



# ANNEX 3

LIST OF DATA SOURCES & MODEL FOR  
AVAILABLE SEATS ESTIMATE

GREEN BOND IMPACT REPORTING  
**MARCH 2025**

List of the data sources EUROFIMA used to produce the Impact Report.

### Source of data (1/2)

Factor	Short name	Source	Page	Value
Average Auto Consumption - Motorway	ACM	<a href="#">Ecopassenger Methodology Report</a>	Page 17	
Average Auto Consumption - Rural	ACR	<a href="#">Ecopassenger Methodology Report</a>	Page 17	
% of time traveled in a Motorway	TM%	Assumption		50%
% of time traveled in Rural roads	TR%	Assumption		50%
Average Auto Consumption - Travel	ACT	Calculated		
Average Diesel Auto Consumption – Travel	ACTD	Calculated		4.9 l/100km
Average Petrol Auto Consumption – Travel	ACTP	Calculated		6.7 l/100km
% of Diesel cars in the European Fleet	DC%	<a href="#">ACEA (fleet type)</a>		42%
% of Petrol cars in the European Fleet	PC%	<a href="#">ACEA (diesel vs petrol)</a>		53.9%
Average car weight		<a href="#">European vehicle market statistics</a>	Page 53	1395 kg
Average Auto Consumption	AC	Calculated		5.9 l/100km
Passengers per kilometer by country/mode of operations	pkmC	<a href="#">Eurostat - Rail transport of passengers</a> <a href="#">SCI Verkher GmbH</a>		
Passengers per kilometer by item of equipment	pkmT	Calculated		
Available seats by country/mode of operations	AvSC	SCI Verkher GmbH		
Available seats by specific item of equipment	AvST	Railways/Manufacturer data sheet Specific model for Loco-Coaches formation		
Numbers of specific green items	#ST	Project		
Baseline GhG emissions per pkm, avoided	EBA	<a href="#">EU Taxonomy</a>	Art. 24.1, Page 329	290 gCO <sub>2</sub> /vkm
Baseline GhG emissions per pkm, reduced	EBR	<a href="#">EU Taxonomy</a>	Art. 24.1, Page 329	90 gCO <sub>2</sub> /pkm
Passenger per vehicle	PV	<a href="#">Ecopassenger</a>		1.5
Project savings [CO <sub>2</sub> ] as reduced emissions	PSCDR	Calculated		
Project savings [CO <sub>2</sub> ] as avoided emission	PSCDA	Calculated		
CH <sub>4</sub> emitted by energy unit- Petrol	CKwhP	<a href="#">UK Gov- GG Reporting- Conversion factors</a>	See table «Conversion factors 2020: condensed set (for most users)»	0.00071 kg/kWh
CH <sub>4</sub> emitted by energy unit- Diesel	CKwhD	<a href="#">UK Gov- GG Reporting- Conversion factors</a>	See table «Conversion factors 2020: condensed set (for most users)»	0.00002 kg/kWh
N <sub>2</sub> O emitted by energy unit- Petrol	NKwhP	<a href="#">UK Gov- GG Reporting- Conversion factors</a>	See table «Conversion factors 2020: condensed set (for most users)»	0.00064 kg/kWh
N <sub>2</sub> O emitted by energy unit- Diesel	NKwhD	<a href="#">UK Gov- GG Reporting- Conversion factors</a>	See table «Conversion factors 2020: condensed set (for most users)»	0.00331 kg/kWh
Project savings [CH <sub>4</sub> ] as avoided emissions	PSMHA	Calculated		
Project savings [CH <sub>4</sub> ] as reduced emissions	PSMHR	Calculated		
Project savings [N <sub>2</sub> O] as avoided emissions	PSNOA	Calculated		
Project savings [N <sub>2</sub> O] as reduced emissions	PSNOR	Calculated		
Diesel Heating Value-by Kg		<a href="#">Heating values</a>		45.5 MJ/Kg
Energy consumption baseline per pkm, car	JBC	<a href="#">Mobitool.ch</a>		1.30 MJ/pkm
Energy consumption baseline per pkm, diesel equipment	JBD	<a href="#">Ecopassenger Methodology Report</a>	Page 18	1.15 MJ/pkm
Average Energy Consumption of the Green Asset per Pkm [CH,AT,DE, FR,IT]	JGA	<a href="#">Mobitool.ch</a>		
Average Energy Consumption of the Green Asset per Pkm [Other country]	JGA	<a href="#">Ecopassenger Methodology Report</a>	Page 18	0.32 Mj/pkm

List of the data sources EUROFIMA used to produce the Impact Report.

Source of data 2/2]

Factor	Short name	Source	Page	Value
Project savings as reduced energy consumption	PSJR	Calculated		
Project savings as avoided energy consumption	PSJA	Calculated		
Heating value by liter -Petrol	HVP	<a href="#">Heating values</a>		33.9 MJ/l
Heating value by liter- Diesel	HVD	<a href="#">Heating values</a>		36.7 MJ/l
Reduction in fuel consumption- Avoided	RFCA	Calculated		
Reduction in fuel consumption- Reduced	RFCR	Calculated		



E464																					
Type of coaches		# of seats					# of coaches							Unitary market value							
Type of coaches	% of usage	2nd class	1st class	Driving trailer	Dining car	Wagon lits	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco	Seats (whole formation)	Seats weighted by loco Value	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco	Formation value
MD	50.0%	84	58	64			3	2	1			1	432	334.4	63,788 €	77,785 €	92,188 €			1,504,762 €	1,943,884 €
PR	15.0%	84		61			5		1			1	481	439.0	24,000 €	24,000 €	24,000 €			1,504,762 €	1,648,762 €
NCDP	10.0%	126	90	90			3	2	1			1	648	176.8	640,857 €	659,328 €	769,078 €			1,504,762 €	5,515,065 €
CDPTR	10.0%	126	90	90			3	2	1			1	648	130.9	953,177 €	978,250 €	1,128,066 €			1,504,762 €	7,448,859 €
UIC- Z1	10.0%	66	54	64	35		5	2	1			1	502	297.8	121,462 €	124,346 €	176,059 €			1,504,762 €	2,536,819 €
Night train (UIC X - WL FS)	5.0%	66		64		36	2				7	2	384	157.3	24,000 €	24,000 €	24,000 €		87,959 €	1,504,762 €	3,673,236 €

E464 - # of weighted seats

301.5

E403 FS																					
Type of coaches		# of seats					# of coaches								Unitary market value						
Type of coaches	% of usage	2nd class	1st class	Driving trailer	Dining car	Wagon lits	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco	Seats (whole formation)	Seats weighted by loco Value	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco	Formation value
IC - Gran comfort	35.0%	48	48	41	35		5	3	1			1	425	278.0	117,236 €	123,763 €	175,141 €			2,141,433 €	3,274,044 €
IC MOD	40.0%	78	52	64	35		5	3	1			1	610	276.8	224,848 €	228,663 €	768,321 €			2,141,433 €	4,719,982 €
Night train (UIC X - WL FS)	25.0%	66		64		36	2				7	1	384	293.1	24,000 €	24,000 €	24,000 €		87,959 €	2,141,433 €	2,805,146 €

E403 FS - # of weighted seats

281.3

E401 FS																					
Type of coaches		# of seats					# of coaches							Unitary market value							
Type of coaches	% of usage	2nd class	1st class	Driving trailer	Dining car	Wagon lits	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco	Seats (whole formation)	Seats weighted by loco Value	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco	Formation value
IC MOD	75.0%	78	52	64			4	2	1			1	480	146.0	224,848 €	228,663 €	768,321 €			928,483 €	3,053,521 €
Night train (UIC X - WL FS)	25.0%	66		64		36	2				7	1	384	223.9	24,000 €	24,000 €	24,000 €		87,959 €	928,483 €	1,592,196 €

E401 FS - # of weighted seats

165.4

MODEL TO ESTIMATE THE SEATS TO BE ALLOCATED TO LOCOMOTIVES

E414																					
Type of coaches		# of seats					# of coaches							Unitary market value							
Type of coaches	% of usage	2nd class	1st class	Driving trailer	Dining car	Wagon lits	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco	Seats (whole formation)	Seats weighted by loco Value	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco	Formation value
IC - Gran comfort	33.0%	48	48	41			5	3				2	384	121.3	117,236 €	123,763 €	175,141 €			820,650 €	2,598,770 €
IC MOD	66.0%	78	52	64			5	3				2	546	129.8	224,848 €	228,663 €	768,321 €			820,650 €	3,451,527 €

E414 - # of weighted seats

125.7

E402 B FS																					
Type of coaches		# of seats					# of coaches								Unitary market value						
Type of coaches	% of usage	2nd class	1st class	Driving trailer	Dining car	Wagon lits	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco	Seats (whole formation)	Seats weighted by loco Value	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco	Formation value
IC - Gran comfort	35.0%	48	48	41	35		5	3	1			1	425	208.6	117,236 €	123,763 €	175,141 €	1,179,307 €		1,092,248 €	2,224,859 €
IC MOD	40.0%	78	52	64	35		4	2	1			1	480	163.0	224,848 €	228,663 €	768,321 €			1,092,248 €	3,217,286 €
Night train (UIC X - WL FS)	25.0%	66		64		36	2				7	1	384	238.9	24,000 €	24,000 €	24,000 €		87,959 €	1,092,248 €	1,755,960 €

E402 B FS - # of weighted seats

197.9

CLASS HLE 18																					
Type of coaches		# of seats					# of coaches							Unitary market value							
Type of coaches	% of usage	2nd class	1st class	Driving trailer	Dining car	Wagon lits	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco	Seats (whole formation)	Seats weighted by loco Value	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco	Formation value
M6	100.0%	140	124	136			4	2	1			1	944	239.4	991,193 €	1,014,887 €	1,436,668 €			2,524,596 €	9,955,808 €

Class HLE 18 - # of weighted seats

239.4

CLASS HLE 19																					
Type of coaches		# of seats					# of coaches							Unitary market value							
Type of coaches	% of usage	2nd class	1st class	Driving trailer	Dining car	Wagon lits	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco	Seats (whole formation)	Seats weighted by loco Value	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco	Formation value
M6	100.0%	140	124	136			7	3				2	1352	218.8	991,193 €	1,014,887 €	1,436,668 €			2,389,216 €	14,761,442 €

Class HLE 19 - # of weighted seats

218.8

A locomotives in itself carries no passengers; therefore, to estimate the available seats (as a basis to derive the pkm) we have to develop a model that properly weight the following factors:

- a) The frequency of use of the specific formations that are utilized.
- b) The passengers cars, in terms of class, type and numbers and seats of the single coach, which form the relevant formation.

Here below we have described the single steps to calculate the available seats, using the Locomotive E403 FS as example; the other locomotives use the same logic.

- 1] We first define the different passengers car and relevant % of usage (E403 FS utilizes IC- Gran comfort cars 35% of the time, IC MOD Cars 40% of the time and night formation for 25.% of the time) and then the formation and relevant seats by type of passengers (i.e. the loco E403 FS carries 5 second class [48 seats available each], 2 first class [48 seats available each] and 1 driving trailer [41 available seats] of the coach type IC- Gran Comfort).
- 2] We then calculate the seats of each complete formation (i.e. the formation with the IC-Gran comfort cars has  $48*5+48*3+41*1=425$  seats) and define the market value (as estimated by EUROFIMA proprietary model developed in cooperation with SCI Verkehr) of the single formation component, cars and locomotives, as the parameter to derive the "weighted seats" of the locomotive (i.e. the value of the formation with the IC-Gran comfort is 3.274.044€, while the loco value is 2.141.433€).
- 3] As a next step, we calculate the "weighted" number of seats of each formation that can be allocated to the loco as pro rata of the market value (i.e. in the formation with the IC-Gran comfort cars the seats allocated to the loco are  $[425/3.274.044€*2.141.433€]=278.0$ ).
- 4] Finally, we estimate the average seats allocated to the loco E403 FS, weighing the available weighted seats of a formation with the frequency of utilization (i.e.  $278.0*35\%+276.8*40\%+293.1*25\%=281,3$ ). This is the value we use for a single locomotive (see cells in green).

MODEL TO ESTIMATE THE SEATS TO BE ALLOCATED TO PASSENGER CARS

NCDP																			
	# of seats					# of coaches						Unitary market value							
	2nd class	1st class	Driving trailer	Dining car	Wagon lits	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Seats (whole formation)	Loco		2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco
	126	90	90			3	2	1			648	E464	1	640,857 €	659,328 €	769,078 €			1,504,762 €

NCDP - # of weighted seats	75.3	77.5	90.4	0	0
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CDPTR																			
	# of seats					# of coaches						Unitary market value							
	2nd class	1st class	Driving trailer	Dining car	Wagon lits	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Seats (whole formation)	Loco		2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco
	126	90	90			3	2	1			648	E464	1	953,177 €	978,250 €	1,128,066 €			1,504,762 €

CDPTR - # of weighted seats	82.9	85.1	98.1	0	0
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IC-MOD																			
	# of seats					# of coaches						Unitary market value							
	2nd class	1st class	Driving trailer	Dining car	Wagon lits	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Seats (whole formation)	Loco		2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco
	78	52	64			4	2	1			480	E401	1	224,848 €	228,663 €	768,321 €			928,483 €

IC-MOD - # of weighted seats	35.3	35.9	120.8	0	0
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M6																			
	# of seats					# of coaches						Unitary market value							
	2nd class	1st class	Driving trailer	Dining car	Wagon lits	2nd class	1st class	Driving trailer	Dining car	Wagon lits	Seats (whole formation)	Loco		2nd class	1st class	Driving trailer	Dining car	Wagon lits	Loco
	140	124	136			5	2	1			1084	Clas HLE 18	1	991,193 €	1,014,887 €	1,436,668 €			2,524,596 €

M6 - # of weighted seats	98.2	100.5	142.3	0	0
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A passengers car, in itself, has no power and it always coupled with a locomotive; the number of available seats must be properly weighted and depends on the following factors:

- a) The most frequent formation, in terms of type, number and seats and locomotive class, the passengers car is operated under.
- b) The value of the single passenger car type as % of the value of the entire configuration.

Here below we have described the single steps to calculate the available seats, using the passengers car NCDP as example; the other passengers cars use the same logic:

- 1) We first define the most common formation the NCDP runs under; in this case the passengers cars are coupled with a E464 locomotive and the formation consist of 3 second class coaches (126 seats), 2 first class coaches (90 seats) and 1 driving trailer (90 seats).
- 2) We then define the market value (as estimated by Eurofima proprietary model developed in cooperation with SCI Verkehr) of the single formation component, cars and locomotives, as the parameter to derive the “weighted seats” of the passengers cars (i.e. the value of the formation is 5.515.065€, while the 2nd class car value is 640.857€).
- 3) Finally, we calculate the “weighted” number of seats of each passengers car type as pro rata of the market value (i.e. weighted seats of the 2nd class passenger car are  $[126 * 640.857€ / 5.515.065€] = 75.3$ ). This is the value we use for a single passenger cars type (see cells in green).



## LIST OF AVAILABLE SEATS BY ASSET CLASS

Asset class	Asset Type	Type of passengers car	Seats
CLASS HLE 18	EL - Electrical locomotives		239.4
CLASS HLE 19	EL - Electrical locomotives		218.8
E401 FS	EL - Electrical locomotives		165.4
E402 B FS	EL - Electrical locomotives		197.9
E403 FS	EL - Electrical locomotives		281.3
E414	EL - Electrical locomotives		125.7
E464	EL - Electrical locomotives		301.5
CIVIA 463	EMU - Electrical multiple units train		169.0
CIVIA 464	EMU - Electrical multiple units train		223.0
CIVIA 465	EMU - Electrical multiple units train		277.0
CLASS 2400 CFL	EMU - Electrical multiple units train		334.0
CLASS 447 RF	EMU - Electrical multiple units train		234.0
CLASS 449	EMU - Electrical multiple units train		263.0
CLASS 640/2	EMU - Electrical multiple units train		221.0
CLASS 650/2	EMU - Electrical multiple units train		140.0
ETR 324 JAZZ	EMU - Electrical multiple units train		202.0
ETR 425 JAZZ	EMU - Electrical multiple units train		290.0
MINUETTO E	EMU - Electrical multiple units train		169.0
MR 08 DC	EMU - Electrical multiple units train		232.0
MR 08 MS B	EMU - Electrical multiple units train		232.0
RABE 511-4	EMU - Electrical multiple units train		337.0
RABE 511-6	EMU - Electrical multiple units train		535.0
RABE 514	EMU - Electrical multiple units train		384.0
RABE 520	EMU - Electrical multiple units train		128.0

Asset class	Asset Type	Type of passengers car	Seats
RABE 521	EMU - Electrical multiple units train		161.0
RABE 522	EMU - Electrical multiple units train		161.0
RABE 523	EMU - Electrical multiple units train		161.0
RABE 523 F3	EMU - Electrical multiple units train		161.0
RABE 524-4	EMU - Electrical multiple units train		182.0
RABE 524-6	EMU - Electrical multiple units train		250.0
RABE 524-6 F3	EMU - Electrical multiple units train		250.0
RABE 526-3	EMU - Electrical multiple units train		106.0
RABE 526-4	EMU - Electrical multiple units train		163.0
TAF FS	EMU - Electrical multiple units train		475.0
RABDE 500	HST - High speed train		431.0
RABE 503	HST - High speed train		422.0
S-104	HST - High speed train		237.0
S-114	HST - High speed train		237.0
CDPTR DT	PC - Passenger car	Driving trailer	98.1
CDPTR IC	PC - Passenger car	Second class	82.9
IC MOD-DT	PC - Passenger car	Driving trailer	120.8
IC MOD-INT	PC - Passenger car	Second class	35.3
IC MOD-INT 1ST	PC - Passenger car	First class	35.9
M6 SNCB	PC - Passenger car	Second class	98.2
M6 SNCB 1ST	PC - Passenger car	First class	100.5
NCDP DT	PC - Passenger car	Driving trailer	90.4
NCDP IC	PC - Passenger car	Second class	75.3
NCDP IC 1ST	PC - Passenger car	First class	77.5

