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Twenty-second session

Bonn, 19–27 May 2005

Item 5 (a) of the provisional agenda

Methodological issues

Emissions from fuel used for international aviation and maritime transport

Methodological issues relating to emissions from fuel used for international aviation and maritime transport

Submissions from Parties

1. The Subsidiary Body for Scientific and Technological Advice, at its nineteenth session, recognized the importance of reliable inventory data for further work on the implementation of decision 2/CP.3 and agreed to continue consideration of inventory issues relating to this decision at its twenty-second session (FCCC/SBSTA/2003/15, para. 17 (f)).
2. A submission on methodological issues relating to emissions from fuel used for international aviation and maritime transport has been received from one Party.
3. In accordance with the procedure for miscellaneous documents, this submission is reproduced* in the language in which it was received and without formal editing.

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FCCC/SBSTA/2005/MISC.6

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SUBMISSION FROM LUXEMBOURG ON BEHALF OF THE EUROPEAN COMMUNITY
AND ITS MEMBER STATES

19th April 2005

International aviation and maritime transport

EU submission on inventory issues related to the implementation of Decision 2/CP.3

Methodological challenges

The EU welcomes the increasing awareness of the methodological issues related to emissions from fuel used for international aviation and maritime transport over the last few years. Recalling the conclusions of SBSTA 21, the EU equally welcomes the FCCC/SBSTA/2005/INF.2 document, which contains useful information.

Recalling the conclusions at SBSTA 19, the EU is looking forward to discussing inventory issues related to Decision 2/CP.3 at SBSTA 22, and in this context, recognises the importance of having reliable inventory data for further work on the implementation of this decision.

Decision 2/CP.3 urges the SBSTA to further elaborate on the inclusion of these emissions in the overall GHG inventories of Parties. The EU would like to stress that this methodological elaboration should not lead to any implications for the current commitment period. The task at SBSTA 22 is of a technical nature, and should help the understanding of the complex data issues. It should not predetermine any future climate regime.

In our opinion, SBSTA 22 should provide more insight into the data requirements for this elaboration. The EU will be very much interested in the views of other Parties on how to proceed with the inventory issues related to Decision 2/CP.3 at SBSTA 22.

In this context the SBSTA might conclude to request the Secretariat to write a paper on data issues related to the remaining options 1, 3, 4, 5 and 6 described in document FCCC/SBSTA/1996/9/add.1, to set-up a correspondence group to prepare such a paper and/or to organise a meeting of UNFCCC, ICAO, IMO and IPCC experts on this issue. Another possibility would be a UNFCCC workshop.

The EU remains open to other suggestions on how to develop this work further.

To assist the discussions at SBSTA 22 this submission will:

1. Share the main findings from a **EU workshop** on the improvement of the quality of data reporting, which was held in Copenhagen in May 2004.
2. Share some initial findings from within the EU on **data issues** related to elaborating on the inclusion of emissions from international aviation and maritime transport in the overall GHG inventories of Parties.

1) EU workshop

In May 2004 the EU organised a workshop on emissions of greenhouse gases from aviation and navigation. The main aim of the workshop was to improve the quality of reporting by EU Member States by exchanging information on emission estimates for aviation and navigation under the 1996 IPCC Guidelines. Other issues discussed were recommendations for improvements of the reporting guidelines and methodological questions connected with possible inclusion options. The workshop recommended:

- to use flight movement data for compiling aviation inventories;
- to improve the quality of marine activity data;
- to harmonise the definitions used in the joint IEA / EUROSTAT energy questionnaires and those used in the IPCC guidelines; and
- to simplify the split between domestic and international trips and the inclusion of a new methodology solely based on movement data in the 2006 IPCC guidelines.

In this context the EU welcomes the ongoing work in the IPCC and the IEA to harmonise definitions of bunker fuels and the inclusion of a new tier 3 methodology solely based on flight movement data for aviation in the 2006 IPCC Guidelines. The workshop report and a complete set of recommendations are available at:

http://air-climate.eionet.eu.int/docs/meetings/040517_GHGEm_Aviat_Nav_WS/meeting040517.html

2) Data issues related to the elaboration on the inclusion of emissions from international aviation and maritime transport in the overall GHG inventories of Parties

The EU would like to share its views on data availability and difficulties for the options 1, 3, 4, 5 and 6 described in document FCCC/SBSTA/1996/9/add.1. Options 2, 7 and 8 are not considered because they were not favoured by SBSTA 4 (FCCC/SBSTA/1996/20). The EU is aware of the dynamics with regard to ownership, operations, country of registration etc. within both the aviation and maritime industries which could have consequences for the availability and quality of data, just as different data issues might exist for these two industries.

The EU shares the analysis in paragraph 34 of FCCC/SBSTA/1999/INF.4 that it might take Parties three to five years to put in place adequate systems to collect and report information in a consistent manner on emissions from international bunker fuels for options 4, 5 and 6.

This section is designed to help engagement in constructive discussion.

Option 1

– General description

No inclusion of the emissions in the overall GHG inventories of Parties.

Under this scenario, Parties will keep reporting international bunker fuels as a memo item in their national GHG inventories, thus not being included in overall GHG inventories of Parties. Under this option the data problems that currently exist will be discussed.

– **Data requirements**

The split between domestic and international emissions for bunker fuels in the current IPCC guidelines is rather data intensive and based on movement of aircraft or ships, including information on pick-up and drop-off of passengers and cargo at stop-overs.

– **Data availability, difficulties and possible solutions**

For availability of data regarding movement of aircraft and ships, see option 5 below. With regards to data on the origin/destination of passengers and/or cargo, it is widely recognised that this data is not available both for aviation and maritime transport (in that sense, option 7 has already been disregarded as a possible option for the inclusion of emissions in overall GHG inventories of Parties).

It needs to be noted that current reporting problems are not only a result of the availability of data, but also of the incorrect implementation of the current IPCC guidelines.

– **Non-CO₂ greenhouse gases**

Methods based on movement are the most suitable for the estimation of non-CO₂ GHG, in particular for the case of aviation. Both for aviation and maritime transport, the estimation of other gases also requires information on the technology used (e.g. type of engine).

Option 3

– **General description**

In this option, emissions from bunker fuels would be included in the overall GHG inventories of Parties where the fuel is sold.

– **Data requirements**

For this option, the emissions need to be calculated using statistics on fuel sales.

– **Data availability, difficulties and possible solutions**

Statistics on the fuel sold are usually available both for **aviation** and **navigation**. These data should be derived from the National Energy Balance of each country even if only as a total figure (without the split into domestic and international). Therefore, total emissions could be easily calculated at a country level.

Improvements in data accuracy would be appreciated and inconsistencies with international data bases should be overcome by the improvement in transparency of the figures and a better specification of the joint IEA / EUROSTAT energy questionnaire filled in at national levels. For **navigation**, bunker delivery notes required for Annex VI of MARPOL 73/78 entering into force in 2005 may improve information on data fuel statistics.

Problems remain from a reporting point of view if parties are interested in separate estimates of national and international emissions. Additional data, which might not always be available, would be needed to accurately calculate the split.

– **Non-CO2 greenhouse gases**

Problems arise for the estimation of non-CO₂ greenhouse gases, whose emissions are not only related to the amount and type of fuel burnt but depend on operational activities and time per operational mode, e.g. for **aviation** climbing, cruising and descending phases, for **navigation** discharge of passengers/cargo, use of auxiliary engines in port.

Option 4

– **General description**

Inclusion in the overall GHG inventories of Parties according to the nationality of the transporting company or to the country where a ship or aircraft is registered or to the country of the operator.

Both for aviation and navigation, some Parties use country specific definitions based on the flag of carriers (see 4.2 of report of Copenhagen Workshop).

This method for inclusion in the overall GHG inventories of Parties may be based on fuel sales or on movement.

Each of these options, in turn, includes three sub-options:

- country of origin of the transporting company,
- country in which the ship or aircraft is registered (flag), or
- country of origin of the operator.

It is widely recognised that, generally, information will be more readily available for aviation than for maritime transport.

Emissions based on fuel sales (top-down methodology)

– **Data requirements**

Information on fuel sales to each individual company, aircraft/ship or operator including the respective nationality.

– **Data availability, difficulties and possible solutions**

Usually, but not necessarily always, energy balances are elaborated based on surveys to oil companies. These companies usually only state whether the fuel has been sold to a national or international company/flag/operator. In this case, it is not possible to allocate the fuel sold to an international company, aircraft/ship or operator to a specific country. Furthermore, the definition of the country of a company or operator may prove to be difficult (e.g. for multinational companies). Definition of nationality based on the flag is more straightforward.

Possible solutions include the airline/shipping companies (nationals of a country) to be required to report on fuel consumption (including fuel acquired abroad) directly to a responsible entity. In case the criterion chosen is the flag, the airline/shipping companies should be required to report fuel consumption for each aircraft/ship registered in a given country. Therefore, this inclusion method needs to rely on information to be provided by private companies, either the transporting or oil companies. Coordination with energy authorities is necessary for this method.

Use of models: The UK's Fast model includes information on nationality of airline. Models may face the difficulties mentioned above regarding the definition of a given company's nationality.

– **Non-CO2 greenhouse gases**

Given the limited scope of data gathered (fuel sales) this approach increases uncertainty in the estimate of other gases than CO₂, which are dependent on technology or operation (e.g. Landing and Take-Off cycle).

Emissions based on movement (bottom-up methodology)

See comments on option 5. Issue of determination of nationality remains.

Option 5

– **General description**

In this option, emissions from bunker fuels would be included in the overall GHG inventories of Parties by country of destination or departure of the aircraft or ship. Alternatively, the emissions could be shared between the country of departure and the country of arrival.

– **Data requirements**

For this option, the emissions need to be calculated using models based on bottom-up movement data, data requirements depend on the model used. In a simpler model, estimates are based on origin-destination matrixes using standard routes and emission factors. Complex models use the actual route taken and the type of aeroplane or ship for each single trip.

– **Data availability, difficulties and possible solutions**

For **aviation**, several possible sources for the necessary activity data exist worldwide: Flight plans filed by pilots, route charge data collected by Parties or the ICAO database on scheduled flights could be possible sources for origin-destination matrixes by airport and aircraft type. Difficulties arise at a practical level from the lack of a central collection point for most of these data sources, the form in which the data might be stored, costs for accessing the data and questions of confidentiality. In Europe, the European air traffic control authority EUROCONTROL has a detailed database of all flights using instrumental flight rules including information on aircraft type and the actual route flown from 1996 onwards. Due to the rather homogenous aircraft fleet worldwide, only a limited number of emission factors and parameters are necessary to estimate emissions using models in aviation. One issue is that the calculated fuel consumption might be different from the fuel sale statistics due to tankering and other effects, and inconsistencies with national energy balances might result. Other questions in need of further consideration include which data sources are available for all Parties; whether a consistent timeline back to 1990 is achievable and necessary; and whether a harmonisation of the models used by Parties would be necessary to ensure consistent reporting. One way ahead could be to set up a central database and the establishment of a standard procedure for air traffic control authorities to load the data into this database.

For **navigation** the situation is more difficult due to the limited data availability and the lack of a widely accepted methodology. Some Member States of the European Union have detailed OD-matrixes for all their ports but most do not have the necessary data for a modelling approach readily available. One possible source of activity data for this inclusion option would be the Lloyds Marine Intelligence Unit database containing movements, flag and size of ships over 100 tonnes gross. One of the difficulties of using models to estimate emissions from navigation is the large variety in the sizes and types of ship, and the resulting emission factors. Similar

practical problems and questions as those listed under aviation would need to be resolved for navigation as well.

– **Non-CO2 greenhouse gases**

Emissions of all GHG can be estimated using models based on movement data. For **aviation**, emissions of non-CO₂ GHG and cloud formation depend on various factors, of which many can be incorporated into detailed models. These factors include altitude, weather conditions and engine type. The more detailed models like AERO2K or SAGE, which incorporate the actual route taken, are able to estimate emissions of several GHG. For **navigation**, the large variety of ships complicates the estimation of all GHG. More research would be needed to provide reliable emission factors for estimating emissions of non-CO₂ GHG.

Option 6

– **General description**

Inclusion in the overall GHG inventories of Parties according to the country of departure and/or destination of passenger or cargo

– **Data requirements**

In this option the emissions could be estimated either based on models or fuel sales and would then be included in the overall GHG inventories of Parties in relation to the movement of passengers and cargo. Apart from the information necessary to perform the emission estimates as elaborated in Option 3 and 5 above, detailed movement data on the level of individual passengers or units of freight would be needed.

– **Data availability, difficulties and possible solutions**

In general the information needed for this option is not readily available. Although some carriers might have the necessary activity data, it is often considered sensitive business information and therefore confidential. For cargo, freight papers exist and could be used, but they are not normally collected at a central location.

If this option is chosen, extensive and resource intensive studies would be needed to prepare and update origin-destination matrixes for **aviation** and **navigation**.

– **Non-CO2 greenhouse gases**

The inclusion of non-CO₂ GHG depends on the method used to estimate emissions, details are provided in Option 3 and 5.

Concluding Remarks

This submission has set out to assist the discussions at SBSTA 22 and help facilitate constructive discussions. We look forward to SBSTA 22 providing more insight into the data requirements for this elaboration.

The EU remains open to the views of other Parties in taking this issue forward.