One Hundred Questions & Answers about MRV in Developing Countries

Version 3.0 (COP21), November 2015

IGES Institute for Global Environmental Strategies

This book aims to present information on existing MRV schemes for greenhouse gases in plain language, while covering technical information. It will continue to be updated and made available online. Authors are responsible for all errors or omissions that may remain.

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Table of Contents

Abbreviations 2

Major updates from previous version 4

1. Introduction 5

2. Our Approach 8

3. MRV at a Glance 10

4. Questions and Answers 17

4.1. National Communications (non-Annex I) 18

4.2. Biennial Update Reports 31

4.3. National Greenhouse Gas Inventories (non-Annex I) 46

4.4. Nationally Appropriate Mitigation Actions 63

4.5. City-scale Greenhouse Gas Inventories 76

4.6. Clean Development Mechanism 96

4.7. Joint Crediting Mechanism 112

5. Good Practices 131

6. Annexes

References 155

Index 163

Abbreviations

ADB	Asian Development Bank
AFOLU	Agriculture, Forestry, and Other Land Use
APN	Asia-Pacific Network for Global Change Research
AusAID	Australian Agency for International Development
BAU	Business-as-usual
BRs	Biennial Reports
BURs	Biennial Update Reports
cCR	Carbonn Climate Registry
CDM	Clean Development Mechanism
CGE	Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention
CDP	Carbon Disclosure Project
CER	Certified Emission Reduction
COP	Conference of the Parties (to the UNFCCC)
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CRF	Common Reporting Format
C40	C40 Cities Climate Leadership Group
DOE	Designated Operational Entity
DNA	Designated National Authority
EB	CDM Executive Board

ERT	Expert Review Team
GEF	Global Environment Facility
GHGMI	Greenhouse Gas Management Institute
GHGs	Greenhouse Gases
GIO	Greenhouse Gas Inventory Office of Japan
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Society for International Cooperation)
GPC	Global Protocol for Community-Scale Greenhouse Gas Emissions
GPG	Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories
GPG-LULUCF	Good Practice Guidance for Land Use, Land-Use Change and Forestry
HFCs	Hydrofluorocarbons
HCFC	Hydrochlorofluorocarbon
IAF	International Accreditation Forum
IAR	International Assessment and Review
ICA	International Consultations and Analysis
ICLEI	International Council for Local Environmental Initiatives
IGES	Institute for Global Environmental Strategies
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change

IPPU	Industrial Processes and Product Use
ISO	International Organisation for Standardization
JC	Joint Committee
JCM	Joint Crediting Mechanism
JICA	Japan International Cooperation Agency
LDCs	Least developed countries
LULUCF	Land use, land-use changes, and forestry
MRV	Measurement, Reporting and Verification
NAMAs	Nationally Appropriate Mitigation Actions
NCs	National Communications
NCSP	National Communication Support Program
NIES	National Institute for Environmental Studies, Japan
NIR	National Greenhouse Gas Inventory Report
OECD	Organisation of Economic Development Cooperation
PDD	Project Design Document
PFCs	Perfluorocarbons
PP	Project Participant
QA	Quality Assurance
QC	Quality Control
SBI	Subsidiary Body for Implementation

SBSTA	Subsidiary Body for Scientific and Technological Advice
SIDS	Small Island Developing States
TCCCA	Transparency, Consistency, Comparability, Completeness and Accuracy
TTE	Team of Technical Experts
TPE	Third Party Entity
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNOPS	United Nations Office for Project Services
USAID	U.S. Agency for International Development
U.S.EPA	U.S. Environmental Protection Agency
WRI	World Resources Institute

Major updates from previous version (Version 2.1 (Post COP20))

Section/ Question	Page	Changes
Section 4.4: Nationally Appropriate Mitigation Actions (Q47-58)	**63**	**Newly added.**
Q25: What is the training programme for technical analysis?	**43**	Newly added.
Q61: What is the role of GHG inventories in goal setting and performance tracking?	**79**	Newly added.
Q74: Where to find calculation tools and training resources?	**92**	Newly added.
Q102: What is the relationship between the JCM and Japan's INDC?	**122**	Newly added.
Good Practice 5: Advanced reporting of GHG inventories	**138**	Newly added.
Good Practice 6: Advanced reporting of mitigation actions and their effects	**139**	Newly added.
Good Practice 15: Advanced reporting of NAMAs in a BUR	**148**	Newly added.
Good Practice 19: Demonstrating cities' climate action through global platforms	**152**	Newly added.
Good Practice 21: Development of JCM methodologies using default values	**154**	Newly added.

(There are also other updates, based on the updated status of MRV schemes introduced in this book.)

1. Introduction

Background

In the United Nations Framework Convention on Climate Change (UNFCCC), the 2007 Bali Action Plan, that is to enable the full, effective and sustained implementation of the Convention through long-term cooperative action, now, up to and beyond 2012, refers to "measurement, reporting and verification (MRV)" as an essential part of international processes. These include nationally appropriate mitigation actions (NAMAs) by developing country (non-Annex I) Parties.

While provisions of MRV, e.g. scope, procedure, methodological guidance, etc., are yet to be decided, it is certain that the future MRV system will be built on the existing one. Almost all developing country parties to the UNFCCC have been involved with MRV of greenhouse gases (GHGs) under different schemes.

Examples of these schemes at the national level include national communications (NCs) and national GHG inventories. Another example is the assessment of emission reductions under the Clean Development Mechanism (CDM). Some developing countries also have experience in MRV beyond what is currently established under the UNFCCC. In addition, developing countries have started gaining experiences with NAMA development and implementation on the ground.

Why this book has been made

One of the tasks at hand is to strengthen the understanding of existing MRV schemes. Learning from earlier experiences by developing countries is also vital to meet their needs and capacities. Efforts to increase the availability of information on MRV have been widely made.

The aim of this book is to help those who work, or are beginning to work, with MRV in climate change issues to understand MRV in a practical way, and learn the lessons and good practices that are available for developing countries. We introduce seven MRV schemes that have been established and on-going (see table on right). These range in scale from national to project. At the time of writing this book, some are directly under the UNFCCC and others, including the Joint Crediting Mechanism (JCM), are not. The JCM is jointly being developed and implemented by Japan and its partner countries.

How this book is useful

Our unique approach – one hundred questions and answers about MRV, can guide you to understand different existing MRV schemes in an easy-to-understand manner. In addition, we introduce lessons and good practices for developing countries when they practice MRV. The authors of this book have many years of experience with various MRV schemes in developing countries in Asia and other regions. Based on these experiences, we try to use our own words and also try to be as simple as possible.

MRV schemes introduced in this book

Scheme (Regulatory or implementing body)	Scale
National Communication (UNFCCC)	National
Biennial Update Report (UNFCCC)	
National GHG inventory (UNFCCC)	
Nationally Appropriate Mitigation Actions (UNFCCC)	
City GHG inventory (World Resources Institute, C40 Cities Climate Leadership Group, and ICLEI – Local Governments for Sustainability)	City
Clean Development Mechanism (UNFCCC)	Project
Joint Crediting Mechanism (Japan and a host country)	

This book may be found to be useful for those who want to learn about MRV in general, including policy makers, private sector, NGOs, students and donor agencies. Categorisations of questions and answers by theme and scale are available with visual marks. An index of questions is also attached at the end of this book.

The book is intended to be a living product, meaning that we will continue to revise and improve it as more information becomes available and good practices are shared. To this end, we would welcome any and all comments from readers.

2. Our Approach

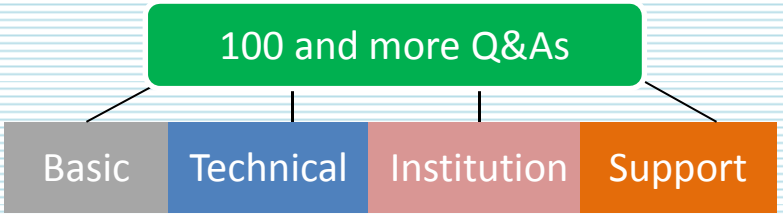
2.1 Questions & answers on MRV

The diagram below presents our two-step approach in this book. Step 1 provides you with questions and answers for understanding the 'why', 'what', 'how', 'who', 'how often', etc. for existing MRV schemes. Based on this understanding of the overall picture of MRV, Step 2 introduces selected good practices to help developing countries overcome their common challenges.

The two steps in this guidebook

The one hundred and more Q&As are comprised of around four thematic elements as follows:

- Basic: *why and what is it about?*
- Technical: *how to do it?*
- Institution: *who will do it?*
- Support: *what kind of support is available?*

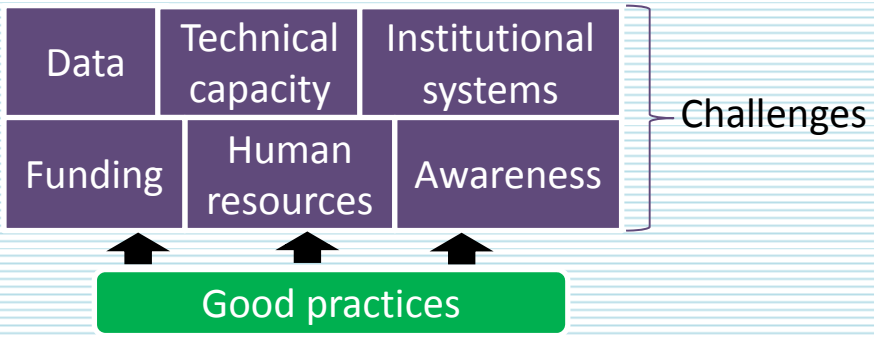


Structure of questions & answers

2.2 Good practices – lessons from Asia

Once you can grasp the overall picture of MRV, it is important to get an idea of how challenges may occur, in the course of practicing MRV, as well as what kinds of challenges may occur in the context of developing countries. Note that such challenges may also be common to some developed countries. We identified the six challenges that the majority of developing countries are likely to face when they practice MRV schemes, as listed below.

- Data: *data is lacking or not sufficient*
- Technical capacity: *technical capacity is limited*
- Institutional systems: *appropriate institutional systems are not in place*
- Funding: *funding is lacking or not enough*
- Human resources: *human resources are not there or insufficient*
- Awareness: *lack of awareness about MRV and its importance*



Good practices and the six common challenges

We introduce good practices to address each or a combination of these challenges. This is based on our experiences working in and with some developing countries in Asia and other regions. We could not provide examples of good practices for all of the challenges. We believe that a good practice derived from a particular MRV scheme can also be applied to other MRV schemes. We also intend to increase the examples of good practices in subsequent editions of this book.

3. MRV at a Glance

National Communications (non-Annex I)

	M	R	V
Why is it necessary?	To report the accurate circumstances of each party regarding such issues as GHG emissions and removals, mitigation measures, adaptation measures and other aspects of climate change to COP.	COP needs to understand the status of GHG emissions/removals and implementation of mitigation and adaptation measures by each Party to consider how to tackle climate change.	-
What is it about?	✓ National circumstances ✓ National greenhouse gas inventory ✓ Adaptation measures and vulnerability assessment ✓ Mitigation measures ✓ Constraints and gaps, and related financial, technical and capacity needs ✓ Other information (technology transfer, research and systematic observation, education, training and public awareness, capacity-building, information and networking)		-
How to do it?	NCs coordinating entity collects relevant data/information in cooperation with a broad range of relevant ministries and organisations.	Submit to the UNFCCC	-
Who will do it?	NCs coordinating entity, relevant ministries, institutions, organisations, etc.	National Government	-
Any standard or guidelines for it?	Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention (Decision 17/CP.8)	Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention (Decision 17/CP.8)	-

Biennial Update Reports (non-Annex I)

	M	R	V
Why is it necessary?	To report the accurate circumstances of each party regarding such issues as GHG emissions and removals, mitigation measures and other aspects of climate change to COP more frequently than NCs.	To enhance reporting from non-Annex I Parties on GHG emissions and removals and measures taken to mitigate climate change.	To increase transparency of mitigation actions and their effects.
What is it about?	✓ National circumstances and institutional arrangements ✓ Mitigation actions and their effects ✓ Constraints and gaps, and related financial, technical and capacity needs ✓ Domestic measurement reporting and verification; ✓ Other information		✓ National greenhouse gas inventory report ✓ Information on mitigation actions ✓ Analysis of the impacts of mitigation actions and the associated methodologies and assumptions ✓ Progress made in their implementation ✓ Information on domestic MRV ✓ Support received
How to do it?	Biennial updates reports (BURs) coordinating entity collects relevant data/information in cooperation with a broad range of relevant ministries and organisations.	Submit to the UNFCCC	International Consultations and Analysis (ICA), consists of the following: ✓ Technical analysis ✓ Facilitative sharing of views
Who will do it?	BURs coordinating entity, relevant ministries, institutions, organisations, etc.	National Government	Technical analysis: Team of Technical Experts (TTE) Facilitative sharing of views : SBI
Any standard or guidelines for it?	UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention (2/CP.17, Annex III)	UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention (2/CP.17, Annex III)	Modalities and guidelines for international consultation and analysis (2/CP.17, Annex IV)

National Greenhouse Gas Inventories (non-Annex I)

	M	R	V
Why is it necessary?	To estimate GHG emissions and removal at the national level.	COP needs to understand the status of GHG emissions/removals by each Party to consider how to tackle climate change	To increase the transparency of mitigation actions and their effects.
What is it about?	National GHG emission/removal estimation database prepared based on UNFCCC Reporting Guidelines and IPCC Guidelines.	Chapters on the national GHG inventories in the NCs and BURs.	ICA
How to do it?	Determined by each non-Annex I country based on Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention (Decision 17/CP.8).		To be determined based on Annex IV of UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention (Decision 2/CP.17), and Composition, modalities and procedures of the team technical experts under international consultation and analysis (Decision 20/CP19).
Who will do it?	Depends on each non-Annex I country's national circumstances (there is no particular decision for the institution.)		
Any standard or guidelines for it?	✓ Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention (Decision 17/CP.8) ✓ UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention (Decision 2/CP.17) ✓ Revised IPCC Guidelines ✓ GPG(2000) ✓ GPG-LULUCF ✓ 2006 IPCC Guidelines	✓ Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention (Decision 17/CP.8) ✓ 1996 Revised IPCC Guidelines ✓ GPG(2000) ✓ GPG-LULUCF ✓ 2006 IPCC Guidelines	UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention (Decision 2/CP.17)

Nationally Appropriate Mitigation Actions (NAMAs)

	M	R	V
Why is it necessary?	To understand the effects of mitigation actions by developing countries and the level of support provided for the actions to be taken.	With BURs, the international community can be informed of progress made by developing countries in terms of mitigation actions and whether gaps exist for support.	With ICA, to increase transparency of mitigation actions and their effects.
What is it about?	To determine GHG emissions reduction through NAMAs relative to "business as usual" emissions and support provided for the mitigation actions.	Reporting in BURs as components. Reporting on domestically supported NAMAs in BURs is a country's selection.	ICA for BURs. No verification agreed on domestically supported NAMAs.
How to do it?	It is done by following international requirements, domestic policy and arrangements and requirements associated with support.	Submission of BURs to the UNFCCC. How reporting on domestically supported NAMAs should be made depends on each country.	ICA consists of technical analysis and facilitative sharing of views.
Who will do it?	A broad range of NAMA implementers, from national, sub-national, to local scale.	BURs coordinating entity designated by the government.	TTE for ICA.
Any standard or guidelines for it?	✓ UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention (2/CP.17, Annex III) ✓ General guidelines for domestic MRV of domestically supported NAMAs by developing country Parties (21/CP.19, Annex)		Modalities and guidelines for international consultation and analysis (2/CP.17, Annex IV)

City-Scale GHG Inventories

	M	R	V
Why is it necessary?	To determine the emission levels, identify reduction opportunities, facilitate the design of mitigation actions, and to track progress toward reductions.	For public disclosure and/or for the upper level governments to track the GHG performances of their cities.	To enhance the credibility of GHG inventories.
What is it about?	An inventory should include emissions from stationary energy sources; transportation; waste; industrial process and product use (IPPU); and agriculture, forestry, and other land use (AFOLU) sectors.	A GHG inventory report should include GHG emission data, description of inventory boundary, year of inventory, data quality, methodologies used, and emission changes over time.	Verification involves an assessment of the completeness, accuracy and reliability of reported data.
How to do it?	It is typically done by calculation based on “activity data” and “emission factors”.	Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) provides standard reporting templates.	It covers verification of inventory boundary, calculation methodologies, data quality, etc.
Who will do it?	Normally GHG inventories are implemented (either in-house or out-sourced) by the agencies responsible for climate change or environmental protection under the city governments.	In some countries, cities are required to report their emission data to the national governments. Cities may also report to voluntary GHG reporting programmes.	It can be done by an independent organization/individual (third party verification) or internally (internal verification).
Any standard or guidelines for it?	Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC)	Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC)	Currently there is no international standard for verification but the GPC provides some guidance on it.

Clean Development Mechanism (CDM)

	M	R	V
Why is it necessary?	To determine GHG emissions reduction and removal through CDM project activity.		Ex post determination of the monitored GHG emissions reduction and removal.
What is it about?	GHG emissions reduction and removal within the CDM project boundary.		
How to do it?	Collecting and archiving all relevant data in accordance with the monitoring plan as described in a project design document (PDD).	Writing a monitoring report.	Documentation check, on-site inspections, review of the monitoring methodology, writing a verification report.
Who will do it?	Project participants (PPs).		Designated operational entity (DOE).
Any standard or guidelines for it?	✓ Clean development mechanism project standard ✓ Clean development mechanism project cycle procedure ✓ Form and guidelines for completing the monitoring report form ✓ Guidelines for completing the monitoring report form		✓ Clean development mechanism validation and verification standard ✓ Guidelines on the application of materiality in verifications

Joint Crediting Mechanism (JCM)

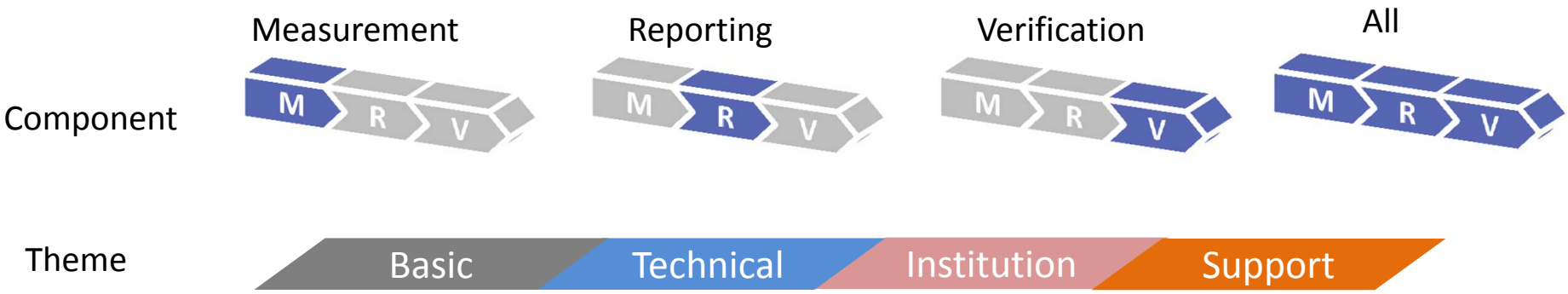
	M	R	V
Why is it necessary?	To monitor GHG emissions reduction and removal by JCM project based on PDD.		To verify the amount of GHG emissions reduction and removal on the basis of the monitoring report.
What is it about?	GHG emission reductions or removals achieved by the contribution of PPs in the implementation of GHG emissions reduction and removal project activities under the JCM.		
How to do it?	Collecting and archiving all relevant data necessary for estimating GHG emissions.	Setting out the GHG emissions reduction of an implemented registered JCM project for a particular monitoring period.	Ex post determination by a third party entity (TPE) of the monitored GHG emissions reduction as a result of a registered JCM project during the verification period.
Who will do it?	The PPs prepare a draft monitoring report in line with the applied methodology and PDD and Monitoring Guidelines.		(a) An entity accredited under ISO 14065; or (b) A DOE of the CDM
Any standard or guidelines for it?	✓ Approved JCM methodology ✓ JCM Guidelines for Developing PDD and Monitoring Report		✓ JCM Guidelines for Validation and Verification

All ideas are subject to further consideration and discussion with host countries under the JCM.

4. Questions and Answers

Guide to Q&A

The following sections present questions and answers on MRV schemes. The following icons serve as a guide with regards to which component part of MRV it refers to and which theme it is in relation to.



4.1. National Communications (non-Annex I)

This section covers questions and answers on national communications, as follows:

1. What are national communications?
2. Why do national communications need to be prepared?
3. How frequently should national communications be prepared?
4. What information is included in national communications?
5. What is the status of submission of national communications by non-Annex I Parties?
6. How should we develop national communications and biennial update reports?
7. Are there any standards or guidelines for national communications?
8. Are national communications from non-Annex I Parties verified or reviewed?
9. Who should develop national communications and biennial update reports?
10. How do countries establish institutional arrangements to prepare national communications and biennial update reports?
11. Is there any financial support available to develop national communications?
12. Is there any technical support available to develop national communications?

Q1: What are national communications?

A: National communications (NCs) are reports for providing information on how each Party is implementing their Convention commitments to mitigate and adapt to climate change.

In detail

- ✓ In accordance with Article 4, paragraph 1, and Article 12, paragraph 1, of the UNFCCC, each Party shall provide the Conference of the Parties (COP) with the information on national greenhouse gas inventories; national or, where appropriate, regional programmes containing measures to mitigate, and to facilitate adequate adaptation to climate change; and any other information that the Party considers relevant to the achievement of the objective of the Convention.
- ✓ The elements and timetables of NCs for non-Annex I Parties are differentiated from those of Annex I Parties based on the principle of "common but differentiated responsibilities and respective capability".

Content of NCs of non-Annex I Parties

Elements
National circumstances
National GHG inventory
General description of steps taken or envisaged to implement the Convention (Mitigation, Adaptation)
Constraints and gaps, and related financial, technical and capacity needs
Other information (Technology transfer, Research & systematic observation, Education, training and public awareness, Capacity-building, Information and networking)

•Details of contents of NCs is shown in Q16,
"What information is included in national communications?"

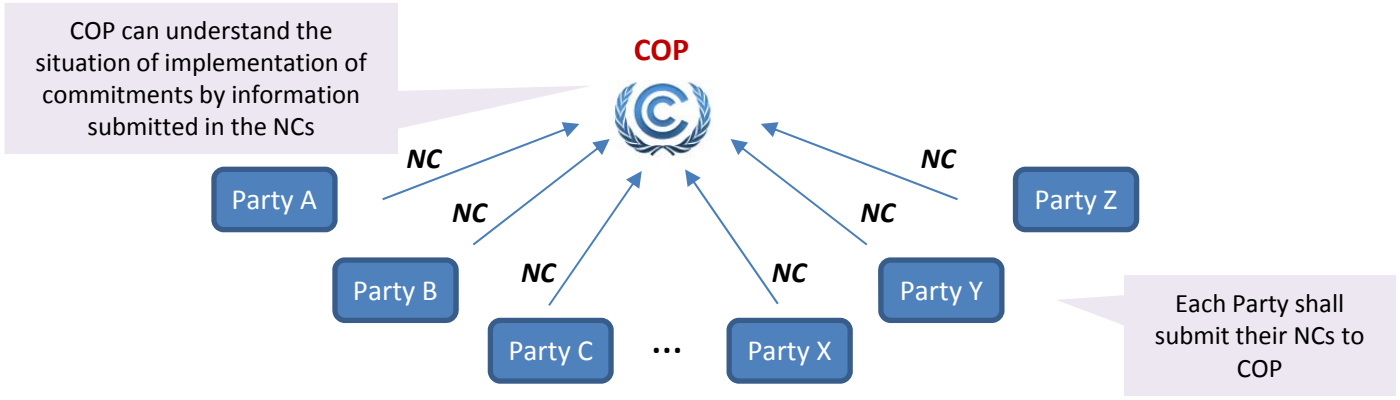
Reference:
1. UNFCCC. (1992)
2. UNFCCC. (2002)

Q2: Why do national communications need to be prepared?

A: COP needs to understand the status of GHG emissions/removals and implementation of mitigation and adaptation measures by each Party in order to consider how to tackle climate change.

In detail

- ✓ The ultimate objective of the UNFCCC is to achieve stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. In order to achieve the objective, all Parties shall fulfill the following commitments:
  - Develop and periodically update national GHG inventories
  - Formulate, implement, publish and regularly update programmes containing mitigation and adaptation measures
  - **Communicate information to COP that is related to the implementation of commitments etc.**
- ✓ Information included in the NCs provided by Parties is significant for COP to check the situation of GHG emissions/removals and implementation of mitigation and adaptation measures by each Party. Information reported by Parties is fundamental to consider future actions to tackle climate change.



Reference:
1. UNFCCC. (1992)
2. UNFCCC. (2002)

Q3: How frequently should national communications be prepared?

A: Each non-Annex I Party shall submit its initial NCs within three years of the Convention for that Party coming into force. The deadlines of second and third NCs are not determined. However, non-Annex I Parities should submit future NCs every four years in accordance with the Cancun Agreements.

Initial NC

- ✓ Each non-Annex I Party shall submit its initial NCs within three years of the Convention for that Party coming into force, or of the availability of financial resources in accordance with Article 4, paragraph 3 of the Convention.
- ✓ Least developing countries (LDCs) may make their initial NCs at their discretion.

Second NC
Third NC
Subsequent NCs

- ✓ The deadlines for submitting second and third NCs have not been decided. But COP11 decided that each non-Annex I Party should make all efforts to submit second and third NCs within four years of the initial disbursement of financial resources.
- ✓ COP16 decided that non-Annex I Parities should submit future NCs **every four years**.

Reference:
1. UNFCCC. (1992)
2. UNFCCC. (2005)

Q4: What information is included in national communications?

A: The components that should be included in NCs are information on national circumstances, national GHG inventory, mitigation and adaptation measures, constraints and gaps, support needs, as well as any other relevant information.

Elements	Details
National circumstances	• Description of national and regional development priorities, objectives and circumstances • Description of existing institutional arrangements relevant to the preparation of their NCs on a continuous basis.
National GHG inventory	Information on GHG emissions and removals • Inventory years : 1994 or 1990 for 1st NC. 2000 for 2nd NC • Methodologies : Revised 1996 IPCC guidelines and IPCC good practice guidance • Gas : CO_2, CH_4, N_2O (shall) HFCs, PFCs, SF_6 (encourage)
General description of steps taken or envisaged to implement the Convention	• Measures to facilitate adequate adaptation to climate change • Vulnerability to the adverse effects of climate change • Measures to mitigate climate change
Other information considered relevant to the achievement of the objective of the Convention	• Activities relating to technology transfer • Climate change research and systematic observation • Activities relating to education, training and public awareness • Capacity-building activities • Information and networking
Constraints and gaps, and related financial, technical and capacity needs	• Constraints and gaps, financial, technical and capacity needs and activities for overcoming the constraints and gaps • Financial resources and technical support provided by GEF, Annex II Parties or multilateral/bilateral institutions • Proposed projects for financing • Information on implementing adaptation measures • Country-specific technology needs and assistance received from developed country Parties and the financial mechanism of the Convention
Other information	Additional or supporting information

Reference:
1. UNFCCC. (2002)
2. UNFCCC. (2003)

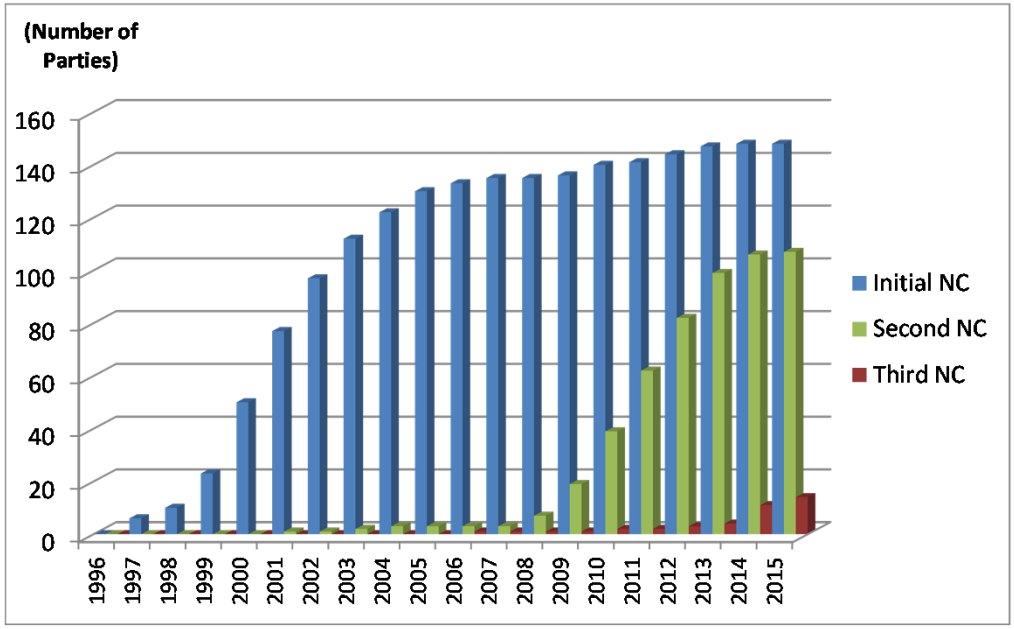
Q5: What is the status of the submission of national communications by non-Annex I Parties?

A: 147 non-Annex I Parties have submitted their initial NCs, 108 have submitted second NCs and 13 have submitted third NCs as of the end of August 2015.

In detail

- ✓ Most of the non-Annex I Parties, except for some countries, have already submitted their initial NCs.
- ✓ The numbers of non-Annex I Parties that have submitted second NCs has increased rapidly since 2008.
- ✓ Only several non-Annex I Parties have submitted their third NCs until 2013, but the number of parties which have submitted their third NCs has increased to 13 in 2015.
- ✓ Fourth and Fifth NCs have been submitted by only Mexico.

Number of Parties that have submitted initial, second and third NCs



Reference: UNFCCC. (2015)

Q6: How should we develop national communications and biennial update reports?

A: NCs/BURs coordinating entity proceeds and manages the preparation process for NCs and BURs, and collects relevant data/information and prepares reports on each reporting element of NCs/BURs in cooperation with a broad range of relevant ministries and organisations.

Overview of NCs/BURs preparation process

Planning	Preparation	Reporting	Follow-up
✓Reviewing lessons learned from previous NCs and BURs preparation ✓Preparation of work plan and schedule ✓Preparation of budget ✓Identifying contributing organisations ✓Developing institutional arrangements, including establishing a NCs/BURs coordinating entity, technical working group, stakeholder involvement process, role allocation, etc.	✓Collecting relevant data/information and drafting reports on each reporting element of NCs/BURs • National circumstances • National GHG Inventory • Mitigation analysis • Vulnerability & Adaptation assessment • Other relevant information ✓Holding coordination meetings ✓Compilation of each report ✓Reviewing first drafts	✓Approval of reports ✓Linking the NCs/BURs process to sustainable development planning ✓Submission to the UNFCCC	✓Documentation and archiving of any data and information in order to enhance transparency and ensure sustainability of the process ✓Evaluating strengths and weaknesses to improve the preparation process.

Reference:
1. NCSP/UNDP-UNEP-GEF. (2006)
2. UNFCCC. (2009)

Q7: Are there any standards or guidelines for national communications?

A: The COP adopted "Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention" (17/CP.8) . Non-annex I Parties should use these guidelines for the preparation of their NCs.

In detail

- ✓ Guidelines for the preparation of initial NCs from non-Annex I Parties were adopted at COP2 (10/CP.2) and revised at COP8 (17/CP.8, "Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention").
- ✓ Non-Annex I Parties should use these guidelines (17/CP.8) for the preparation of second and, where appropriate, first and third NCs.
- ✓ The secretariat prepared the "User manual for the guidelines on national communications from non-Annex I Parties" in order to support and facilitate the use of the guidelines for the preparation of NCs from non-Annex I Parties (17/CP.8).

Contents of the guidelines for NCs from non-Annex I Parties

I. INTRODUCTION
- A. Objectives
- B. Scope

II. NATIONAL CIRCUMSTANCES

III. NATIONAL GREENHOUSE GAS INVENTORY
- A. Methodologies
- B. Reporting

IV. GENERAL DESCRIPTION OF STEPS TAKEN OR ENVISAGED TO IMPLEMENT THE CONVENTION
- A. Programmes containing measures to facilitate adequate adaptation to climate change
- B. Programmes containing measures to mitigate climate change

V. OTHER INFORMATION CONSIDERED RELEVANT TO THE ACHIEVEMENT OF THE OBJECTIVE OF THE CONVENTION
- A. Transfer of technologies
- B. Research and systematic observation
- C. Education, training and public awareness
- D. Capacity-building
- E. Information and networking

VI. CONSTRAINTS AND GAPS, AND RELATED FINANCIAL, TECHNICAL AND CAPACITY NEEDS

VII. SUBMISSION

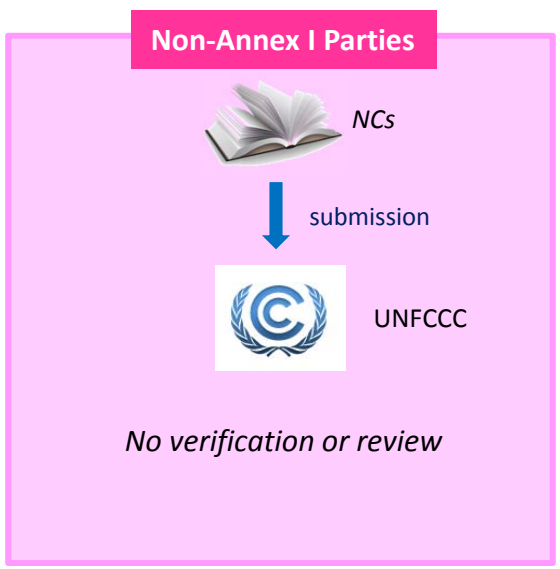
Reference:
1. UNFCCC. (2002)
2. UNFCCC. (2003)

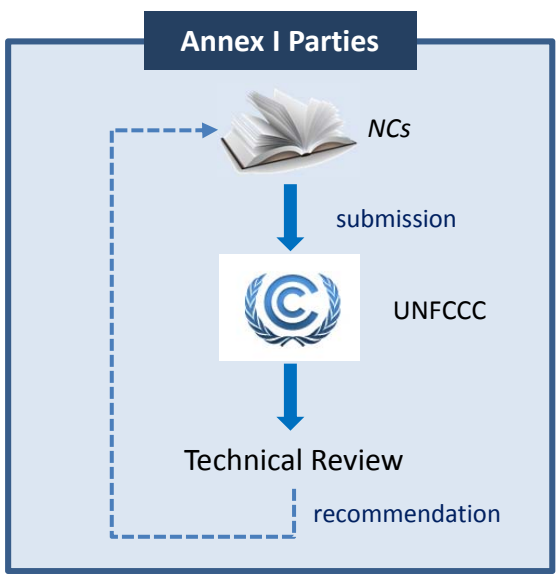
Q8: Are national communications from non-Annex I Parties verified or reviewed?

A: No. There is no official international verification or review process for NCs submitted by non-Annex I Parties.

In detail

- ✓ NCs from non-Annex I Parties are neither verified nor reviewed internationally.
- ✓ On the other hand, all NCs of Annex I Parties are subject to individual technical review. The technical reviews of NCs are conducted by an expert review team (ERT) nominated by a roster of experts. The reports of these reviews contribute to facilitating the assessment of the implementation of the commitments under the Convention by Annex I Parties, and assist Annex I Parties in improving their reporting.





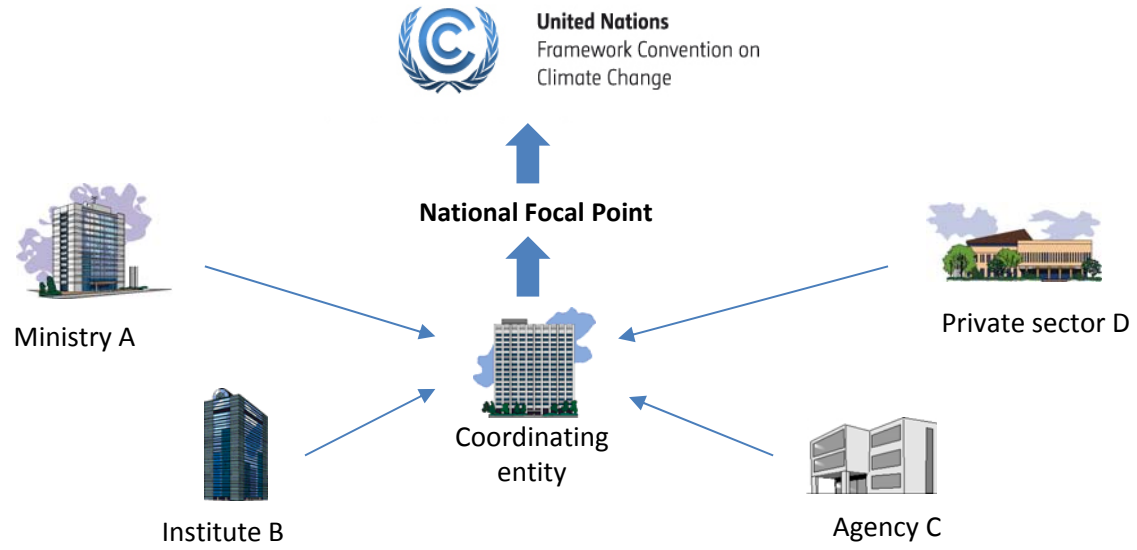
Reference: UNFCCC.(2013a), UNFCCC. (2013b)

Q9: Who should develop national communications and biennial update reports?

A: NCs/Biennial update reports (BURs) coordinating entity in each Party designated as responsible for the overall NCs/BURs preparation should develop their NCs and BURs. The role and nature of NCs/BURs coordinating entity depends on their national circumstances.

In detail

- ✓ Since the development and submission of NCs and BURs are commitments of all Parties under the UNFCCC, the government of each country Party should develop their NCs and BURs.
- ✓ Which ministry, agency and/or other organisation has responsibility for developing NCs/BUR in the country depends on its national circumstances. Generally, the ministry related to the environmental issues in the country concerned becomes a coordinating agency and other related ministries, agencies and organisations cooperate together in the development of NCs/BURs.



Source: Author. (2013)

Q10: How do countries establish institutional arrangements to prepare national communications and biennial update reports?

A: Key elements for establishing institutional arrangements is to designate a NCs/BURs coordinating entity which is responsible for the overall preparation process. This entity would then manage the effective coordination with a broad range of stakeholders, institutional and technical in-country capacity building, and the establishment of legal/formal arrangements for NCs/BURs preparation, as appropriate.

In detail

- ✓ It is quite important that a single national NCs/BURs coordinating entity is designated as responsible for the overall coordination and management for the NCs/BURs preparation process for establishing effective institutional arrangements. The NCs/BURs coordinating entity should be responsible for the following tasks:
  - Develop a work plan and time schedule for preparing NCs/BURs
  - Identify all stakeholders that should be involved in the preparation process of NCs/BURs
  - Arrange and coordinate the task of each component of NCs/BURs
  - Allocate roles and responsibilities between organisations
  - Coordinate with relevant ministries, agencies, organisations and others
  - Manage the overall budget
- ✓ The coordinating entity should be maintained and motivated in order to enhance and improve the next NCs/BURs preparation.
- ✓ It is recommended that a national legal arrangement for the preparation of NCs/BURs, be established as necessary.
- ✓ In addition, it is also recommended that a Memorandum of Understanding or some other formal agreement between the coordinating entity and other relevant organisations involved in NCs/BURs process be established to define roles and responsibilities.
- ✓ In-country capacity building for domestic experts and organisations is key so that the Party can produce subsequent NCs/BURs in a sustainable manner.

Reference:
1. NCSP/UNDP-UNEP-GEF. (2012)
2. NCSP/UNDP-UNEP-GEF. (2006)

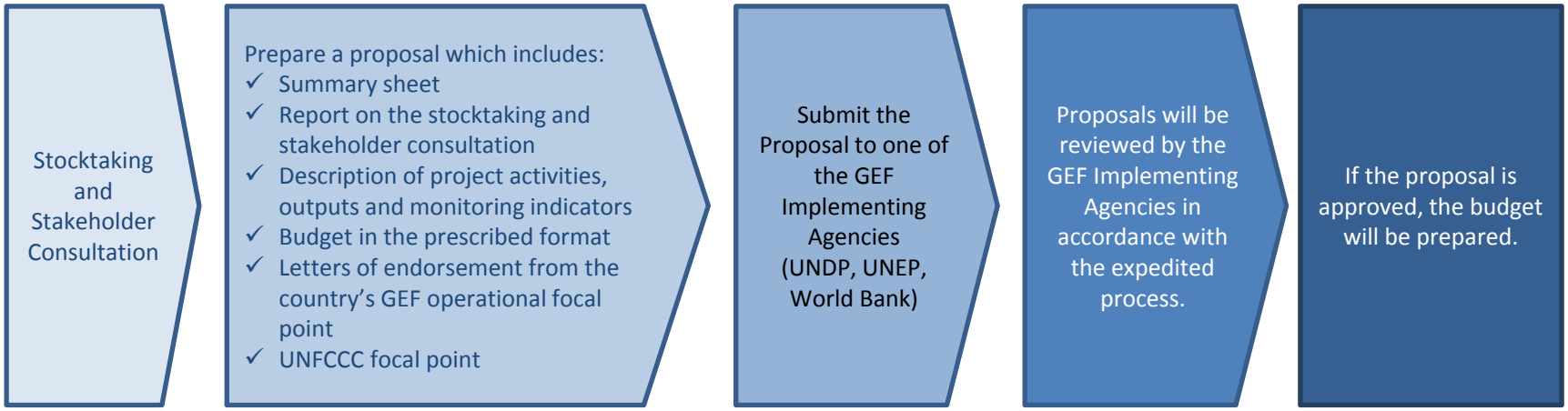
Q11: Is there any financial support available to develop national communications?

A: The Global Environment Facility (GEF) provides non-Annex I Parties with financial support for the preparation of NCs on an agreed full-cost basis.

In detail

- ✓ The GEF prepares operational procedures for the expedited financing of NCs from non-Annex I Parties. Up to US$ 500,000 per each non-Annex I party is made available for the preparation of its NCs.
- ✓ Non-Annex I Parties which want to obtain financial support for the preparation of the NCs need to submit a proposal that includes a detailed description of the activities and expected cost. The application form can be downloaded from the GEF website <http://www.thegef.org/gef/CC_direct_access_template>

Procedures for financing NCs from non-Annex I Parties



Reference:
1. GEF. (2007)
2. UNFCCC. (2015)

Q12: Is there any technical support available to develop national communications?

A: The Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention (CGE) provides various training materials and hands-on workshops for assisting the preparation of NCs by non-Annex I Parties. In addition, other organisations also provide useful materials and tools for non-Annex I Parties.

Organisation/project	Materials	Reference URL
CGE - CGE training materials	CGE training materials cover "Vulnerability and Adaptation Assessments", "National GHG Inventories" and "Mitigation Assessments". Many kinds of handbooks, presentations and exercises on the above fields are available.	http://unfccc.int/national_reports/non-annex_i_natcom/training_material/methodological_documents/items/349.php
UNFCCC - UNFCCC resource guide for preparing NCs of non-Annex I Parties	UNFCCC resource guide which consists of the following four modules provides additional information as a supplement to the "User manual for the guidelines on NCs from non-Annex I Parties" Module 1 : The Process of NCs from Non-Annex I Parties Module 2 : Vulnerability and adaptation to climate change Module 3 : National greenhouse gas inventories Module 4 : Measures to mitigate climate change	http://unfccc.int/resource/docs/publications/09_resource_guide1.pdf http://unfccc.int/resource/docs/publications/08_resource_guide2.pdf http://unfccc.int/resource/docs/publications/09_resource_guide3.pdf http://unfccc.int/resource/docs/publications/08_resource_guide4.pdf
NCSP (National Communication Support Program)	NCSP is funded by the GEF and jointly managed by UNDP and UNEP. NCSP provides general methodologies and guidance documents on each element of NCs and training workshops.	http://ncsp.undp.org/

Source: Author. (2013)

4.2. Biennial Update Reports

This section covers questions and answers on biennial update reports, as follows:

13. What are biennial update reports?
14. Why do biennial update reports need to be prepared?
15. How frequently should biennial update reports be prepared?
16. What information is included in the biennial update reports?
17. What is the status of the submission of biennial update reports by non-Annex I Parties?
18. How should we develop national communications and biennial update reports? (see Q6)
19. Are there any standards or guidelines for biennial update reports?
20. What is the relationship between national communications and biennial update reports?
21. What is the relationship between biennial update reports and nationally appropriate mitigation actions?
22. How are biennial update reports verified or reviewed?
23. How are biennial update reports analysed?
24. How is a team of technical experts composed of?
25. What is the training programme for technical analysis?
26. Who should develop national communications and biennial update reports? (see Q9)
27. How do countries establish institutional arrangements to prepare national communications and biennial update reports? (see Q10)
28. Is there any financial support available to develop biennial update reports?
29. Is there any technical support available to develop biennial update reports?

Q13: What are biennial update reports?

A: BURs are reports which non-Annex I Parties shall submit every two years from 2014 to provide more frequent and further information such as GHG emission/removals, status of implementation of mitigation and adaptation measures and capacity building needs in the context of enhancement of reporting in national communications.

In detail

- ✓ In accordance with 1/CP.16, developing country Parties should submit BURs **every two years** to enhance the reporting in national communications consistent with their capabilities and the level of support provided for reporting.
- ✓ Developing country Parties should submit their first BURs by **December 2014**, but the least developed country Parties (LDCs) and small island developing states (SIDS) may submit BURs at their discretion.

Content of BURs of non-Annex I Parties

Elements
(a) National circumstances and institutional arrangements
(b) National GHG Inventory
(c) Mitigation actions and their effects
(d) Constraints and gaps, and related financial, technical and capacity needs
(e) Level of support received for preparation of BURs
(f) Domestic Measurement, Reporting and Verification (MRV)
(g) Any other information

* Details of contents of BURs is shown in Q16, "What information is included in biennial update reports?"

Reference: UNFCCC. (2011)

Q14: Why do biennial update reports need to be prepared?

A: COP16 agreed that the reporting of NCs from developing country Parties is enhanced by the submission of BURs to enhance their mitigation actions.

In detail

- ✓ COP16 agreed that developing country Parties will take nationally appropriate mitigation actions (NAMAs) and decided to enhance reporting in NCs.
- ✓ In the context, developing countries should submit BURs containing updates of national GHG inventories, information on mitigation actions, needs and support received in order to enhance their reporting to the UNFCCC consistent with capabilities and the level of support provided.

Before 2014

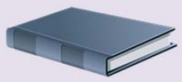
NCs

Each non-Annex I Party shall submit only NCs. The frequency of the submissions of NCs is not determined.

Enhance of reporting

After 2014

BUR ***NCs***



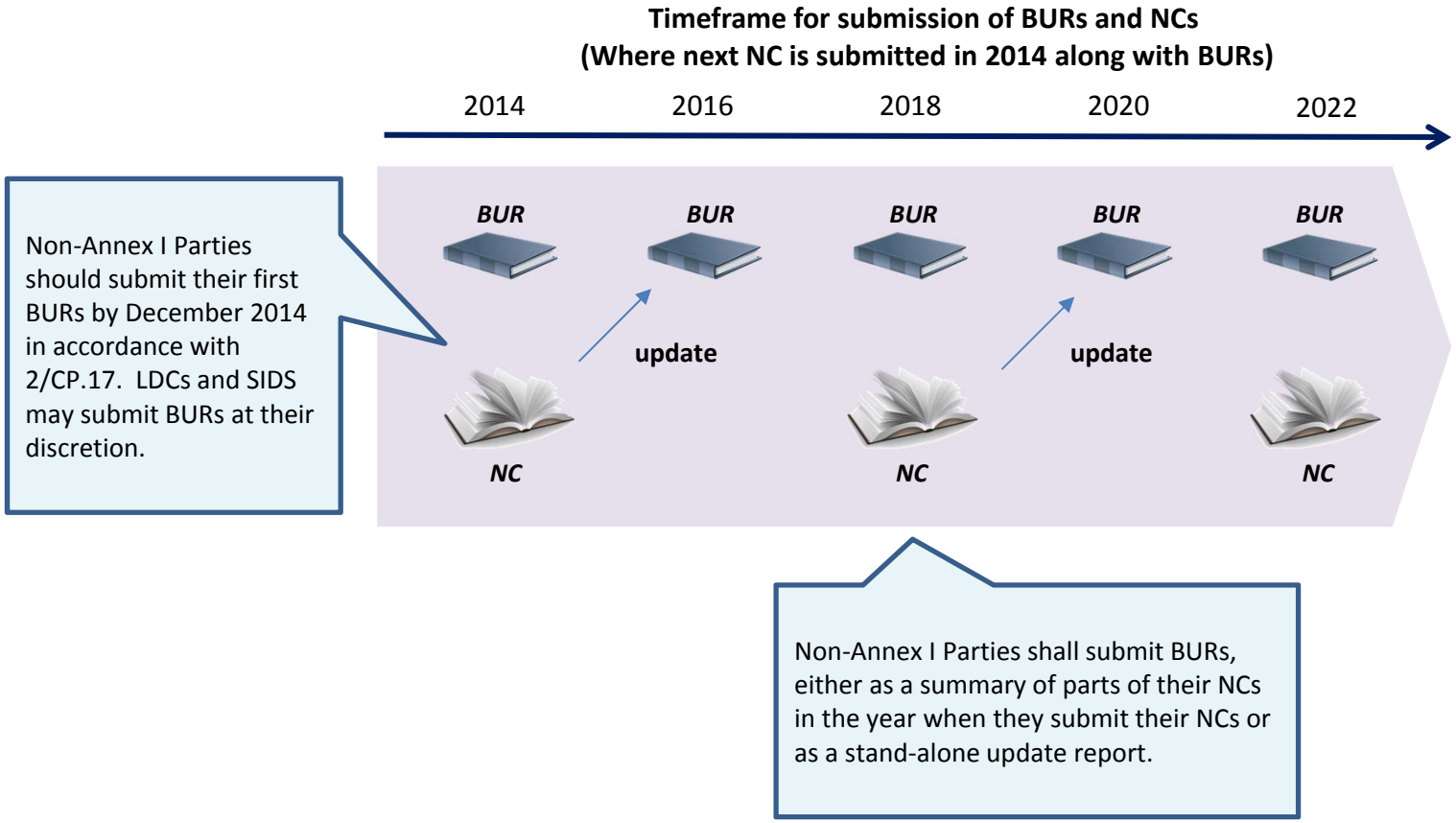
Every 2 years **Every 4 years**

Each non-Annex I Party shall submit both BURs and NCs. BURs shall be submitted every 2 years and NCs shall be submitted every 4 years.

Reference:
1. UNFCCC. (2010)
2. UNFCCC. (2011)

Q15: How frequently should biennial update reports be prepared?

A: As the name suggests, BURs should be prepared every two years. The submission due date for the first BURs is December 2014.



Reference: UNFCCC. (2011)

Q16: What information is included in biennial update reports?

A: The components that should be included in the BURs are information on the national GHG inventory, mitigation actions and their effects, needs and support received and any other relevant information.

Elements	Detail
(a) National circumstances and institutional arrangements	Information on national circumstances and institutional arrangements relevant to the preparation of the NCs on a continuous basis;
(b) National GHG inventory	Update of national GHG inventories according to the guidelines for the preparation of NCs. • Inventory years : calendar year no more than 4 years prior to the date of submission or more recent years. Consistent time series back to the years reported in the previous NCs. • Methodologies : Revised 1996 IPCC guidelines and IPCC good practice guidance
(c) Mitigation actions and their effects	(a) Name and description of the mitigation action (b) Methodologies and assumptions (c) Objectives of the action and steps taken or envisaged to achieve that action (d) Progress of implementation of the mitigation actions and the underlying steps taken or envisaged, and the results achieved (e) Information on international market mechanisms.
(d) Constraints and gaps, and related financial, technical and capacity needs	Updated information on financial resources, technology transfer, capacity-building needs. Updated information on financial resources, technology transfer, capacity-building and technical support received from the GEF, developed country Parties and multilaterals institutions.
(f) Level of support received for preparing BURs	Information on support received for the preparation of the BURs.
(g) Domestic Measurement, Reporting and Verification (MRV)	
(h) Any other information	Any other information that the non-Annex I Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its BURs.

Reference: UNFCCC. (2011)

Q17: What is the status of the submission of biennial update reports by non-Annex I Parties?

A: 10 non-Annex I Parties have submitted their first BURs by the submission due date. After that, four more Parties have submitted their first BURs in 2015.

In detail

- ✓ In accordance with 2/CP.17, non-Annex Parties should submit their first BURs by December 2014. 10 non-Annex I Parties successfully have submitted their BURs to the UNFCCC by the submission due date. 14 Parties have submitted their first BURs as of the end of August 2015.
- ✓ The GEF secretariat reported at SBI42 that they had received 51 requests from non-Annex I Parties for funds for the preparation of their BURs. Therefore, more BURs from non-Annex I Parties are expected to be submitted in 2015 and later.

Status of submission of BURs from non-Annex I Parties

Parties	Submission date
NAMIBIA	2 December 2014
VIET NAM	8 December 2014
CHILE	10 December 2014
SOUTH AFRICA	17 December 2014
ANDORRA	19 December 2014
REPUBLIC OF KOREA	29 December 2014
PERU	30 December 2014
BRAZIL	31 December 2014
TUNISIA	31 December 2014

Parties	Submission date
THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA	26 February 2015
BOSNIA AND HERZEGOVINA	12 March 2015
AZERBAIJAN	31 March 2015
GHANA	21 July 2015

Reference: UNFCCC. (2015a)

Q19: Are there any standards or guidelines for biennial update reports?

A: The COP adopted "UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention" (2/CP.17, Annex III). Non-annex I Parties should use these guidelines for the preparation of BURs.

In detail

- ✓ COP16 agreed on a work programme for the development of guidelines for BURs from non-Annex I Parties.
- ✓ COP17 adopted "UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention" (2/CP.17, Annex III) .
- ✓ COP17 also decided that non-Annex I Parties should take into account their development priorities, objectives, capacities and national circumstances in using the UNFCCC biennial update reporting guidelines, and that the guidelines should be used as a basis to provide guidance to the GEF for funding the preparation of first BURs from non-Annex I Parties.

Contents of the guidelines for BURs from non-Annex I Parties

I. **Objectives**
II. **Scope**
III. **National greenhouse gas inventory**
IV. **Mitigation actions**
V. **Finance, technology and capacity-building needs and support received**
VI. **Submission**
VII. **Updating the guidelines**

Reference: UNFCCC. (2011)

Q20: What is the relationship between national communications and biennial update reports?

A: The BURs are the update of the most recently submitted NCs. BURs are submitted at some point between the submission of NCs.

NCs		BURs
✓ **National circumstances**	⟷	✓ **National circumstances and institutional arrangements**
✓ **National greenhouse gas inventory**	⟷	✓ **National greenhouse gas inventory** (shall cover, at a minimum, the inventory for the calendar year no more than 4 years prior to the date of submission or more recent years if information is available)
✓ **General description of steps taken or envisaged to implement the Convention** • Programmes containing measures to facilitate adequate adaptation to climate change • Programmes containing measures to mitigate climate change	⟷	✓ **Mitigation actions and their effects** (Name and description of the mitigation action, methodologies and assumptions, objectives of the action and steps, progress of implementation of the mitigation actions and Information on international market mechanisms)
✓ **Other information considered relevant to the achievement of the objective of the Convention** • Technology transfer • Research and systematic observation • Education, training and public awareness • Capacity-building activities • Information and networking		
✓ **Constraints and gaps, and related financial, technical and capacity needs**	⟷	✓ **Constraints and gaps, and related financial, technical and capacity needs and support received** ✓ Information on domestic measurement reporting and verification
✓ **Additional or supporting information**	⟷	✓ **Additional or supporting information**

overlapped

Reference:
1. UNFCCC. (2002)
2. UNFCCC. (2011)

Q21: What is the relationship between biennial update reports and nationally appropriate mitigation actions?

A: Non-Annex I Parties shall provide information in their BURs on the progress of implementation of nationally appropriate mitigation actions (NAMAs) listed in "FCCC/SBI/2013/INF.12".

In detail

- ✓ The document FCCC/SBI/2013/INF.12 presents a compilation of the information on all NAMAs communicated by developing country Parties.
- ✓ In accordance with the UNFCCC guidelines for the preparation of the BURs, developing country Parties shall provide the following information, in a tabular format, for each mitigation action or groups of mitigation actions including, as appropriate, those listed in document FCCC/SBI/2013/INF.12 to the greatest extent possible:
  - Name and description of the mitigation action, including information on the nature of the action, coverage (i.e. sectors and gases), quantitative goals and progress indicators;
  - Information on methodologies and assumptions;
  - Objectives of the action and steps taken or envisaged to achieve that action;
  - Information on the progress of implementation of the mitigation actions and the underlying steps taken or envisaged, and the results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the greatest extent possible;
  - Information on international market mechanisms.
- ✓ Non-annex I Parties can report the progress of NAMAs included in FCCC/SBI/2013/INF.12 in the BURs.

Reference:
1. UNFCCC. (2002)
2. UNFCCC. (2011)

Q22: How are biennial update reports verified or reviewed?

A: There is no official international verification and review process for BURs submitted by non-Annex I Parties. Instead, international consultation and analysis (ICA) of BURs is implemented.

In detail

- ✓ Although the BURs submitted by non-Annex I Parties **are neither verified nor reviewed**, those are subject to **ICA** for the purpose of increasing the transparency of mitigation actions and their effects. ICA is implemented in accordance with the modalities and guidelines for ICA contained in Annex IV of decision 2/CP.17 and Composition, modalities and procedures of the team of technical experts under ICA adopted at COP19.
- ✓ The 1st round of ICA will commence **within six months** of the submission of the first round of BURs.
- ✓ The frequency of participation in subsequent rounds of ICA will be determined by the frequency of the submission of BURs based on their respective capabilities and national circumstances.
- ✓ LDCs and SIDS may undergo ICA as a group of Parties at their discretion.

Comparison of International Assessment and Review (IAR) for BRs from Annex I Parties and ICA for BURs from non-Annex I Parties

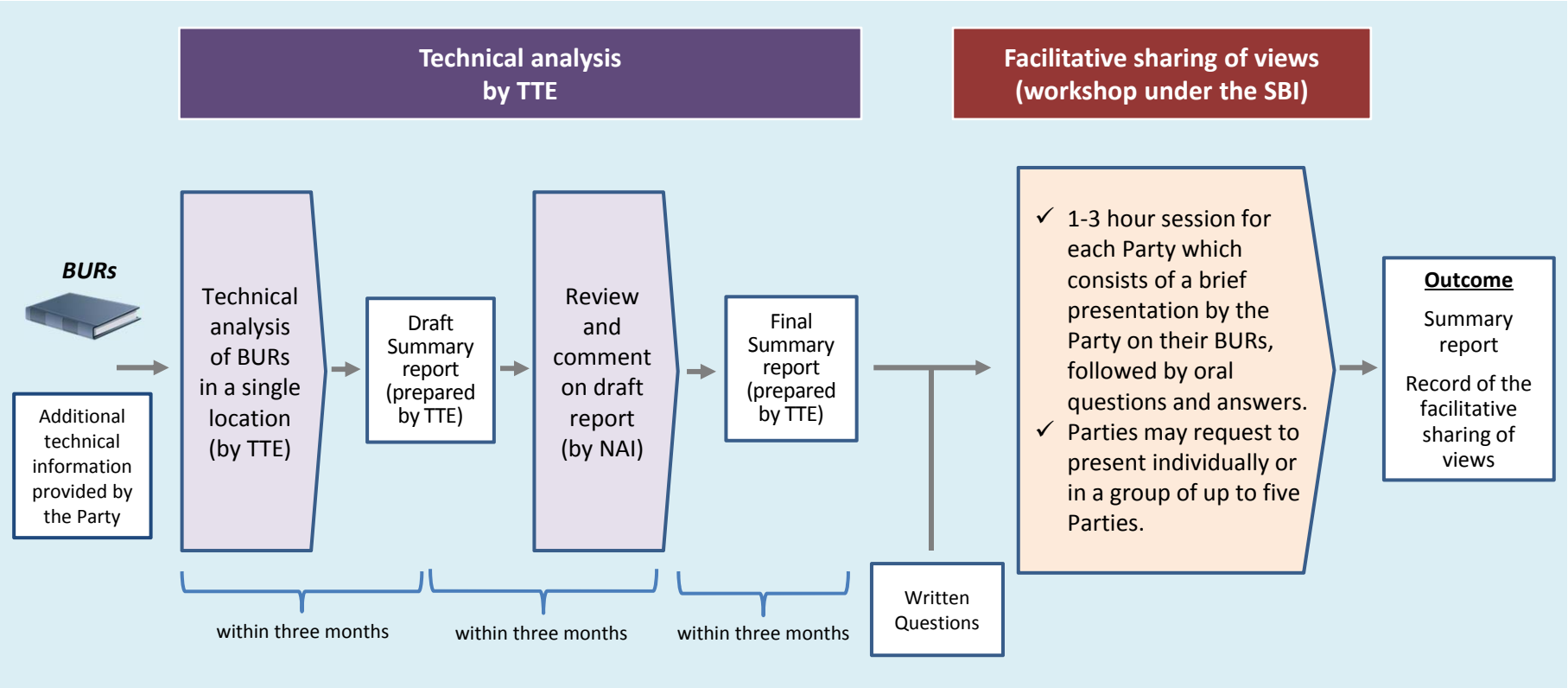
	IAR for BRs from Annex I Parties	ICA for BURs from non-Annex I Parties
Step 1	**Technical review** by expert review team (ERT)	**Technical analysis** by technical team of experts (TTE)
Step 2	**Multilateral assessment** under the SBI	**Facilitative sharing of views** under the SBI

Reference: UNFCCC. (2011), UNFCCC. (2013)

Q23: How are biennial update reports analysed?

A: BURs are analysed by a technical team of experts (TTE) in a manner that is non-intrusive, non-punitive and respectful of national sovereignty, and ICA is conducted to increase the transparency of mitigation actions and their effects.

Overview of ICA process



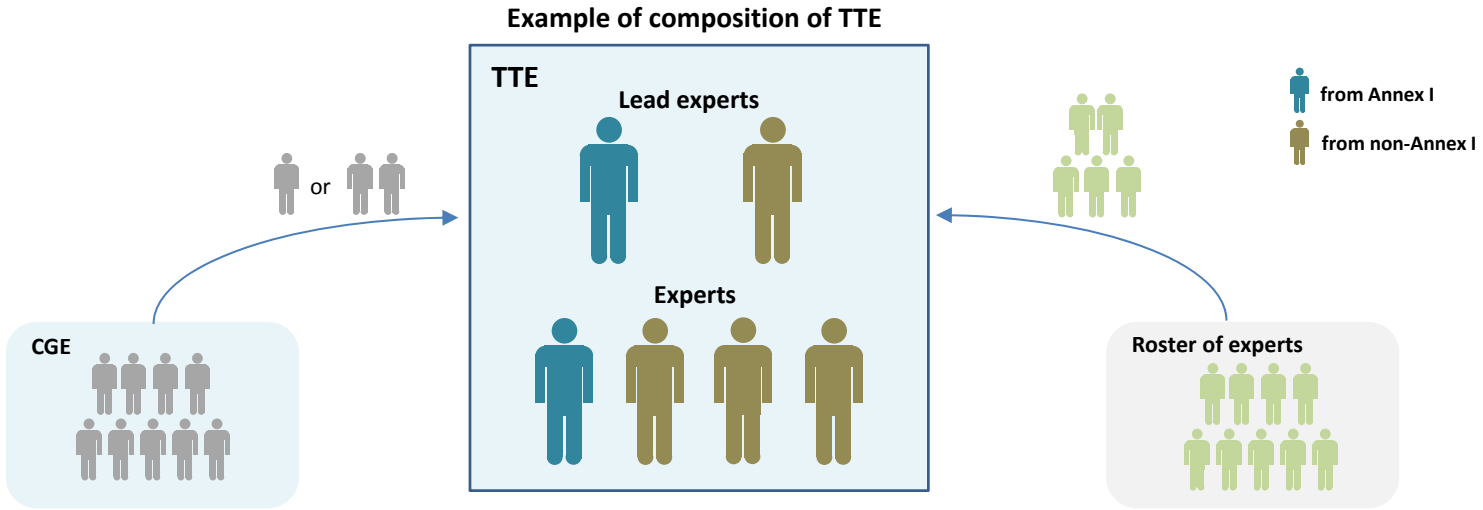
Reference: UNFCCC. (2011), UNFCCC. (2013)

Q24: How is a team of technical experts composed of?

A: A team of technical experts (TTE) is composed of experts nominated to the UNFCCC roster of experts who have completed the training programme.

In detail

- ✓ A TTE is composed of a **UNFCCC roster of experts** who have **successfully completed the training programme** prepared by the CGE. The UNFCCC secretariat selects experts of TTEs under the guidance of the CGE.
- ✓ A TTE includes **at least one CGE member and up to one third** of the TTE. The majority of experts of a TTE are from non-Annex I Parties with effort to ensure geographical balance among the experts selected from Annex I Parties and non-Annex I Parties.
- ✓ **Each TTE is led by two experts**: one from an Annex I Party and another from a non-Annex I Party.
- ✓ The number of experts in each TTE is not defined.



Reference: UNFCCC. (2013)

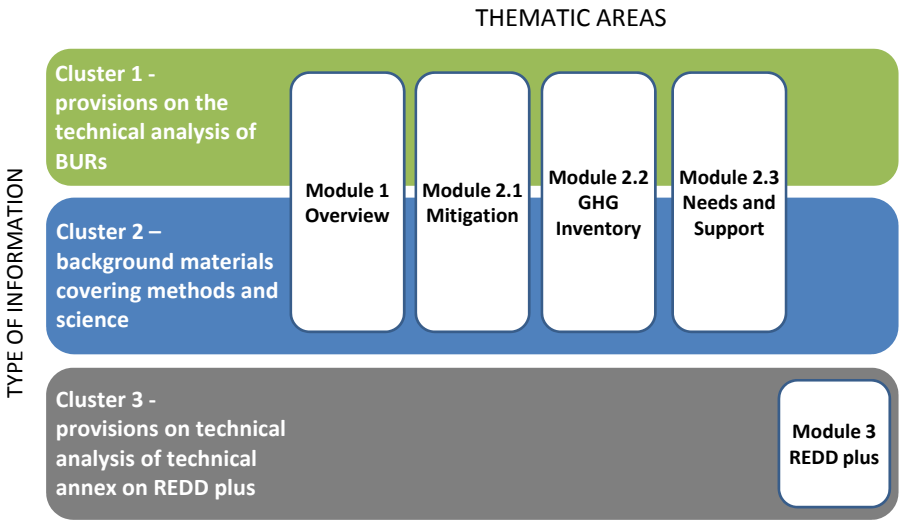
Q25: What is the training programme for technical analysis?

A: The training programme for technical analysis is a series of training materials developed by the CGE (Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention). A team of technical experts (TTE) shall successfully complete the training programme.

In detail

- ✓ In accordance with decision 20/CP.19, the CGE has developed a training programme for TTE to undertake technical analysis of submitted BURs by non-Annex I Parties.
- ✓ The training programme covers the following three clusters of training materials;
  - ✓ Cluster 1 : provisions on reporting information in the BURs and conducting technical analysis of BURs under the ICA process
  - ✓ Cluster 2 : background materials covering methods and science on key themes addressed in BURs
  - ✓ Cluster 3 : provisions relevant to the technical analysis of a technical annex containing information on results-based actions relating to REDD-plus activities.
- ✓ The training materials consists of some training modules by each thematic area. TTE need to successfully complete the corresponding modules based on their expertise and experiences of activities related to the reporting and review under the UNFCCC.

Structure of the TTE training programme



Reference: UNFCCC. (2015b)

Q28: Is there any financial support available to develop biennial update reports?

A: GEF provides financial support to non-Annex I Parties preparing their first BURs on the basis of agreed full cost funding.

In detail

- ✓ COP17 decided to urge non-Annex I Parties to submit their requests to the GEF for support, in a timely manner and that enhanced support for the preparation of BURs should be ensured by developed country Parties by means of resources on the basis of agreed full cost funding.
- ✓ The COP requests the secretariat to facilitate assistance to non-Annex I Parties in the preparation of their BURs.
- ✓ The COP urges and requests the GEF to make support available to non-Annex I Parties preparing their first BURs as early as possible in 2012.
- ✓ Non-annex I Parties can access up to USD352,000 through a GEF Agency or via direct access. Non-Annex I Parties that wish to access the fund for the preparation of BURs can submit project proposals using the following template. (http://www.thegef.org/gef/content/gef-5-enabling-activity-template-sept-2011)

Indicative guide for the budget of BURs

Components of BURs	Suggested funding (USD)
(a) Information on national circumstances and institutional arrangements	~10,000
(b) National GHG inventory , including a national inventory report	~120,000
(c) Information on mitigation actions and their effects	~100,000
(d) Constraints and gaps, and related financial, technical and capacity needs, including a description of support needed and received	~5,000
(e) Information on the level of support received to enable the preparation and submission of BURs	~5,000
(f) Information on domestic MRV	~45,000
(g) Any other information	~5,000
(h) Monitoring, reporting and preparation of financial audits	~15,000
(i) Publication and submission of BURs	~15,000
Sub total	**320,000**
(j) Project Management (maximum -10% of project total)	32,000
Total	**352,000**

Reference:
1. UNFCCC. (2011)
2. GEF. (2012)

Q29: Is there any technical support available to develop biennial update reports?

A: Most of the technical support that is available for NCs is also available for BURs because the reporting elements of both overlap. In addition, CGE has been developing new supplementary training materials for the preparation of BURs.

Technical assistance from the CGE for the preparation of BURs

Reporting elements of BURs	Training materials provided by CGE	Details
(a) National circumstances and institutional arrangements	Presentation and handbook on "Institutional Arrangements" are prepared.	The presentation and handbook provide the overview of institutional arrangements, process and tools for designing effective institutional arrangements and best practices and lessons learned from the NC process.
(b) National GHG inventory	Many existing training material for GHG inventories for NCs can be used.	Information on how to estimate GHG emissions and removals are provided as a presentation, handbook, exercise and other forms by each IPCC category including cross-cutting issues.
(c) Mitigation actions and their effects	Presentation on "Mitigation Actions and Their Effects" is prepared.	The presentation provides suggestive toolkit how to report the relevant information required in the BUR reporting guidelines, and illustrative examples of reporting from non-Annex I Parties for reference.
(d) Constraints and gaps, and related financial, technical and capacity needs	Presentation and handbook on "Constraints and Gaps and Related Financial, Technical and Capacity-Building Needs" are provided.	The presentation and handbook provide the overview of reporting elements, process for identifying support needs, guide to report barriers/challenges/bottlenecks and support received.
(f) Level of support received for preparing BURs	Same as above	Same as above.
(g) Domestic Measurement, Reporting and Verification (MRV)	Presentation on "mitigation actions and their effects" covers this reporting element.	In the presentation, example of Kenya's reporting and verification framework is provided.
(h) Any other information	None	-

- The training materials by CGE can be download at http://unfccc.int/national_reports/non-annex_i_natcom/training_material/methodological_documents/items/7914.php

Reference: UNFCCC.(2014, 2015c, 2015d)

4.3. National Greenhouse Gas Inventories (non-Annex I)

This section covers questions and answers on national greenhouse gas (GHG) inventories, as follows:

30. What is a national GHG inventory?
31. Why prepare a national GHG inventory?
32. What is the role of GHG inventories in goal setting and performance tracking? (see Q61)
33. How frequently should national GHG inventories be prepared?
34. How should we prepare national GHG inventories?
35. How should we verify national GHG inventories?
36. Are there any standards or guidelines for national GHG inventory preparation?
37. Are there any principles for preparing national GHG inventories?
38. What categories and gases should non-Annex I Parties cover in their national GHG inventories?
39. How should we estimate national-level GHG emissions and removals?
40. Are the national GHG inventories submitted by non-Annex I Parties reviewed?
41. Are there different levels of estimation methods?
42. What should we do if it is not possible to estimate all emission sources and removal sinks?
43. Who should prepare national GHG inventories?
44. How do countries establish institutional systems to prepare national GHG inventories?
45. Is there any financial support available to prepare national GHG inventories?
46. Is there any technical support available to prepare national GHG inventories?

Q30: What is a national GHG inventory?

A: A national GHG inventory is an inventory which provides information on national-level emissions and removals of GHGs, which is one of the fundamental pieces of information for a country to develop and monitor policies and measures on mitigation of climate change.

In detail

- ✓ Non-Annex I Parties shall submit their national GHG inventories to the COP under the UNFCCC as a part of their NCs and BURs.
- ✓ Basic information on GHG emissions and removals provided by the national GHG inventory are:
  - National total GHG emissions and removals due to anthropogenic causes.
- ✓ In addition, non-Annex I Parties are encouraged to submit the following information:
  - Methodologies for how to estimate the emissions and removals,
  - Procedures and arrangements undertaken to collect and archive data for the preparation of national GHG inventories.

For further information, see:
"Q1: What are national communications?",
"Q13: What are biennial update reports?".

Reference:
1. UNFCCC. (2002)
2. UNFCCC. (2011)

Q31: Why prepare a national GHG inventory?

A: COP needs to understand the status of GHG emissions/removals by each Party to consider how to tackle climate change. Hence, preparation of national GHG inventories is required to all Parties under Article 4, paragraph 1, and Article 12 of the UNFCCC in order to figure out quantity of GHG emissions and removals from each Party due to human activities.

In detail

- ✓ The UNFCCC aims to stabilise GHG concentrations in the atmosphere at a level that would prevent and reduce dangerous human-induced interference with the climate system.
- ✓ In order to achieve this objective, it is necessary to accurately understand anthropogenic GHG emissions trends and our collective ability to alter these trends.
- ✓ Therefore, all Parties in the UNFCCC must prepare and submit their national GHG inventories to the COP.
  - **Non Annex I Parties:**
    - Need to submit their national GHG inventories as a part of their NCs,
    - Need to submit their national GHG inventories biennially as a part of their BURs from December 2014.

For further information, see:
"Q2: Why do national communications need to be prepared?",
"Q14: Why do biennial update reports need to be prepared?".

Reference: UNFCCC. (2013)

Q33: How frequently should national GHG inventories be prepared?

A: Non-Annex I Parties need to prepare and submit their national GHG inventories once every two years to the COP under the UNFCCC as a part of BURs or NCs .

In detail

- ✓ In contrast to Annex I Parties, non-Annex I Parties do not have to submit their national GHG inventories as independent reports to the COP.
- ✓ The Cancun Agreement determined that non-Annex I Parties should submit their NCs once every four years, and the Durban Outcomes states that non-Annex I Parties shall submit their BURs once every two years.
- ✓ Hence, non-Annex I Parties need to prepare their national GHG inventories and submit them to the COP once every two years as a part of their BURs or NCs.

For further information, see the pages on:
"Q3: How frequently should national communications be prepared?",
"Q15: How frequently should biennial update reports be prepared?".

Reference: UNFCCC. (2013)

Q34: How should we prepare national GHG inventories?

A: We should prepare national GHG inventories by following a procedural arrangement determined in accordance with each country's national circumstances.

In detail

- ✓ A procedural arrangement for national GHG inventory preparation is important for clarifying the process for periodically preparing national GHG inventories.
- ✓ The procedural arrangement should be documented and disclosed to relevant stakeholders in order to enhance smooth preparation of national GHG inventories.
- ✓ There are various procedural arrangements according to each country's national circumstances, but the main steps of the procedural arrangement are planning, preparation and management.

Example: Japan's procedural arrangement:

I. Planning Phase:
   1. Discussion on the inventory improvement
   2. Holding a meeting of the Committee regarding the methods for estimating Greenhouse Gas Emissions

II. Preparation Phase:
   3. Collection of data for the national inventory
   4. Preparation of a draft of the Common Reporting Format (CRF)
   5. Preparation of a draft of the National GHG Inventory Report (NIR)
   6. Implementation of the exterior quality control (QC) and the coordination with the relevant ministries and agencies
   7. Correction of the drafts of CRF and NIR

III. Management Phase:
   8. Submission and official announcement of the national inventory
   9. Holding a meeting of the Greenhouse Gas Inventory Quality Assurance Working Group

Reference: UNFCCC. (2013)

Q35: How should we verify national GHG inventories?

A: As domestic verification, we should verify national GHG inventories by utilising QA/QC procedures.

In detail

QA/QC procedures in national GHG inventory preparation contributes to the accomplishment of the development of national GHG inventories that can be readily assessed in terms of quality and completeness.

- ✓ QC is a system of routine technical activities, to measure and control the quality of the inventory as it is being compiled.
  - QC is done mainly by inventory compilers.
  - The main purpose of QC is to control the accuracy of estimated GHG emissions and removals.
- ✓ QA is a planned system of review procedures conducted by personnel not directly involved in the inventory compilation/development process.

The national GHG inventories prepared by non-Annex I Parties are not verified internationally. However, the inventories are subject to ICA as a part of BURs.

For further information, see:

"Q22: How are biennial update reports verified or reviewed?"

"Q23: How are biennial update reports analysed?"

Reference: UNFCCC. (2013)

Q36: Are there any standards or guidelines for national GHG inventory preparation?

A: The "Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention" under Decision 17/CP.8 and the UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention under Decision 2/CP.17 include guidelines for national GHG inventory preparation for non-Annex I Parties.

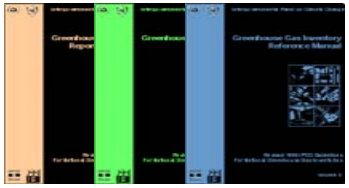
The contents of the guidelines under Decision 17/CP.8 and Decision 2/CP.17 which are relevant to national GHG inventory preparation are as follows:

A) Methodologies
   1. Choice of IPCC Guidelines
   2. Choice of estimation methods, from the IPCC Guidelines, for GHG emission and removal
   3. Application and development of country-specific emission factors and activity data

B) Reporting
   1. Information to be reported in the national GHG inventories
   2. GHGs to be estimated
   3. Choice of global warming potentials (GWP)

Decision 17/CP.8 and Decision 2/CP.17 also decide which IPCC Guidelines for national GHG inventories need to be used by non-Annex I Parties . The IPCC Guidelines include concrete methodologies on GHG emission/removal estimation and other issues relevant to national GHG inventories. The names of the Guidelines are as follows:

1. Revised 1996 IPCC Guidelines for National Greenhouse Inventories (1996GL),
2. Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (GPG(2000)),
3. Good Practice Guidance for Land Use, Land-use Change and Forestry (GPG-LULUCF),
4. 2006 IPCC Guidelines for National Greenhouse Gas Inventories (2006GL)



1996GL

GPG(2000)

GPG-LULUCF

For further information, see:
"Q7: Are there any standards or guidelines for national communications?"; "Q19: Are there any standards or guidelines for biennial update reports?".

Reference: UNFCCC. (2013)

Q37: Are there any principles for preparing national GHG inventories?

A: The principles for national GHG inventories are Transparency, Consistency, Comparability, Completeness and Accuracy, abbreviated as "TCCCA".

Principle	Definition
Transparency	Transparency means that **the assumptions and methodologies used for an inventory should be clearly explained** to facilitate replication and assessment of the inventory by users of the reported information. The transparency of inventories is fundamental to the success of the process for the communication and consideration of information.
Consistency	Consistency means that an inventory should be internally consistent in all its elements over a period of years. **An inventory is consistent if the same methodologies are used for the base and all subsequent years** and if **consistent data sets are used to estimate emissions or removals** from sources or sinks.
Comparability	Comparability means that **estimates of emissions and removals reported by Parties in inventories should be comparable among Parties**. For this purpose, Parties should use the methodologies and formats agreed by COP for estimating and reporting inventories. The allocation of different source/sink categories should follow the split of the IPCC Guidelines adopted by the COP.
Completeness	Completeness means that **an inventory covers all sources and sinks as well as all gases included** in the Revised 1996GL in addition to other existing relevant source/sink categories which are specific to individual Parties (and therefore may not be included in the IPCC guidelines.
Accuracy	Accuracy is a relative measure of the exactness of an emission or removal estimate. Estimates should be accurate in the sense that **they are systematically neither over nor under true emissions or removals**, as far as can be judged, and that uncertainties are reduced as far as practicable. Appropriate methodologies conforming to guidance on good practices should be used to promote accuracy in inventories.

Reference: UNFCCC. (2006)

Q38: What categories and gases should non-Annex I Parties cover in their national GHG inventories?

A: Non-Annex I Parties shall cover CO_2, CH_4 and N_2O from energy; industrial processes; solvent and other product use; agriculture; land-use change and forestry; and waste, as appropriate and to the greatest extent possible. In addition, non-Annex I Parties are encouraged to estimate the gases mentioned below:

GHGs which non-Annex I Parties shall estimate	Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O),
GHGs which non-Annex I Parties are encouraged to estimate	Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6), carbon monooxide (CO), nitrogen oxides (NOx), and non-methane volatile organic compounds (NMVOCs)
Sectors to be estimated in the inventories	Energy, Industrial processes, Solvent and Other Product Use, Agriculture, Land-use changes and forestry (LUCF), Waste

Reference: UNFCCC. (2002)

Q39: How should we estimate national-level GHG emissions and removals?

A: A general method for estimating national-level GHGs is to multiply activity data by emission factors.

The basic equation for estimating GHG emissions

$$E = AD * EF$$

E:	**GHG emissions**
AD:	**Activity data**
EF:	**Emission factor**

In detail

Basically, national-level GHG emissions are not directly measured at emission sources but estimated by using the equation shown above.

Term	Explanation in the Glossary of 2006 IPCC Guidelines for National Greenhouse Gas Inventories	Material
AD	Data on the magnitude of human activity resulting in emissions or removals taking place during a given period of time	Data obtained from national–level statistics, such as quantity of energy consumption, cement production, and the number of domestic animals by species.
EF	A coefficient that quantifies the emissions or removals of a gas per unit activity.	Research results from measurement data, such as the carbon content of each fuel type and CH_4 emission per head of a ruminant animal.

Reference: UNFCCC. (2006)

Q40: Are the national GHG inventories submitted by non-Annex I Parties reviewed?

A: No, the national GHG inventories submitted by non-Annex I Parties are not reviewed. Instead of this the national GHG inventories, which are a part of BURs, will be analysed under ICA for BURs.

In detail

- ✓ The ICA will be conducted in a manner that is non-intrusive, non-punitive and respectful of national sovereignty.
- ✓ The ICA consists of the two steps as mentioned below:
  - Technical analysis
  - Facilitative sharing of views

For further information, see:
"Q22: How are biennial update reports verified or reviewed?",
"Q23: How are biennial update reports analysed?".

Reference: UNFCCC. (2006)

Q41: Are there different levels of estimation methods?

A: There are three levels of estimation methods provided by the IPCC Guidelines for National Greenhouse Gas Inventories. The levels of methodological complexity are referred to as “tiers” in the Guidelines.

Tier	Level	Explanation
Tier 1	Basic	Use readily available estimation methods and default emission factors provided by the IPCC Guidelines
Tier 2	Intermediate	Use readily available estimation methods provided by the IPCC Guidelines and country-specific emission factors
Tier 3	Most complex	Use country-specific estimation methods, such as complex modeling approaches, and country-specific emission factors

Reference:
1. IPCC. (2006)
2. UNFCCC. (2006)

Q42: What should we do if it is not possible to estimate all emission sources and removal sinks?

A: If an inventory does not cover all sources and sinks as well as gases included in the IPCC Guidelines, you should clarify why the sources, sinks or gases are not covered in the inventory.

If there are sources and sinks not covered in a national GHG inventory, but which are included in the IPCC Guidelines, **using notation keys** is an effective way to indicate the reasons why sources and sinks are not covered.

Notation Key	Definition	Explanation
"NE"	Not estimated	Emissions and/or removals occur but have not been estimated or reported.
"IE"	Included elsewhere	Emissions and/or removals for this activity or category are estimated and included in the inventory but not presented separately for this category.
"C"	Confidential information	Emission and/or removals are aggregated and included elsewhere in the inventory because reporting at a disaggregated level could lead to the disclosure of confidential information.
"NA"	Not applicable	The activity or category exists but relevant emissions and removals are considered never to occur. (Such cells are normally shaded in the reporting tables.)
"NO"	Not occurring	An activity or process does not exist within a country.

Reference: UNFCCC. (2006)

Q43: Who should prepare national GHG inventories?

A: The national government of each Party shall prepare its national GHG inventories. Allocation of detailed roles for the preparation depends on each Party's national circumstances.

In detail

- ✓ National GHG inventories shall be prepared as a part of NCs and BURs. As stated in Article 12 of the UNFCCC and Decision 2/CP.17, Parties are responsible for preparing and submitting the NCs and BURs to the UNFCCC. Hence, the national government of each party is responsible for preparing the national GHG inventories as well as NCs and BURs.
- ✓ In order to ensure periodical national GHG inventory preparation, it is necessary to clearly allocate which entity shall implement which role of the preparation.

Steps for designating roles of national GHG inventory preparation:

1. Designate a single national entity with overall responsibility for the national inventory,
2. Define and allocate specific responsibilities in the inventory development process by specifying the roles of, and cooperation between, government agencies and other entities relevant to inventory preparation. For example, specific responsibilities include the following roles:
   a. Choice of estimation methods,
   b. Data collection,
   c. Processing and archiving of inventory information,
   d. Quality assurance/quality control (QA/QC).

For further information, see:
"Q9: Who should develop national communications and biennial update reports?".

Reference: U.S. EPA. (2013)

Q44: How do countries establish institutional systems to prepare national GHG inventories?

A: The institutional systems for each non-Annex I Parties to prepare national GHG inventories can be established by considering the key elements of the inventory preparation process, such as planning, preparation, and management.

Key elements in the preparation of national GHG inventories	
Planning	Designation of a single national entity with overall responsibility for the preparation
	Allocation of specific responsibilities in the inventory preparation process, such as choice of estimation methods, data collection, estimation of GHG emissions/removals, quality assurance/quality control (QA/QC) activities
	Elaboration of an inventory QA/QC plan
	Establishment of processes for the official consideration and approval of the inventory
Actual Preparation	Data collection, preparation of estimates on GHG emissions and removals, recalculation, key category analysis, uncertainty assessment, documentation of estimation methodologies and information relevant to inventory preparation
Management	Archiving of inventory information on data used for the inventory preparation, estimation methodologies, QA/QC procedures and inventory improvement plan

For further information, see:
"Q10: How do countries establish institutional arrangements to prepare national communications and biennial update reports?"

Reference: UNFCCC. (2013)

Q45: Is there any financial support available to prepare national GHG inventories?

A: GEF provides non-Annex I Parties with financial support for preparing national GHG inventories as a part of NCs and BURs.

In detail

National GHG inventories prepared by non-Annex I Parties are submitted to the COP under the UNFCCC as a part of NCs and BURs; hence, the financial support for NCs and BURs for non-Annex I Parties includes those for the national GHG inventories.

Organisation	Coverage	Reference
GEF	Comprehensive financial support for NCs and BURs, including for national GHG inventories	For further information, see the following pages: "Q8: Is there any financial support available to develop national communications?"(page 25), "Q20: Is there any financial support available to develop biennial update reports?"(page35)
APN	Financial support for global change research in the Asia-Pacific region, including climate change issues, such as research funds for developing country- or regional-specific emission factors	http://www.apn-gcr.org/programmes-and-activities/arcp/ http://www.apn-gcr.org/programmes-and-activities/capable/

Reference: UNFCCC. (2013)

Q46: Is there any technical support available to prepare national GHG inventories?

A: There is various technical support provided by international institutes and bilateral donors as shown below.

Organisation	Reference
Consultative Group of Experts on National Communications from Parties not included in Annex I (CGE)	For further information on these organisations, see "Q9: Is there any technical support available to develop national communications?" (page 26).
National Communication Support Program (NCSP)	
IPCC (inventory software)	http://www.ipcc-nggip.iges.or.jp/software/index.html
UNFCCC	http://unfccc.int/national_reports/non-annex_i_natcom/training_material/methodological_documents/items/349.php
USEPA	http://www.epa.gov/climatechange/EPAactivities/internationalpartnerships/capacity-building.html#National
Asian Develop Bank	http://www.adb.org/projects/43100-012/main
Japan International Cooperation Agency	http://www-gio.nies.go.jp/wgia/wg10/pdf/3_1.pdf
USAID	http://www-gio.nies.go.jp/wgia/wg10/pdf/3_3.pdf

Reference: UNFCCC. (2013)

4.4. Nationally Appropriate Mitigation Actions (NAMAs)

This section covers questions and answers on MRV for Nationally Appropriate Mitigation Actions (NAMAs):

47. What are NAMAs?
48. What is MRV for NAMAs?
49. Why does MRV for NAMAs need to be conducted?
50. How frequently should MRV of NAMAs be conduced?
51. What is the difference of MRV for internationally and domestically supported NAMAs?
52. How should we implement MRV of NAMAs?
53. Are there any standards or guidelines for MRV of NAMAs?
54. How can NAMAs be reported in BURs?
55. How Is verification conducted in the context of MRV for NAMAs?
56. Who should conduct MRV of NAMAs?
57. How do countries establish institutional arrangements to conduct MRV of NAMAs?
58. Is there any technical and financial support available to help countries conduct MRV of NAMAs?

Q47: What are NAMAs?

A: NAMAs indicate mitigation actions within frameworks of long-term national development plans in a sustainable manner, emphasising national ownership, consensus and GHG emissions reductions, under the unique conditions of each developing country. NAMAs are supported and enabled by technology, financing and capacity-building.

In detail

- ✓ The Bali Action Plan in 2007 indicated that 'developing country Parties will take nationally appropriate mitigation actions in the context of sustainable development, supported and enabled by technology, financing and capacity-building, aimed at achieving a deviation in emissions relative to "business as usual" emissions in 2020'.
- ✓ Later, the Cancun Agreement in 2010 was adopted to formalise those ideas, and the subsequent Durban Outcomes in 2011 then added procedures and format of reporting through Biennial Update Reports (BURs) and International Consultation and Analysis (ICA).

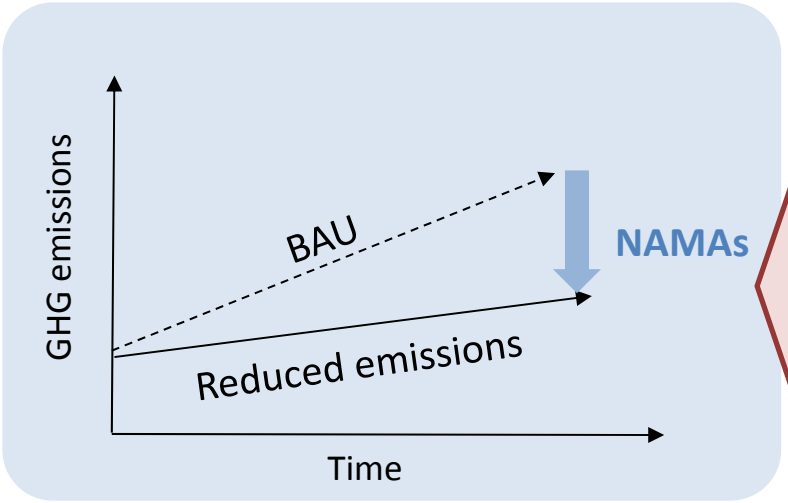
For further information on BUR, see section 4.2
and on ICA, see "Q23: How are biennial update reports analysed? ".

Reference:
1. UNFCCC. (2007)
2. UNFCCC (2010)
3. UNFCCC (2011)

Q48: What is MRV for NAMAs?

A: MRV of NAMAs can comprise of: MRV of the effects of NAMAs relative to 'business as usual (BAU)' GHG emissions in 2020 and MRV of support provided, when applicable, for the reduction of emissions.

NAMA implementation by a Party



MRV

In detail

- ✓ **BAU:** Refers to calculation of GHG emissions without NAMAs. Parties agreed on developing country Parties to implement NAMAs, aimed at achieving a deviation in emissions relative to "business as usual" emissions in 2020.
- ✓ **Emissions reduction:** Refers to measurement of GHG emissions reduction through NAMAs in relation to the corresponding BAU GHG emissions.
- ✓ **Support:** Focuses on how developed countries mobilise support provided for mitigation actions, where support means finance, technology development and transfer, and capacity building.

Reference:
1. UNFCCC. (2010)

Q49: Why does MRV for NAMAs need to be conducted?

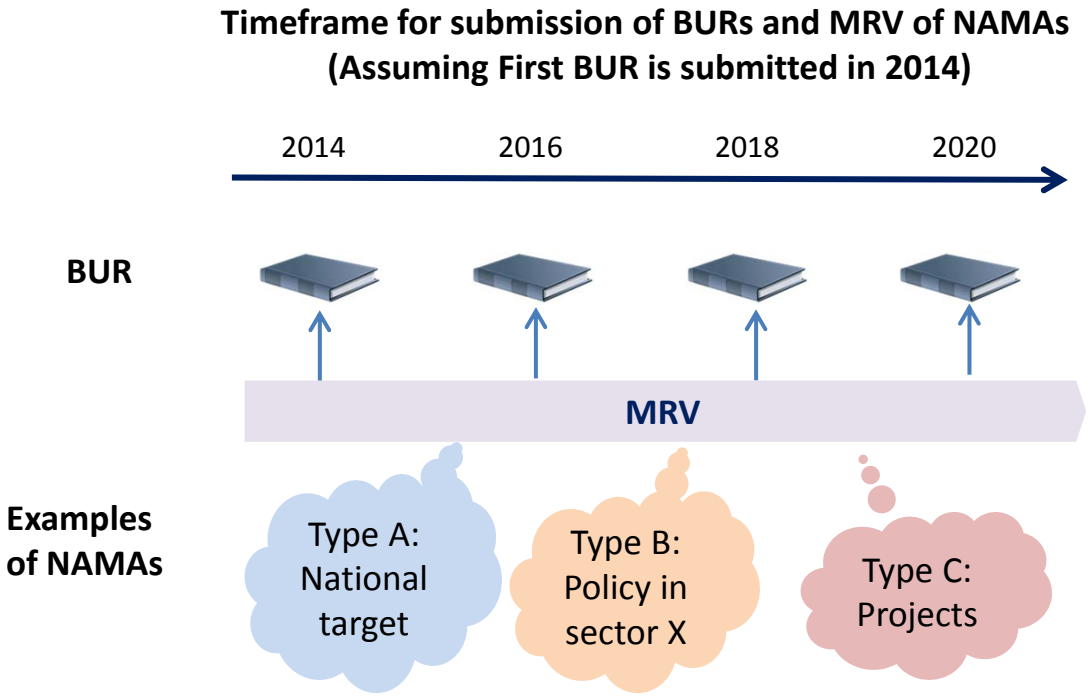
A: MRV of NAMAs can help provide transparency, show the country's level of ambition and effort, and expose the potential of emissions reduction to receive international support.

Transparency	• Information on measurement of emissions reduction together with information about what financial sources (international support) have been used in order to obtain those reductions can provide transparency to the international community.
Ambition/ effort	• By reporting on NAMAs, countries can show the level of ambition or effort invested in specific sectors. It can also show the country's level of commitment and contributions made in relation to global efforts to attain the two degree goal.
Need of support	• By properly reporting on NAMAs, countries can expose the potential of emissions reduction in specific sectors, as well as informing on constraints and gaps which can attract international support to conduct NAMAs.

Source: Authors. (2015)

Q50: How frequently should MRV of NAMAs be conduced?

A: At the international level, BURs should be prepared every two years. At the national level, the frequency of MRV of each mitigation action could depend on how a developing country Party designs NAMAs and MRV of each mitigation action.



For further information on BUR, see:
"Q15: How frequently should BURs be prepared?"

Source: Authors. (2015)

In detail

At the national level:

- ✓ NAMAs are nationally appropriate, taking into account different national circumstances. Diversity of NAMAs is reported through a country's submissions (http://unfccc.int/meetings/cop_15/copenhagen_accord/items/5265.php) .
- ✓ Hence, MRV of each mitigation action should be conducted in a nationally appropriate manner, including how frequently it is conducted.

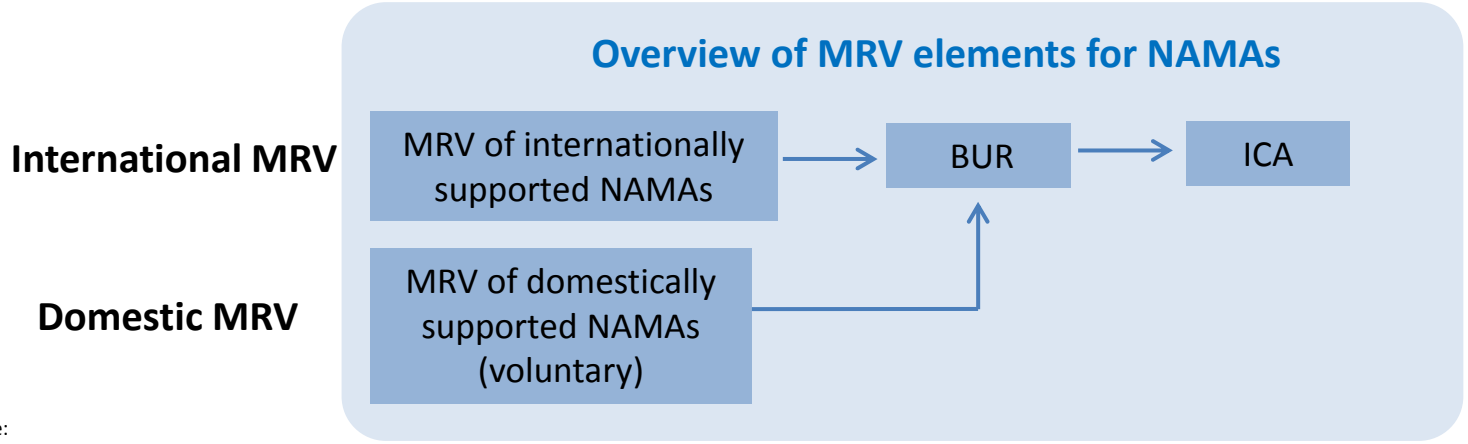
Q51: What is the difference of MRV for internationally and domestically supported NAMAs?

A: Internationally supported NAMAs are subject to international MRV through BURs and ICA. Domestic MRV process should be applied to domestically supported NAMAs. Guidelines for domestic MRV, adopted in COP19, are for voluntary use.

In detail

In accordance with 1/CP.16,

- ✓ Internationally supported mitigation actions will be measured, reported and verified domestically and will be subject to international measurement, reporting and verification in accordance with guidelines to be developed under the Convention; and
- ✓ Domestically supported mitigation actions will be measured, reported and verified domestically in accordance with general guidelines to be developed under the Convention.



Reference:
1. UNFCCC. (2010)
2. UNFCCC. (2013)
3. UNFCCC Secretariat. (2014)

Q52: How should we implement MRV of NAMAs?

A: International reporting requirements for NAMAs through BURs, domestic policies for NAMAs and MRV, and requirements given by international supporters, if any, altogether determine how specific MRV process for NAMAs should be.

International requirements	• "UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention" (2/CP.17, Annex III) • "General guidelines for domestic MRV of domestically supported nationally appropriate mitigation actions by developing country Parties" (21/CP.19, Annex)
Domestic policy and arrangements	• Domestic policy and arrangements govern how MRV of NAMAs should be conducted at the country level. • They also determine which of the NAMAs implemented are reported internationally through BURs.
Requirements associated with support	• Internationally supported NAMAs usually contain requirements for MRV. These requirements are considered stringent, because support providers have responsibility for clear output, e.g. GHG emissions reduction or other impacts.

Reference:
1. UNFCCC. (2011)
2. UNFCCC. (2013)
3. Lutken et al. (2014)

Q53: Are there any standards or guidelines for MRV of NAMAs?

A: At the international level, there are two sets of guidelines adopted for BUR and MRV of domestic NAMAs. At the country level, it is developing country Parties that decide which standards or guidelines to follow or, if they wish, they can make their own, keeping in mind that they are encouraged to use existing resources and capacities.

Decision	Requirements
UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention" (2/CP.17, Annex III)	See "Q22: What information is included in biennial update reports?" (page 37)
General guidelines for domestic MRV of domestically supported NAMAs by developing country Parties (21/CP.19, Annex)	a. To establish, when appropriate, and/or recognise, where relevant, inter alia, the institutions, entities, arrangements and systems involved in the domestic measurement, reporting and verification of NAMAs; b. To measure domestically supported NAMAs, including the collection and management of relevant and available information and the documentation of methodologies; c. To verify domestically supported NAMAs, including the use of domestic experts using domestically developed processes, thereby enhancing the cost-effectiveness of the verification process

Reference:
1. UNFCCC. (2011)
2. UNFCCC. (2013)

Q54: How can NAMAs be reported in BURs?

A: A consultative group of experts (CGE) has suggested some tabular formats that can be taken as a model to prepare for reporting on NAMAs and their effects in BURs.

Tabular format: Summary of Mitigation Actions

Mitigation Action	Status (planned / ongoing / imple-mented)	Specific objectives	Description (Type of action, time frame, etc.)	Coordination and Management	Estimated Emissions Reduction Potential	Co-benefits	Other effects	Type of Support Received	Cost of Preparation and Implementation
Action 1 (e.g. NAMA1)									
Action 2									
Action 3									
…									

Reference:
1. UNFCCC. (2015)

Q55: How is verification conducted in the context of MRV for NAMAs?

A: There is no officially agreed verification and review process for NAMAs. Instead, International Consultation and Analysis (ICA) of BURs is conducted. At the national level, it is largely the choice of countries to implement verification to increase transparency and accountability of information about NAMAs. International supporters or schemes that countries participate in may require countries to implement verification.

ICA for BURs and potential verification process for nationally supported NAMAs

Internationally supported NAMAs	At international level, BURs are subject to the process of verification called International Consultation and Analysis (ICA) conducted by a team of technical experts (TTE) within six months of submission of the BUR to the secretariat.
Nationally supported NAMAs	Discussions are ongoing on how and who should conduct verification of nationally supported NAMAs. If the NAMA does not involve credits or some kind of offsetting scheme, it is up to the country's climate change authority to decide whether to ask a third party (verifier), or designate a national entity to conduct the verification process building upon experiences such as the CDM or others.

For further information on ICA, see: "Q22: How are biennial update reports verified or reviewed?" (page 38); and "Q23: How are biennial update reports analysed?"

Reference:
1. UNFCCC. (2011)

Q56: Who should conduct MRV of NAMAs?

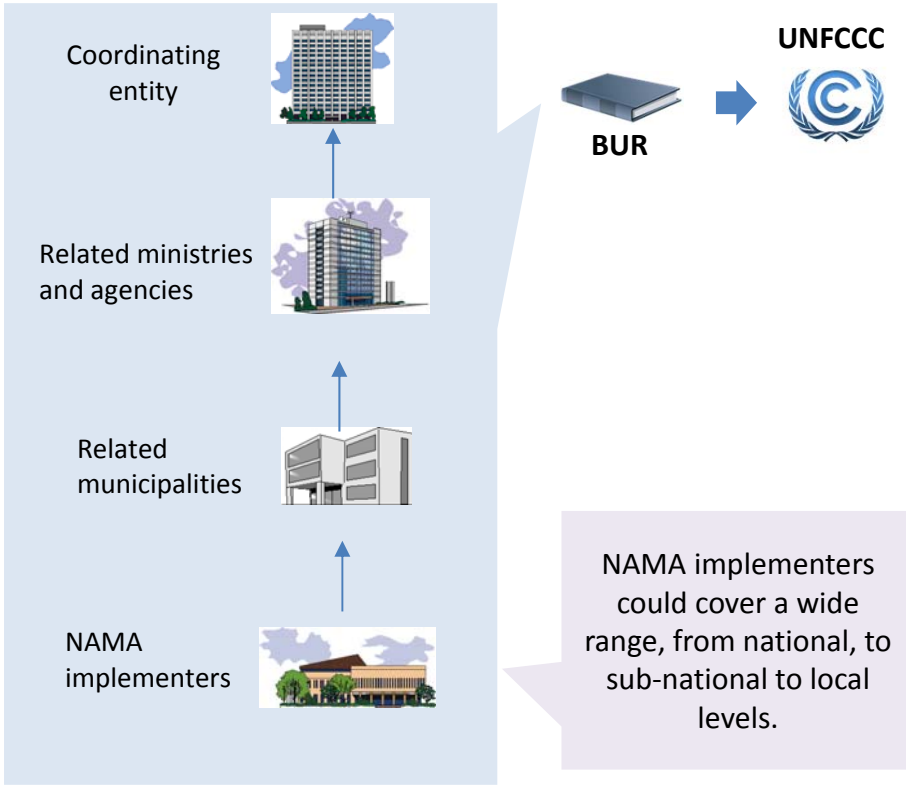
A: BURs coordinating entity in each Party designated as responsible for the overall BURs preparation should develop BURs. MRV of each mitigation action to be reported in a BUR should be conducted by different entities designated by the government/coordinating entity.

In detail

- ✓ Since NAMAs are decided for developing country Parties to implement under the UNFCCC, the government of each country Party should have the overall responsibility.
- ✓ NAMAs can come in diverse forms, involving diverse NAMA implementation entities, e.g. related ministries, municipalities, private entities, etc.
- ✓ Generally these entities involved in NAMA implementation have roles in conducting MRV of each NAMA.

For further information on BUR, see:
"Q9: Who should develop NCs and BURs?"

Image of institutional arrangements



Source: Authors. (2015)

Q57: How do countries establish institutional arrangements to conduct MRV of NAMAs?

A: Developing country Parties are encouraged to use existing domestic processes, arrangements or systems as much as possible to establish institutional arrangements for MRV of NAMAs.

In detail

In accordance with 21/CP.19:

- ✓ Developing country Parties are encouraged to utilise existing domestic processes, arrangements or systems, including domestically available information, methodologies, experts and other aspects, for domestic MRV.
- ✓ Otherwise, developing country Parties may wish to voluntarily establish domestic processes, arrangements or systems for the domestic measurement, reporting and verification of domestically supported NAMAs.

Most developing countries have experience with:

- National Communications (NCs)
- Biennial Update Reports (BURs)
- National GHG inventories
- Clean Development Mechanism (CDM)

Some countries have experience with other initiatives, including the ones outside the UNFCCC.

Reference:
1. UNFCCC. (2013)

Q58: Is there any technical and financial support available to help countries conduct MRV of NAMAs?

A: A range of technical and financial support is provided through multilateral and bilateral collaborations and other organisations, such as NGOs. Because NAMAs can take various forms based on national circumstances, support available for other initiatives is also considered linked to NAMAs.

In detail

The following organisations are some examples of those providing support and useful resources.

- Asian Development Bank (ADB)
- Global Environment Facility (GEF)
- Japan International Cooperation Agency (JICA)
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- Institute for Global Environmental Strategies (IGES) (*)
- National Institute for Environmental Studies (NIES), Japan (*)
- Organisation of Economic Development Cooperation (OECD) (*)
- United Nations Framework Convention on Climate Change (UNFCCC) Secretariat (*)
- United Nations Development Programme (UNDP)
- United Nations Environment Programme (UNEP)
- World Bank
- World Resources Institute (WRI) (*)

(* indicates organisations providing mainly technical guidance).

Reference:
1. Lutken et al. (2014)

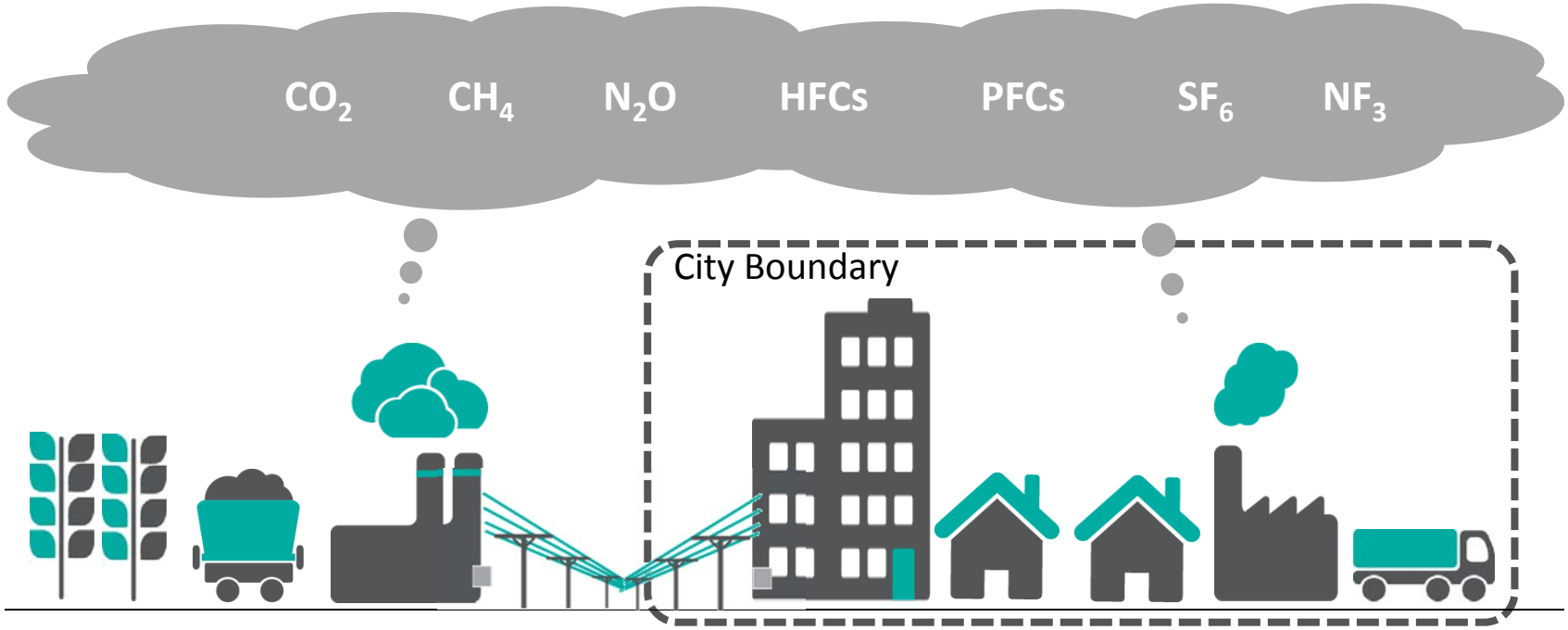
4.5. City-Scale Greenhouse Gas Inventories

This section covers questions and answers on city-scale greenhouse gas (GHG) inventories, as follows:

59. What is a city-scale GHG inventory?
60. Why developing GHG inventories for cities?
61. What is the role of GHG inventories in goal setting and performance tracking?
62. How frequent should cities develop GHG inventories?
63. What are the differences between national and city inventories?
64. How long does it normally take to complete an inventory?
65. What are the differences between city GHG inventories and mitigation actions GHG accounting?
66. How many cities use the GPC?
67. Can the GPC be used for other sub-national entities?
68. How to develop a city-scale GHG inventory?
69. Is there any standard methodology for developing and reporting city-scale GHG inventories?
70. Is there any standard template for reporting city GHG inventories?
71. Are cities required to disclose their GHG inventory data?
72. How to report in-boundary and trans-boundary emissions?
73. What should a city do if not able to account for all emission sources?
74. Where to find calculation tools and training resources?
75. Who can develop city-scale GHG inventories?
76. Are there any technical and financial supports available to help cities develop GHG inventories?
77. Are there any training programmes for city-scale inventories?

Q59: What is a city-scale GHG inventory?

A: A city-scale GHG inventory presents the GHG emissions and removal data for a city in a continuous period of 12 months (calendar or fiscal year). It includes all emissions sources within the city boundary as well as emissions that occur outside the city boundary as a result of activities taking places within the city. An complete GHG inventory includes seven GHGs, namely carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6), and nitrogen trifluoride (NF_3).



Reference: WRI, C40, ICLEI . (2014)

Q60: Why developing GHG inventories for cities?

A: GHG inventories help cities benchmark their emissions, identify key emission sources, and develop effective mitigation actions.

Benchmarking	• It helps cities understand their levels of emissions and benchmark with other cities.
Identifying GHG reduction opportunities	• It helps cities measure GHG emissions, set emission reduction targets, identify emission reduction opportunities, and develop mitigation action plans.
Tracking performance	• Regular and consistent GHG inventories help cities monitor their GHG reduction progress towards the targets and evaluate the effectiveness of mitigation actions.
Cross-learning between cities	• Comparing GHG inventories and mitigation measures between cities to facilitate cross-learning of good practices.

Source: Author (2013).

Q61: What is the role of GHG inventories in goal setting and performance tracking?

A: Developing GHG inventories, setting goals and tracking progress are part of an interconnected process. GHG reduction goals can apply to a city's overall emissions or to a subset of the gases or emission sectors identified in the inventory boundary. Cities may also set goals separately for each scope in order to avoid double counting the same emissions in the same goal.

Four typical goal types

Goal Type	Description	Example
Base year emission goal	Represents a reduction in emissions relative to an emissions level in a historical base year.	By 2025 60% GHG emissions reduction on 1990 levels
Fixed level goal	Represents a reduction in emissions to an absolute emissions level in a target year.	Achieve zero net carbon emissions by 2020
Base year intensity goal	Represents a reduction in emissions intensity relative to an emissions intensity level in a historical base year.	20% GHG emissions reduction per capita until 2030 from 2007 levels
Baseline scenario goal	Represents a reduction in emissions relative to a baseline scenario emissions level.	Reduce GHG emissions to 16% below business-as-usual (BAU) levels by 2020

Base year: A specific year of historical data against which emissions are compared over time.
Target year: For single-year goals, the year by which the goal is to be met, which is the last year of the goal period.
Baseline scenario: A reference case that represents future conditions most likely to occur in the absence of activities taken to meet the goal.
Business-as-usual scenario: A reference case that represents future conditions most likely to occur as a result of implemented policies and actions.

Reference: WRI, C40, ICLEI. (2014)

Q62: How frequent should cities develop GHG inventories?

A: It depends on country and programme requirements. The GPC recommends cities to update GHG inventories on an annual basis, as it will provide more frequent and timely update to the GHG emissions data.

In detail

- ✓ The GPC recommends cities to update GHG inventories on an annual basis but it is not a strict requirement.
- ✓ Countries and programmes may impose their requirements or recommendations.
- ✓ In general, it varies from one to five years. Some countries require only base year and target year inventories. (see some examples on the right)

Carbonn Climate Registry

- Cities voluntarily report their GHG data without any specific requirement on the frequency of inventories.

Compact of Mayors

- Cities are required to update their GHG inventories at least once in every three years.

Rio de Janeiro

- Its climate change law requires the city to develop GHG inventories every four years.

Tokyo & New York City

- Tokyo and New York City update their GHG inventories annually.

Reference:
1. cCCR. (2015)
2. Compact of Mayors. (2015)
3. WRI, C40, ICLEI . (2014)

Q63: What are the differences between national and city inventories?

A: The key difference is that national inventories mainly measure GHG emissions within the country while city inventories measure both in-boundary and trans-boundary emissions.

National Inventories

- Measure mainly GHG emissions occur within national territory (in-boundary emissions)
- The only trans-boundary emission is from international bunkers (flights and vessels).

City Inventories

- Measure both in-boundary and trans-boundary GHG emissions.
- Trans-boundary emissions include grid-supplied electricity and heating/cooling, out-of-boundary waste treatment/disposal, trans-boundary transportation, and transmission and distribution losses from grid-supplied energy
- Please refer to the next page (Q58) for further details.

Reference:
1. IPCC. (2006)
2. WRI, C40, ICLEI. (2014)

Q64: How long does it normally take to complete an inventory?

A: Typically it takes six to nine months to complete an inventory. Some examples are presented below for reference.

Buenos Aires

- 4 to 6 months

Durban

- 6 months

Kyoto

- 2 months

Melbourne

- 2 months

Rio de Janeiro

- 10 months

Sydney

- 6 months

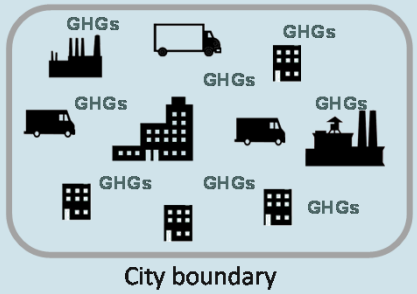
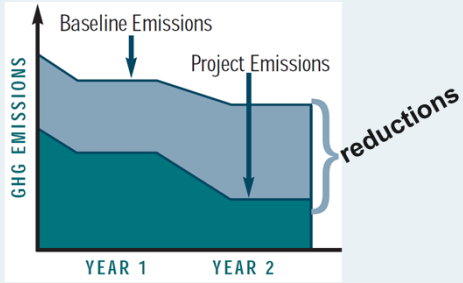
Tokyo

- 12 months

Reference: WRI, C40, ICLEI. (2013)

Q65: What are the differences between city-scale GHG inventories and mitigation actions GHG accounting?

A: City-scale GHG inventories provide a comprehensive set of GHG emission data for a city in a given year; while mitigation actions GHG accounting, measures changes in emissions due to specific policies or actions.

Type of accounting	Advantages	Disadvantages
City GHG inventory 	• Comprehensive accounting of all GHG emissions. • Necessary to track the overall progress towards GHG reduction goals.	• Does not provide detailed explanation of the effectiveness of each action.
Mitigation actions GHG accounting 	• Attributes changes in GHG emissions to specific policies and actions.	• Not comprehensive. The overall emissions may increase even if individual policies or actions are reducing emissions.

Reference: GHG Protocol. (2014a, b)

Q66: How many cities use the GPC?

A: Based on the latest count by GHG Protocol (August 2015), there are 175 cities use or committed to use the GPC to develop GHG inventories, including 135 cities signed up to the Compact of Mayors, 23 cities completed the GPC pilot projects in 2013, and 21 cities participate in the Inter-America Development Bank's Emerging and Sustainable Cities Initiative that use the GPC to measure emissions.

Cities use or committed to use the GPC to develop GHG inventories

Reference: Author (2015)

Q67: Can the GPC be used for other sub-national entities?

A: Yes, the GPC can be used for assessing GHG emissions of any geographically defined subnational area.

In detail

- ✓ Although the GPC is primarily designed for cities, the accounting framework can also be used for boroughs or wards within a city, as well as towns, districts, counties, prefectures, provinces, and states.
- ✓ In the GPC and this document, the term "city" is used to refer to all these jurisdictions, unless otherwise specified.

The Wellington Region, New Zealand uses the GPC to account and reporting GHG emissions for the entire region as well as for its eight Territorial Authorities within the region (see above map), namely Carterton, Kapiti Coast, Lower Hutt, Masterton, Porirua, South Wairarapa, Upper Hutt, Wellington.

Reference: WRI, C40, ICLEI. (2013, 2014)

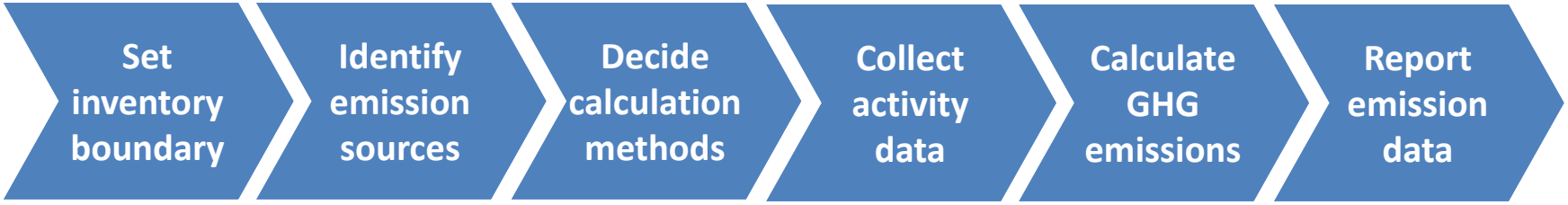
Q68: How to develop a city-scale GHG inventory?

A: Cities typically develop their GHG inventories by calculation methods. They collect data of all activities that produce GHGs, multiply each of them with their respective emission factors, then aggregate them to yield total GHG emissions.

In detail

- ✓ The figure below provides an overview of a typical GHG inventory process.
- ✓ For further information, please refer to the GPC.

Typical GHG Inventory Process



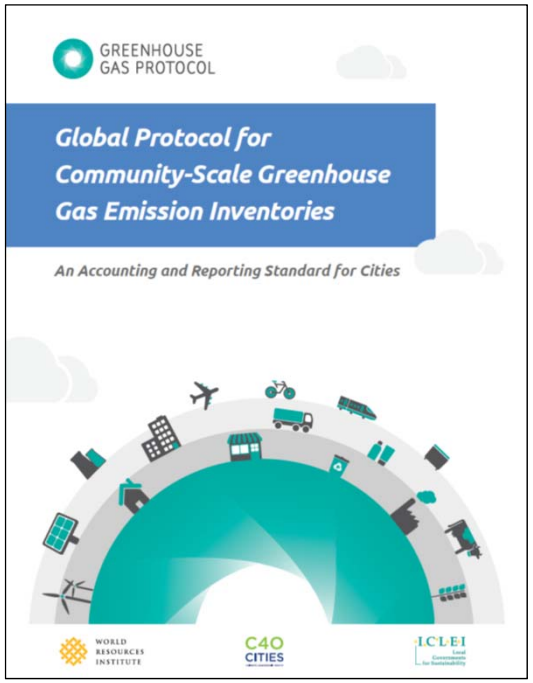
Source: Author. (2013)

Q69: Is there any standard methodology for developing and reporting city-scale GHG inventories?

A: Yes, the *Global Protocol for Community-Scale Greenhouse Gas Emission Inventories* (GPC) is an international standard for accounting and reporting city-scale GHG inventories.

In detail

- ✓ The GPC is a GHG Protocol standard jointly developed by World Resources Institute, C40 Cities Climate Leadership Group, and ICLEI – Local Governments for Sustainability, with support from the World Bank, UN-HABITAT, and the United Nations Environment Programme.
- ✓ It was launched in December 2014.
- ✓ The electronic copy of the GPC is available at www.ghgprotocol.org/city-accounting.
- ✓ The GPC sets out requirements and provides guidance for calculating and reporting city-scale GHG inventories, consistent with the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. It also identifies calculation methods and data options, and provides calculation equations or procedures to assist cities develop their GHG inventories.



Reference: WRI, C40, ICLEI. (2014)

Q70: Is there any standard template for reporting city GHG inventories?

A: Yes, the *Global Protocol for Community-Scale Greenhouse Gas Emission Inventories* (GPC) provides standard templates for reporting city-scale GHG emissions. Below are the summary tables. Please refer to the GPC for more details.

Sector		Total emissions by scope (tCO2e)				Total by city-induced reporting level (tCO2e)	
		Scope 1 (Territorial)	Scope 2	Scope 3	Other Scope 3	BASIC	BASIC+
Stationary Energy	Energy use						
	Energy generation supplied to the grid						
Transportation							
Waste	Waste generated in the city						
	Waste generated outside the city						
Industrial process & product use							
Agriculture, forest, and other land use							
Total							

Reference: WRI, C40, ICLEI. (2014)

Q71: Are cities required to disclose their GHG inventory data?

A: It depends on the country and programme requirements. There is no international rule that requires cities to disclose their GHG inventory data (see below for some examples).

Carbonn Climate Registry

- The Carbonn Climate Registry publicly discloses the GHG inventories that are submitted to them.

Compact of Mayors

- Cities sign-up to the Compact of Mayors are required to report and publicly disclose their base year GHG inventories.

France

- In France, cities with a population above 50,000 are required to report their GHG inventories but there is no specific requirement on public disclosure.

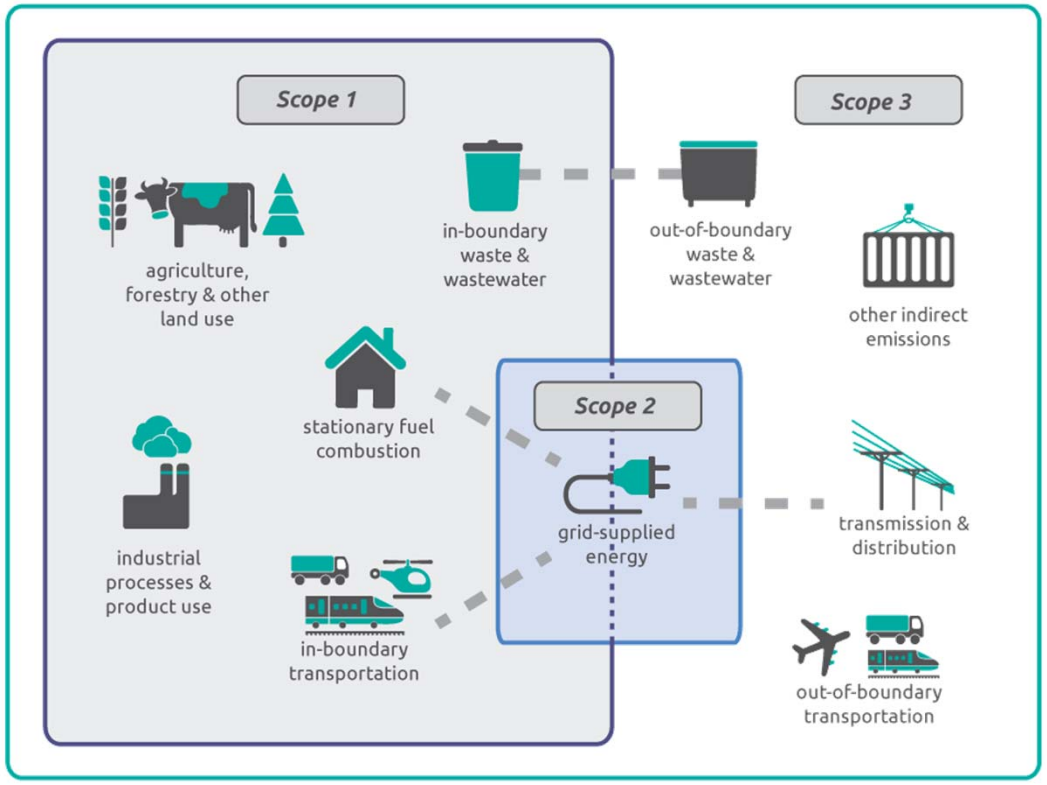
Tokyo

- Tokyo develops GHG inventories annually, and publicly discloses them through its website and other voluntary GHG reporting programmes.

Reference:
1. cCCR. (2013)
2. Compact of Mayors. (2015)
3. ARENE. (2013)
4. WRI, C40, ICLEI. (2013)

Q72: How to report in-boundary and trans-boundary emissions?

A: City emissions are grouped into three 'scopes' as follows: **Scope 1** includes emissions from sources located within the city boundary; **Scope 2** includes emissions occurring as a consequence of the use of grid-supplied electricity, heat, steam and/or cooling within the city boundary; **Scope 3** covers all other emissions that occur outside the city boundary as a result of activities taking places within the city boundary.



Reference: WRI, C40, ICLEI. (2014)

Q73: What should a city do if not able to account for all emission sources?

A: The GPC allows different options of reporting and provides notation keys to indicate any exclusion of emission sources.

In detail

The GPC allows two options of reporting (BASIC, BASIC+) and provides notation keys for cities to indicate any exclusion of emission sources:

- **IE**: GHG emissions for this activity are estimated and presented in another category of the inventory.
- **NE**: Emissions occur but have not been estimated or reported.
- **NO**: An activity or process does not occur or exist within the city.
- **C:** GHG emissions which could lead to the disclosure of confidential information and can therefore not be reported.

BASIC totals include:

- All scope 1 emissions from stationary energy sources *(excluding energy production supplied to the grid, which shall be reported in the scope 1 total)*
- All scope 1 emissions from transportation sources
- All scope 1 emissions from waste sources *(excluding emissions from imported waste, which shall be reported in the scope 1 total)*
- All scope 2 emissions from stationary energy sources and transportation
- Scope 3 emissions from treatment of exported waste

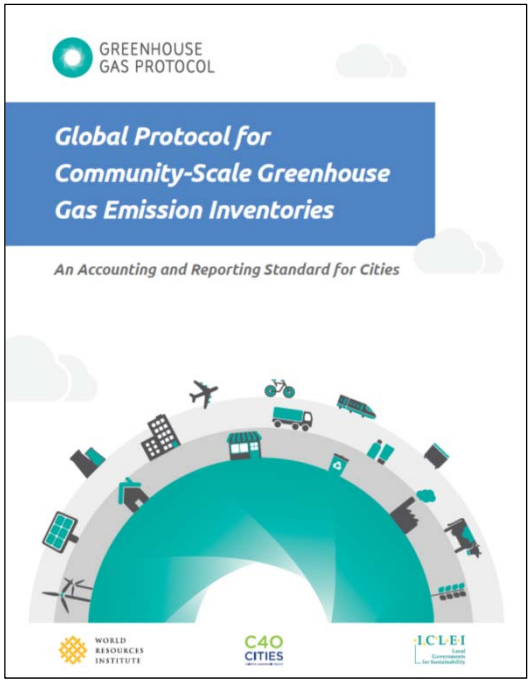
BASIC+ totals include all BASIC sources, plus:

- All scope 1 emissions from IPPU
- All scope 1 emissions from AFOLU
- Scope 3 emissions from stationary energy sources (only transmission and distribution losses), and from transportation

Reference: WRI, C40, ICLEI. (2014)

Q74: Where to find calculation tools and training resources?

A: GHG Protocol and partners have developed calculation tools, training materials and research papers to help cities develop GHG inventories according to the GPC. Cities may visit the official website of the GPC at www.ghgprotocol.org/city-accounting to find these resources. Alternatively, cities may also visit partners' websites: www.wri.org, www.c40.org, and www.iclei.org.



GPC Calculation Tool (available soon)

Above are some of the available resources on GHG Protocol website. More resources will be available soon.

Reference: Author (2015)

Q75: Who can develop city-scale GHG inventories?

A: Currently there is no accreditation of city GHG inventory professionals. Anybody who has the necessary technical capacity may develop GHG inventories for cities.

In detail

- ✓ In general, any individuals or organisations that have the necessary technical competencies in performing GHG inventories, according to the country or programme requirements, can develop GHG inventories for cities.
- ✓ However, certain countries and programmes may have more specific requirements on qualifications for developing city-scale GHG inventories.
- ✓ For other voluntary initiatives, it is recommended to apply the *Global Protocol for Community-Scale Greenhouse Gas Emission Inventories* (GPC). So it is essential that the individuals or organisations who develop GHG inventories should have a full understanding of the GPC.

Source: Author. (2013)

Q76: Are there any technical and financial supports available to help cities develop GPC inventories?

A: There are a number of donors, multilateral organisations, and other organisations that provide technical and financial support to cities for developing GHG inventories and other related low-carbon initiatives.

In detail

Cities may reach out to the following GPC partners for more information on potential technical and financial supports to develop GPC inventories:

- C40 Cities Climate Leadership Group
- Compact of Mayors
- GHG Protocol
- ICLEI-Local Governments for Sustainability (ICLEI)
- World Bank
- World Resources Institute (WRI)
- UN-HABITAT

Source: Author. (2015)

Q77: Are there any training programmes for GPC inventories?

A: There are a number of organisations provide training to cities and practitioners for developing GPC inventories.

In detail

Cities may reach out to the following GPC partners for more information on training opportunities:

- C40 Cities Climate Leadership Group
- Compact of Mayors
- GHG Protocol
- ICLEI-Local Governments for Sustainability (ICLEI)
- World Bank
- World Resources Institute (WRI)
- UN-HABITAT

Source: Author. (2015)

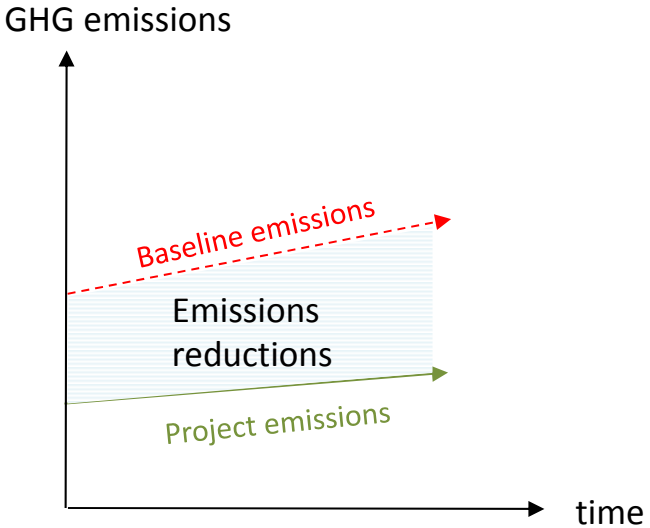
4.6. Clean Development Mechanism

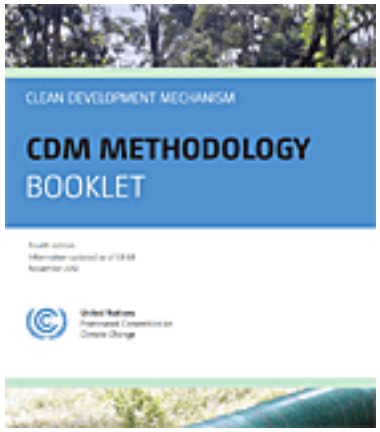
This section covers questions and answers on the Clean Development Mechanism (CDM), as follows:

78. What is MRV for the CDM?
79. Why is MRV needed for the CDM?
80. How frequently should MRV of the CDM be conducted?
81. How long does it take to do MRV for the CDM?
82. How much does it cost to conduct MRV for the CDM?
83. How many project activities have finished the MRV process for the CDM?
84. How is the CDM monitored and reported?
85. How is the CDM verified?
86. Are there any standards or guidelines for MRV in the CDM?
87. Is MRV different across sectors?
88. Who should do MRV for the CDM?
89. How is the monitoring system for the CDM established?
90. How can an organization etc. become a verification body?
91. Is there any financial support available to the CDM?
92. Is there any technical support available to implement the CDM?

Q78: What is MRV for the CDM?

A: "Monitoring" refers to the collection and archiving of data from CDM projects. "Reporting" refers to making a monitoring report. "Verification" involves the independent review and check of the monitoring report. Application of a baseline and monitoring methodology by Project Participants (PP) is required in order to determine the amount of Certified Emission Reductions (CERs) generated by a CDM project activity in a host country.





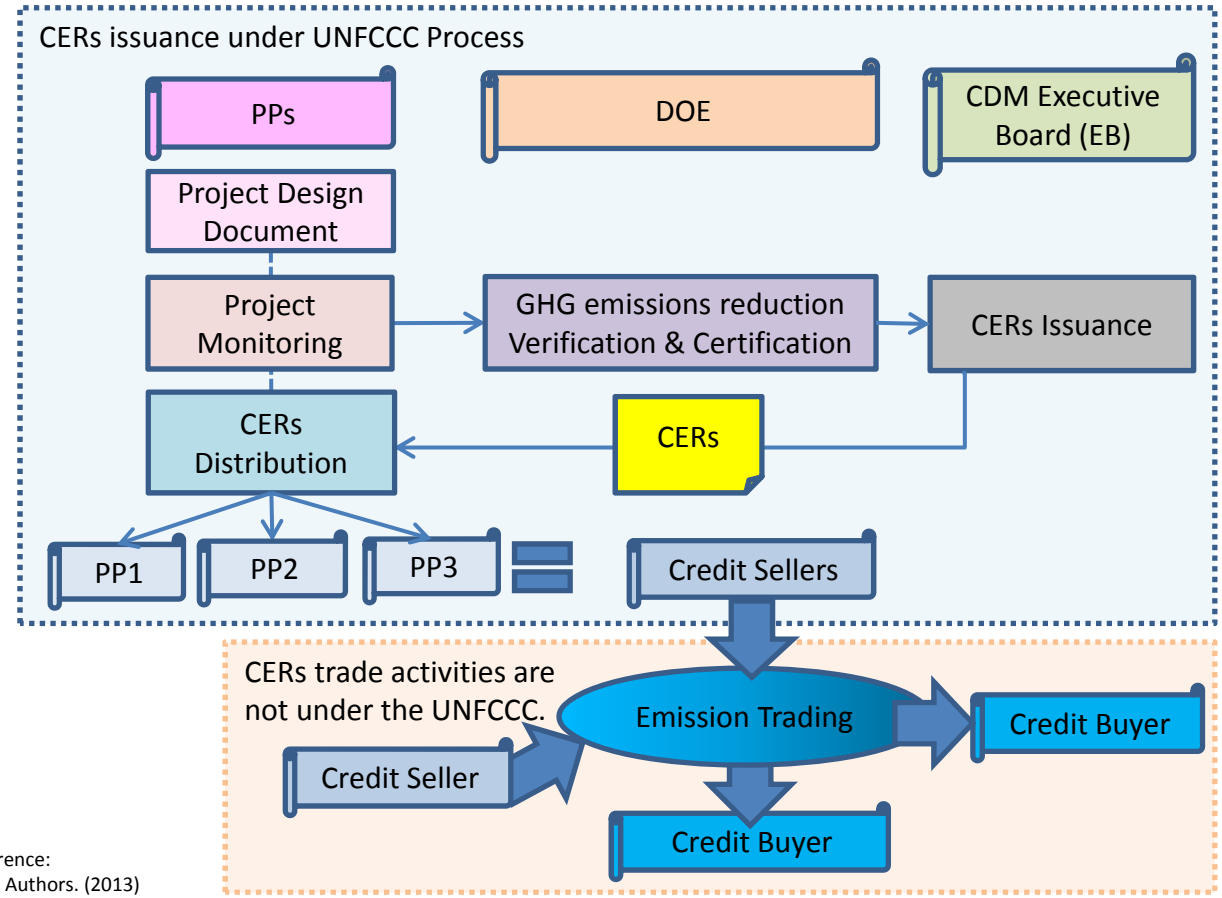
In detail

- ✓ The baseline (scenario and emissions) reasonably represents GHG emissions that would occur in the absence of the proposed project activity.
- ✓ The UNFCCC CDM Methodology Booklet is available to guide potential CDM PPs through methodologies and assist them in identifying methodologies suitable for their project activities.
- ✓ Emissions reductions from a CDM project shall be additional to any that would occur in the absence of the certified project activity.

Reference:
1. IGES. (2015a, b)
2. UNFCCC. (2014)

Q79: Why is MRV needed for the CDM?

A: Annex I Parties, with GHG emission caps, assist non-Annex I Parties with no emission caps, to implement CDM project activities to reduce/remove GHG emissions. There needs to be accurate calculation and MRV of the amount of emissions reduced since this amount is directly linked with the number of CERs issued and traded.



In detail

PPs (Project Participants)	A Party involved that intends to participate, or a private and/or public entity authorised by the Designated National Authority of a Party involved to participate in a CDM project activity or Programme of Activities, as applicable.
DOE (designated operational entity)	An entity qualified by the Convention to validate proposed CDM project activities as well as verify and certify GHG reductions.
CDM EB (CDM Executive Board)	The Executive Board of the CDM as defined in Article 12 of the Kyoto Protocol. The CDM EB supervises the CDM in accordance with paragraph 5 of the annex to decision 3/CMP.1.

Reference:
1. Authors. (2013)
2. UNFCCC. (2006)

Q80: How frequently should MRV of the CDM be conducted?

A: The timing and frequency of MRV are not specified in the official documents of the CDM. The frequency of monitoring is normally specified in the monitoring plan in PDD. The timing and frequency of reporting and verification is determined by PPs. For the selection, PPs generally consider the verification cost, amount of CER to be issued and the average trading price.

Image of the monitoring plan in PDD:

D.3 Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

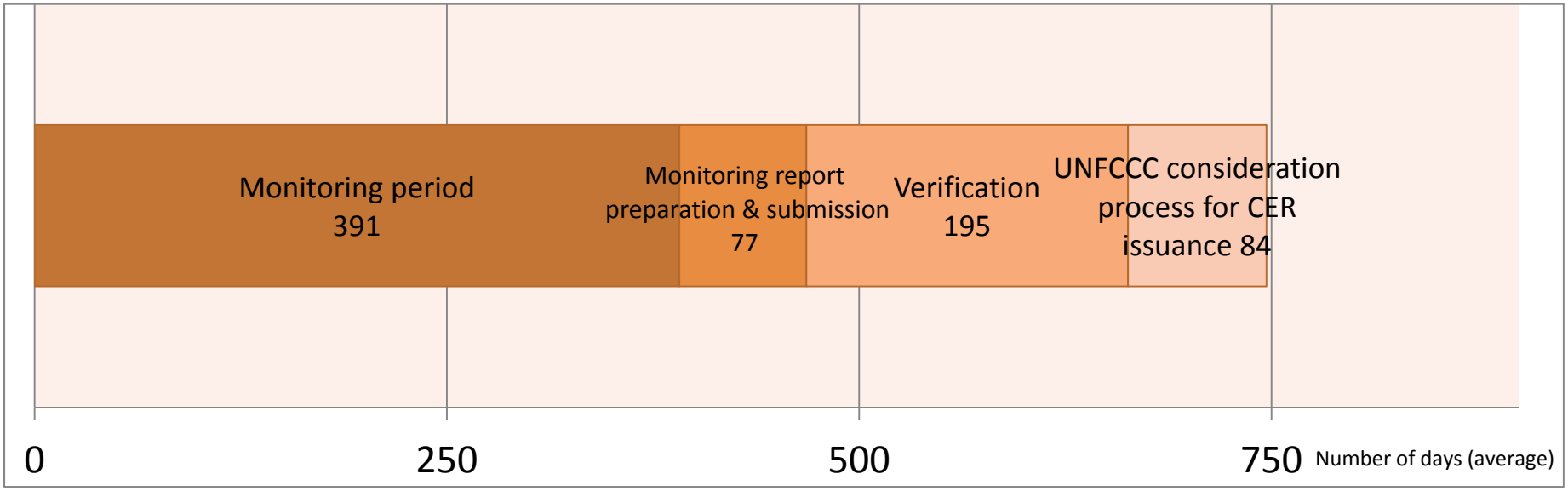
ID Number *(Please use numbers to ease cross-referencing to Table D.6)*	Data Type	Data Variable	Data Unit	Measured (m), Calculated or estimated (e)	Recording Frequency	Proportion of Data to be Monitored	How will the data be archived? (Electronic / paper)	For how long the is the archived data to be kept?	Comment
$Q_{HFC\ 23\text{-}Leak}$	Mass	Un-oxidised HFC 23 in Flue Gas	MT-HFC 23	m	Every 6 months	100 %	Paper & Electronic Copy	10 years	Analysis of flue gases to check leaked HFC 23
$Q_{CO2\text{-}HFC\ 23}$	Mass	CO2 generated by oxidation of HFC23	Kg-CO2	C	Monthly	100 %	Paper & Electronic Copy	10 years	-
Q_{Fuel}	Mass	Fuel fed to Thermal Oxidiser	Kg	m	Monthly	100 %	Paper & Electronic	10 years	Fuel meter

Recording frequency of monitoring is indicated in PDD.

Reference: Authors. (2013)

Q81: How long does it take to do MRV for the CDM?

A: It takes approximately two years from the start of the monitoring period to the date of the request for issuance of CER during the CDM project activities.



Stage	Start date	End date
Monitoring period	Start date of the monitoring period	End date of a monitoring period
Monitoring report preparation & submission	End date of the monitoring period	Date of the monitoring report published
Verification	Date of the monitoring report published	Date of the request for issuance of CER
Processed by UNFCCC secretariat and under consideration by the CDM EB	Date of the request for issuance of CER	Date of CER issuance

Reference: IGES. (2015a)

Q82: How much does it cost to conduct MRV for the CDM?

A: The cost of MRV for the CDM depends on the project's activity features (i.e. applied methodology, scale, complexity and etc.) The verification costs that are paid to DOE vary from 10,000 USD to 25,000 USD.

In detail

Components of monitoring and reporting cost:

- ✓ Installing monitoring equipments
- ✓ Data collection
- ✓ Calibration
- ✓ Employment cost
- ✓ Fee to consultant/specialized measuring institution

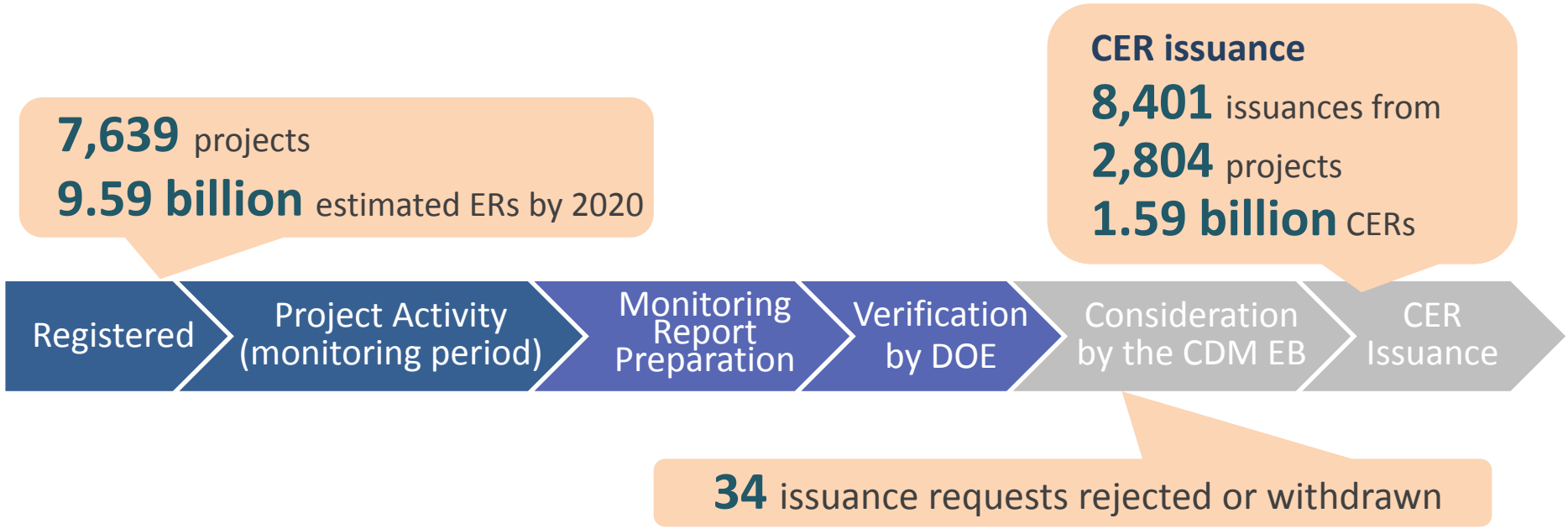
Verification cost:

Scale of project	First/initial verification	Ongoing/periodical verification
Small scale	5,000 – 15,000 USD	5,000 – 10,000 USD
Large scale	5,000 – 30,000 USD	5,000 – 25,000 USD
Programme of Activities (PoA)	30,000 – 100,000 EUR	15,000 – 40,000 EUR

Reference:
1. Hayashi et al. (2010)
2. UNFCCC. (2010)
3. Eco Securities and UNEP Risoe Centre. (2007)

Q83: How many project activities have finished the MRV process for the CDM?

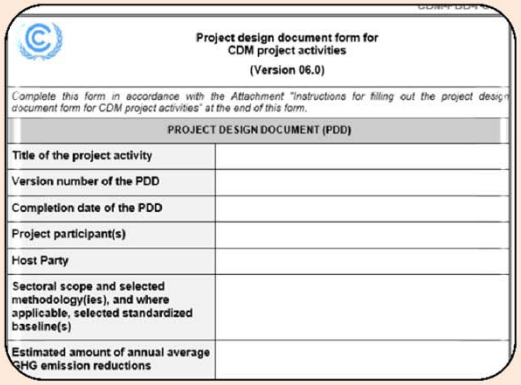
A: Approximately 40% of the registered CDM projects have gone through MRV (in other words, finished verification and submitted the CER issuance request). Conducting MRV for the CDM is a periodical cycle that is repeated continuously. A project will do MRV multiple times during its crediting period (the period in which verified and certified GHG emission reductions/removals attributable to a CDM project activity can result in the issuance of credits).



Reference:
1. IGES. (2015a)
2. IGES. (2015b)

Q84: How is the CDM monitored and reported?

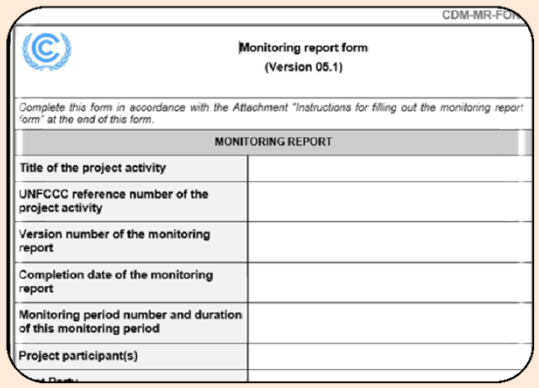
A: PPs shall monitor, in accordance with the monitoring plan as described in the registered PDD, and report all necessary information and documentation in a monitoring report.



Project design document form for CDM project activities
(Version 06.0)

Complete this form in accordance with the Attachment "Instructions for filling out the project design document form for CDM project activities" at the end of this form.

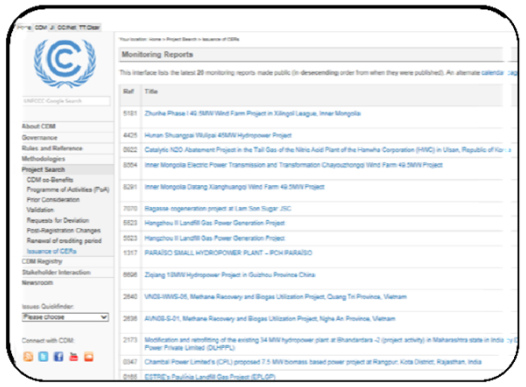
PROJECT DESIGN DOCUMENT (PDD)	
Title of the project activity	
Version number of the PDD	
Completion date of the PDD	
Project participant(s)	
Host Party	
Sectoral scope and selected methodology(ies), and where applicable, selected standardized baseline(s)	
Estimated amount of annual average GHG emission reductions	



Monitoring report form
(Version 05.1)

Complete this form in accordance with the Attachment "Instructions for filling out the monitoring report form" at the end of this form.

MONITORING REPORT	
Title of the project activity	
UNFCCC reference number of the project activity	
Version number of the monitoring report	
Completion date of the monitoring report	
Monitoring period number and duration of this monitoring period	
Project participant(s)	



Monitoring Reports

Monitoring plan
(In the PDD)

- Data and parameters monitored
- Operational and management structure
- Provisions for ensuring data-keeping
- Definition of responsibilities and institutional arrangements
- QA/QC procedures
- Uncertainty levels, methods and the associated accuracy level of measuring instruments
- Specifications of the calibration frequency

Monitoring report
(individual document)

- General description
- Description of implemented registered project activity
- Description of the monitoring system
- Data and parameters
- Calculation of emission reductions or net removals

Verification request to the DOE

- Monitoring report and supporting documents are submitted during verification request.
- Monitoring report is made publicly available by DOE through the UNFCCC CDM website: http://cdm.unfccc.int/Issuance/MonitoringReports/index.html

Reference:
1. UNFCCC. (2013a)
2. UNFCCC. (2013b)

Q85: How is the CDM verified?

A: The DOE shall conduct a thorough, independent assessment of the registered project activities. The verification approaches may include desk assessment, on-site visits and interviews.

Determine project activity compliance with the requirements of CDM modalities and procedures

Assess quantitative and qualitative information on emission reductions provided in the document

Assess whether data collection system meets the requirements of the monitoring plan of the applied methodology, including applicable tool(s)

Make the monitoring report publicly available

Determine whether the operation of the project and the steps taken to report emission reductions comply with the CDM criteria and relevant guidance

Ensure that only verification activities shall be used as a basis for the DOE to conclude their verification and submit request for issuance of CERs

In detail

Documents reviewed:

a) Registered PDD and the monitoring plan

b) Validation report

c) Previous verification reports, if any

d) Applied monitoring methodology

e) Monitoring report

f) Any other information

Reference: UNFCCC. (2013c)

Q86: Are there any standards or guidelines for MRV in the CDM?

A: There are three principal standard and procedure documents for implementing CDM project activities, which mention MRV process, two MRV specified guidelines, and one specified form.

Documents		Contents for MRV
Standard	Clean development mechanism project standard (PS) http://cdm.unfccc.int/Reference/Standards/index.html	Para 239 – 323 (Version 09.0) Implementation and monitoring requirements for all project types
	Clean development mechanism validation and verification standard (VVS) http://cdm.unfccc.int/Reference/Standards/index.html	Para 11 – 15, 345 – 432 (Version 09.0) Principles for validation and verification, verification requirements
	Clean development mechanism project cycle procedure (PCP) http://cdm.unfccc.int/Reference/Procedures/index.html#proj_cycle	Para 208 – 217 (Version 09.0) Procedure for publication of monitoring report
Guideline	Guideline for completing the monitoring report form http://cdm.unfccc.int/Reference/Guidclarif/iss/iss_guid07.pdf	General and specific guideline for completing the monitoring report form
	Guideline on the application of materiality in verifications http://cdm.unfccc.int/Reference/Guidclarif/iss/iss_guid08.pdf	• General information on the concept of materiality • Consideration of materiality in planning and conducting the verification • Reporting on the application of materiality • Flowchart on the application of materiality in verifications
Form	Monitoring report form (F-CDM-MR) http://cdm.unfccc.int/Reference/PDDs_Forms/Issuance/iss_form07.pdf	Monitoring report form template

Source: Authors. (2015)

Q87: Is MRV different across sectors?

A: Yes, this is due to the different monitoring parameters and methods (i.e., by meter or survey) for each sector.

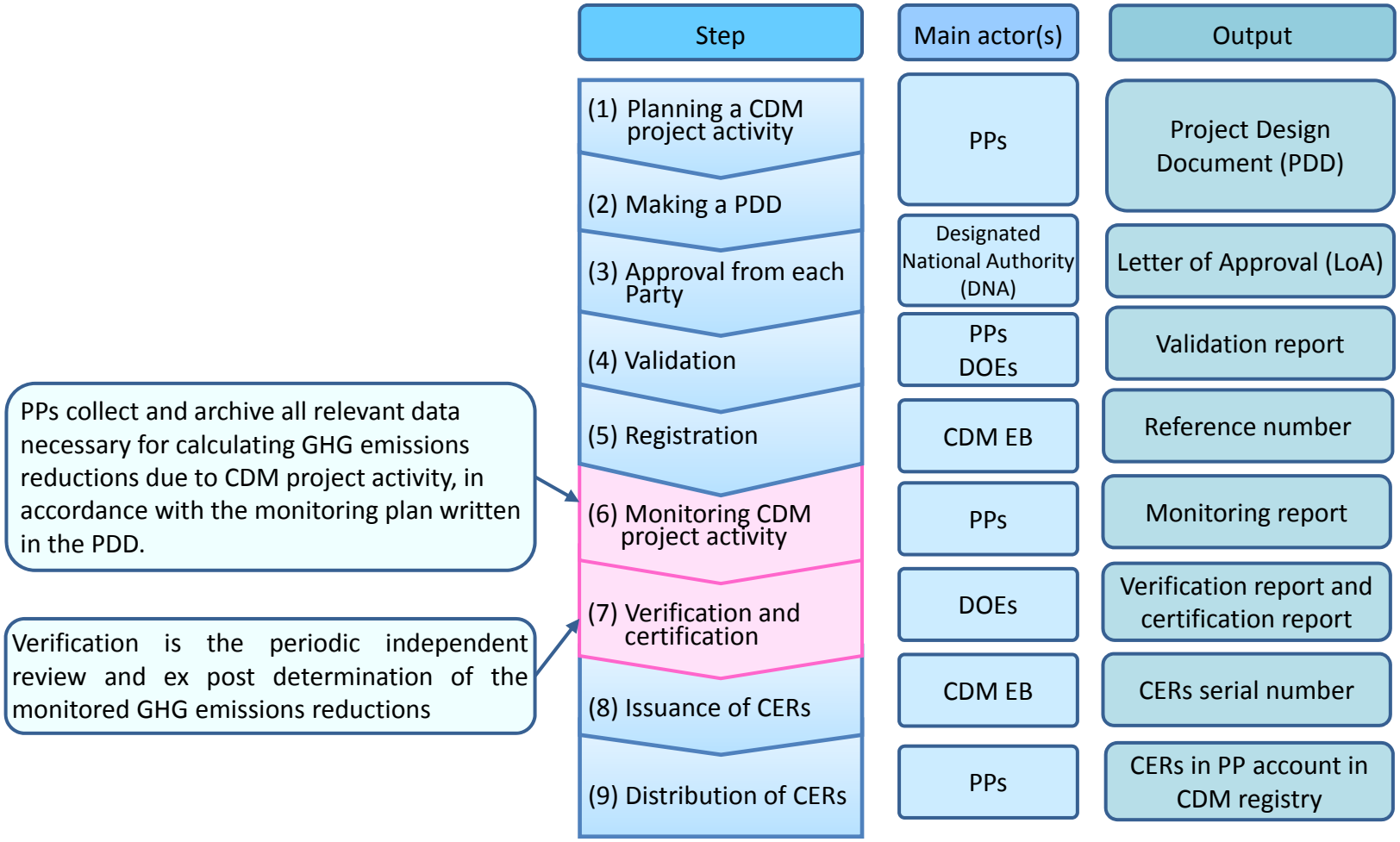
Example of parameters to be monitored for typical projects in the CDM

Sector	Monitored by meter	Monitored by survey
Renewable energy	• CO_2 emission factor • Quantity of net electricity supplied	-
Industrial gas	• Quantity of HFC-23 generated and emitted at the outlet • Amount of HCFC-22 produced	-
Energy efficiency	• Power of the project equipment • Energy use of the project equipment	• Number of pieces of equipment distributed
Waste Methane recovery Composting Biogas	• Landfill gas volume and content • Temperature and pressure of the LG	-
	-	• Quantity of waste composted • Waste delivered to the facility • Percentage of waste, by weight, delivered for composting
	• Biogas volume and content • Temperature and pressure of the BG • Flare efficiency	• Manure • Number of animals and days • Volume of waste water • Chemical oxygen demand

Source: Authors. (2013)

Q88: Who should conduct MRV for the CDM?

A: MRV for the CDM normally starts after the implementation of a project. The institutional structure of MRV for the CDM involves PPs, an independent verifier (DOE) and the CDM EB under the UNFCCC.



Reference: UNFCCC. (2006)

Q89: How is the monitoring system for the CDM established?

A: PPs should develop a monitoring system that can cover the following information.

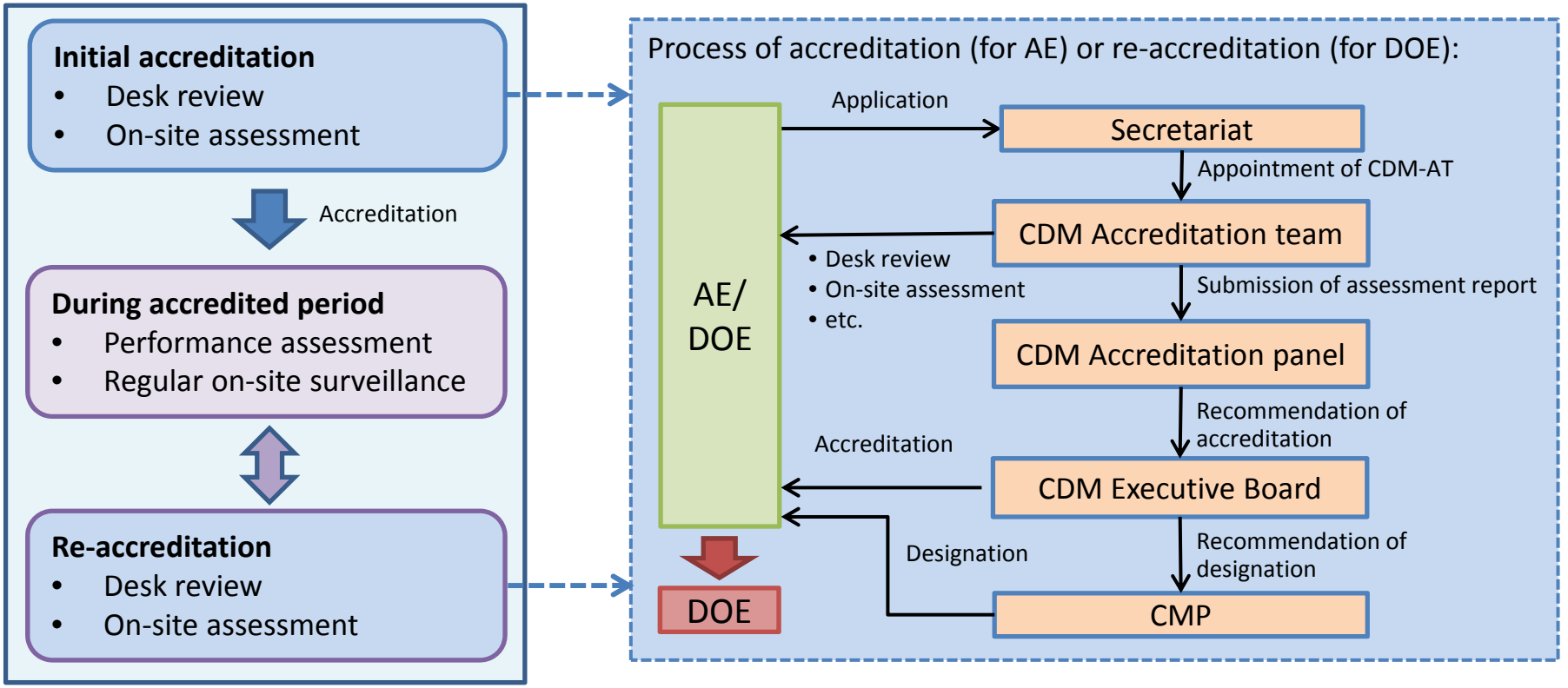
Data collection procedure	• Includes data generation, aggregation, recording, calculation, and reporting.
Organizational structure	• Shows how each unit of an organization plays a role in information flow.
Roles and responsibilities of personnel	• Indicates who does what, including training for personnel, if necessary.
Emergency procedures	• Prepares for emergency cases to backup the monitoring system.

Reference: UNFCCC. (2013a)

Q90: How can an organization become a verification body?

A: Under the CDM, verification bodies are equivalent to a DOE. An applicant entity (AE) becomes a DOE through a desk review and an on-site assessment that demonstrates the competence of the AE to conduct proper validation and verification in accordance with the validation and verification standard.

Assessment of AE/DOE:



Reference:
1. CDM EB. (2012)
2. CDM EB. (2013)

Q91: Is there any financial support available to the CDM?

A: The CDM Loan Scheme (http://cdmloanscheme.org/) provides financial support for the MRV process for CDM project activity located in the least developed countries (LDCs) and any country with fewer than 10 registered CDM projects.

In detail

Coverage of cost by the loan scheme:

- ✓ To cover the costs of the development of PDDs;
- ✓ To cover the costs of validation and the first verification for these project activities;
- ✓ Loans are to be paid starting from the first issuance of CERs;
- ✓ Financial resources are the interest accrued on the principal of the Trust Fund for the CDM as well as any voluntary contributions from donors.

Loan Scheme Overview	
Eligible beneficiaries	• LDCs (with >7,500 CERs/year) • Countries with less than 10 registered CDM projects (>15,000 CERs/year)
Implementing agency	UNFCCC secretariat, United Nations Office for Project Services (UNOPS), and UNEP Risoe Centre
Decision Maker	Technical review committee will decide implementation of the loan.
Covered cost	PDD development, validation, registration, monitoring, and verification.
Disbursement method and interest rate	No interest rate. Payment will be made to the contracted consultant with UNOPS.
Time of disbursement	6 milestones for disbursement: 1) PDD development 2) Validation start 3) Draft validation report 4) Registration request 5) Registration 6) Monitoring and verification completed

Reference:
1. UNFCCC. (2010)
2. UNFCCC Loan Scheme for CDM Website (2015).

Q92: Is there any technical support available to implement the CDM?

A: Immediate technical support is available through some "help-desks" and online sources on the UNFCCC website (http://cdm.unfccc.int/).

Name	Eligible User	Technical support provided
CDM Help Desk http://cdm.unfccc.int/helpdesk	PPs, developers, coordinating and/or managing entities (CMEs), DNAs, DOEs in Africa, least developed countries (LDCs), small island developing states (SIDS) and countries that had 10 or fewer registered CDM projects	Answers technical questions related to CDM, including MRV process. The project in question needs to be in the process of validation or verification.
DNA Help Desk http://cdm.unfccc.int/DNA/helpdesk	DNAs from Africa, least developed countries (LDCs), small island developing states (SIDS) and Parties that had 10 or fewer registered CDM projects	Support for developing proposals for standardized baselines, microscale additionality, and grid emission factors.
Online resources and Frequently Asked Questions http://cdm.unfccc.int/faq/index.html	Open to public	Answers questions on general issues, registration and issuance, fees and payment details, CDM news, methodologies, DOEs, CERs, post 2012 issues, and true up period issues.

Reference:
1. UNFCCC CDM Help Desk. (2015)
2. UNFCCC CDM DNA Help Desk. (2015)
3. UNFCCC CDM Frequently Asked Questions. (2015)

4.7. Joint Crediting Mechanism

This section covers questions and answers on the Joint Crediting Mechanism (JCM), as follows:

93. What is the JCM?
94. What is the scheme for the JCM?
95. What is the current status of the JCM?
96. What is the MRV for the JCM?
97. Why is MRV needed for the JCM?
98. How is the MRV simplified in the JCM?
99. How many JCM methodologies are approved?
100. How many JCM projects are registered?
101. What is the difference between the CDM and the JCM in terms of MRV?
102. What is the relationship between the JCM and Japan's INDC?
103. How is the JCM monitored and reported?
104. How is the JCM verified?
105. Are there any standards or guidelines for the JCM?
106. How are emissions reductions through the JCM reported to the COP?
107. How is a net decrease and/or avoidance of GHG emissions ensured in the JCM?
108. Who should conduct MRV for the JCM?
109. How can a candidate entity become a third party entity that verifies the amount of GHG emission reductions or removals?
110. Is there any support available to conduct the JCM?

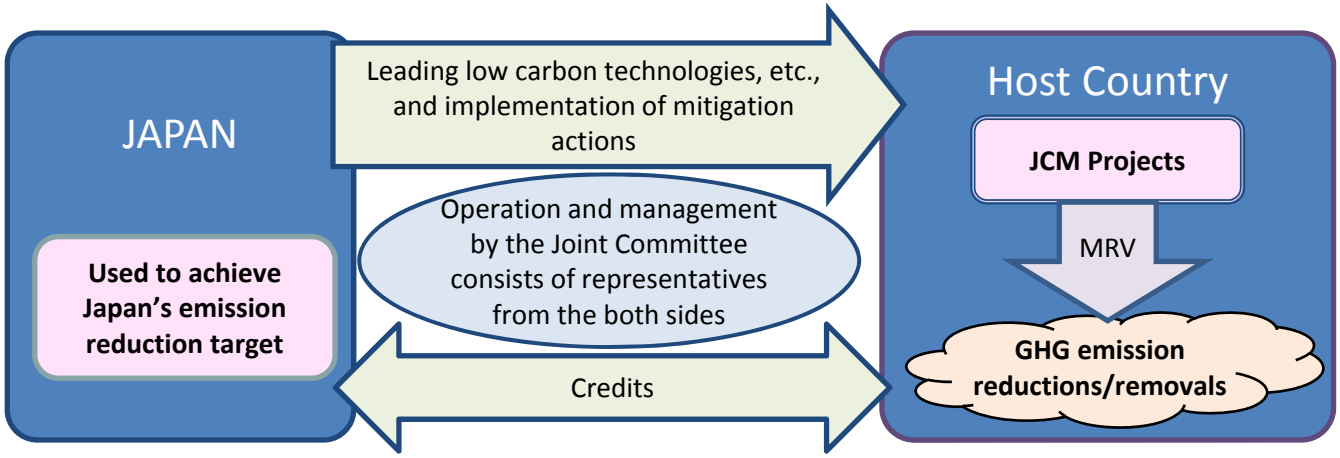
Q93: What is the JCM?

A: The JCM is one of various approaches based on Decision 1/CP.18, jointly developed and implemented by Japan and partner countries, and Japan intends to contribute to elaborating the framework for such approaches under the UNFCCC.

In detail

Basic concept of the JCM:

- ✓ Facilitating diffusion of leading low carbon technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions, and contributing to sustainable development of developing countries.
- ✓ Appropriately evaluating contributions from Japan to GHG emission reductions or removals in a quantitative manner, by applying measurement, reporting and verification (MRV) methodologies, and use them to achieve Japan's emission reduction target.
- ✓ Contributing to the ultimate objective of the UNFCCC by facilitating global actions for GHG emission reductions or removals.

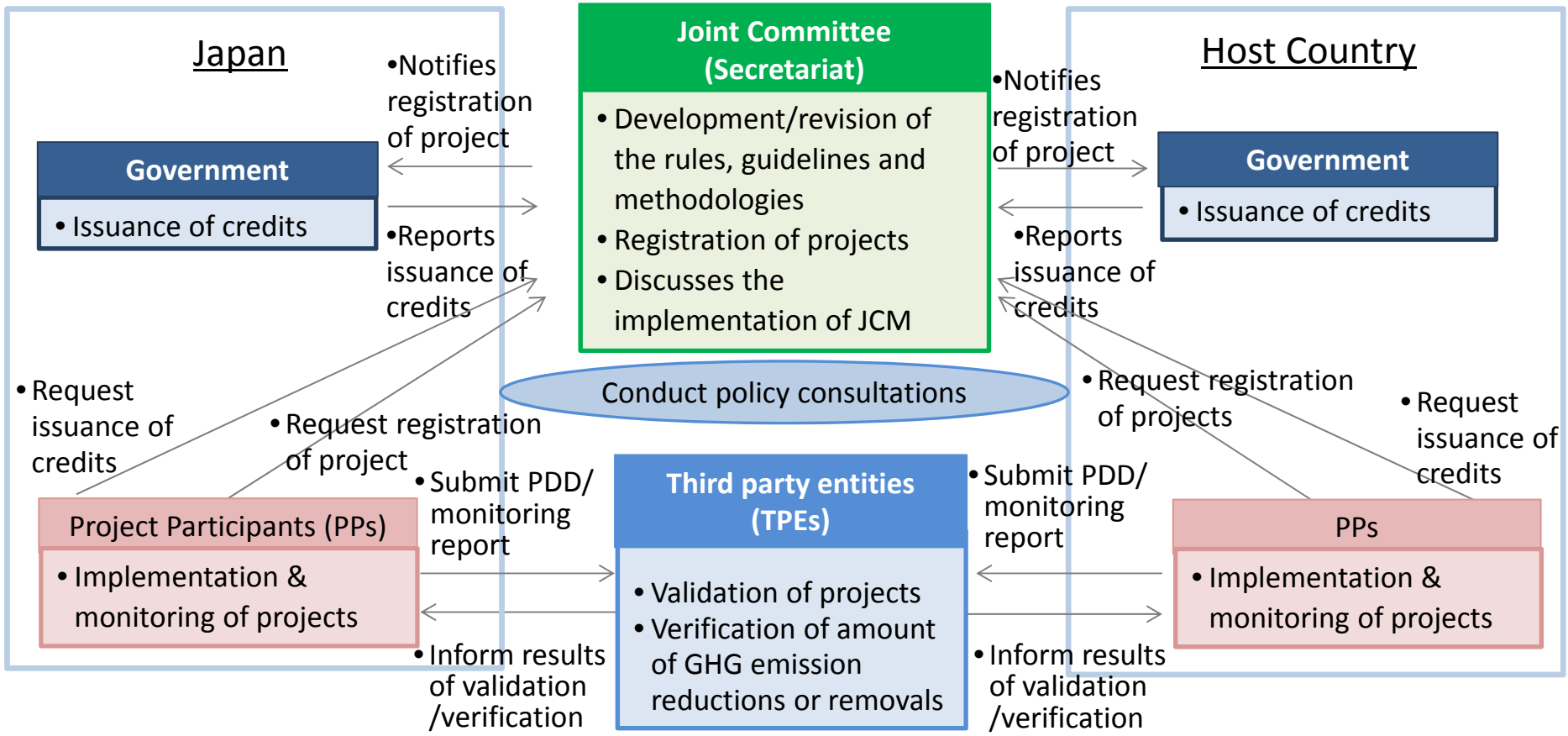


All ideas are subject to further consideration and discussion with host countries

Reference:
1. UNFCCC. (2013a)
2. Government of Japan. (2015)

Q94: What is the scheme for the JCM?

A: Both sides (Japan & Host country) establish a Joint Committee which consists of representatives from both sides. The Joint Committee may develop or modify the Rules of Implementation and other rules and guidelines necessary for the implementation of the JCM.



All ideas are subject to further consideration and discussion with host countries

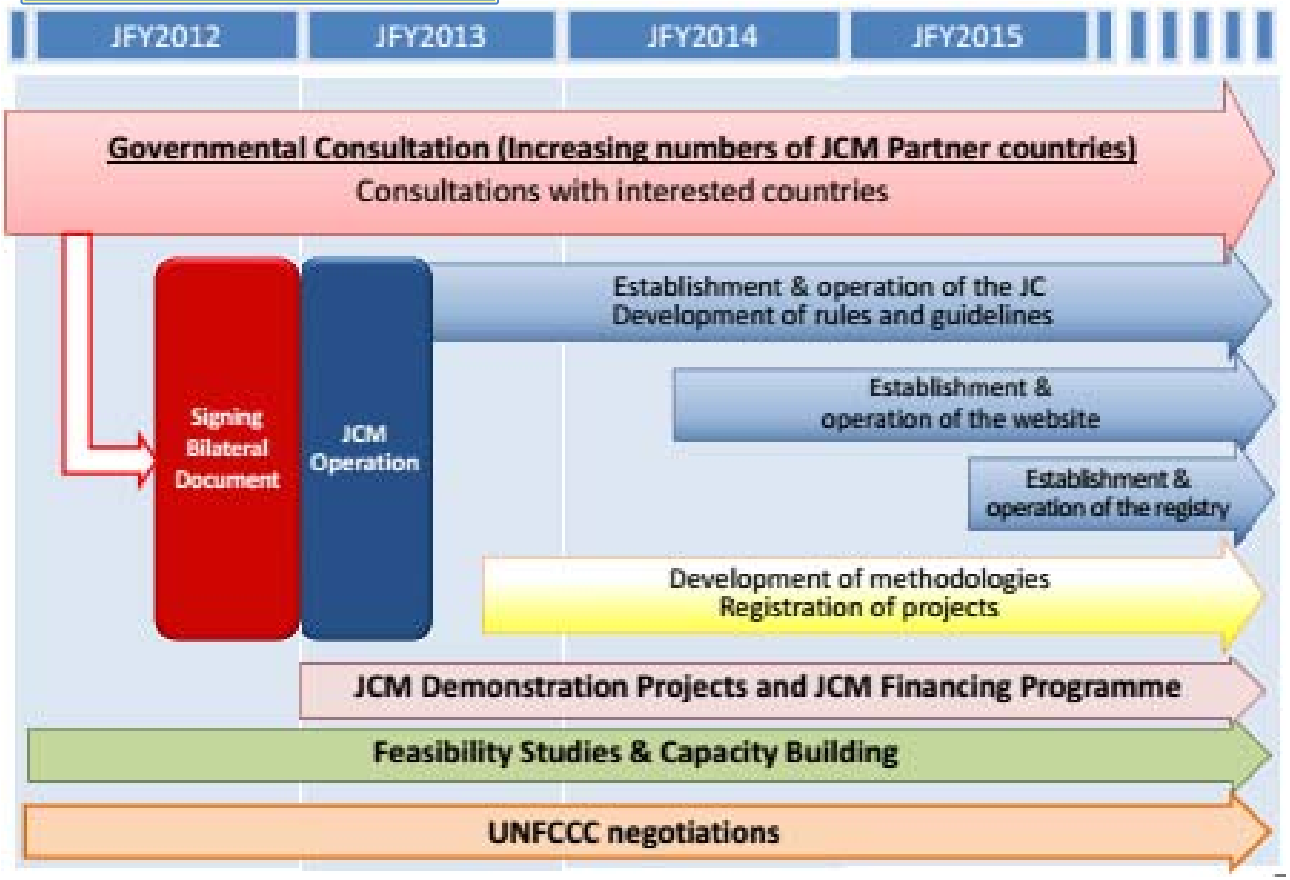
Reference:

1. JCM between Mongolia and Japan. (2013b)
2. Government of Japan. (2015)

Q95: What is the current status of the JCM?

A: Japan has held consultations for the JCM with developing countries since 2011 and signed the bilateral document for the JCM with 15 countries (as of September 2015).

Roadmap for the JCM



All ideas are subject to further consideration and discussion with host countries

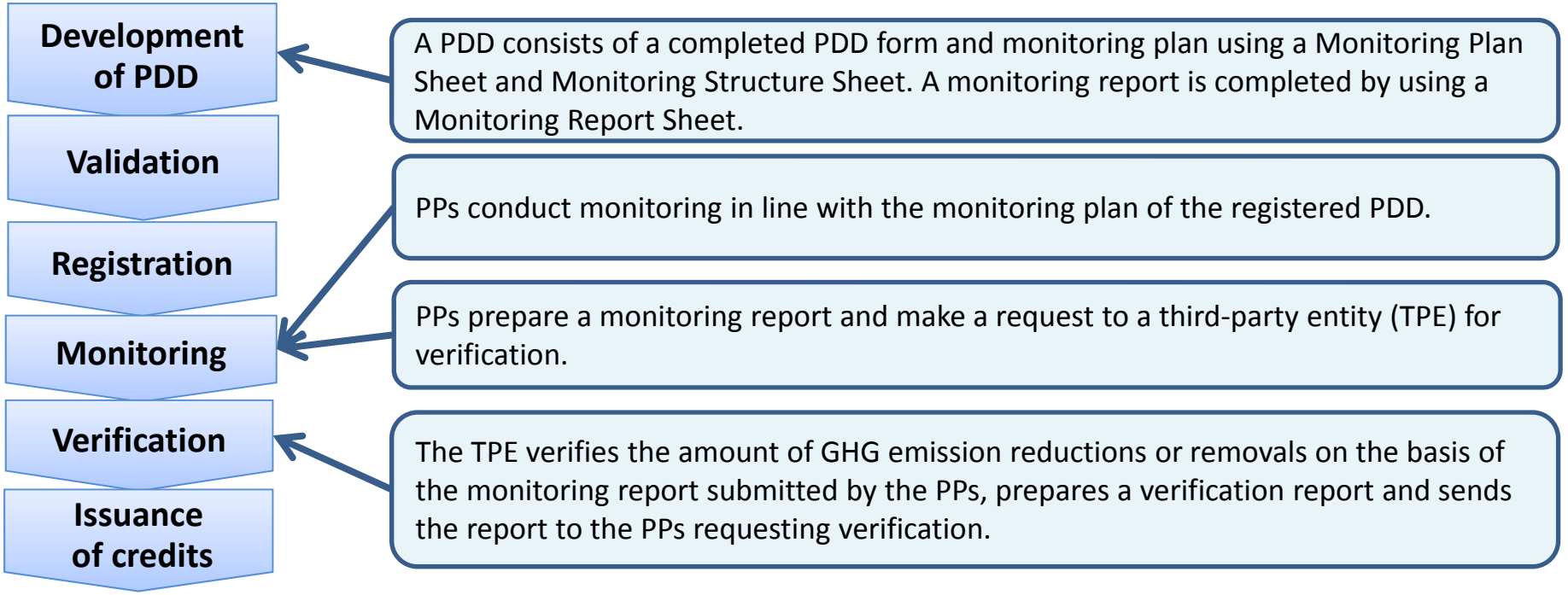
In detail

- Japan held Joint Committee meetings with 11 countries respectively.
- Three (3) JCM projects have been registered between Indonesia and Japan, one (1) JCM project has been registered between Palau, Japan and two (2) projects have been registered between Mongolia and Japan and one (1) JCM project has been registered between Viet Nam and Japan.

Reference:
1. Government of Japan. (2014)

Q96: What is the MRV for the JCM?

A: **Monitoring** is collecting and archiving all relevant data necessary for estimating GHG emissions that are significant and reasonably attributable to a registered JCM project. **A monitoring report** is prepared by a PP and sets out the GHG emission reductions for an implemented, registered JCM project for a particular monitoring period. **Verification** is the periodic independent review and *ex post* determination by a TPE of the monitored GHG emissions reductions as a result of a registered JCM project during the verification period.



All ideas are subject to further consideration and discussion with host countries

Reference:
1. JCM between Mongolia and Japan. (2013d)
2. JCM between Mongolia and Japan. (2013f)
3. JCM between Mongolia and Japan. (2013b)

Q97: Why is MRV needed for the JCM?

A: To appropriately evaluate contributions to GHG emission reductions or removals from Japan in a quantitative manner, by applying measurement, reporting and verification methodologies, and use them to achieve Japan's emission reduction target.

Framework for various approaches (FCCC/CP/2012/8/Add.1, 1/CP.18)
42. *Re-emphasizes* that, as set out in decision 2/CP.17, paragraph 79, all such approaches must meet standards that deliver real, permanent, additional and verified mitigation outcomes, avoid double counting of effort and achieve a net decrease and/or avoidance of greenhouse gas emissions;

Japan has been promoting the JCM as one of these various approaches.

Reference:
1. UNFCCC. (2013a)
2. UNFCCC. (2012)

Q98: How is the MRV simplified in the JCM?

A: The JCM methodologies are designed in such a way that PPs can use them easily and verifiers can verify the data easily.

In detail

Key features of the JCM methodology:

- ✓ In order to reduce monitoring burden, default values are widely used in a **conservative manner**.
- ✓ Eligibility criteria clearly defined in the methodology can reduce the risks of rejection of the projects proposed by PPs.

Eligibility criteria	✓ A “check list” will allow easy determination of eligibility of a proposed project under the JCM and applicability of JCM methodologies to the project.
Data (parameter)	✓ List of parameters will allow PPs to determine what data is necessary to calculate GHG emissions reductions/removals with JCM methodologies. ✓ Default values for specific country and sector are provided beforehand.
Calculation	✓ Premade spreadsheets will allow GHG emission reductions/removals to be calculated automatically by inputting relevant values for parameters, in accordance with methodologies.

All ideas are subject to further consideration and discussion with host countries

Reference:
1. Government of Japan. (2015)

Q99: How many JCM methodologies are approved?

A: 18 Methodologies in five countries are approved as JCM methodologies by each Joint Committee respectively (as of September 2015). Approved methodologies are publicly available on the JCM website.

Country	Number of Approved Methodology	Sectoral scope of the Methodology
Mongolia	2 (AM_MN001~002)	1. Energy industries (Energy-saving transmission lines) 2. Energy distribution (High efficiency Heat Only Boiler (HOB))
Maldives	1 (AM_MV001)	1. Energy industries (renewable-/non-renewable sources) (Solar PV system)
Viet Nam	4 (AM_VN001~004)	3. Energy demand (Inverter air conditioners, Energy efficient buildings (High efficiency boiler, Heat recovery heat pump and LED lighting)) 7. Transport (Digital tachograph systems) 13. Waste Handling and Disposal (Anaerobic digestion of organic waste)
Indonesia	10 (AM_ID001~010)	1. Energy industries (Waste heat recovery at Cement Plant, PV) 3. Energy demand (High efficiency centrifugal chiller, Energy-efficient refrigerators, Inverter-type air conditioning system, LED lighting, Optimisation of refinery plant, Optimisation of boiler operation, Separate type fridge-freezer showcase, Regenerative burners for aluminum holding furnaces, Double-bundle modular electric heat pumps)
Palau	1 (AM_PW001)	1. Energy industries (renewable-/non-renewable sources) (Small-scale Solar PV System)

Reference:
1. JCM Website (2015)

Q100: How many JCM projects are registered?

A: Seven projects in four countries are registered as JCM project by each Joint Committees respectively (as of September 2015). JCM PDD and validation reports are summarised on the JCM website.

Country	ID	Title of registered project
Indonesia	ID001	Energy Saving for Air-Conditioning and Process Cooling by Introducing High-efficiency Centrifugal Chiller
	ID002	Project of Introducing High Efficiency Refrigerator to a Food Industry Cold Storage in Indonesia
	ID003	Project of Introducing High Efficiency Refrigerator to a Frozen Food Processing Plant in Indonesia
Palau	PW001	Small scale solar power plants for commercial facilities in island states
Mongolia	MN001	Installation of high-efficiency Heat Only Boilers in 118th School of Ulaanbaatar City Project
	MN002	Centralisation of heat supply system by installation of high-efficiency Heat Only Boilers in Bornuur soum Project
Viet Nam	VN001	Eco-Driving by Utilising Digital Tachograph System

Reference:
1. JCM Website (2015)

Q101: What is the difference between the CDM and the JCM in terms of MRV?

A: The major differences are summarized as follows.

	JCM	CDM
Validation of projects	✓ In addition to DOEs, ISO 14065 certification bodies can conduct ✓ Check whether a proposed project fits eligibility criteria which can be examined objectively	✓ Only DOEs can conduct validation of projects ✓ Assessment of additionality of each proposed project against hypothetical scenarios
Calculation of Emission Reductions	✓ Spreadsheets are provided ✓ Default values can be used in conservative manner when monitored parameters are limited.	✓ Various formulas are listed ✓ Strict requirements for measurement of parameters
Verification of projects	✓ The entity which validated the project can conduct verification ✓ Validation & verification can be conducted simultaneously	✓ In principle, the entity which validated the project can not conduct verification ✓ Validation & verification must be conducted separately

All ideas are subject to further consideration and discussion with host countries

Reference:
1. Government of Japan. (2014)

Q102: What is the relationship between the JCM and Japan's INDC?

A: The JCM is not included as a basis of the bottom-up calculation of Japan's Intended Nationally Determined Contributions (INDC). However, the amount of emissions reductions and removals acquired by Japan under the JCM will be appropriately counted as Japan's reduction.

In detail

- ✓ Japan communicated its INDC towards post-2020 GHG emissions reductions and this is **at the level of a reduction of 26.0% by fiscal year (FY) 2030 compared to FY2013** (25.4% reduction compared to FY2005) (approximately 1.042 billion t-CO_2 eq. as 2030 emissions).
- ✓ In the reference information of the INDC, the JCM is clearly described as follows:
  - Japan establishes and implements the JCM in order both to appropriately evaluate contributions from Japan to GHG emissions reductions or removals in a quantitative manner achieved through the diffusion of low-carbon technologies, products, systems, services and infrastructure as well as implementation of mitigation actions in developing countries, and also to use them to achieve Japan's emissions reduction target.
  - Apart from contributions achieved through private-sector based projects, accumulated emissions reductions or removals by FY2030 through governmental JCM programmes to be undertaken within the government's annual budget are estimated to range from 50 to 100 million t-CO2.

Reference:
1. Japan's INDC (2015)

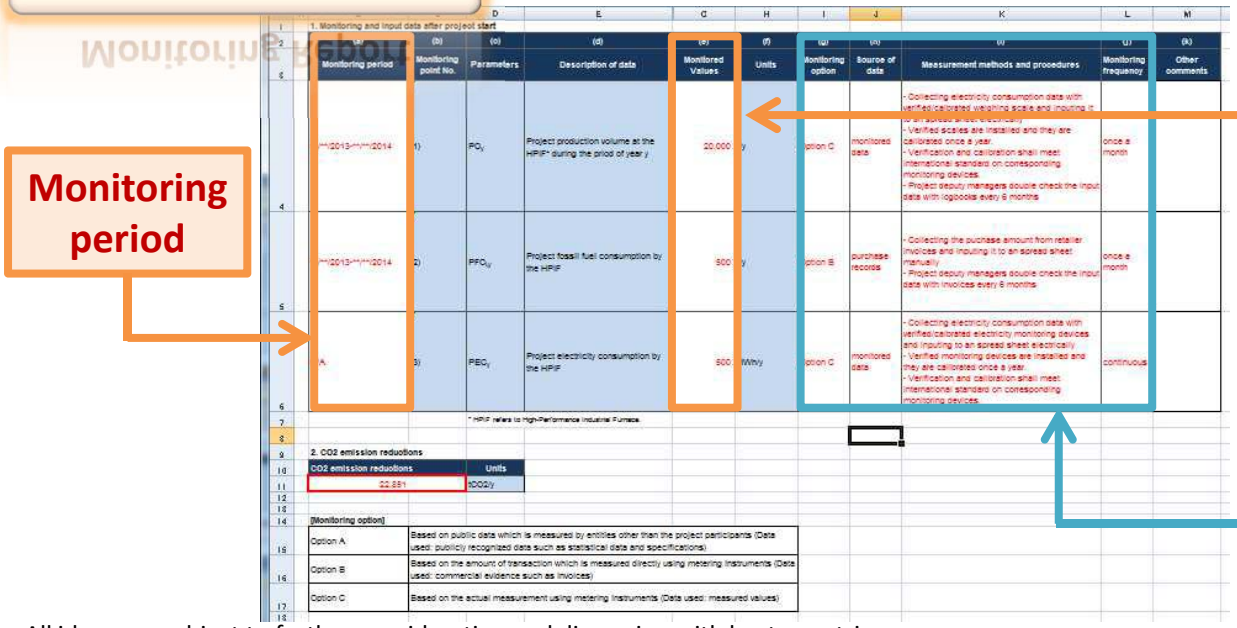
Q103: How is the JCM monitored and reported?

A: PPs conduct monitoring in line with the monitoring plan of the registered PDD and develop a monitoring report using the Monitoring Report Sheet that applies to the registered JCM project.

Making a Monitoring Report:

- ✓ A Monitoring Report should be made by filling cells for data input (ex post) in the Monitoring Report Sheet with monitored values.
- ✓ PPs prepare supporting documents which include evidence for stated values in the cells for data input.

Monitoring Report



Monitoring period

Cell for data input (ex post)

Other necessary information on monitored parameters are to be filled in :

- ✓ **Monitoring options**
- ✓ **Source of data**
- ✓ **Measurement methods and procedures**
- ✓ **Monitoring frequency**

All ideas are subject to further consideration and discussion with host countries

Reference:
1. Government of Japan. (2015)
2. JCM between Mongolia and Japan. (2013d)

Q104: How is the JCM verified?

A: In carrying out its verification activities, a TPE determines whether the project complies with the requirements of the applied methodology(ies), JCM Guidelines for Validation and Verification, and decisions by the Joint Committee.

In detail

The main focus of verification activities is the assessment of the following aspects:

- ✓ Satisfaction of the eligibility criteria which are stipulated in the applied methodology of implemented projects.
- ✓ The data used in monitoring reports is credible and reliable.
- ✓ Double registration is avoided.
- ✓ There are no post registration changes which prevent the use of the applied methodology.

In assessing information provided by the PPs, the TPE applies the means of verification specified throughout JCM Guidelines for Validation and Verification, including but not limited to:

- ✓ Document review; and
- ✓ On-site assessment

All ideas are subject to further consideration and discussion with host countries

Reference:
1. JCM between Mongolia and Japan. (2013f)

Q105: Are there any standards or guidelines for the JCM?

A: Rules and guidelines of the JCM between Japan and partner countries are available on the JCM Website. (website: https://www.jcm.go.jp/).

Contents

- General information page
- Individual JCM Partner countries-Japan page

Function

- Information sharing to the public, e.g.,
  - the JC decisions,
  - rules and guidelines,
  - methodologies,
  - projects,
  - call for public inputs/comments,
  - status of TPEs, etc.
- Internal information sharing for the JC members, e.g.,
  - File sharing for electric decisions by the JC

Image of the general information page

Image of the individual JCM Partner countries-Japan page

Reference:
1. JCM Website. (2014)
2. Government of Japan. (2015)

Q106: How are emissions reductions through the JCM reported to the COP?

A: Japan will report to the COP the use of the JCM in Biennial Reports including the Common Tabular in line with Decision 19/CP18.

Decision 19/CP18

Common tabular format for
"UNFCCC biennial reporting guidelines for developed country Parties"

Table 4(b) Reporting on progress

	Kyoto Protocol units[d] *(kt CO_2 eq)*										*Other units*[d,e] *(kt CO_2 eq)*			
	AAUs		*ERUs*		*CERs*		*tCERs*		*lCERs*		*Units from market-based mechanisms under the Convention*		*Units from other market-based mechanisms*	
	20XX-3	*20XX-2*	*20XX-3*	*Year X-2*	*20XX-3*	*20XX-2*	*20XX-3*	*20XX-2*	*20XX-3*	*20XX-2*	*20XX-3*	*20XX-2*	*20XX-3*	*20XX-2*
Quantity of units														
							20XX-3						20XX-2	
Total														

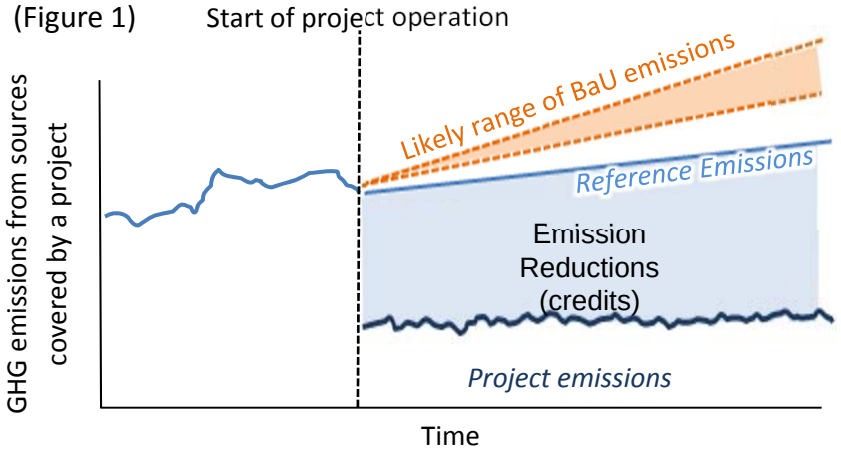
All ideas are subject to further consideration and discussion with host countries

Reference:
1. Government of Japan. (2015)

Q107: How is a net decrease and/or avoidance of GHG emissions ensured in the JCM?

A: There are two conservative ways of calculating emissions reductions or removals in the JCM.

(Figure 1)



(Figure 2)

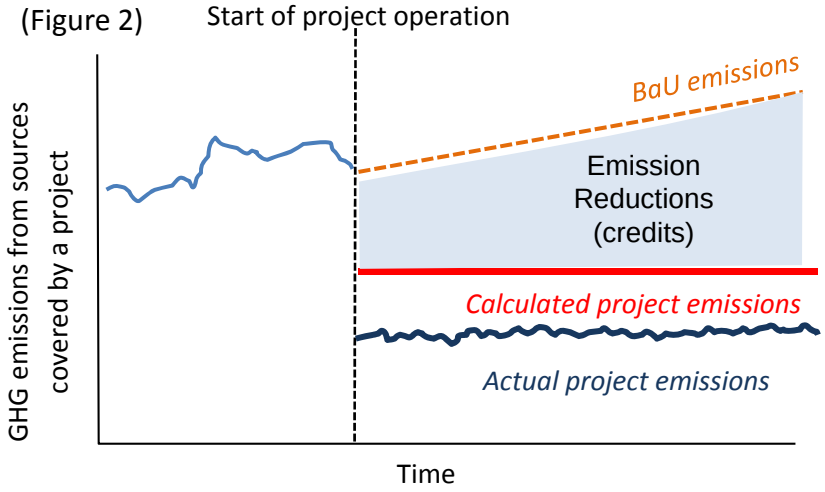


Figure 1 shows an example of a conservative way of calculating emissions reduction. The reference emissions here are set below the likely range of business-as-usual (BAU) emissions – which represent plausible emissions in providing the same outputs or service level of the project under the mechanism – by, for instance, discounting certain percentage points from BaU emissions. In this case, the emission reductions to be credited are calculated as the difference between the reference emissions and the project emissions.

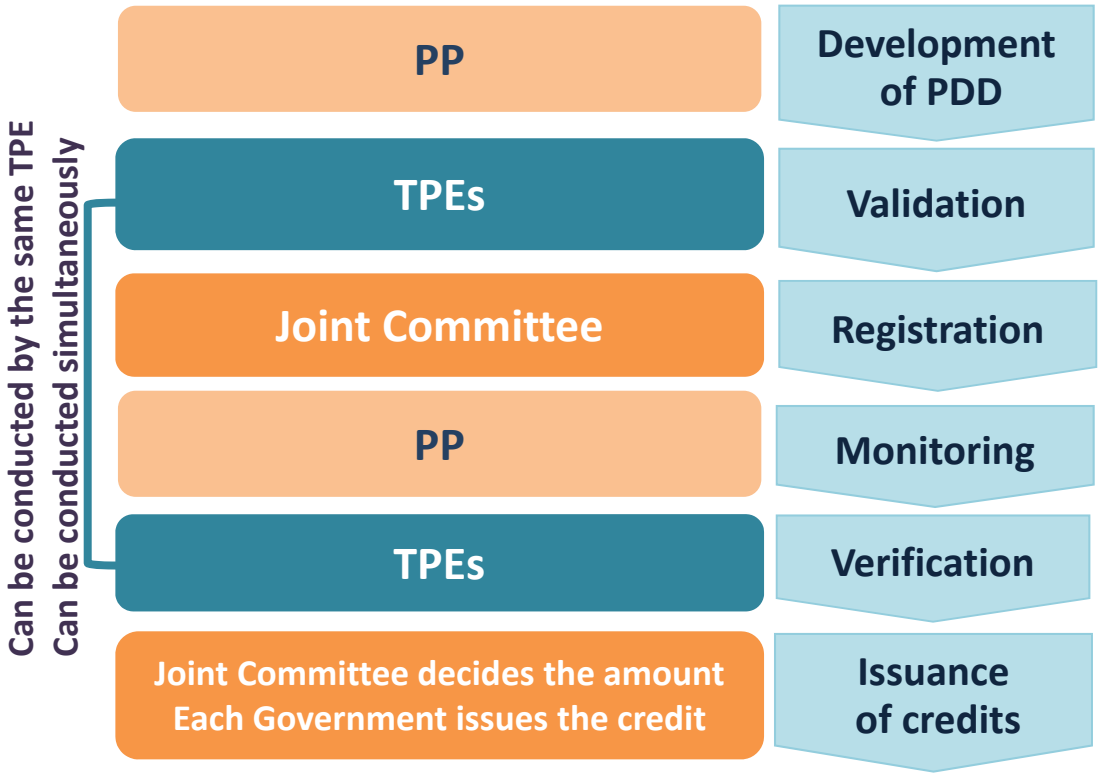
In another example, shown in Figure 2, project emissions are calculated as being larger than the actual project emissions by applying conservative default values for parameters to calculate project emissions instead of monitoring actual values. In this case, the emissions reduction to be credited are calculated as the difference between the BaU emissions and the project emissions calculated in a simple and conservative manner.

All ideas are subject to further consideration and discussion with host countries

Reference
1. UNFCCC. (2014)

Q108: Who should conduct MRV for the JCM?

A: The main actors for each process are as follows.



PPs:
(d) Implement the JCM project and conduct monitoring in line with the PDD;
(e) Prepare a monitoring report and send the report to a third-party entity for verification;

A TPE that is designated by the Joint Committee:
(b) On the basis of requests from PPs, verifies GHG emissions reductions or removals achieved by the JCM project as described in the monitoring report prepared by the PPs, in line with the guidelines for the verification of GHG emissions reductions or removals as developed by the Joint Committee, records the verification result in a verification report and sends this report to the PPs.

All ideas are subject to further consideration and discussion with host countries

Reference:
1. Government of Japan. (2015)
2. JCM between Mongolia and Japan. (2013b)

Q109: How can a candidate entity become a third party entity that verifies the amount of GHG emissions reductions or removals?

A: To be eligible to become a TPE under the JCM, the candidate entity must be either:

(a) An entity accredited under ISO 14065 by an accreditation body that is a member of the International Accreditation Forum (IAF) based on ISO 14064-2; or

(b) A DOE of the CDM.

In detail

Competence:

- A TPE must have sufficient knowledge of the JCM between the Host country and Japan by reading and knowing all the applicable rules and guidelines of the JCM.

Procedure for designation as a TPE:

- Candidate entities submit an application form* to the Joint Committee (JC).
- The secretariat checks whether the application form is complete, and communicates the result to the candidate entity within seven (7) days after the receipt of the submission.
- When the application has been completed, the Joint Committee (JC) determines whether to designate the candidate entity as a TPE or reject the application.
- The secretariat notifies the candidate entity of the result of the above decision and makes the relevant information about the designated TPE and the sectoral scopes publicly available through the JCM website*.

*The application form for designation as a TPE is available at https://www.jcm.go.jp/mn-jp/rules_and_guidelines

*TPEs of the JCM between Japan and Mongolia are publicly available at https://www.jcm.go.jp/mn-jp/tpes

All ideas are subject to further consideration and discussion with host countries

Reference:
1. JCM between Mongolia and Japan. (2013e)
2. JCM between Mongolia and Japan. (2013f)
3. JCM between Mongolia and Japan (2013g)

Q110: Is there any support available to conduct the JCM?

A: Both sides (Japan & host country) work in close cooperation to facilitate the financial, technological and capacity building support necessary for the implementation of the JCM. Government of Japan provides supporting programmes in FY 2015 (from April 2015 to March 2016) as follows:

Ministry of Economy, Trade and Industry (METI)

JCM Demonstration Projects
The budget for FY 2015: 3billion JPY (approx. USD30 million)

JCM Feasibility Study (FS)
To promote potential JCM Projects and to survey their feasibility as well as to check the practicality of the MRV methodology

Capacity Building Programmes
Variety of capacity building activities to increase technical experts e.g.,) Experts on measuring amount of emission reductions by introducing low carbon technologies and products in the host country

Ministry of the Environment (MOE)

Financing Programme for JCM Model Projects
The budget for FY 2015: 2.4 billion JPY (approx. USD24 million) per year by FY2017 (total 7.2 billion JPY)

Support Program Enabling "Leapfrog" Development (Finance/ADB)
Collaborative Financing Programme: 1.8 billion JPY per year by FY2018 (total 7.2 billion JPY)
ADB Trust Fund: 1.8 billion JPY

Feasibility Studies
Elaborating investment plan on JCM projects, developing MRV methodologies and investigating feasibility on potential JCM projects

Capacity Building Programmes
Facilitating understanding on the JCM rules and guidelines, enhancing capacities for implementing MRV

Outreach
New Mechanisms Information Platform website

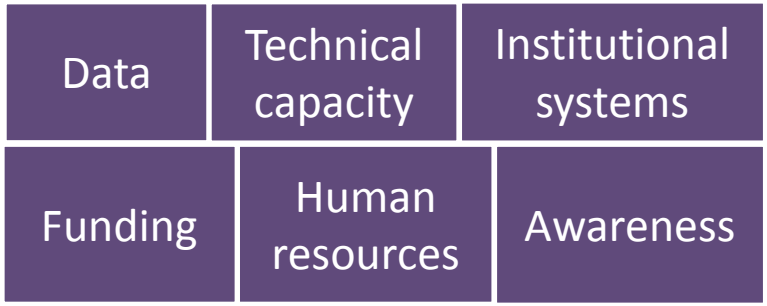
Reference:
1. Government of Japan. (2015)

5. Good practices – lessons from Asia

Guide to selected good practices

The subsequent section presents those good practices that the authors identified as being in place for some developing countries when they practice MRV. The following icons can assist in linking good practices and challenges.

Relevant challenge



List of good practices

National Communications (non-Annex I)

1. Dealing with data gaps
2. Institutional capacity building
3. Establishment of institutional arrangements
4. Mobilisation of financial resources

Biennial Update Reports

5. Advanced reporting of GHG inventories
6. Advanced reporting of mitigation actions and their effects

National GHG Inventories (non-Annex I)

7. Estimation of time-series GHG emissions/removals
8. Development of country-specific emission factors
9. South-south cooperation for improvement of data quality
10. Exchange of information on how to improve technical capacity of GHG inventory compilation
11. Mutual learning on how to improve technical capacity of GHG inventory compilation
12. Enhancement of local experts' technical capacity
13. Establishment of national systems for national GHG inventory preparation
14. Development of Quality Assurance/Quality Control (QA/QC) system

Nationally Appropriate Mitigation Actions

15. Advanced reporting of NAMAs in a BUR

List of good practices (continued)

City-scale GHG Inventories

16. GHG inventory tool for Chinese cities
17. First cities GHG reporting program in China
18. Annual updates of GHG inventories in Tokyo, Japan
19. Demonstrating cities climate action through global platforms

Clean Development Mechanism

20. Development of Grid Emission Factors

Joint Crediting Mechanism

21. Development of JCM methodologies using default values

1. Dealing with data gaps

It is rare that the NCs coordinating entity can gather all the necessary information and data for preparing NCs. Most non-Annex I Parties have faced the challenge of data gaps and have sought a range of ways to deal with these data gaps.

Country	Good practice
Bangladesh	Bangladesh conducted surveys on the activity data used for its GHG inventory to deal with their data gaps. The surveys were implemented with training courses for professionals working on agriculture, land use change and forestry, and municipal solid waste management in divisional headquarters and district towns to ensure the quality of the data collected by surveys.
Philippines	The Philippines had data gaps in the forestry sector. This was handled by improving the data collection approach using simple data-collection spreadsheets adopted by the forestry department.
Thailand	Thailand establishes networks among academics and implementing agencies for preparing GHG inventories, and the National Committee facilitates communications between those involved in the network and keeps a roster of experts. This kind of network is also important for preparing BURs which is a new reporting obligation under the Convention for non-Annex I Parties.

Reference: NCSP/UNDP-UNEP-GEF. (2012)

2. Institutional capacity building

Since various expertise is necessary for developing NCs, non-Annex I Parties often utilise external or internal consultants to obtain technical assistance. This is useful for developing NCs effectively and provides many benefits. However, this can lead to the dissipation of information and data used for the preparation of NCs, a shortage of domestic well-experienced experts and difficulties in maintaining an NCs preparation team. Institutional capacity building is an important element for preparing NCs on continuous basis.

Country	Good practice
Philippines	• The Philippines prepared its initial NCs by relying largely on external consultants. However, the second NCs was prepared without relying on international consultants to enhance the capacity of the government institutions. • The Philippines has prepared a National Reference Manual which includes information on how to address the various tasks involved in preparing NCs. It uses lists of questions & answers that are repeatedly encountered while preparing GHG inventories so that future domestic experts can smoothly implement tasks related to the preparation of NCs and BURs.
Thailand	The initial and second NCs was developed by academic institutions. However, the National Climate Change Policy Committee decided to undertake the preparation of the third NCs and BURs in order to improve the capacity of the national implementing agency.

Reference: NCSP/UNDP-UNEP-GEF. (2012)

3. Establishment of institutional arrangements

NCs cover a wide range of climate change issues such as GHG inventories, mitigation policies, vulnerability and adaptation assessments, support needs, etc. Therefore it is important for Parties to establish institutional arrangements with good cooperation and collaboration among various stakeholders and manage the NCs preparation process efficiently.

Country	Good practice
Bangladesh	There were five Core Sectoral Working Groups which prepared the NCs, these consisted of governmental and non-governmental institutions and academics. They provided the technical staff with guidance for developing each reporting element of the NCs.
Malaysia	NC2 Program Management Group, which is chaired by the Ministry of Natural Resources and Environment , was established for the preparation of the second NCs. The NC2 Program Management Group includes GHG Inventory, Mitigation and Adaptation.
Myanmar	Myanmar's initial NCs has been prepared by the following 6 teams of experts involving 55 multidisciplinary scientists: i) GHG inventory and mitigation option analysis, ii) Vulnerability and adaptation assessment, iii) Development and transfer of environmentally sound technologies, iv) Research and Systematic observation, v) Education, training and public awareness, vi) Compilation of NCs.
Philippines	Diverse civil society organisations and national consultants participated in the preparation process for the NCs.

Reference:
1. Than. (2013)
2. NCSP/UNDP-UNEP-GEF. (2013)

4. Mobilisation of financial resources

Adequate securement and effective allocation of financial resources is essential to prepare NCs smoothly. It is helpful for non-Annex I Parties to build their own capacities for making the information included in NCs available to the organisations in charge of providing finance related to climate change in order to improve the quality of their NCs and implement climate change related policies and actions.

Country	Good practice
Bangladesh	Bangladesh established the Bangladesh Climate-Change Trust Fund (BCCTF), which is USD300 million from its national budget between 2009 and 2012. This BCCTF funding is for assisting many projects related to climate change by government entities, NGOs, research organisations and the private sector. These organisations continue to use data and information included in its NCs.
Thailand	The government of Thailand needs to consider how to allocate funds from various donors on projects and programs in order to avoid funding overlaps. The information included in the NCs can provide guidance for decision making on the allocation of funds.

Reference: NCSP/UNDP-UNEP-GEF. (2012)

5. Advanced reporting of GHG inventories

Some non-Annex I Parties have voluntarily reported the more advanced and high-quality national GHG inventories in their BURs, which is beyond the requirements of the reporting guidelines for the BURs.

Country	Good practice
Chile	Chile has also submitted the National Inventory Report (NIR) as a single document in addition to its BUR. The NIR contains detailed tables of emissions and removals, emissions trends for 1990-2010, methods of tiers, description of methodologies and data used by each category for the estimation of GHG emissions and removals.
Republic of Korea	Republic of Korea has reported its national GHG inventories which cover the entire time series between 1990 and 2012. In addition, detailed data tables of emissions trends by gas and by sector for 1990-2012 are provided in the annex of its BUR.
South Africa	South Africa has submitted the National Inventory Report (NIR) as a single document in addition to its BUR. The NIR contains a detailed description of GHG inventories such as methodologies and data used by each category, key category analysis and uncertainty assessment. Furthermore, South Africa uses the 2006 IPCC guidelines for its estimation of GHG emissions and removals.

Reference:
1. Republic of Korea. (2014)
2. South Africa. (2014)
3. Chile. (2014)

6. Advanced reporting of mitigation actions and their effects

In general, it is difficult to report the quantitative goals and emissions reductions achieved for each mitigation action due to the limitation of data available. However, some non-Annex I Parties successfully reported quantitative data on these indicators. In addition, some Parties have also submitted their projections in the BURs although the reporting guidelines for the BUR does not explicitly require non-Annex I Parties to report their future GHG emissions and removals.

Country	Good practice
Republic of Korea	Republic of Korea has reported GHG reduction pathways until 2020 which includes BAU and "with measures" projections .
Singapore	Singapore has reported the list of mitigation measures which includes the description, progress, quantitative goal in 2020 and results achieved.
South Africa	South Africa has reported its projection of GHG emissions to 2050 under two different cases which are (1) "without measures" case, assuming that no mitigation measures have been implemented since 2000 and (2) "with existing measures" case, including the impacts of mitigation actions, policies and measures implemented to date.
Viet Nam	Viet Nam has reported the GHG reduction potential and cost of mitigation actions by sector. In addition, Viet Nam has also reported the projections of GHG emissions and removals for 2020 and 2030. The results of projections are provided in the table by each sector. The key variables and assumptions used in the projections are also provided.

Reference:
1. Singapore. (2014)
2. South Africa. (2014)
3. Republic of Korea. (2014)
4. Viet Nam. (2014)

7. Estimation of time-series GHG emissions/removals

Non-Annex I Parties are not required to prepare and submit time-series GHG emissions and removals to the COP under the UNFCCC. However, some Asian Parties voluntarily estimate the time-series GHG emissions and removals. The time-series GHG emissions are helpful for simulating a projection of future GHG emissions by providing the trends of past emission status.

Country	Achievement
Indonesia	Estimated annual time-series GHG emissions and removals from 2000 to 2005.
Mongolia	Estimated annual time-series GHG emissions and removals from 1990 to 2006.
Thailand	Estimated quadrennial time-series GHG emissions and removals from 1990 to 2003, as well as annual time-series GHG emissions excluding LULUCF from 2000 to 2005.

Reference:
1. Jargal. (2009)
2. Towprayoon et al. (2009)
3. Boer. (2009)

8. Development of country-specific emission factors

IPCC Guidelines provide default emission factors for estimating GHG emissions and removals. However, the default emission factors sometimes do not fit country-specific circumstances. Hence, developing country-specific emission factors is effective for improving the accuracy of national GHG emissions and removals because the country-specific factors can reflect country-specific circumstances in the estimation. For example, the following Asian countries developed country-specific emission factors for certain sectors.

Country	Achievement
China	Developed country-specific emission factors for •CH_4 emissions from paddy fields, •N_2O emissions from cropland.
India	Developed country-specific emission factors for •CH_4 emissions from enteric fermentation by ruminant animals, •N_2O emissions from agricultural soils.
Indonesia	Developed country-specific emission factors for •CH_4 emissions from rice cultivation.

Reference:
1. Han et al. (2012)
2. Sharma. (2010)
3. Sing. (2010)
4. Boer. (2009)

9. South-south cooperation for improvement of data quality

One approach for improving the quality of national GHG inventories is to cooperate with neighbouring countries that have similar socio-economic or climatic conditions. If your neighbouring non-Annex I Party has similar socio-economic or climatic conditions, it is good for your country to cooperate with your neighbouring non-Annex I Party in order to enhance regional cooperation for improving both Parties' national GHG inventories.

The following pictures show a study visit to Thailand that was conducted by Myanmar's inventory compilers to share information on measurement methodologies in the agriculture sector.

Lecture from a Thai Professor

Practicing taking measurements of rice straw burning

Demonstration of measuring GHG emissions from crop residue burning

Practicing collecting methane gas from fields

Reference: Swe. (2010)

10. Exchange of information on how to improve the technical capacity of GHG inventory compilation

To improve the accuracy of GHG inventories in the Asia region, the Workshop on Greenhouse Gas Inventories in Asia (WGIA) has been held annually since 2003 with the support of the Ministry of the Environment of Japan. It provides an opportunity for countries in the region to cooperate and share their information and experiences in relation to the development of national GHG inventories. Participants of the workshops include researchers and government officials who are engaged in preparing national GHG inventories and experts from relevant international organisations.

Workshop title:	Workshop on Greenhouse Gas Inventories in Asia (WGIA)
Objective:	To support countries in Asia to improve the quality of national GHG inventories via a regional information exchange
Organisers:	Ministry of the Environment of Japan / National Institute for Environmental Studies
Participating countries:	Cambodia, China, India, Indonesia, Japan, Republic of Korea, Lao P.D.R., Malaysia, Mongolia, Myanmar, Philippines, Singapore, Thailand, Vietnam (14 countries)
Style:	Annual workshop since 2003
Funds:	Ministry of the Environment of Japan

Participants in WGIA

Plenary session

Hands-on training session

Sectoral working group session

Mutual learning session

Reference: GIO. (2013)

11. Mutual learning on how to improve the technical capacity of GHG inventory compilation

Studying another country's inventory, asking questions of a country's inventory compilers and getting their answers, helps countries to obtain useful information/data. This information could be used for preparing a country's own inventory, finding good examples to follow to make their own inventory report more transparent, better understanding the methodologies for preparing an inventory as well as enhancing their own capacity for inventory compilation. Hence, Japan cooperates with other Asian countries and provides opportunities for countries to mutually learn about each others' national GHG inventory in detail.

Meetings for bilateral peer reviews of each national GHG inventory on the waste sector were held between the Republic of Korea (RoK) and Japan and these events were the first experiences where the RoK and Japan learned about each others' national GHG inventory.

- ✓ Held twice so far on a voluntary and informal basis.
  - 1st meeting: October 2008 in Seoul, RoK
  - 2nd meeting: November 2009 in Tsukuba, Japan
- ✓ Attended by experts who actually produced waste sector inventories at the national level.
- ✓ Studied the actual, latest inventories through Q&A sessions that were held between the two groups (two-way, not one-way) in an atmosphere of friendliness and cooperation.

Bilateral peer review between RoK and Japan

Mutual learning session in WGIA11 on the energy sector

Mutual learning sessions were held in WGIAs between the following pairs.

	Energy	Industrial Processes	Agriculture	LULUCF	Waste
WGIA9	Indonesia - Mongolia			Lao PDR – Japan	Cambodia, Indonesia, RoK
WGIA10	Cambodia – Thailand	Indonesia - Japan	Indonesia – Vietnam		China - RoK
WGIA11	Lao PDR – Thailand		China – Myanmar		Malaysia – Vietnam
WGIA12	Indonesia - Myanmar		China - Mongolia	Vietnam – Int'l consultants	

Reference: GIO. (2013)

12. Enhancement of local experts' technical capacity

Intensive capacity development projects for enhancing the capacity of national GHG inventories are effective for comprehensively improving non-Annex I Parties' inventory preparation systems and the technical skills of the inventory compilers in the Parties. The Japan International Cooperation Agency (JICA) has implemented two projects related to GHG inventory preparation in non-Annex I Parties.

Case 1: Project for Capacity Development of the National GHG Inventory in Vietnam (2010-2014)	
Project Purpose	Strengthen the capacity **to periodically prepare** GHG inventories based **on clear estimation methods** for GHG emissions, using **accurate and consistent data**
Outputs	1. Capacity to **periodically and systematically collect and compile** necessary data for National GHG inventories was enhanced. 2. Capacity to **promote understanding** of national GHG inventories in relevant ministries and agencies was enhanced. 3. Capacity to manage **quality assurance/quality control (QA/QC)** of GHG inventories was enhanced in each sector.

Case 2: Project of Capacity Development for Climate Change Strategies in Indonesia (2010-2015)	
Project Purpose	To build capacity so that GHG inventories can be prepared in cooperation with the key ministries and local governments on a regular basis.
Outputs	1. National system for preparing national GHG inventories is being designed. 2. Capacity to periodically and systematically manage data necessary for national GHG inventories is being enhanced. 3. Understanding on accuracy, transparency and reliability of GHG inventories is being enhanced for each sector among key ministries and local governments.

Reference: Mori. (2012)

13. Establishment of national systems for national GHG inventory preparation

A national system for national GHG inventory preparation is a system which includes all institutional, legal, and procedural arrangements for estimating GHG emissions/removals and for reporting and archiving inventory information. This system is indispensable for periodical national GHG inventory preparation. The following non-Annex I Parties have developed their own national systems.

Country	Achievement
Indonesia	Enacted Presidential Regulation 71/2011 as the foundation for Indonesian GHG inventory preparation and established a national GHG inventory system.
Mongolia	Appointed the National Agency for Meteorology, Hydrology and Environment Monitoring as a designated professional authority for national GHG inventory preparation and designed the structure of its national system with the work of this Agency at the centre.
Republic of Korea	Established the GHG Inventory & Research Center of Korea and improved the existing national system by entrusting the GIR with a central coordination function.

Reference:
1. Batimaa et al. (2010)
2. Lee. (2011)
3. Ministry of the Environment, Korea. (2009)
4. Mori. (2012)

14. Development of Quality Assurance/Quality Control (QA/QC) system

QA/QC procedures in the national GHG inventory preparation acts as a domestic verification for enhancing the accuracy and completeness of the inventories. The following non-Annex I Parties have developed their own QA/QC systems.

Country	Achievement
Mongolia	Established a QA/QC plan for the energy and industrial processes sector.
Republic of Korea	Developed QA/QC system for the waste sector. As one of its QA activities, it applied a bilateral peer review that was carried out on the GHG inventories of the Republic of Korea and Japan by these two countries.

Reference:
1. Jargal. (2011)
2. Lee. (2011)

15. Advanced reporting of NAMAs in a BUR

International reporting on NAMAs through BURs has begun recently. Among those which already submitted information on NAMAs in their BURs, Singapore provided quantitative information on NAMAs, such as a goal toward 2020 and achieved emissions reductions, as shown in below. This helps to increase the transparency and accountability of the information provided at the international level.

Singapore's reporting on NAMAs: Example of reducing emissions from waste and wastewater treatment

Mitigation Action	Objectives	Description	Progress	Nature	2020 goal	Method & assumptions	Gas	Progress indicators	Results
Waste water sludge disposal by incineration	To reduce methane gas emissions from waste-water sludge	Incinerating wastewater sludge, a by-product of water reclamation plants, which would otherwise be disposed off at landfills.	Since 2009, ECO Special Waste Management and Sumitomo Mitsui Banking Corporation have been contracted to perform sludge incineration.	Infra-structure	0.10 (MT)	Assumptions are referenced from IPCC methodology	CH_4	Amount of sludge incinerated	Estimated abatement achieved in 2012: 0.06 MT

Reference:
1. Singapore. (2014)

16. GHG inventory tool for Chinese cities

In China, the World Resources Institute (WRI) developed a country-specific GHG inventory tool for cities.

- ✓ It is compatible with the *Global Protocol for Community-Scale Greenhouse Gas Emission Inventories* (GPC) and consistent with the Chinese government's requirements.
- ✓ It is a user-friendly Excel-based tool.
- ✓ It provides built-in emission factors for China.
- ✓ It emphasises on buildings, industries, transportation, and waste emissions, which are the key emission sources in Chinese cities.
- ✓ It is available for free download at

  http://www.ghgprotocol.org/chinese-city-tool
- ✓ WRI provides cities and practitioners with training on how to apply the tool.

Reference: WRI, CASS, WWF, ISC. (2013)

17. First cities GHG reporting program in China

In 2014, Zhejiang province established the first cities GHG reporting program in China by requiring all 11 cities and 90 counties in the province to report their GHG inventory data on a annual basis.

In detail

- ✓ In 2009, China made a commitment to UNFCCC to lower its carbon dioxide emissions per unit gross domestic product (GDP) by 40-45% from 2005 levels by 2020. To fulfill this commitment, under its Twelfth Five-Year Plan (2011-2015), China set a medium-term target to reduce its carbon dioxide emissions per unit GDP by 17% from 2010 levels by 2015.
- ✓ To achieve this target, the national government uses a top-down *command and control* system by assigning national target to all provinces that range from 10.0% to 19.5%.
- ✓ Zhejiang province's Twelfth Five-Year Plan target is 19%. Using the same approach, the provincial government allocated the provincial target to its 11 cities.
- ✓ In order track the performance of its cities, in 2014, Zhejiang Development and Reform Commission announced that all cities and counties in the province are required to develop and report GHG inventories. All 11 cities shall complete their 2010-2013 inventories by the end of 2014 and all 90 counties shall complete the same by 2015.
- ✓ Complementing this reporting program, the Zhejiang Development and Reform Commission developed an online reporting platform and conducted a series of training for cities.

Reference: Author. (2015)

18. Annual updates of GHG inventories in Tokyo, Japan

Tokyo is one of the world leaders in city GHG inventories. The city has completed GHG inventories for 1970, 1980, and annually since 1990. Below are some of the good practices of Tokyo.

For further information, please visit http://www.kankyo.metro.tokyo.jp/en/climate/index.html.

Annual GHG Inventories	• Tokyo has conducted GHG inventories every year since 1990 to monitor its GHG performance.
Public Disclosure	• The inventory reports are publicly available on the city government's website. The city also discloses its GHG data through the Carbonn Climate Registry and CDP.
Detailed Data Analysis	• The city conducts detailed analysis for each emission source to identify the key drivers of emissions so as to design and implement effective intervention measures to mitigate them.
In-house Staff	• The GHG inventory work is led by in-house staff who have in-depth understanding of government policies and how to design intervention measures.

Reference: Author. (2015)

19. Demonstrating cities' climate action through global platforms

Cities are encouraged to demonstrate their emissions reduction commitments, actions and progress through global cities platforms. **Compact of Mayors** is among the most influential cities platforms that was launched in 2014 by the UN Secretary-General Ban Ki-moon, the U.N. Secretary-General's Special Envoy for Cities and Climate Change Michael R. Bloomberg, ICLEI-Local Governments for Sustainability (ICLEI), C40 Cities Climate Leadership Group (C40), United Cities and Local Governments (UCLG), and the United Nations Human Settlements Programme (UN-Habitat).

Compact of Mayors is not merely a city network. Upon signing up to the Compact of Mayors, cities must demonstrate their action transparently. Within three years, cities should develop their citywide GHG inventories based on the GPC, set their GHG reduction targets, and develop their mitigation and adaptation action plans.

Sign-up to the Compact of Mayors

Develop a GHG inventory based on the GPC

Commit to a GHG reduction target

Develop mitigation and adaptation action plans

Reference: Compact of Mayors (2015)

20. Development of Grid Emission Factors

There are two types of data vintage; ex-ante (defined in the PDD) and ex-post (monitored in the project activity implementation). If the ex-ante data option, such as a grid emission factor (GEF) which is already checked by the designated operational entity (DOE) in validation, is selected then it helps to reduce the cost of monitoring and verification.

Length of time for MRV process for CER issued project activities with and without GEF:

	M	R	V
Ex – ante	389 days	57 days Skip data collection and calculation for GEF when reporting	176 days Skip checking the GEF calculation and related data
Ex – post	470 days PPs may plan to have a long monitoring period to reduce the number of steps in the MRV process	113 days Need to collect data from all power plants in the system. The project activity connects and calculates GEF using this data	378 days Check the GEF calculation and related data

GEF is:

- The CO_2 emission factor for the displacement of electricity generated by power plants in an electricity system
- Used in electricity related project activities (e.g. renewable energy, energy efficiency)

Reference:
1. UNFCCC. (2013g)
2. IGES. (2013a)

21. Development of JCM methodologies using default values

Each methodology prepares its monitoring report format with clearly defined parameters to be monitored *ex-post* (monitoring parameters) and project-specific parameters to be fixed *ex-ante*. GHG emissions reductions of the following projects could be measured and reported in a streamlined and conservative manner under the JCM.

Case 1: Introduction of high-efficiency centrifugal chiller in Indonesia (Project No. ID001, Methodology No. ID_AM002)	
Monitoring parameter	Only electricity consumption of project chiller is monitored by using measurement methods and procedure described in the methodology.
Project-specific parameters to be fixed *ex-ante*	Coefficient of Performance(COP) of reference chiller are selected from default values set in the methodology. COP of project chiller is calculated by specification of project chiller. Grid emission factor is sourced from "Emission Factors of Electricity Interconnection Systems", National Committee on CDM Indonesian DNA

Case 2: Transportation energy efficiency activities by installing digital tachograph systems in Viet Nam (Project No. VN001, Methodology No. VN_AM001)	
Monitoring parameter	Project fuel consumption of freight vehicle and project distance travelled by freight vehicle are monitored by using measurement methods and procedure described in the methodology.
Project-specific parameters to be fixed *ex-ante*	Net calorific value of fuel and CO2 emission factor of fuel are selected from IPCC default values. Reference fuel efficiencies of freight vehicles are calculated before activation of digital tachograph system.

1. JCM Website (2014)

6. Annexes
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Index (Q&As)

National Communications (non-Annex I):

Q 1: What are national communications? (p.19)
Q 2: Why do national communications need to be prepared? (p.20)
Q 3: How frequently should national communications be prepared? (p.21)
Q 4: What information is included in national communications?(p.22)
Q 5: What is the status of submission of national communications by non-Annex I Parties?(p.23)
Q 6: How should we develop national communications and biennial update reports? (p.24)
Q 7: Are there any standards or guidelines for national communications? (p.25)
Q 8: Are national communications from non-Annex I Parties verified or reviewed?(p.26)
Q 9: Is there any technical support available to develop national communications? (p.27)
Q10: How do countries establish institutional arrangements to prepare national communications and biennial update reports?(p.28)
Q11: Is there any financial support available to develop national communications? (p.29)
Q12: Is there any technical support available to develop national communications? (p.30)

Biennial Update Reports:

Q13: What are biennial update reports? (p.32)
Q14: Why do biennial update reports need to be prepared? (p.33)
Q15: How frequently should biennial update reports be prepared? (p.34)
Q16 = Q4 (p.22)
Q17 = Q5 (p.23)
Q18 = Q6 (p.24)
Q19: Are there any standards or guidelines for biennial update reports? (p.37)
Q20: What is the relationship between national communications and biennial update reports?(p.38)
Q21: What is the relationship between biennial update reports and nationally appropriate mitigation actions?(p.39)
Q22: How are biennial update reports verified or reviewed?(p.40)
Q23: How are biennial update reports analysed?(p.41)
Q24: How is a team of technical experts composed of?(p.42)
Q25: What is training materials for the technical analysis?(p.43)
Q26: = Q9(p.27)
Q27: = Q10(p.28)
Q28: Is there any financial support available to develop biennial update reports?(p.44)
Q29: Is there any technical support available to develop biennial update reports?(p.45)

National GHG Inventories (non-Annex I):

Q30: What is a national GHG inventory? (p.47)

Q31: Why prepare a national GHG inventory? (p.48)

Q32 = Q61 (p.79)

Q33: How frequently should national GHG inventories be prepared?(p.49)

Q34: How should we prepare national GHG inventories? (p.50)

Q35: How should we verify national GHG inventories? (p.51)

Q36: Are there any standards or guidelines for national GHG inventory preparation? (p.52)

Q37: Are there any principles for preparing national GHG inventories?(p.53)

Q38: What categories and gases should non-Annex I Parties cover in their national GHG inventories?(p.54)

Q39: How should we estimate national-level GHG emissions and removals?(p.55)

Q40: Are the national GHG inventories submitted by non-Annex I Parties reviewed?(p.56)

Q41: Are there different levels of estimation methods?(p.57)

Q42: What should we do if it is not possible to estimate all emission sources and removal sinks? (p.58)

Q43: Who should prepare national GHG inventories?(p.59)

Q44: How do countries establish institutional systems to prepare national GHG inventories?(p.60)

Q45: Is there any financial support available to prepare national GHG inventories? (p.61)

Q46: Is there any technical support available to prepare national GHG inventories? (p.62)

City-scale GHG Inventories:

Q47: What is a NAMA?(p.64)

Q48: What is MRV for NAMAs?(p.65)

Q49: Why does MRV for NAMAs need to be conducted?(p.66)

Q50: How frequently should MRV of NAMAs be conduced?(p.67)

Q51: What is the difference between the international and national levels of MRV for NAMAs?(p.68)

Q52: How should we implement MRV of NAMAs?(p.69)

Q53: Are there any standards or guidelines for MRV of NAMAs?(p.70)

Q54: How can NAMAs be reported in BURs?(p.71)

Q55: How Is verification conducted in the context of MRV for NAMAs? (p.72)

Q56: Who should conduct MRV of NAMAs?(p.73)

Q57: How do countries establish institutional arrangements to conduct MRV of NAMAs?(p.74)

Q58: Is there any technical and financial support available to help countries conduct MRV of NAMAs?(p.75)

City-Scale Greenhouse Gas Inventories:

Q59: What is a city-scale GHG inventory? (p.77)
Q60: Why developing GHG inventories for cities? (p.78)
Q61: What is the role of GHG inventories in goal setting and performance tracking? (p.79)
Q62: How frequent should cities develop GHG inventories? (p.80)
Q63: What are the differences between national and city inventories? (p.81)
Q64: How long does it normally take to complete an inventory? (p.82)
Q65: What are the differences between city GHG inventories and mitigation actions GHG accounting? (p.83)
Q66: How many cities use the GPC? (p.84)
Q67: Can the GPC be used for other sub-national entities? (p.85)
Q68:How to develop a city-scale GHG inventory? (p.86)
Q69: Is there any standard methodology for developing and reporting city-scale GHG inventories? (p.87)
Q70: Is there any standard template for reporting city GHG inventories? (p.88)
Q71: Are cities required to disclose their GHG inventory data? (p.89)
Q72: How to report in-boundary and trans-boundary emissions? (p.90)
Q73:What should a city do if not able to account for all emission sources? (p.91)
Q74: Where to find calculation tools and training resources? (p.92)
Q75: Who can develop city-scale GHG inventories? (p.93)
Q76: Are there any technical and financial supports available to help cities develop GHG inventories? (p.94)
Q77: Are there any training programmes for city-scale inventories? (p.95)

Clean Development Mechanism:

Q78: What is MRV for the CDM? (p.97)
Q79: Why is MRV needed for the CDM? (p.98)
Q80: How frequently should MRV of the CDM be conducted?(p.99)
Q81: How long does it take to do MRV for the CDM?(p.100)
Q82: How much does it cost to conduct MRV for the CDM? (p.101)
Q83: How many project activities have finished the MRV process for the CDM?(p.102)
Q84: How is the CDM monitored and reported?(p.103)
Q85: How is the CDM verified? (p.104)
Q86: Are there any standards or guidelines for MRV in the CDM? (p.105)
Q87: Is MRV different across sectors? (p.106)
Q88: Who should do MRV for the CDM? (p.107)
Q89: How is the monitoring system for the CDM established? (p.108)
Q90: How can an organization etc. become a verification body? (p.109)
Q91: Is there any financial support available to the CDM? (p.110)

Index (Good Practices)

Q92: Is there any technical support available to implement the CDM? (p.111)

Joint Crediting Mechanism:

Q93: What is the JCM? (p.113)
Q94: What is the scheme for the JCM? (p.114)
Q95: What is the current status of the JCM? (p.115)
Q96: What is the MRV for the JCM? (p.116)
Q97: Why is MRV needed for the JCM? (p.117)
Q98: How is the MRV simplified in the JCM? (p.118)
Q99: How many JCM methodologies are approved? (p.119)
Q100: How many JCM projects are registered? (p.120)
Q101What is the difference between the CDM and the JCM in terms of MRV? (p.121)
Q102: What is the relationship between the JCM and Japan's INDC? (p.122)
Q103: How is the JCM monitored and reported? (p.123)
Q104: How is the JCM verified? (p.124)
Q105: Are there any standards or guidelines for the JCM? (p.125)
Q106: How are emission reduction through the JCM reported to the COP? (p.126)
Q107: How is a net decrease and/or avoidance of GHG emissions ensured in the JCM? (p.127)
Q108: Who should conduct MRV for the JCM? (p.128)
Q109: How can a candidate entity become a third party entity that verifies the amount of GHG emission reductions or removals? (p.129)
Q110: Is there any support available to conduct the JCM? (p.130)

National Communications (non-Annex I):

1. Dealing with data gaps (p.134)
2. Institutional capacity building (p.135)
3. Establishment of institutional arrangements (p.136)
4. Mobilisation of financial resources (p.137)

Biennial Update Reports:

5. Advanced reporting of GHG inventories(p.138)
6. Advanced reporting of mitigation actions and their effects(p.139)

National GHG Inventories (non-Annex I):

7. Estimation of time-series GHG emissions/removals(p.140)
8. Development of country-specific emission factors(p.141)
9. South-south cooperation for improvement of data quality(p.142)
10. Exchange of information on how to improve technical capacity of GHG inventory compilation(p.143)

Index (Good Practices)

11. Mutual learning on how to improve technical capacity of GHG inventory compilation(p.144)
12. Enhancement of local experts' technical capacity(p.145)
13. Establishment of national systems for national GHG inventory preparation(p.146)
14. Development of Quality Assurance/Quality Control (QA/QC) system(p.147)

Nationally Appropriate Mitigation Actions:

15. Advanced reporting of NAMAs in a BUR(p.148)

City-scale GHG Inventories:

16. GHG inventory tool for Chinese cities(p.149)
17. First cities GHG reporting program in China(p.150)
18. Annual updates of GHG inventories in Tokyo, Japan(p.151)
19. Demonstrating cities climate action through global platforms(p.152)

Clean Development Mechanism:

20. Development of Grid Emission Factors(p.153)

Joint Crediting Mechanism:

21. Development of JCM methodologies using default values (p.154)

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