

# Current Status of the Radioactive Waste Management, issues to be overcome, and the way forward to access the JC



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**Regional Workshop on the Joint Convention on the Safety of Spent  
Fuel Management and on the Safety of Radioactive Waste  
Management**

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# CONTENTS



- ☐ **Brief Introduction on BAEC**
- ☐ **Sources of RW and Exposure in Bangladesh**
- ☐ **Status of Legal Instrument/ Framework**
- ☐ **Legal Framework for RWM in Bangladesh**
- ☐ **Waste Management Activities**
- ☐ **Status of JC on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management**

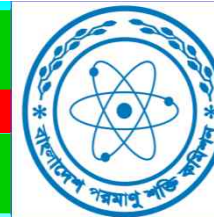
# BANGLADESH



- ❖ **Official Name:** The People's Republic of Bangladesh
- ❖ **Capital City:** Dhaka
- ❖ **Area:** 147,570 sq. km
- ❖ **Total Population:** 150 million
- ❖ **Language:** Bengali (Bangla) is the national language
- ❖ **Main Contributors to GDP:** Agriculture & Garments Industries



# Sources of RW and Exposure in Bangladesh



## Threat Category II:

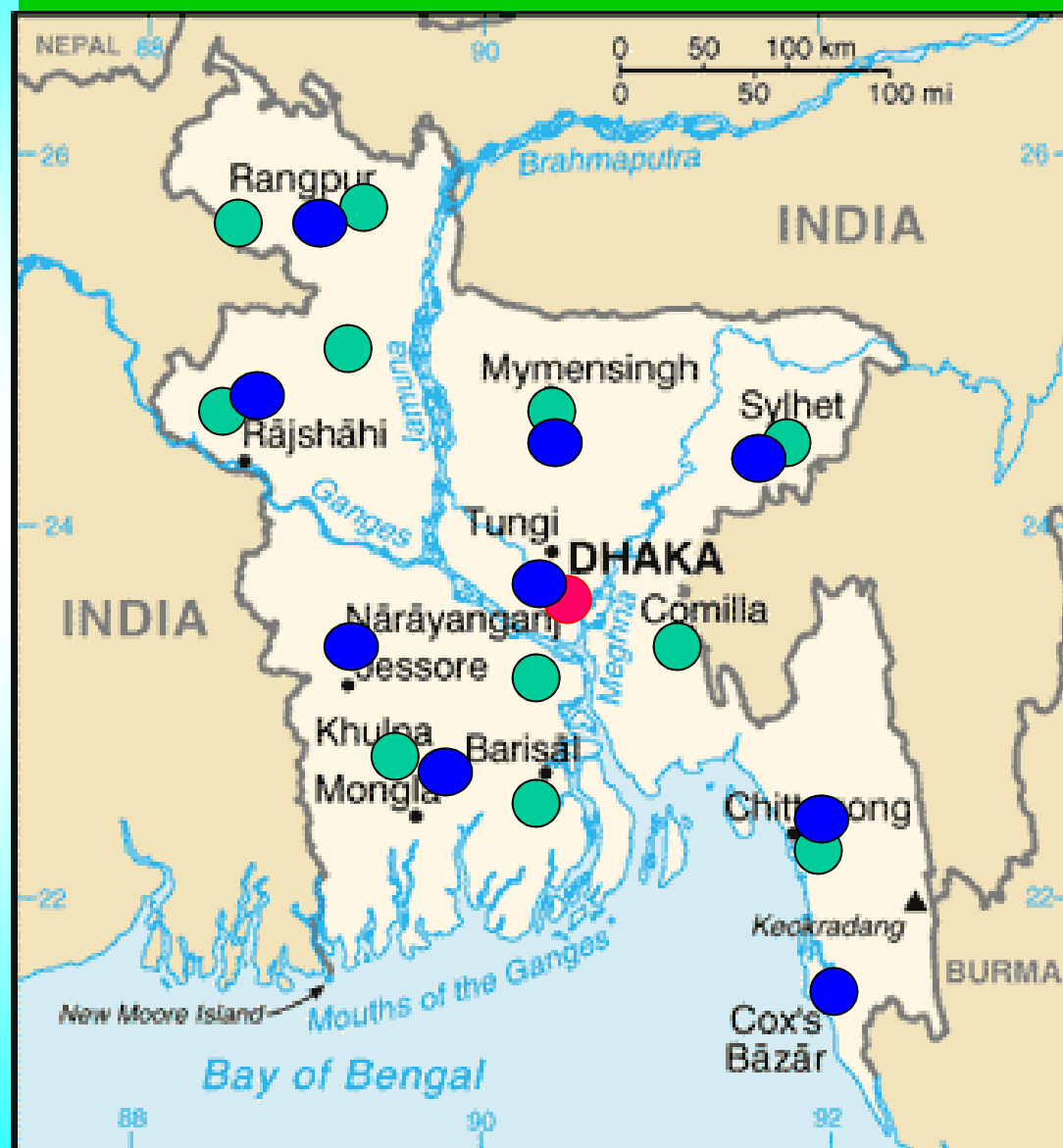
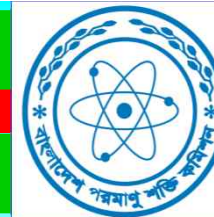
**Research Reactor  
(1 Nos.)**



## Threat Category III:

- **Commercial Gamma Irradiator**
- **Central Radioactive Management and Storage Facility**
- **Radiotherapy Facilities**

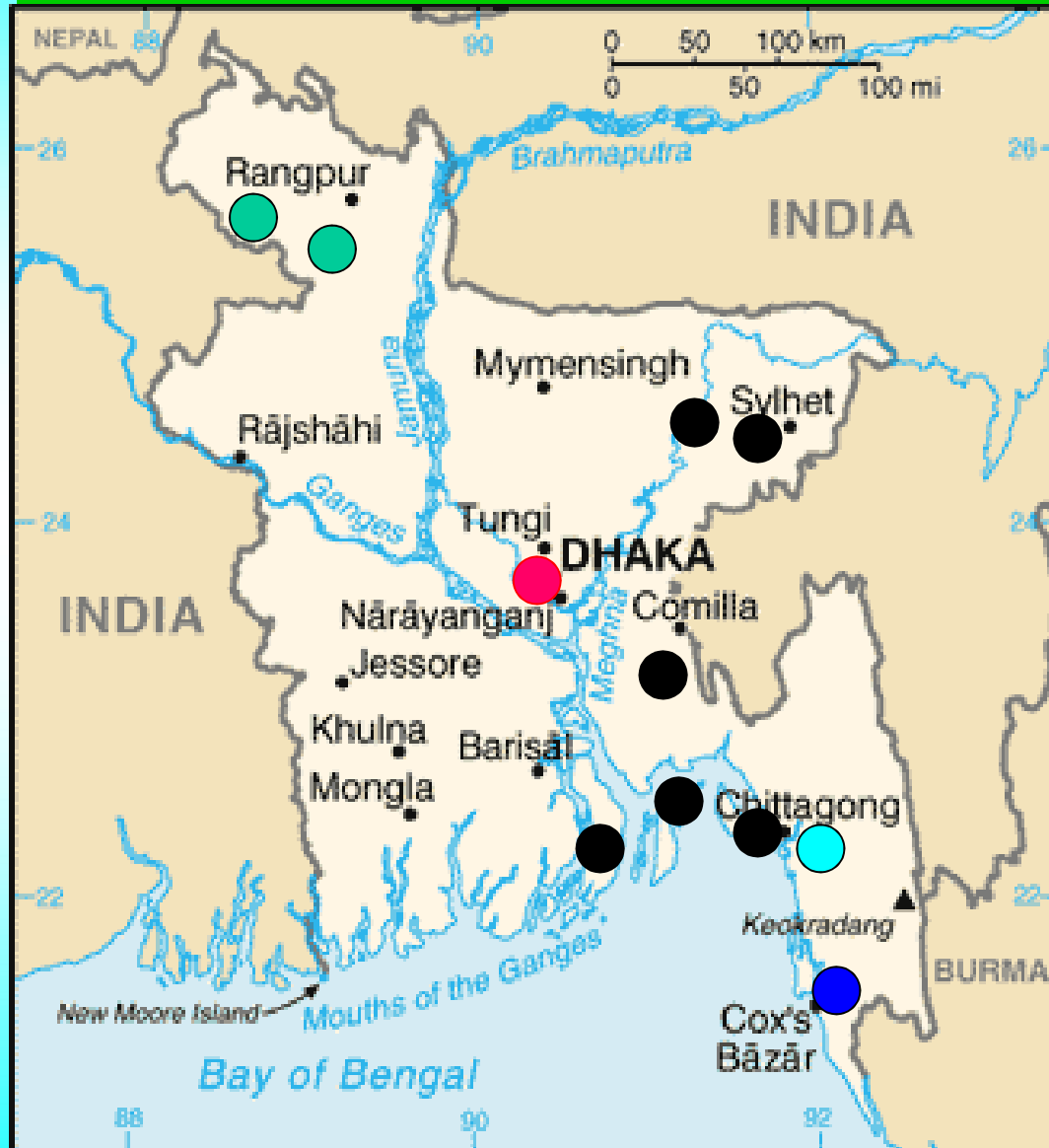
# Sources of RW and Exposure in Bangladesh



## Threat Category IV

- INMs
- RIP Facility
- Industry, Research & Education and Medical X-rays

# NORM & TENORM Wastes Generating Sources



- Coal Mines
- Ship Breaking and Metal Recycling Area
- Beach Sand Minerals
- Oil and Gas Exploration



## ❑ Nuclear Facilities

- ❖ 3 MW TRIGA MARK-II Research Reactor
- ❖ Radioactive Waste Management Unit

## ❑ Nuclear Material

- ❖ ~20% enriched fuel of the research reactor,
- ❖ Uranium cask used in RI production lab.
- ❖ Uranium shielding heads of irradiators being used in medical facilities.



**TRIGA MARK-II Research  
Reactor**

## ❑ Proposed Nuclear Power Reactor



# Status of Legal Instrument/ Framework



❑ Bangladesh is fully committed to peaceful uses of atomic energy. As such Bangladesh has signed a number of international and bi-lateral agreements, protocols and conventions.

## Agreements with IAEA

- Application of Safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons (11 June 1982)
- Improved Procedures of Designation of Safeguards Inspectors (25 April 1995)
- Protocol Additional to the Agreement between the People's Republic of Bangladesh and the IAEA for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (30 March 2001)



# Relevant International Treaties/Conventions



- Treaty on the Non-Proliferation of Nuclear Weapons (NPT) (31 August 1979)
- Comprehensive Nuclear-Test-Ban Treaty (8 March 2000)
- Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency (7 February 1988)
- Convention on Early Notification of a Nuclear Accident (7 February 1988)
- Convention on Nuclear Safety (24 October 1996)
- Convention on the Physical Protection of Nuclear Material (10 June 2005)
- International convention for suppression of acts of nuclear terrorism (7 July 2007)



# Status of the Spent Fuel and Radioactive Waste Management Policy

A preliminary draft document on “**Radioactive Waste and Spent Fuel Management Policy of the People’s Republic of Bangladesh**” has been developed. A National Workshop including different stockholders was held on 29 July – 01 August, 2013 in Dhaka, Bangladesh, organized by BAEC and IAEA (under IAEA RAS-9071 Project) to finalize the national policy draft document and the document is under review process of IAEA experts of this RAS project.

# Legal Framework for RWM in Bangladesh



## National Legal Instruments ...

- I. Bangladesh Atomic Energy Regulatory (BAER) Act 2012 (Passed in the National Parliament of Bangladesh on 19 June 2012).
- II. Nuclear Safety and Radiation Control (NSRC) Rules-1997 (SRO No. 205- Law/97).
- III. Radioactive Waste Management Policy- 2011 (Preliminary Draft).
- IV. An authority “Bangladesh Atomic Energy Regulatory Authority” was formed on 12 February, 2013.
- V. National and international legal tools are followed (a) to carry out nuclear security, safeguards and related activities, and (b) to ensure physical protection in the process of issuance of license, permit, inspection, monitoring etc.



# I. Bangladesh Atomic Energy Regulatory Authority (BAERA) Act- 2012

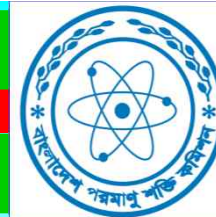
## Chapter V: Transport and Waste Safety

### Section 38: Management of Radioactive Waste and Spent Fuel

- (1) Responsibility of Waste Generator
- (2) Responsible authority (CWPSF, BAEC)
- (3) Responsibility of authority
- (4) Treatment and conditioning of waste
- (5) Management procedures of waste
- (6) Responsibility for SF management and security
- (7) Formulation of necessary regulations

### Section 39: Transport of Radioactive Material

Details concerning the transport of radioactive material .... to be issued by the Authority.



## II. Nuclear Safety and Radiation Control Rules-1997

### Chapter X: Transport of Radioactive Material and Waste Management

#### Article 86- Transport of Radioactive Materials and Waste

86.1- General requirements

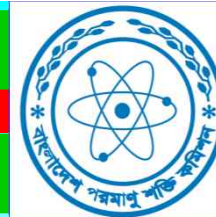
86.2- Information to regulatory authority

86.3- Compliance with the rules

#### Article 87- Radioactive Waste Management

(1) Compliance with the requirements for management

(2) Disposal requirements



### **III. Radioactive Waste Management Policy Draft**

#### **1.0 Introduction**

#### **2.0 Objective**

#### **3.0 Scope**

#### **4.0 Radioactive Waste Management Principles & Policy**

##### **4.1 Waste Management Principles**

##### **4.2 Policy Statement**

#### **5.0 Declaration**

# Management Procedures



## Liquid Waste

**Sources: Hospitals, INMs, RR and RI Production Facility**

- Wastes with very short-lived Isotopes are controlled by onsite storage (delay-decay/dilute-disperse) and then discharged if exemption limit is satisfied.**
- Practices are continued under periodic review of the Regulatory Body.**
- Waste with long-lived Isotopes are collected and stored at the Interim-storage facility of CWPSF to reach at the exemption limit set by the **Regulatory Body**.**
- A limited amount of liquid waste is processed for demonstration purpose using the liquid radwaste processing unit (IEX-cum- Ultra filtration).**



# Solid Waste



**Sources: Hospitals, INMs, RR, RI Production Facility, Industries etc.**

- **Wastes with short-lived isotopes** are stored onsite for delay-decay and the burnable wastes are then incinerated if exemption limit is satisfied.
- **Unburnable solid waste** are collected, segregated and stored at the Central Radioactive Waste Processing and Storage Facility (CWPSF).
- **Long-lived Disused SRS** (e.g., Co-60, Cs-137 etc.) and unsealed sources (e.g., Ra-226) are collected, processed and stored in the interim storage facility of the CWPSF.
- **NORMs** are yet to bring under proper regulatory control. However, they are under occasional monitoring.

SLUDGE



AOF = OUTSIDE FRONT OF SEPARATOR A  
AIF = INNERSIDE FRONT OF SEPARATOR A  
AOM = OUTSIDE MIDDLE OF SEPARATOR A  
AOR = OUTSIDE REAR OF SEPARATOR A  
A, V-101 = SEPARATOR A  
B, V-103 = SEPARATOR B

B, V-103

A, V-101

AOR

AOM

AOF; AIF



Fig. Separators of JB Process Plant showing different locations of radiation dose measurement. Sludge location (above).

# Waste Processing & Storage Facility



**CWPSF:** Central Radioactive Waste Processing and Storage Facility.

**Aim:** Pre-disposal management of RWs (collection, handling, transportation, treatment, conditioning and interim-storage).

**Design:** IAEA generic design and recommendation.

**Implementation:** Annual Development Programme (ADP) (1997– 2004) *and* IAEA Technical Co-operation (TC) Project (2001-2004).

**Officially Started:** 2005  
**Total Area:** 12,000 Sq-ft  
**Capacity:** ~50 Years





# Waste Processing Facility



**Sorting Box (2 Units)**  
Compressible and  
Non-compressible Waste



**Compactor (1 Unit)**

**Cementation Unit**



# LIQUID Waste Processing Facility

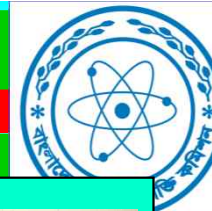


## IEX-cum-UF Unit



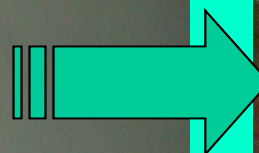
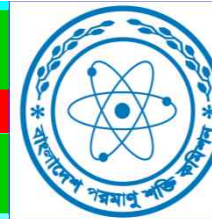


# Interim Waste Storage Facility



**Interim-storage of  
Unsealed Sources**

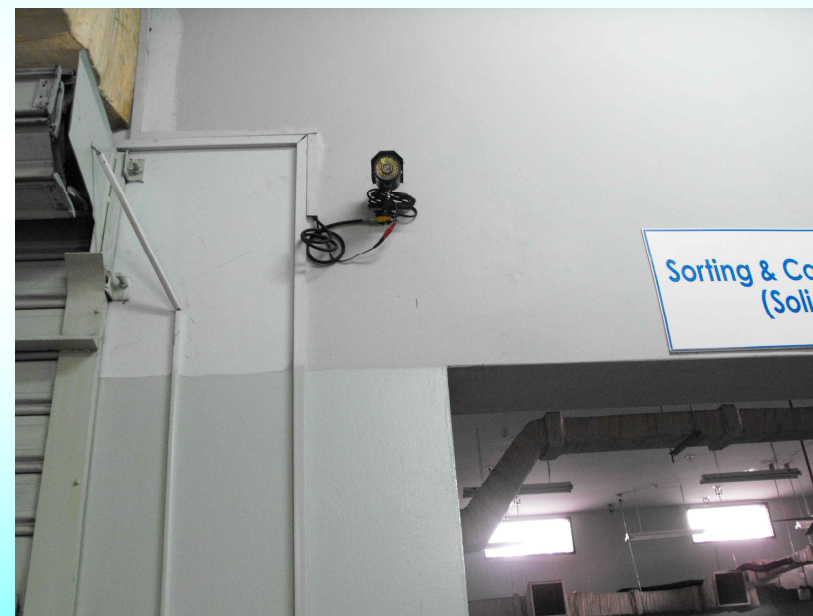
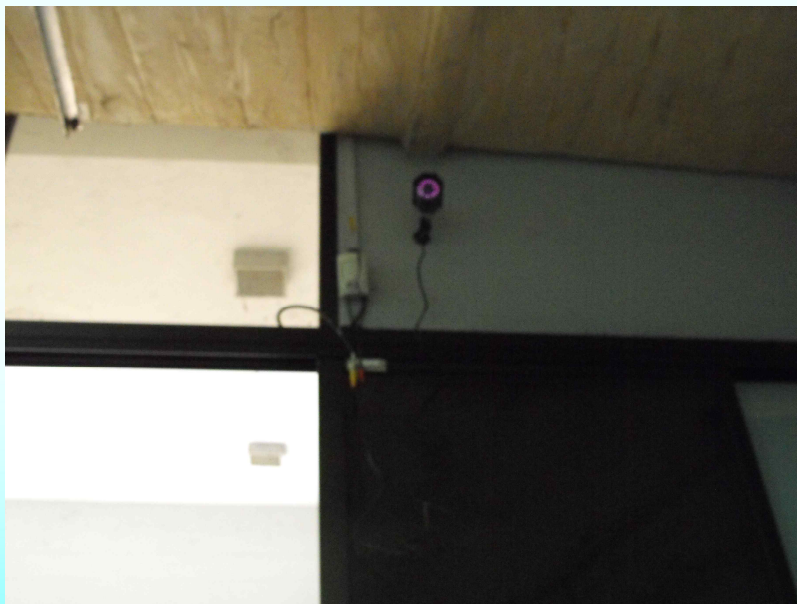
# Interim Waste Storage Facility



**Spent Sealed Radioactive Source (SRS) Room**



# Surveillance Cameras



# Detection Systems at the CWPSF



- **HSSS (Homeland Surveillance Security System)- its include**
  - **IR Camera (3)**
  - **PTZ Camera (1)**
  - **Radiation Detector (1)**
  - **RFID Reader (1)**
  - **Long Range IR illuminator (2)**



# PTZ Camera



# Response Force for the CWPSF



- CWPSF is guarded round the clock by security guards who are the permanent employees of BAEC.
- Additional security guards patrol around the security fencing of the CWPSF during the off hours.

The patrol team consists of

1. BAEC Security Guards,
2. Police Forces &
3. Ansers.

# Status of Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

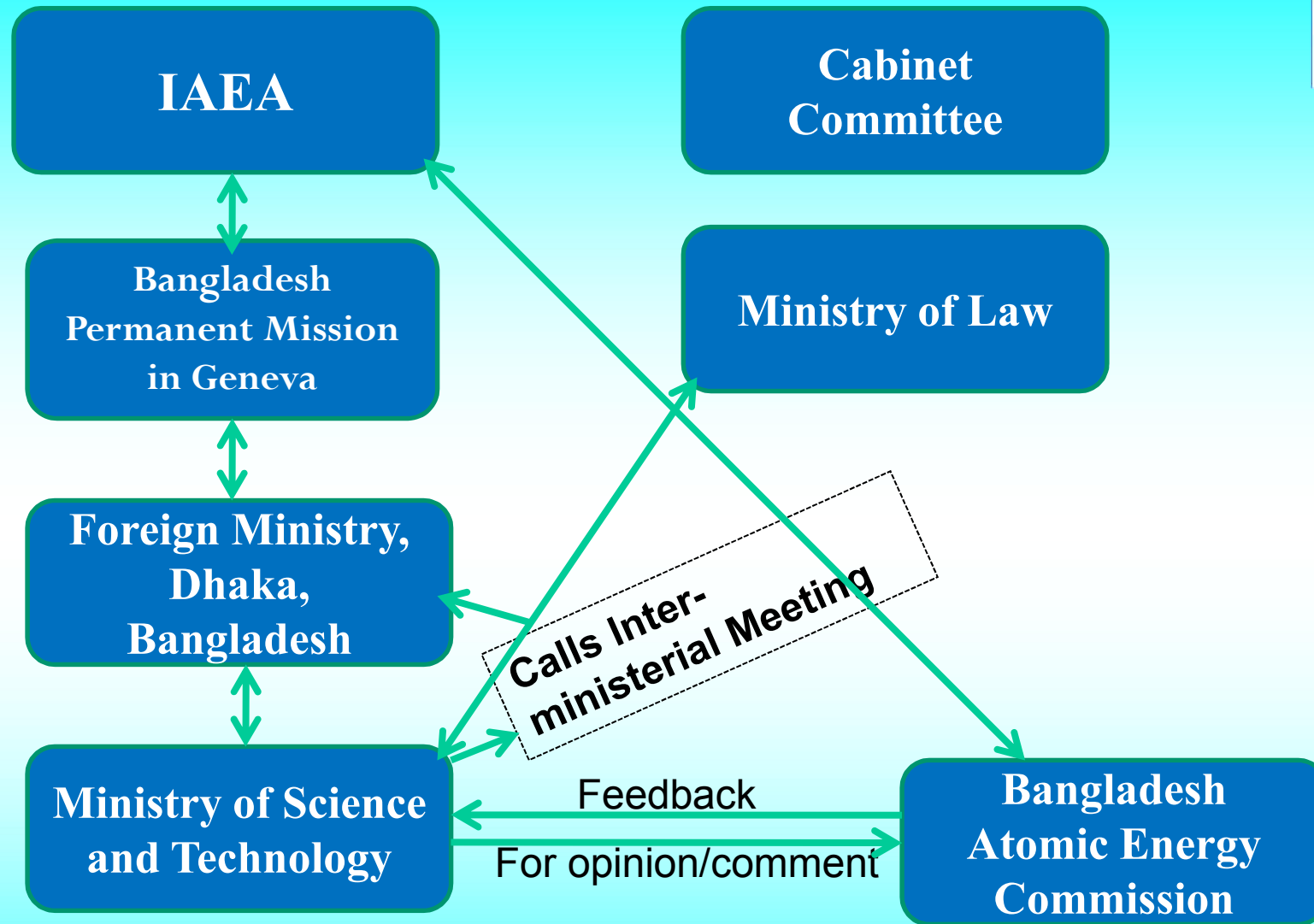


- BAEC studied the merit of Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.
- A proposal has been sent to Ministry of Science and Technology for active consideration to access the Joint Convention.

## Issues to be overcome and the way forward

BAEC can follow up with necessary document and information to MOST on merit to access the Joint Convention.





## Conclusion



- ❑ Bangladesh is very much transparent about its activities on handling and managing nuclear material and radioactive waste (including spent fuel) in accordance with the statute and safeguards system of IAEA.
- ❑ Bangladesh is working to ensure the protection of nuclear and radioactive material, radioactive waste and associated facilities, in accordance with relevant recommendations and guidelines of IAEA.
- ❑ In order to enhance the physical protection for nuclear security systems in the country, we are actively working with our strategic partners such as IAEA, USDOE, JAEA, FNCA etc.
- ❑ New act has been passed in 2012 and an independent regulatory body has been established this year (2013). It would help to strengthen country's security and safety system for radioactive waste including spent fuel.
- ❑ IAEA's cooperation in this regard will enhance the BAEC's efforts very much.



**Thank You Very Much for Your Kind  
Attention!!!**