NAMA and GHG Inventory

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Four types of MRV

|	Type I: MRV of GHG emissions at organization level	Type II: MRV of GHG reductions at project level for crediting	Type III: MRV of GHG emissions at national level	Type IV: MRV of GHG reductions by policy/ action
Object	GHG emissions at organization level under GHG scheme	GHG reductions realized by individual project	GHG emissions at national/sub-national level	GHG reductions by policy/action at national/sub-national level
Aim	Determination of GHG emissions at covered organization under GHG scheme	Crediting and certification of amount of GHG reductions by individual project under GHG scheme	Determination of GHG emissions at national level and compliance assessment for developed countries under Kyoto Protocol	Unavailable

"Type IV" needs to share the knowledge of "type I", "type II" and "type III" comprehensively.

Outline of Japanese GHG Inventory

- MRV Methodology
  - MR : IPCC Guidelines and UNFCCC COP/CMP Decisions
  - V : UNFCCC COP/CMP（Decisions and Kyoto Protocol Art. 8 with related documents for review)
- MRV Implementation body
  - MR : National government/ sub-national government
  - V : Expert Review Team under UNFCCC/ Kyoto Protocol Art.8

Japan's Institutional Arrangement for the National Inventory Preparation
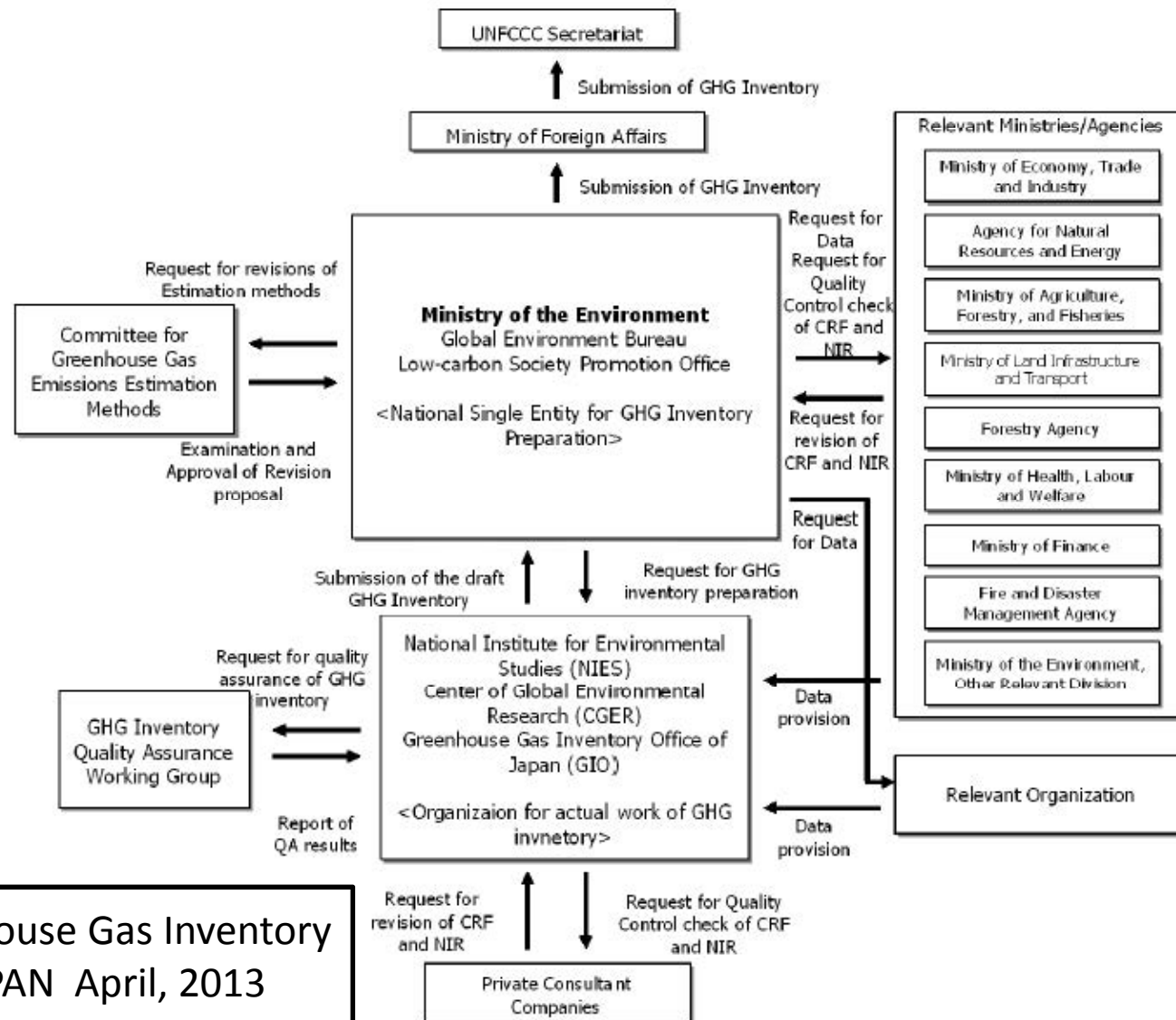
Annual Cycle of the Inventory Preparation in Japan

Table 1-1 Annual cycle of the inventory preparation

*Inventory preparation in fiscal yaer "n"

	Process	Relevant Entities	Calender Year n+1 (Fiscal Year n+1)								CY n+2			FY n+2
			May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
1	Discussion on the inventory improvement	MOE, GIO		→	→	→	→							
2	Holding the meeting of the Committee	MOE, (GIO, Private consultant)		→	→	→	→	→	→	→	→			
3	Collection of data for the national inventory	MOE, GIO, Relevant Ministries/Agencies, Relevant organization, Private consultant								→	→	→	→	
4	Preparation of a draft of CRF	GIO, Private consultant									→	→	→	
5	Preparation of a draft of NIR	GIO, Private consultant									→	→	→	
6	Implementation of the exterior QC and the coordination with the relevant ministries and agencies	MOE, GIO, Relevant Ministries/Agencies, Private consultant										→	→	→
7	Correction of the drafts of CRF and NIR	MOE, GIO, Private consultant											→	→
8	Submission and official announcement of the national inventory	MOE, Ministry of Foreign Affairs, GIO												★
9	Holding the meeting of the QA-WG	MOE, GIO	→	→	→	→								

★: Inventory submission and official announcement must be implemented within 6 weeks after April 15.
MOE: Ministry of the Environment
GIO: Greenhouse Gas Inventory Office of Japan
Committee: Committee for the Greenhouse Gas Emission Estimation Methods
QAWG: Inventory Quality Assurance Working Group

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Process of the Inventory Preparation in Japan (part1)

Step 1 : Discussion on the inventory improvement	The MOE and the GIO identify the items, which need to be addressed by the Committee, based on the results of the previous inventory review of the UNFCCC, etc.
Step 2 : Holding the meeting of the Committee (experts)	The MOE holds the meeting of the Committee, in which estimation methodologies for an annual inventory and the issues
Step 3 : Collection of data for the national inventory	The data required for preparing the national inventory are collected.

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Process of the Inventory Preparation
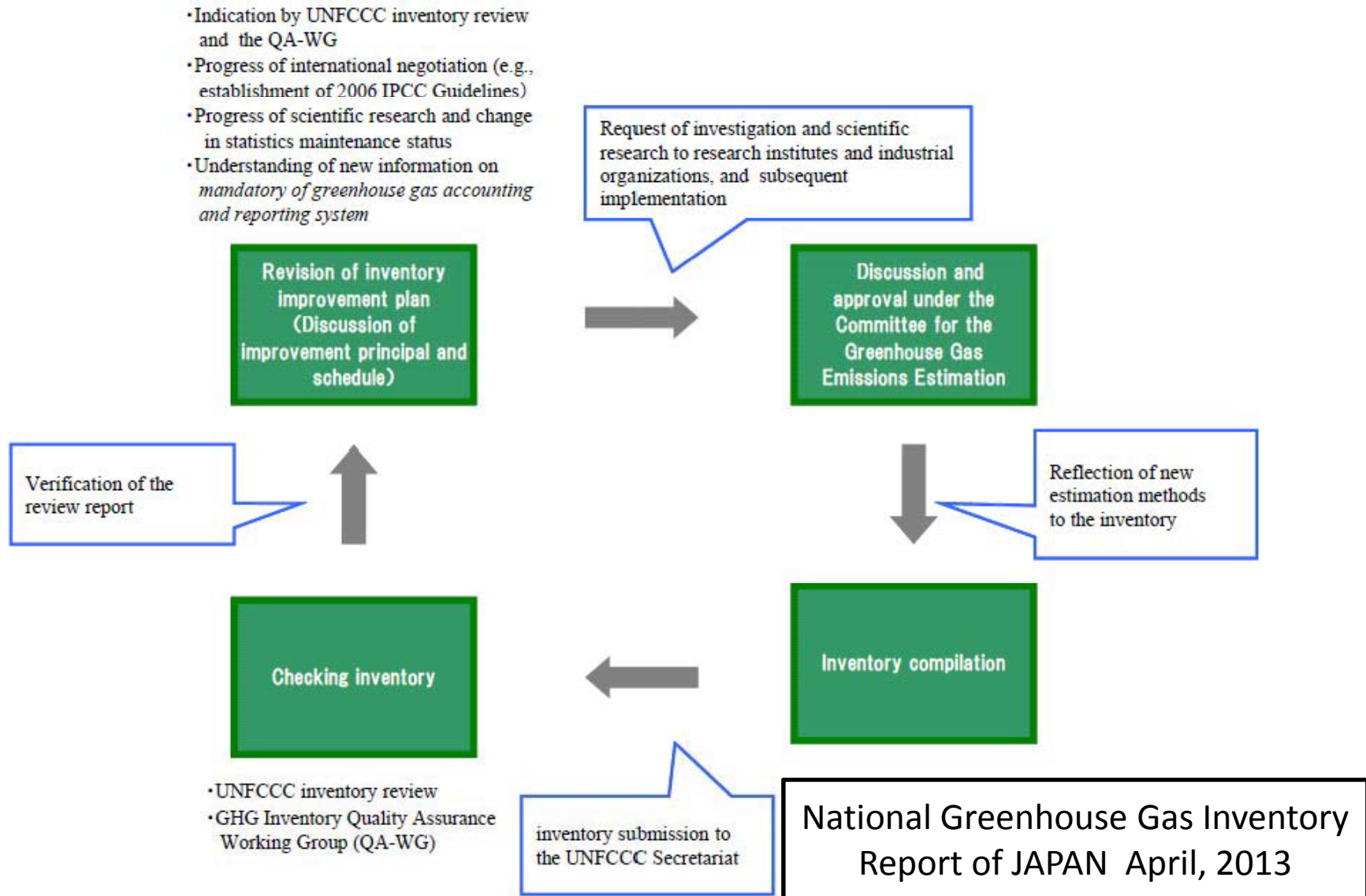# in Japan (part2)

Step 4 : Preparation of a draft of CRF	The data input and estimation of emissions and removals (by utilizing JNGI files), Key Category Analysis, Uncertainty Assessment
Step 5 : Preparation of a draft of NIR	The drafts on NIR is prepared by following the general guidelines made by the MOE and the GIO. Updating data, adding and revising descriptions
Step 6 : Implementation of the exterior QC and the coordination with the relevant ministries and agencies	Exterior QC (private consulting companies check the JNGI files and the initial draft CRF) Cross-check (re-calculating the GHG) JNGI files, draft CRF and draft NIR are checked by the private consulting companies.

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Process of the Inventory Preparation in Japan (part3)

Step 7 : Correction of the drafts of CRF and NIR	The primary draft; relevant ministries (agencies) submit request of revision coordinate contents The secondary drafts are sent out again. The final versions; no additional requests
Step 8 : Submission and official announcement of the national inventory	The completed inventory (MOE → Ministry of Foreign Affairs → UNFCCC Secretariat) Publication (MOE's homepage; http://www.env.go.jp, GIO's homepage; http://www-gio.nies.go.jo/index-j.html)
Step 9 : Holding the meeting of the QA-WG	QA-WG (experts who are not directly involved in or related to the inventory preparation process), reviews the appropriateness of the estimation methodologies, activity data, emission factors, and the contents of CRF and NIR

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Diagram of the Inventory Improvement Process in Japan

- Indication by UNFCCC inventory review and the QA-WG
- Progress of international negotiation (e.g., establishment of 2006 IPCC Guidelines)
- Progress of scientific research and change in statistics maintenance status
- Understanding of new information on *mandatory of greenhouse gas accounting and reporting system*

Request of investigation and scientific research to research institutes and industrial organizations, and subsequent implementation

Revision of inventory improvement plan (Discussion of improvement principal and schedule)

Discussion and approval under the Committee for the Greenhouse Gas Emissions Estimation

Verification of the review report

Reflection of new estimation methods to the inventory

Checking inventory

Inventory compilation

- UNFCCC inventory review
- GHG Inventory Quality Assurance Working Group (QA-WG)

inventory submission to the UNFCCC Secretariat

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List of the main relevant ministries and agencies and the relevant organizations

Ministry	Major data or statistics
Ministry of the Environment	Research of Air Pollutant Emissions from Stationary Sources / Volume of Waste in Landfill / Volume of Incinerated Waste / Number of People per Johkasou facility / Volume of Human Waste treated at Human Waste Treatment Facilities
Ministry of the Economy, Trade and Industry	General Energy Statistics / Yearbook of Production, Supply and Demand of Petroleum, Coal and Coke / Yearbook of Iron and Steal, Non-ferrous Metals, and Fabricated Metals Statistics / Yearbook of Chemical Industry Statistics / Yearbook of Ceramics and Building Materials Statistics / Census of Manufactures / General outlook on electric power supply and demand

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List of the main relevant ministries and agencies and the relevant organizations

Ministry	Major data or statistics
Ministry of Land, Infrastructure, Transport and Truism	Annual of Land Transport Statistics / Survey on Transport Energy / Statistical Yearbook of Motor Vehicle Transport / Survey on Current State of Land Use, Survey on Current State of Urban Park Development / Sewage Statistics
Ministry of Agriculture, Forestry and Fisheries	Crop Statistics / Livestock Statistics / Vegetable Production and Shipment Statistics / World Census of Agriculture and Forestry / Statistics of Arable and Planted Land Area / Handbook of Forest and Forestry Statistics / Table of Food Supply and Demand
Ministry of Health, Labour and Welfare	Statistics of Production by Pharmaceutical Industry

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List of the main relevant ministries and agencies and the relevant organizations

Agencies/Organizations	Major data or statistics
Federation of Electric Power Companies	Amount of Fuel Used by Pressurized Fluidized Bed Boilers
Japan Coal Energy Center	Coal Production
Japan Cement Association	Amount of clinker production / Amount of waste input to in raw material processing / Amount of RPF incineration
Japan Iron and Steel Federation	Emissions from Coke Oven Covers, Desulfurization Towers, and Desulfurization Recycling Towers
Japan Paper Association	Amount of final disposal of industrial waste / Amount of RPF incineration

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Difference between NAMA and GHG Inventory

- GHG inventory
  - Estimation of GHG **emissions** at national/sub-national level
  - MRV Methodology is approximately completed.

- NAMA
  - Estimation of GHG **reductions** by policy/action at national/sub-national level
  - MRV Methodology is undeveloped.

Relation between NAMA and GHG Inventory

- The point that can make use of experience of GHG Inventory in NAMA

- Generally
  - (supposition)"NAMA reductions" = "NAMA Baseline Emissions" – "NAMA Emissions"
  - "NAMA Baseline Emission" is technically difficult.

About NAMA Baseline Emissions

- (**supposition**) NAMA Baseline Emissions are as follows;

    I. Some past year → GHG Inventory itself

    II. Trend of some past years → Utilization of GHG inventory

    III. Set value → Case by Case (But, the past GHG inventory should be referred to.)

   IV. The buildup of the baseline (reference) emissions of individual projects. → All of NAMA may not be included.

    etc.

Case Study of NAMA Baseline Emissions

- "NAMA Baseline Emissions" = "Activity" x "Emission Factor"
  - $\rightarrow$ This concept can utilize the methods of GHG inventory.
- "Activity" = "Basic statistics data" x "Index such as basic unit etc."
  - Basic statistics data: barometer of each sector (level of production, the number of households, floor area, traffic volume, etc.)
  - Index such as basic unit, etc.: factor of operation, activity and measures, etc.
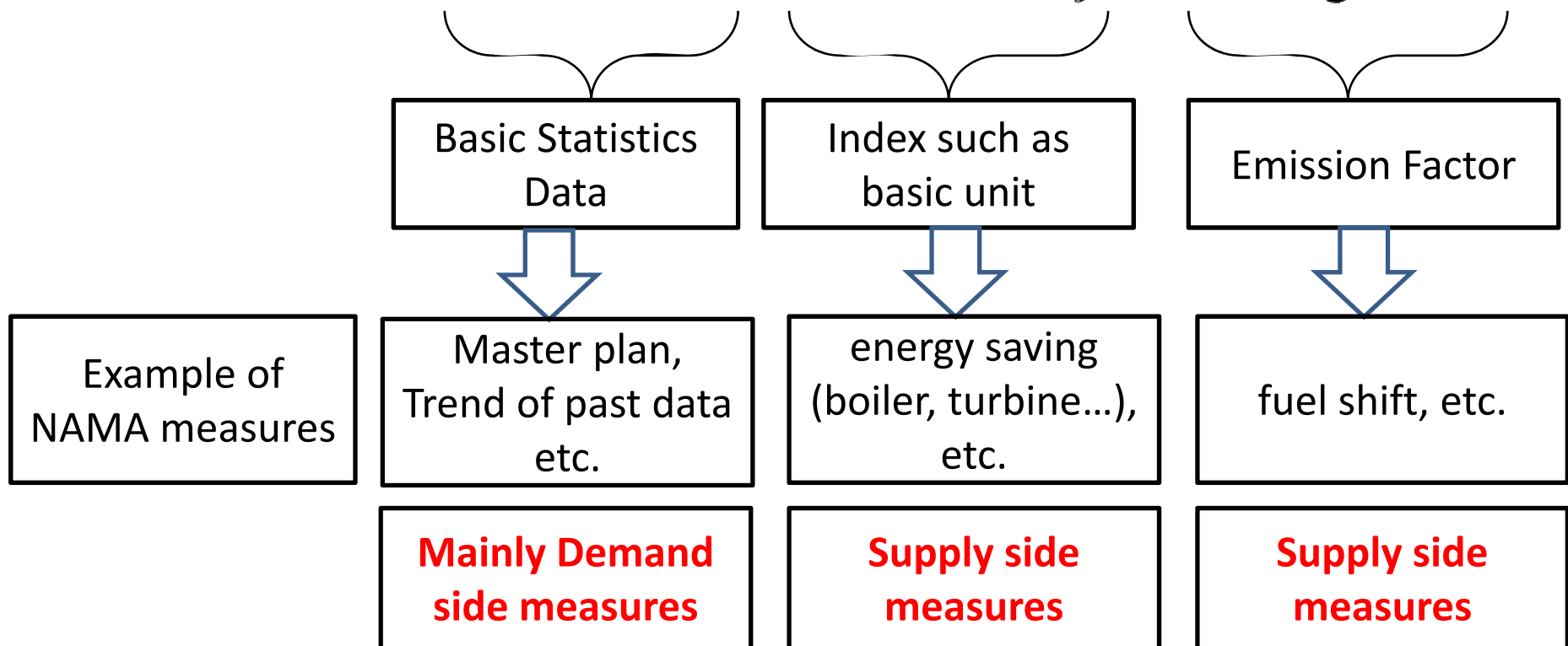
Image of NAMA Reductions

Candidate of NAMA Baseline Emissions

NAMA Emissions

Same as Inventory

NAMA Reductions

Past

Now

Future

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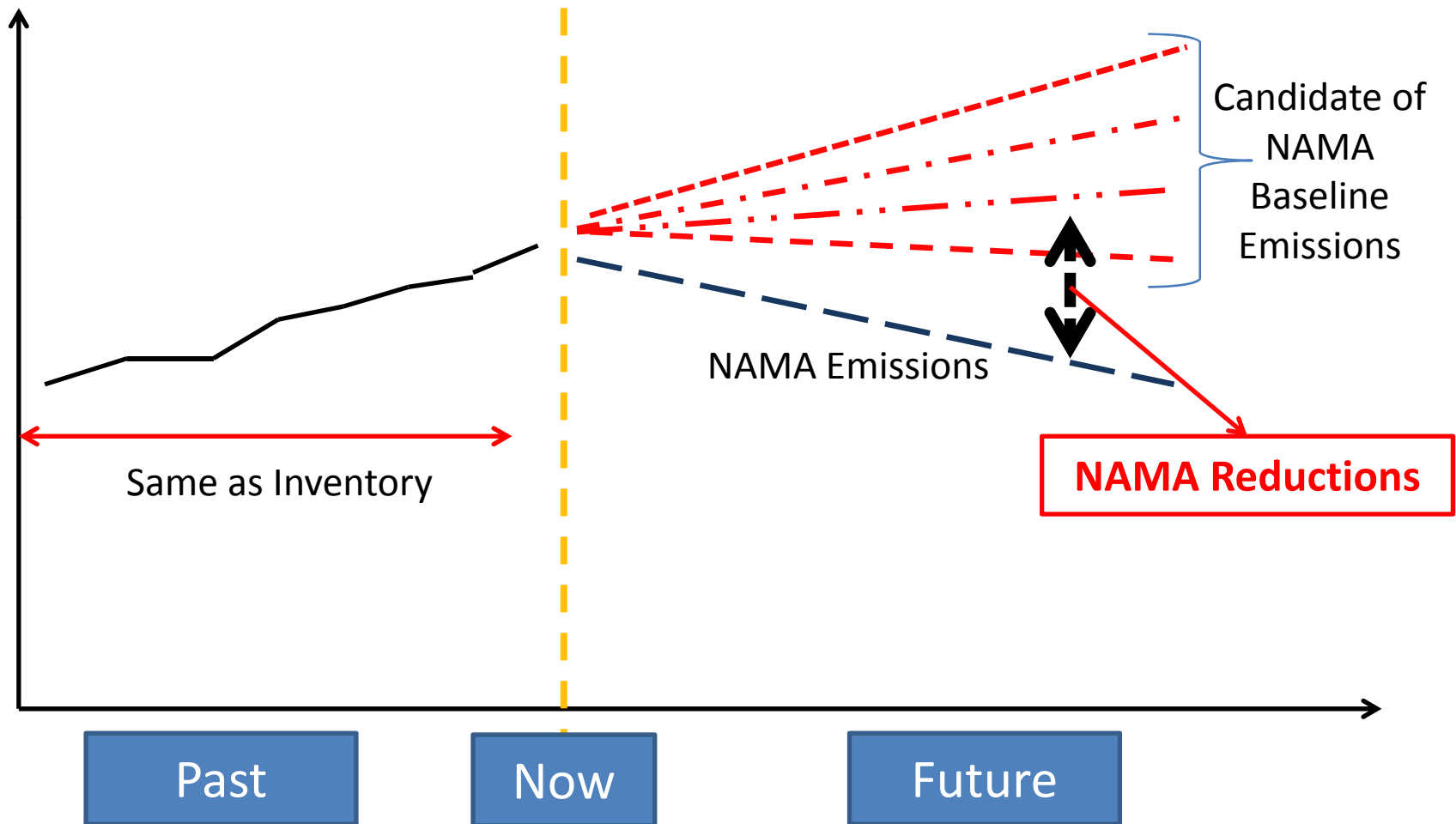
Example of CHPs

- Emissions from Electricity

$$= \sum_m EG_m \times SFC(E)_{m,y} \times EF_{Lignite}$$

Basic Statistics Data	Index such as basic unit	Emission Factor

Example of NAMA measures	Master plan, Trend of past data etc.	energy saving (boiler, turbine…), etc.	fuel shift, etc.

	Mainly Demand side measures	**Supply side measures**	**Supply side measures**

Basic Statistics Data of CHP

ДУЛААНЫ ЦАХИЛГААН СТАНЦУУДЫН ҮЙЛДВЭРЛЭСЭН, ТҮГЭЭСЭН ЭРЧИМ ХҮЧ, ЗАРЦУУЛСАН НҮҮРС

2012 он

№	Үзүүлэлт		ДЦС-2	ДЦС-3	ДЦС-4	ДДЦС	ЭДЦС	ТЭХС	ДорДЦС	ДзДЦС	Нийт
1	Үйлдвэрлэсэн цахилгаан [сая.кВтц]		124.1	706.1	3328.5	268.6	148.2	4575.5	137.5	21.8	4734.8
2	Станцаас түгээсэн цахилгаан [сая.кВтц]		105.3	563.2	2891.6	218.5	117	3895.6	112.5	16.5	4024.6
3	Түгээсэн дулаан [мян.Гкал]		165.3	1975.5	3375.3	463.4	521.8	6501.3	208.1	15.2	6724.6
	Үүнээс:	Усаар	149.9	1680	3212.5	451.5	484.9	5978.8	208.1	15.2	6202.1
		Ураар	8.1	295.5	162.8	11.8	36.9	515.1	-	-	515.1
4	Нүүрсний дундаж илчлэг [ккал/кг]		3438	3436	3265	3296	3765	3337	2528	5368	3302
5	Зарцуулсан нүүрс[мян.тонн]		192.6	1128.1	3104.1	394.9	247.5	5067.2	322.9	35.9	5426

Source: Energy Statistics 2012

Example of amounts of the generation of electrical energy in CHP4

	2008	2009	2010	2011	2012
CHP4	2694.4	2711.3	2940.6	3101.5	3328.5

n	n+1	n+2
XXX	XXY	XXZ
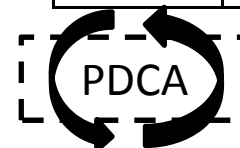
NAMA Baseline and Emissions (ex-ante)

YYY	YYX	YYZ

PDCA

ZZZ	ZZX	ZZY

GHG Emissions (ex-post)

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Specific Coal Consumption at each CHP2

ДУЛААНЫ ЦАХИЛГААН СТАНЦУУДЫН ЦАХИЛГААН ҮЙЛДВЭРЛЭХЭД НОГДОХ ЖИШМЭЛ
ТҮЛШНИЙ ХУВИЙН ЗАРЦУУЛАЛТ

(гр/кВт.ц)

Нэр	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012 он
ДЦС-2	643.5	649.3	628.9	654.1	679.5	644.3	622.3	610.0	588.4	591.3	611.2
ДЦС-3	477.4	467.1	459.2	443.5	418.5	393.5	381.2	359.3	357.3	363.7	356.8
ДЦС-4	389.3	364.6	365.1	349.5	336.8	316.9	306.2	307.2	314.2	305.1	298.8
ДарДЦС	418.5	416.6	415.6	413.1	421.9	438.4	438.5	434.1	438.0	431.8	433.4
ЭрдДЦС	330.1	343.1	333.0	328.9	324.9	314.2	315.1	309.8	328.7	315.6	328.4
ДорДЦС	753.7	743.0	700.5	707.2	708.5	699.7	682.9	699.4	706.3	636.3	677.4
ДалДЦС	854.1	853.0	910.7	816.6	885.0	950.3	968.0	1636.0	1409.3	1455.6	1399.7

ДУЛААНЫ ЦАХИЛГААН СТАНЦУУДЫН ДУЛААН ҮЙЛДВЭРЛЭХЭД НОГДОХ ЖИШМЭЛ ТҮЛШНИЙ
ХУВИЙН ЗАРЦУУЛАЛТ

(кг/Гкал)

Нэр	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012 он
ДЦС-2	184.3	184.1	190.0	189.0	201.0	200.8	197.5	195.1	193.5	192.6	195.0
ДЦС-3	192.8	190.9	189.0	187.3	182.3	182.9	178.4	177.8	177.8	179.7	179.3
ДЦС-4	184.1	182.5	181.1	180.4	177.0	173.6	175.4	175.3	175.2	174.4	173.4
ДарДЦС	187.7	187.5	187.5	192.1	195.4	203.2	196.3	197.0	197.5	196.7	197.5
ЭрдДЦС	176.7	179.9	178.8	178.0	179.2	168.1	177.2	174.4	180.6	184.8	181.4
ДорДЦС	221.1	211.7	212.1	209.6	205.3	203.5	214.1	200.9	196.9	202.0	195.3
ДалДЦС	345.0	315.7	303.4	245.4	219.7	285.1	347.9	362.4	363.5	296.9	293.3

Source: Energy Statistics 2012

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Example of HOBs

- Emissions from HOB

$$= \sum_m HG_m \times EF_{Lignite}$$

Basic Statistics Data	Emission Factor

I think it is very difficult.
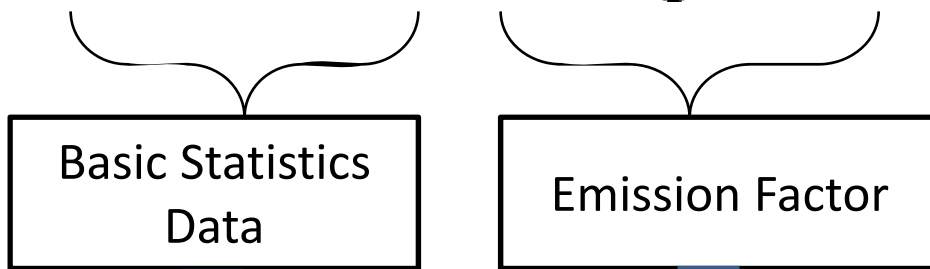
Master plan, Trend of past data, Sample of field survey, statistics data, etc.	fuel shift, etc.

These data of HOBs is not clear.

If we can estimate this term as follows;
Coal consumptions = $\sum$
(Capacity according to each model) $\times$ (Installation quantities according to each model) $\times$ (Boiler efficiency according to each mode)

One Example of NAMA of HOBs

- Activity of HOB is coal consumption.
  - Statistics data
  - АГААР БОХИРДУУЛАХ ЭХ ҮҮСВЭРИЙН 2011 ОНЫ УЛСЫН НЭГДСЭН ТОО БҮРТГЭЛ
- Data collection of HOB is necessary.
  - The estimation method of Coal Consumption?
    - (Minimum) Information : Number of HOB
    - (Better) Information: Capacity, Type of HOB, Real Boiler Efficiency
    - (Best) Coal consumption of each HOB

From the information such as CDM projects/ JCM projects, the coal consumption may be gotten to some extent.

Table of Balance of Coal

BALANCE OF COAL

мян.т *thous.t*

Үзүүлэлтүүд	Indicators	2009	2010	2011	2012
Нөөц–Бүгд	Resources– Total	**14 883.5**	**26 506.1**	**34 903.9**	**34 140.9**
Эхний үлдэгдэл	Stock at the begining of the year	441.2	1 344.0	2 874.1	4 214.5
Үйлдвэрлэсэн	Produced	14 442.1	25 161.9	32 029.7	29 926.1
Төрийн өмчит уурхай	State owned mining company	7 186.7	10 459.5	12 090.3	10 335.6
Хувийн хэвшлийн уурхай	Private sector's mining company	7 255.4	14 702.4	19 939.4	19 590.5
Импорт	Import	0.2	0.2	0.1	0.3
Хэрэглэсэн–Бүгд	Consumption–Total	6 426.2	6 905.8	6 815.3	7 381.3
Дулааны цахилгаан станцад хэрэглэсэн	Consumed by thermal power stations	5 077.9	5 533.2	5 410.1	5 800.9
Аж ахуйн нэгж байгуулага болон өрхөд түлшний зориултаар нийлүүлсэн:	Distributed to establishments and households for fuel purposes	1 348.3	1 372.6	1 405.2	1 580.4
Үүнээс:	Of which:				
Аж үйлдвэр, барилга	Industry & construction	226.3	179.6	221.9	336.6
Тээвэр, холбоо	Transport & communication	41.2	49.5	52.5	42.2
Хөдөө аж ахуй	Agriculture	13.6	10.0	8.9	3.7
Орон сууц, нийтийн аж ахуй	Communal housing	598.2	614.9	641.3	637.0
үүнээс: өрхөд	of which: household	596.5	612.3	639.7	626.0
Бусад	Other	469.0	518.6	480.6	560.9
Дахин боловсруулах үйлдвэрт	Manufacturing	-	-	2 578.1	3 813.3
Экспорт	Export	7 113.2	16 726.2	21 296.0	20 915.5
Эцсийн үлдэгдэл	Stock at the end of the year	1 344.0	2 874.1	4 214.5	2 030.7

Which sector include HOB?

Statistics 2012

Example of HOBs Information

	Coal Consumption of HOB		Coal Consumption of technology Boiler (Factory)		Boiler of capacity more than 1,000kW	
	quantity	Coal consumption (ton/year)	quantity	Coal consumption (ton/year)	quantity	Coal consumption (ton/year)
全国合計	2,629	710,884	145	150,893	114	1,653,897

Source: АГААР БОХИРДУУЛАХ ЭХ YYCBЭРИЙН

There are no data integrity between these data and statistics data.
And the source of these data is unclear.

The following information is necessary to prepare NAMA about HOB;
(1) Maintenance of basic information of HOB
(2) Investigation/ information to estimate coal consumptions, etc.
These data/information can be applied in not only the making the GHG inventory but also air pollution measures. In other words, these can be utilized for the planning and evaluation of the environmental policy.

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Conclusion (1)

- The MRV of NAMA is close to the MRV of the credit (CDM and JCM) from the point of view of the emission reductions.

- However, the NAMA whole can not be evaluated even if the MRV of each project is accumulated.

- On the other hand, NAMA is a policy evaluation of mitigation action, and the result (quantification) of GHG emission reductions measures is the GHG inventory.

Conclusion (2)

- It is necessary to comprehend the GHG inventory regularly in Mongolia, and the evaluation of NAMA should be linked with it. (cost of government, consistency of domestic policies, etc.)

- GHG inventory (past data) may be utilized in the "NAMA baseline emissions".

- The implementation body of NAMA MRV(M/R) is unknown but may be the same as the GHG inventory; National Government/ sub-national government. i.e. it is near with the implementation body of GHG inventory MRV.

Thank you !

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