



# ANNEX 3

LIST OF DATA SOURCES & MODEL FOR  
AVAILABLE SEATS ESTIMATE

GREEN BOND IMPACT REPORTING  
**MARCH 2023**

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> SCI Verkher GmbH		
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		
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	2nd class Seats	1st class Seats	Driving trailer Seats	2nd class coaches - #	1st class coaches - #	% of usage	Seats (whole formation)	Seats weighted by loco Value	Unitary book value - Coaches	Unitary book value - Driving trailer	Unitary book value - Loco	Formation value	# Green loco	# Green coaches	# Complete formations	Single Locos left	Single Coaches left	
MD	82	72	60	3	2	52.6%	450	246.8	175,203 €	254,044 €	1,372,536 €	2,502,595 €	251			201		
PR	100		76	5		15.8%	576	576	63,398 €	153,645 €	1,372,536 €	1,843,169 €						
Vivalto	126	90	90	3	2	31.6%	648	115.2	991,896 €	1,388,470 €	1,372,536 €	7,720,487 €		302	50			2

Seats of the average formation	532.4	234
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E403*																	
Type of coaches	2nd class Seats	1st class Seats	Driving trailer Seats	2nd class coaches - #	1st class coaches - #	% of usage	Seats (whole formation)	Seats weighted by loco Value	Unitary book value - Coaches	Unitary book value - Driving trailer	Unitary book value - Loco	Formation value	# Green loco	# Green coaches	# Complete formations	Single Locos left	Single Coaches left
IC - Gran comfort	74	52	59	5	3	35%	585	254.6	440,483 €	1,179,307 €	3,623,293 €	8,326,467 €	23			23	
UIC Z1**	66	54	64	5	3	40%	556	250.3	405,814 €	1,179,307 €	3,623,293 €	8,049,115 €					

Seats of the average formation	427.2	189.2
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\*Assumed that 25% of the loco run during the night and are excluded from the estimation

\*\*All UIC Z1 are assumed to be coupled with the loco E414 for the sake of simplicity

E401*																	
Type of coaches	2nd class Seats	1st class Seats	Driving trailer Seats	2nd class coaches - #	1st class coaches - #	% of usage	Seats (whole formation)	Seats weighted by loco Value	Unitary book value - Coaches	Unitary book value - Driving trailer	Unitary book value - Loco	Formation value	# Green loco	# Green coaches	# Complete formations	# Coaches left	# Coaches left
UIC Z1**	66	54	64	5	1	75%	448	140.49	405,814 €	1,179,307 €	1,651,229 €	5,265,422 €	21			21	

Seats of the average formation	336.0	105.4
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\*Assumed that 25% of the loco run during the night and are excluded from the estimation

\*\*All UIC Z1 are assumed to be coupled with the loco E414 for the sake of simplicity

E414																	
Type of coaches	2nd class Seats	1st class Seats	Driving trailer Seats	2nd class coaches - #	1st class coaches - #	% of usage	Seats (whole formation)	Seats weighted by loco Value	Unitary book value - Coaches	Unitary book value - Driving trailer	Unitary book value - Loco	Formation value	# Green loco	# Green coaches	# Complete formations	Single Locos left	Single Coaches left
IC - Gran comfort	74	52	59	5	3	33%	585	70.5	440,483 €	1,179,307 €	644,653 €	5,347,827 €	58			39	
UIC Z1	66	54	64	5	3	66%	556	70.7	405,814 €	1,179,307 €	644,653 €	5,070,475 €		176	19		

Seats of the average formation	560.0	69.9
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E402 B*																	
Type of coaches	2nd class Seats	1st class Seats	Driving trailer Seats	2nd class coaches - #	1st class coaches - #	% of usage	Seats (whole formation)	Seats weighted by loco Value	Unitary book value - Coaches	Unitary book value - Driving trailer	Unitary book value - Loco	Formation value	# Green loco	# Green coaches	# Complete formations	Single Locos left	Single Coaches left
IC - Gran comfort	74	52	59	5	3	35%	585	65.2	440,483 €	1,179,307 €	589,443 €	5,292,617 €	5			5	
UIC Z1**	66	54	64	5	3	40%	556	65.3	405,814 €	1,179,307 €	589,433 €	5,015,255 €					

Seats of the average formation

427.2 48.9

\*Assumed that 25% of the loco run during the night and are excluded from the estimation

\*\*All UIC Z1 are assumed to be coupled with the loco E414 for the sake of simplicity

Class HLE 18*																	
Type of coaches	2nd class Seats	1st class Seats	Driving trailer Seats	2nd class coaches - #	1st class coaches - #	% of usage	Seats (whole formation)	Seats weighted by loco Value	Unitary book value - Coaches	Unitary book value - Driving trailer	Unitary book value - Loco	Formation value	# Green loco	# Green coaches	# Complete formations	Single Locos left	Single Coaches left
M6	140	124	130	5	2	70%	1078	238.3	1,206,730 €	1,749,759 €	2,893,862 €	13,090,731 €	22	103	12	8	7
Class I11	80	60	58	5	2	30%	578	268.1	346,216 €	920,879 €	2,893,862 €	6,238,253 €		16	2		

Seats of the average formation

928.0 247.3

\*The locomotives Class HLE 18 is coupled with a fragmented mix of formations and several different coaches; to simplify, we assume that there are only two formations, with the two types of coaches mainly used and the average numbers of coaches. In this model we assume that 12 locos carry 1078 passengers, 2 locos 578 and 8 locos 247.3.

Class HLE 19*																	
Type of coaches	2nd class Seats	1st class Seats	Driving trailer Seats	2nd class coaches - #	1st class coaches - #	% of usage	Seats (whole formation)	Seats weighted by loco Value	Unitary book value - Coaches	Unitary book value - Driving trailer	Unitary book value - Loco	Formation value	# Green loco	# Green coaches**	# Complete formations	# Coaches left	# Coaches left
M6	140	124	130	3	1	100%	674	203.2	1,206,730 €	1,749,759 €	2,837,959 €	9,414,638 €	4	7	1	3	2

Seats of the average formation

674.0 203.2

\* The locomotives Class HLE 19 is coupled with a fragmented mix of formations and several different coaches; to simplify, we assume that there is only one formation, with the M6 coaches, where each loco carries 6 coaches. In this model 1 Loco carries, as complete formation, 674 passengers, while the other 3 loco 203.2

\*\* The number of coaches are the ones left, after we have associated the total 103 to the 12 complete formations with the loco Class HLE 18; as 5 of them form a complete formation with the Loco Class HLE 19, only 2 are the singles and carries 140 passengers each

In case of a locomotive pulling/pushing a set of passengers cars (i.e. E464/E414 of FS), the number of available seats depends on the frequency of use of the specific formations that are utilized and on the coaches, in terms of type and numbers, which form the relevant formation. Here below we have described the single steps to calculate the available seats, using the Locomotive E464 as example; the other locomotives use the same logic.

- 1) We first define the different coaches and relevant % of usage (E464 utilizes MD coaches 52.6% of the time, PR Coaches 15.8% of the time and Vivalto coaches for 31.6% of the time) and then the formation and relevant seats by type of coach (i.e. the loco E464 carries 3 second class (82 seats available each), 2 first class (72 seats available each) and 1 driving trailer (60 available seats) of the coach type MD).
- 2) We then calculate the financial value of the formation and of the single component (loco, coaches), taking as a basis the updated book value received by the Railway Operator.
- 3) As we did not finance always the entire formation, but only the Locomotive, we weighed the available seats as pro rata of the book values (i.e. for the coach MD:  $450 * 1.372.536 / 2.502.595 = 246.8$ ).
- 4) Starting from this data, provided by FS, we can estimate the seats that the average loco-coaches formation carries, weighing the available seats of a formation with the frequency of utilization (i.e. for the locomotives E464:  $256,8 * 52,6\% + 428,9 * 15,8\% + 115,2 * 31,6\% = 234,0$ ). This is the value we use for a single locomotive (pair in green).
- 5) In case we financed also the coaches (i.e. Vivalto), we estimated the numbers of complete formations (in this case, 50, as we financed 302 Vivalto coaches and each formation requires 6 coaches) and use the total available seats for the formation (648) (pair in orange).
- 6) To avoid a double counting, the savings of the Vivalto coaches are not considered and put to zero, with the exclusion of the 2 coaches left;  $302 \text{ (Financed Coaches)} - 6 \text{ (Coaches per formation)} * 50 \text{ (number of complete formation)} = 2 \text{ Coaches left}$ . The value of the Seats is in this case 126, the one of the 2nd class type (pair in pale blue).

## LIST OF AVAILABLE SEATS BY ASSET CLASS

Asset class	Available seats	Notes
CLASS 2400 CFL	334	
CLASS HLE 18	247.3	This value does not apply on 14 locomotives, where we have enough coaches to form a complete formation. In this case the value is 1078 seats for 12 locos and 578 for 2 locos
CLASS HLE 19	203.2	This value does not apply on 1 locomotives, where we have enough coaches to form a complete formation. In this case the value is 674 seats
CLASS 11 SNCB	-	We put to zero the savings, not to double count them (see above the note on the Class HLE19): all coaches are part of a full formation with the loco Class HLE 19
M6 SNCB	-	We put to zero the savings, not to double count them (see above the note on the Class HLE18), with the exclusion of the 2 coaches which are left, after completing the 14 formation. In this case the value is 140 seats.
RABE 514	384	
RABE 521	161	
RABE 522	161	
RABE 523	161	
RABE 503	422	
CIVIA 465	277	
E464	234.0	This value does not apply on 50 locomotives, where we have enough coaches to form a complete formation. In this case the value is 648 seats
VIVALTO*	-	We put to zero the savings, not to double count them (see above the note on the E464), with the exclusion of the 2 coaches which are left, after completing the 50 formation. In this case the value is 126 seats.
E403 FS	189	
CLASS 449	263	
CIVIA 463	169	
CIVIA 464	223	
S-104	237	
S-114	237	
ETR 324 JAZZ	202	
ETR 425 JAZZ	290	
MINUETTO E	169	
CLASS 447 RF	234	
RABDE 500	431	
RABE 511-6	535	
RABE 511-4	337	
RABE 520	128	
UIC Z1**	-	We put to zero the savings, not to double count them (see below the note on the E414), with the exclusion of the 5 coaches which are left, after completing the 19 formation. In this case the value is 66 seats
E401 FS	105.4	
E402 B FS	48.9	
E414	69.9	This value does not apply on 19 locomotives, where we have enough coaches to form a complete formation. In this case the value is 556 seats
CLASS 6112 HZ	220	
RABE 523 F3	161	
RABE 524-4	182	
RABE 524-6	250	
RABE 524-6 F3	250	
RABE 526-3	106	
RABE 526-4	163	

\* With the name Vivalto we define a family of very similar coaches; NCDP DT, NCDP IC, CDPTR DT, CDPTR IC, as denominated in the list of assets

\*\* With the name UIC Z1 we define a family of coaches; UIC Z1 FS (Intermediate) and UIC Z1A (Driving), as denominated in the list of assets