Workshop on GHG Inventories in Asia
<July 6, 2013>

Experiences of Designing NAMAs in a MRV manner in Asia

-Bottom up approach taken in the MOEJ/OECC Capacity-building Programme-

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About the plan of drafting NAMA Guidebook

1. Background of NAMAs in a MRV manner

Proposed table of contents

1. Background
2. Basic Elements of NAMAs
   (1) Linkage with SD, and LCSD & Planning
   (2) COP Decisions
   (3) Others
3. Approach to Designing NAMAs
   (1) Top-down Approach (modeling)
   (2) Bottom-up Approach (aggregating)
   (3) Financial Options
   (4) Elements of MRV

Proposed table of contents

4. Experiences with NAMAs in Asia- Case Studies-
   (1) National Scenario Development (AIM)
   (2) Sub-national Scenario Development
   (3) Energy Supply (Mongolia)
   (4) Waste Sector (Viet Nam)
   (5) Agricultural Sector (Cambodia)
   (6) Transport Sector (Lao PDR)
   (7) XXXXXXXXX (Your case?)
5. Lessons Learned

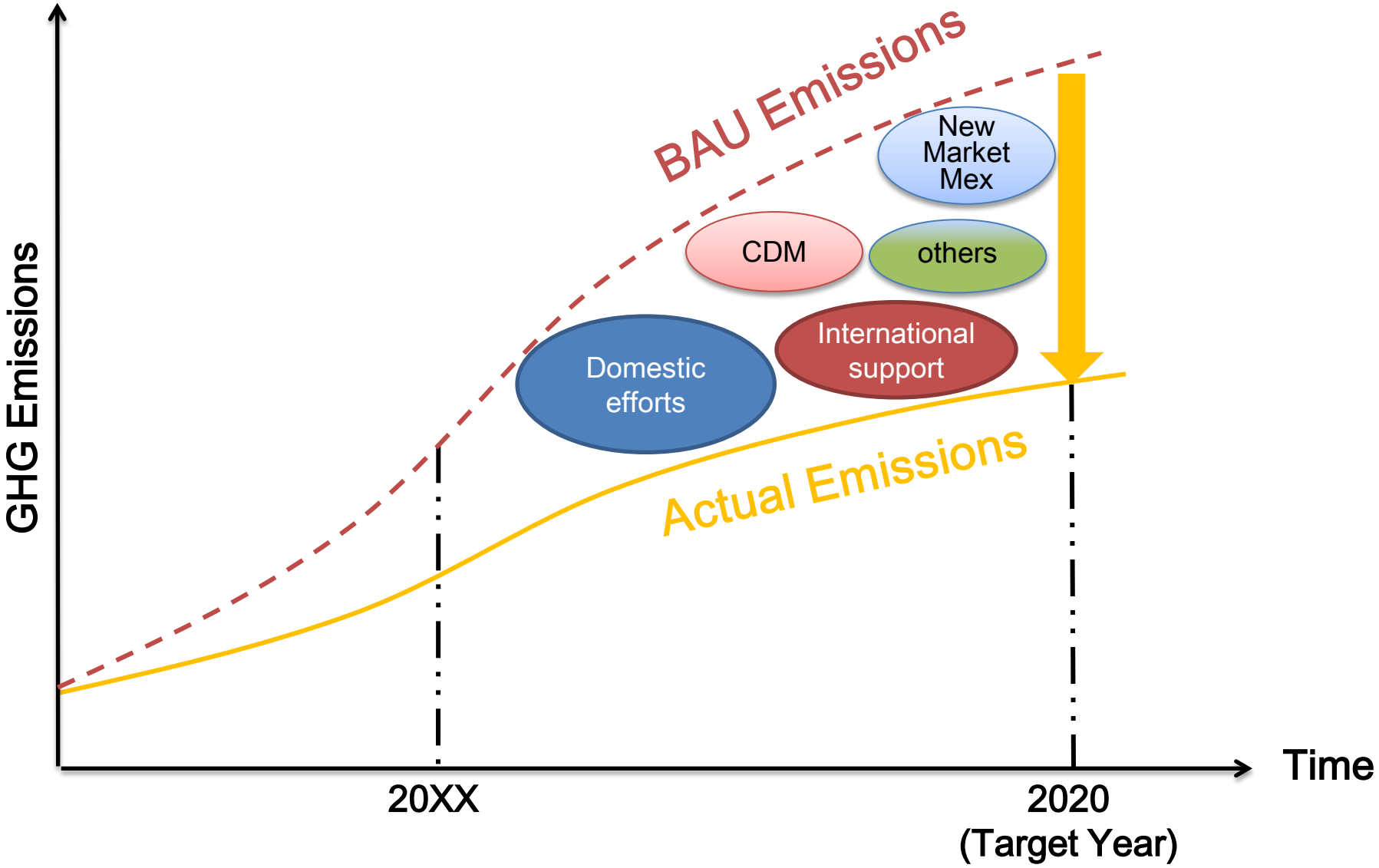
Elements of NAMAs

- Subject to **measurement, report, verification(MRV)** (differentiated MRVs for domestic and international finance)
- Supported by technology, financing, and capacity-building
- Aims (at least) at **deviation from business-as-usual emission (BAU) in 2020**
- Reported together with GHG Inventory in BUR and described **with quantitative goals and progress indicators**
- Encouraged to **link with low carbon development strategies and planning**

1/CP.13, 2/CP.15 Annex, 1/CP.16, and 2/17 and its Annex III (for detail slides 25 and later)

As long as with these elements, NAI Parties can decide NAMAs as they like, (while further elements may be agreed by the COP)

Illustration of mitigation actions in relation to BAU



NB. The above graphic does not include how accounting of GHG should be sorted out, in relation to offset mechanisms.

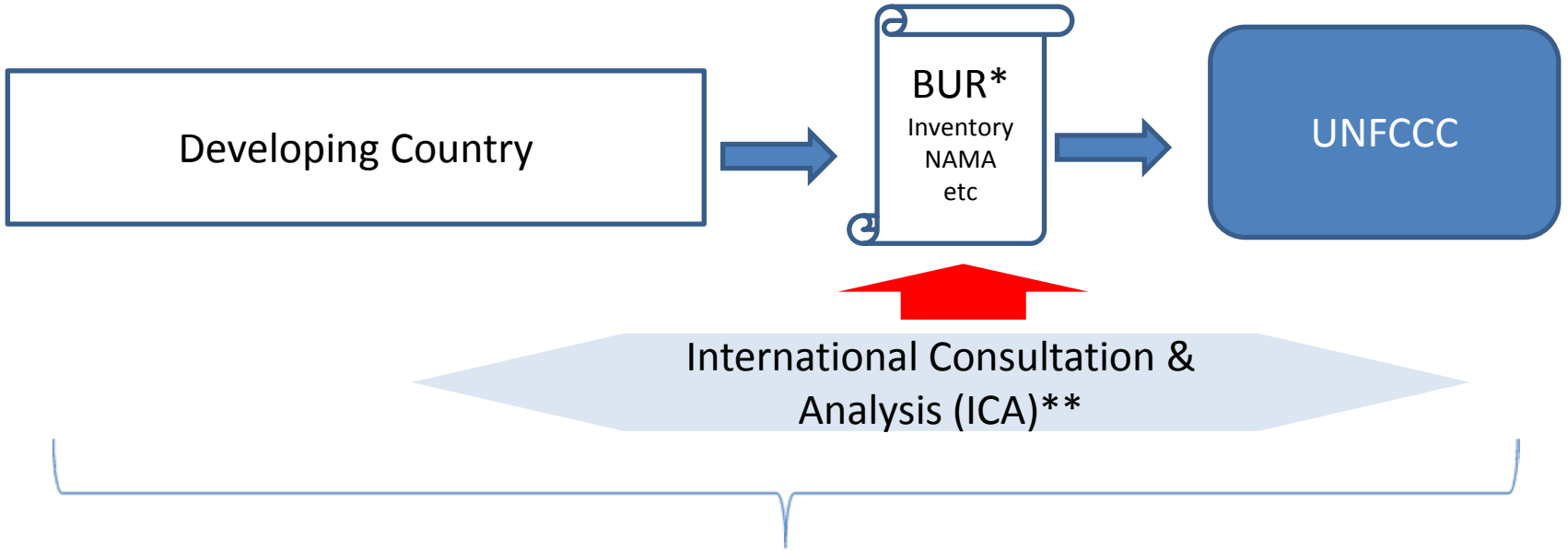
NAMA Response by NAI Parties to UNFCCC (examples)

Country	Target	Sectors for NAMAs	Reference Level
China	40-50% /GDP	• 15% for the share of non-fossil fuel • Forest Coverage 40,000,000 ha	2005
Colombia	Unilateral Support Market	• Unilateral - more than 7% RE in 2020 • Support - Forest • Market- CDM, NMM	BAU (depending on schemes)
Indonesia	26-41% (26% reduction thru unsupported NAMAs)	• Sustainable Peat land • Deforestation • Forestry, Agriculture • Renewable Energy • Waste • Transport	BAU
Mongolia	N/A	• Renewable Energy • Construction, Industry • Transport • Agriculture, forestry	N/A

Source: : Compilation of information on NAMAs (FCCC/AWGLCA/2011/INF.1)

MRV for describing the international process

* Guidelines decided by 2/CP.17 Annex III
** Details are not yet decided (subject to further negotiations)



MRV describing Macrospective Review of Policy Action Implementation

National Committee on NAMAs
(verification at macro level)

Secretariat of the Committee

MRV

Report on NAMAs

Verify

Possible Verification at macro level

- Assumption of GHG calculation
- GHG quantification methodologies
- Use of different schemes

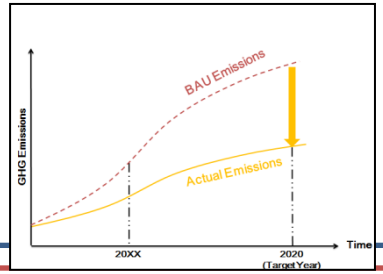
UN Guidelines is being negotiated at SBSTA

Ministries and institutions in charge

Ministry | Ministry | Ministry | Ministry | Ministry | Ministry

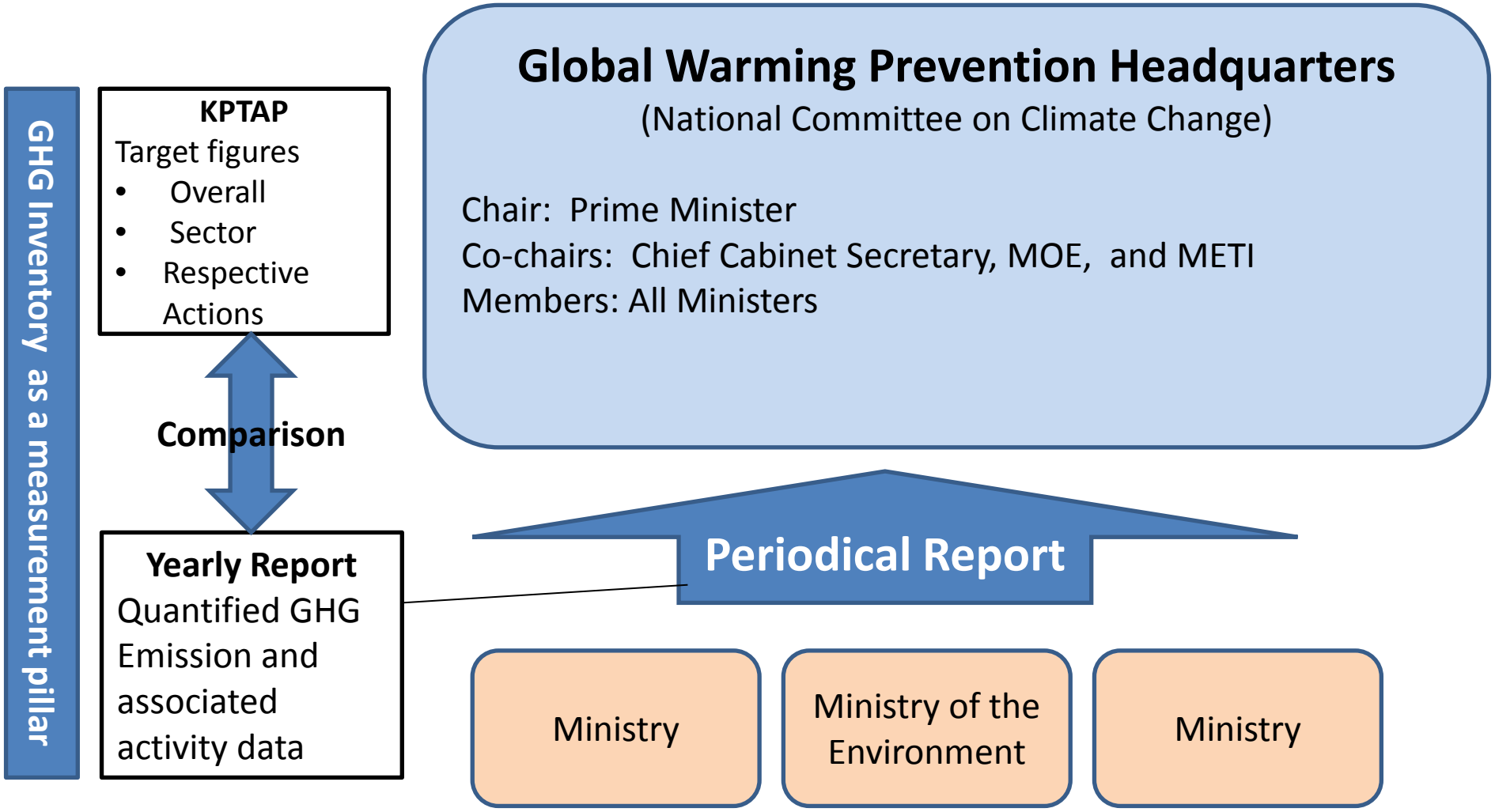
NAMAs (to be designed and implemented as a package of policy or programme)

NAMAs (Reduction Plan against Sectoral baselines)



NB. Guidelines on domestic MRV is being developed at SBSTA. The structure is a suggested model for policy level MRV.

Institutional Arrangement overviewing the Progress of KPTAP(Japan's mitigation Actions)



MRV at Activity level (Project or entity level)

[Emissions Reduction per biodigester]

$$ER_y = BE_y - PE_{PL,y} - PE_{flare,y}$$

[Baseline Emissions per household]

$$BE_y = GWP_{CH4} * D_{CH4} * \sum_{j,LT} MCF_j * B_{0,LT} * N_{T,hh} * VS_{LT,y} * MS\%_{BI,j}$$

Project Design
(Ex Ante GHG calculation)

Emission Reduction Activity
(Monitoring GHG)

Project complete
(Ex post GHG calculation)

Verification

MRV

* Guidelines on methodologies are not decided by the UN

2. OECC's approach to developing NAMAs in a MRV manner under the MOEJ Programme

Quantifying GHG Emissions Reduction

Climate Change Sectoral Strategy

Cambodia Energy Sector Strategy

Others

*Extract data and make fact sheets

Activity1:
Data and Info. collection

Fig 1. Energy Development Plan in BAU and NAMAs

	2012	2020
BAU	XXX MWh	X,XXX MWh
NAMAs	-	X,XXX MWh

Activity2:
GHG Emissions Calculation

Fig 2. GHG Emissions in BAU and NAMAs

	2012	2020
BAU	XXX t/CO2	X,XXX t/CO2
NAMAs	-	X,XXX t/CO2

Activity3:
Identify Mitigation Action
- **XX MW Solar**
- **XX units Boilers**

Proposed Steps for NAMA Development

(1) Collection of Info on relevant policies and strategies

Collect and analyze relevant policy documents of development, climate change and related sector

(2) Collection data for BAU in the sector

Collect data for calculating BAU emission with bottom-up approach (eg. List all individual landfills, and collect respective waste volumes in the waste sector)

(3) Quantification GHG emissions of BAU

Quantify GHG emissions based on (2) data, and
a) Identify the calculation formulas
b) Calculate respective emission in BAU
c) Aggregate respective emissions

(4) Examination and selection of NAMAs options

Select possible NAMAs options and technologies based on (1) policies and mitigation strategies and additional consideration.

(5) Quantification GHG emission reduction by NAMAs

Quantify GHG emissions with (4)NAMAs assumptions
a) Set the calculation formulas
b) Calculation
c) Aggregate potential with reduction by NAMAs

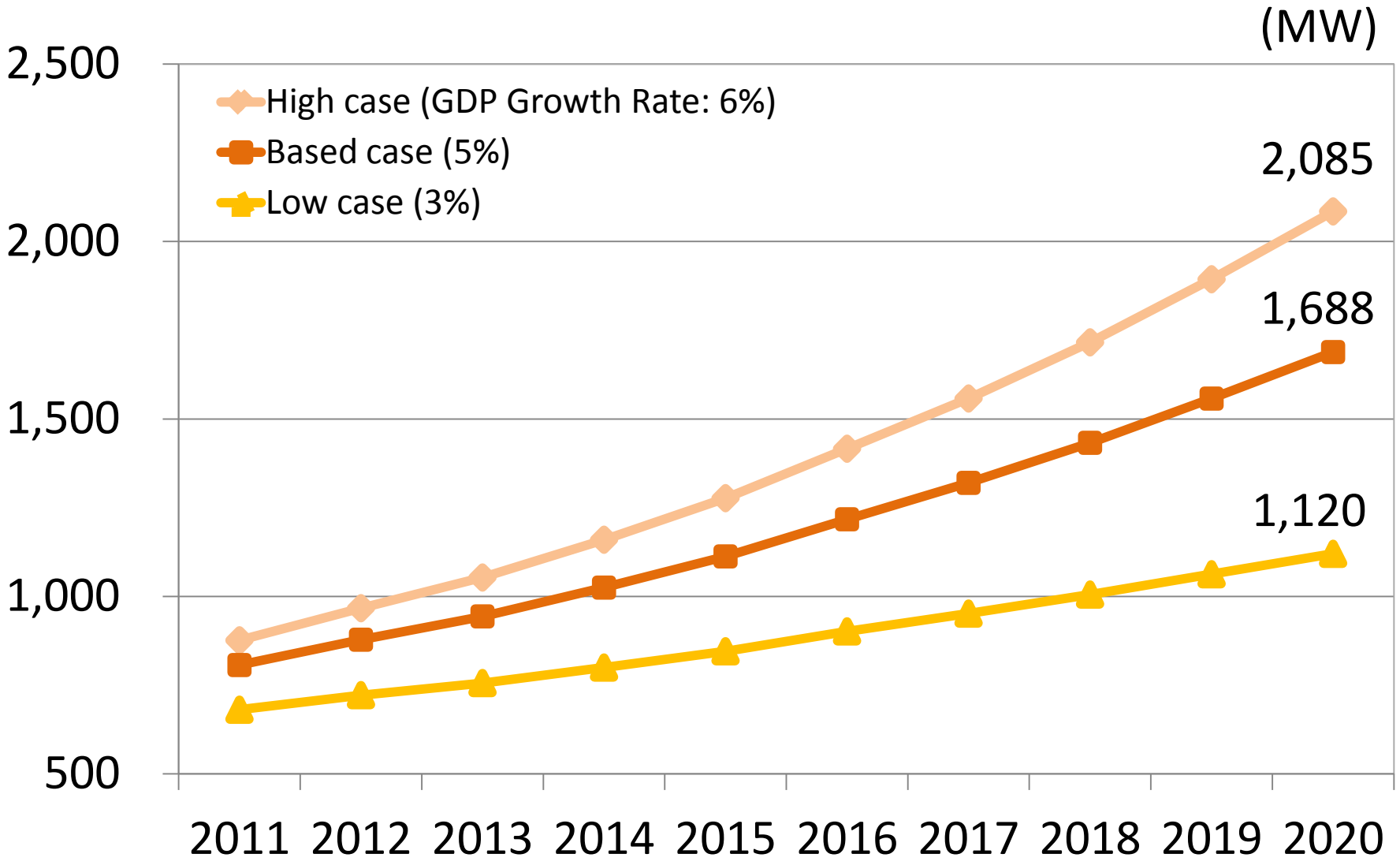
Low-carbon technology survey

Examination MRV methods

Capacity-buildings in a developing country for NAMAs implication

Source: OECC 2012

BAU: Energy Demand Projection in County Cambodia



Source: OECC 2012

BAU: Power Development Plan in Country Cambodia

*Need to consider projects which may be developed in BAU out of the present plan.

No.	Project Name	Type	Capacity (MW)	Year	Condition as of Dec. 2011
1	XXXX	Heavy Fuel Oil	340	-	Operating
2	YYYY	Coal	13	-	
3	ZZZZ	Hydro	13	-	
4	AAAA	Wood, Biomass	6	-	
5	Kamchay	Hydro	194	2012	Under Construction
6	Kirirom III	Hydro	18	2012	
7	Stung Atay	Hydro	120	2012	
8	Stung Tatay	Hydro	246	2013	
9	Lower Stung Russei Churum	Hydro	338	2013	
10	100 MW Coal Fired Power Plant	Coal	100	2013	
11	270 MW Phase 1 of the 700MW Coal Fired Power Plant	Coal	270	2014 ~2015	PPA singed
12	100 MW Coal Fired Power Plant	Coal	100	2016	PPA singed
13	430 MW Phase 2 of the 700MW Coal Fired Power Plant	Coal	430	2017	FS completed
…	…	Coal	α*	20XX	May be developed*
	Total		2188+α		

Source: OECC 2012

Power Development Plan with mitigation options

No.	Project Name	Type	Capacity (MW)	Year
1	XXXX	Heavy Fuel Oil	340	
2	YYYY	Coal	13	-
3	ZZZZ	Hydro	13	-
4	AAAA	Wood, Biomass	6	-
5	Kamchay	Hydro	194	2012
6	Kirirom III	Hydro	18	2012
7	Stung Atay	Hydro	120	2012
8	Stung Tatay	Hydro	246	2013
9	Lower Stung Russei Churum	Hydro	338	2013
10	100 MW Coal Fired Power Plant	Coal	100	2013
11	270 MW Phase 1 of the 700MW Coal Fired Power Plant	Coal	270	2014 ~2015
12	100 MW Coal Fired Power Plant	Coal	100	20
13	430 MW Phase 2 of the 700MW Coal Fired Power Plant	Coal	430	2017
…	…	Coal	α*	20XX
	Total		2188+α	

Introduction of high-performance boiler

Promotion of renewable energy (hydro, solar, biomass

Source: OECC 2012

GHG Emissions Reduction with mitigation measure

***All values are calculated on the assumption.**

Mitigation measure	Calculation method	Emissions reduction
Introduction of high-performance boiler	Amount of energy conserved by high-performance boilers (50 kl oil-equivalent/unit) × Cumulative numbers of boilers introduced in target year 2020 (100 units) × Emission factor (2.62 tCO2/kl)	**13,100 t-CO2**
Promotion of renewable energy	The use of renewable energy in 2020 (1,000,000 MWh) ×Grid emission factor (0.6257 t-CO2/MWh)	**625,700 t-CO2**

Source: OECC 2012

Possible Institutional Arrangement

GHG Inventory as a measurement pillar?

Climate Change Committee
(verification at macro level)

Secretariat of the Committee

Report

Possible Verification at macro level

- Assessment of Plan
- Verification of the progress report
- Review of aggregated GHG emission reduction
- Assessment of challenges and further needs(PDCA cycle)
- Submission and Report to UNFCCC

Ministries and institutions in charge

Ministry | Ministry | Ministry | Ministry | Ministry | Ministry

Implementation and verification at micro level* (ER from individual activities/projects)

* For a policy measures not as a project-based(such as taxation policy, etc) may be MRVed at the macro level but still need to have some ways for QA/QC of collected data within its programme.

Verification varies by different financial schemes	
Non-market	Regular monitoring and data collection procedure (such as that of energy regulatory committee's)
JCM/BOCM	JCM meth, third party verification
CDM	CDM meth, monitoring, DOE verification

Preliminary Results/Outputs

1. Identified **BAU and emission reduction potentials** (now thru 2020) by a bottom-up approach for quantifying GHGs
2. Identified useful **low carbon technologies** to be introduced for NAMAs
3. Established an **inter-ministerial WG**, which may be a core group for national decision making process
   (and policy-level MRV)
4. Elaborated **a possible mitigation in a template**, which may be part of whole **implementation plan NAMAs**

3. Preliminary Results of Capacity-building Cooperation

Mongolia

Selected Sector: Energy Supply Sector

NAMAs: Improvement of CHP Plants

Working Group: MEDG, Ministry of Energy, other key institutes and experts, chaired by Climate Change Special Envoy

Results:

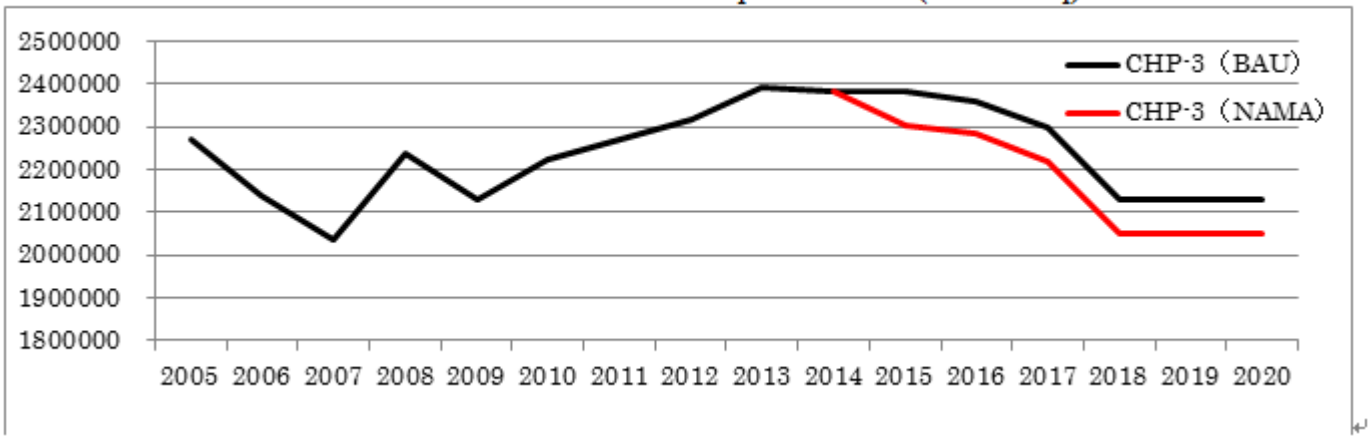
Calculated BAU and ER by NAMAs ex ante both for power and heat supplies for CHP3 and CHP4

Sorted out reporting process of activity data (ie Energy Regulatory Committee)

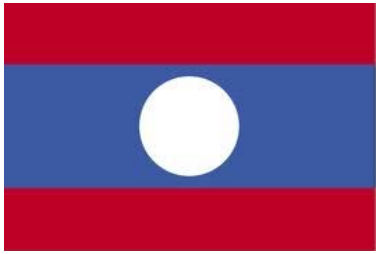
Discussed technology options for application in NAMAs, including process diagnosis in CHP

Diagnosis by energy technology experts from Japan at CHP

GHG emissions in the BAU scenario and after NAMA implementation (ton-CO2eq)



Lao PDR

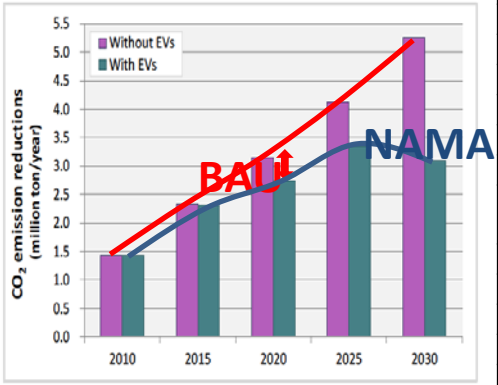


Selected Sector: Transport Sector

NAMAs: Replacement of conventional vehicle with EV

Working Group: 7 Ministries participates, including MONRE, MPWT, MIME, MOIC, MOST, chaired by Results:

- Calculated BAU and ER by NAMAs ex ante
- Activity data (fuel economy data) originally collected and based on JICA Study
- Proposed institutional arrangements are planned to be a part of technical WG under the National Climate Change Committee



Source: Basic Data Collection Study on Low-emission Public Transport System in Lao PDR, JICA, modified by OECC

	Motorcycle	Passenger car	Tuk Tuk / Mini bus	Song Thew / Middle size bus	Large bus	Total
Baseline Emissions						
Baseline fuel economy (km/liter)	40	13.0	20	6.5	2.5	
Baseline fuel economy (km/liter) (2020)	43.3	14.1	21.7	7.0	2.7	
Driving distance (km/day)	16	25	45	85	120	
CO_2 emission factor ($kgCO_2$/liter)	2.18	2.18	2.70	2.70	2.70	
Days per year	365	365	365	365	365	
Baseline emission (tCO_2/year/vehicle)	0.3	1.4	2.0	11.9	43.8	
Project Emissions						
Driving distance (km/day)	16	25	45	85	120	
Project electricity economy (kWh/km)	0.080	0.130	0.130	0.310	1.000	
Grid electricity emission factor (tCO_2/MWh)	0.135	0.135	0.135	0.135	0.135	
Days per year	365	365	365	365	365	
Project emission (tCO_2/year/vehicle)	0.1	0.2	0.3	1.3	5.9	
Emission reduction (tCO_2/year/vehicle)	0.2	1.3	1.8	10.6	37.9	
Number of EV	698000	45000	12000	4000	1000	
Total Emission Reduction (tCO_2/year)	161,204	56,280	21,065	42,537	37,887	318,973

Viet Nam

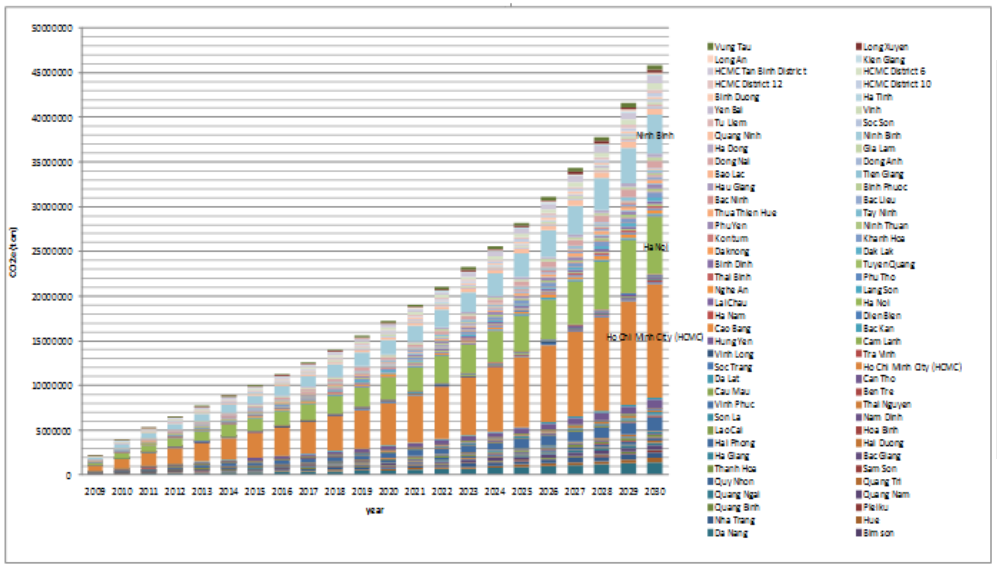
Selected Sector: Waste Sector

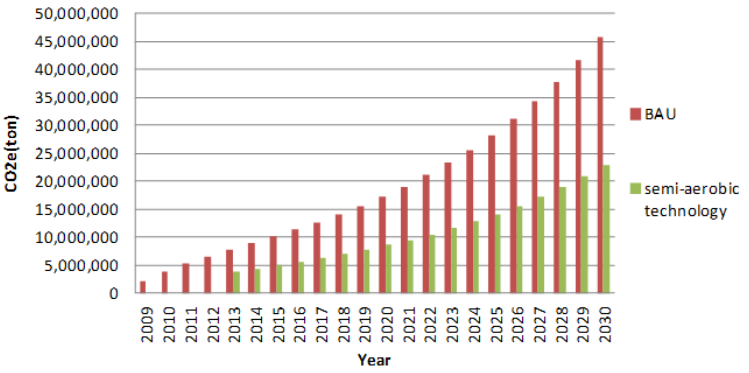
NAMAs: CH4 Reduction from Landfill (semi aerobic technology)

Working Group: MONREE, MOC, MPI, VEA, IMHEN, chaired by IMHEN

Results:

- Collected historical activity data from all landfills in Viet Nam
- Calculated BAU and reduction by NAMA candidates (Emission Reductions from Methane Emission from LFs)
- Discussed possible reporting procedures
- Jointly reported at COP18 Side Event





Cambodia

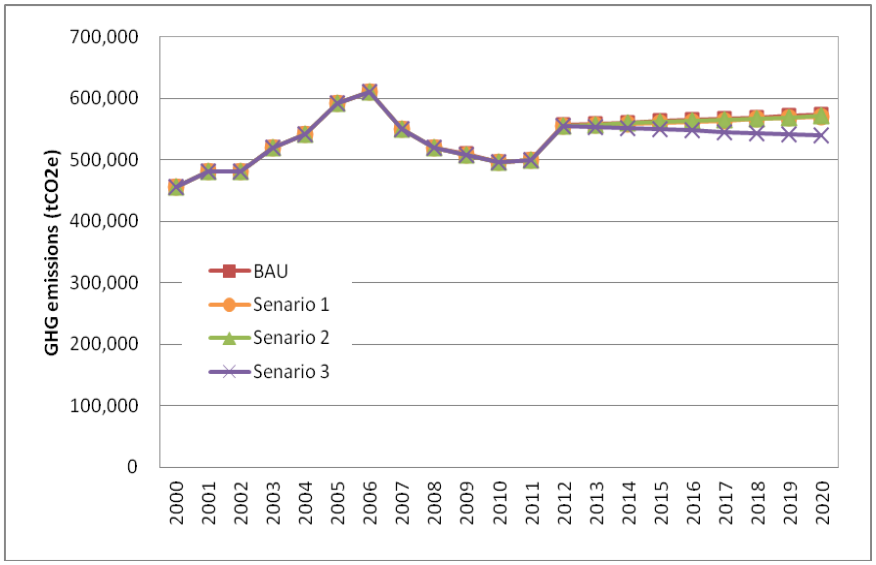
Selected Sector: Agricultural Sector

NAMAs: National Biodigester Programme

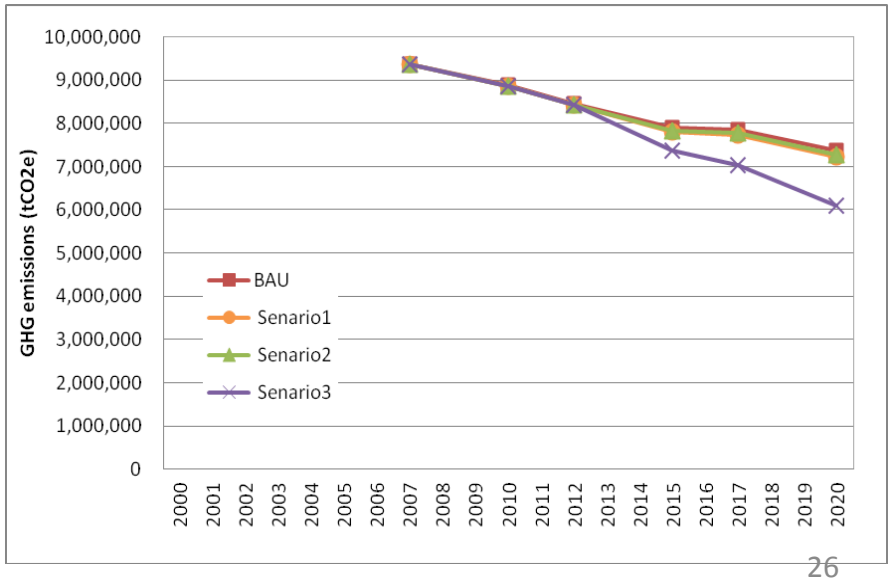
Working Group: MOE, MPWT, MIME chaired by MOE DG

Results:

- Calculated BAU and ER by NAMAs ex ante (Emission Reductions from Methane Reduction and NRB)
- Sorted out reporting procedure



CH4 Emission from animal manure and its Reduction by biodigester Programme



CO2 reduction from non renewable biomass by different fuels

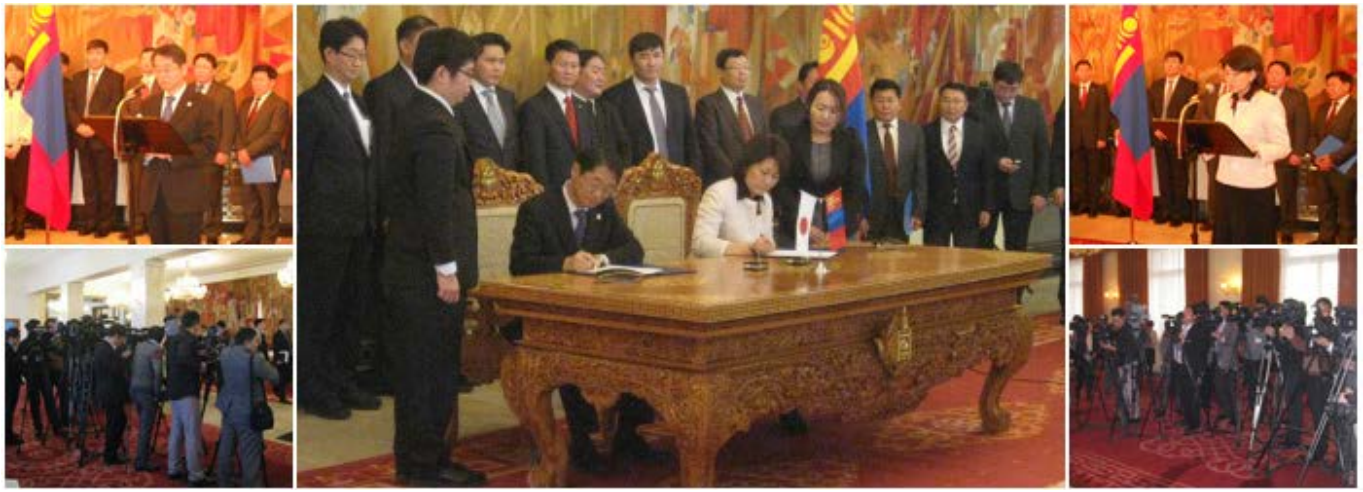
Next Steps

1. Expanding sectors/subsectors for designing NAMAs
2. Drafting and Implementation Plan (national level), which contains institutional framework and process for domestic PDCA Cycle
3. Linking with existing domestic reporting procedures
4. Elaboration on different financial options, such as multilateral and bilateral finance, including the Joint Crediting Mechanism (JCM)

Joint Crediting Mechanism

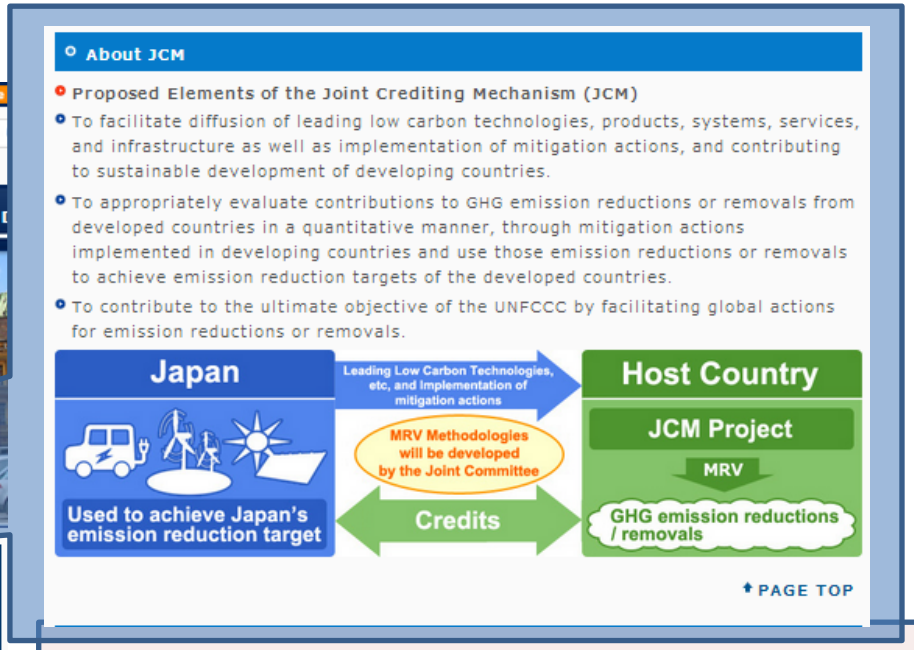
as a financial and technology driver for NAMAs

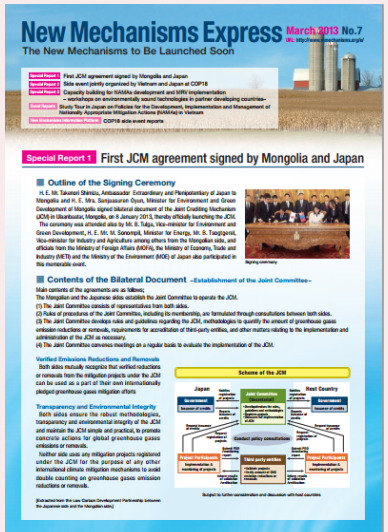
- On January 8, 2013, Mongolia and Japan signed a Memorandum of Understanding on JCM
- On March 19, Bangladesh and Japan signed a MOU on JCM/BOCM
- On May 29, Ethiopia and Japan signed a MOU on JCM
- On July 1, Maldives, and on July 2, Viet Nam also signed a MOU with Japan



Source: New Mechanisms Information Platform:
http://www.mmechanisms.org/e/initiatives/130108_mongolia.html

New Mechanisms Information Platform (www.mmecanisms.org)





Thank You!