



UNION INTERNATIONALE DES CHEMINS DE FER
INTERNATIONALER EISENBahnVERBAND
INTERNATIONAL UNION OF RAILWAYS

Planning and Sustainable Development

UIC guideline

Non traction energy consumption and related CO₂ emission from European Railway sector

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1. Introduction

Keeping up with a process started in July 2007, CER and EIM decided on December 2007 to found the sector CO₂ specific reduction commitment on the principles of *baseline year 1990* and of a *whole sector average* (no binding single company reduction limits).

In April 2008, UIC delivered a report giving the final CO₂ data European overview for the feasibility of this commitment, as requested by CER and EIM. These figures did not take into account CO₂ emissions from stationary processes.

The data received so far by the UIC survey and Database unfortunately doesn't allow UIC to draft any view regarding the commitment for this kind of emissions in the period 1990-2020.

This situation is understandable, if we consider that no specific methodology has been drafted so far for a correct accounting of these kinds of emissions in the railway sector, and no clear directions on the choice of specific or total emissions has been yet given to members.

Furthermore, this exercise is also new for members: CO₂ emissions from stations, buildings and workshops are generally not included in the railways CO₂ emissions calculation.

Moreover, for most members it was impossible to look up for the 1990-figures in the necessary format.

This report is a first attempt to clear the subject and to define a common methodology for an accounting of non traction energy consumption and CO₂ emissions and to develop common indicators to assess improvement in this field.

It would be helpful, when reading this Report, to keep also in mind the following additional UIC CO₂ documents:

1. "First input on CO₂ reduction" (September 2007)
2. "CO₂ emissions Guidelines" (November 2007)
3. "CO₂ calculation Methodology" (January 2008).
4. "UIC Feasibility study- 1990-2020 CO₂ reduction commitment from European Railway sector" (April 2008)
5. Process, Power, People, A Railway Manager's Guide to Energy Efficiency (September 2008)
6. UIC leaflet 330 environmental performance indicators (October 2008)



Important preliminary remark:

“non-traction energy consumption (and/or CO₂ emissions)” must not be described as “Infrastructure manager’s energy consumption (and/or CO₂ emissions)” and this for two reasons:

1. Both the IM and the RO are involved in the energy consumption (and/or CO₂ emissions) from the traction of trains. Most of the efforts needed to enhance energy efficiency or to reduce CO₂ emissions from the train traction have to be taken jointly.
2. Also RO’s are involved in the non traction energy consumption (and/or CO₂ emissions), eg the energy consumed in rolling stock maintenance shops.

2. Inventory of energy consumption by energy carrier

A rigorous energy accounting is a preliminary condition for a good energy management. From this energy accounting it should be possible to establish the following list of all non traction energy consumption by energy carrier.

Energy carrier	unit	volume	Applicable CO ₂ emission (Direct + indirect)	Specific emission (Direct + indirect)	Total emission (t)	CO ₂
electricity	MWh		****g/kWh			
fuel oil (heating)	Tonnes		****g/kg			
Gas	MWh		****g/kWh			
Coal	Tonnes		****g/kg			
Pellets	Tonnes		****g/kg			
Own production of renewable resources	MWh		0 g/kWh			
gasoline	Tonnes		****g/kg			
Diesel	Tonnes		****g/kg			
LPG	Tonnes		****g/kg			
....						
others						

3. Inventory of energy consumption by type of utilization

In order to evaluate past and future developments, to benchmark within the company, within the railway sector or to compare with other sectors or industries, we propose the following types of utilization.

It will not be easy to obtain exact or even reliable data in short term but it should be every energy manager's task to improve gradually the quality of the data.

	Type of utilization	Description: energy consumed for:	Proposed denominator to calculate a local indicator	Proposed denominator to calculate a company level indicator
1	Services to final transport customers	Lighting of platforms, stations, halls, Elevators, escalators, ... in stations Heating/Cooling of stations Maintenance of stations Car fleet	Number of daily passenger getting in the train from this station	Number of total passengers/year
2	Technical services for train operation	Signalling equipment, Signalling boxes, dispatching centres, heating of switches, lighting of sidings, communication equipment, ... Car fleet (1)	Number of daily train pads, starting from, ending or passing the station.	Number of trains paths/year (trainkm)
3	Workshops	Buildings for maintenance of rolling stock Buildings for maintenance (and /or construction) of railway infrastructure	m ² of building (Working hours)	m ² of buildings (Working hours)
4	Offices	Buildings for company's administration Car fleet	m ² of building or number of employees working in this building.	m ² of building or total number of employees
5	Maintenance of railway infrastructure	Traction for track and catenary's maintenance rolling stock. Other kinds of machinery Car and truck fleet		km of railway track

(1) pre-heating or pre-cooling of trains must not be considered (are be included in "traction energy")

4. communication and commitment of targets

In order to benchmark with other modes of transport or in setting company or sector targets it should be decided if all mentioned types of utilization should be included.