

## Press release

Renewable Carbon Initiative (RCI)

[www.renewable-carbon-initiative.com](http://www.renewable-carbon-initiative.com)

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## Products made from crude oil have a significantly higher CO<sub>2</sub> footprint than previously assumed

New data sets have substantial implications for the comparison of renewable carbon-based and fossil crude oil-based plastics

For years, the life cycle assessment community has been discussing how to make a fair comparison between products made from crude oil and those made from biomass, from Carbon Capture and Utilisation (CCU) and from recycling. A regularly critically emphasised aspect is that while all possible environmental impacts of – often novel – renewable carbon-based products are analysed at great expense and included in the LCA, for crude oil the scrutiny appears to be less stringent. Here, standard values are frequently applied that do not fully account for regional differences, lack granularity and transparency, and do not take into account a number of impacts on similar level of detail than what is requested for non-fossil alternatives.

The two latest updates of the Swiss ecoinvent database, which is the basis for many European LCA's, have started to address some of these imbalances as they include updated data on fossil raw materials and plastics. In ecoinvent versions 3.9 and 3.10 (end of 2023), new data on the supply of crude oil and natural gas have been implemented, which for the first time include unintended methane emissions during extraction and processing. Another highly relevant database in Sphera (GaBi) is also working on updating their data accordingly.

ecoinvent on crude oil and natural gas in their 3.9 update:

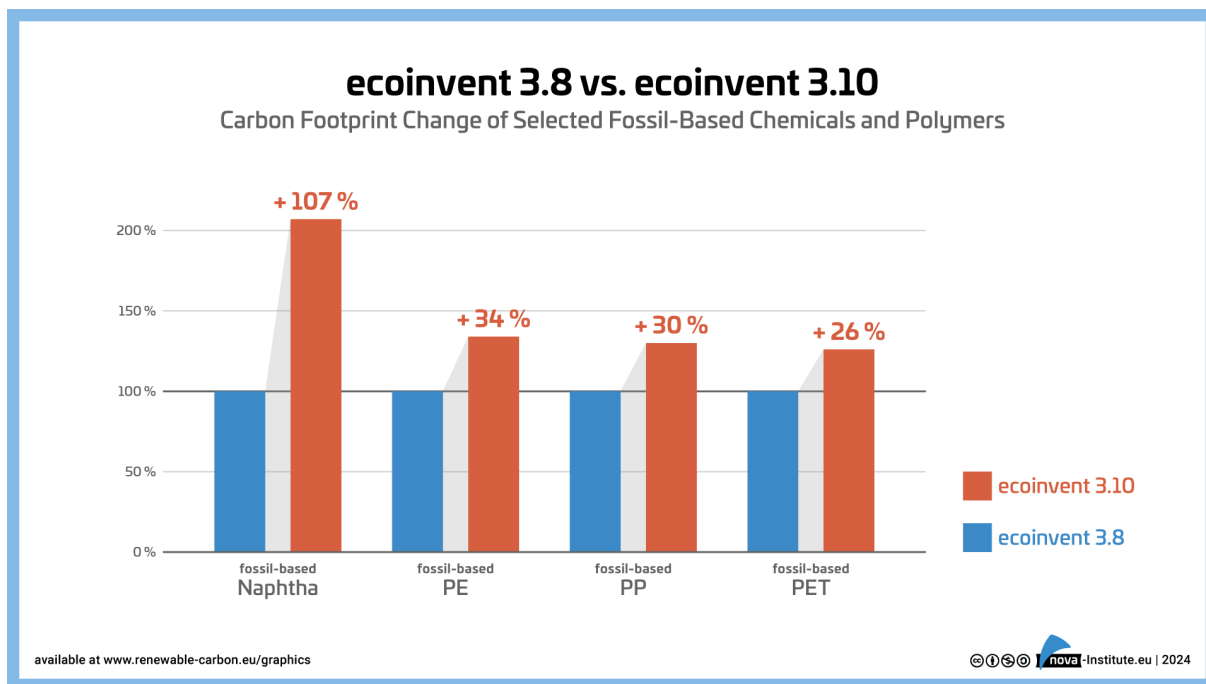
*ecoinvent v3.9 introduces an extensive overhaul of the data on natural gas and crude petroleum oil supply. Specifically, this version includes an update on the natural gas and crude petroleum oil supply chains (production, long-distance transport, and regional distribution) in the ecoinvent database to reflect the global supply situation in 2019. The geographical coverage in the database is expanded with data on the production of natural gas and crude petroleum oil in different countries and regions. When combined, the ecoinvent database now covers 90% of the global production of crude oil and nearly 80% of natural gas. In addition, the update introduces regional consumption mixes for crude petroleum oil to North America and Europe, alongside new or updated natural gas supply to 44 countries, based on the situation in 2019.*

ecoinvent on chemicals in their 3.10 update:

*The Chemicals sector is updated to improve the data representation for essential chemical precursors and their derivatives, such as short-chain alkenes (ethylene, propylene, butene, and butadiene), monocyclic aromatics (benzene, toluene, and xylenes [p-, o-, mixed]), ethylene oxide, and ethylene glycol. Additional key updates comprise of technological and geographical coverage expansion for ethylene, propylene, hydrogen, and methanol. Specifically, ecoinvent v3.10 introduces data for China, United States, and Europe.*

Furthermore, a collaboration between IFEU, PlasticsEurope and ecoinvent has added improved level of disaggregation for steamcracking and the production of polyolefins (PE, PP), PVC and PET, which increased the transparency of these processes.

**As a result of the above updates, the average carbon footprint of crude oil and natural gas and derived products have increased significantly between ecoinvent versions 3.8 and the latest version 3.10. The footprint of fossil naphtha has almost doubled and those for commodity plastics have increased by around 30% (PET 26%, PE 34% and PP 30%).**



This is a starting point for re-examining the impact of crude oil and fossil raw materials in detail and including them properly in life cycle assessments, since they are the main cause of human-made climate change after all.

The impact of these increased footprints will be significant for non-fossil plastics and other products made from renewable carbon. Many carbon footprints will be recalculated based on the updated data with the expectation that previous comparisons between fossil and non-fossil plastics will shift further in favour of the latter. For example, whereas the carbon footprint associated with the production of bio-based plastics has typically been around 20-30% lower than that of fossil-based plastics, it is now expected that bio-based plastics actually emit rather 40-50% less CO<sub>2</sub> than their fossil-based counterparts.

Michael Carus, executive manager of RCI, says:

*“The defossilisation of the chemical industry is more important for climate protection than previously thought. The importance of bio-based and CO<sub>2</sub>-based carbon has been underestimated, because data for crude oil and natural gas has been systematically embellished. Now the first steps have been taken to recognise the true impact of petroleum use. Politicians therefore have another reason to support the chemical industry's transition away from fossil carbon much more strongly.”*

The results are expected to have a significant impact on European policy, which has so far shown little support for alternatives from renewable carbon. Bio-based products, as well as CO<sub>2</sub>-based or recycled products, could play a much greater role in future policy, for example in the Packaging and Packaging Waste Regulation (PPWR) or in the European Commission's

Transition Pathway for the chemical industry, which implementation is currently under preparation.

In order to fully understand these new updates and their implications, the Renewable Carbon Initiative (RCI) is looking into commissioning a project that investigates in the differences and its consequences, and to compare the updated fossil footprints in ecoinvent with other major LCA databases like GaBi and CarbonMinds. Initial results would then only be available to RCI members.

*The Renewable Carbon Initiative (RCI), founded in September 2020, is a group of more than 60 pioneering companies from the entire chemical value chain from raw material to end-of-life. The aim of the initiative is to support and speed up the transition from fossil carbon to renewable carbon from biomass, direct CO<sub>2</sub> utilisation or recycling for all organic chemicals and materials. [www.renewable-carbon-initiative.com](http://www.renewable-carbon-initiative.com)*

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*Disclaimer: RCI members are a diverse group of companies addressing the challenges of the transition to renewable carbon with different approaches. The opinions expressed in this press release may not reflect the exact individual policies and views of all RCI members.*