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USER NEEDS OF CLIMATE CHANGE STATISTICS FROM A GREENHOUSE GAS INVENTORY PERSPECTIVE -

GAINING SUPPORT FOR IMPROVED INVOLVEMENT OF NATIONAL STATISTICAL OFFICES

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I. INTRODUCTION

1. Quality improvements are intrinsic to the annual reporting of GHG inventories. Under the Kyoto Protocol each Party is required to set up a 'national system' for the estimation of emissions by sources and removals by sinks aimed at ensuring and improving the quality of GHG inventories through planning, preparation and management of inventory activities. These activities include collecting activity data, selecting the appropriate methods and emission factors, estimating GHG emissions/sinks, implementing QA/QC procedures and verification of national data.

2. More broadly, the discussion on the role of National Statistical Offices (NSOs) in climate change statistics is essentially linked to a better understanding of user needs, as active demandeurs of climate change statistics, existing gaps in statistical information and the value added NSOs can provide in filling those gaps. For example, the internal set-up (i.e. national system) to deliver high quality emission inventories varies from country to country. The actual role of NSOs in the national system and/or their involvement in the compilation process also varies from country to country. The key issue is however to ensure that the relevant statistical data is available and shared with national GHG inventory compilers. The quality of emission estimates reflects the quality of the national system.

3. From a greenhouse gas inventory (GHG) perspective, user needs can be categorised into three main groups:

a) GHG inventory compilers
b) GHG inventory reviewers
c) Climate change analysts

4. Whereas the first group are mostly interested in the availability of good quality activity data to estimate GHG emissions, the focus of the latter group is on the review and assessment of the quality of those emission estimates. The last group of users which has played an increasing role in the last years is that of climate change analysts who often shade light into

the complexity of inventory information for the benefit of policy makers, journalists and the general public.

II. QUALITY OF INVENTORY DATA

5. GHG inventories aren't just numbers. First of all, the ultimate objective of the UNFCCC is to stabilise GHG concentrations in the atmosphere at a level that would prevent and reduce dangerous human-induced interference with the climate system. GHG inventories include accurate and reliable information on GHG emission trends and are the basis from which policy makers design climate mitigation policies and assess the impact of those policies to help prevent higher GHG concentrations in the atmosphere. Secondly, GHG inventories are not a simple collection of numbers. A GHG inventory is a scientific compilation of evidence (activity data, emission factors, methods and emissions) on which policy makers and other actors inform their decisions regarding climate change mitigation. Moreover, the quality of the reported emissions undergoes a very thorough and independent review by international groups of experts on an annual basis. In both the compilation and review process, users demand more and better quality of the activity data underpinning emission estimates. NSOs have a clear role meeting those demands, and in a number of countries this is happening already[1].

6. Quality of emissions depends on activity data. The quality of GHG estimates is as good as the underpinning activity data. This activity data is often collected by NSOs and provided to GHG inventory compilers. Some argue that the quality of statistical data from NSOs is superior to other types of data collected by other national institutions and/or agencies. These views are either too general or are impaired by a lack of understanding of the scientific nature of a GHG inventory and of the quality procedures in GHG inventories. See for example chapter 8 on Quality Assurance and Quality Control of the IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories http://www.ipcc-nggip.iges.or.jp/public/gp/english/

7. For example, the application of a wrong calorific value (e.g. could be underestimated or overestimated) to a key emission source such as lignite combusted in power stations would have larger consequences in terms of emissions than the emission factor itself or even the complexity of the method used to estimate those emissions. It is therefore naïve to think that the quality of NSOs statistical data would be any different than the resulting emissions calculated using this data.

8. Review process adds an extra layer to ensure data quality. In addition, the quality of the reported emissions is subject to international scrutiny by independent review experts from all over the world. Read more on the UNFCCC review process http://unfccc.int/national_reports/annex_i_ghg_inventories/review_process/items/2762.php

9. For the purpose of Annex I GHG inventories, quality has been clearly defined in the UNFCCC Reporting Guidelines as comprising transparency, consistency, comparability, completeness and accuracy[2] http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf It is worth

[1] A UNECE survey carried out in 2011 showed that more than 75 per cent of NSOs (36 countries) that replied to the Survey are involved in the work related to GHG emission inventories: 19 are involved in providing source data, 11 participate in GHG calculations and 6 are responsible for reporting GHG inventories.

[2] In the context of these UNFCCC reporting guidelines on annual inventories:

noting that standardisation and/or harmonisation do not improve all aspects of quality. The most important quality aspect for the review of information reported to UNFCCC is 'transparency', as lack of it impairs the assessment of the remaining quality criteria.

10. Ultimately, the expert review teams under UNFCCC decide on whether the reported information in GHG inventories meet all quality requirements.

III. SOME EXAMPLES OF USER NEEDS FOR EACH OF THE BROAD GROUPS IDENTIFIED ABOVE

a) GHG inventory compilers:

11. About 80% of all GHG emissions are accounted for by energy combustion activities. National energy balances are by and large the most important input to the activity data reported in the CRFs of Parties' GHG inventories. The quality of reported GHG emissions therefore depends on the quality of the energy balance. A good energy balance is a pre-requisite for a good GHG emission inventory and credible emission estimates.

b) GHG inventory reviewers:

12. It is often difficult for UNFCCC reviewers to ascertain the quality of the underpinning activity data and/or the national energy balance. A key tool in the verification of emission estimates in the energy sector is the IPCC Reference Approach for CO2 emissions from fossil fuel combustion. Ideally, there should not be significant differences between bottom-up sectorial estimates as reported in the CRF tables and estimates from a top-down approach using national energy balances. If differences between both approaches differ by more than 2% Parties should provide clear explanations in the GHG inventory report. At European level, the EU Energy Statistics Regulation explicitly requires Member States to ensure the

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Transparency means that the assumptions and methodologies used for an inventory should be clearly explained to facilitate replication and assessment of the inventory by users of the reported information. The transparency of inventories is fundamental to the success of the process for the communication and consideration of information;

Consistency means that an inventory should be internally consistent in all its elements with inventories of other years. An inventory is consistent if the same methodologies are used for the base and all subsequent years and if consistent data sets are used to estimate emissions or removals from sources or sinks. Under certain circumstances referred to in paragraphs 15 and 16, an inventory using different methodologies for different years can be considered to be consistent if it has been recalculated in a transparent manner, in accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories and Good Practice Guidance for Land Use, Land-Use Change and Forestry*;

Comparability means that estimates of emissions and removals reported by Annex I Parties in inventories should be comparable among Annex I Parties. For this purpose, Annex I Parties should use the methodologies and formats agreed by the COP for estimating and reporting inventories. The allocation of different source/sink categories should follow the split of the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, at the level of its summary and sectoral tables;

Completeness means that an inventory covers all sources and sinks, as well as all gases, included in the IPCC Guidelines as well as other existing relevant source/sink categories which are specific to individual Annex I Parties and, therefore, may not be included in the IPCC Guidelines. Completeness also means full geographic coverage of sources and sinks of an Annex I Party;

Accuracy is a relative measure of the exactness of an emission or removal estimate. Estimates should be accurate in the sense that they are systematically neither over nor under true emissions or removals, as far as can be judged, and that uncertainties are reduced as far as practicable. Appropriate methodologies should be used, in accordance with the IPCC good practice guidance, to promote *accuracy* in inventories.

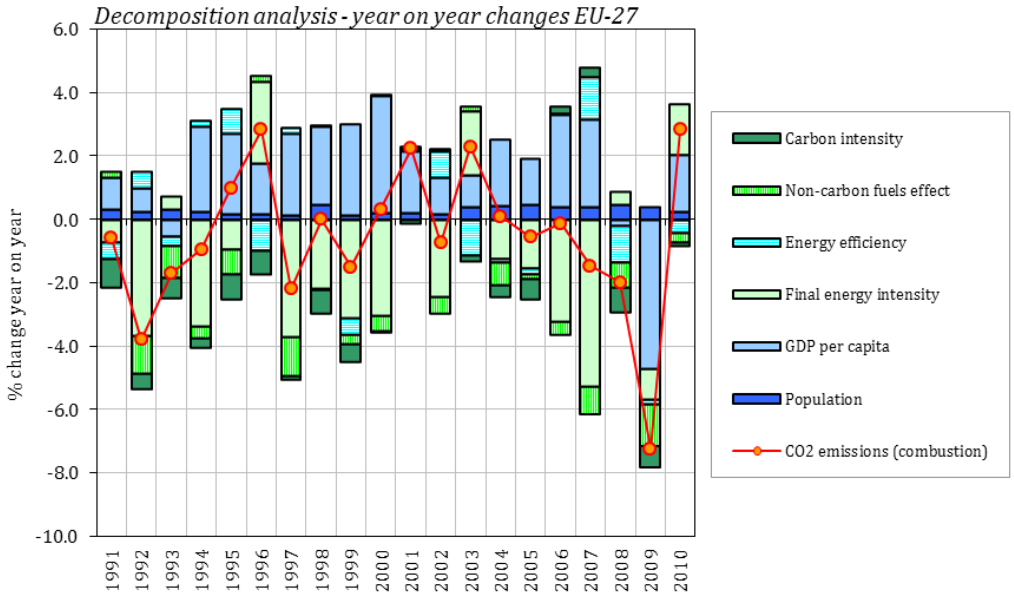
consistency of activity data reported to UNFCCC with the energy balances reported to Eurostat.

c) GHG inventory analysts:

13. There are several factors outside formal GHG inventory reporting that are key to understanding the reasons behind increases and decreases in greenhouse gas emissions. For example, emissions can decrease as a result of fossil-fuel switching (e.g. hard coal to natural gas). This information can be derived from the activity data reported in GHG inventories. Emissions can also decrease if more renewables, such as wind or solar, replace fossil-fuels to generate part of the final electricity demand. This activity data cannot be found in GHG inventories as non-combustible renewables are not a source of emissions. The analysis of trends in climate change mitigation also requires additional socio-economic explanatory variables to provide a more complete picture of why emissions from fossil fuel combustion increase or decrease in a particular year.

14. For example, the chart below shows the estimated contributions of the various factors that have affected CO2 emissions from energy production and consumption in the EU-27 since 1990. This approach is often used to portray the primary forces driving emissions. The only input from GHG inventories to the chart are the CO2 emissions, with the remaining variables being reported by EU Member States to Eurostat (the EU's Statistical Office). This is just one example of the importance of NSOs in providing relevant data to GHG analysts to be able to better explain emission trends.

Explanatory factors for CO2 emissions from energy combustion in the EU-27, 1990–2010



Source: 'Why did greenhouse gas emissions increase in the EU in 2010?', European Environment Agency http://www.eea.europa.eu/publications/european-union-greenhouse-gas-inventory-2012/why-did-greenhouse-gas-emissions.pdf

IV. IMPROVING THE POTENTIAL INVOLVEMENT OF NSOS FOR EACH OF THE GROUPS OF USER NEEDS IDENTIFIED ABOVE

a) Input to GHG inventory compilation:

15. The key objective should be to improve the quality and availability of data underpinning GHG emission estimates. Where NSOs are part of the national GHG inventory system, these improvements should be part of the Party's QA/QC Programme. But this cannot be taken for granted. Inventory compilers are often users of NSOs data which underpin GHG inventory estimates and need to know that the data delivered to them have high quality standards. NSOs can always initiate these quality improvements for the data falling within their mandate. NSOs can also refer to the 'key source analysis' reported in GHG inventories to determine the most pressing lack of activity data (and/or quality) affecting emissions. GHG inventory submissions of Annex I Parties to UNFCCC are publicly available
http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php

16. It is difficult to change the institutional set-up and/or the roles of each institution during the current Kyoto Protocol commitment period, especially if the current set-up works efficiently by delivering the best quality (as judged by the expert review teams). In other instances, the current set-up could be improved in various ways. One such possibility could be expanding the role of NSOs or including NSOs in the relevant national GHG inventory system. This is a decision for the competent authority in the country. It may be comparably easier to increase the involvement of NSOs in the upcoming 'biennial reporting' starting in 2014.

b) Input from UNFCCC reviews:

17. This could be the easiest entry point to increased involvement by NSOs in GHG inventories. The final GHG inventory reviews under UNFCCC and the Kyoto Protocol could be an excellent source of information to finding and/or increasing the 'NSO niche' in the GHG inventory process. Expert review teams (ERTs) more often than not recommend Parties to improve the background activity data underpinning GHG emission estimates in the annual review reports (ARRs). The ARRs are publicly available
http://unfccc.int/national_reports/annex_i_ghg_inventories/inventory_review_reports/items/6048.php

18. Recommendations can range from better coordination and collaboration between agencies involved in inventory preparation, to better and more transparent QA/QC of activity and emissions data, and better coherence/consistency in data reported to different organisations.

19. Three examples from the 2011 review cycle (energy sector):

(i) During the review the Party stated that its inventory agency will request the compiler of [country X] energy statistics to investigate the differences between apparent consumption reported to UNFCCC and that reported to the International Energy Agency. The ERT welcomes [country X] proactive approach. The ERT also recommends that the Party investigate the differences between the AD

submitted in its CRF tables with the energy balances reported to Eurostat under the EU regulation on energy statistics which has legal provisions aimed at ensuring the consistency of energy data in the energy balances with AD in the CRF tables

(ii) [Country Y] has not used EU ETS data to estimate emissions from the energy sector, for verification of its estimates or for any other purpose. The ERT considered that the detailed EU ETS data could provide useful information for the Party's inventory, such as carbon contents of fuels, net calorific values (NCVs) and EFs. Furthermore, EU ETS data may be used as a valuable instrument for the QA/QC of both AD and emission estimates. The ERT recommends that [country Y]'s inventory team obtain access to EU ETS data and consider using them in the preparation of the inventory, as appropriate

(iii) The previous ERT encouraged [country Z] to report CH4 and N2O emissions from biomass in road transportation even though they were considered negligible. In 2011, the notation key "NE" was replaced by the notation key "IE" (included elsewhere), indicating that the CH4 and N2O emissions were included under gasoline and diesel oil for the years 2007–2009. This information has not been further explained in the NIR. The ERT commends the Party for its efforts to improve the completeness of the data; however, in order to improve the transparency of its reporting, the ERT recommends that [country Z] provide, in the NIR, background information on the biofuel use in the country and report the emission estimates for CH4 and N2O separately in the next annual submission.

(c) Needs from GHG analysts:

20. As explained above, NSOs not only have a key role improving the underpinning activity data to GHG emissions estimates, but also on providing background socio-economic data to help improve the analysis of trends for policy analysis. Some examples of such activity data include population, fuel prices (gas, coal, oil, and electricity), GDP and GVA by branch, good (!) national energy balances, and heating/cooling degree days, to mention but a few. Last but not least, GHG analysts are demanding more and more timely data to be able to estimate/nowcast GHG emissions (t-1) to inform climate change mitigation polices more effectively. The issue of timeliness is very much linked to policy relevance and NSOs could also play a stronger role here.

V. REFERENCES

Annual European Union greenhouse gas inventory 1990–2010 and inventory report 2012
http://www.eea.europa.eu/publications/european-union-greenhouse-gas-inventory-2012

Inventory Review Reports for 2011 by the UNFCCC Secretariat
http://unfccc.int/national_reports/annex_i_ghg_inventories/inventory_review_reports/items/6048.php

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