

Comparative LCA Approach for Sustainable Transport Fuel Production from Waste Cooking Oil and Rapeseed



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The Aim of the Study



- **Evaluation of the environmental implications of replacing petroleum-based diesel with 5 and 20 percent waste cooking oil (WCO) and rapeseed biodiesel blends in city buses of Istanbul, Turkey.**

Importance of Transportation in Turkey



- Turkey faces with a dual challenge of providing an adequate energy supply for population and economic growth and reducing the GHG emissions and waste production.
- The recent approval of the Kyoto Protocol by the Turkish parliament has highlighted the country's commitment to tackle the climate change. (Issue: 27144, February 17, 2009)

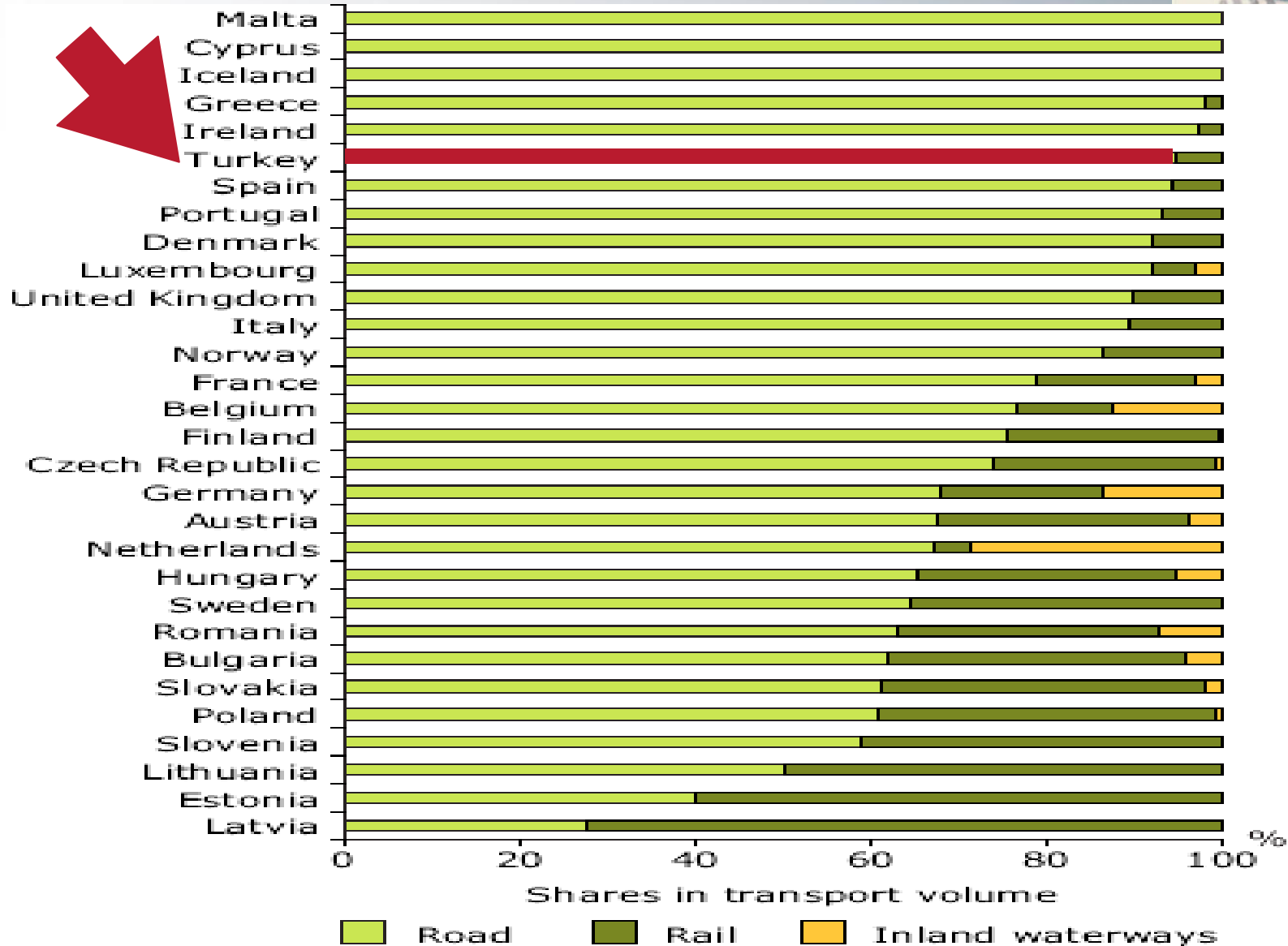
Importance of Transportation in Turkey



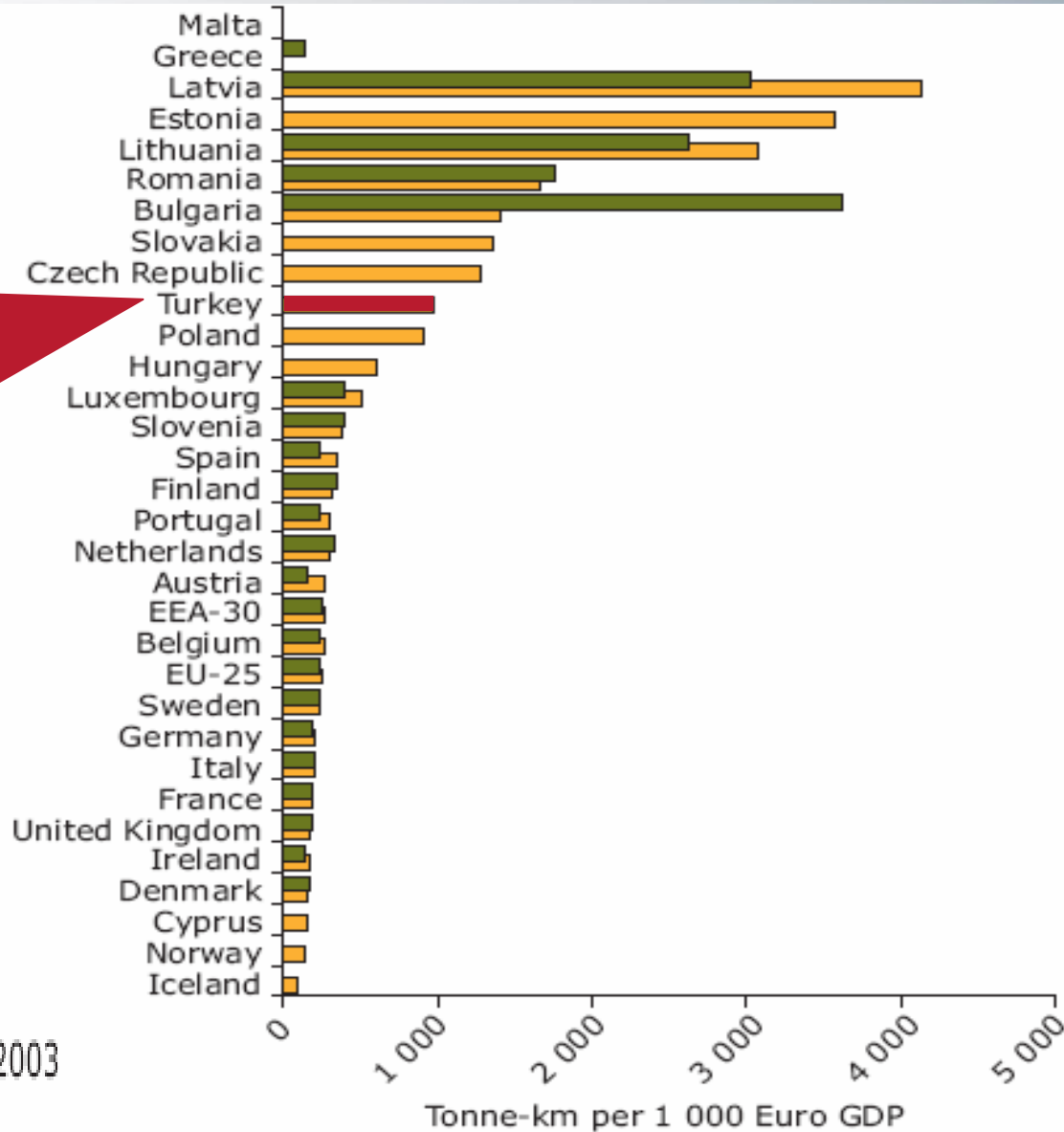
- GHG emissions of Turkey from the transport sector have increased by 69% from 1990 to 2006.
- **Istanbul** roughly contains one-fifth of all road motor vehicles creating additional local air quality concerns.



Importance of Transportation in Turkey



Importance of Transportation in Turkey



Goal and Scope Definition



Software

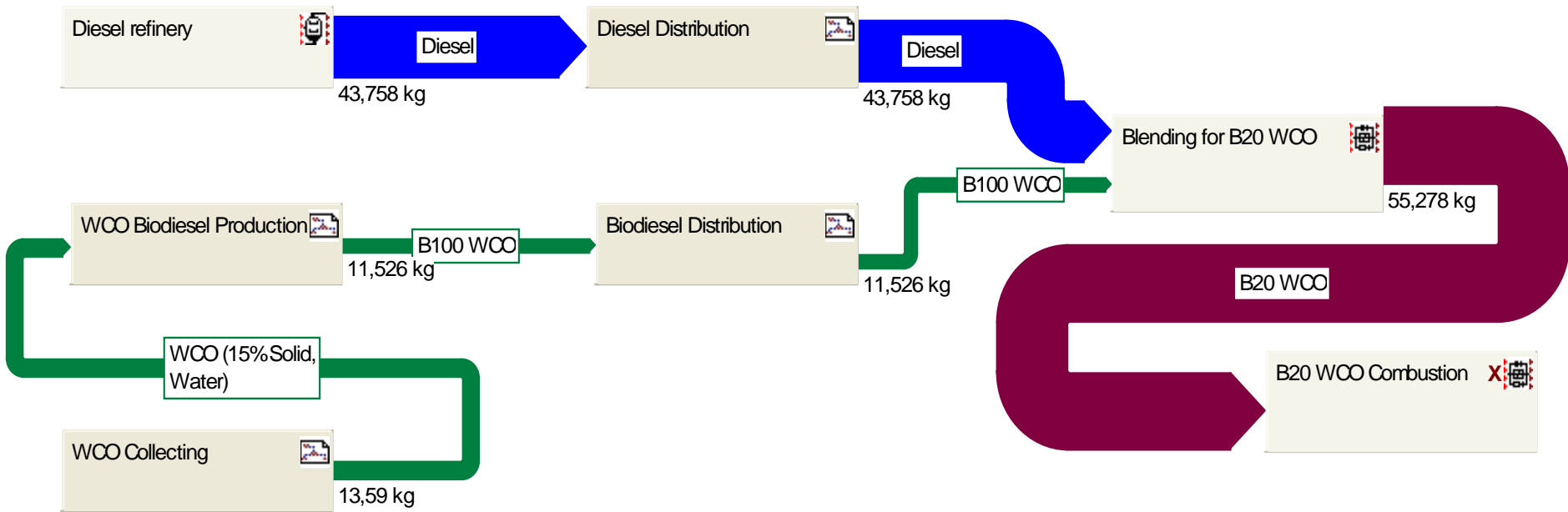
- Gabi 4 (existing in Bogazici University Sustainable Development and Cleaner Production Center)

Functional Unit

- The functional unit: 100 km in defined city route.
- Economic allocation was implemented for two byproducts of the biodiesel lifecycle; glycerine and rape meal.



Flow Chart of WCO Biodiesel

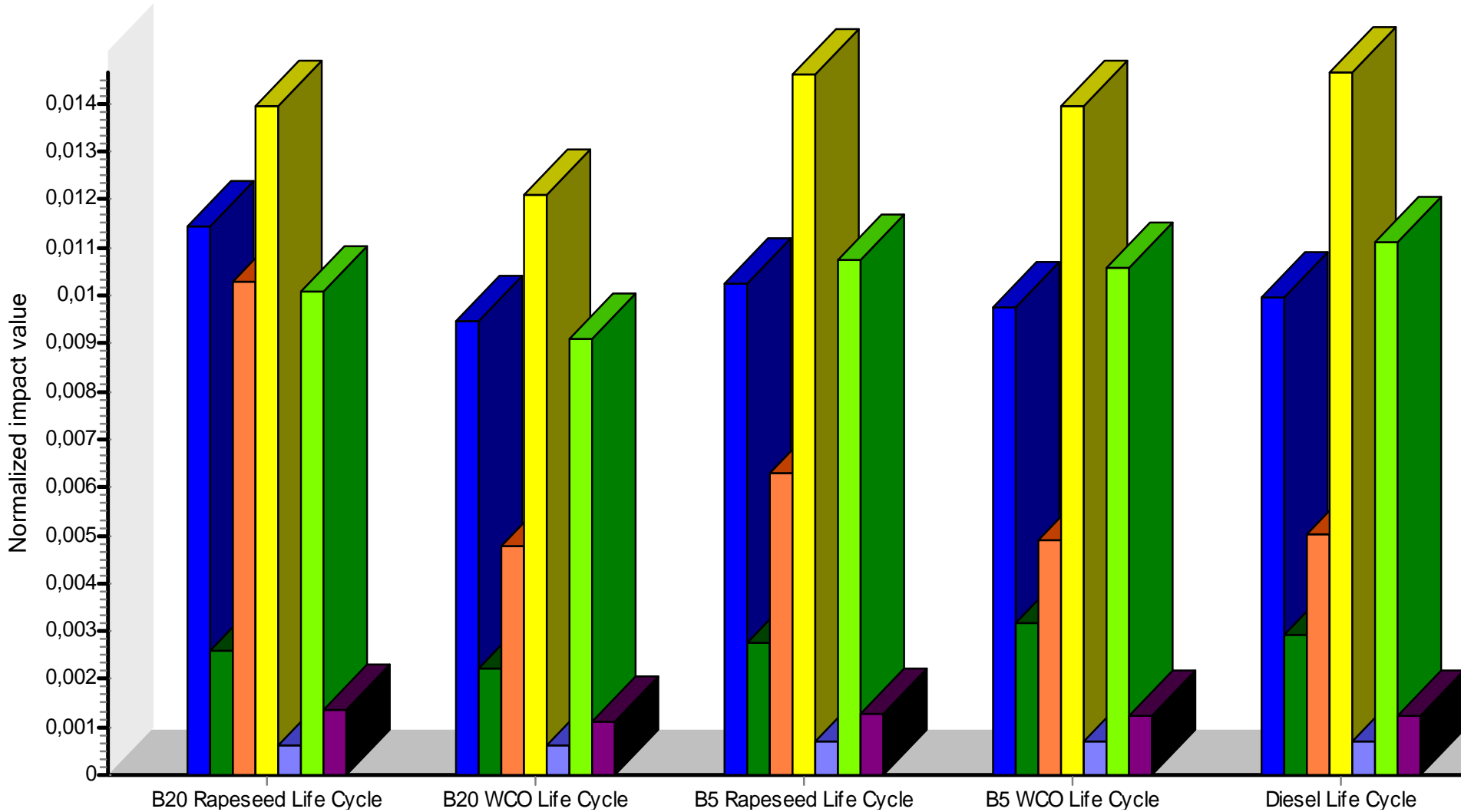


B20 WCO Life Cycle

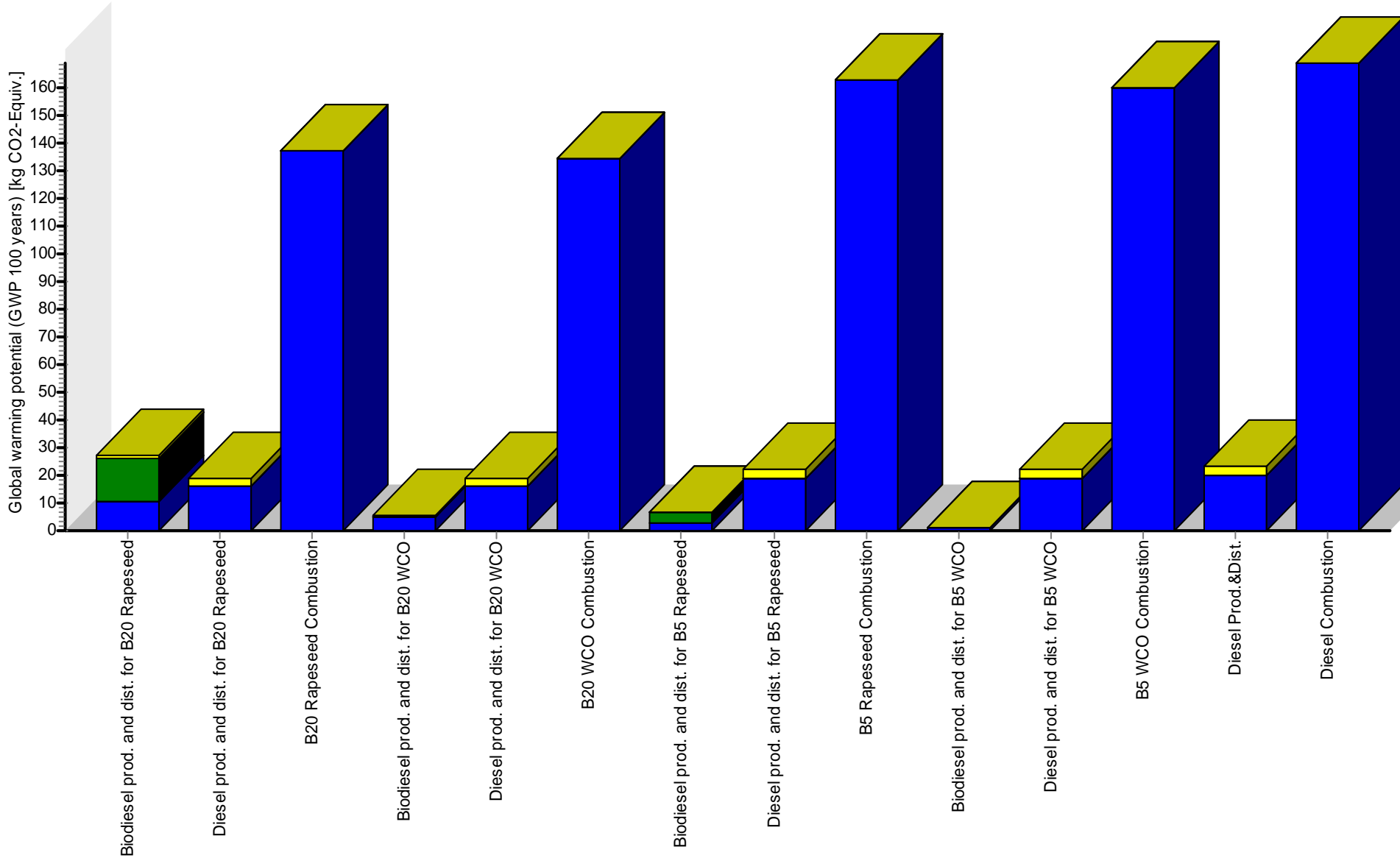
Life Cycle Impact Assessment



- Winter smog (EI 95) [kg SO2-Equiv.]
- Heavy metals (EI 95) [kg Pb-Equiv.]
- Eutrophication potential (EP) [kg Phosphate-Equiv.]
- Acidification potential (AP) [kg SO2-Equiv.]
- Photochemical oxidant potential (POCP) [kg Ethene-Equiv.]
- Global warming potential (GWP 100 years) [kg CO2-Equiv.]
- Carcinogenic substances (EI 95) [kg PAH-Equiv.]



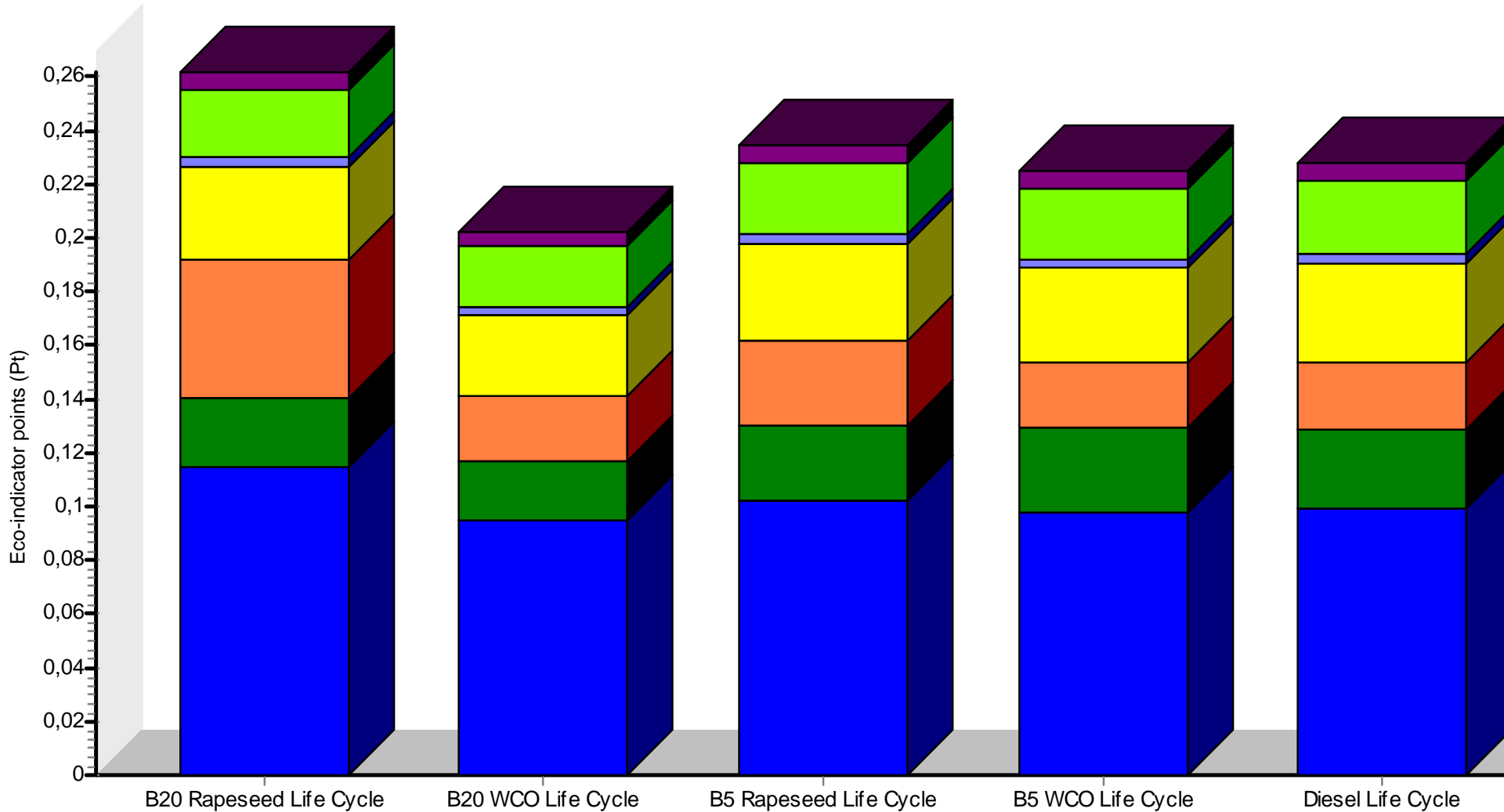
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Thank you!