Transport Panel summary
Bern, Switzerland
15 May 2012

Agenda

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Emission inventory Guidebook update: Black carbon (BC) – M. Winther

As the CLRTAP decided to include black carbon (as a percentage of PM 2.5) in the inventory there is a need to estimate this pollutant in all modes. A literature review was performed by Univ. of Aarhus with the aim to provide BC fractions of PM.

Some data are available for aviation but a detailed methodology cannot be defined. Different literature (3 papers) providing PM speciation (BC vs OC) has been analyzed and a summary table reporting all the values observed in the papers has been presented. On the basis of this...
information the relevant tables of the Guidebook should be updated. A general factor of 50% could be used for all airplanes but the piston-propelled ones where 15% rate should be used.

Regarding navigation more data sources are available. It is proposed to use one paper with more than 200 measurements to update the EF tables. Regarding the content of sulphur we need to specify which content refer the low level.

Road transport: COPERT already include the relevant literature and provide the EC vs OC fractions, where EC is considered equal to BC. Regarding Tier1 and Tier2 there will be calculated average BC fractions. For non-exhaust emissions, data are consistent with those used by IIASA and no additional information is available.

Railways: in consideration of the lack of data the same factors used for diesel HDV in road transport could be used in consideration of the similar engines. For Tier1 and Tier2 average values have been proposed calculated on the basis of the range of the figures available for road transport. For Tier3 different values have been derived with respect to the technologies.

Non road engines: Also in this case it is proposed to use road transport values and list of different emission factors have been proposed with respect to different fuels and technologies.

In addition consistency checks of PM size fractions, HM and POP emission factors reported in the transport chapters of the guidebook have been done. All consistency checks are ok; minor errors for railways footnote which are not coherent with the figures in the table. Concerning HM and POP emission factors, additional source of information have been identified for aviation, navigation, and road transport non exhaust categories.

Heavy Metals (HM)- T. Pulles

A review of the implied emission factors used by parties gives a difference of up to 5 orders of magnitudes. To improve these estimates and reduce the uncertainties on the factors, TNO measured the content of HM of 65 samples of petrol fuel and 110 of diesel fuel in different countries (between 5 and 20 samples per fuel / per country) and found that there is no significant difference in HM content among countries’ fuels and no correlation between a specie of metal and another. These measurements allowed narrowing down the variability of the HM emission factors. Measurements are considered reproducible (regression analysis). Frequency distribution of HM content has been built and samples show that lognormal distributions are for all HM. No specific differences between countries have been observed so as any correlation between HMs. A table of emission factors is proposed, including low and high parameters calculated on the basis of HM content in the fuels. TNO emission factors do not account for the HM content in lube oil hence one need to multiply the HM emission factor from fuel by a factor 2 to 4.

On the basis of the comparison with emission reported by countries it seems that emissions reported are overestimated. It could be interesting to see in depth the share of two stroke vs four stroke. The work presented has taken into account the Danish report on HM inventories,
with emission factors that take into account also the contribution from lube oil and engine attrition and these have been already inherited in COPERT. This is a positive development because it shows that a consensus has been developed on which emission factors to use, despite the large uncertainties.

**Passenger cars air conditioning contribution to CO2 emissions – L. Ntziachristos**

Emission factor for A/C have been introduced in COPERT. The modification is expected to attribute about a 4% share of emissions to A/C assuming a usage factor of 40%.

The main effects are observed on fuel consumption; A/C could have effect on emissions but not consistent impacts. FC and CO2 increase with the increase of humidity and temperature. The formula of calculation takes in account share distance when A/C is on. In COPERT the percentage of vehicles equipped and percentage of usage are to be provided together with average temperature. For urban, rural and highway driving modes different emission factor values are provided.

The methodology is consistent with HBEFA database; it does not increase CO2 national totals but the A/C can be used to balance the final fuel consumption. Future A/C systems are expected to be more efficient and a reduction factor will be introduced when available. Also Urea and lube oil have effect on additional CO2 emissions and have been introduced in the model.

**TRACCS project /data collection – L. Ntziachristos**

DG-Clima project funded a project involving Emisia, Infras and IVL institutes. Key objectives are the data collection, produce consistent data matrices for all transport modes. The general approach consists in different phases: data collection, data streamlining, and data presentation. Annual time series 2005-2010 will be collected and existing data for earlier years if available, for EU27 + Norway, Iceland and Switzerland. Passenger car information will be collected possibly by market segment. In addition age and ownership of PC will be collected. Data required are very detailed and different from the official statistics. It is asked the cooperation from countries.

**Belarus inventory – S. Kakareka**

Belarus presented its road transport inventory and found inconsistencies between Tier 1, Tier 2 and Tier 3 methodologies. An assessment of accuracy for the different information concurring to estimate emissions have been done. In particular mileages are considered have low accuracy. Comparisons with other countries estimated per person have been presented together with the emission estimates for Belarus. The findings will be further discussed with the European Topic Centre (LAT) to pinpoint any problem.
EUROCONTROL in collaboration with the Commission (DG Clima) is preparing a Tier 3 methodology to estimate emissions from airplanes.

A feasibility study was conducted on the basis of flight movements for EU27 airport to airport, a common operation database with a sample of trajectory (WISDOM) and the update of the AEM model. To increase accuracy, trajectory should be used, WISDOM database should be used to fill the gap in flight not completely inside the geo zone, a unique source should be developed, and times in mode could be refined (revised).

The important factors to consider are: number of flights, fuel (kerosene, gasoline), percentage share of domestic and international flight, percentage share of LTO (landing take off) phase, emission factors for NOx.

The ETC/AEM compare results from EUROCONTROL with Parties estimates. A comparison between the PAGODA, WISDOM methodology with the reported CRF (common reporting format) shows that WISDOM emission factors are generally 50% higher than PAGODA depending on the pollutant. From Pagoda, 2002-2010 data have been supplied including number of flights, fuel consumption, LTO and non LTO activities. Comparison regarded implied emission factors, the number of flight and fuel consumption reported for domestic and international, both LTO and cruise activities.

Regarding the Guidebook, EUROCONTROL should update the TIER 3 a and b. Times in mode also should be updated because are very different to the real measured in the European airports.

COPERT 5 – L. Ntziachristos

The delivery of the new version is planned not before end 2013. An in depth discussion in the panel tried to enhance possible elements to be introduced in the revised version of the software. In particular have been underlined the need to introduce from a side tools for advanced users with the aim to refine emission estimates at urban level (e.g. taking in account different average speeds functions for urban mode), from the other side some more simple tool to allow countries with lack of basic statistics and information to use the model.