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MEETING DOCUMENT

From:	General Secretariat of the Council
To:	Working Party on the Environment
Subject:	CO2 in HDV: follow-up to WPE on 6 September - Commission presentation

As a follow-up to the WPE meeting on 6 September 2018 delegations will find attached the Commission presentation delivered at the meeting.

European Commission

PUBLIC

Commission Proposal for a Regulation setting CO_2 emission performance standards for new heavy-duty vehicles

(COM/2018/284, 17 May 2018)

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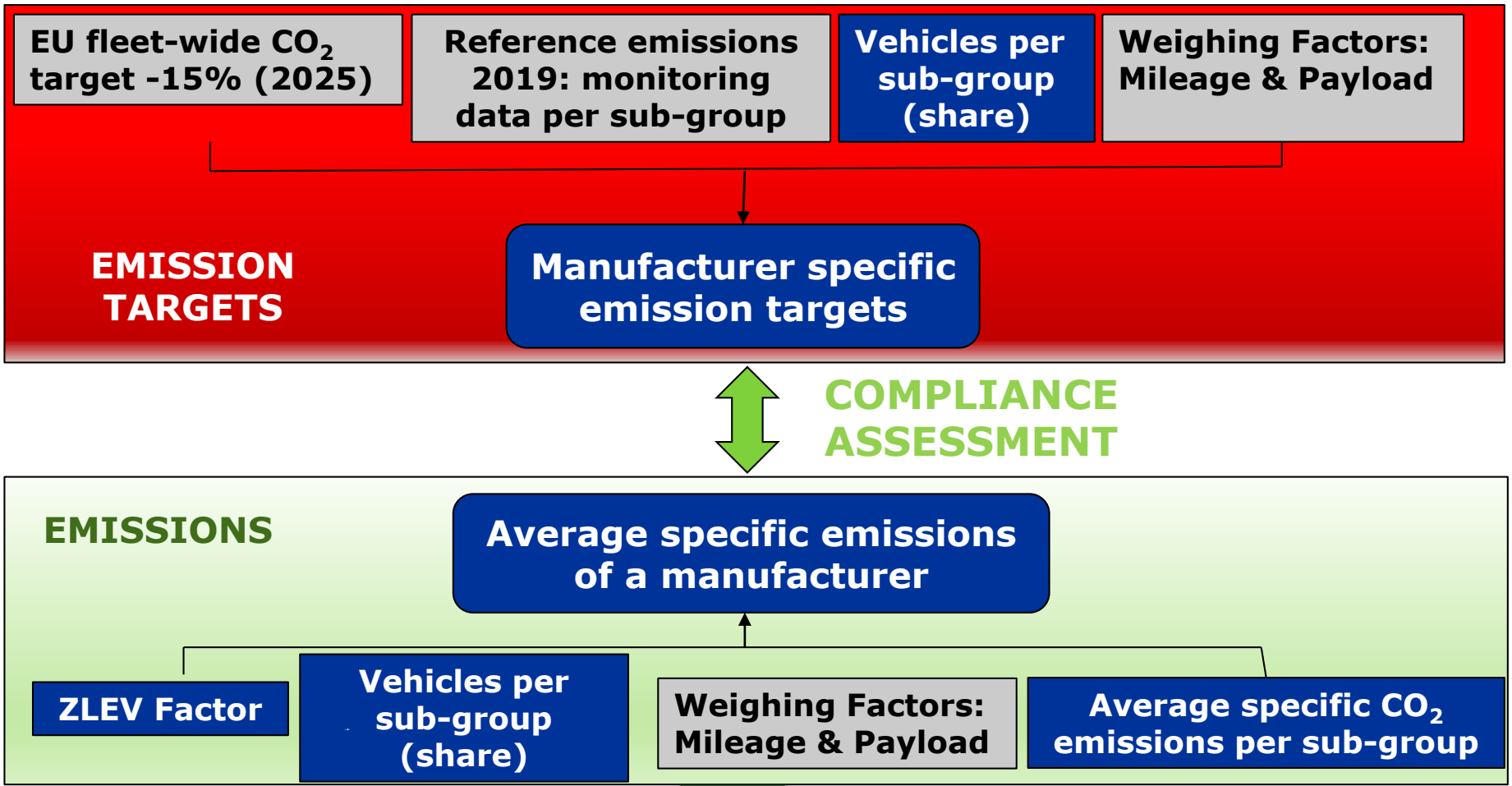
Selected topics

Council Working Party Environment 06 September 2018

Climate Action

Manufacturer specific emissions and emission targets – Building Blocks



From reference emissions 2019 …

$$rCO2_{sg} = \frac{\sum_v CO2_v}{rV_{sg}\ x\ PL_{sg}}$$

Sum of CO_2 emissions of vehicles in sub-group (EU fleet 2019)*		Vehicles per sub-group (EU fleet)	Weighted Payload	2019 Reference emissions by subgroup
4-UD	23,953,374	29,052	2.7	311
4-RD	7,315,551	8,958	3.2	257
4-LH	8,820,084	10,920	7.4	109
5-RD	16,973,411	20,460	6.3	132
5-LH	22,973,841	27,576	13.4	62
9-RD	24,485,916	29,616	6.3	132
9-LH	13,302,360	16,350	13.4	61
10-RD	6,756,594	8,052	10.3	82
10-LH	13,485,892	16,404	13.8	59
	g/km			**g/tkm**

*randomly generated example data

Payloads weighted over the share of the different mission profiles within a subgroup

… to manufacturer-specific 2025 emission target

$$T = \sum_{sg} share_{sg} \times MPW_{sg} \times (1 - rf) \times rCO2_{sg}$$

2019 Reference emissions by subgroup		MPW$_{sg}$ weighing factor: Payload x mileage	Share of vehicles per sub-group
4-UD	311	0.10	17%
4-RD	257	0.16	5%
4-LH	109	0.47	7%
5-RD	132	0.32	12%
5-LH	62	1.00	16%
9-RD	132	0.29	18%
9-LH	61	0.93	10%
10-RD	82	0.45	5%
10-LH	59	0.95	10%

* * * Reduction factor (1-rf) = 85 % = **39.2**

g/tkm

Weighing factor is normalised to mileage and payload on 5-LH

Manufacturer-specific target 2025

Average specific emissions of a manufacturer

COMPLIANCE LEVEL

$$CO2 = ZLEV \times \sum_{sg} share_{sg} \times MPW_{sg} \times avgCO2_{sg}$$

ZLEV Factor

Vehicles per sub-group (share)

MPW_{sg} weighing factor: Payload x mileage

Average specific CO2 emissions per sub-group

Sum over all sub-groups sg

Similar to baseline calculation

Calculation of the ZLEV factor

$$ZLEV = V / (V_{conv} + V_{zlev})$$

$$V_{zlev} = V_{in} + V_{out}$$

ZLEV = ZLEV factor, with a minimum of 0.97

V = number of HDVs in vehicle groups 4-5-9-10, excluding vocational vehicles

$\mathbf{V_{conv}}$ = V, but excluding zero- and low emission vehicles (ZLEVs)

$\mathbf{V_{in}}$ = number of ZLEVs in vehicle groups 4-5-9-10, multiplied by [1+ (1-$CO2_v$/350)]

$\mathbf{V_{out}}$ = number of ZEVs in the HDV categories referred to in second sub-paragraph of Article 2(1), multiplied by 2, and with a maximum of 1.5% of V_{conv}

$\mathbf{V_{zlev}}$ = sum of V_{in} and V_{out}

Calculation of the ZLEV factor

Example 1: illustration of V_{out} cap (1.5% of V_{conv}) – case where V_{in} = 0

Vout<1.5% cap		
V	27898	
Vconv	27898	
	Number of vehicles	Multiple counting
Vin	0	0
Vout	150	300
Vzlev		300
	ZLEV	0.989

Vout=1.5% cap		
V	27898	
Vconv	27898	
	Number of vehicles	Multiple counting
Vin	0	0
Vout	209	418
Vzlev		418
	ZLEV	0.985

Vout>1.5% cap		
V	27898	
Vconv	27898	
	Number of vehicles	Multiple counting
Vin	0	0
Vout	306	418
Vzlev		418
	ZLEV	0.985

V = number of HDVs in vehicle groups 4-5-9-10, excluding vocational vehicles
V_{conv} = V, but excluding ZLEVs
V_{in} = number of ZLEVs in vehicle groups 4-5-9-10, multiplied by [1+ (1-$CO2_v$/350)]
V_{out} = number of ZEVs in the HDV categories referred to in second sub-paragraph of Article 2(1), multiplied by 2, and with a maximum of 1.5% of Vconv
V_{zlev} = sum of V_{in} and V_{out}

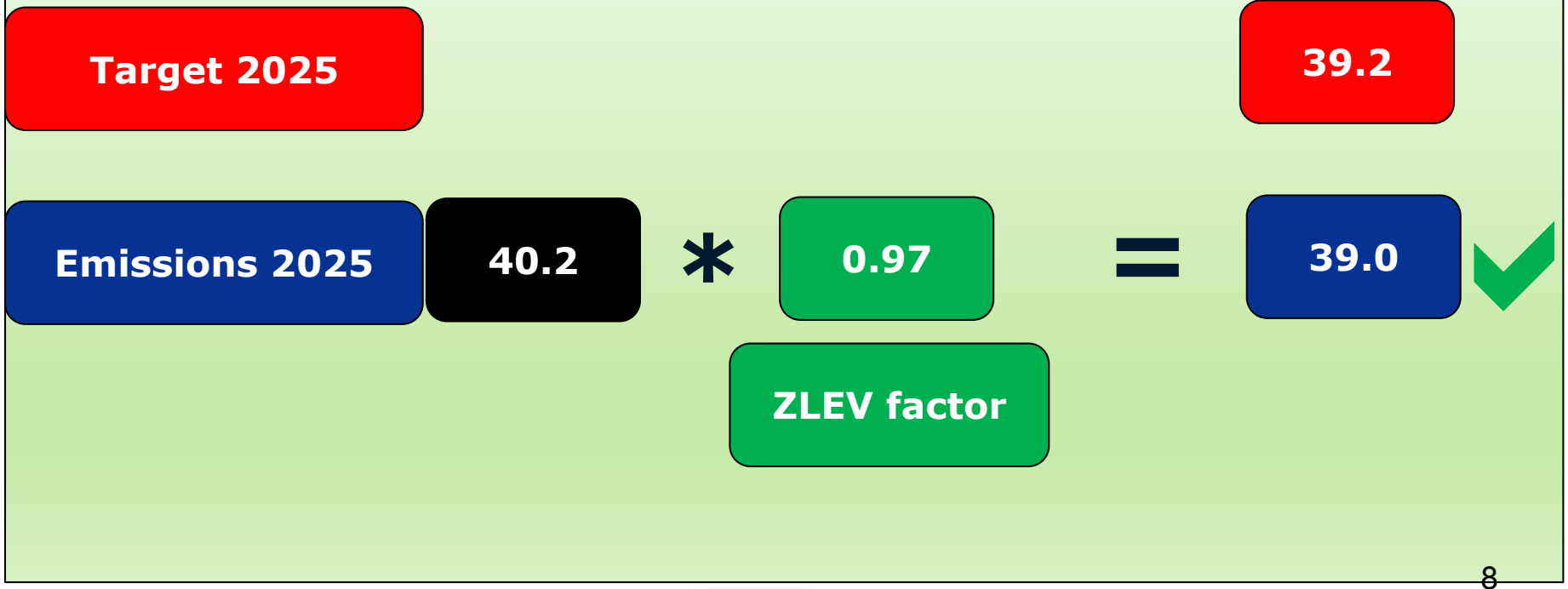
Calculation of the ZLEV factor

Example 2: illustration of 3% cap – case where $V_{in} \neq 0$ but only consists of ZEV

$V / (V_{conv} + V_{zlev}) > 0.97$			$V / (V_{conv} + V_{zlev}) = 0.97$			$V / (V_{conv} + V_{zlev}) < 0.97$		
V	27998		V	28348		V	28698	
Vconv	27898		Vconv	27898		Vconv	27898	
	Number of vehicles	Multiple counting		Number of vehicles	Multiple counting		Number of vehicles	Multiple counting
Vin	100	200	Vin	450	900	Vin	800	1600
Vout	300	418		300	418	Vout	300	418
Vzlev		618	Vzlev		1318	Vzlev		2018
	ZLEV	0.982		ZLEV	0.970		ZLEV	0.970

V = number of HDVs in vehicle groups 4-5-9-10, excluding vocational vehicles
V_{conv} = V, but excluding ZLEVs
V_{in} = number of ZLEVs in vehicle groups 4-5-9-10, multiplied by [1+ (1-$CO2_v$/350)]
V_{out} = number of ZEVs in the HDV categories referred to in second sub-paragraph of Article 2(1), multiplied by 2, and with a maximum of 1.5% of Vconv
V_{zlev} = sum of V_{in} and V_{out}

Compliance assessment



Number of electric buses needed to fill the 1.5% cap (V_{out})

Manufacturer		Trucks (category 4, 5, 9, 10)	Number of electric buses needed to fill the cap
1		40833	306
2		46299	347
3		23063	173
4		35092	263
5		37312	280
6		63934	480
Total		246533	1849

THANK YOU

Sum of CO_2 emissions per sub-group (EU fleet 2019)*

$$\sum_{v}$$

sub-group	Emissions 2019 (EU fleet) g/km					
	RDL	RDR	LHL	LHR	UDL	UDR
4-UD	0	0	0	0	827	822
4-RD	817	815	822	823	0	0
4-LH	809	846	804	807	0	0
5-RD	831	828	819	843	0	0
5-LH	849	829	814	841	0	0
9-RD	814	831	834	835	0	0
9-LH	800	840	812	812	0	0
10-RD	832	843	829	836	0	0
10-LH	824	842	831	816	0	0

sub-group	Mission profile weights (W)					
	RDL	RDR	LHL	LHR	UDL	UDR
4-UD	0	0	0	0	0.5	0.5
4-RD	0.45	0.45	0.05	0.05	0	0
4-LH	0.05	0.05	0.45	0.45	0	0
5-RD	0.27	0.63	0.03	0.07	0	0
5-LH	0.03	0.07	0.27	0.63	0	0
9-RD	0.27	0.63	0.03	0.07	0	0
9-LH	0.03	0.07	0.27	0.63	0	0
10-RD	0.27	0.63	0.03	0.07	0	0
10-LH	0.03	0.07	0.27	0.63	0	0

Weighing Factors: **Payload**

sub-group	Mission profile weights (W)					
	RDL	RDR	LHL	LHR	UDL	UDR
4-UD	0	0	0	0	0.5	0.5
4-RD	0.45	0.45	0.05	0.05	0	0
4-LH	0.05	0.05	0.45	0.45	0	0
5-RD	0.27	0.63	0.03	0.07	0	0
5-LH	0.03	0.07	0.27	0.63	0	0
9-RD	0.27	0.63	0.03	0.07	0	0
9-LH	0.03	0.07	0.27	0.63	0	0
10-RD	0.27	0.63	0.03	0.07	0	0
10-LH	0.03	0.07	0.27	0.63	0	0

Payload values (PL)					
RDL	RDR	LHL	LHR	UDL	UDR
0.9	4.4	1.9	14	0.9	4.4
0.9	4.4	1.9	14	0.9	4.4
0.9	4.4	1.9	14	0.9	4.4
2.6	12.9	2.6	19.3	2.6	12.9
2.6	12.9	2.6	19.3	2.6	12.9
1.4	7.1	2.6	19.3	1.4	7.1
1.4	7.1	2.6	19.3	1.4	7.1
2.6	12.9	2.6	19.3	2.6	12.9
2.6	12.9	2.6	19.3	2.6	12.9

MPW_{sg} weighing factor
- **Payload**
- **Annual mileage**

$$MPW_{sg} = \frac{(AM_{sg} \times PL_{sg})}{(AM_{5-LH} \times PL_{5-LH})}$$

sub-group	Mission profile weights (W)						Payload values (PL)					
	RDL	RDR	LHL	LHR	UDL	UDR	RDL	RDR	LHL	LHR	UDL	UDR
4-UD	0	0	0	0	0.5	0.5	0.9	4.4	1.9	14	0.9	4.4
4-RD	0.45	0.45	0.05	0.05	0	0	0.9	4.4	1.9	14	0.9	4.4
4-LH	0.05	0.05	0.45	0.45	0	0	0.9	4.4	1.9	14	0.9	4.4
5-RD	0.27	0.63	0.03	0.07	0	0	2.6	12.9	2.6	19.3	2.6	12.9
5-LH	0.03	0.07	0.27	0.63	0	0	2.6	12.9	2.6	19.3	2.6	12.9
9-RD	0.27	0.63	0.03	0.07	0	0	1.4	7.1	2.6	19.3	1.4	7.1
9-LH	0.03	0.07	0.27	0.63	0	0	1.4	7.1	2.6	19.3	1.4	7.1
10-RD	0.27	0.63	0.03	0.07	0	0	2.6	12.9	2.6	19.3	2.6	12.9
10-LH	0.03	0.07	0.27	0.63	0	0	2.6	12.9	2.6	19.3	2.6	12.9

sub-group	Annual mileage AM_{sg} (in km)
4-UD	60000
4-RD	78000
4-LH	98000
5-RD	78000
5-LH	116000
9-RD	73000
9-LH	108000
10-RD	68000
10-LH	107000