CLEAN DEVELOPMENT MECHANISM

CDM-MP63-A02

Draft Methodological tool

Baseline emissions for modal shift measures in inter-urban cargo transport

Version 01.0

United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. The Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP), at its sixth session, decided that Parties, project participants, as well as international industry organizations or admitted observer organizations through the host country's designated national authority (DNA), may submit proposals for standardized baselines applicable to new or existing methodologies, for consideration by the Executive Board (Board) of the clean development mechanism (CDM).

2. In this context, the Board, at its sixty-second meeting, adopted the "Guidelines for the establishment of sector specific standardized baselines" (the SB guidelines) and at its sixty-fifth meeting, the Board agreed to the "Work programme on standardized baselines" that included the element of expanding the SB guidelines to CDM projects in the transport sector.

3. In response to the mandate given by the Board to the secretariat on the expansion of the SB guidelines to CDM projects in the transport sector, the secretariat: (i) conducted an elaborate analysis of approaches to standardization of baseline setting in the transport sector; (ii)hired a consultant and scrutinized the report developed by the consultant; and (iii) conducted consultations on the report and approaches to standardization with external experts, the Methodologies Panel (Meth Panel) and the Small-Scale Working Group (SSC WG). After an elaborate analysis and extensive consultations, the secretariat came to the conclusion that there are fundamental limits to the standardization of baseline setting in the transport sector and described these challenges in a concept note presented to the Board at its sixty-ninth meeting.

4. At its sixty-ninth meeting, the Board considered the concept note on the challenges and options for work on the development of guidelines on standardized baselines for the transport sector, provided feedback and requested the secretariat to submit a concept note for the Board's consideration at a future meeting, with a detailed analysis of the following elements:

   (a) Background information and rationale for the key challenges for the standardized baselines for transport sector projects, as presented in the concept note as per annex 12 to the annotated agenda of the sixty-ninth meeting of the Board;

   (b) Rationale for the options suggested on standardization and scaling-up of CDM in the transport sector;

   (c) Benefits of and efforts required for the options suggested.

5. At its seventy-second meeting, the Board considered a concept note on the challenges and opportunities for standardization and simplification in the context of the transport sector and requested the secretariat to develop guidelines on standardized baselines for the transport sector covering standardization at the following levels:

   (a) Standardized parameters or approaches that are country-specific or region-specific;

   (b) The development of the draft guidelines should be done in consultation with the Meth Panel and the SSC WG, for consideration of the Board at its seventy-fifth meeting.

6. The Board also requested the Meth Panel to develop, where suitable, standardized parameters or approaches that can be applied at the global level in the form of a methodological tool, for the Board's consideration at its seventy-fifth meeting. These tasks were included in the approved work plan of the Board for 2013 which contained the product "Development and implementation of the guideline on standardized baselines for transportation projects" under project 110 on standardized baselines.

7. At its seventy-fifth meeting, the Board considered the draft guideline "Establishment of standardized baselines in the transport sector" and agreed that the document should be a methodological tool to ensure its immediate use by project participants and other stakeholders in the development of standardized baselines. The Board requested the Meth Panel to revise the draft, taking into account the inputs provided by the Board, for the consideration of the Board at a future meeting.

8. At its sixty-second meeting, the Methodologies Panel agreed on the draft tool and decided to launch a call for public inputs. There were no public inputs received in response to the call. At its sixty-third meeting, the Methodology Panel agreed to recommend this tool to the Board for approval.

2. Purpose

9. The purpose is to propose a methodological tool that provides methodological approaches for estimating baseline emissions for modal shift measures in inter-urban cargo transport. The tool can be used by both, DNAs to establish standardized baselines to be used by a number of project activities, and project participants to estimate baseline emissions for individual project activities.

3. Key issues and proposed solutions

10. Not applicable.

4. Impacts

11. The draft tool provides methodological approaches to estimate baseline emissions for modal shift measures in cargo transport that shift inter-urban transportation of cargo from road to rail or water-borne transport, which according to international literature, offers the largest mitigation potential in cargo transportation.

5. Subsequent work and timelines

12. The draft methodological tool is recommended by the Methodologies Panel to be considered by the Board at its seventy-ninth meeting. No further work is envisaged.

6. Recommendations to the Board

13. The Methodologies Panel recommends that the Board approve the draft methodological tool.

TABLE OF CONTENTS **Page**

1. Introduction

1. This tool provides methodological guidance to determine baseline emissions for transport projects implementing modal shift measures in inter-urban cargo transport.

2. Scope, applicability, and entry into force

2.1 Scope

2. The tool includes approaches for estimating baseline emissions for project activities aimed at modal shift in inter-urban cargo transport.

2.2 Applicability

3. The tool is applicable to project activities in inter-urban cargo transport that implement a measure or a group of measures aimed at modal shift from road to water-borne (using barges or domestic ships) or rail transportation.[1]

4. The tool can be used by designated national authorities (DNAs) and is applicable for establishing standardized baselines.

5. The tool is also applicable for estimating baseline emissions for individual CDM project activities.

2.3. Entry into force

6. The date of entry into force of the tool is the date of the publication of the EB 79 meeting report on 1 June 2014.

3. Normative references

7. This tool refers to the following documents:

   (a) "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

8. When the tool is used for establishing standardized baselines, relevant provisions from the latest approved versions of the following standards shall be applied:

   (a) "Guidelines for quality assurance and quality control of data used in the establishment of standardized baselines";

   (b) "Procedure for development, revision, clarification and update of standardized baselines";

   (c) "Standard for data coverage and validity of standardized baselines".

[1] DNAs, project participants and other stakeholders may propose revisions that further expand the applicability of the tool to include other approaches and measures.

4. Definitions

9. The definitions contained in the Glossary of CDM terms shall apply.

10. For the purpose of this tool, the following definitions apply:

    (a) **Measure (for emission reduction activities) -** a broad class of greenhouse gas (GHG) emission reduction activities possessing common features;

    (b) **Level of aggregation -** the level of aggregation and geographical scope is linked to the type of measure implemented. For modal shift in cargo transportation, only modes used for long-haul cargo transport need to be taken into account when the respective baseline is established;

    (c) **Inter-urban cargo transport -** long-haul cargo transport with inter-urban transportation distances greater than 50 km;

    (d) **Heavy duty vehicles (HDVs**) - vehicles with a gross vehicle weight greater than or equal to 3.5 tonnes are classified as heavy duty vehicles;

    (e) **Light duty vehicles (LDVs) -** vehicles with a gross vehicle weight less than 3.5 tonnes are classified as light duty vehicles.

5. Methodological steps to establish the baseline

11. Baseline emissions from the transportation of cargo are calculated based on the amount of cargo type *i* transported under a project activity and the emission factor per baseline transport mode relevant for that cargo type.

12. The amount of cargo transported under the project activity shall be monitored during the crediting period.

13. Data not older than three years coming from reliable sources shall be used for calculations.

5.1. Step 1. Determine relevant cargo types

14. Determine the cargo types (can be similar to those in Table 3) that are relevant to the project activity or standardized baseline and are transported in the country. The level of aggregation of a region or province can be chosen if there is data available to implement a calculation procedure for the region. The baseline is then applicable to this region or province. If this regional baseline is used for another region, justification needs to be provided to prove that another region is in a similar situation in terms of the availability of infrastructure and modes of transport.

5.2. Step 2. Determine the mode share for each relevant cargo type

15. Mode share is expressed in tonne-kilometres (TKM) and is determined for each relevant cargo type identified in Step 1 and shall include all relevant modes used for its transportation such as road, pipeline, rail and shipping.

16. For each relevant cargo type, the mode share can be based on official statistics, studies or data collected by transport agencies. A survey to collect data can be carried out in the

country, region or province for which the baseline emissions are calculated. Data should be relevant for the level of aggregation defined in paragraph14.

17. The mode share for cargo type *i* is determined based on TKM transported by the mode *k* divided by the total TKM for that cargo type transported in the same time period and the region/province/country.

$$M_{k,i,x} = \frac{C_{k,i,x}}{\sum_k C_{k,i,x}} \quad \text{Equation (1)}$$

Where:

$M_{k,i,x}$	=	Mode share of transport mode *k* that transports cargo type *i* in year *x* (% of TKM)
$C_{k,i,x}$	=	Cargo type *i* transported by transport mode *k* in year *x* (TKM)
k	=	Transport mode (i.e. rail, road, pipeline and domestic water transport)
x	=	Most recent calendar year for which data is available. Data not older than three years

5.3. Step 3. Determine the average specific emission factor per TKM for cargo type

18. The average emission factor for cargo per TKM per mode of transport is determined based on the approaches below:

5.3.1 Rail

19. For rail, the average specific emission factor per TKM is determined using the following three options.

20. **Option 1.** If data on fuel/electricity consumption per cargo type transported by trains is available, the average specific emission factor per TKM per cargo type *i* transported by trains is estimated. To determine TKM of cargo type *i* transported, data for calculations should be based on:

(a) Records of the rail operator or official statistics of total TKM of cargo type *i* transported and total fuel and electricity used to transport this cargo type by rail.

$$SEF_{RL,i,x} = \frac{\sum_n FC_{RL,i,n,x} \times NCV_{n,x} \times EF_{CO2,n,x} + EC_{RL,i,x} \times EF_{elect}}{C_{RL,i,x}} \quad \text{Equation (2)}$$

Where:

$SEF_{RL,i,x}$	=	Specific emission factor for cargo type *i* transported by rail in year *x* (g CO_2/TKM)
$FC_{RL,i,n,x}$	=	Fuel consumption of the rail system to transport cargo type *i* using fuel type *n* in year *x* (kg)
$NCV_{n,x}$	=	Net calorific value of fuel type *n* consumed in year *x* (MJ/kg)
$EF_{CO2,n,x}$	=	Emission factor of fuel type *n* in year *x* (g CO_2/MJ)

$EC_{RL,i,x}$ = Electricity consumption of the rail system to transport cargo type *i* in year *x* (kWh)

EF_{elect} = Emission factor for electricity (g CO_2/kWh)

$C_{RL,i,x}$ = Cargo type *i* transported by the rail system in year *x* (TKM)

x = Most recent calendar year for which data is available. Data not older than three years

21. **Option 2.** If data on fuel/electricity consumption per cargo type transported by trains is not available, the average specific emission factor per TKM can be determined as an average for all cargo types transported by trains. To determine TKM of cargo transported, data for calculations should be based on:

(a) Records of the rail operator or official statistics of total TKM of cargo transported and total fuel and electricity used (preferred option);

(b) Total tonnes of cargo and an average transportation distance for cargo.

$$SEF_{RL,x} = \frac{\sum_n FC_{RL,n,x} \times NCV_{n,x} \times EF_{CO2,n,x} + EC_{RL,x} \times EF_{elect}}{C_{RL,x}} \quad \text{Equation (3)}$$

Where:

$SEF_{RL,x}$ = Specific emission factor per TKM of cargo transported by rail in year *x* (g CO_2/TKM)

$FC_{RL,n,x}$ = Fuel consumption of the rail system for cargo transport using fuel type *n* in year *x* (kg)

$NCV_{n,x}$ = Net calorific value of fuel type *n* consumed in year *x* (MJ/kg)

$EF_{CO2,n,x}$ = Emission factor of fuel type *n* in year *x* (g CO_2/MJ)

$EC_{RL,x}$ = Electricity consumption of the rail system for cargo transport in year *x* (kWh)

EF_{elect} = Emission factor for electricity (g CO_2/kWh)

$C_{RL,x}$ = Cargo transported by the rail system in year *x* (TKM)

x = Most recent calendar year for which data is available. Data not older than three years

22. **Option 3.** The average default factor per TKM can be also be determined using default factors provided in Table 1 below. The default emission factors for electric trains need to be multiplied by the emission factor for electricity in order to estimate the average specific emission factor per TKM of cargo type *i* transported by electric trains.

Table 1. Default factors for rail transport depending on the type of fuel used by trains transporting cargo of different density

Type of cargo transported	Electric train	Diesel train
	Default factor (kWh/TKM)	Default factor (gCO_2/TKM)
Low density goods	0.04	30
Perishable and semi-perishable foodstuff and canned food		
Transport equipment		
Machinery and metal products		
Grouped goods		
Groceries		
Other manufactured articles		
High density goods	0.03	20
Agricultural products and live animals		
Beverage		
Other food products and fodder		
Solid mineral fuels and petroleum products		
Ores and metal waste		
Metal products		
Mineral products		
Other crude and manufactured minerals and building materials		
Fertilizers		
Chemicals		
Glass and ceramic and porcelain products		

Note: Low density products are products with density equal to or below 250 kg/m3.

Source: CO_2 information for transport services. 2012. Application of Article L. 1431-3 of the French transport code. Methodological guide. Ministry of Ecology, Sustainable Development and Energy of France.

5.3.2. Domestic water transport

23. For domestic water transport, the average specific emission factor per TKM is determined using the following three options:

24. **Option 1.** If data on fuel consumption per cargo type transported by domestic ships or barges is available, the average specific emission factor per TKM per cargo type *i* transported by domestic water transport is estimated as follows:

$$SEF_{S,i,n,x} = \frac{\sum_k FC_{S,k,i,n,x} \times NCV_{n,x} \times EF_{CO2,n,x}}{\sum_{i,k} C_{S,i,k,n,x}} \quad \text{Equation (4)}$$

Where:

$SEF_{S,i,n,x}$	=	Specific emission factor for cargo type *i* transported by ships operated on fossil fuel *n* in year *x* (g CO_2/TKM)
$FC_{S,k,i,n,x}$	=	Fuel consumption of ship *k* transporting cargo type *i* using fuel type *n* in year *x* (kg)
$NCV_{n,x}$	=	Net calorific value of fuel type *n* consumed in year *x* (MJ/kg)
$EF_{CO2,n,x}$	=	Emission factor of fuel type *n* in year *x* (g CO_2/MJ)
$C_{S,i,k,n,x}$	=	Cargo type *i* transported by ship *k* operated on fuel type *n* in year *x* (TKM)
i	=	Cargo type transported by ships
x	=	Most recent calendar year for which data is available. Data not older than three years

25. **Option 2.** If data on fuel consumption per cargo type transported by domestic ships or barges is not available, the average specific emission factor per TKM is estimated for all cargo types transported by domestic ships as follows:

$$SEF_{S,n,x} = \frac{\sum_k FC_{S,k,n,x} \times NCV_{n,x} \times EF_{CO2,n,x}}{\sum_k C_{S,k,n,x}} \quad \text{Equation (5)}$$

Where:

$SEF_{S,n,x}$	=	Specific emission factor for cargo transported ships operated on fossil fuel *n* in year *x* (g CO_2/TKM)
$FC_{S,k,n,x}$	=	Fuel consumption of ship *k* transporting cargo using fuel type *n* in year *x* (kg)
$NCV_{n,x}$	=	Net calorific value of fuel type *n* consumed in year *x* (MJ/kg)
$EF_{CO2,n,x}$	=	Emission factor of fuel type *n* in year *x* (g CO_2/MJ)
$C_{S,k,n,x}$	=	Cargo transported by ship *k* operated on fuel type *n* in year *x* (TKM)
x	=	Most recent calendar year for which data is available. Data not older than three years

26. **Option 3**. Default values can be used to determine the average specific emission factor per TKM of cargo transported by domestic ships.

Table 2. Default factors for domestic water transport depending on the type of cargo transported

Type of cargo	Emission factor (gCO_2/TKM)
Bulk	40*
Containers	70**

Source: *Estimated based on IFEU, EcoTransIT World: Methodology and Data – Update 31 July 2011, Table 40.

** Estimated based on CO_2 information for transport services. 2012. Application of Article L. 1431-3 of the French transport code. Methodological guide. Ministry of Ecology, Sustainable Development and Energy of France.

5.3.3. Pipeline

27. Pipelines are used to transport very specific goods such as liquid and gaseous fuels. The average specific emission factor per TKM can be estimated based on data from the records of the pipeline operator(s).

28. To determine TKM of cargo transported via pipelines, data for calculations should be based on:

(a) Records of the pipeline operator or publications of total TKM of cargo types transported via pipelines and total fuel and electricity used for their operation (preferred option);

(b) Total tonnes of cargo, the length of the pipeline(s) and total fuel and electricity used for their operation.

29. For each cargo type transported by the pipeline(s), the specific emission factor for each relevant cargo type is calculated as follows:

$$SEF_{PL,i,x} = \frac{\sum_{m,n} FC_{PL,i,m,n,x} \times NCV_{n,x} \times EF_{CO2,n,x}}{\sum_{m,n} C_{PL,i,m,n,x}} + \frac{\sum_{m} EC_{PL,i,m,elect,x} \times EF_{PL,i,elect,x}}{\sum_{m} C_{PL,i,m,elect,x}} \quad \text{Equation (6)}$$

Where:

$SEF_{PL,i,x}$ = Specific emission factor per TKM of cargo type *i* transported by the pipeline(s) in year *x* (g CO_2/TKM)

$FC_{PL,i,m,n,x}$ = Fuel consumption to operate pipeline *m* for transporting cargo type *i* using fuel type *n* in year *x* (kg)

$NCV_{n,x}$ = Net calorific value of fuel type *n* consumed in year *x* (MJ/kg)

$EF_{CO2,n,x}$ = Emission factor of fuel type *n* in year *x* (g CO_2/MJ)

$C_{PL,i,m,n,x}$ = Cargo type *i* transported by pipeline *m* operated on fuel type *n* in year *x* (TKM)

$EC_{PL,i,m,elect,x}$ = Electricity consumption to operate pipeline *m* for transporting cargo type *i* in year *x* (kWh)

$EF_{PL,i,elect,x}$ = Emission factor of electricity used to operate pipeline *m* to transport cargo type *i* in year *x*(g CO_2/kWh)

$C_{PL,i,m,elect,x}$ = Cargo type *i* transported by pipeline *m* operated on electricity in year *x* (TKM)

i = Cargo type transported by pipeline *m*

x = Most recent calendar year for which data is available. Data not older than three years

5.3.4. Road

30. For road transportation, the specific emission factor per TKM is determined for each relevant cargo type separately, using the following options:

(a) **Option 1. Default values.** For the relevant cargo types identified in Step 1,the default emission factors can be applied for the transportation of cargo by diesel and gasoline trucks:

(i) If trucks operate on natural gas in the host country, the default values in Table 3 shall be multiplied by the ratio of the emission factor of natural gas to the emission factor of diesel (both expressed in gCO_2/GJ);

(ii) If trucks operate on a blend of diesel with biofuels in the host country, the default values in Table 3 shall be multiplied by the fraction of diesel in the blend determined on an energy basis (i.e. it is conservatively assumed that the emission factor for biofuels is equal to zero).

Table 3. Default emission factors for road transportation depending on the type of cargo transported

Type of cargo transported	Emission factor (gCO_2/TKM)
Agricultural products and live animals	83
Beverage	61
Groceries	76
Perishable and semi-perishable foodstuffs and canned food	94
Other food products and fodder	74
Solid mineral fuels and petroleum products	76
Ores and metal waste	90
Metal products	80
Mineral products	57
Other crude and manufactured minerals and building materials	70
Fertilizers	76
Chemicals	70

Type of cargo transported	Emission factor (gCO_2/TKM)
Transport equipment	100
Machinery and metal products	119
Glass and ceramic and porcelain products	84
Grouped goods	94
Other manufactured articles	113

Sources: "Repérage des produits les plus concernés par la maîtrise de la demande de transport routier", Beauvais Consultants, ADEME, 2006 and "Le point sur N°25, Les émissions de CO_2 par les poids lourds français entre 1996 et 2006 ont augmenté moins vite que les volumes transportés", Commissariat général du développement durable, Ministère de l'écologie, de l'énergie, du développement durable et de la mer, 2009.

(b) **Option 2. Historic data or survey**

31. The baseline emission factor is calculated based on historical data on the amount of fuels consumed for transportation of the cargo type, net calorific values and CO_2 emission factors of the fuel types used, amount of cargo transported, distance of the baseline trip route and a factor to account for non-empty return trips. This option can be applied only if reliable data records on the amount of cargo transported, amount of fuel consumed and the fuel types used are available for the trucks dedicated to the transportation of the particular type of cargo (see Step 1). This information may be obtained through surveys performed by public or other qualified entities.

32. The specific emission factor for each relevant cargo type is calculated as follows:

$$SEF_{R,i,x} = \frac{\sum n\, FC_{i,n,x} \times NCV_{n,x} \times EF_{CO2,n,x}}{\sum n\, CW_{i,n,x} \times D_{i,n,x}} \quad \text{Equation (7)}$$

Where:

$SEF_{R,i,x}$ = Specific emission factor for cargo type *i* transported by road in year *x* (g CO_2/tonne-km)

$FC_{i,n,x}$ = Annual fuel consumption of trucks using fuel type *n* to transport cargo type *i* in year *x* (litre, m^3 or kg)

$NCV_{n,x}$ = Net calorific value of fuel type *n* consumed by trucks in year *x* (MJ/litre, MJ/m^3 or MJ/kg)

$EF_{CO2,n,x}$ = Emission factor of fuel *n* consumed by the trucks in year *x* (g CO_2/MJ)[2]

$CW_{i,n,x}$ = Annual weight of cargo type *i* transported by trucks using fuel type *n* in year *x*(tonne)

$D_{i,n,x}$ = Total distance driven by trucks (including empty return trips) using fuel type *n* to transport cargo type *i* in year *x* (km)

n = Fuel types used by trucks in year *x*

[2] If the fuel is blended with biofuel, the emission factor of the blend shall be calculated assuming an emission factor of zero for the biofuel.

i = Cargo type transported by trucks

x = Most recent calendar year for which data is available. Data not older than three years

5.4. Step 4. Determine baseline emission factor

33. The baseline emission factor is determined for each cargo type separately, based on the modal split and the emission factor per TKM per mode according to the following formula:

$$EF_{i,x} = M_{R,i,x} \times SEF_{R,i,x} + M_{RL,i,x} \times SEF_{RL,i,x} + MC_{S,i,x} \times SEF_{S,i,n,x} + M_{PL,i.x} \times SEF_{PL,i,x} \quad \text{Equation (8)}$$

Where:

$EF_{i,x}$ = Emission factor per cargo type *i* transported in year *x* (g CO_2/TKM)

$M_{R,i,x}$ = Mode share for road transport of cargo type *i* in year *x* (% of TKM)

$SEF_{R,i,x}$ = Specific emission factor for cargo type *i* transported by road in year *x* (g CO_2/TKM)

$M_{RL,i,x}$ = Mode share for rail transport of cargo type *i* in year *x* (% of TKM)

$SEF_{RL,i,x}$ = Specific emission factor for cargo type *i* transported by rail in year *x* (g CO_2/TKM). If Option 2 is chosen, then specific emission factor per TKM of cargo transported by rail in year *x* $SEF_{RL,x}$shall be used

$MC_{S,i,x}$ = Mode share for ship transport for cargo type *i* in year *x* (%of TKM)

$SEF_{S,i,n,x}$ = Specific emission factor for cargo type *i* transported by ships operated on fossil fuel *n* in year *x* (g CO_2/TKM). If Option 2 is chosen, then specific emission factor for cargo transported ships operated on fossil fuel *n* in year *x* $SEF_{S,n,x}$ shall be used

$M_{PL,i.x}$ = Mode share for pipeline for cargo type *i* in year *x* (% of TKM)

$SEF_{PL,i,x}$ = Specific emission factor for cargo type *i* transported through pipelines in year *x* (g CO_2/TKM)

i = Cargo type transported

x = Most recent calendar year for which data is available. Data not older than three years

5.5. Step 5. Determine baseline emissions

34. Baseline emissions for cargo are based on TKM of actually transported cargo by the project multiplied by the relevant baseline emission factor. TKM of cargo transported is based on the project records.

$$BE_y = \sum_i EF_{x,i} \times AL_{i,y} \times 10^{-6}$$ Equation (9)

Where:

BE_y = Baseline emissions of project cargo in the year *y* (t CO_2)

$EF_{x,i}$ = Emission factor per cargo type *i* transported in year *y* (g CO_2/TKM)

$AL_{i,y}$ = Cargo activity level of the project expressed as TKM transported of cargo type *i* in year *y* (TKM)

y = Crediting year when emission reductions are estimated

6. Data and parameters

6.1 Data and parameters not monitored

Data / Parameter table 1.

Data / Parameter:	**$C_{RL,x}$/$C_{RL,i,x}$**
Data unit:	TKM
Description:	Cargo transported by the rail system in year *x*/cargo type *i* transported by the rail system in year *x*
Source of data:	Rail company
Measurement procedures (if any):	Vintage maximum three years
Any comment:	Same time period and same location as $FC_{RL,n,x}$ and $EC_{RL,x}/FC_{RL,i,n,x}$ and $EC_{RL,i,x}$

Data / Parameter table 2.

Data / Parameter:	**$C_{S,k,n,x}$/$C_{S,i,k,n,x}$**
Data unit:	TKM
Description:	Cargo transported by ship *k* operated on fuel type *n* in year *x*/cargo type *i* transported by ship *k* operated on fuel type *n* in year *x*
Source of data:	Rail company
Measurement procedures (if any):	Vintage maximum three years
Any comment:	Same time period and route(s) as $FC_{S,k,n,x}/FC_{S,k,i,n,x}$

Data / Parameter table 3.

Data / Parameter:	**$C_{PL,i,m,elect,x}$/$C_{PL,i,m,n,x}$**
Data unit:	TKM
Description:	Cargo type *i* transported by pipeline *m* operated on electricity/fuel type *n* in year *x*

Source of data:	Pipeline operator
Measurement procedures (if any):	Vintage maximum three years
Any comment:	Same time period and same location as $FC_{PL,i,m,n,x}$/$EC_{PL,i,m,elect,x}$

Data / Parameter table 4.

Data / Parameter:	**$FC_{RL,n,x}$/$EC_{RL,x}$ or $FC_{RL,i,n,x}$/$EC_{RL,i,x}$**
Data unit:	kg for fuels and kWh for electricity
Description:	Fuel consumption of the rail system for cargo using fuel type *n* in year *x*/electricity consumption of the rail system for cargo transport in year *x* or fuel consumption of the rail system to transport cargo type *i* using fuel type *n* in year *x*/electricity consumption of the rail system to transport cargo type *i* in year *x*
Source of data:	Rail company
Measurement procedures (if any):	Vintage maximum three years
Any comment:	Same time period and same location as $C_{RL,x}$ or $C_{RL,i,x}$

Data / Parameter table 5.

Data / Parameter:	**$EC_{PL,i,m,elect,x}$**
Data unit:	kWh
Description:	Electricity consumption to operate the pipeline *m* for transporting cargo type *i* in year *x*
Source of data:	Pipeline operator
Measurement procedures (if any):	Vintage maximum three years
Any comment:	Same time period and same location as $C_{PL,i,m,elect,x}$/$C_{PL,i,m,n,x}$

Data / Parameter table 6.

Data / Parameter:	**$FC_{i,n,x}$**
Data unit:	litre, m^3 or kg
Description:	Annual fuel consumption of trucks using fuel type *n* to transport cargo type *i* in year *x*
Source of data:	Historical data or survey
Measurement procedures (if any):	-
Any comment:	-

Data / Parameter table 7.

Data / Parameter:	**$FC_{S,k,n,x}$/$IFC_{S,k,i,n,x}$**
Data unit:	kg
Description:	Fuel consumption of ship *k* transporting cargo using fuel type *n* in year *x*/fuel consumption of ship *k* transporting cargo type *i* using fuel type *n* in year *x*
Source of data:	Historical data or survey
Measurement procedures (if any):	-
Any comment:	Same time period as $C_{S,k,n,x}$/$C_{S,i,k,n,x}$

Data / Parameter table 8.

Data / Parameter:	**$FC_{PL,i,m,n,x}$**
Data unit:	kg
Description:	Fuel consumption to operate pipeline *m* for transporting cargo type *i* using fuel type *n* in year *x*
Source of data:	Historical data or survey. Records from the pipeline operator
Measurement procedures (if any):	-
Any comment:	-

Data / Parameter table 9.

Data / Parameter:	**$NCV_{n,x}$**
Data unit:	Energy/mass or volume units of fuel type *n* in year *x*
Description:	Net calorific value of fuel type *n* consumed in year *x*
Source of data:	The following data sources may be used if the relevant conditions apply:

Data source	**Conditions for using the data source**
(a) National default values	This source can only be used for liquid fuels and should be based on well documented, reliable sources(such as national energy balances)
(b) IPCC default values at the lower limit of the uncertainty at a 95 per cent confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	

Measurement procedures (if any):	-

Monitoring frequency:	For (a): review the appropriateness of the values annually. For (b): any future revision of the IPCC Guidelines should be taken into account
QA/QC procedures:	Verify whether the values under (a) and (b) are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range, collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in (a) should have ISO17025 accreditation or demonstrate that they can comply with similar quality standards
Any comment:	-

Data / Parameter table 10.

Data / Parameter:	**$EF_{CO2,n,x}$**
Data unit:	g CO_2/J
Description:	Emission factor for fuel type *n* in year *x*
Source of data:	The following data sources may be used, if the relevant conditions apply: **Data source** / **Conditions for using the data source** (a) National default values / This source can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances) (b) IPCC default values at the lower limit of the uncertainty at a 95 per cent confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories /
Measurement procedures (if any):	-
Monitoring frequency:	For (a): review the appropriateness of the values annually. For (b): any future revision of the IPCC Guidelines should be taken into account
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 11.

Data / Parameter:	**EF_{elect}/$EF_{PL,i,m,elect,x}$**
Data unit:	kgCO_2/kWh
Description:	Emission factor for electricity

Source of data:	Procedures in the latest approved version of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" shall be followed
Measurement procedures (if any):	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" shall be applied
Any comment:	-

Data / Parameter table 12.

Data / Parameter:	**$CW_{i,n,x}$**
Data unit:	tonne
Description:	Annual weight of cargo type *i* transported by trucks using fuel type *n* in year *x*
Source of data:	Sample measurements or trucking/logistics companies
Measurement procedures (if any):	Vintage maximum three years. For sample measurements, relevant provisions from the latest approved version of the "Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities" shall be followed. The lower 95 per cent confidence level shall be taken
Any comment:	The parameter is not required if mode split data for cargo on road is available for the country/region/province

Data / Parameter table 13.

Data / Parameter:	**$D_{i,n,x}$**
Data unit:	km
Description:	Total distance driven by trucks including empty return trips using fuel type *n* to transport cargo type *i* in year *x* (km)
Source of data:	Historical data or survey
Measurement procedures (if any):	-
Any comment:	-

6.2 Data and parameters monitored

Data / Parameter table 14.

Data / parameter:	**$AL_{i,y}$**
Data unit:	TKM
Description:	Cargo activity level of the project expressed as TKM transported of cargo type *i* in year *y*
Source of data:	Rail/barge/ship/pipeline operator
Measurement procedures (if any):	Based on records of the transport operator
Monitoring frequency:	Continuously, aggregated at least annually
QA/QC procedures:	Can be cross-checked with invoices
Any comment:	-

Appendix I. Key parameters to calculate the baseline for modal shift in inter-urban cargo transport

Table 1. Key parameters to calculate the baseline for modal shift in inter-urban cargo transport

Parameter	Level of aggregation and sources of data
Cargo types/geographical area	1. Country level ; 2. The level of aggregation of a region or province can be chosen if there is data to implement a calculation procedure for the region. The baseline is applicable to this region; 3. If this regional baseline is used for another region, justification needs to be provided to prove that another region is in a similar situation in terms of the availability of infrastructure
Mode share for each relevant cargo type	1. Country level; 2. Region/province (please see the requirement above)
Rail	
Fuel consumption	1. Country level; 2. Region/province (see the requirement above). If data is available, emission factors for specific cargo types can be estimated for those cargo types that are transported by dedicated trains. For trains transporting a mix of cargo, one emission factor for all types of cargo is estimated
Net calorific value	1. National default; 2. International default (IPCC)
Emission factor of fuel	1. National default; 2. International default (IPCC)
Electricity consumption	Grid
Grid emission factor	Combined margin
Shipping	Country level
Pipeline	Country level
Road	Emission factor/cargo type: 1. Default value 2. Calculated based on historic data
Amount of cargo type transported under the project	Project-specific. Data obtained by PPs, not DNAs
Project transportation distance	Project-specific. Data obtained by PPs, not DNAs

- - - - -

Document information

Version	*Date*	*Description*
01.0	14 May 2014	MP 63, Annex 2 To be considered by the Board at EB 79. The draft tool was available for public input from 12 to 27 February 2014. No inputs were received.

Decision Class: Regulatory
Document Type: Tool
Business Function: Methodology
Keywords: standardized baselines, transport