GHG QUOTA SYSTEM

The View of a Fuel Supplier

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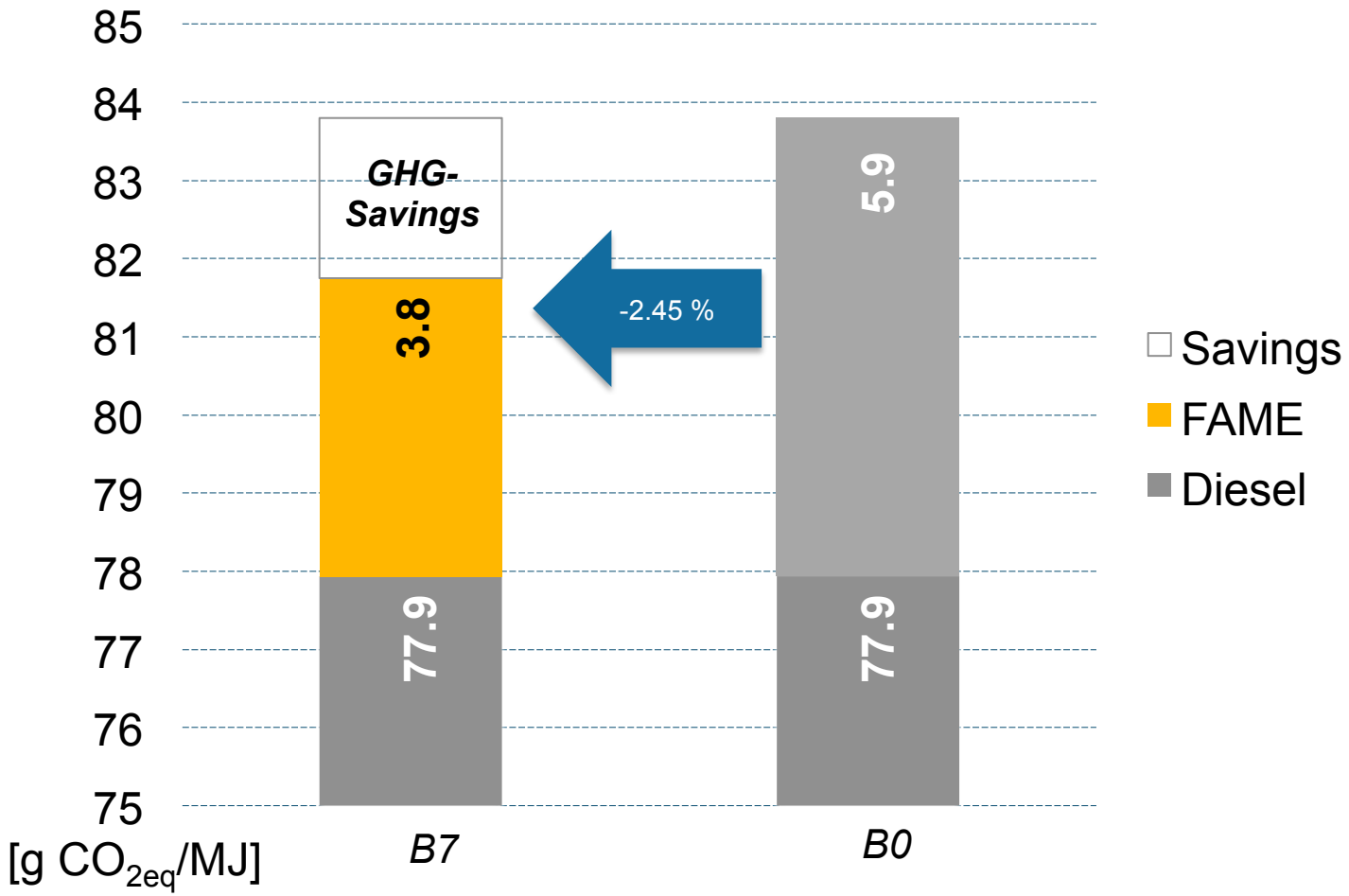
SPECIFIC CO_2-SAVINGS PER MJ OF B7-DIESEL



Hypothesis of Calculation:

FAME = 52 g CO_{2eq}/MJ as in the RED

Petrol/Diesel = 83.8 g CO_{2eq}/MJ as in the FQD

FAME <= 7 % V/V as in the EN 590

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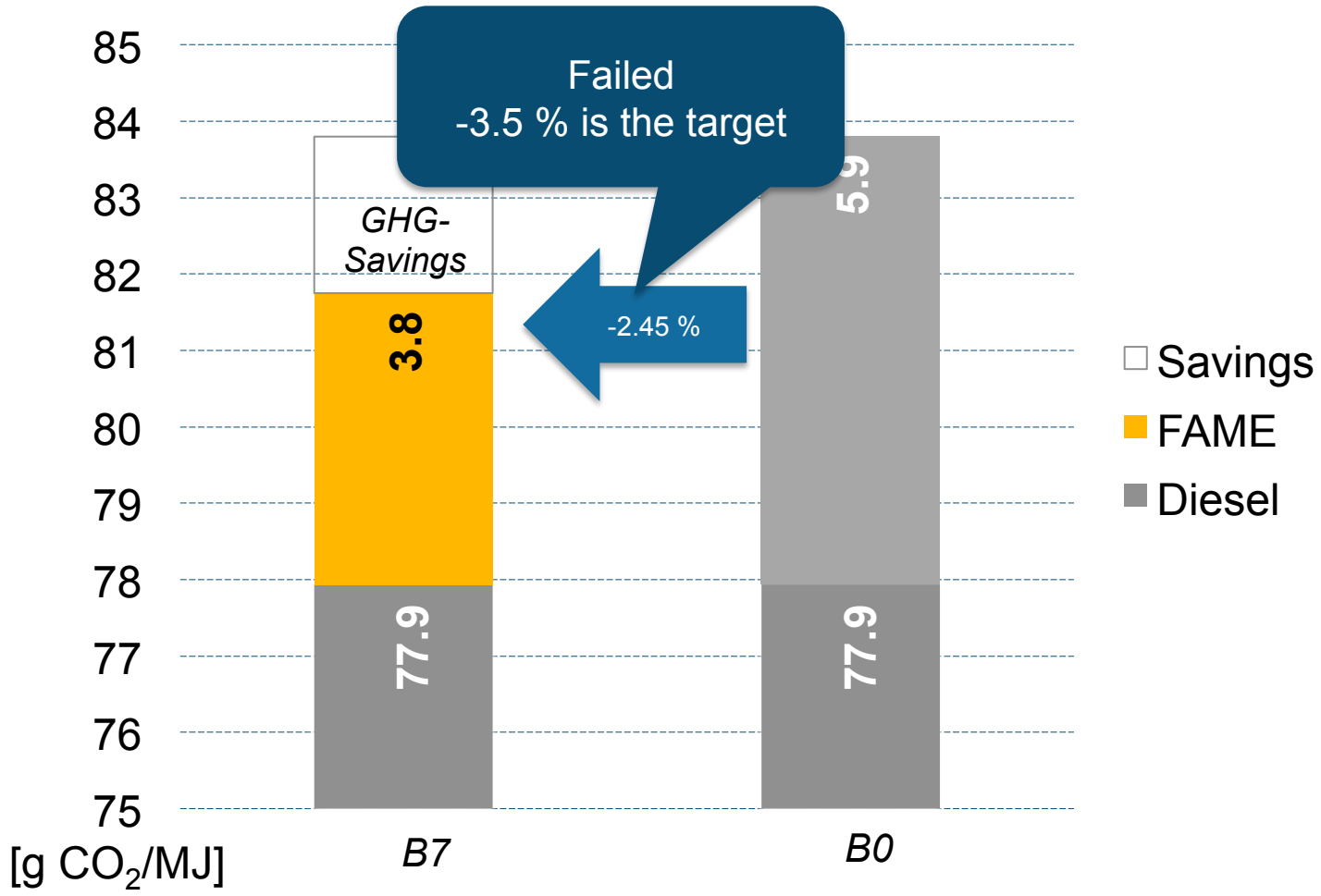

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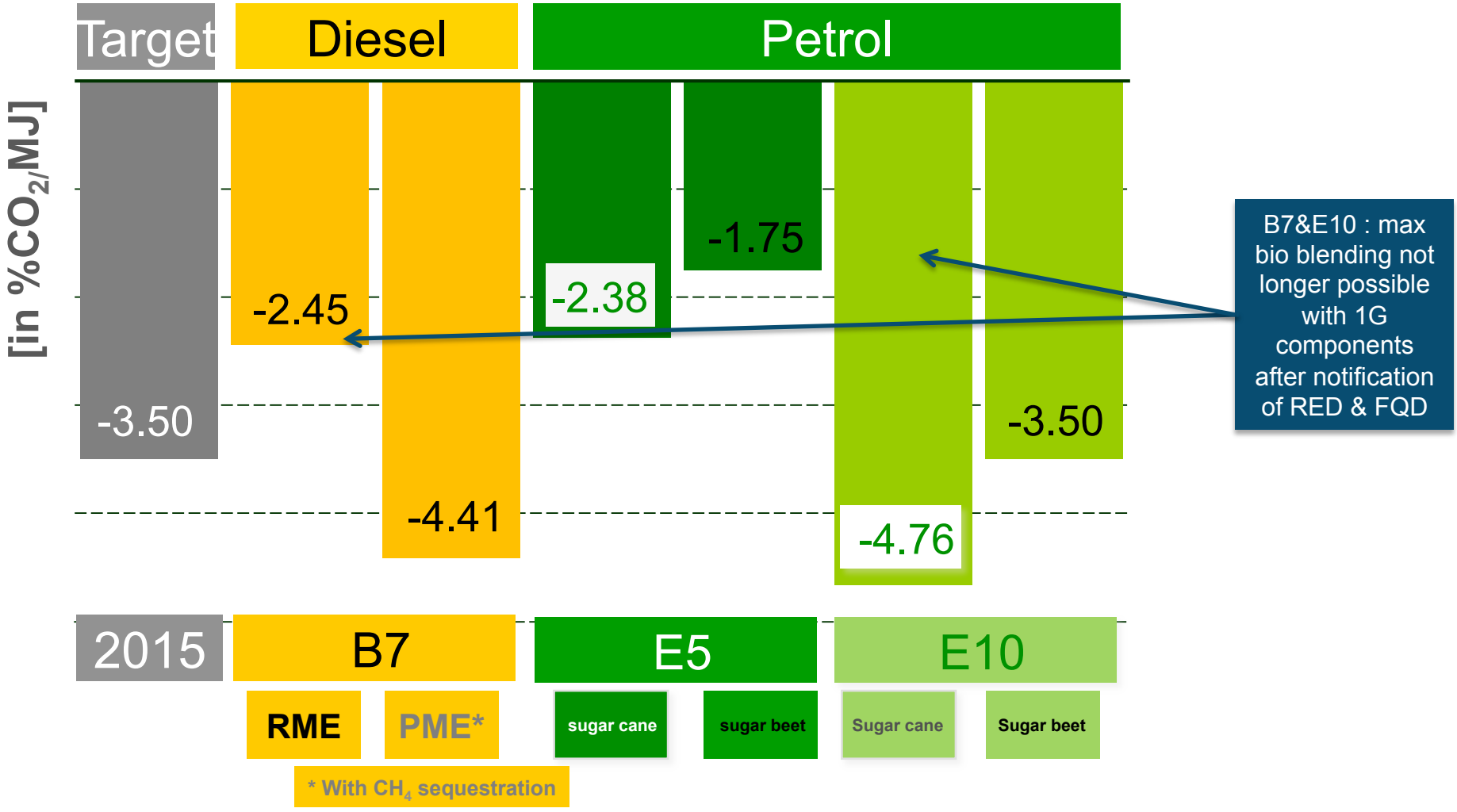
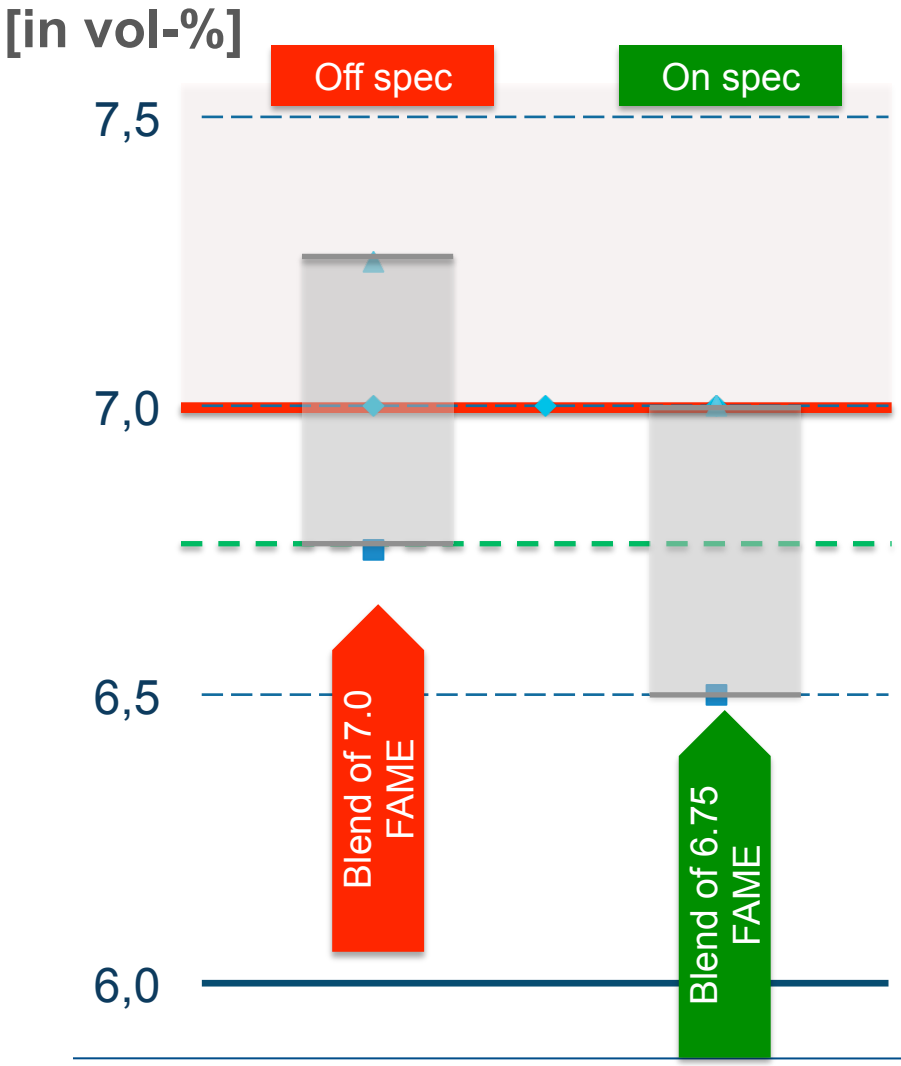
POTENTIAL OF B7, E5 & E10 WITH MAX BLENDING AND DEFAULT VALUES



2015+:The CO_2 Abatement aim can‘t be achieved by own blending with 1G components.

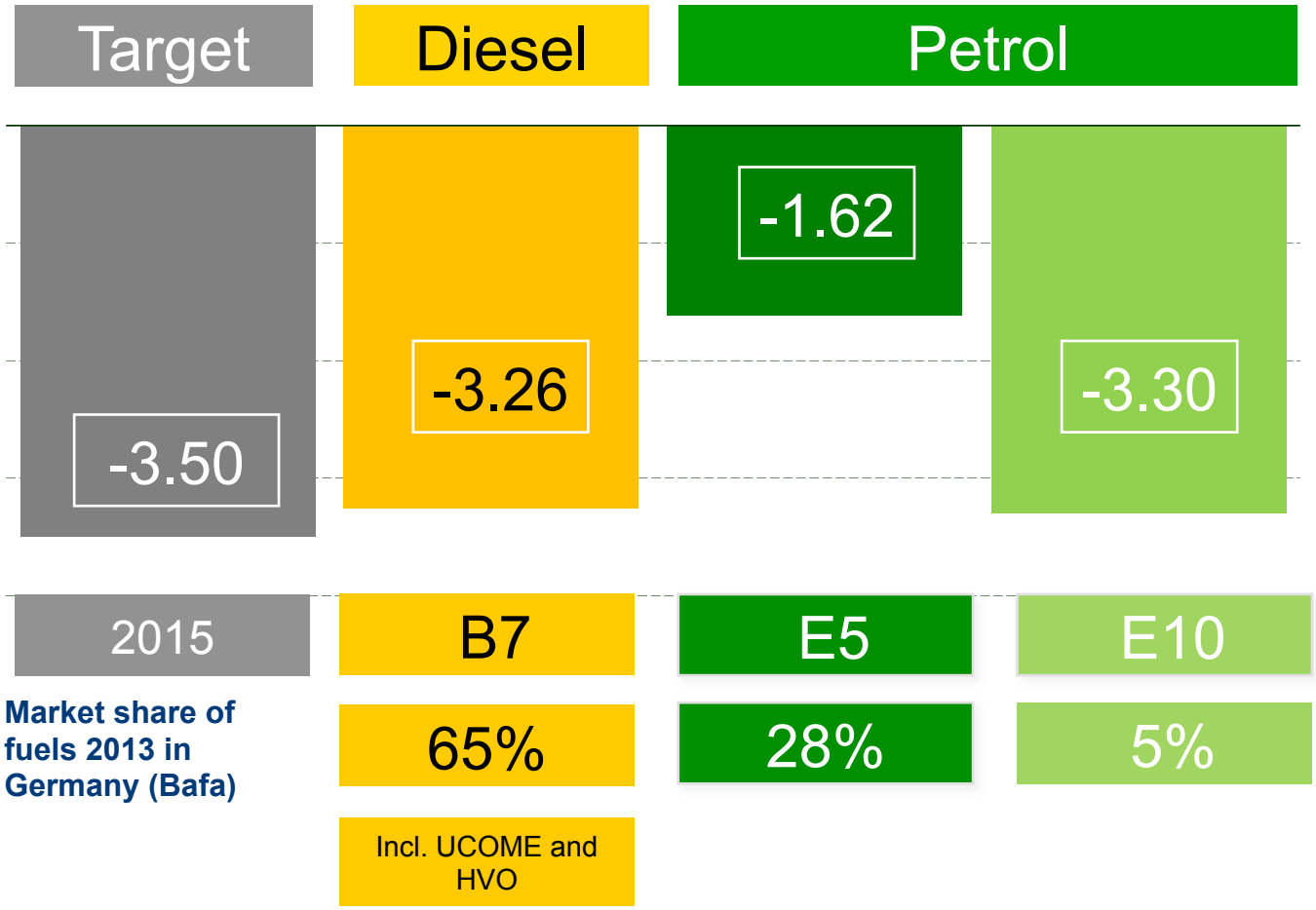
BLENDLIMITS ACCORDING TO EN 590 & EN 228



- In Germany only fuels according to EN 590 and EN 228 are permitted to be put into circulation (10. BImSchV)
- FAME and EtOH have a maximum in EN specification and are not to be exceeded
- Tolerances in installations, measuring and analytic multiply
- Overall uncertainty: +/- 0,2 bis 0,3 vol-%
- Consequence: Always smaller values than maximum in pratice found

→ ca. 3 to 5 % (B7, E5, E10) less biocomponents in fuel than in theory

REFLECTION OF 2013 TRANSFERRED TO 2015 (AS REPORTED BY ONE MARKET PLAYER)



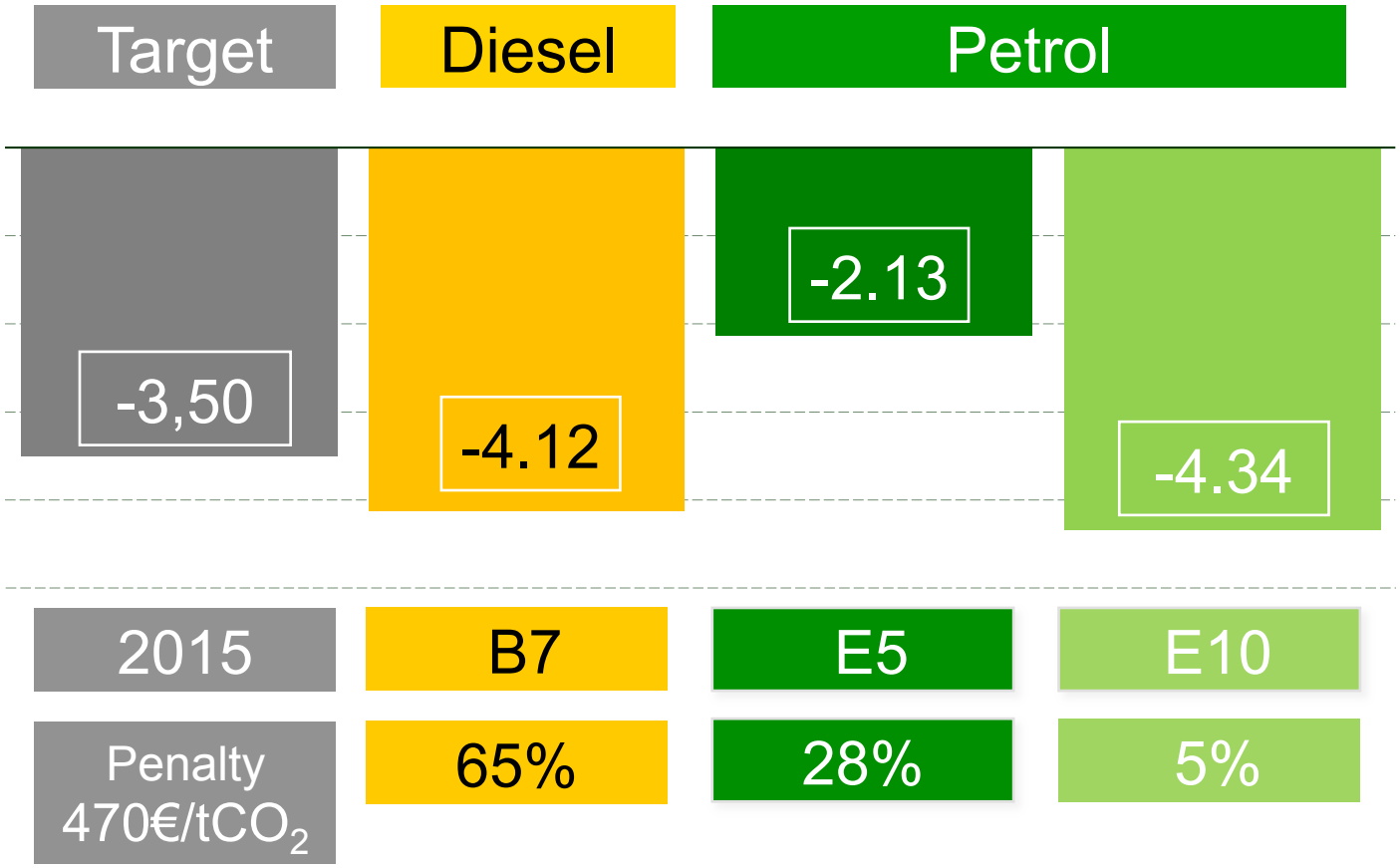
Hypothesis of Calculation:

- FAME/Et-OH = CO_2 emission as reported in sustainable proofs, Rest default values
- Petrol/Diesel = 83.8 g CO_{2eq}/MJ as in the FQD
- FAME in B7 = EN 590
  EtOH in E5, E10 = EN 228

Overall GHG reduction: – 2.73 %. Target missed!

Average GHG reduction of biofuels: 50%

HOW TO FULFIL GERMAN OBLIGATION IN 2015?



Market share of fuels 2013 in Germany (Bafa)

Biofuels with **64% GHG reduction** must be used to fulfil the target with respect to the blend walls (without HVO).

DEFAULT VALUES AND BEST SEEN IN SUSTAINABLE PROOFS

Fuel	Bio blendstock	Bio source	Default value		Best seen	
			Specific emission	GHG-abatement	Specific emission	GHG-abatement
			g CO_{2eq}/MJ	%	g CO_{2eq}/MJ	%
Diesel (83,8 g CO_2/MJ)	FAME	Rape seed	52	38	35,5 (2013) 45,7 (2014)	58,0 (2013) 40,6 (2014)
	FAME	Palmoil (kaum in 2014)	68	19	20,0 (2013)	74,0 (2013)
	FAME	Residues from fruit, vegetables and crops - oil, fat, soap			7,4	90,3
	FAME	Residues from production and use of fats, lubricants and soaps			11,6	86,1
	UCOME	Used cooking oil	14	83	14	83
	HVO	Rape seed	44	47		
	NExBTL	Palmoil	62	26	23,5	72
	FT Diesel	Cultivated wood	6	93		
	Farnesan	Sugar cane	>17	< 80		
	DME	Cultivated wood	7	92		
Petrol (83,8 g CO_2/MJ)	Et-OH	Sugar beet(40%)+ Cereals(15%)			37	52
	Et-OH	Sugar beet(85%)+ Maize(15%)	40	52	36,3	57
	Et-OH	Sugar beet(50%)+ Maize(50%)	40	52	36,8	56
	Et-OH	Sugar cane	24	71	26,4	68
	Et-OH	Maize	43	49	38,5	54
	Et-OH	Wheat	44	48	38,5	54
	Et-OH	Cultivated wood	25	70		
	Et-OH	Woody rests	22	74		
	Et-OH	Wheat straw	13	85		
	Me-OH	Crude glycerine	10	88	22,6	73

ACTUAL SITUATION

The German GHG quota can‘t be fulfilled:

- With the actual fuel types (B7 : E10 : E5)
- Actual specifications (EN 590 for B7 & EN 228 for E5, E10) – no new fuel types foreseeable
- With conventional biofuels with default values

- Further constraints discussed on EU level (cap 1G, iLUC)
- Constraints on technical level (e. g. co-processing not accepted in Germany)
- E10 still not accepted by the German customer
- Biofuels market still searching for new price criteria for GHG reduction of biofuels
- GHG calculation will have impact on starting materials for biofuel production, e. g. methanol

BUT

- Biofuels producers are increasing the GHG reduction of conventional fuels
  - FAME (incl. UCOME) can reach over 65% GHG reduction
  - 1G Ethanol can reach up to 60% GHG reduction

Mineral oil companies are bearing the full risks and incertainties of policy and bioquota obligations.

THANK YOU FOR YOUR ATTENTION!

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