



Development and application of an API for the GLEC framework and ISO 14083 with modelled road transport emissions

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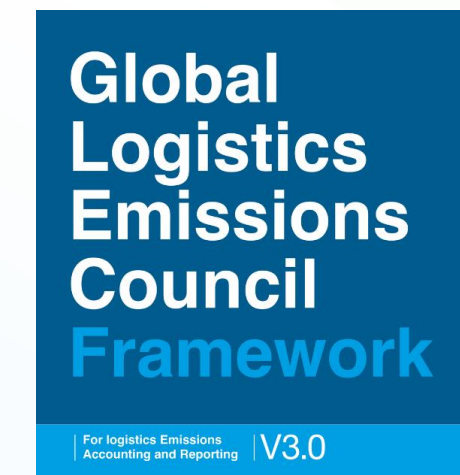
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Introduction

Transport sector is considered one of the main contributors in greenhouse emissions, while 8% of global GHG emissions are caused by Freight Transport.

- ✓ GLEC framework is the industry standard, established for calculating and reporting CO₂ equivalent emissions from logistics operations and implementation guideline of ISO 14083



Main requirements

- Transparent data collection methodology
- Reliable input data
- Harmonization with calculations described in the standard
- Data reporting

Combined in a user-friendly **API** that can be used by non-experts

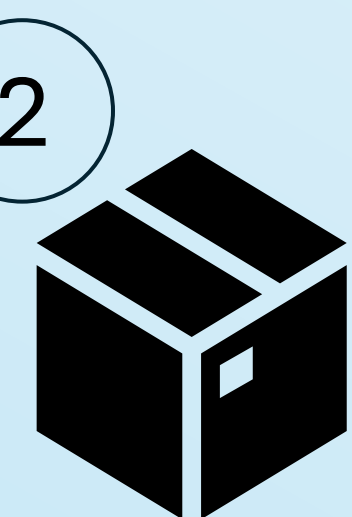
Description of the API

Compiles the calculations of GHG emissions for all transport modes and hubs, as imposed by GLEC Framework/ISO 14083 and combines them with a routing engine

User inputs:



Origin and destination for each TCE



Shipment weight

3

Energy / fuel consumed

1. Primary data
2. Modeled data
3. Default data

Data quality ↑

4

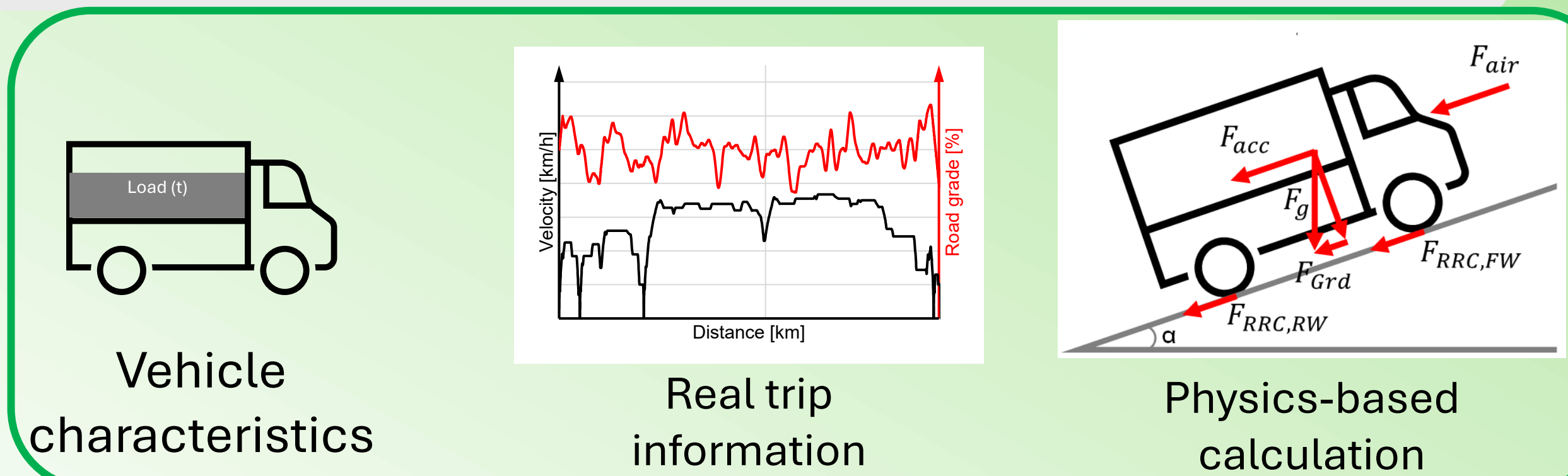
Transport Chain and TCEs

Modes covered:

- Road
- Rail
- Sea
- Inland waterways
- Air
- Logistic hubs

Modelled data for road transport

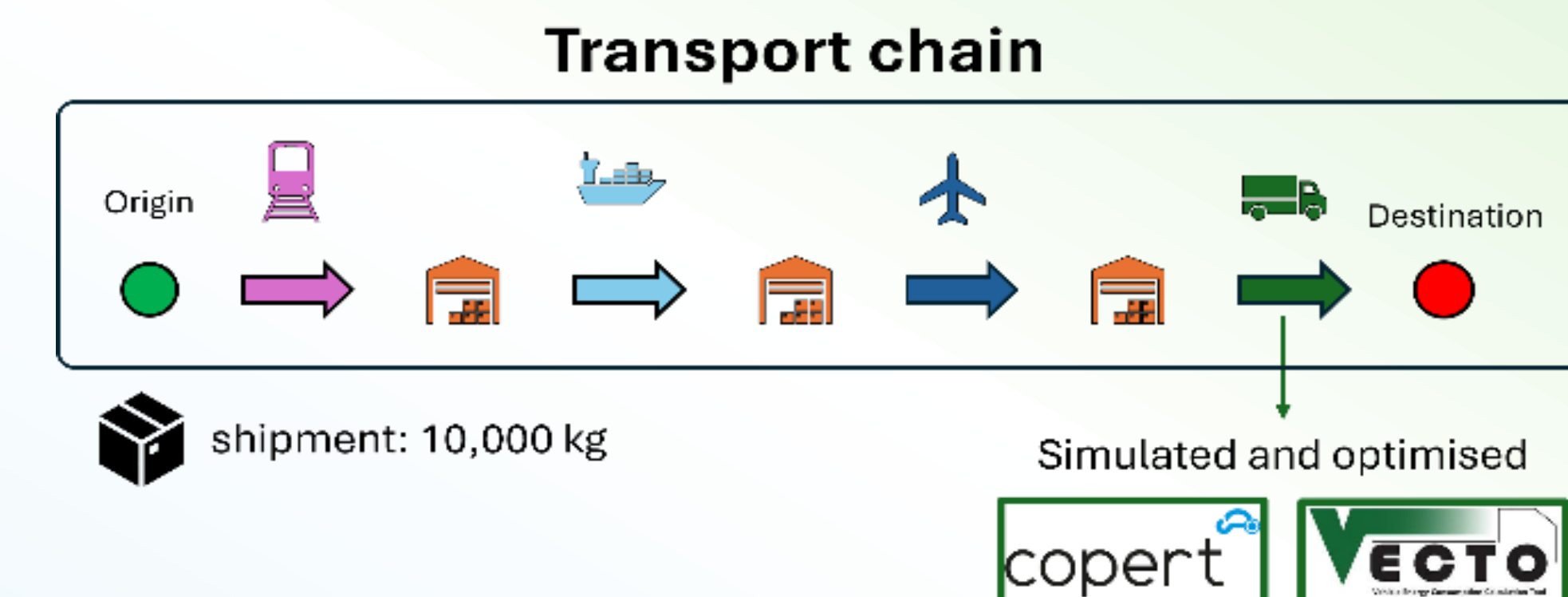
Calculation of vehicle fuel consumption under specific trips using vehicle simulation models
→ **Used in case primary energy/fuel consumption data are not available**



API output

- Visibility of carbon emissions across of all transport chains
- Automated compliant reporting with GLEC Framework/ISO 14083 provisions

API Preview



API results

CO ₂ e emissions	
148 kg	Truck
143 kg	Ship
5,570 kg	Plane
1,610 kg	Truck
39 kg	Warehouse

References

- [1] Smart Freight Centre (SFC), 2025, The GLEC Framework, <https://www.smartfreightcentre.org/en/our-programs/emissions-accounting/global-logistics-emissions-council/calculate-report-glec-framework/>
- [2] Fontaras, G., Rexeis, M., Dilara, P., Hausberger, S. et al., "The Development of a Simulation Tool for Monitoring Heavy-Duty Vehicle CO₂ Emissions and Fuel Consumption in Europe," SAE Technical Paper 2013-24-0150, 2013, <https://doi.org/10.4271/2013-24-0150>.

Acknowledgements

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