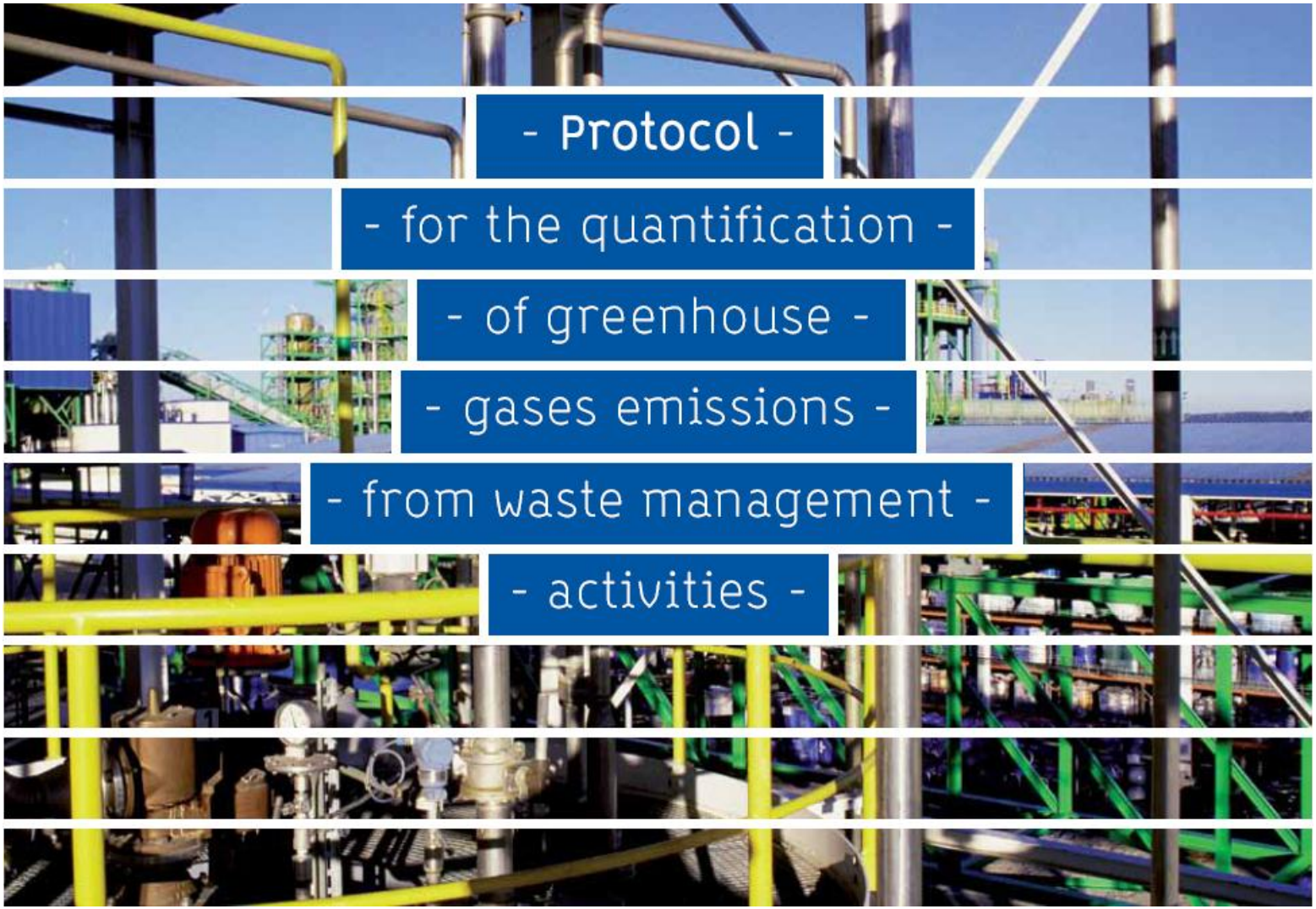

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ISWA/UNEP GHG Accounting Workshop

19 & 20th of September 2013

- Outline -

- Purposes & Brief History
- Main characteristics
- Use at a city level

- Purposes & Brief History -

- The Waste Sector Protocol, what is it for? -

- Method and tool for calculation and reporting of GHG emissions associated with a waste management service, over a specific time period (usually one year) and based on simple operational data associated with the considered period

- *Example of use : annual GHG emissions inventory verified by external auditors*

- Purposes -

- Providing a consistent and transparent approach to quantify, report and verify greenhouse gases direct and indirect emissions of waste management actors
- Establishing best practice across the Waste Sector for the implementation of a coherent and homogeneous annual GHG emissions reporting
- Helping Waste Sector to explain its particularities in terms of GHG emissions *(complex emission for landfills, GHG avoided emissions, carbon sequestration, uncertainties)*
- Helping companies to take proper commitments and stakeholders to understand and verify those commitments

- The Waste Sector Protocol fills the gap -

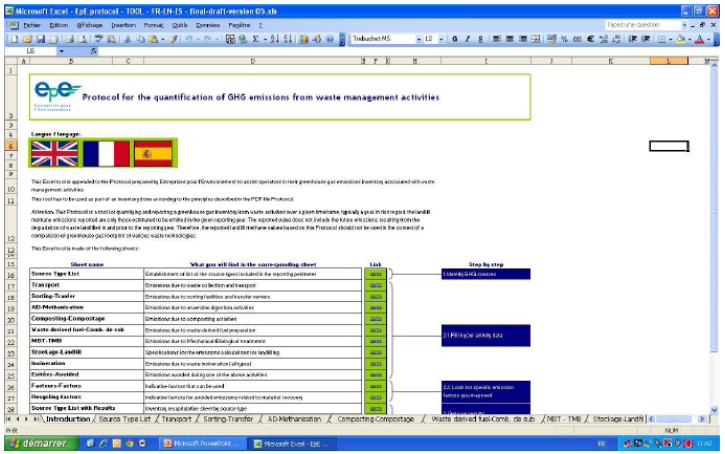
Reporting Methods	Reporting Level	Purpose	Examples
Mandatory national reporting of GHG emissions	National	National GHG reporting for the Nations who signed the UNFCCC	IPCC (Intergovernmental Panel on Climate Change) Methodologies
Mandatory/Regulatory annual reporting for regulated facilities covering numerous parameters including GHGs	Installation	Regulations for integrated pollution prevention and control. These reporting requirements help to improve public access to information on the environment.	Pollutant Release and Transfer Register (PRTRS) - (Europe)
		Reporting specific to GHG emissions in the framework of cap and trade systems.	ETS directive (guidelines for monitoring and reporting GHG emissions from covered installations)
Annual Reporting Protocols to prepare GHG inventory for companies, local governments, or facilities (often on a voluntary basis)	Company/ local government organisation	Regular GHG reporting on the organisational level.	GHG Protocol (WRI / WBCSD) EpE Waste Sector Protocol (2007) ISO 14064
Life Cycle Analysis used in decision making or planning support	Various (National, regional, local)	LCA modelling of waste management systems is carried out in order to form a technical and environmental platform for decision making.	ISO 14048
Carbon Trading Project Mechanisms	Project	Different project-based flexible mechanisms are operational. The estimation of their emission reductions is obtained through a "baseline versus project" approach	CDM approved methodologies Voluntary project standards Offset protocols (CCX, RGGI...) CCAR landfill protocol... GHG Protocol for Project Accounting

Taken from page 35 of the ISWA White Paper « Waste and Climate Change »

- From V0 to V5 -

Protocol Content

- A manual presenting guidelines
- A calculation excel tool
- Answers to Frequently Asked Questions



Brief History

- Published for the first time in 2006
- Main editor : EpE Working Group / Main reviewers : FEAD, CEWEP, FNADE, DWMA, ADEME, CITEPA, ESA
- Version 4 (June 2010) endorsed by FEAD, FNADE, ESA, CEWEP, ASEGRE and DWMA in 2011
- Remains on a continuous improvement path to take into account last developments in matter of GHG accountings
- Languages available : English, Spanish *(translation performed by ASEGRE)* & French

- Working to be an International Reference -

WRI Review

- Full review of the Protocol undertaken in 2012 by the World Resource Institute (WRI) to ensure that it conforms with the requirements of the GHG Protocol and **to obtain label "Built on the GHG Protocol"**
- Revision of the Protocol based on the WRI comments **>> V5**
- Review & comment of the revised Protocol by various agencies and associations
- Labeling expected by the end of the year 2013

WORLD RESOURCES INSTITUTE

BUILT ON GHG PROTOCOL

Tools or documents that have been reviewed by the GHG Protocol, are in conformance with methodology and requirements set forth in the standard, are publically and freely available, and included public stakeholder feedback during development.

A tool or document given the "Built on GHG Protocol Mark" does not have access to the GHG Protocol Logo.

Future evolution

- Constitution of an international Working Group comprised of members of associations that will endorse the Protocol V5

2

- Main Characteristics -

- Creating a GHG Emissions Inventory, step by step -

1. Setting Organisational Boundaries
2. Setting Operational Boundaries
3. Collecting Data
4. Calculating GHG emissions
5. Presenting GHG inventory
6. Verifying GHG inventory
7. Establishing an emissions reduction plan & setting a reduction target

Steps covered by the Guidelines of the Waste Sector Protocol

Step not directly covered by the Guidelines of the Waste Sector Protocol

>> Reference to the GHG Protocol Corporate Standard

- Organisational Boundaries -

- To be defined according to operational control approach
- Guidelines for adjustments from a reporting period to the next

- Operational Boundaries -

Gases covered : CO_2, CH_4, N_2O, SF_6, HFCs, PFCs

Emissions category covered :

- Scopes 1 & 2
- Biogenic CO_2 emissions *(reported separately from scopes 1&2 emissions)*
- Avoided emissions *(reported separately from scopes 1&2 emissions)*
- Carbon sequestration for information only

Source types covered :

Application of the completeness principle / better to include all sources even though with high uncertainty

Dedicated sheet in the Excel Tool for helping the user

- Emissions sources types covered (1/2) -

Activity	Direct Emissions	Indirect Emissions Sources	Avoided Emissions Sources	Biogenic CO_2 sources
Collection & Transportation	-> CO_2 from fuel consumption -> HFC from A/C leakages	-> CO_2 from electric vehicles -> CO2 from outsourced transport	N.A.	-> CO_2 from consumption of biofuels
Transfer	-> CO_2 from fuel consumption	-> CO_2 from purchased electricity consumption	N.A.	-> CO_2 from consumption of biofuels
Mechanical Pre-treatment (dismantling)	-> CO_2 from fuel consumption	-> CO_2 from purchased electricity consumption	N.A.	-> CO_2 from consumption of biofuels
Sorting, Recycling & Recovering	-> CO_2 from fuel consumption -> HFC emissions from WEEE dismantling	-> CO_2 from purchased electricity consumption	-> Potential avoided GHG emissions corresponding to the difference between virgin raw material production emissions and material recovery emissions -> Potential avoided GHG emissions corresponding to the difference between burning fossil fuel and solid recovered fuels (SRF)	-> CO_2 from consumption of biofuels
Physico-chemical waste treatment	-> CO_2 from fuel consumption	-> CO_2 from purchased electricity consumption	-> Potential avoided GHG emissions corresponding to the difference between burning fossil fuel and alternative fuels	-> CO_2 from consumption of biofuels
Biological Treatment (composting)	-> CO_2 from fuel consumption -> Process emissions (CH_4 and N_2O)	-> CO_2 from purchased electricity consumption	-> Potential avoided GHG emissions corresponding to the difference between use of chemical fertilizer and compost spreading	-> CO_2 from consumption of biofuels -> Process emissions

- Emissions sources types covered (2/2) -

Activity	Direct Emissions	Indirect Emissions Sources	Avoided Emissions Sources	Biogenic CO_2 sources
Biological Treatment (Anaerobic Digestion)	-> CO_2 from fuel consumption -> Process emissions (CH_4 and N20)	-> CO_2 from purchased electricity consumption	-> Potential avoided GHG emissions corresponding to the difference between energy production and energy recovered from AD process	-> CO_2 from consumption of biofuels -> Process CO_2 emissions -> CO_2 from biogas combustion
Landfill	-> CO_2 from fuel consumption -> Diffuse CH_4 emissions -> CH_4 from incomplete landfill gas combustion	-> CO_2 from purchased electricity consumption	-> Potential avoided GHG emissions corresponding to the difference between energy production and energy recovered from landfill gas	-> CO_2 from consumption of biofuels -> Diffuse CO_2 & oxidised CH_4 emissions -> CO2 from landfill gas combustion process
Incineration	-> CO_2 from fuel consumption -> N20 process emissions -> CO_2 process emissions (only the fossil carbon share of the waste)	-> CO_2 from purchased electricity consumption	-> Potential avoided GHG emissions corresponding to the difference between energy production and energy recovered from landfill gas. -> Potential avoided GHG emissions corresponding to the difference between virgin raw material production emissions and material recovery emissions (slag and bottom ashes)	-> CO_2 from consumption of biofuels -> CO_2 process emissions (the biogenic carbone share of the waste)
Mechanical Biological Treatment (MBT)	-> CO_2 from fuel consumption -> Process emissions (CH_4, N20)	-> CO_2 from purchased electricity consumption	-> Potential avoided GHG emissions corresponding to the difference between energy production and energy recovered from the incineration process. -> Potential avoided GHG emissions corresponding to the difference between virgin raw material production emissions and material recovery emissions (compost production, alternative fuels, material recovery...)	-> CO_2 from consumption of biofuels -> Process emissions

- Data Used -

Data provided by the Excel tool

- Global Warming Potentials *(IPCC 4th Assessment Report, 2007)*
- Default emissions factors *(energy, process emissions, avoided emissions)* adapted to different geographic area when data is available.

  >> The Waste Sector Protocol do not impose the use of these emissions factors.

Data to be completed by the user in the Excel tool

- Quantity of waste treated and material recovered
- Type & amount of energy consumed
- Type & amount of energy produced and sold
- Specific emissions factors not provided by the Protocol or more accurate
- Diffuse emissions from landfills calculated from an external model

- Results Presentation -

- Different summary tables available in the Excel Tool
  - *Emissions synthesis per source types*
  - *Emissions synthesis per category (direct, indirect, biogenic CO_2, avoided)*
  - *Emissions synthesis per GHG*

- Guidelines regarding the content of a public GHG inventory report in the manual

- Strengths of the Waste Sector Protocol -

Comprehensive :

- Covers all the steps of the creation of a GHG emissions inventory
- Raises all the questions to which the users need to answer & provides answers or indications for each of these questions

Documented :

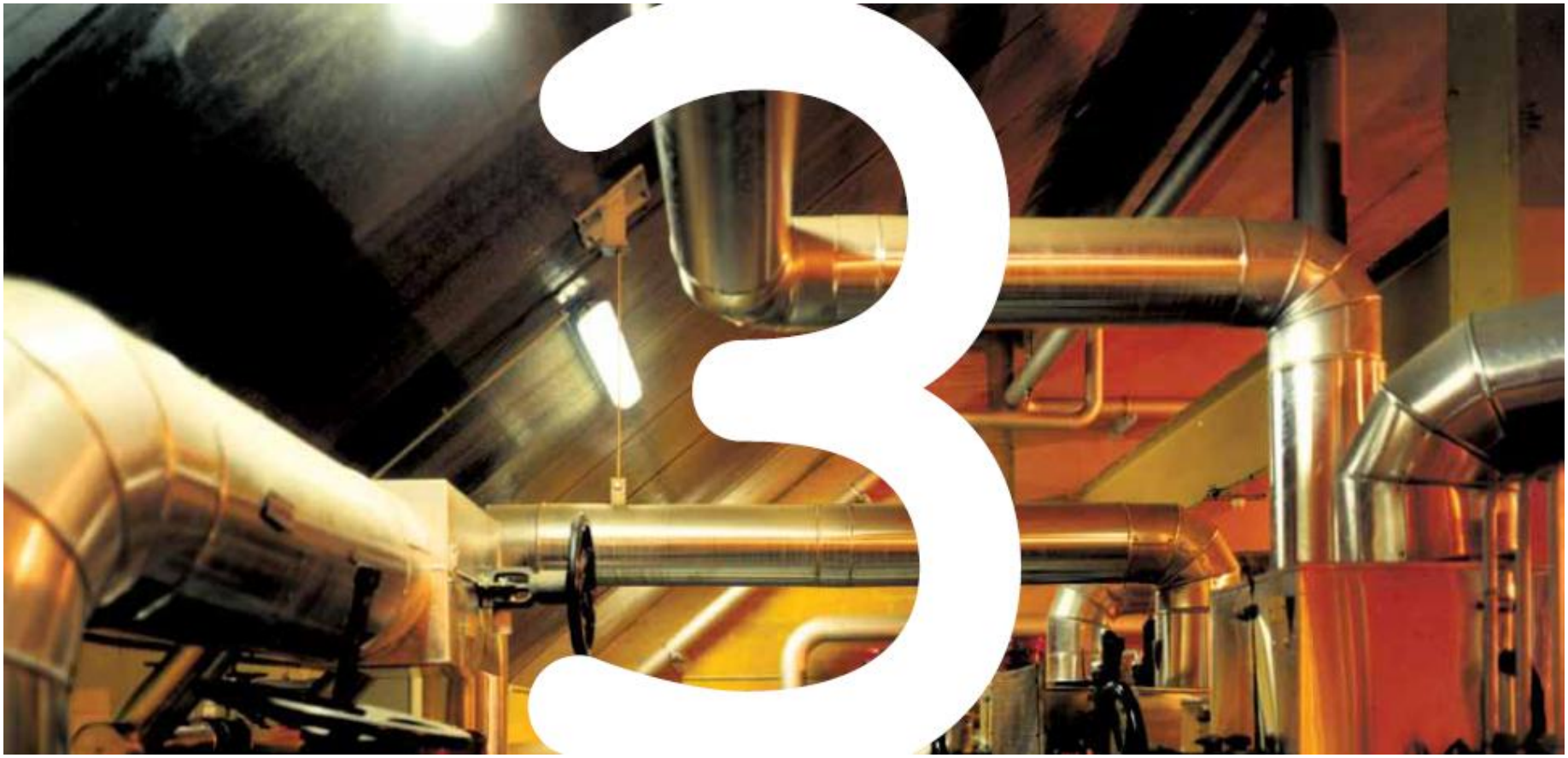
- Details specific issues in three annexes (diffuse emissions from landfills, carbon sequestration, emissions from composting)
- Compiles several emissions factors to facilitate the work of the user

On the way to becoming a international reference :

- “Built on GHG Protocol” labeling ongoing
- Several reviews conducted by various agencies & associations since its creation

Dynamic & customizable :

- A common set of rules to follow in matter of emissions calculations & presentation
- A possible customization to adapt to specific cases
- A possible inclusion of new GHG (ex : black carbon) / sources in a future release



- Use at a City Level -

- Could the Protocol be used at a City Level ? -

Yes, if the objective is to establish a GHG emissions inventory for a specific time period at the city level and follow the efficiency of a emissions reduction plan

> Collaboration with delegates & subcontractors necessary for collecting relevant and reliable input data

No, if the objective is to compare waste management scenarios at the city level, unless the landfill methane emissions are calculated over the life of the site (LCA approach required)

- Thank you for your attention -


- Protocol -
- for the quantification -
- of greenhouse -
- gases emissions -
- from waste management -
- activities -

- Annex -

- Summary of the Waste Sector Protocol's characteristics (1/4) -

Prepared by	EpE working group and several reviewers
Year of release	V0 in 2006, V4 in 2010, V5 scheduled for the end of 2013 after WRI's review
Open to public	Yes, Protocol available on EpE website in three different languages (French, English & Spanish)
Target group	Waste management actors
Intended use	GHG inventory over a specific time period
Methodology	Inventory approach (≠ LCA approach)
Geographic perimeter	Developing & emerging countries
Required user competence	Preliminary reading of the manual ; Use of MS Excel
Ease of use	Easy-to-use Excel-based tool
Scenarios comparison	Protocol not appropriate for comparison calculation. GHG inventory calculations are performed over a specific time period (ex : annual) which is not necessary consistent with a project lifespan

- Summary of the Waste Sector Protocol's characteristics (2/4) -

Gas considered	CO_2 fossil & biogenic, CH_4, N_2O, HCFs, PFCs, SF_6 *Carbon sequestrated (for information only)*
GWP	IPCC 2007 (time horizon : 100 years)
Transparency of calculation	Core principle of a GHG inventory ; Protocol highly recommends a verification by a third party ; Calculation sheet visible
Accuracy of calculation	Default emissions factors can be modified by the users ; Results accuracy depends on the accuracy of the input data ; Protocol gives some guidelines for uncertainty calculations & reduction
Output results	Tables & graphs with results aggregated to CO_2e and detailed per source types, emissions categories and GHG Guidelines to prepare the GHG inventory report in the manual

- Summary of the Waste Sector Protocol's characteristics (3/4) -

Applicable waste activities	• Collection & Transportation • Transfer • Mechanical pretreatment (dismantling) • Sorting • Recycling • Waste derived fuel preparation • Biological treatment (composting, anaerobic digestion, stabilisation) • Landfilling • Thermal treatment • Mechanical biological treatment

- Summary of the Waste Sector Protocol's characteristics (4/4) -

Main required input data	• Type and quantity of energy consumed / produced • Quantity of waste collected, sorted, treated, recycled • Waste composition (for instance for the calculation of CO2 emissions from thermal treatment) • Combustion efficiency of biogas combustion units • CH_4 and CO_2 emissions from landfills calculated with an external model • Specific emissions factors not provided by the Protocol or more accurate (specific SF6 and HFCs emissions for instance)