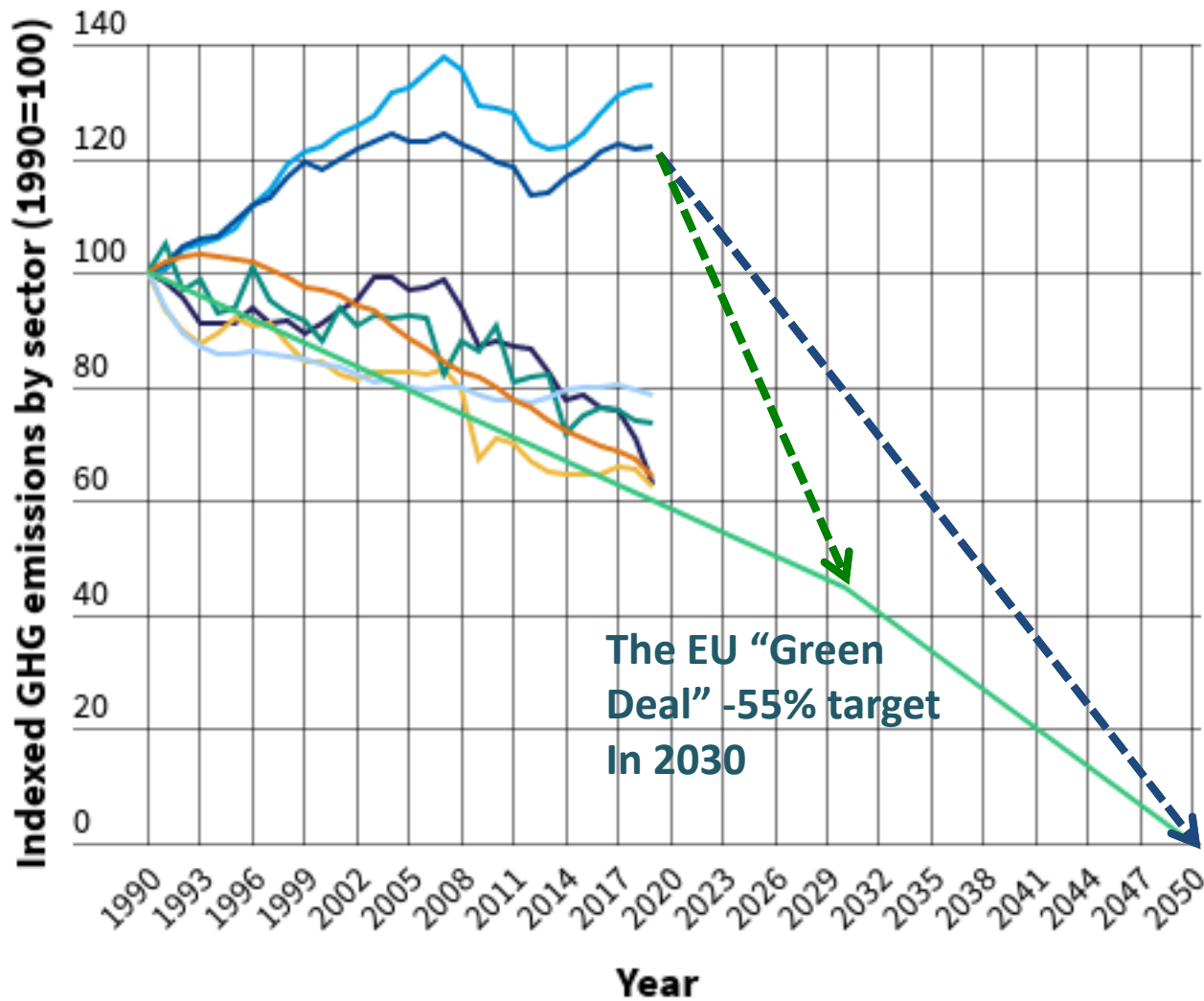




A European perspective of a fast-track transition to electromobility

Tommaso Pardi (Gerpisa, CNRS)



The problem(s)

The EU "Green Deal" -55% target In 2030

The EU Green Transition -100% target in 20 50

- Transport sector ● Cars ● Power generation ● Industry
- Buildings ● Agriculture ● Waste
- Decarbonisation Targets (-55% 2030, -100% 2050)

Between 2000 and 2019 the EU28 car fleet has increased by 32%

EU28	2000	2019	%
Population (millions)	499	526	+5,4%
New car sales	15,366,229	15,467,336	+0,7%
New cars per 1000 inhabitants	30,7	29,4	-4,5%
Passenger cars per 1000 inhabitants	414	516	+24,6%
Total car fleet	207 millions	272 millions	+32%

Source: Eurostat

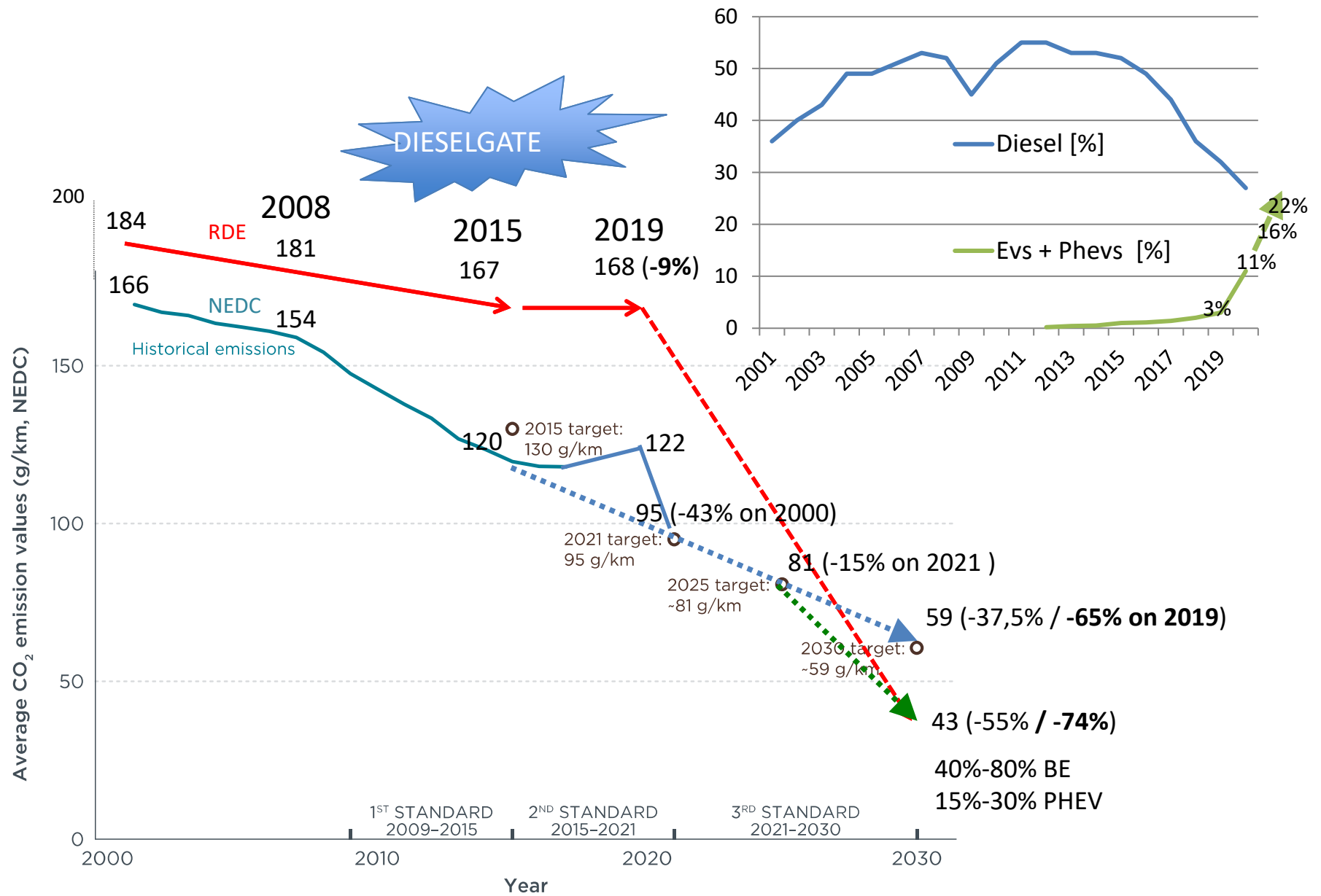
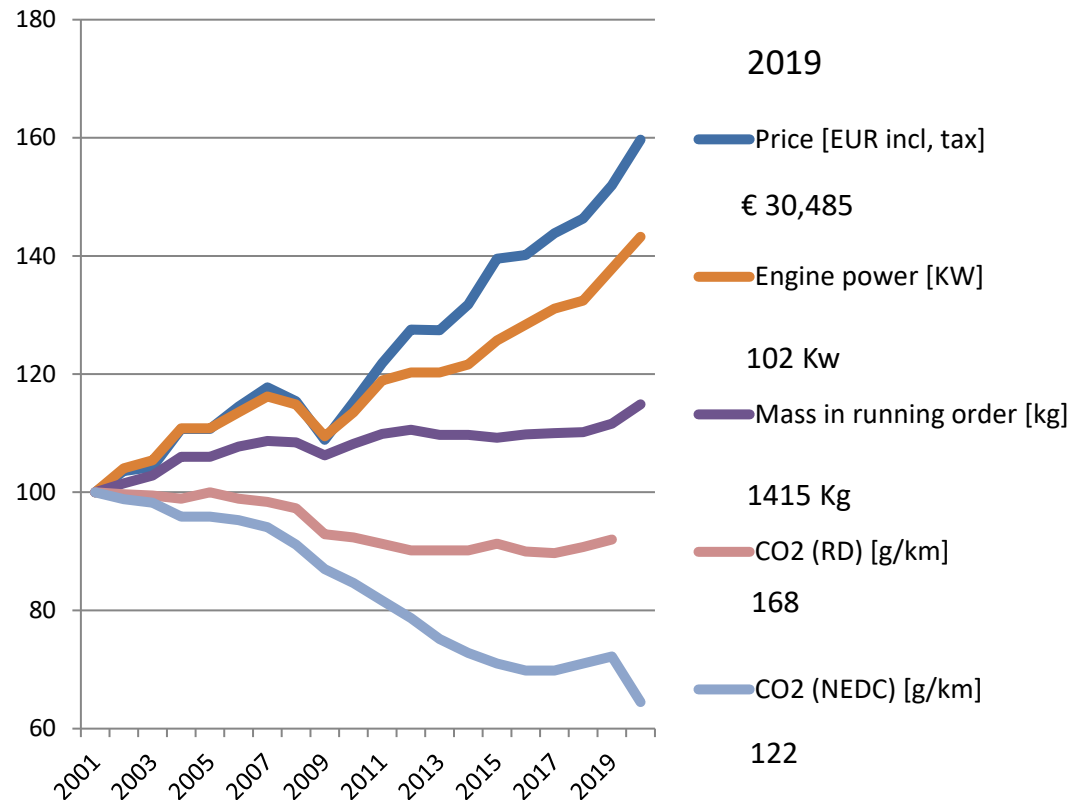


Figure 1. Average historical CO₂ emission values and adopted CO₂ standards for new passenger cars in the EU. All CO₂ values refer to New European Driving Cycle (NEDC) measurements.

Source: ICCT

The upmarket drift of the average new car sold in EU28



“It would appear that part of OEMs’ difficulty in hitting emissions targets is self-inflicted.”
(J-P. Skeete, Energy Policy 2017, 379),

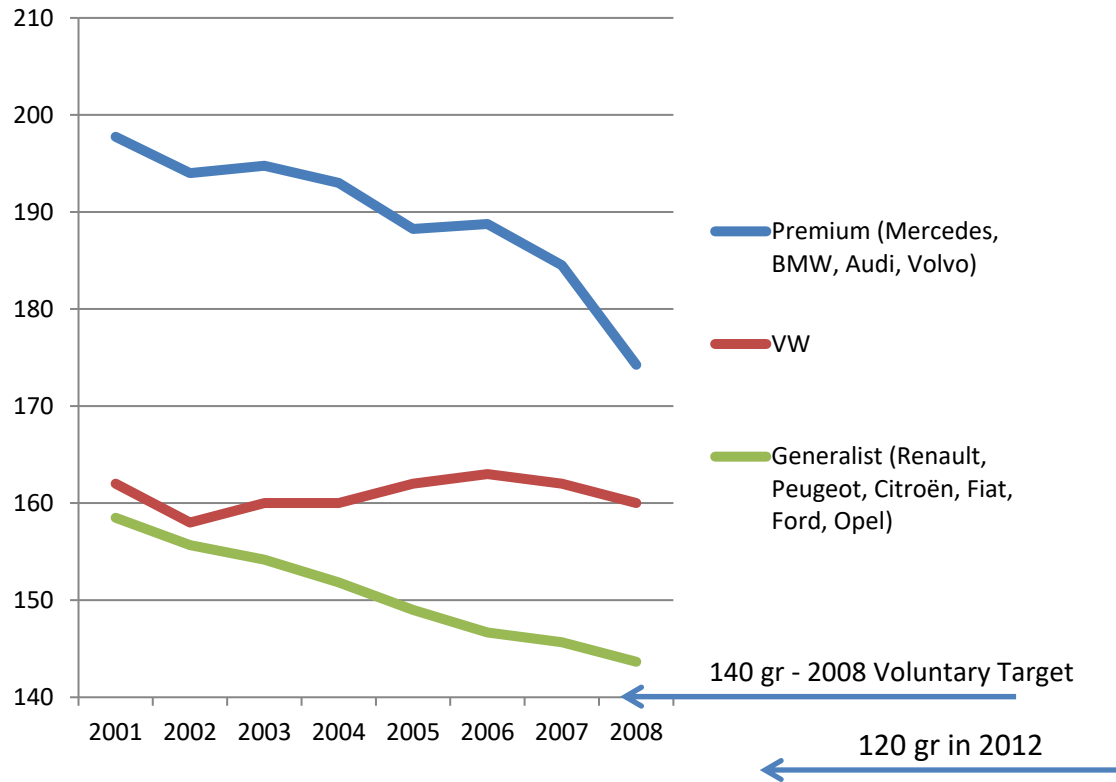
“We have to face the global competition and take the lead - to be ahead, to find the best solutions, the best technology, the highest standard, in all areas.”

Commissioner for Enterprise and Industry, **Günter Verheugen**.
Debate in the European Parliament on the restructuring of EU industry, Brussels, 4 July 2006

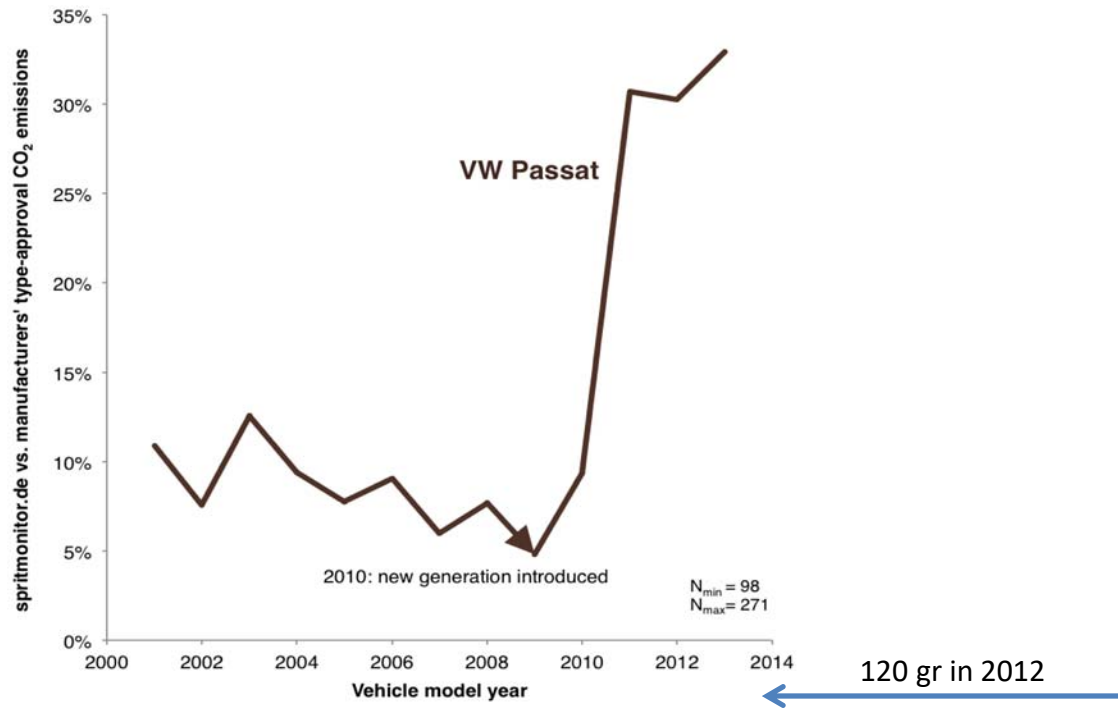
→ CARS 21 → GEAR2030
→ Whole Vehicle Type-Approval System

(Klüver 2013; Gössling, Cohen, and Hares 2016; Haas and Sander 2019; Batho 2016; Katzemich 2018; Nowack and Sternkopf 2015)

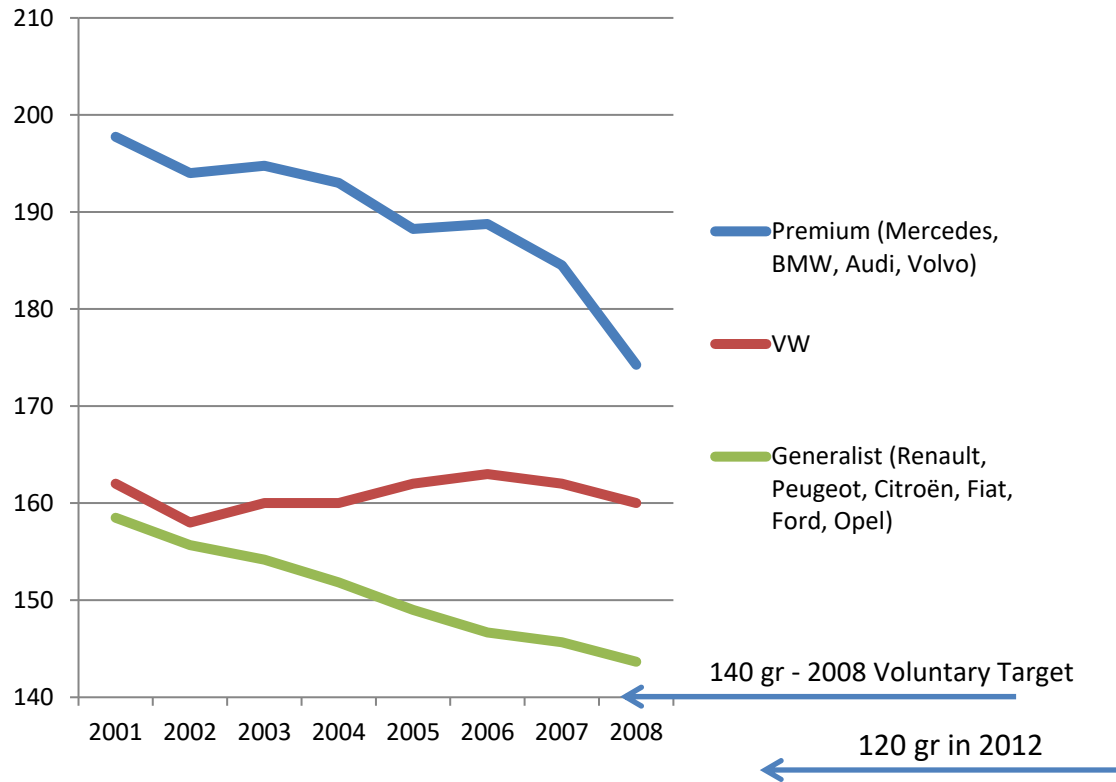
The 2008-2009 battle over the UE regulation on CO₂: the weight based standards



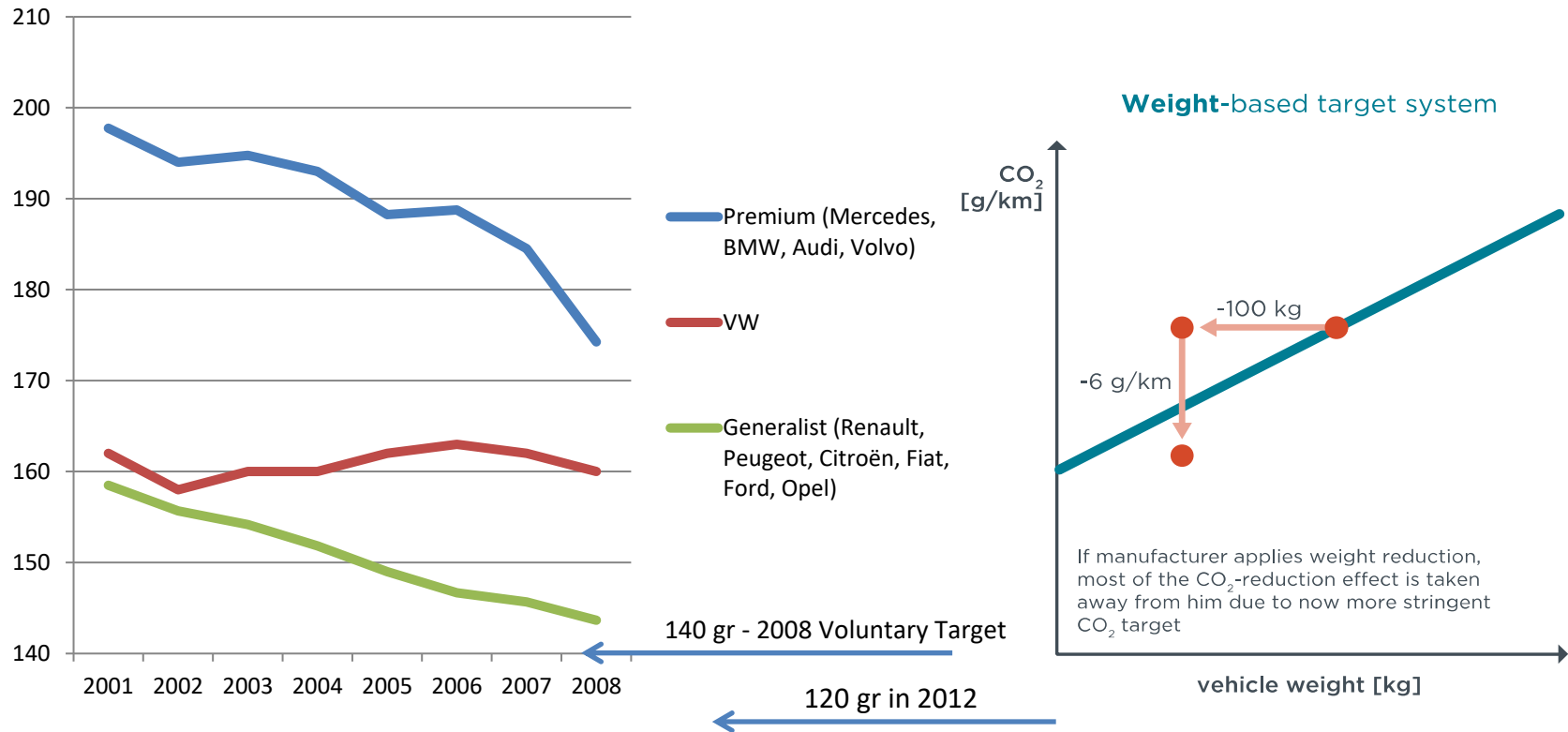
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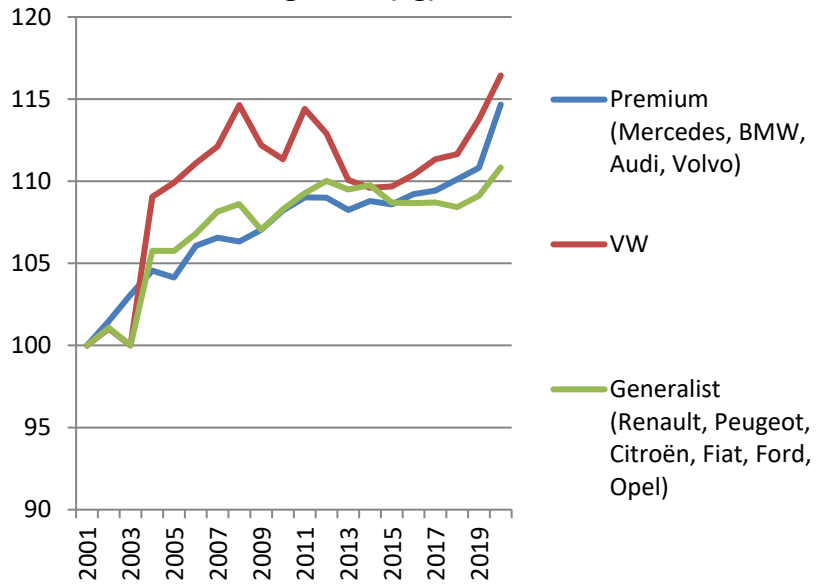
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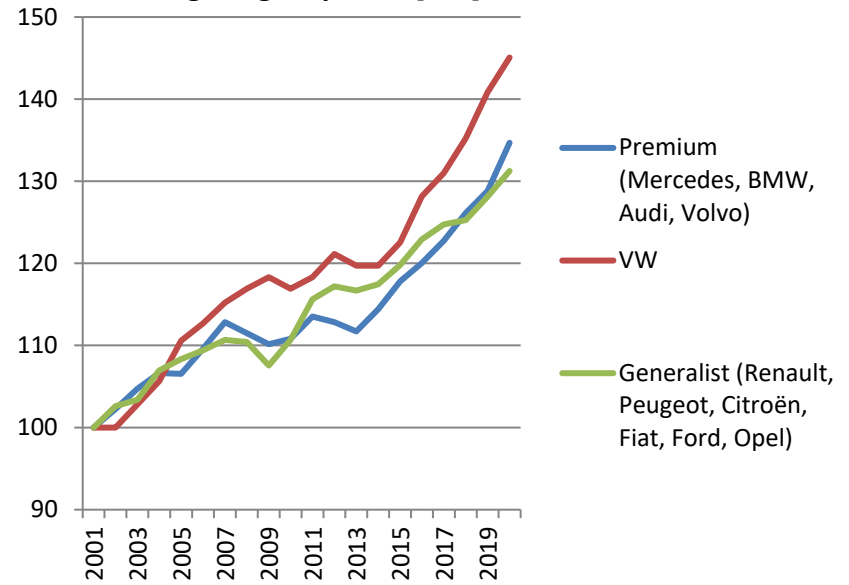
A EU regulated
upmarket drift

"Weight-based CO₂ standards for cars are a very bad idea for the following reasons: they punish positive action. Car makers who reduce their vehicles' weight (one of the most important paths to cutting CO₂ emissions) would be faced with a stricter CO₂ standard. Therefore, they do not help to break the trend towards ever-heavier vehicles, which is one of the major reasons why car CO₂ emissions have not come down quickly enough in recent years." (T&E 2007).

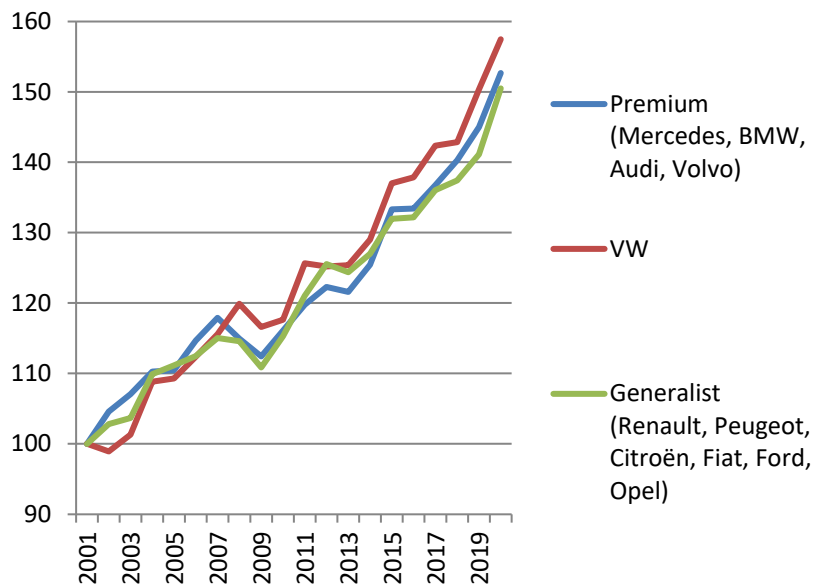
Mass in running order (kg)



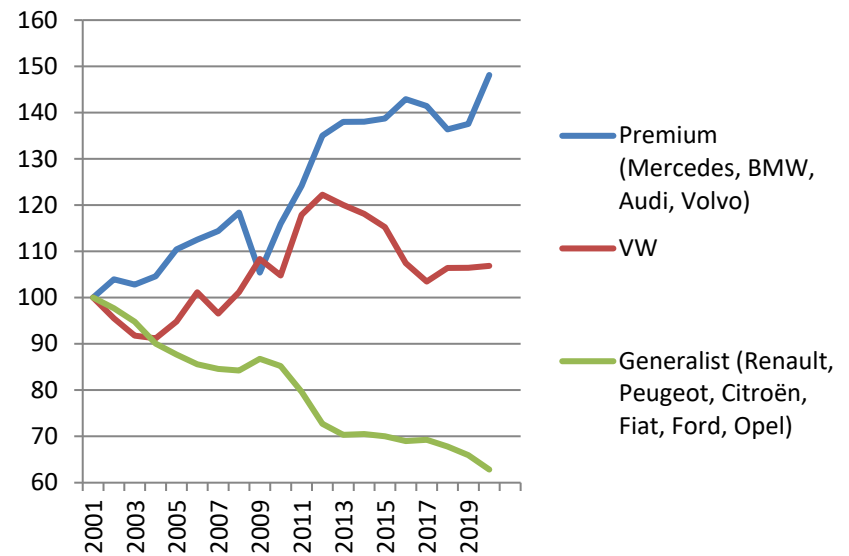
Average Engine power [KW]



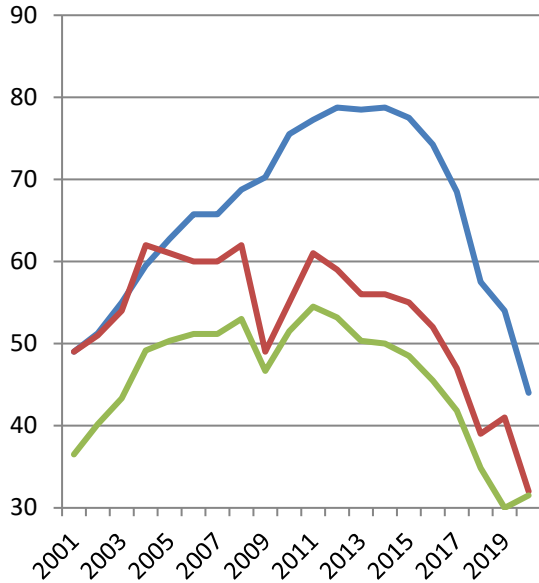
Price [EUR incl, tax]



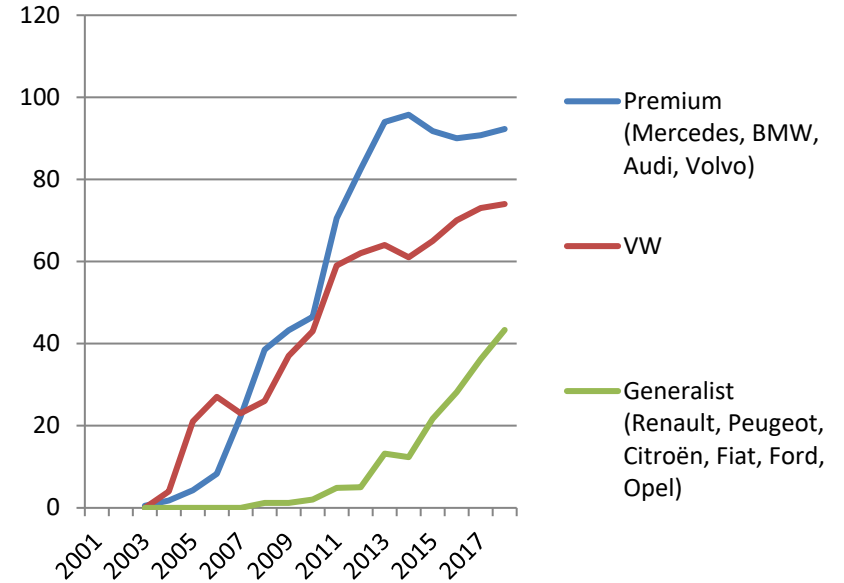
EU market share



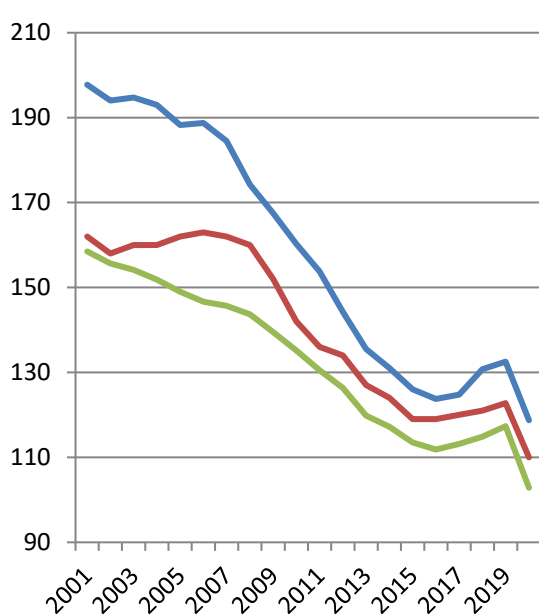
Diesel %



Gasoline Direct Injection %



NEDC CO₂



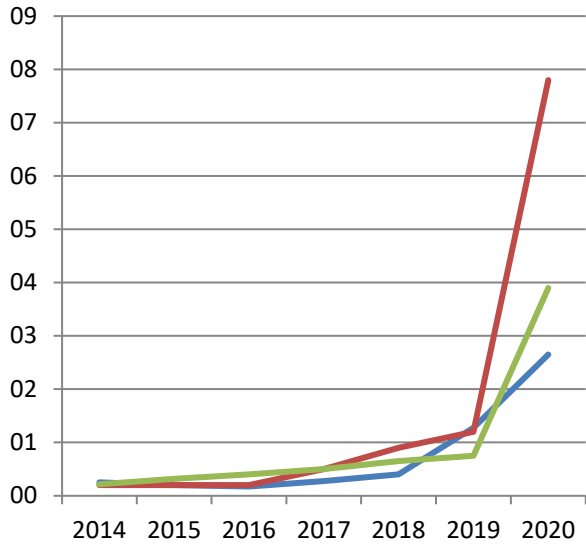
2019

47,640 €
 1690 kg (165kg more than in 2001)
 193 CO₂ gr/km on the road
+38% sales since 2001

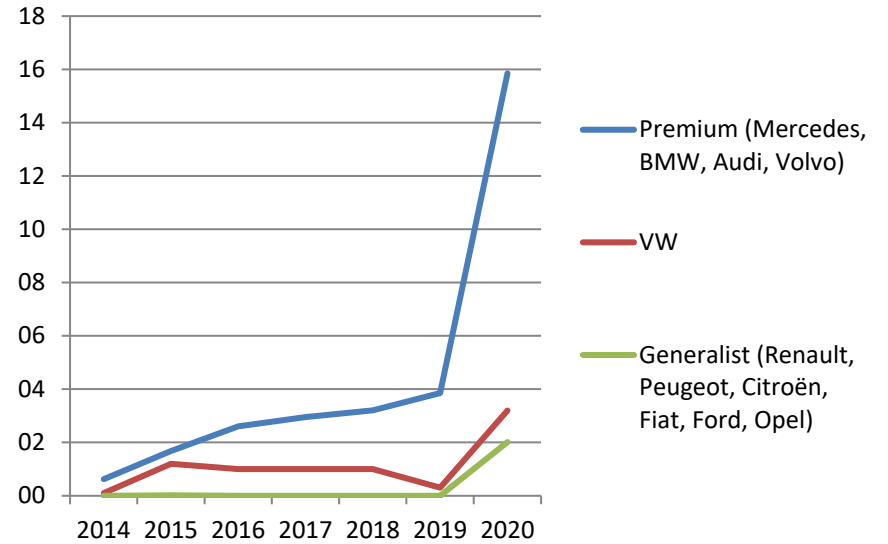


23,213 €
 1300 kg (109 kg more than in 2001)
 160 CO₂ gr/km on the road
-35% sales since 2001

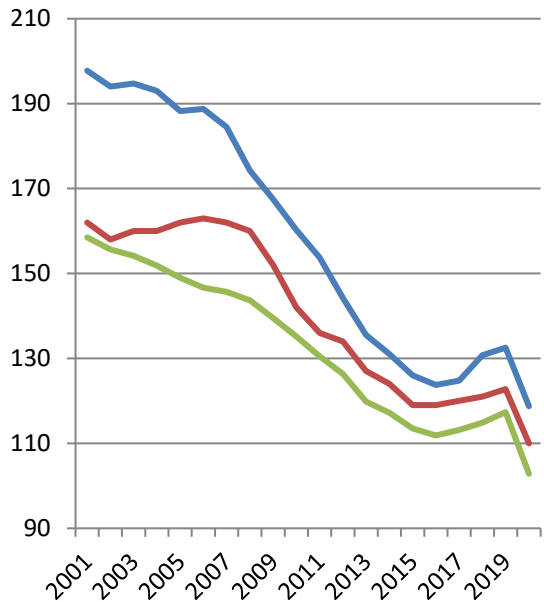
BEVs %



PHEVs %



CO₂ gr/km NEDC



2019

47,640 €
 1690 kg (165kg more than in 2001)
 193 CO₂ gr/km on the road
+38% sales since 2001

Premium (Mercedes, BMW, Audi, Volvo)
 VW
 Generalist (Renault, Peugeot, Citroën, Fiat, Ford, Opel)

23,213 €
 1300 kg (109 kg more than in 2001)
 160 CO₂ gr/km on the road
-35% sales since 2001

2020

50,168 €
 1749 kg
+7% sales

1415 kg (+147)
 NEDC 122 CO₂
 30,485 €
RDE 168 CO₂

24,753 €
 1320 kg
-4% sales

0,4% **2194 kg PHEV Diesel**
 NEDC 40 CO₂ **+870 kg**

4,7% **1913 kg PHEV Gasoline**
 NEDC 41 CO₂ **+600 kg**

6,2% **1721 kg BEV**
 NEDC 0 CO₂ **+400 kg**

28,6% **1626 kg Diesel**
 NEDC 122 CO₂

1463 kg (+195) +48 kg
 NEDC 108 CO₂
 32,035 € (+5%)

58,4% **1322 kg Essence**
 NEDC 118 CO₂



30 kw/h



50 kw/h



22 kw/h
→ 41 kw/h
→ 61 kw/h

65 kw/h



95 kw/h



While the price of batteries has fallen by 87% between 2010 and 2019, “the average Battery Electric Vehicles price increased by more than 40% between 2011 and 2019 as manufacturers were focusing on premium and larger mid-size cars, leaving very few offerings in the entry-level segments” (European Commission 2021, 16)

AFFORDABILITY!

EU BEV 58% more expensive than Chinese BEV (2019)

GM Wuling Hongguang
MINI (2020)



5-15 kw/h

9,2 kwh /
13,8 kw/h
\$4000-6000



