

TAIEX/ECRAN Regional Training Seminar on assessment of GHG Inventories in Waste

Hotel Bristol Sarajevo
Fra Filipa Lastrica 2
Sarajevo
24-25 November 2015

Introduction

Workshop Overview: Day 1

- Introduction
- Background: Methods and Reporting
- Country Waste Inventories. “State of Play”
 - Croatia, Bosnia and Herzegovina, Albania, Montenegro, Kosovo*, Serbia, Turkey, Former Yugoslav Republic of Macedonia
- Waste National Systems
 - Céline Gueguen (Examples of Good Practice)
- Methods, Data Sources and Assumptions
 - Hans Oonk (Insights and lessons learned)
- Break out Groups & Discussion on National Systems and Methods and Data sources: “Key questions”
 1. *What key institutional arrangements are in place?*
 2. *What key institutional arrangements are needed?*
 3. *What tier 2/3 methods are being used successfully?*
 4. *Where are improvements to methods, data sources and assumptions needed?*

Workshop Overview: Day 2

- Tools for Waste compilation & QA/QC
 - Richard Claxton & Juraj Farkas
- Tools for Waste compilation & QA/QC: Break out Groups & Discussion: Key Questions.
 - *What practical tools and QA/QC techniques do you apply?*
 - *What tools and QA/QC activities are missing?*
- Practical Exercises working on your estimates
 - Putting into practice some of our discussions.
 - Hands on, Expert clinic.
 - *What did you learn from each other?*
 - *What are your priorities for future development?*
- Reporting Back from Practical exercise.
 - Achievements from the workshop
 - Priorities for further improvement
- Wrap-up, Next Steps
 - Outline follow-on workplan

Objectives

- Waste estimates suitable for MMR reporting:
 - Filling Gaps & identifying improvement needs.
 - Sharing experiences on:
 - **Methods** = 2006 IPCC, **Data sources & Assumptions** = Country specific EFs, National Statistics, Surveys, Local Expert judgement
 - Level of detail (**CRF reporting**)
 - Ensuring suitable **quality** (TCCCA).
 - QA/QC
 - Transparency (NIR)

Background and Technical Objectives

What is a National “Inventory” System

A team of organisations (people), available resources and agreed processes and tools focussed on efficiently and repeatedly:

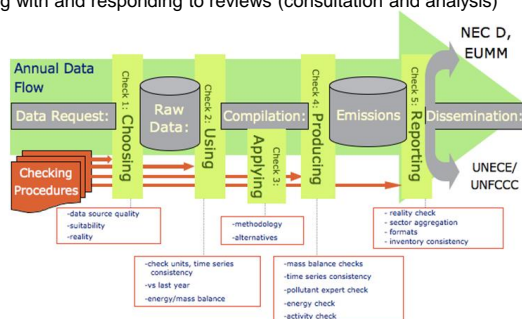
- **Estimating & reporting** GHGs of timely & “acceptable quality” (TCCCA)
- **Engaging** with external review activities (verification) and the outside world!
- **Improving estimates** and **evolving its-self** (the National System) to fit with governance structures and data suppliers.

It is one of the foundations for MRV



Key National System: Activities

- **Data Flow:** Collecting data, estimating emissions/removals, reporting & archiving.
 - Methods & data (e.g. official statistics and country specific EFs/research, 2006 IPCC).
 - Applying expert judgement, using tools for analysis, aggregation, QA/QC & archiving.
- **Quality and continuous improvement.**
 - Understanding weaknesses and prioritising improvement.
 - QA/QC plan, quality objectives, implementation and documentation.
 - General and sector specific, verification of the inventory data
 - engaging with and responding to reviews (consultation and analysis)

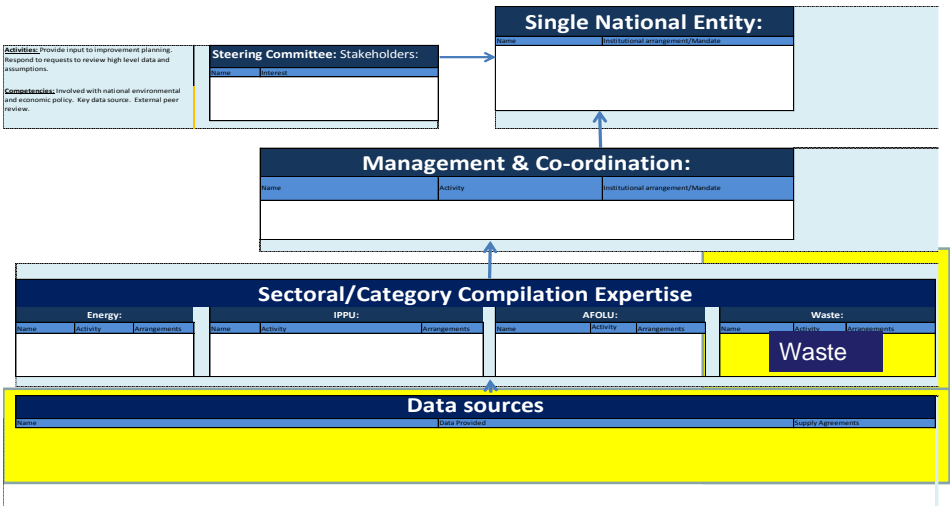


National System: Institutional Arrangements

- A National Entity:
 - Responsible for the outputs
- Management/Co-ordination
 - Co-ordination entity: Finding and retaining the resources, skills & tools needed for a good quality GHG inventory.
 - Establish and maintain the institutional, legal and procedural arrangements
 - Define and allocate specific responsibilities
 - Ensure sufficient capacity for timely performance of the functions
 - Archiving

- Compilation Expertise
 - Co-ordinators to organise the work undertake QA/QC and bring things together on time.
 - Sector experts that understand the data & emitting/removal processes.
 - Strong links to national networks of technical experts and data sources for sector/category.
- Data sources
 - Data owners and suppliers
 - National Statistics

National System: Institutional Arrangements



Methods and Guidelines

- 2006 IPCC
- <http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol5.html>

Task Force on National Greenhouse Gas Inventories

ipcc
INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP

IPCC web sites

Publications

2006 IPCC Guidelines for National Greenhouse Gas Inventories

2006 IPCC Guidelines Top

- Vol.1 GGR
- Vol.2 Energy
- Vol.3 IPPU
- Vol.4 AFOLU
- Vol.5 Waste

2006 IPCC Guidelines for National Greenhouse Gas Inventories
Volume 5
Waste

Chapter	Chapter Name
-	Cover Page of Volume 5
1	Introduction
2	Waste Generation, Composition, and Management Data
3	Solid Waste Disposal *1 IPCC Waste Model (MS Excel)
4	Biological Treatment of Solid Waste *9
5	Incineration and Open Burning of Waste
6	Wastewater Treatment and Discharge *1
Annex 1	Worksheets *6

*1: Corrected chapter(s) as of April 2007.
*6: Corrected chapter(s) as of August 2011.
*9: Corrected chapter(s) as of July 2015.

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2006 IPCC Guidelines for
National Greenhouse Gas Inventories
Volume 5
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Environment and Climate
Regional Accession Network **ECRAN**

Waste Reporting (CRF)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO ₂ ⁽¹⁾	CH ₄	N ₂ O	NO _x	CO	NM VOC	SO ₂
	(kt)						
Total waste	252.11	822.12	5.67	1.51	24.15	7.31	0.70
A. Solid waste disposal	NO,NE	659.95		NO,NE	NO,NE	2.38	
1. Managed waste disposal sites	NO,NE	659.95		NE	NE	2.38	
2. Unmanaged waste disposal sites	NO	NO		NO	NO	NO	
3. Uncategorized waste disposal sites	NO	NO		NO	NO	NO	
B. Biological treatment of solid waste		28.52	2.03	NE	NE	NE	
1. Composting		25.42	1.91	NE	NE	NE	
2. Anaerobic digestion at biogas facilities		3.11	0.13	NE	NE	NE	
C. Incineration and open burning of waste	252.11	0.40	0.15	1.51	24.15	4.93	0.70
1. Waste incineration	252.11	0.07	0.15	1.14	6.09	2.15	0.70
2. Open burning of waste	NO,NE	0.33	NO,NE	0.37	18.07	2.78	NE
D. Wastewater treatment and discharge		133.25	3.49	NO,NE	NO,NE	NO,NE	
1. Domestic wastewater		29.04	3.49	NE	NE	NE	
2. Industrial wastewater		104.21	NE	NE	NE	NE	
3. Other (as specified in table 6.B)		NO	NO	NO	NO	NO	
E. Other (please specify)	NO	NO	NO	NO	NO	NO	NO
Memo item: ⁽²⁾	NE						
Long-term storage of C in waste disposal sites	NE						
Annual change in total long-term C storage	NE						
Annual change in total long-term C storage in HWP waste ⁽³⁾	NE						

5.A. Solid Waste Disposal

- Managed solid waste disposal (SWD)
 - Anaerobic & Semi Anaerobic
- Unmanaged SWD
- Uncategorised SWD
- Amount sent to SWD (kt), CH4 flared & recovered (kt), Emissions (kt/yr)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER			IMPLIED EMISSION		EMISSIONS			
	Annual waste at the SWDS	MCF	DOC _f	CH ₄ ⁽¹⁾	CO ₂	CH ₄			CO ₂ ⁽⁴⁾
						Emissions ⁽²⁾	Amount of CH ₄ flared	Amount of CH ₄ for energy recovery ⁽³⁾	
				(kt)	%	(t/t waste)	(kt)		
1. Managed waste disposal sites	19,266.07			0.04	NO,NE	659.9456802	124.6466903	1033.8	NO,NE
a. Anaerobic	19,266.07	1.00	16.91	0.04	NE	659.95	124.65	1,033.80	NE
b. Semi-aerobic	NO	NA	NA	NO	NO	NO	NO	NO	NO
2. Unmanaged waste disposal sites	NO	NA	NA	NO	NO	NO	NO	NO	NO
3. Uncategorized waste disposal sites	NO	NA	NA	NO	NO	NO	NO	NO	NO

5.B. Biological Treatment of Solid Waste

- Municipal Solid Waste or other waste
 - Composting & Anaerobic Digestion
 - Amount treated (kt dm)
 - CH4 flared & recovered (kt)
 - Emissions (kt/yr)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		ACTIVITY DATA AND OTHER RELATED INFORMATION	IMPLIED EMISSION FACTOR		EMISSIONS			
	Annual waste amount treated	CH ₄ ⁽¹⁾	N ₂ O	CH ₄			N ₂ O	
				Emissions ⁽²⁾	Amount of CH ₄ flared	Amount of CH ₄ for energy recovery ⁽³⁾		
		(kt dm)	(g/kg waste)	(kt)				
1. Composting	2,541.81	10.00	0.75	25.42	NO		1.91	
Municipal solid waste	2,541.81	10.00	0.75	25.42	NO		1.91	
Other (please specify) ⁽⁴⁾	NO	NO	NO	NO	NO		NO	
2. Anaerobic digestion at biogas facilities ⁽⁵⁾	733.84	4.23	0.17	3.11	NA,NE	NA,NE	0.13	
Municipal solid waste	733.84	4.23	0.17	3.11	NE	NE	0.13	
Other (please specify) ⁽⁴⁾	NO	NO,NA	NO	NO	NA	NA	NO	

5.C. Waste Incineration & Open Burning

• Biogenic/Non Biogenic

- Waste burned (kt)
- Emissions (kt)

– Incineration

- Municipal Solid Waste
- Other e.g.
 - Sewage sludge
 - Clinical
 - Chemical

– Open Burning

- Municipal Solid Waste
- Other e.g.
 - Car fires
 - House fires

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA Amount of wastes (incinerated/open burned) (kt wet weight)	IMPLIED EMISSION FACTOR			EMISSIONS		
		CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O
		(kg/t waste)			(kt)		
1. Waste incineration	397.66	635.04	0.17	0.37	252.11	0.07	0.15
Biogenic ⁽¹⁾	165.29	NO	0.39	0.80	NO	0.06	0.13
Municipal solid waste	NO	NO	NO	NO	NO	NO	NO
Other (please specify) ⁽²⁾	165.29	NO	0.39	0.80	NO	0.06	0.13
Sewage Sludge	165.29	NO	0.39	0.80	NO	0.06	0.13
Non-biogenic	231.72	1,085.02	0.01	0.07	252.11	0.09	0.02
Municipal solid waste	NO	NO	NO	NO	NO	NO	NO
Other (please specify) ⁽³⁾	231.72	1,085.02	0.01	0.07	252.11	0.09	0.02
Clinical Waste	97.54	836.00	0.02	0.03	81.55	0.00	0.00
Other (please specify)	134.18	1,271.23	NE	0.10	170.57	NE	0.01
Chemical Waste	134.18	1,271.23	NE	0.10	170.57	NE	0.01
2. Open burning of waste	52.48	NO/NE	6.32	NO/NE	NO/NE	0.33	NO/NE
Biogenic ⁽⁴⁾	NO	NO	NO	NO	NO	NO	NO
Municipal solid waste	NO	NO	NO	NO	NO	NO	NO
Other (please specify)	NO	NO	NO	NO	NO	NO	NO
Non-biogenic	52.48	NO/NE	6.32	NO/NE	NO/NE	0.33	NO/NE
Municipal solid waste	NO	NO	NO	NO	NO	NO	NO
Other (please specify)	52.48	NE	6.32	NE	NE	0.33	NE
Accidental vehicle fires	6.38	NE	5.00	NE	NE	0.03	NE
Accidental building fires	46.10	NE	6.50	NE	NE	0.30	NE

5.D. Wastewater treatment

• Domestic & Industrial Wastewater treatment

- Total Organic product & Sludge removed (ktDC/yr) & N in effluent (kt N/yr)
- CH₄ recovered (kt)
- Emission CH₄, N₂O (kt)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND RELATED			IMPLIED EMISSION		EMISSIONS			
	Total organic product	Sludge removed ⁽¹⁾	N in effluent	CH ₄ ⁽²⁾	N ₂ O ⁽³⁾	CH ₄			N ₂ O ⁽³⁾
						Emissions ⁽⁴⁾	Amount of CH ₄ flared	Amount of CH ₄ for Energy Recovery ⁽⁵⁾	
	(kt DC ⁽⁶⁾ /yr)		(kt N/yr)	(kg/kg DC)	kg N2O- N/kg N				
1. Domestic wastewater	1,597.93	NA	284.16	0.02	0.01	29.04	0.26	1.19	3.49
2. Industrial wastewater	595.50	NE	NE	0.18	NE	104.21	NA	NA	NE
3. Other (<i>please specify</i>)	NO	NO	NO	NO,NA	NO	NO	NA	NA	NO

National Inventory Report

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