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How can we now reduce CO₂ emissions from cars?

Nicolas Meilhan – Scientific Advisor

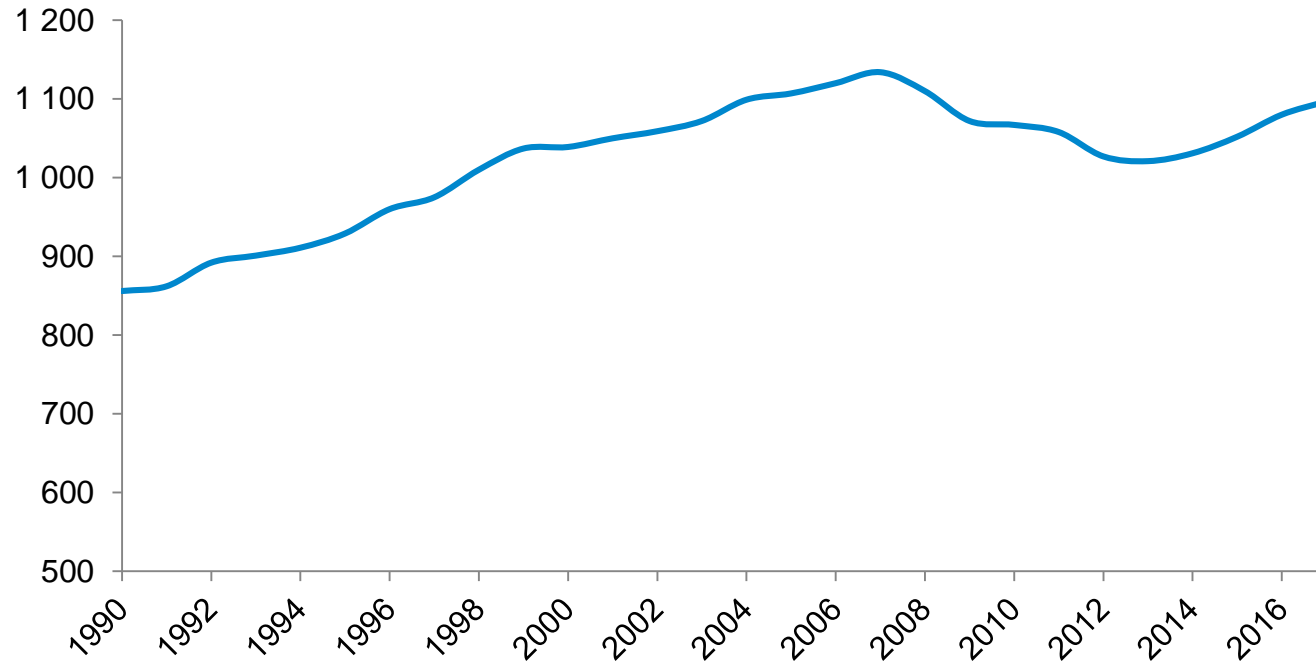


- 1. Reducing CO₂ emissions in the automotive sector : a European failure**
- 2. What measures can reduce CO₂ emissions and car energy consumption?**
- 3. Example of a bonus-malus scheme based on car weight**

1. Reducing CO2 emissions in the automotive sector : a European failure

Transport is the black ship of the Kyoto Protocol

Greenhouse gas emissions from the transport sector in the European Union, 1990-2017

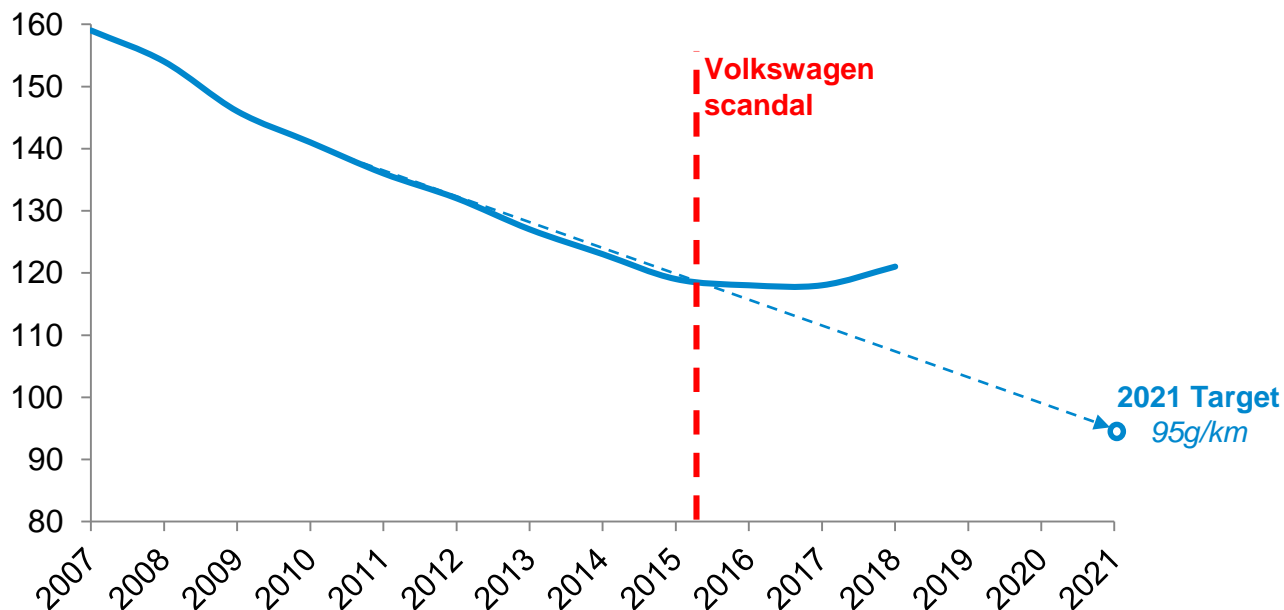


Source : *Agence Européenne de l'Environnement*



For the 1st time over the last 25 years, CO₂ emissions from new passenger cars have increased following the VW diesel gate

Average CO₂ emissions measured in the laboratory and targets for new cars in the European Union

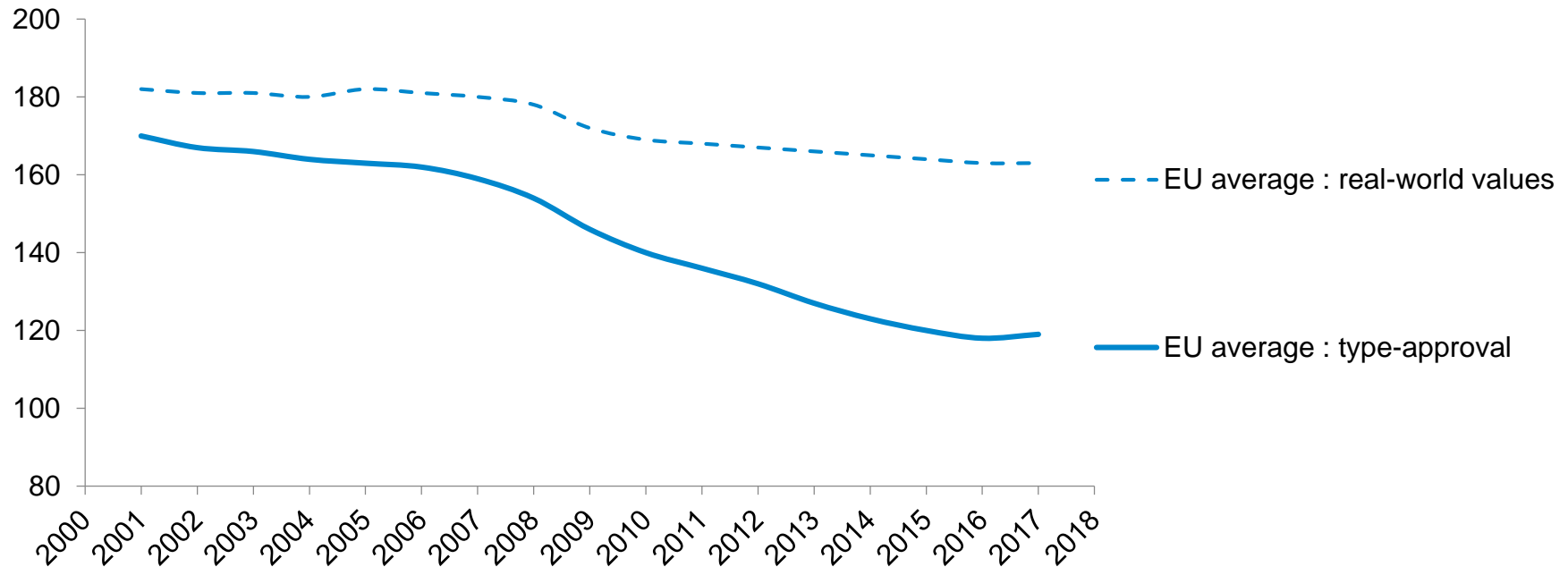


Source : [JATO](#)



Two thirds of CO₂ emissions reductions since 2001 are artificial

Average CO₂ emissions from new cars measured under real-world driving conditions and in the laboratory in Europe

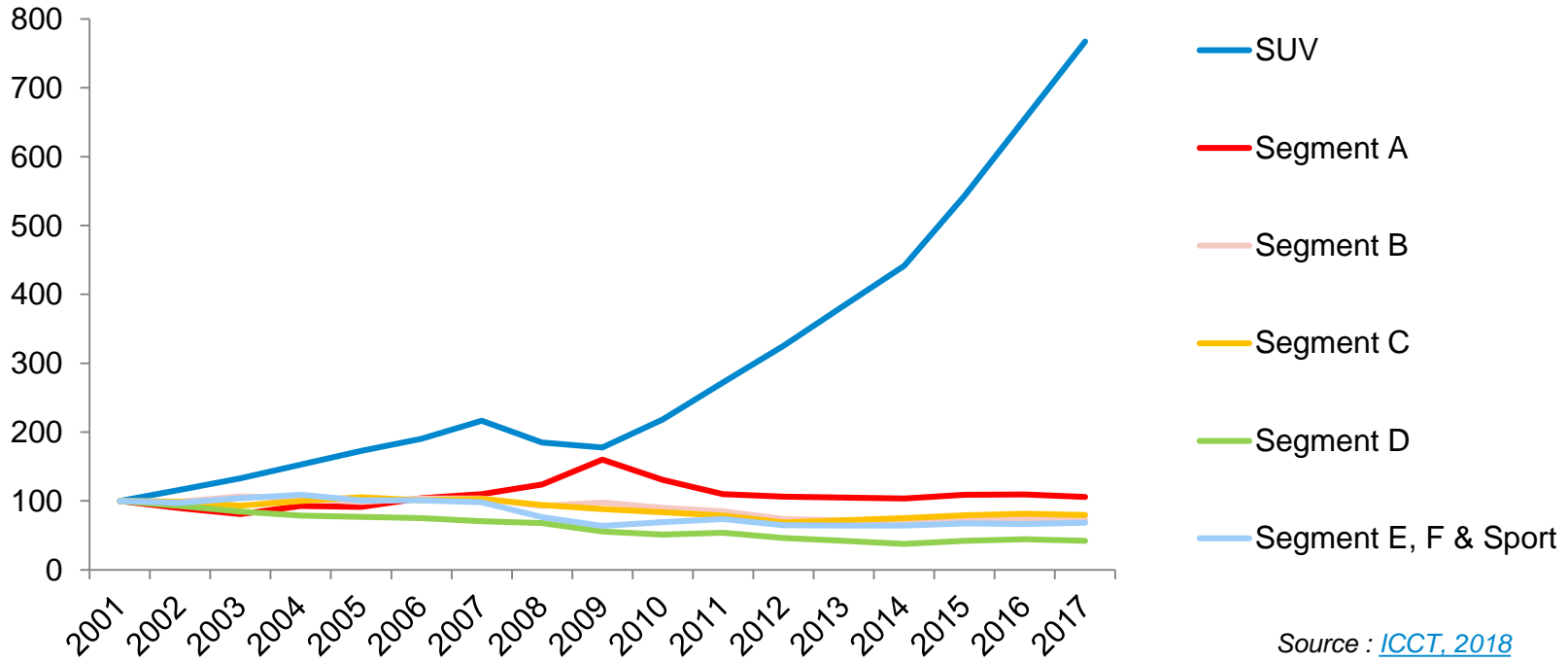


Source : *ICCT, 2019*



The only significant decrease in real CO₂ emissions was caused by a peak in small car sales combined with a decrease in large car sales

New car sales in the European Union, by segment, 2001-2017
(100 base = 2001)

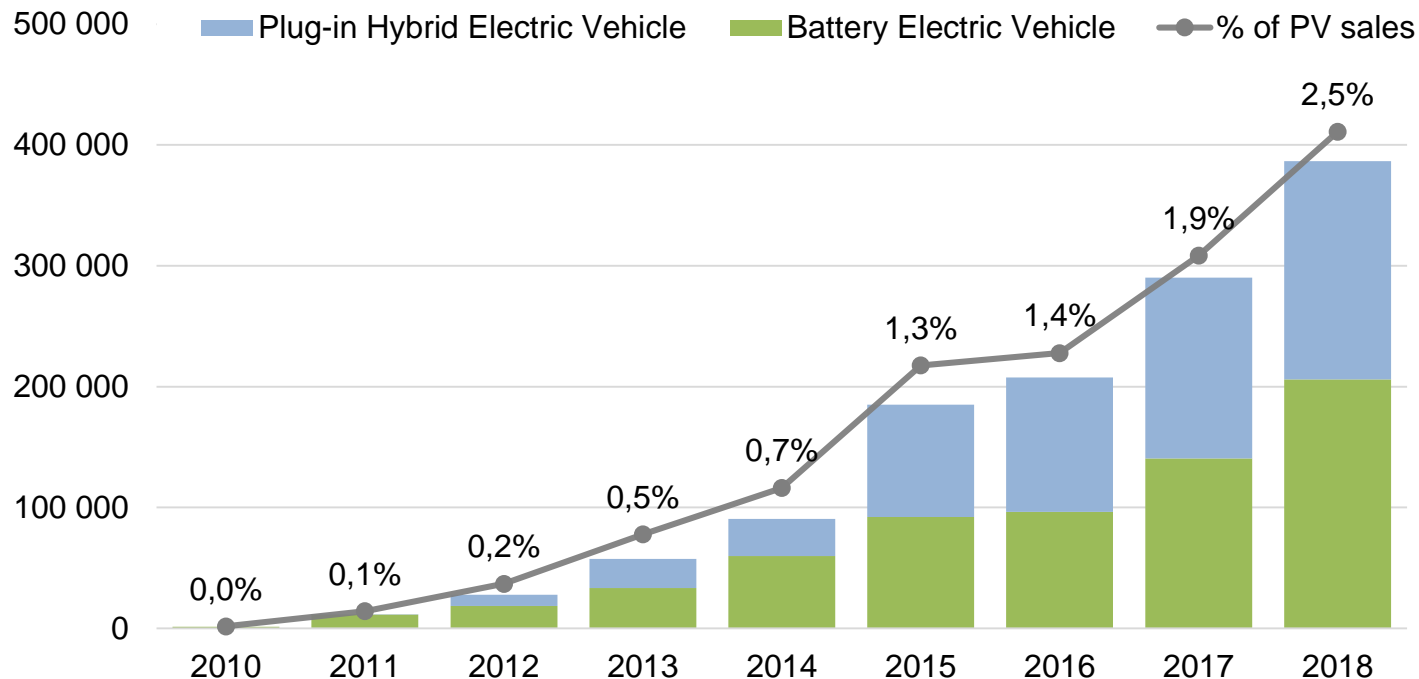


Source : [ICCT, 2018](#)



Diesel market share decrease has not been offset – for the time being – by a significant increase in sales of electric cars, as in Norway

Electric cars sales in Europe, by type, 2010 - 2018

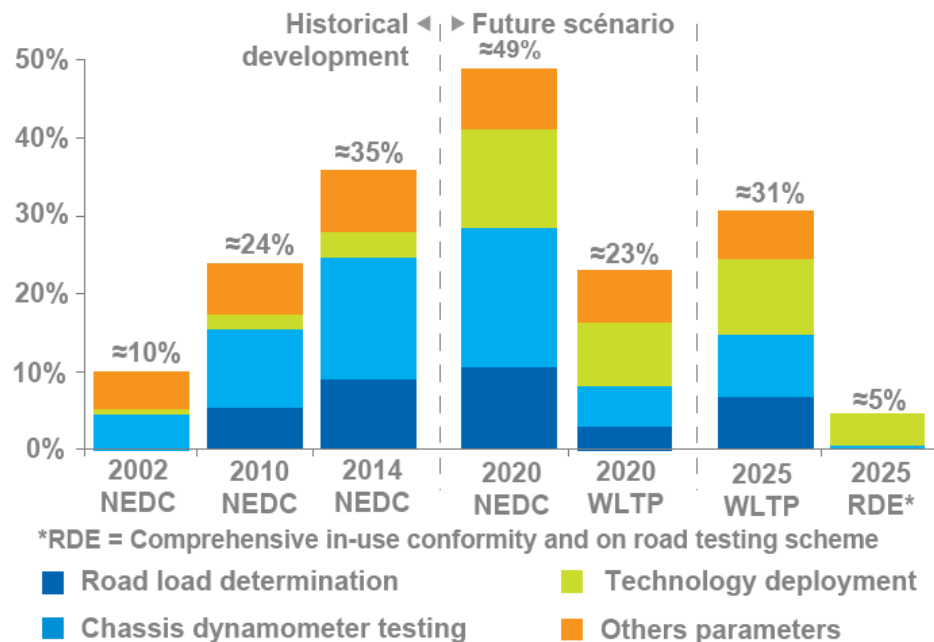


Source : EV-volumes.com



Even though the CO₂ « thermometer » reliability was slightly improved, no real-driving emissions test are planned for the time being

Gaps between official and real-world CO₂ emissions from new cars in the European Union, as a percentage



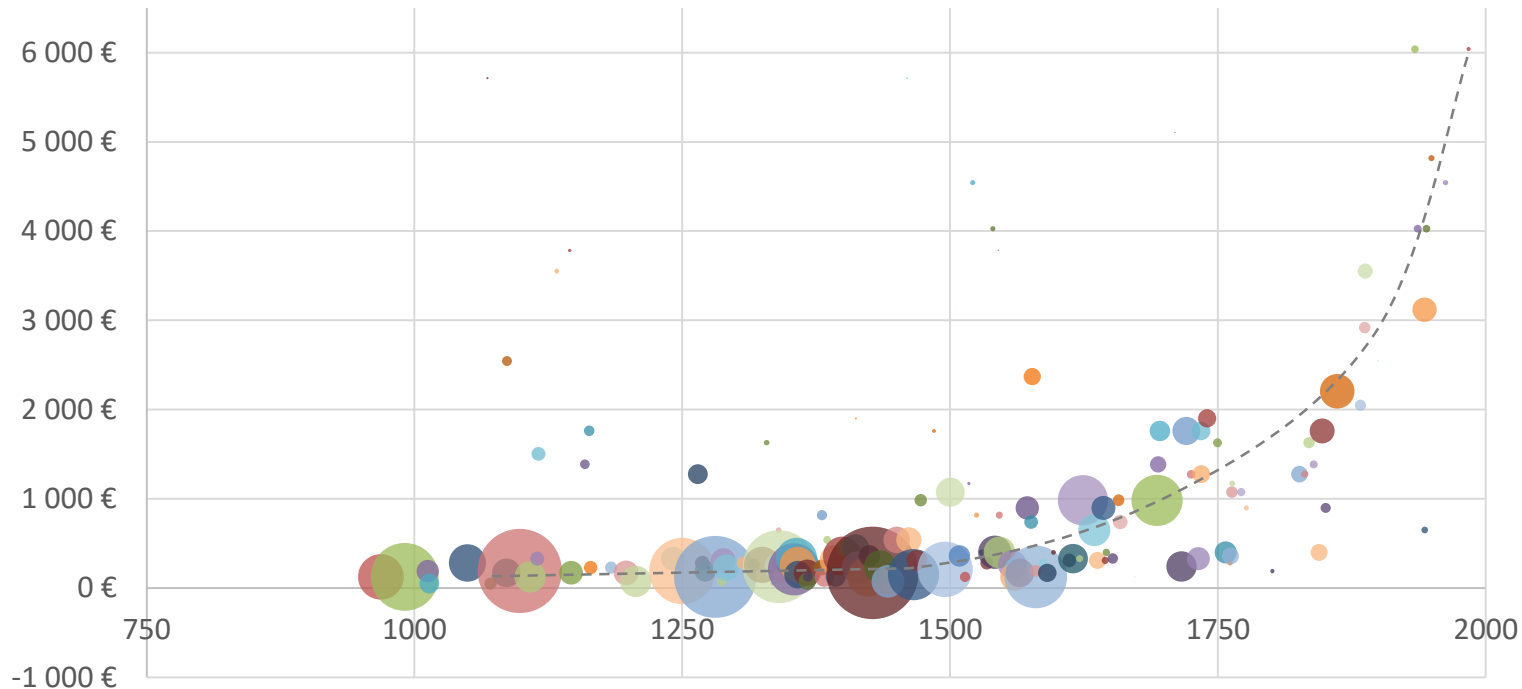
Source : Element Energy / ICCT, 2015



Tax incentives schemes efficiency is limited.

In France, only 10% of new car sold will pay a 500€+ malus in 2020.

Malus 2020 (€) vs. weight (kg) vs. 2018 new cars registrations



Source : EEA, France Stratégie



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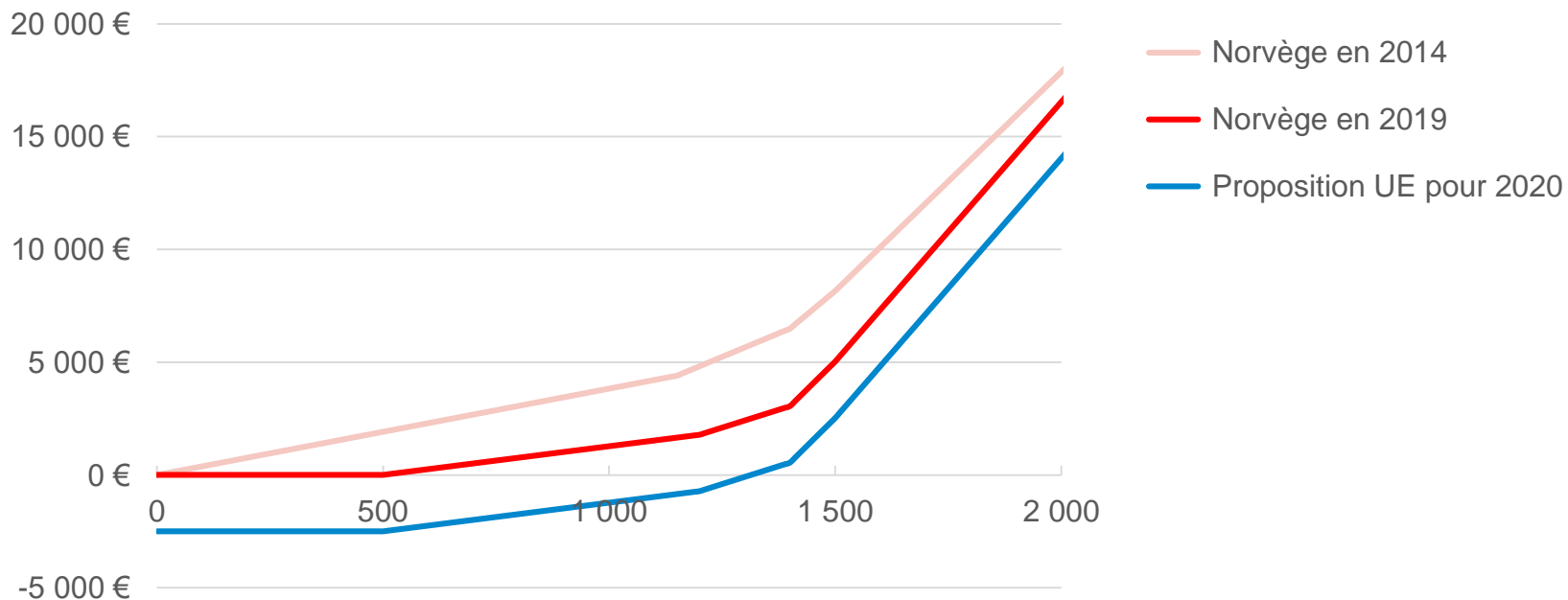
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2. What measures can reduce CO₂ emissions and car energy consumption?



We propose to improve the existing tax incentives on CO2 by adding a weight component to discourage the purchase of 1,4t+ cars

Bonus/malus based on car weight



Source : Gouvernement norvégien & Analyse France Stratégie



Why adding a weight component to existing tax incentives on CO₂?

1. CO₂ based incentive schemes are not working as CO₂ emissions from new passenger cars have increased over the last 2 years.
2. « Optimizing » a weight balance is much harder than optimizing a type-approval test : latitude and margin are close to null.
3. Weight is a factor in 3 of the 4 reasons affecting driving resistance, hence energy consumption, for cars : rolling drag, potential energy and inertia
4. Weight is a better proxy for well-to-wheel and life-cycle energy consumption & CO₂ emissions but also metal footprint (cobalt in batteries)



Exemptions from the malus associated to this weight component

- 1. Large families will continue to benefit from reductions**
→ in France, 20 gr and 65 kg per children for 3 children or more

- 2. Any electric car « lighter » than 2 tons**

- 3. Plug-in Hybrid Electric Vehicles proportionally to their electric mileage**
→ 80% electric mode driving = 80% exemption

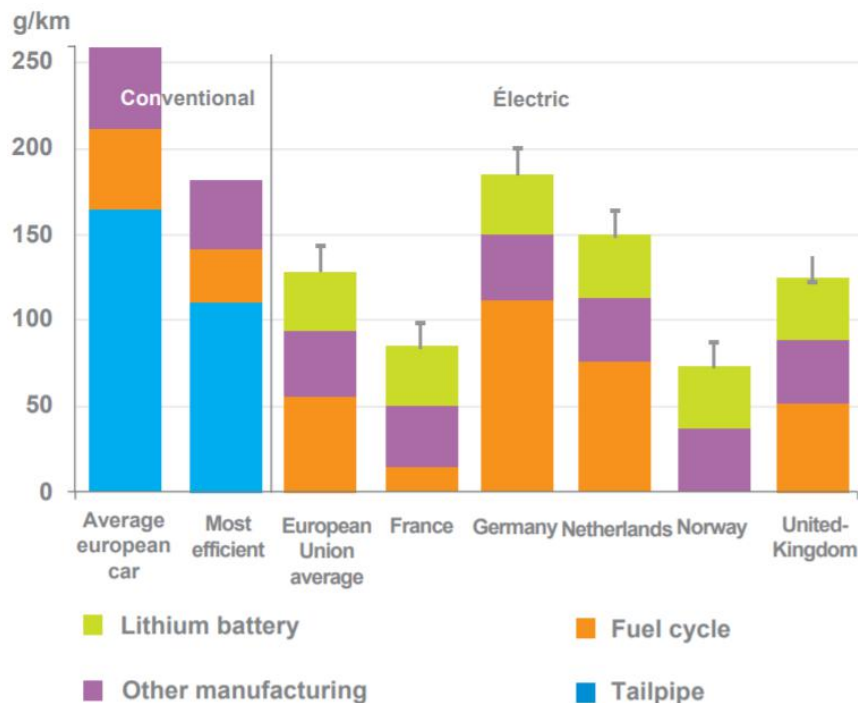


Electric cars are as clean as the electricity used to manufacture them (and their battery) and to charge them



We propose to introduce a standard limiting the carbon footprint associated to the production of low-emissions cars and their batteries

CO₂ emissions over the life-cycle of an electric or combustion-engine vehicle in Europe



Source : ICCT 2018





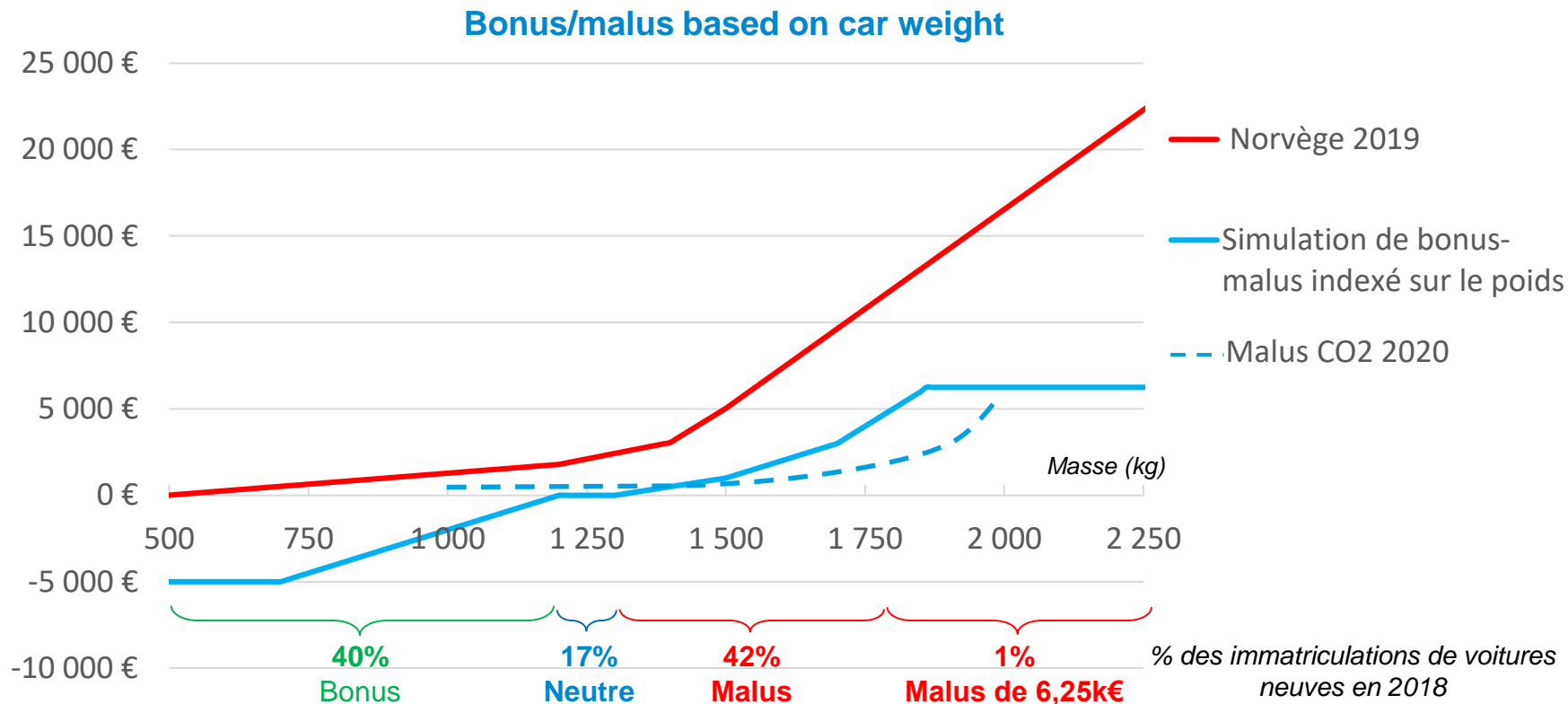
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3. Example of a bonus-malus scheme based on car weight



Example of a bonus-malus scheme based on car weight

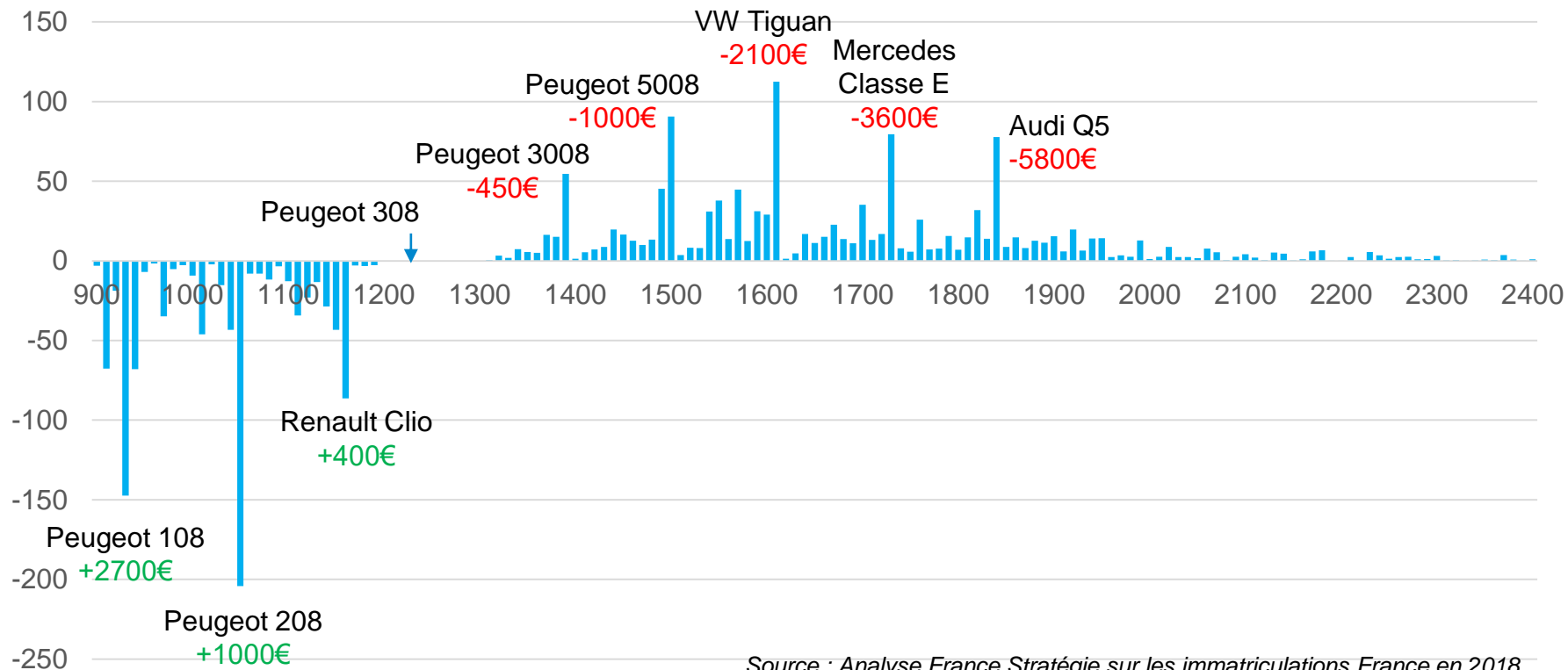


Source : *Gouvernement norvégien* & *Analyse France Stratégie*



Example of a bonus-malus scheme based on car weight

Bonus-malus (M€) vs. Weight (kg)



Source : Analyse France Stratégie sur les immatriculations France en 2018



Example of a bonus-malus scheme based on car weight

Car model	Weight (kg)	CO ₂ emissions (g/km)	Bonus-malus CO ₂ (€)		Bonus-malus CO ₂ + weight (€)	
			2019	2020	Weight	Total
Peugeot 108	930	95	-	-	+2700	+2700
Peugeot 208	1100	103	-	-	+1000	+1000
Renault Clio	1160	103	-	-	+400	+400
Peugeot 308	1270	105	-	-	-	-
Peugeot 3008	1400	116	-	-190	-500	-690
Peugeot 5008	1500	117	-35	-210	-1000	-1210
VW Tiguan	1610	133	-210	-1074	-2100	-3174
Mercedes Classe E	1730	125	-75	-400	-3600	-4000
Audi Q5	1840	139	-613	-1761	-5800	-6761
Audi Q7	2140	162	-3473	-7462	-6250	-13712

Source : Analyse France Stratégie





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Questions & Answers

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You can read and download this 12-page paper
« How can we now reduce CO₂ emissions from cars? »
on France Stratégie's website [strategie.gouv.fr](https://www.strategie.gouv.fr)