

# Europe's lost decade of truck fuel economy

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A briefing by  TRANSPORT & ENVIRONMENT

## Summary

Emissions from heavy-duty vehicles (HDV), which include trucks and buses, increased by 36% between 1990 and 2010 and are estimated to continue growing in the foreseeable future. HDV emissions currently represent around 30% of all road transport CO<sub>2</sub> emissions and unless additional measures are taken by 2030 HDV emissions will increase to over 40% of road transport CO<sub>2</sub>.<sup>i</sup> By 2030 HDV would emit around 15% of emissions not covered by the EU ETS (non-ETS/ESD) – which EU member states will have to reduce by 30% by 2030. The main reason for the increase of HDV carbon emissions is the stagnation of truck fuel efficiency coupled with increasing demand for road freight.

A new [report](#)<sup>ii</sup> by the International Council for Clean Transportation (ICCT), based on an extensive, multi-annual real world testing programme, adds to the existing evidence demonstrating truck fuel consumption has stalled for decades. The report suggests truckmakers have focused technological development on enhanced performance and engine power rather than on reducing fuel consumption. The European Commission suspects EU truckmakers ran a cartel that “*agreed the timing and price increase levels for the introduction of new emission technologies*” for much of the period covered by the ICCT report. Despite this, and in sharp contrast to the US, the EU has made little or no progress in tackling truck CO<sub>2</sub> emissions.

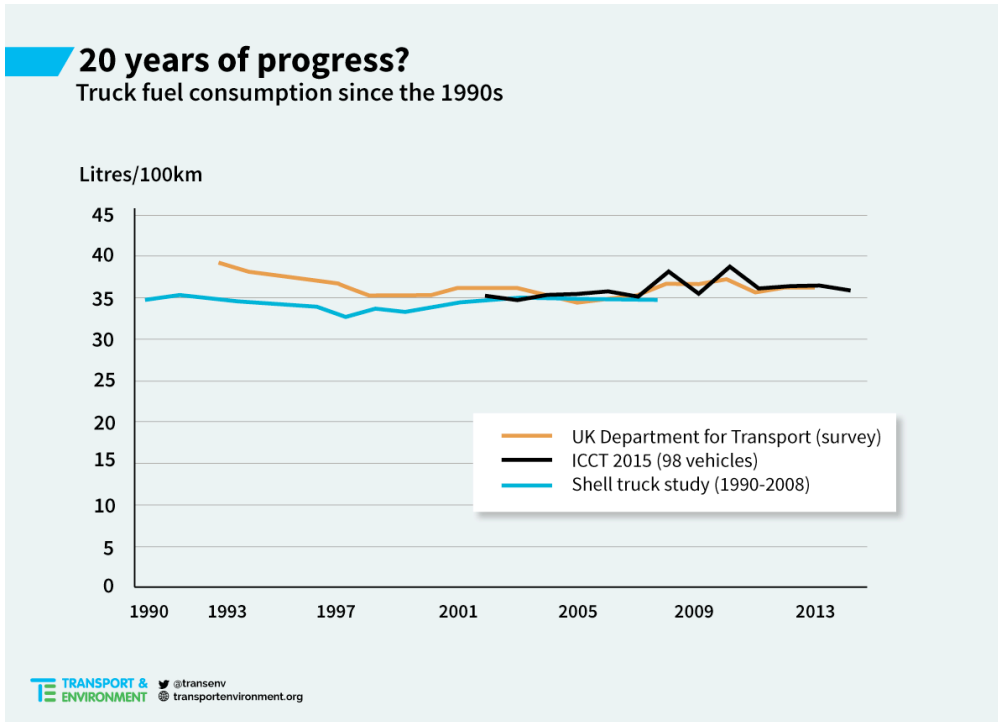
In the US a similar lack of truck fuel economy progress led to the US Environment Agency (EPA) introducing its first HDV fuel efficiency and CO<sub>2</sub> targets in 2011. In July 2015 the EPA has made a new proposal for post 2020 standards that would make US trucks the most technologically advanced and fuel efficient in the world.

The European Commission has lost a full decade on truck fuel economy. The 2016 ‘decarbonisation of transport strategy’ offers a new opportunity to finally take meaningful action to tackle HDV CO<sub>2</sub> and should set the EU on a firm path towards 2025 CO<sub>2</sub> standards for HDV.

### 1. The figures – no progress since mid-1990s

There are currently no officially measured data on truck fuel consumption or CO<sub>2</sub> in the EU or its member states. The best available information comes from professional magazines that test trucks in real-world circumstances. Another useful dataset<sup>iii</sup> is the one compiled by the UK Department for Transport since 1993.

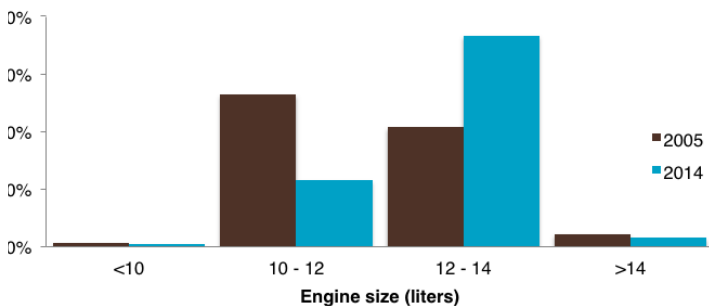
As can be seen from figure 1 on page two, available datasets point to limited or no progress on truck fuel efficiency between the mid-1990s and 2014. That was also the conclusion of the European Commission’s 2014 truck CO<sub>2</sub> strategy.<sup>iv</sup> The numbers obtained contrast sharply with the information provided by truckmakers. In brochures, presentations and reports they claim truck fuel economy has improved significantly over recent decades.<sup>v</sup> However, these claims are hard if not impossible to verify independently.



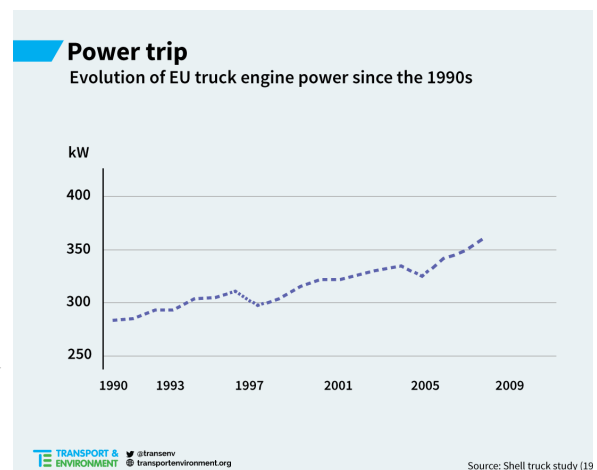
**Figure 1:** based on ICCT 2015<sup>vi</sup>, Shell LKW Study 2010<sup>vii</sup>, UK DfT 2014<sup>viii</sup>

## 2. Truckmakers focused on performance, not fuel consumption

Whilst truck fuel consumption has remained largely stable, engine size and engine power did not. As can be seen in figures two and three, engine power and engine size steadily increased since the early 1990s. This suggests part of the technological development has resulted in enhanced performance rather than in reduced fuel consumption. Similar trends were observed in the light commercial vehicle segment before CO<sub>2</sub> standards were introduced.<sup>ix</sup>



**Figure 3:** Evolution of new truck performance – ICCT 2015<sup>x</sup>



**Figure 2:** performance of new trucks (graph reproduced based on [Shell LKW Study 2010](#) p31)

### 3. The truck cartel

There are strong indications that in the period in which EU truckmakers made little or no progress on truck fuel efficiency, they were colluding in a price fixing cartel. The European Commission has accused all big European truckmakers – Daimler, Volvo-Renault, Man-Scania, Daf, Iveco – of “agree[ing] the timing and price increase levels for the introduction of new emission technologies” between 1997 and 2011.<sup>xi</sup> Truckmakers have already put aside hundreds of millions in anticipation of likely fines.<sup>xii</sup>

Truckmakers’ willingness to abuse their hold over the market to the detriment of their customers and the environment was also apparent during the recent review of the truck weights and dimensions directive. Truckmakers lobbied successfully to block the introduction of voluntary (!) changes that would enable new, aerodynamic truck designs. This was to safeguard what they call “competitive neutrality”.<sup>xiii</sup>

### 4. Truckmakers reduced NOx emissions (but only when regulators introduced real-world tests)

To comply with stricter EU air pollution requirements (EURO I-VI), truckmakers have reduced pollutant emissions and in particular Nitrogen Oxide (NOx) emissions. The HDV industry often blames regulators’ focus on air pollution for the lack of progress on fuel consumption. There is indeed a trade-off between low NOx and fuel consumption within the engine, but, at the tailpipe (where it matters), this largely depends on the type of after-treatment technology used. While Exhaust Gas Recirculation (EGR) does cause increased fuel consumption, Selective Catalytic Reduction (SCR) technology has a positive effect on fuel economy.<sup>xiv</sup> With Euro VI trucks now vastly relying on SCR technology, engine fuel efficiency can be favored with higher engine NOx being treated by the SCR.

Until EURO VI, improvements were mostly achieved in laboratory conditions<sup>xv</sup>, as is the case for passenger cars today<sup>xvi</sup>. For example, the real-world NOx emissions of Euro IV (2005-2008) trucks are on average 6.5 g/kWh<sup>xvii</sup>, which is at the level of the Euro II (1996-2000) standard. It was the introduction of in-service conformity tests for NOx that engaged truckmakers to fit cleaner EURO VI engines that also deliver in real-world conditions. Significant fuel penalties resulting from Euro standards are therefore not very likely.

### 5. The US experience

The European experience is by no means unique. Before the US introduced fuel efficiency standards in 2011, fuel economy had been stagnant for many years. Once standards were adopted, fuel efficiency started improving. In June 2015 the US Environment Protection Agency made a new (phase II) proposal to require another 24% fuel efficiency improvement from trucks by 2027. The proposal is currently under review and will be adopted in the first half of 2016.<sup>xix</sup>

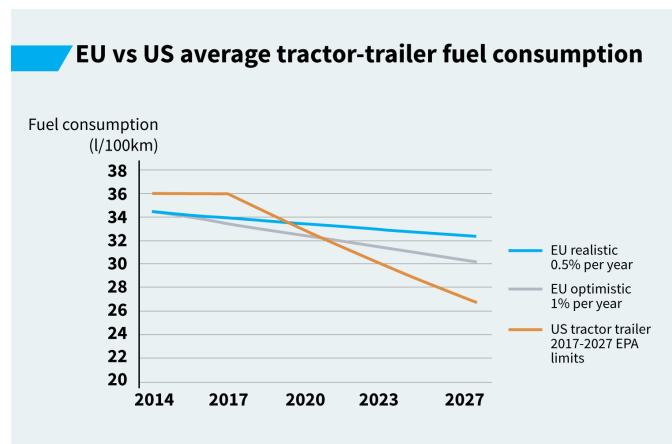


Figure 4: T&E in-house analysis<sup>xviii</sup>

The American Fuel efficiency standards will improve new truck fuel efficiency from around 36l/100km in 2014 to below 27l/100km in 2027 for class 8 high roof tractor trailers (roughly comparable to EU 40t tractor trailer). As shown in figure 4, this suggests US trucks will be the most technologically advanced and fuel efficient in the world by the end of this decade. At the very least, it shows that the pace of fuel efficiency improvements in the US will be much higher than in the EU in the next decade. The difficulty and complexity of comparing EU and US truck fuel efficiency as well as the methodology that underpins graph 4 are discussed in [this note](#).<sup>xx</sup>

# Diverging paths, EU vs US

## What can you do in 10 years?



European Council tells Commission to develop a HDV CO2 test procedure and policies to reduce HDV CO2.

"Green vehicles strategy" announces 'future proposal on fuel consumption from HDV'

Commissioner Hedegaard promises EU strategy to **reduce** HDV CO2 emissions; truck-makers (ACEA) and Commission jointly develop EU truck CO2 test procedure

European Commission publishes HDV CO2 strategy and commits to introducing the truck CO2 test procedure (VECTO)

European Commission "editing board" drafts legal text for HDV CO2 test procedure; Commission Energy Union strategy announces unspecified measures to reduce HDV fuel consumption

Commission plans to introduce truck CO2 test procedure into type approval legislation; VECTO doesn't cover trailers or hybrid technology

Commission to make a proposal to monitor, report and verify (MRV) truck CO2

EU truckmakers to **report** new truck CO2; due to 'testing burden' process will be spread over two years; no action to regulate new truck CO2 is currently planned.

2007

Mid-2010

2011

2014

2015

2016

2017

2018-19



Obama orders US EPA to develop fuel economy standards for heavy trucks; US EPA and NHTSA start working on US Phase I rule

US introduces Phase I fuel efficiency standards requiring ca. 20% efficiency improvements by 2018

Obama orders EPA and NHTSA to start preparing for extension of Phase I HDV standards as Phase I takes effect

EPA and NHTSA Phase II standards proposal requiring ca. 12-24% improvements. Phase II includes updated and improved test procedures (incl. for hybrids) and trailers

First half 2016 - Phase II proposal to be adopted

Phase I requirements fully operational; Phase II requirements are gradually phased in from 2021 to 2027 (according to 2015 proposal - tbd)

## 6. What the EU should do

In 2016 the Commission will present a decarbonisation of transport strategy that will be published alongside the implementing proposals for the 2030 climate targets (Effort Sharing/Non-ETS). The strategy will detail the EU-level actions the Commission will initiate to help member states meet their targets. The Commission must use this opportunity to announce an ambitious and concrete timeline for the introduction of fuel efficiency standards for heavy-duty vehicles that kick in by 2025 at the latest. The standards must be set at a level that forces the uptake of cost-effective technology and should pay back within the first period of ownership (4-5 years) so that hauliers and logistics companies benefit from lower fuel costs. According to the best available EU and US studies, that potential is probably between 35% and 50%. More information on this can be found in [T&E's truck CO<sub>2</sub> briefing](#).<sup>xxi</sup>

### Further information

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### Notes:

- i  
[http://www.transportenvironment.org/sites/te/files/publications/2015%2009%20TE%20Briefing%20Truck%20CO2%20Too%20big%20to%20ignore\\_FINAL.pdf](http://www.transportenvironment.org/sites/te/files/publications/2015%2009%20TE%20Briefing%20Truck%20CO2%20Too%20big%20to%20ignore_FINAL.pdf)
- ii ICCT, Overview of the heavy-duty vehicle market and CO2 emissions in the European Union, December 2015.  
<http://www.theicct.org/overview-heavy-duty-vehicle-market-and-co2-emissions-european-union>  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/479143/rfs0141.xls](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/479143/rfs0141.xls)
- iii “Coupled with stable vehicle fuel consumption, these trends have led to increased HDV CO2 emissions.” [Strategy for reducing Heavy-Duty Vehicles' fuel consumption and CO2 emissions \(2014\)](#), p3.
- iv It is often claimed truck fuel efficiency improved by on average 1% p/a since the 1990s. For example: “Future Highly Energy Efficient Trucks” – presentation Marc Lejeune - 2013 Nov 21 Truck & Bus World Forum, Lyon; Truckmakers also boast significant improvements in their advertising: [http://www2.mercedes-benz.co.uk/content/unitedkingdom/mpc/mpc\\_unitedkingdom\\_website/en/home\\_mpc/truck/home/environment/eurovi/how-do-our-trucks-measure-up.html](http://www2.mercedes-benz.co.uk/content/unitedkingdom/mpc/mpc_unitedkingdom_website/en/home_mpc/truck/home/environment/eurovi/how-do-our-trucks-measure-up.html)
- v Ibidem II
- vii <http://s04.static-shell.com/content/dam/shell-new/local/country/deu/downloads/pdf/publications-2010truckstudyfull.pdf>
- viii [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/479143/rfs0141.xls](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/479143/rfs0141.xls)
- ix [http://www.transportenvironment.org/sites/te/files/media/2010\\_06\\_van\\_engine\\_sizing\\_tno.pdf](http://www.transportenvironment.org/sites/te/files/media/2010_06_van_engine_sizing_tno.pdf)
- x ICCT 2015, p8.
- xi <http://www.reuters.com/article/2014/12/24/us-eu-trucks-cartel-idUSKBN0K20H320141224>
- xii <http://www.handelsblatt.com/unternehmen/industrie/lkw-kartell-man-daimler-und-co-herstellern-droht-milliardenstrafe/11414210.html>
- xiii <http://www.transportenvironment.org/newsroom/blog/sweet-smell-cartel-why-truckmakers-oppose-cleaner-and-safer-lorries>
- xiv [http://www.volvotrucks.com/SiteCollectionDocuments/VTNA\\_Tree/ILF/Products/2010/09-VTM097\\_FW\\_SS.pdf](http://www.volvotrucks.com/SiteCollectionDocuments/VTNA_Tree/ILF/Products/2010/09-VTM097_FW_SS.pdf)
- xv [http://www.theicct.org/sites/default/files/publications/ICCT\\_Briefing\\_EuroIV-V-VI-NOx\\_Mar2015.pdf](http://www.theicct.org/sites/default/files/publications/ICCT_Briefing_EuroIV-V-VI-NOx_Mar2015.pdf)
- xvi [http://www.transportenvironment.org/sites/te/files/publications/TE\\_Mind\\_the\\_Gap\\_2015\\_FINAL.pdf](http://www.transportenvironment.org/sites/te/files/publications/TE_Mind_the_Gap_2015_FINAL.pdf)
- xvii [http://www.theicct.org/sites/default/files/publications/ICCT\\_Briefing\\_EuroIV-V-VI-NOx\\_Mar2015.pdf](http://www.theicct.org/sites/default/files/publications/ICCT_Briefing_EuroIV-V-VI-NOx_Mar2015.pdf)
- xviii Ibidem xviii
- xix <http://www.theicct.org/blogs/staff/parsing-phase-2-tractor-trailers-proposed-regulation>
- xx  
[http://www.transportenvironment.org/sites/te/files/2015\\_06\\_Comparing\\_US\\_EU\\_truck\\_fuel\\_economy\\_explanatory\\_note\\_Final.pdf](http://www.transportenvironment.org/sites/te/files/2015_06_Comparing_US_EU_truck_fuel_economy_explanatory_note_Final.pdf)
- xxi [http://www.transportenvironment.org/sites/te/files/publications/2015\\_06\\_Lorry\\_co2\\_briefing\\_update\\_US\\_PHASE\\_III.pdf](http://www.transportenvironment.org/sites/te/files/publications/2015_06_Lorry_co2_briefing_update_US_PHASE_III.pdf)