional  
Cooperation**

**Feasible/Sustainable  
Framework**

**Non-  
Proliferation**

**Nuclear  
Security**

**Nuclear  
Safety**

**3 S**

**Target:  
Regional MNA**

**Multilateral Nuclear Fuel Cycle  
Approach (MNA) in Asia**

**Treaty**

**Agreements  
(Management & Operation)**

# Justification of the Region (Asia) for MNA

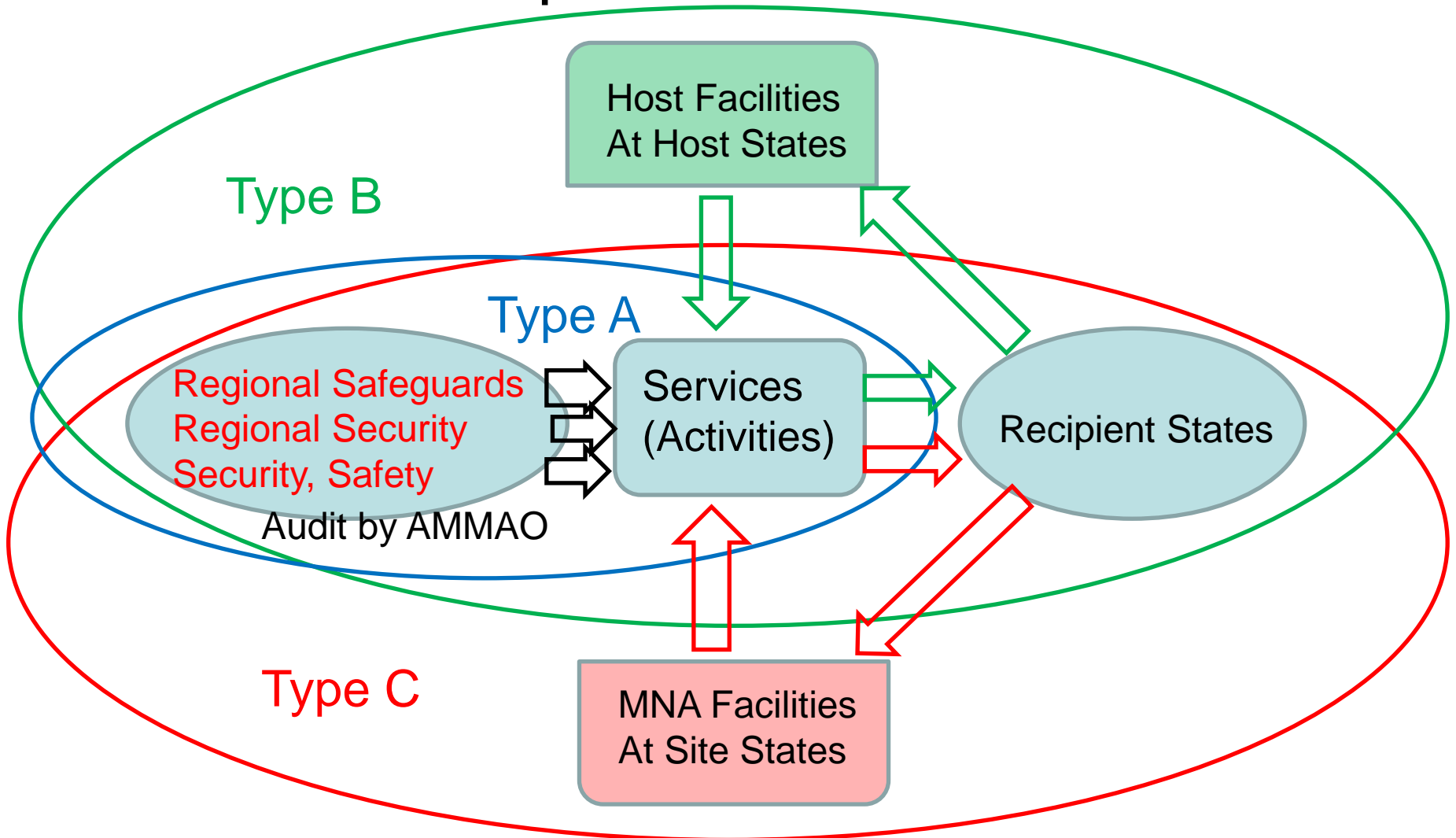
Our Study: Targeted to central – south/east Asian

- Nuclear Power Growth in Asian Region.
- The Region possesses high level of nuclear technologies and capability of nuclear fuel cycle and abundance of nuclear materials
- The region needs stable fuel supply system, spent fuel services and cooperation on 3S between developed and emerging countries is needed.
- Seriousness of spent fuel (SF) accumulation (need of solution), possibility of regional cooperation on SF
- Desire to have new type non-proliferation framework

# Basic Concept on Our MNA Study

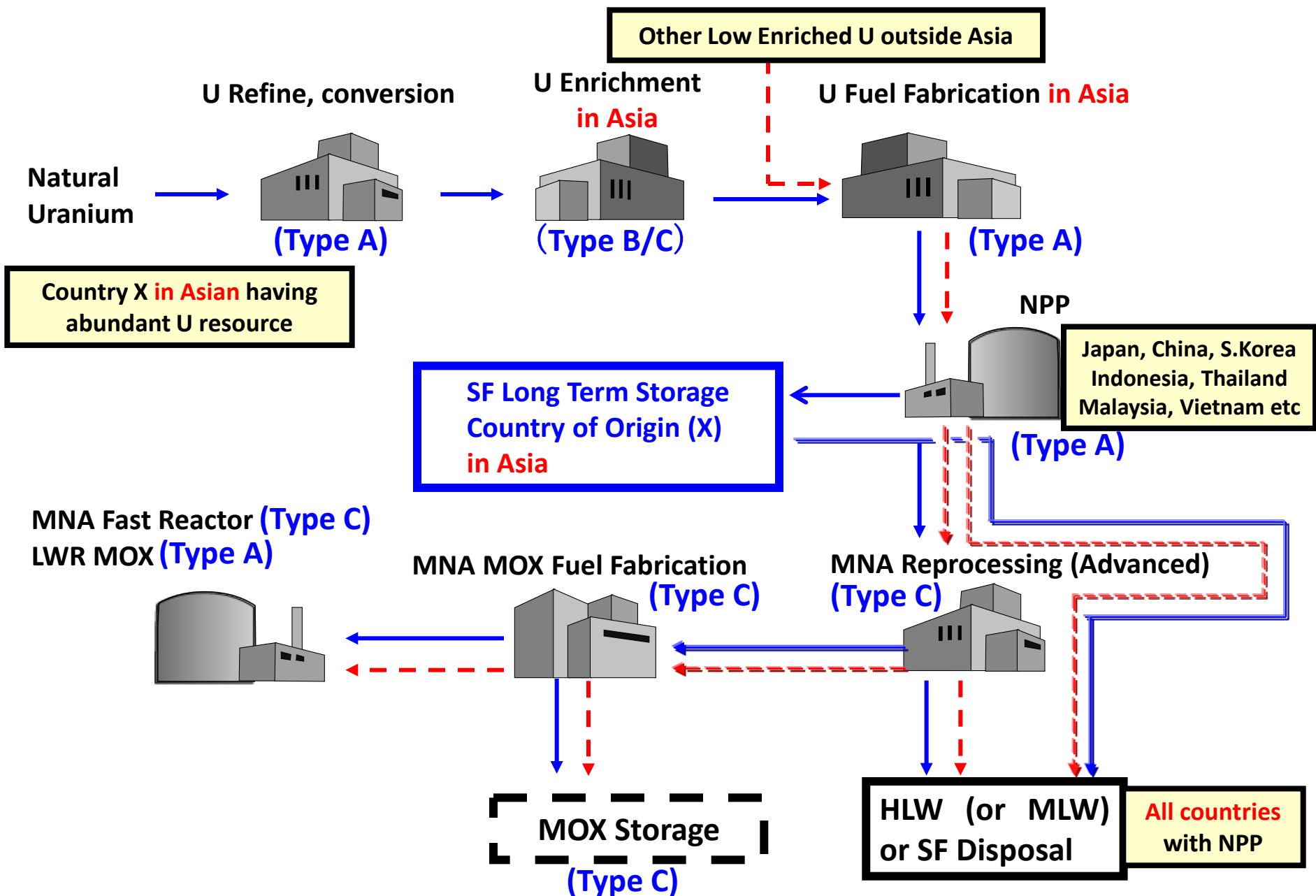
- Proposed MNA-Framework on Nuclear Fuel Cycle should be designed based upon **1) Nuclear- Nonproliferation**, **2) Sustainability**, and **3) Feasibility**.
- Compatibility of “**inalienable right (equality)**” and “**nuclear non-proliferation**” in peaceful use of nuclear energy should be pursued. (pursuant to Article 4, NPT)
- **MNA to hold equal level of nuclear non-proliferation (NNP) function to the existing NNP measures** (e.g. substitute for bilateral nuclear agreement, AEA article 123) *The specific requirement to participate in the multilateral framework is to satisfy conditions equivalent to the “objective criteria” described in INFCIRC 254 part 1, 6-7 (NSG Guidelines revised in 2011).*
- MNA-Framework to include the **services on not only nuclear fuel supply (front-end) but also spent fuel - SF treatment (back-end)**; Not only assurance but provision of both services.
- MNA to comply with the **international guideline/standard on safety, safeguards and security (3S)** (Regional System also should cover Safety/ Security).
- At the same time, **MNA contributes to “improving transparency” and “trust-building”** as a measure for nuclear non-proliferation.

# Cooperative Scheme



Services: Fuel Supply, SF Storage, Reprocessing, MOX Storage by  
Multinational Consortium

Management: Asian Multilateral Fuel Cycle Management Organization  
(AMMAO)



**A MNA Model and Potential New Capabilities in Asia Region**

# Features for formulation of MNA

Label A: Nonproliferation (restriction of NPT Article IV, safeguards, nuclear security and export control)

Label B: Assurance of supply (services)

Label C: Siting – choice of host country

Label D: Access to technology

Label E: Multilateral involvement

Label F: Economics

Label G: Transportation

Label H: Safety

Label I: Nuclear liability

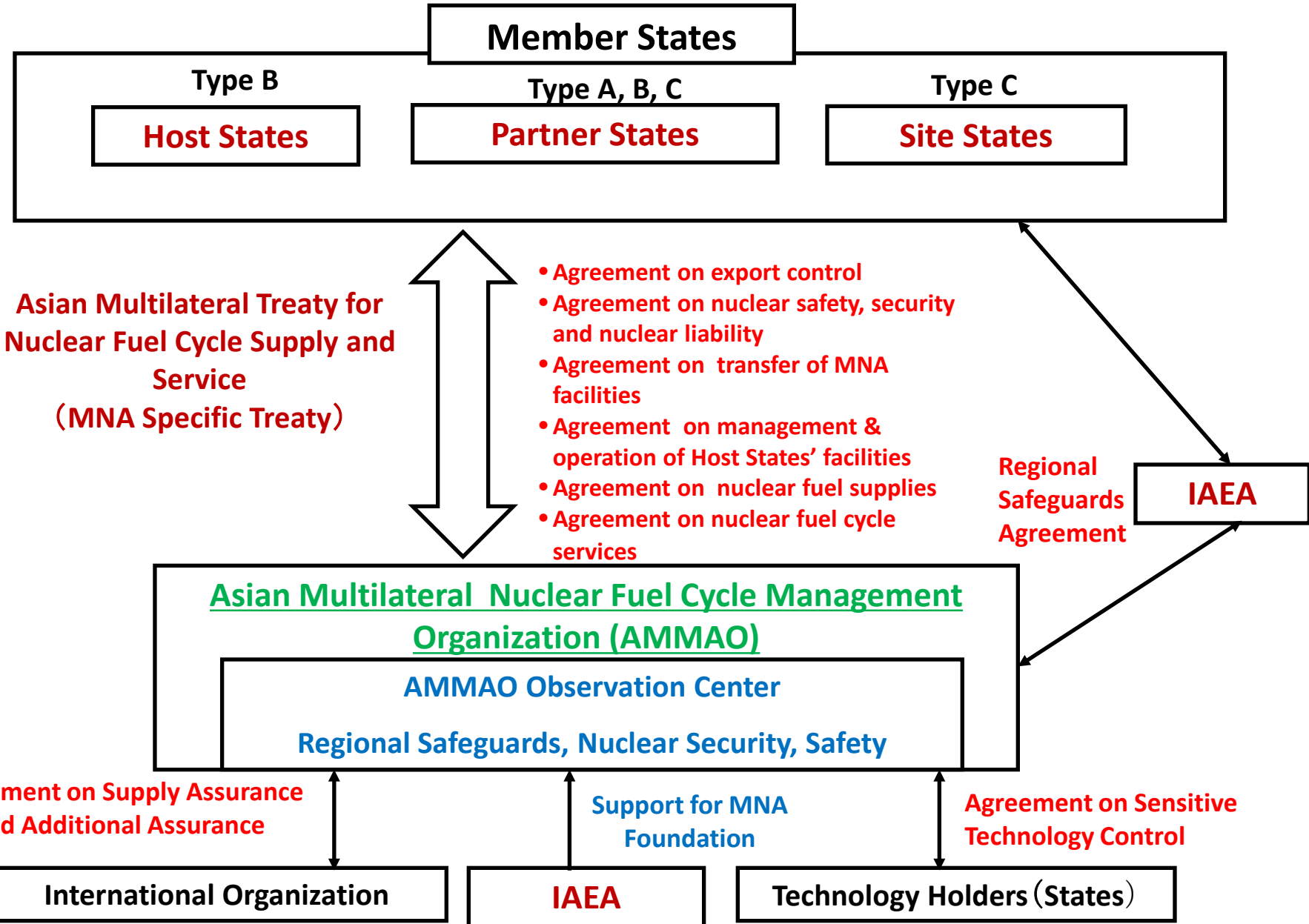
Label J: Political and public acceptance

Label K: Geopolitics

Label L: Legal aspects (relations with international agreement, bilateral agreements, nuclear free zone, etc.)



# Asian Multilateral Nuclear Fuel Cycle Framework: **Structure**



# International Treaties, Agreements, etc. with Regard to Each Label

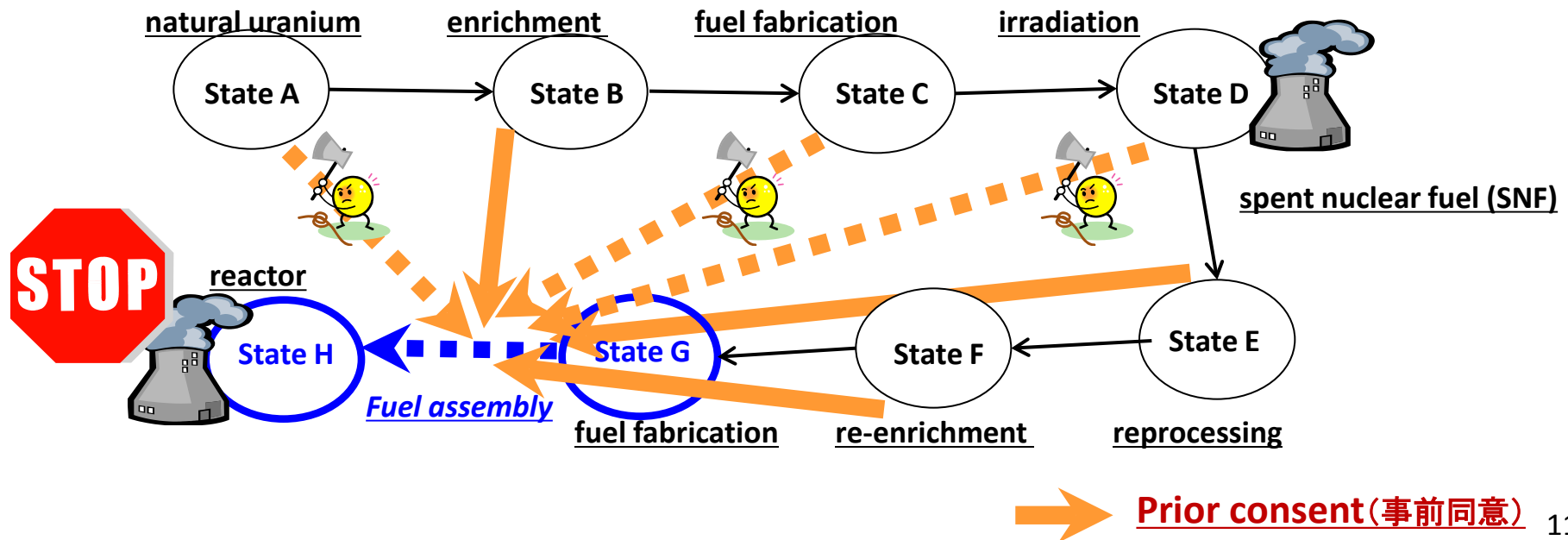
| Evaluation element (label) and its contents |  | Related treaties, agreements, etc.  |  |
|---|--|---|--|
| A   | Nuclear non-proliferation  | A-1: Limitation of sensitive nuclear technologies/peaceful use of nuclear power   | <ul style="list-style-type: none"> <li>• Treaty on the Non-Proliferation of Nuclear Weapons (NPT)</li> <li>• <b>Bilateral nuclear cooperation agreements</b></li> </ul>  |
|   |  | A-2: Safeguards   | <ul style="list-style-type: none"> <li>• <b>Full-Scope Safeguards Agreement (INFCIRC/153)</b></li> <li>• <b>Additional Protocol (INFCIRC/540)</b></li> <li>• <b>Regional safeguards agreements (e.g.: EURATOM, ABACC)</b></li> </ul>   |
|   |  | A-3: Physical protection of nuclear material and nuclear security   | <ul style="list-style-type: none"> <li>• IAEA recommendation regarding physical protection of nuclear material (INFCIRC/225/Rev.5 corrected)</li> <li>• Convention on the Physical Protection of Nuclear Material (INFCIRC/274/Rev.1)</li> <li>• Nuclear Terrorism Protection Agreement</li> </ul> |
|   |  | A-4: Export regulation  | <ul style="list-style-type: none"> <li>• <b>NSG Guideline regarding Export of Nuclear-Related Materials and Equipment (INFCIRC/254/Rev.10/Part 1)</b></li> <li>• <b>United Nations Security Council Resolution 1540</b></li> </ul>   |
| B   | Guarantee of (nuclear fuel) supply   | •NA   |  |
| C   | Selection of host states<br>(In case where Asian states are the member states) | <ul style="list-style-type: none"> <li>• Southeast Asian Nuclear Weapon Free Zone Treaty</li> <li>• Treaty on a Nuclear Weapon Free Zone in Central Asia</li> <li>• Mongolia's Declaration of Non-Nuclear Weapon Position</li> <li>• Korean Peninsula Non-Nuclear Weapon Declaration</li> </ul>   |  |
| D   | Access to technologies   | Related to above-described label A  |  |
| E   | Degree of involvement in multinational initiative                              | NA  |  |
| F   | Economics  | NA  |  |
| G   | Transport  | <ul style="list-style-type: none"> <li>• IAEA recommendation regarding physical protection of nuclear material (INFCIRC/225/Rev.5 corrected)</li> <li>• Convention on the Physical Protection of Nuclear Material (INFCIRC/274/Rev.1)</li> <li>• Execution Standards of Transboundary Movement of Radioactive Wastes (INFCIRC/386)</li> </ul> |  |
| H   | Safety   | <ul style="list-style-type: none"> <li>• Convention on Nuclear Safety, Convention on Early Notice of Nuclear Accidents</li> <li>• Treaty on Nuclear Accident Assistance</li> <li>• Treaty on Safety of Radioactive Wastes, etc.</li> </ul>  |  |
| I   | Compensation   | International Treaty on Compensation for Nuclear Damage   |  |
| J   | Political/social acceptability   | NA  |  |
| K   | Geopolitics  | NA  |  |
| L   | Legal regulations  | NA  |  |

# 二国間協定におけるチャレンジ

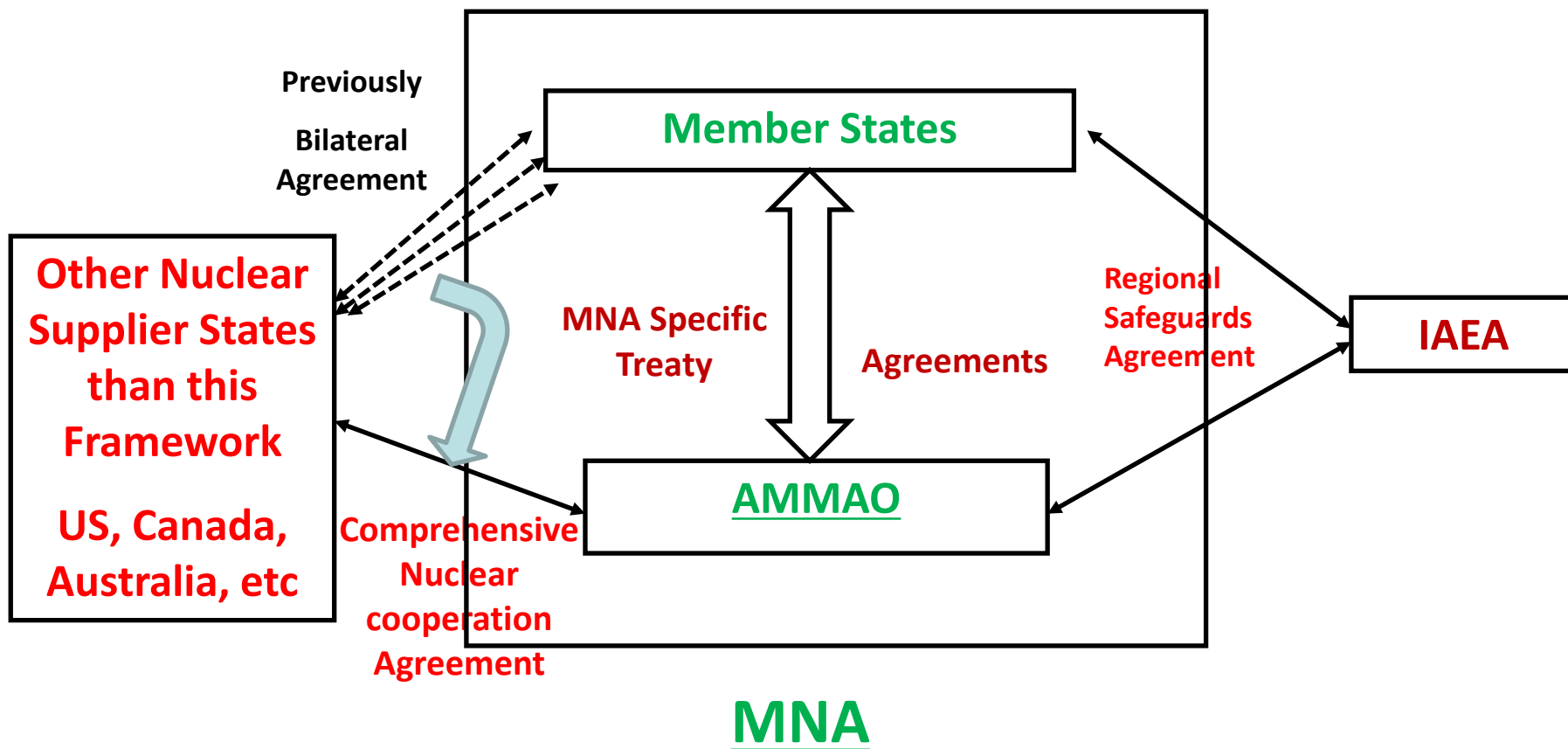
## Bilateral nuclear cooperation agreements

- Challenges:

- ✓ Satisfying non-proliferation requirements by bilateral nuclear cooperation agreements between MNA member states and nuclear supplier states, especially the US
- ✓ Need prior consents by supplier states
  - re- transfer of nuclear materials
  - alternation in form and content by irradiation
  - SNF reprocessing
- ✓ Without such consents, MNA will not function effectively and efficiently
- ✓ In order to gain such consents, the MNA itself needs to be equipped with robust nonproliferation characteristics

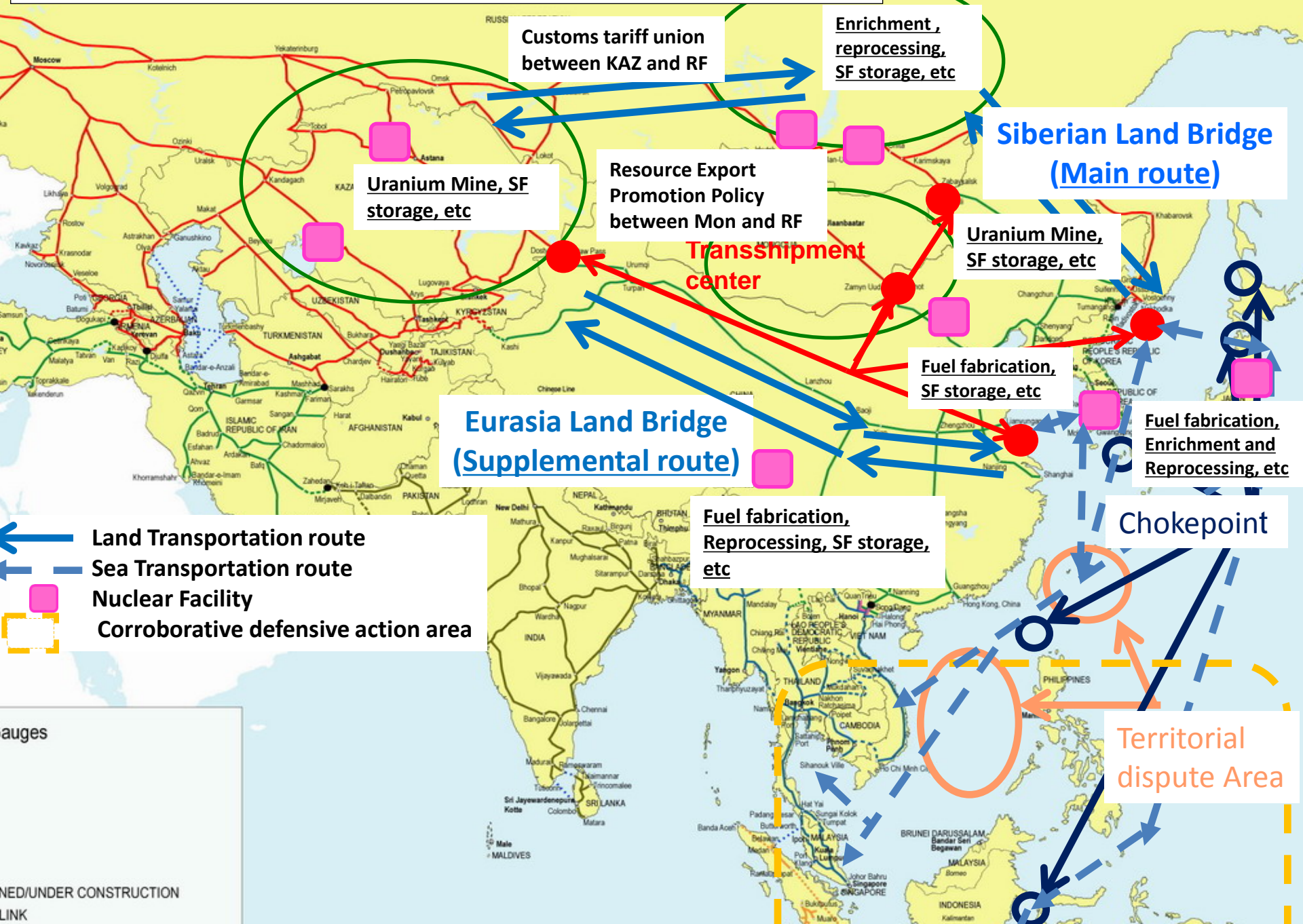


# MNAにおける二国間協定の扱い Countermeasure for Bilateral Agreement Issue



A possible conclusion would be the establishment of comprehensive bilateral agreements between AMMAO and nuclear supplier states which could replace the existing bilateral nuclear cooperation agreements between each state and nuclear supplier states

# MNA Participants and Nuclear Fuel Transportation Route



# Thank you for your attention

## **ACKNOWLEDGEMENT**

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