TGP-EEDP
Thai - German Programme on Energy Efficiency Development Plan

Wuppertal Institute for Climate, Environment and Energy

M&V, M&E, MRV
where is the difference?

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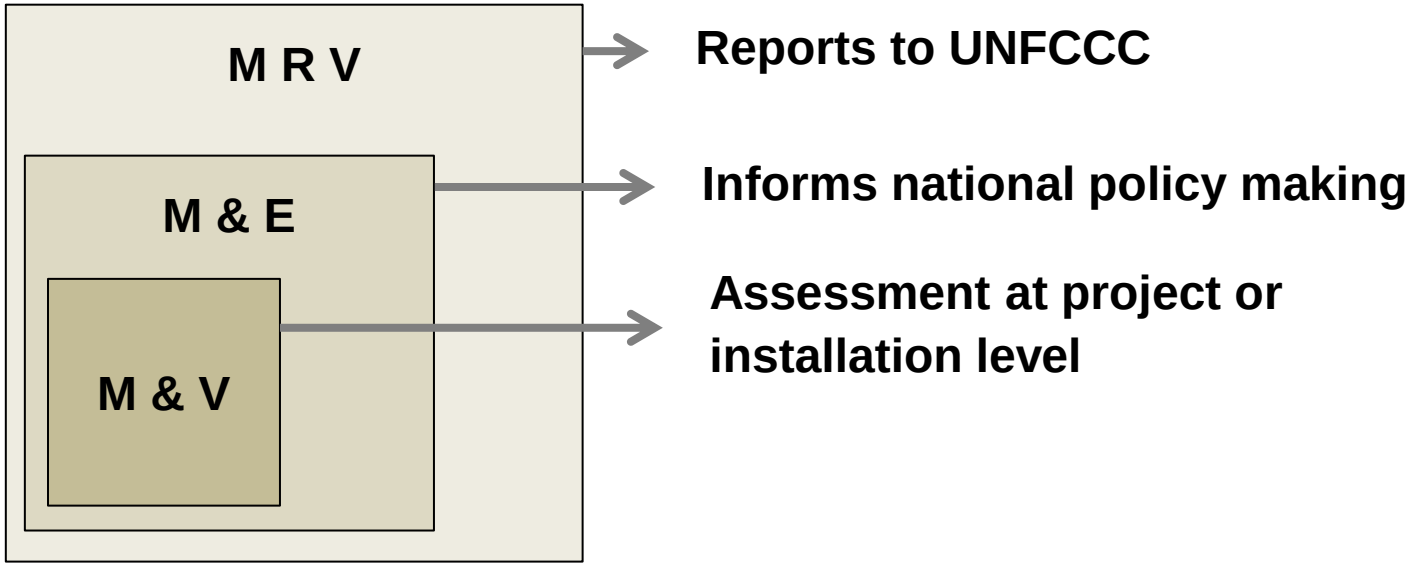
Thai-German Programme on Energy Efficiency Development Plan
M&E Capacity Building Workshop, 25th November 2014
Sukusol Hotel, Bangkok, Thailand

Three different terms – for similar things

- **M&V – Measurement and Verification**
- **M&E – Monitoring and Evaluation**
- **MRV – Measurement, Reporting, Verification**



M&V – Measurement and Verification

Often used for **energy savings of single projects**
e.g. in Energy Performance Contracting (e.g. IPMVP), EERS or SOP scheme

Key questions:

M: What is the exact amount of savings?

V: Have savings as specified in contract been achieved?

Verification:

Re-checking whether information is correct (e.g. external audits) especially important when:

- Compliance needs to be checked (e.g. EERS scheme)
- Energy Savings are to be converted into money, e.g.:
  - incentives for new installations in SOP
  - certified emission reductions in CDM
  - energy cost saving in performance contracting

M&E – Monitoring and Evaluation

Used on national level for **policy impact evaluation**

Key question:

Are policy impact objectives met ?

Possible objectives

- **Energy Savings**
- **Energy Cost Savings**
- **Costs**
- **Other benefits / Contribution to Sustainable Development**
  - **Reducing local air pollution**
  - **Job creation**
  - **Improving Comfort in Buildings**

M & E – Two process steps

Monitoring

Gather data
on progress and achievements of policy e.g.

- **How much money spent?**
- **How many houses built?**
- **Which new technologies implemented?**

Evaluation

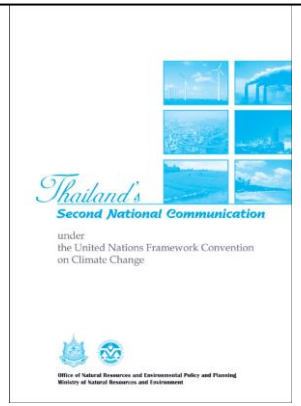
Assess Impacts of Policy
often additionally needed:

- **More specific data, e.g., technical baselines, hours of use, lifetimes (surveys, samples, market data, etc.)**
- **Specific calculations required; modelling may be needed**

MRV – Measurement, Reporting, Verification
UNFCCC Context - Original Meaning

Measurement

Reporting



United Nations
Framework Convention on
Climate Change

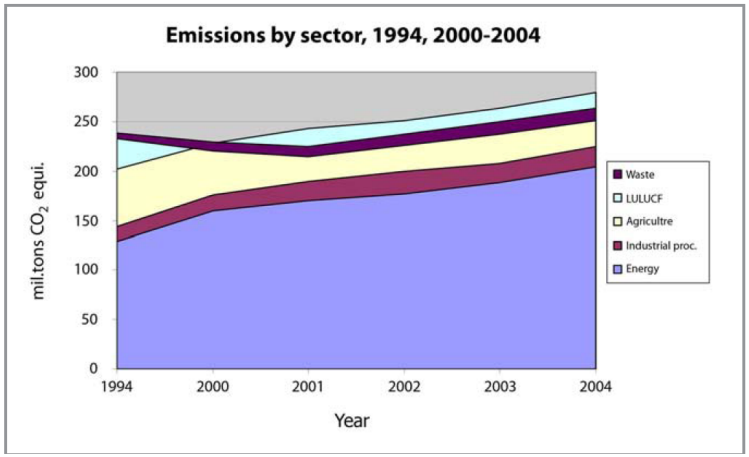
Verification

This use of term "MRV" most valid for GHG inventory data

Verification means international checking on national data

MRV – Measurement, Reporting, Verification
Three different meanings in UNFCCC language

Inventories



- GHG Inventories in
- National Communication and Biennial Updated Reports
- Reported by ONEP / TGO

Impact Evaluation

NAMAs

- Impacts of policies and actions
- Thailand can choose design of MRV system

M = M & E

CDM

- Impacts projects
- Strict MRV rules by UNFCCC

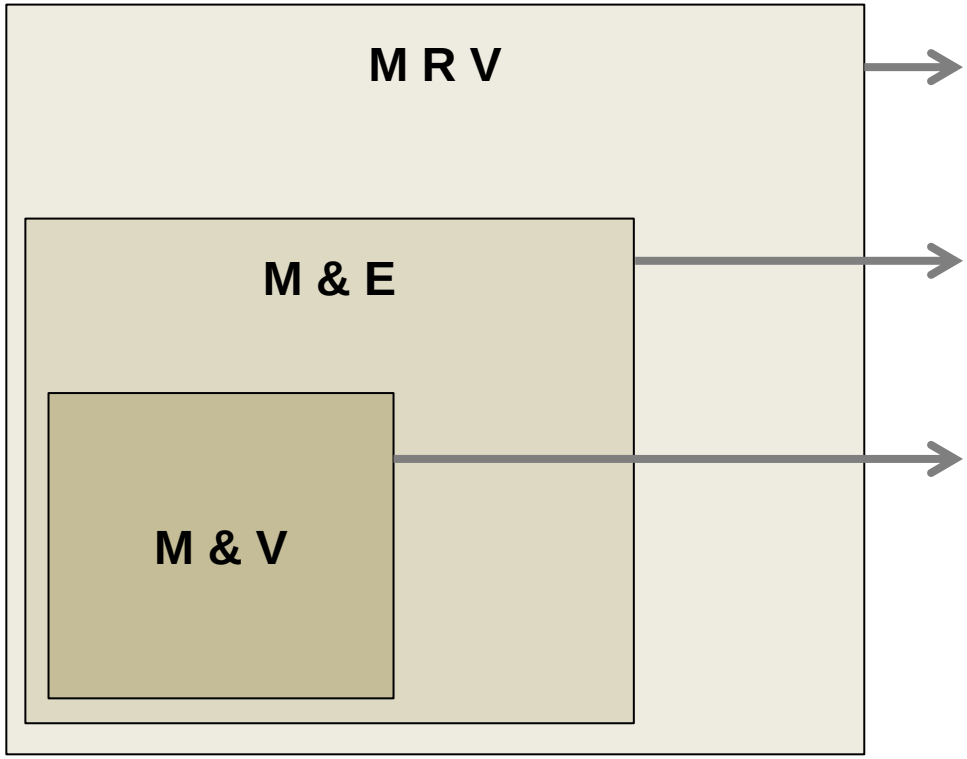
Equals special form of M & V

One term "MRV" is used for three very different actions

MRV / M&E / M&V - Overview

Layers of Impact Assessment

For energy efficiency actions / energy savings / GHG reduction



Reports to UNFCCC
ONEP reports on NAMAs (e.g. EEDP actions)

Informs national policy making
EEDP Impact Evaluation

Assessment at project or installation level
Designated Buildings Database

(Note that MRV of GHG emissions is different – inventory perspective)

Summary

- **MRV – Measurement, Reporting, Verification**
  - used mainly in UNFCCC context
  - originally used for process to communicate national GHG emissions (inventories, national communications, biennial update reports)
  - as MRV of NAMAs also used for impact assessment of individual policy actions

- **M&E – Monitoring and Evaluation**
  - often used for the impact assessment of policies or programmes
  - Monitoring: process of gathering information (measured or qualitative information)
  - Evaluation: drawing conclusions based on monitoring information and additional research

- **M&V – Measurement and Verification**
  - often used for energy savings of single projects e.g. in Energy Performance Contracting (eg, IPMVP), EERS or SOP scheme
  - Verification: re-checking whether information is correct (e.g. external audits)

Different terms often used for the same thing

Same terms often used for different things

Wuppertal Institute
for Climate, Environment
and Energy

Thank you very much for your attention!

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MRV – Measuring, Reporting, Verification

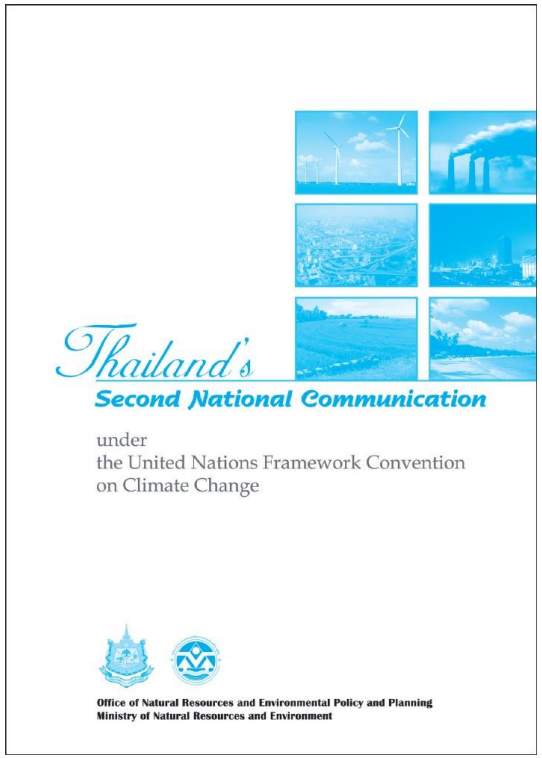
One term used for three – very different ! - things

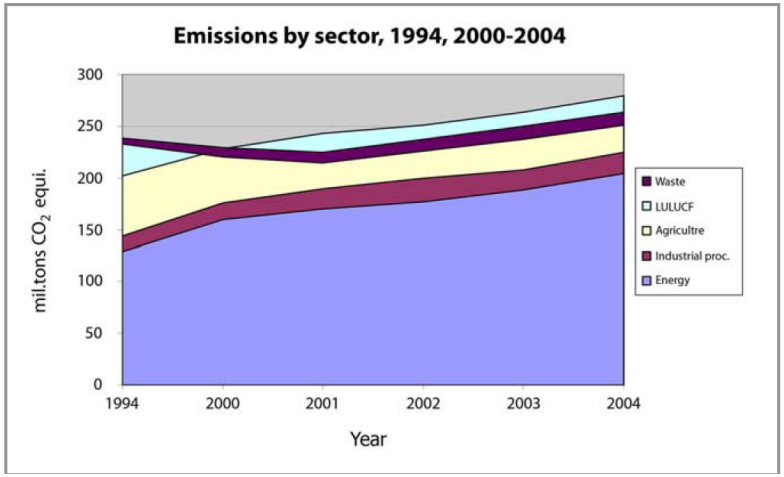
- MRV of Emissions in **Inventories**
- MRV of Emission Reductions in **CDM** projects
- MRV of Emission Reductions in **NAMAs**

UNFCCC MRV – Inventories

Countries report historic emissions (inventories)

in their national communications and biennial update reports (BURs)





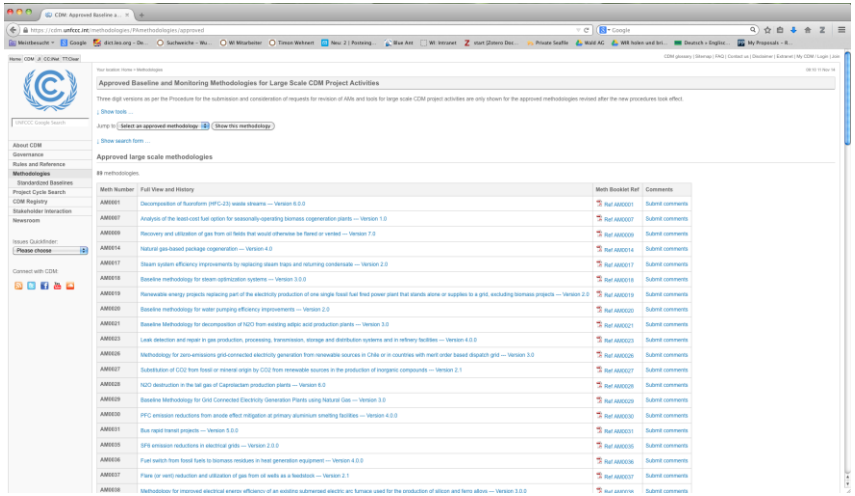
Inventories give information on **how many tons** are being emitted

Inventories do not state what the impact of different factors was (why it was emitted)

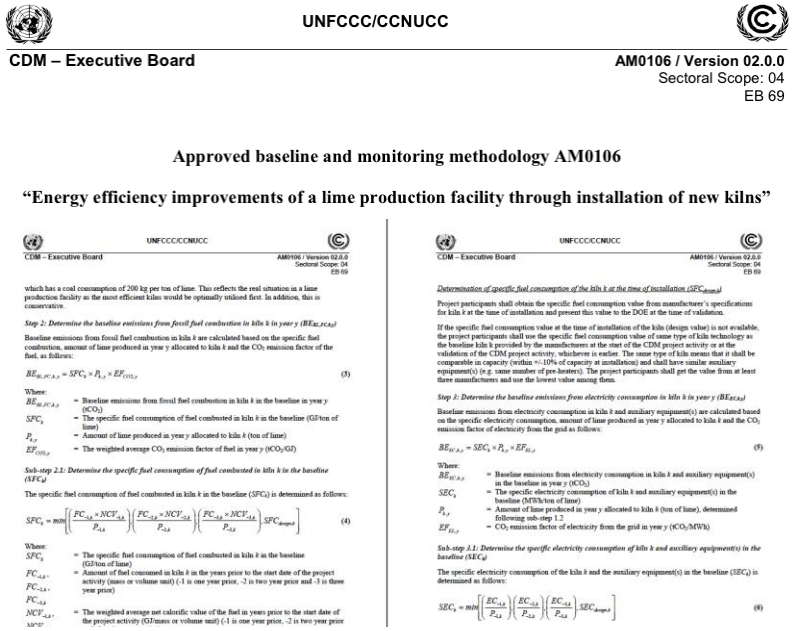
UNFCCC MRV – Clean Development Mechanism (CDM)

Key question: By how many tons were **emissions reduced?**

Many specific methods for individual project types



Methods include detailed formulas for emission reduction calculation



UNFCCC/CCNUCC

CDM – Executive Board

AM0106 / Version 02.0.0
Sectoral Scope: 04
EB 69

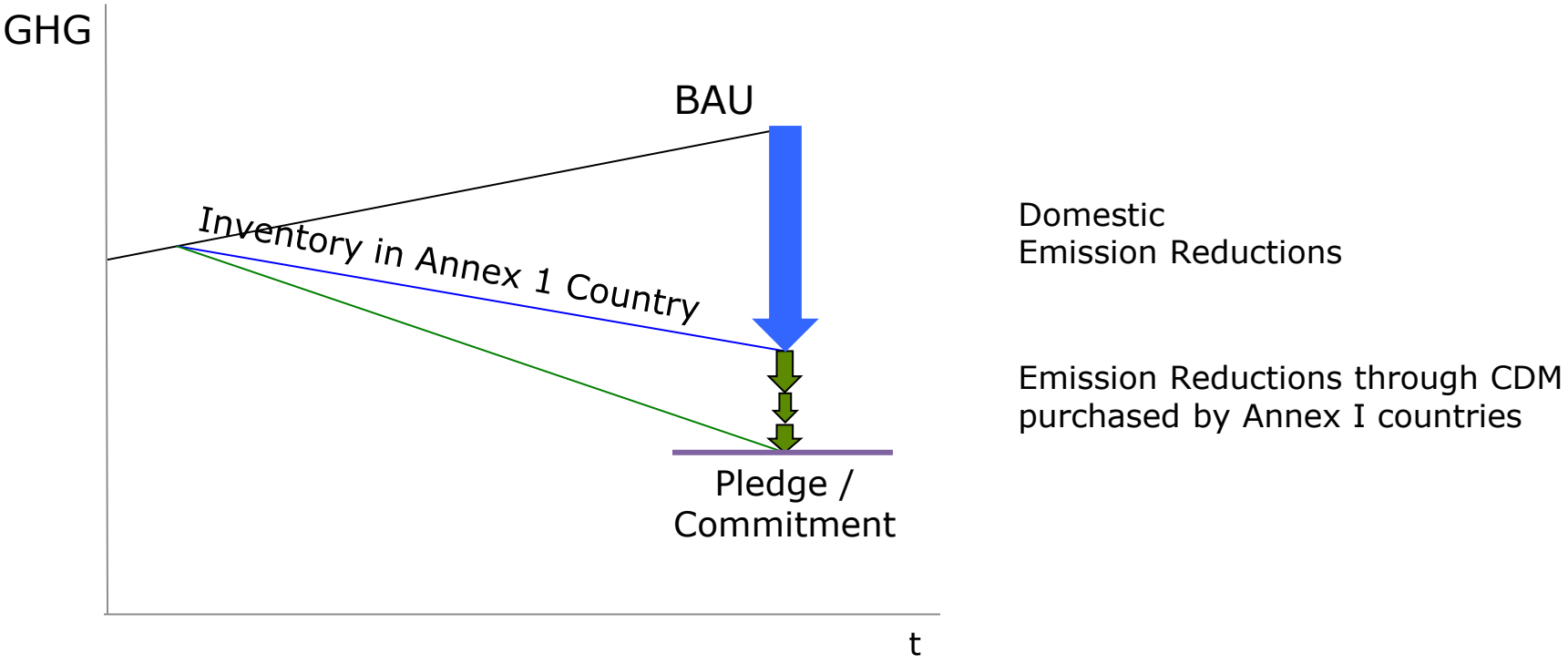
Approved baseline and monitoring methodology AM0106

"Energy efficiency improvements of a lime production facility through installation of new kilns"

Strict rules for MRV of emission reductions in CDM

Very specific for different types of measures / actions

UNFCCC MRV – Clean Development Mechanism (CDM)



Since emission reductions from CDM projects are **traded internationally** and can be used to fulfil mitigation commitments **– certification rules need to be strict**

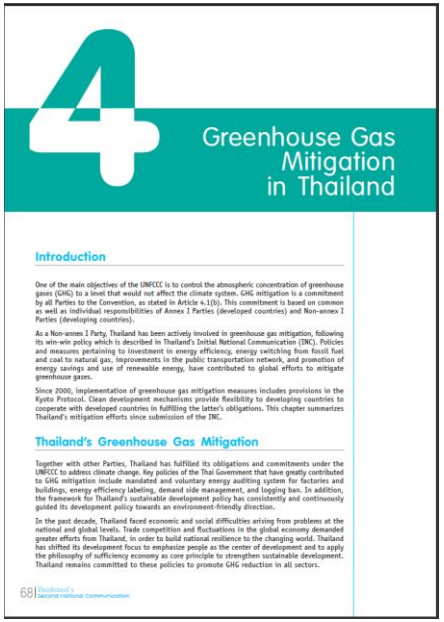
"A ton is a ton!"

UNFCCC MRV of domestic NAMAs

All countries need to report on their mitigation actions

Non-Annex 1 countries report on NAMAs in

- National Communications and
- Biennial Update Reports (BURs)



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Greenhouse Gas Mitigation in Thailand

Introduction

One of the main objectives of the UNFCCC is to control the atmospheric concentration of greenhouse gases (GHG) to a level that would not affect the climate system. GHG mitigation is a commitment by all Parties to the Convention, as stated in Article 4.1(b). This commitment is based on common as well as individual responsibilities of Annex I Parties (developed countries) and Non-annex I Parties (developing countries).

As a Non-annex I Party, Thailand has been actively involved in greenhouse gas mitigation, following its win-win policy which is described in Thailand's Initial National Communication (INC). Policies and measures pertaining to investment in energy efficiency, energy switching from fossil fuel and coal to natural gas, improvements in the public transportation network, and promotion of energy savings and use of renewable energy, have contributed to global efforts to mitigate greenhouse gases.

Since 2000, implementation of greenhouse gas mitigation measures includes provisions in the Kyoto Protocol. Clean development mechanisms provide flexibility to developing countries to cooperate with developed countries in fulfilling the latter's obligations. This chapter summarizes Thailand's mitigation efforts since submission of the INC.

Thailand's Greenhouse Gas Mitigation

Together with other Parties, Thailand has fulfilled its obligations and commitments under the UNFCCC to address climate change. Key policies of the Thai Government that have greatly contributed to GHG mitigation include mandated and voluntary energy auditing system for factories and buildings, energy efficiency labeling, demand side management, and logging ban. In addition, the framework for Thailand's sustainable development policy has consistently and continuously guided its development policy towards an environment-friendly direction.

In the past decade, Thailand faced economic and social difficulties arising from problems at the national and global levels. Trade competition and fluctuations in the global economy demanded greater efforts from Thailand, in order to build national resilience to the changing world. Thailand has shifted its development focus to emphasize people as the center of development and to apply the philosophy of sufficiency economy as core principle to strengthen sustainable development. Thailand remains committed to these policies to promote GHG reduction in all sectors.

68 | Thailand's Second National Communication

Thailand's 2nd National Communication, 2011

What needs to be reported?

NAMA MRV Guidelines

In BURs is should be reported (in tabular format):

- **Name and description of the mitigation action**,
- **Information on methodologies**;
- **Steps taken or envisaged to achieve that action;**
- Information on
  - **the progress of implementation**
  - **estimated outcomes**
    (metrics depending on type of action)
  - **estimated emission reductions**,
    to the extent possible;

Full Text of Guidelines on NAMA MRV
(adopted in Durban 2011)

FCCC/CP/2011/9/Add.1

IV. Mitigation actions

11. Non-Annex I Parties should provide information, in a tabular format, on actions to mitigate climate change, by addressing anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol.

12. For each mitigation action or groups of mitigation actions including, as appropriate, those listed in document FCCC/AWGLCA/2011/INF.1, developing country Parties shall provide the following information to the extent possible:

(a) 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;

(b) Information on methodologies and assumptions;

(c) Objectives of the action and steps taken or envisaged to achieve that action;

(d) 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 extent possible;

(e) Information on international market mechanisms.

13. Parties should provide information on the description of domestic measurement, reporting and verification arrangements.

http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf

NAMA MRV Guidelines
(Warsaw decisions)

…. "Developing country Parties are encouraged to utilize existing domestic processes, arrangements or systems, including domestically available information, methodologies, experts" …

Conclusion

- Choice of how MRV System for NAMAs is designed is up to host country
- No formal UNFCCC methodologies

➢ **Method should match type of action**

Full Text of Guidelines on NAMA MRV
(adopted in Warsaw 2013)

FCCC/CP/2013/10/Add.2

Annex

General guidelines for domestic measurement, reporting and verification of domestically supported nationally appropriate mitigation actions by developing country Parties

A. Principles

1. These guidelines are general, voluntary, pragmatic, non-prescriptive, non-intrusive and country-driven, take into account national circumstances and national priorities, respect the diversity of nationally appropriate mitigation actions (NAMAs), build on existing domestic systems and capacities, recognize existing domestic measurement, reporting and verification systems and promote a cost-effective approach.[1]

B. Purpose

2. The purpose is to provide general guidelines, for voluntary use by developing country Parties, based on the above-mentioned agreed principles, to describe the domestic measurement, reporting and verification of domestically supported NAMAs.

C. Recognizing, using and reporting on the domestic measurement and verification of nationally appropriate mitigation actions

3. Developing country Parties are encouraged to utilize existing domestic processes, arrangements or systems, including domestically available information, methodologies, experts and other aspects, for domestic measurement, reporting and verification. 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.

4. Developing country Parties may, taking into account national circumstances, capacities and national priorities, indicate the general approach adopted:

(a) To establish, when appropriate, and/or recognize, 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.

10th plenary meeting
22 November 2013

[1] FCCC/SBSTA/2012/5, paragraph 89.

17

http://unfccc.int/resource/docs/2013/cop19/eng/10a02.pdf

MRV of CDM vs. MRV of NAMAs

MRV of CDM
is like a school uniform

One rule for each school

All pupils dress the same

MRV of NAMAs
is like business dress code

It is very important to look good

but everyone looks a little different

So if you want to present your NAMA to the UNFCCC,

make sure it is properly dressed – including a credible MRV system

Overview table of characteristics

	GHG Inventories	CDM Projects	NAMAs
What should be MRVed?	GHG **emissions**	GHG emission **reductions**	GHG emission **reductions**
Who defines MRV system?	Strong guidance by UNFCCC	Strict rules by UNFCCC	Thai NAMA developer; Weak guidance by UNFCCC
MRV Approach	Inventories - Monitoring	Impact Assessment – Bottom-up evaluation	Impact Assessment – Bottom-up evaluation or top-down evaluation

For supported NAMAs,
donors will ask for strict monitoring & evaluation (MRV)

Supported NAMA MRV

MRV requirements will mirror different objectives of support programs and may include:

- **Direct GHG emission reductions**
  Whereever quantification is possible – this should be done!
- If quantification of GHG reduction is difficult - **other outcomes** need to be MRVed (trainings held, policies passed, regulations implemented, units installed etc.)
- Contribution to transformational change
- Other benefits towards **sustainable development**
  (air pollution, poverty reduction etc.)

This is policy impact assessment – bottom up methodology required

Example of a supported NAMA
The Mexican Housing NAMA

It promotes the **penetration of basic efficiency standards** in the entire new housing market in Mexico by means of:

- **technical assistance** to large public housing financiers and housing developers and
- **financial incentives** and project-related technical support for small and medium sized developers and financial intermediaries.

NAMA facility project (2013 – 2019): 14 million € (570 million THB)

Scalable to loans 26 billion THB and grants 3 billion THB (UNFCCC NAMA registry)

Elaborate and precise MRV system due to:

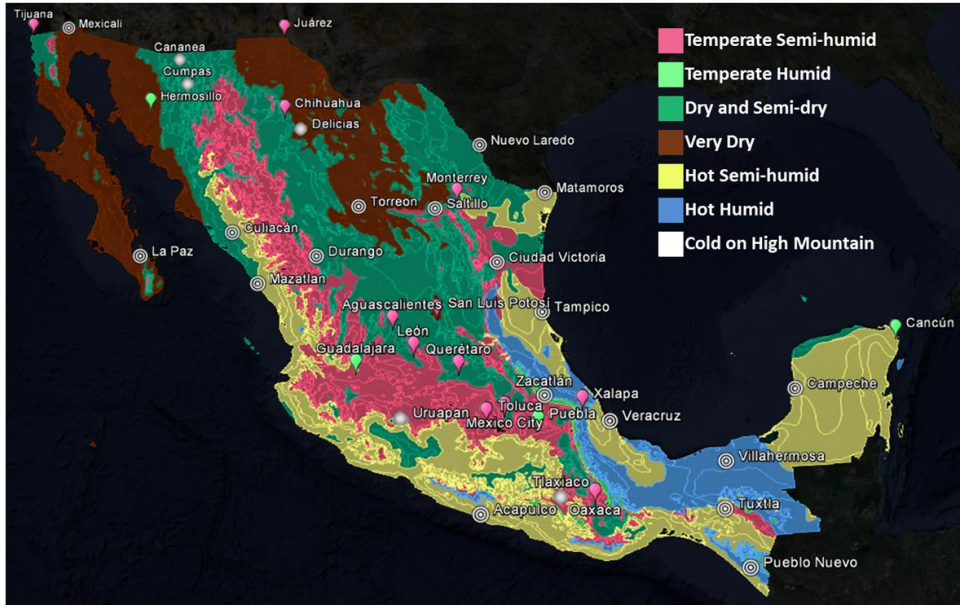
- **Initial objective to use carbon market as potential funding source**
- **Need to account for 7 different climatic zones**

The Mexican Housing NAMA GHG MRV System

MRV system includes GHG monitoring:

- **Sample of 60 (out of 500) houses with measured annual energy consumption**
- **Sample of 2 (out of 500) houses with detailed measurements** (monthly energy consumption, room temperature, humidity, use of appliances etc.)
  min. 1 sample for each climatic zone

Parameter	Unit	Frequency of collection	Source
Electricity Consumption	kWh	Bimonthly Aggregated annually	CFE Electricity Meter
Gas Consumption	Litres	Annually	Gas Meter (to be installed) or simulation
Water Consumption	Litres	Aggregated annually	CONAGUA water Meter
Occupancy	Persons	Annually	Survey



MRV system delivers valuable information to improve energy efficiency in buildings

Source: http://www.conavi.gob.mx/images/documentos/sustentabilidad/2_NAMA_for_Sustainable_New_Housing_with_Technical_Annex.pdf

Conclusions on MRV of NAMAs

NAMA MRV in general:

- **Aim: measure to which degree the NAMA objectives were fulfilled**
  (GHG emission reduction, energy savings, sustainable development benefits)
- **Approach: Impact assessment of policies**
  Method depends on policies, country framework, data availability

Domestic NAMA:

- **MRV systems should first serve country knowledge needs**
  and second deliver information for international reporting UNFCCC

Supported NAMA:

- **MRV system must mirror donors objectives**
- **MRV must measure impact of NAMA**
  Bottom-up approach most suitable
- **Development of elaborate MRV system, can be part of support**

NAMA MRV
What to report to Whom?

Forum Who to report to?	**Objective** Why to report?	**Required Information** What to report?
Domestic	Inform domestic decision-making and planning processes; respond to stakeholder demand	Based on country standards: Cost, sustainable development benefits energy savings, emission reductions
International Donor	Attract climate finance (ex-ante) Account for successful implementation (ex-post)	GHG emission reductions Costs Sustainable development benefits
UNFCCC NAMA Registry	Gain international recognition for efforts and potentially attract climate finance	GHG emission reductions Costs General Information
UNFCCC Biennial Update Reports (BURs)	International reporting on efforts to address climate change	Estimated GHG emission reductions (ex-ante and ex-post) Information on progress of implementation

Further Reading

Overview on decisions and guidelines on NAMA MRV available at

http://unfccc.int/files/national_reports/non-annex_i_natcom/training_material/methodological_documents/application/pdf/mitigation_actions_and_their_effects_281013.pdf

INDCs:

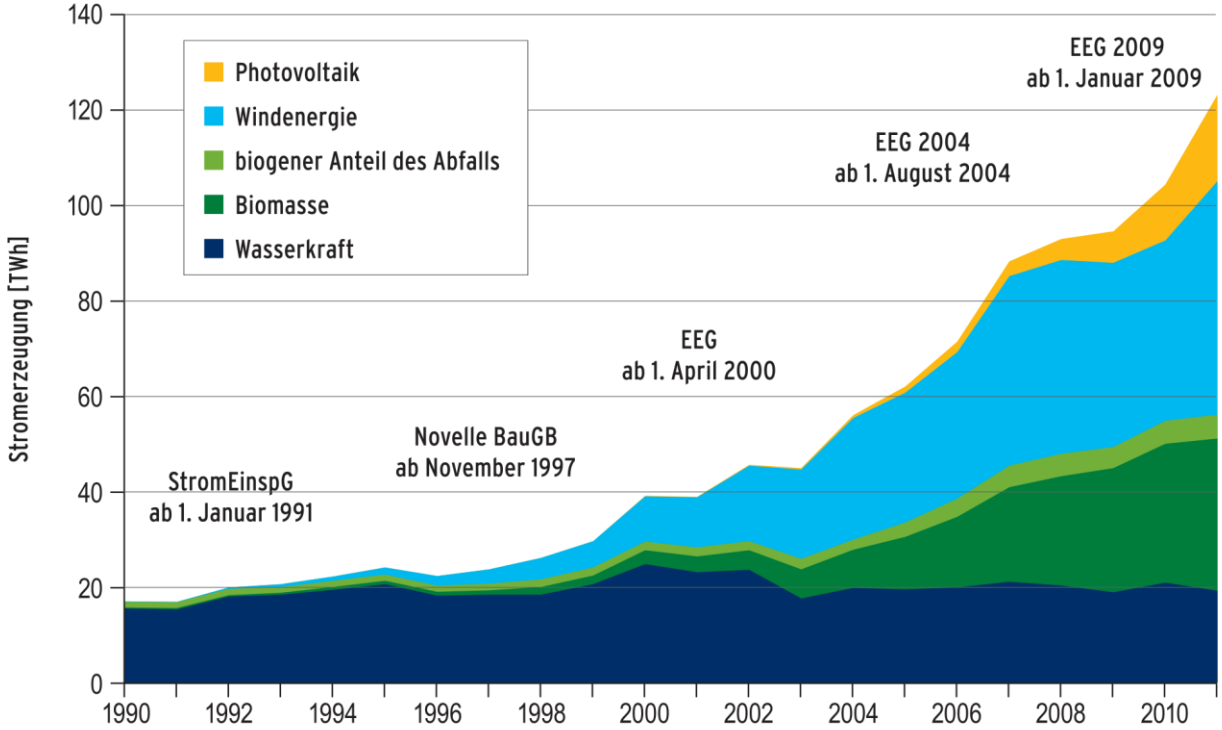
http://mitigationpartnership.net/intended-nationally-determined-contributions-indcs

http://www.ecofys.com/en/publication/intended-nationally-determined-contributions-under-the-unfccc

Impact of Renewable Energy Support in Germany

Fundamental Assumption:
All renewable power generation would not happen if there was no support scheme.

All renewable power is due to feed-in tariff.
(or predecessor support scheme)

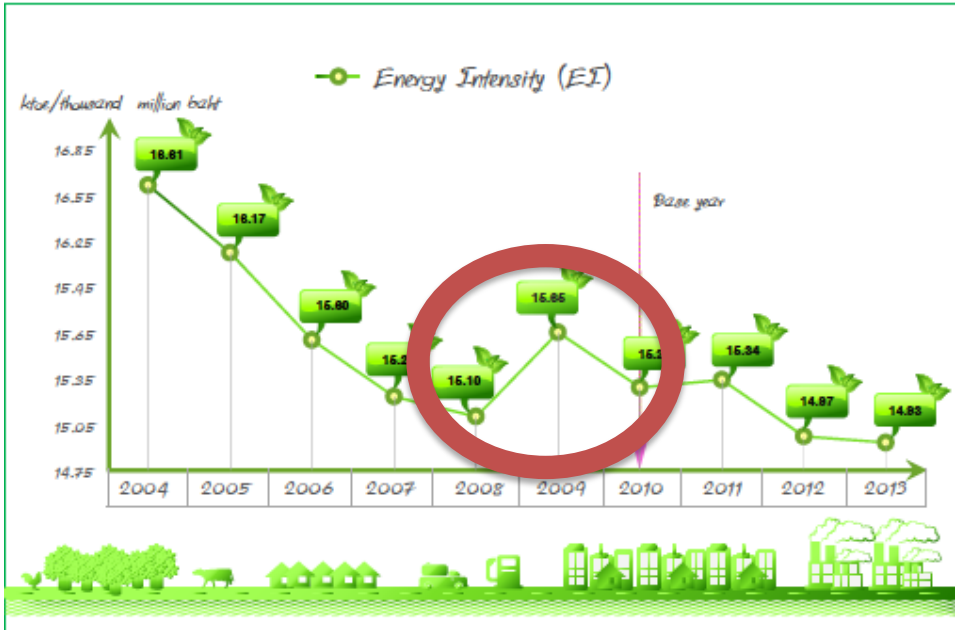


Thus, monitoring of electricity produced = evaluation of policy impact.

The "Inventory Perspective": Statistical Indicators (2)

However: Development of indicators depends on many factors:

- Population
- Economic development
- Structural change of economic sector
- Autonomous Efficiency Improvement
- Policies and Measures (i.e. for energy efficiency)



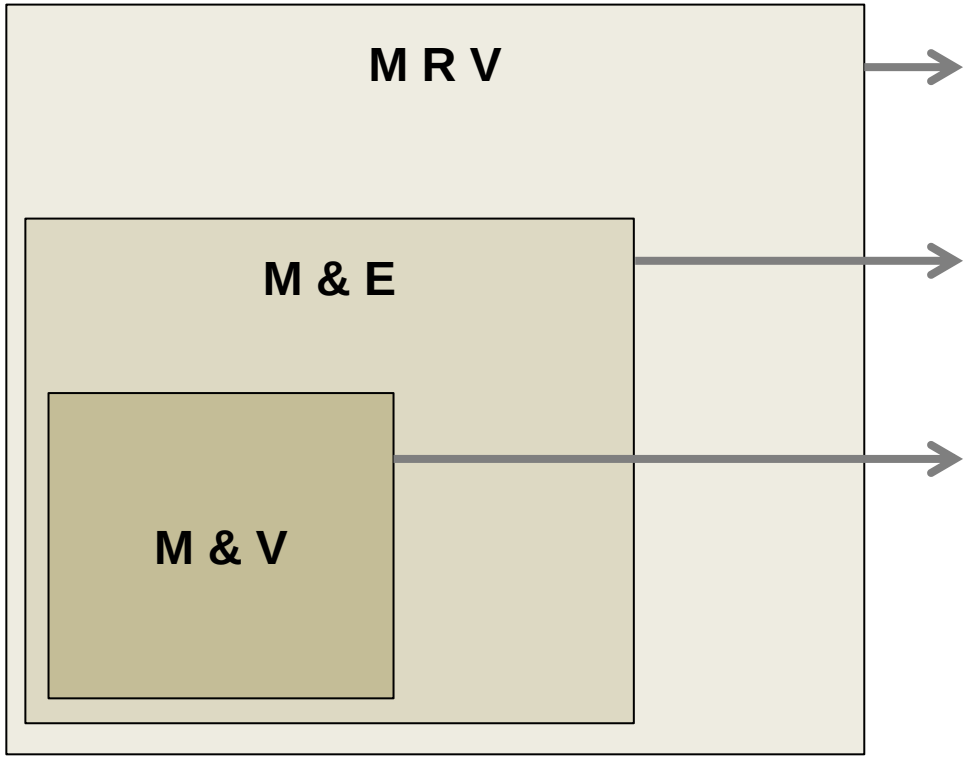
Source: DEDE 2013

- Development of energy use and intensity can be influenced by many different factors; energy efficiency and policy is only one of them

MRV / M&E / M&V - Overview

For energy efficiency actions / energy savings / GHG reduction

Layers of Impact Assessment



Reports to UNFCCC

Informs national policy making

Assessment at project or installation level

(Note that MRV of GHG emissions is different – inventory perspective)