



# Fixing the PHEV loophole

## Recommendations for the review of plug-in hybrid WLTP utility factors

December 2021

### Summary

Real world CO<sub>2</sub> emissions of plug-in hybrids (PHEVs) are on average 2-4 times higher than official values<sup>1</sup>, which for most PHEVs are less than 50g/km on paper. Almost 1 million of them will have been sold in the EU in 2021 alone - carmakers are pushing their sales because their unrealistically low official CO<sub>2</sub> emissions allow them to easily meet their CO<sub>2</sub> targets. Yet PHEVs do not deliver the expected CO<sub>2</sub> savings on the road due to both their design and lack of incentives to charge, undermining the car CO<sub>2</sub> regulation and reducing the sales of truly zero emission cars.

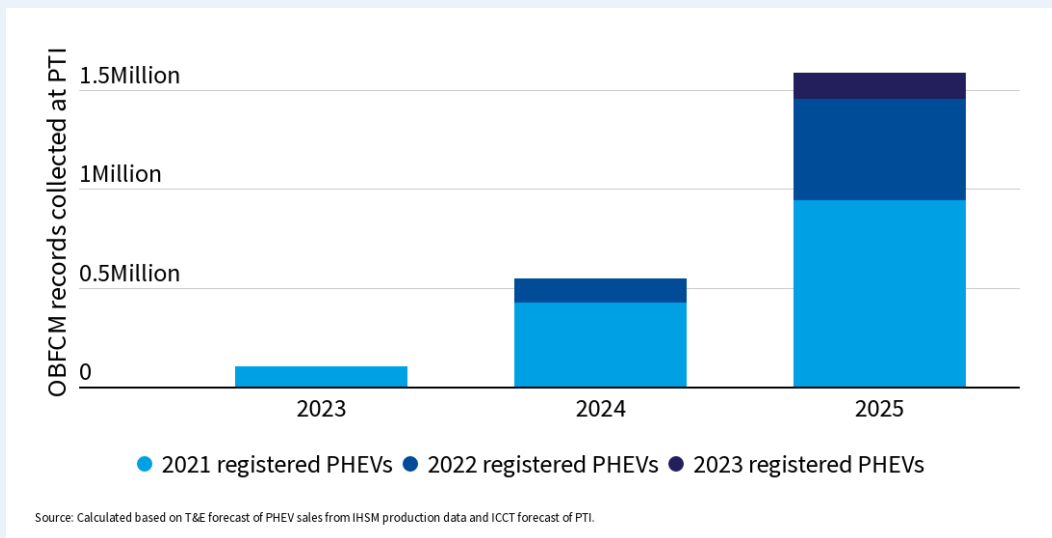
To address the problem, the European Commission is planning to reform the way PHEV CO<sub>2</sub> emissions are calculated, i.e. update utility factors (UFs): the currently unrealistic assumptions on the share of electric kilometers driven by PHEVs which underestimate official PHEV CO<sub>2</sub> values. This **review is welcome and is urgently needed as the credibility of Europe car climate policy is at risk.**

The real-world data on PHEV use will soon be available from on-board fuel consumption meters (OBFCM) fitted to all cars sold in the EU from the start of 2021. Yet, the Commission is not planning to use that data fully until 2030, allowing polluting PHEVs to be sold for another decade. Basing UFs on a very limited data set in 2025-2030 risks, once again, underestimating the PHEVs real CO<sub>2</sub> emissions.

T&E understands that the reason for delaying to 2030 is that the Commission is concerned over real world data availability from OBFCM, as collection during periodic technical inspections (PTI) does not begin until 2023. But the reality is that **only 1.5% of records (14,000) need to be collected by car makers in 2021 from the close to a million PHEV expected to be sold this year** for the Commission to have more representative data than the dataset they plan to use from 2025. It is highly likely that such a small threshold will be achieved, and therefore there is no reason not to **base UF on real world data as soon as possible and no later than 2025.** Delaying will not only

<sup>1</sup> ICCT. (2020) [Real-world usage of plug-in hybrid electric vehicles: Fuel consumption, electric driving, and CO<sub>2</sub> emission.](#)

undermine car CO<sub>2</sub> reduction goals, but will lock Europe's carmakers into sub-optimal technology at the time of the global race to electrification.



Alongside implementing real world UFs as soon as possible, the Commission also needs to ensure that UFs remain representative of PHEV use. **The Commissions should therefore update UFs on an annual basis** in line with the frequency of OBFCM data collection. To reward manufacturers which sell efficient PHEVs and encourage their customers to charge, the Commission should implement manufacturer-specific UFs from 2027 when over 1.5 million PTI records will be available.

T&E recommends that the Commission:

- 1. Introduces real world utility factors based on OBFCM data for the calculation of PHEV CO<sub>2</sub> emissions and for compliance with fleet CO<sub>2</sub> standards no later than 2025.**
- 2. Updates utility factors on an annual basis in line with the frequency with which the Commission will receive updated OBFCM data from the EU fleet.**
- 3. From 2027 introduces manufacturer specific utility factors, to reward those car makers which improve the performance of their PHEVs and encourage their customers to charge.**

## 1. Introduction

Plug-in hybrids (PHEVs) have incredibly low official CO<sub>2</sub> emissions and their EU sales have surged as car makers use them as a compliance technology to meet stricter car CO<sub>2</sub> targets which came into force in

2020/21. Sales increased from just 1.1% of the EU car market in 2019 to 5.1% in 2020 with over 500,000 PHEVs sold<sup>2</sup>. This is a large increase in a year when sales were historically low due to the Covid-19 pandemic. Sales are forecast to almost double again this year. T&E predicts that almost a million PHEVs will be sold in 2021<sup>3</sup>. In the first three quarters of this year PHEV even overtook the share of fully electric cars sold grabbing a market share of 8.6% vs. 7.6% for BEVs<sup>4</sup>.

While the growing shift to e-mobility should be celebrated, the reality is that PHEVs sales today undermine the effectiveness of the car's CO<sub>2</sub> regulation and EU efforts to decarbonise cars. Real world CO<sub>2</sub> emissions of PHEVs are many times higher than the official figures used for calculating manufacturer fleet average CO<sub>2</sub> compliance. Most PHEVs are rated less than 50g/km, yet a study by the International Council for Clean transportation together with the Fraunhofer Institute found that PHEV emissions were on average 2-4 times higher than official figures<sup>5</sup>. Unrealistically low CO<sub>2</sub> emissions are unjust and allow carmakers to benefit twice when it comes to CO<sub>2</sub> compliance. Firstly, through lower CO<sub>2</sub> values, and secondly through super credits until 2023 and Zero and Low Emission Vehicle benchmarks (ZLEV credits) from 2025.

To showcase the problem, last year T&E analysed Volvo's and BMW's 2020 predicted CO<sub>2</sub> compliance. BMW would have missed their target (103 g) by 8-11 g and Volvo ( 111g) by 9-15g if more realistic CO<sub>2</sub> emissions for PHEVs were used<sup>6</sup>. Today, selling PHEVs is an easy way for car makers to comply with CO<sub>2</sub> targets while failing, yet again, to deliver the CO<sub>2</sub> reductions on the road. Their sale cannibalises sales of BEVs as car makers would need to sell more to meet targets if PHEV CO<sub>2</sub> emissions were realistic.

The problem boils down to how official PHEV CO<sub>2</sub> emissions are calculated which rely on overly optimistic assumptions on the share of electric km driven by PHEVs -known as utility factors (UFs)- compared to the actual share of electric kilometers driven. Official UFs are not based on real world PHEV use, due to a lack of PHEV use data when the UFs were being developed, but on outdated data on conventional internal combustion engine (ICE) cars. These unrealistic UFs are not representative of real world PHEV use, resulting in unrealistically low CO<sub>2</sub> emissions. UFs need to be urgently updated to ensure that official PHEV values reflect the car's real world use. The European Commission has now started work on updating the UFs within the WLTP regulation.

## **2. The Commission needs to introduce utility factors based on real world data in 2025 at the latest**

---

<sup>2</sup> T&E. (2021) [CO<sub>2</sub> targets propel Europe to 1st place in emobility race.](#)

<sup>3</sup> T&E. (2021) [Electric car boom at risk: Why the current EU car CO<sub>2</sub> rules will do little to accelerate the switch to zero-emissions mobility.](#)

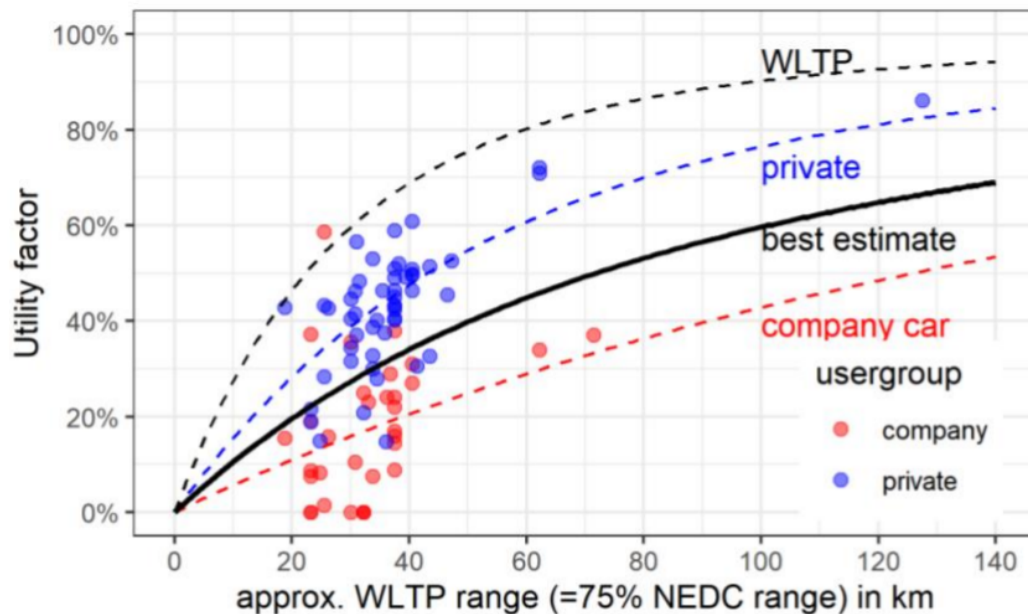
<sup>4</sup> ACEA (2021, 10, 22) [Fuel types of new cars.](#)

<sup>5</sup> ICCT. (2020) [Real-world usage of plug-in hybrid electric vehicles: Fuel consumption, electric driving, and CO<sub>2</sub> emission.](#)

<sup>6</sup> T&E. (2020) [Plug-in hybrids: Is Europe heading for a new dieselgate?](#)

The European Commission is planning a two step approach to updating UFs:

1. **2025-2029:** In the first step UFs will be set based on utility factors derived from a study on PHEV UFs undertaken by ICCT and the Fraunhofer institute last year. Once set, the utility factors may be updated during this period by the Commission to better reflect real world values obtained from on-board fuel consumption meters.



**Figure 1: The black line represents the PHEV utility factors proposed by the Commission for use between 2025-2029<sup>7</sup>. Blue and red lines represent the utility factors determined by**

3. **2030+:** From 2030, the Commission plans to use utility factors which are fully based on real world OBFCEM data.

The problem with the Commission's current approach is that it does not move fast enough to update UFs based on real world use. The problem with PHEV CO<sub>2</sub> emissions is now - at least a million of these vehicles will have been sold in 2021 alone, with similar volumes expected until 2024/25 - so millions of much higher CO<sub>2</sub> emitting cars than claimed will be used across Europe for at least a decade or longer.

The solution to solve the problem is readily available. Since the start of 2021 all new cars sold in the EU, including PHEVs, have to be fitted with so-called on-board fuel consumption meters (OBFCEM). These devices record cars' real world fuel consumption- from which real world CO<sub>2</sub> emissions can be calculated- and the Commission is obliged to collect the data on an annual basis. This data will provide, for the first time, EU wide data on the real world use of PHEVs enabling the calculation of UFs based on real world use. The first batch of data will arrive at the Commission in April 2022, meaning that as soon as the first

<sup>7</sup> European Commission. (2021, 09, 30) Utility factors for OVC-HEV in Regulation (EU) 2017/1151. Presentation to TCMV.

half of next year the EC will be able to start the process to reform UFs of PHEVs based on real world PHEV use.

Yet the Commission is not considering using real world data for UFs until 2030 due to worries around the amount of records that will be available to the Commission and the representativeness of the data.

T&E believes it is unlikely that the dataset by ICCT/Fraunhofer is larger than what the OBFCM 2022 sample will bring. The ICCT/ Fraunhofer UFs are based on 13,771 records from Norway, Germany, and Netherlands. The data is dominated by company cars from the Netherlands, which represent 78% of the records. While the data is the best available currently it is likely to be surpassed in volume (and the number of Member States that it covers) by OBFCM data very quickly. T&E forecast that over 940,000 PHEV will be sold in the EU in 2021. **Just 1.5% of OBFCM records would need to be collected by car makers in 2021 from PHEVs sold in the same year to surpass the size of the ICCT/Fraunhofer data set. These could either be collected when the vehicle undergoes servicing or repair, or by over the air data transfer to manufacturers (OBFCM data collection at periodic technical inspections (PTI) does not begin until 2023).**

The small amount of records that would need to be collected means that it is highly likely that OBFCM data collected by car makers in 2021 and transferred to the Commission in 2022 will be more representative of the real world use of PHEVs than the ICCT/Fraunhofer UFs that the Commission is proposing to base UF on from 2025-2029. It will also be more geographically spread. As such, there is no reason for the Commission not to use data from OBFCM for PHEV UF as a first step, from 2025 already. As a precaution the Commission may use the ICCT/Fraunhofer UFs as a backstop. If the volume of OBFCM records collected in 2022 is less than the volume of data used to determine the ICCT/Fraunhofer UFs, then the ICCT/Fraunhofer UFs can be used for the calculation of PHEV CO<sub>2</sub> emissions in 2025.

However, this must default to real world utility factors based on OBFCM data in 2026 at the latest. The backstop must expire by 2026 because by April 2024 -more than a year and a half prior to 2026- the Commission will definitely have sufficient OBFCM data. OBFCM data must be collected during PTI starting in 2023. It is expected that around 11% of cars sold in 2021 will undergo a PTI inspection in 2023<sup>8</sup>. That is equivalent to over 100,000 PHEVs OBFCM records that will be collected, or more than 7 times the size of the ICCT/Fraunhofer data set. That data will need to be provided to the Commission by April 2024 in addition to those OBFCM records that will be provided to the Commission directly from car makers.

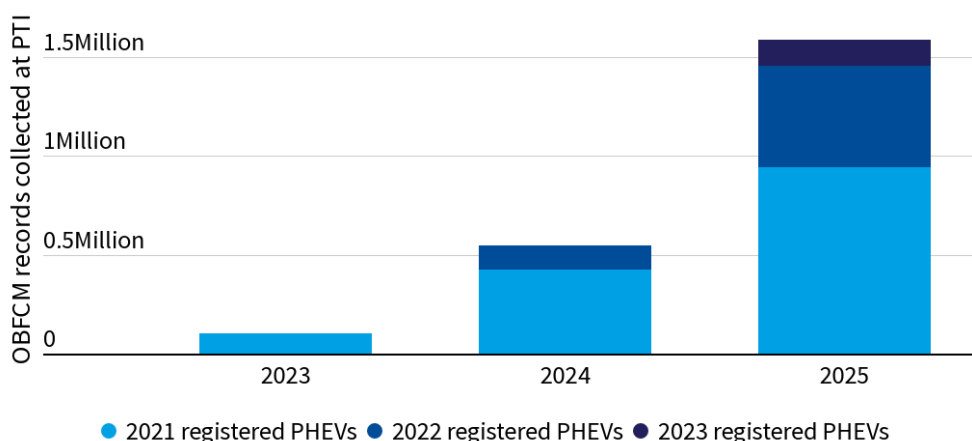
---

<sup>8</sup> Based on ICCT assumptions of the share of vehicles expected to undergo PTI as detailed in: ICCT (2021) [No time to lose for the European Commission to make plug-in hybrid CO2 emission values more realistic — and no need to wait!](#) and T&E's estimation of PHEV sales based on production data T&E (2021) [Commitments but no plans: How European policymakers can make or break the transition to zero emission cars](#) and adjusted to carmakers CO<sub>2</sub> targets.

### 3. The Commission must review utility factors on an annual basis

It is critical that the outdated UFs are reviewed as soon as possible to reflect the real world use of PHEVs. It is also important that once the old UFs are updated, UFs continue to remain representative of the real world use of PHEVs. This is important for carmakers as improvements to PHEV range and efficiency as well as increased density of charging infrastructure might result in larger shares of electric driving in the future. Therefore UFs should be updated on a regular basis. Not only will this ensure that official CO<sub>2</sub> emissions continue to reflect real world values but it will also allow OEMs to benefit from higher UFs if they improve the efficiency of their PHEVs or encourage their consumers to drive more of their journeys electrically. **T&E recommends that UFs are updated by the Commission on an annual basis in line with the frequency of a data collection from OBCFM.**

To ensure that those car makers who have the best performing PHEVs or who do the most to incentivise electric driving benefit fairly from their efforts, the Commission should introduce manufacturer specific UFs no later than 2027. By April 2026, the Commission would have collected in excess of 2.2 million OBCFM records from PTI undertaken in 2023-2025 alone (figure 2)<sup>9</sup>.



Source: Calculated based on T&E forecast of PHEV sales from IHSM production data and ICCT forecast of PTI.

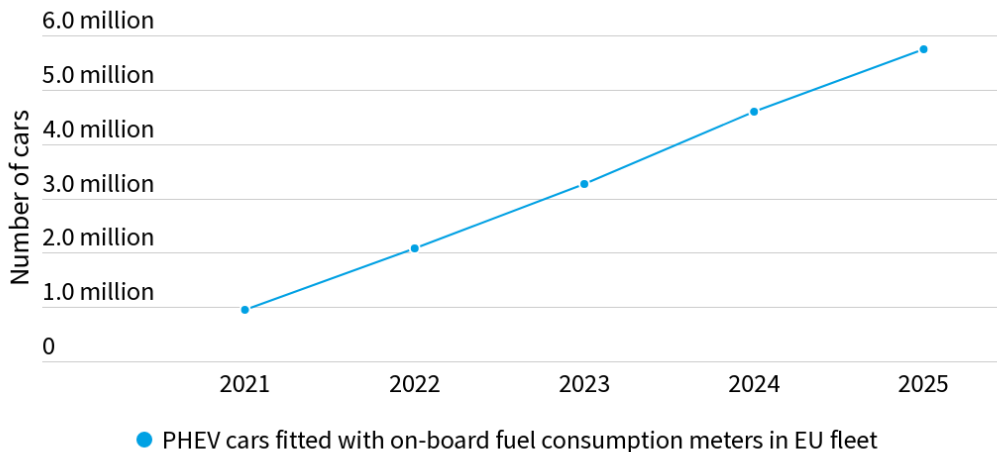
**Figure 2: Predicted number of OBCFM records collected during periodic technical inspections (PTI) between 2023-2025.**

The number of PHEVs fitted with OBCFM within the EU fleet is expected to increase by around 1 million vehicles per year from 940,000 in 2021 to 5.8 million in 2025 (figure 3)<sup>10</sup>. A large share of those cars will be

<sup>9</sup> Based on ICCT assumptions of the share of vehicles expected to undergo PTI as detailed in: ICCT (2021) [No time to lose for the European Commission to make plug-in hybrid CO<sub>2</sub> emission values more realistic – and no need to wait!](#) and T&E's estimation of PHEV sales based on production data T&E (2021) [Commitments but no plans: How European policymakers can make or break the transition to zero emission cars](#) and adjusted to carmakers CO<sub>2</sub> targets.

<sup>10</sup> T&E's estimation of PHEV sales based on production data T&E (2021) [Commitments but no plans: How European policymakers can make or break the transition to zero emission cars](#) and adjusted to carmakers CO<sub>2</sub> targets.

serviced within 1-2 years of the car being registered in order to keep the car’s warranty valid, some vehicles may even be serviced or repaired within the first year. Company cars which make up over 50% of new cars sales in the EU are also likely to be on a service plan which will require the vehicle to be serviced on a regular basis. Combined this means that by the end of the first half of 2026 the Commission will have several million PHEV OBFCM records both by car makers and independently during PTI. **Therefore the European Commission should have sufficient OBFCM data to set manufacturer specific PHEV UF in 2027.**



Source: T&E modelling of EU car sales based on IHSM production data.

**Figure 3: Predicted size of EU PHEV fleet fitted with OBFCM between 2021-2025.**

## 4. Summary

In order to close the gap between official and real world CO<sub>2</sub> emissions of plug-in-hybrids (PHEV) and ensure that they do not undermine the effectiveness of the cars CO<sub>2</sub> regulation, it is critical that the overly optimistic utility factors used for the calculation of official PHEV CO<sub>2</sub> emissions today are updated as soon as possible. Since data on the real CO<sub>2</sub> emissions of PHEVs will be available to the Commission from on-board fuel consumption meters (OBFCM) starting in April 2022, T&E recommends that the Commission:

- 1. Introduces real world utility factors based on OBFCM data for the calculation of PHEV CO<sub>2</sub> emissions and for compliance with fleet CO<sub>2</sub> standards no later than 2025.**
- 2. Updates utility factors on an annual basis in line with the frequency with which the Commission will receive updated OBFCM data from the EU fleet.**
- 3. From 2027 introduce manufacturer specific utility factors, to reward those car makers which improve the performance of their PHEVs and encourage their customers to charge.**

It is now in the hands of the Commission to fix the broken system of PHEV type-approval and ensure that car makers benefit fairly from the sale of these cars. Without real world utility factors, PHEV sales will continue to undermine CO<sub>2</sub> targets and damage consumer trust in low emission vehicles.

## **Further information**

Anna Krajinska

Emissions Engineer

Transport & Environment

[anna.krajinska@transportenvironment.org](mailto:anna.krajinska@transportenvironment.org)