Cost and well-to-wheel implications of the vehicle fleet CO2 emission regulation in the European Union

Abstract:
The current EU regulatory framework for CO2 emissions of cars is based on tank-to-wheel (TtW) emissions. In an exploratory study we have analysed what-if-scenarios within this regulatory framework to quantify the costs in attaining the TtW emission targets and possible impacts on the well-to-wheel (WtW) emissions of the EU’s new vehicle portfolio. In particular, we analysed the introduction of electric drive vehicles (EDV) and shifts between car segments. We performed the what-if-scenarios on the basis of the monitoring data for CO2 emissions from new passenger cars in the EU that was further reprocessed to achieve a break-down per vehicle segment, enriched with cost information and well-to-tank (WtT) emission data. Our calculations show that under the assumption that there are no significant segment shifts towards smaller vehicles, a minimum share of 11% of EDV would be needed to comply with a stricter CO2 target of 70 g/km, as improvements on conventional cars cannot provide sufficient savings. Deploying the EDV allows a cost effective achievement of the regulatory TtW targets, but also leads to higher WtW emissions than the baseline under the assumption that the TtW targets are not overachieved. Public incentives would be necessary to increase the share of EDV in the portfolio. We calculated that the order of magnitude of these incentives would be in the range of scrappage schemes that have been recently witnessed in European countries.

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