Rail statistics on energy consumption and emissions

- Data collection
- Traction energy and emission reporting
- Eco passenger
Data collection

Energy consumption and emissions

Data collected by:

- **Statistics platform**
  - ✓ General data on energy consumption (Diesel, Electricity)
  - ✓ Geographical scope: worldwide members
  - ✓ Period: since 1996

- **Energy Efficiency & CO2 Emissions** - Experts working group
  - ✓ More detailed data (energy consumption and emissions by type of service…)
  - ✓ Geographical scope: European members
  - ✓ Period: since 2005
▪ **Statistics platform**

Data collected for:

- ✓ Energy consumption by rail tractive stock
- Diesel (tonnes and Electricity, GWh at the substation)

Data provided by railway undertakings

Passenger trains / Freight trains

- ✓ Operation data: Train km and gross tonne km of trains according to
  - energy of traction (Electricity / Diesel)
  - passenger trains / freight trains
  - passenger service (short/long distance trains)

Newly introduced: energy consumption by tractive vehicles for Infrastructure maintenance
Energy Efficiency & CO2 Emissions - Experts working group

Energy consumption

✓ Electricity (GWh, at the substation) and diesel consumption (tonnes)

✓ The data refer to the final energy consumption used for train traction

✓ To move goods and passengers only
  Freight trains
  Passenger trains split by passenger service types
  local / regional, intercity, highspeed

✓ Data provided by railway undertakings only

✓ Electricity consumption at the substation
  directly provided or calculated from data given at the pantograph + losses in catenary

✓ Diesel consumption
  fuel tank logs
Operation data according to the traction energy type (Electricity / Diesel)

✓ Train-kilometres >>> passenger and freight trains

✓ Gross tonne-kilometres >>> passenger and freight trains

✓ Passenger-kilometres >>> total passenger transport services
  >>> different service types (local and regional, intercity and high-speed)

✓ Load factor of passenger transport services (total, local/regional, intercity, high speed)

✓ Net tonne-kilometres for freight transport services

Data should be consistent with the corresponding energy consumption data provided
Shunting activities are included
Empty trips are taken into account
GHG Emissions

✓ GHG emissions calculated are well-to-wheel (unit CO2-eq)

✓ Total emissions are calculated from diesel traction and from electric traction

✓ Product of two factors multiplied: quantity of fuel consumption and emission factor

✓ Emission factor are quantity of CO2-eq expressed in grams released per kWh of electricity or kg of diesel used for traction

✓ Emission factor for diesel used is given by the blend of diesel and biodiesel used

✓ Emission factor for electricity is given at market-based and location-based

✓ Market based value is provided by the company

✓ Location-based value is calculated by UIC

➢ Total CO2-eq emissions

➢ Specific CO2-eq emissions gCO2-eq/pkm and gCO2-eq/tkm
Traction energy and emission reporting

Main railway undertakings in Europe provide data
Specific energy consumption and CO2Eq emissions generally decrease since 2005 both for passenger and goods transport.

Negative impact of COVID-19 epidemic on passenger transport performance due to low load factors.

Targets for specific CO2Eq emissions:
-50% 2030 vs 2005
Carbon-free by 2050.
Eco passenger

- A calculator for comparison of the energy consumption, CO2 and exhaust atmospheric emissions of planes, cars and trains for passenger transport
- Geographical scope: Europe
- A user-friendly online tool based on a sound scientific methodology
- Fed with the most accurate and latest available data for all transport modes

Developed through cooperation between UIC, the Sustainable Development Foundation, ifeu (German Institute for Environment and Energy) and HaCon (software)

https://uic.org/sustainability/energy-efficiency-and-co2-emissions/article/ecopassenger
Resource: reports and datasets

https://uic.org/sustainability/energy-efficiency-and-co2-emissions/

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Thank you!

https://uic-stats.uic.org/select/
https://uic.org/support-activities/statistics/

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