COPERT webinar

1. COPERT main elements

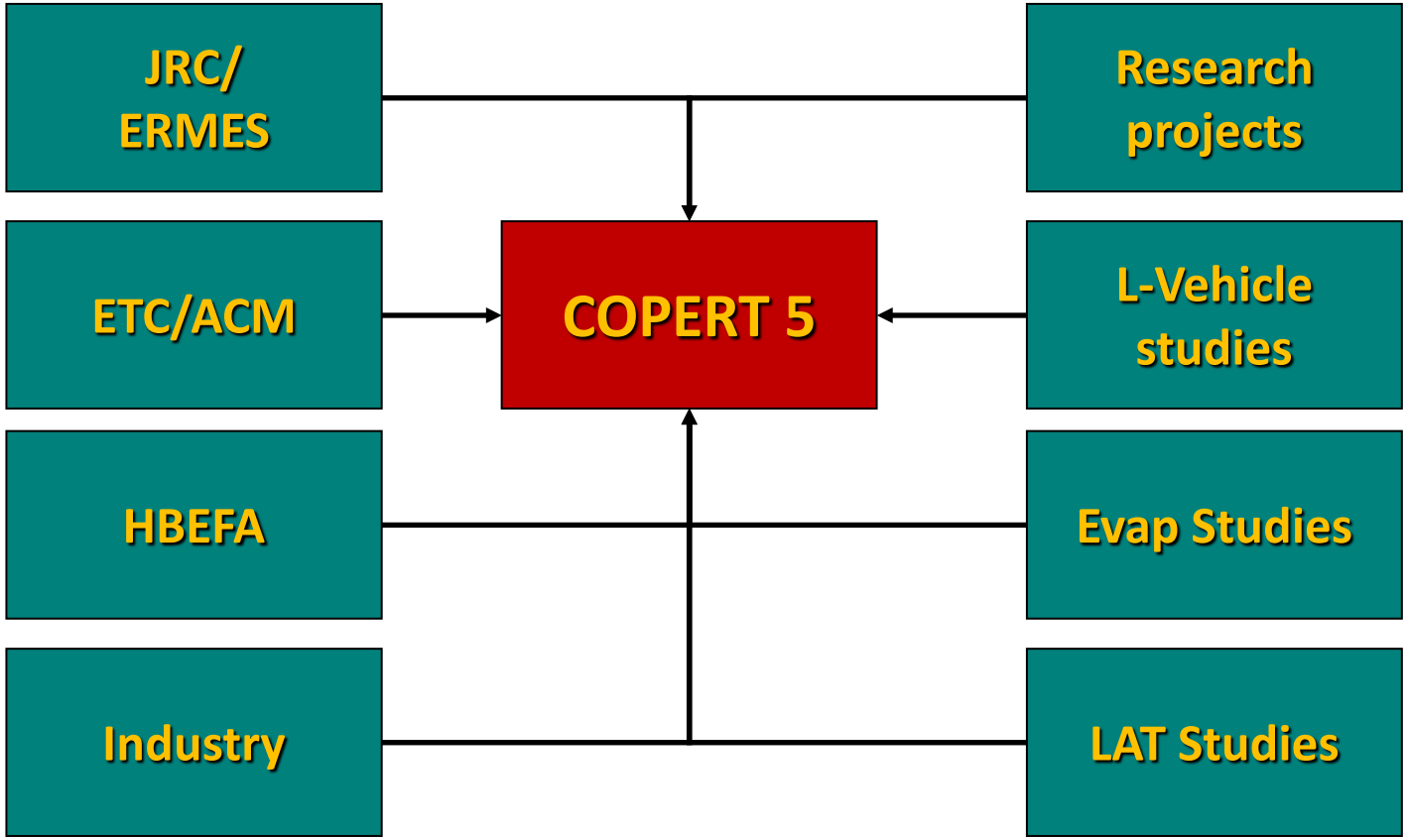
Administrative status

- The name stands for **CO**mputer **P**rogramme to calculate **E**missions from **R**oad **T**ransport
- Now in its COPERT 5 Version (fifth update of the original COPERT 85)
- It incorporates results of several technology, research, and policy assessment projects
- It is continuously supported by the European Environment Agency through consecutive ETC budgets
- It has recently attracted much attention from the Joint Research Centre in Ispra who are further supporting its technical development through the ERMES consortium
- It is scientifically and technically supported by Emisia and the Lab of Applied Thermodynamics

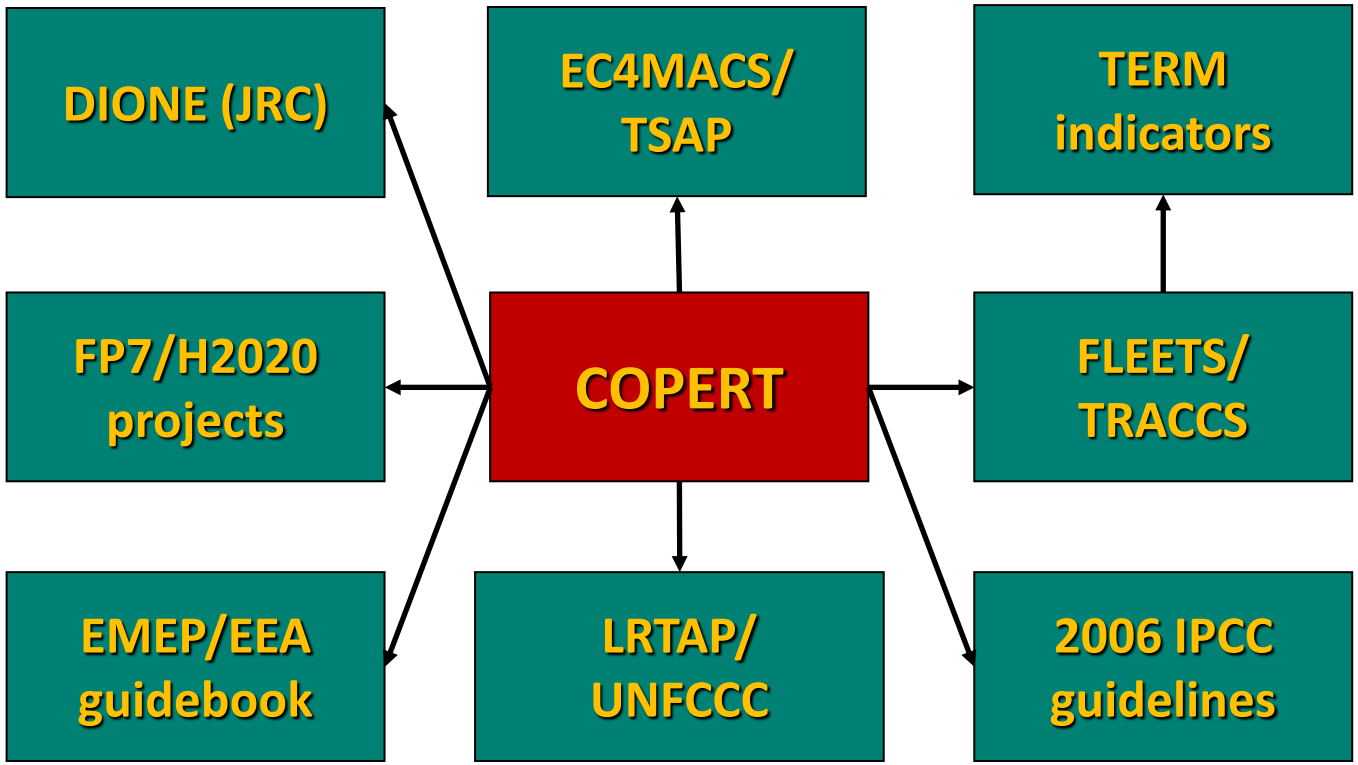
Technical status

- Calculates emissions of all (important) pollutants from road transport
- Covers all (important) vehicle classes
- Can be applied in all European countries, in Asia, S. America and Oceania
- Can be used to produce total emission estimates from 1970 to 2050
- Provides a user-friendly (MS-Office like) GUI to introduce, view, and export data
- Can be downloaded from https://www.emisia.com/utilities/copert/

COPERT inputs



COPERT usage



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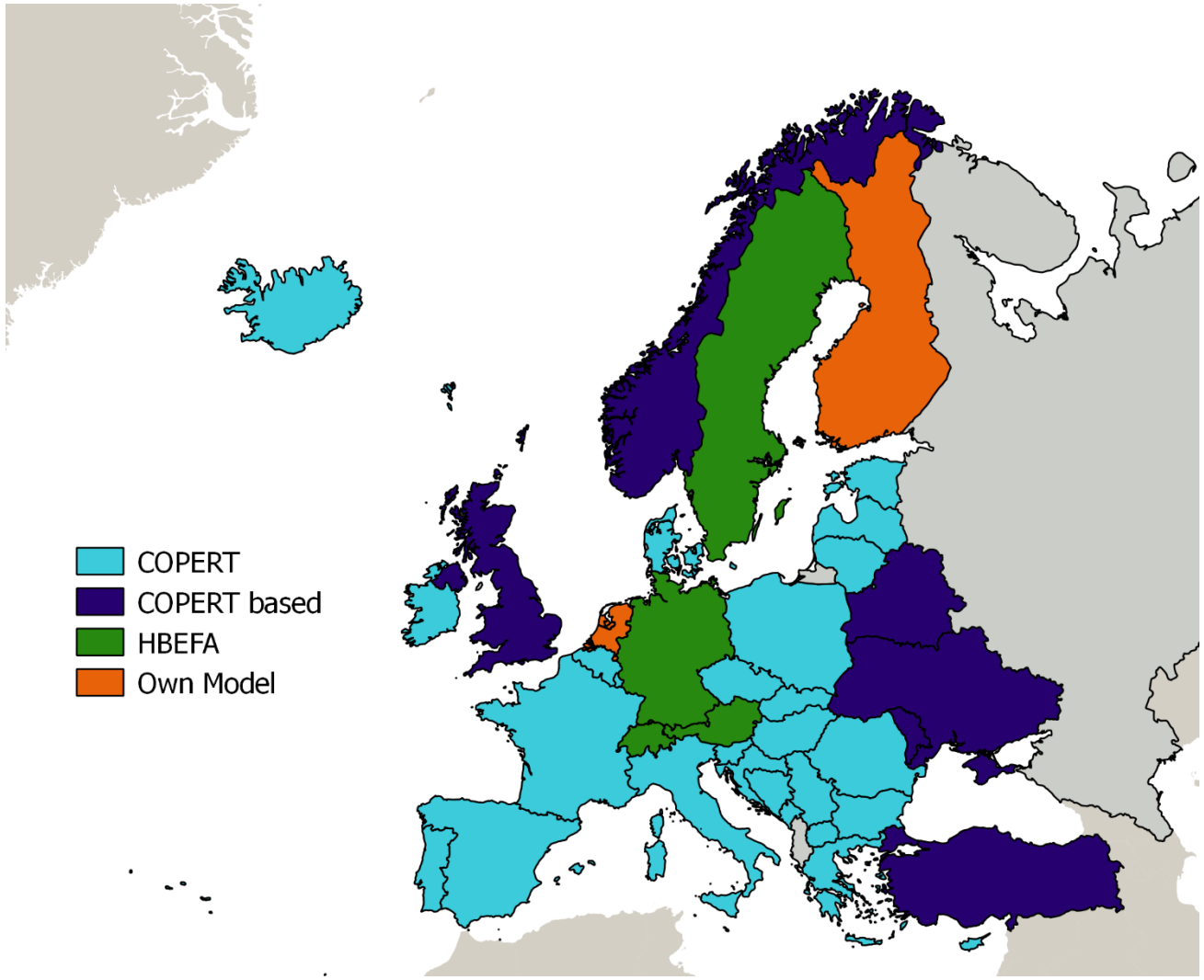
COPERT 5

- Available for download since 30 Sep 2016
- COPERT 4 not supported any longer
- Major software and methodological updates based on:
  - user requests
  - improvements in software development technology
  - new vehicle types
  - fuel/energy consumption calculation requirements

Vehicle emission model usage in Europe



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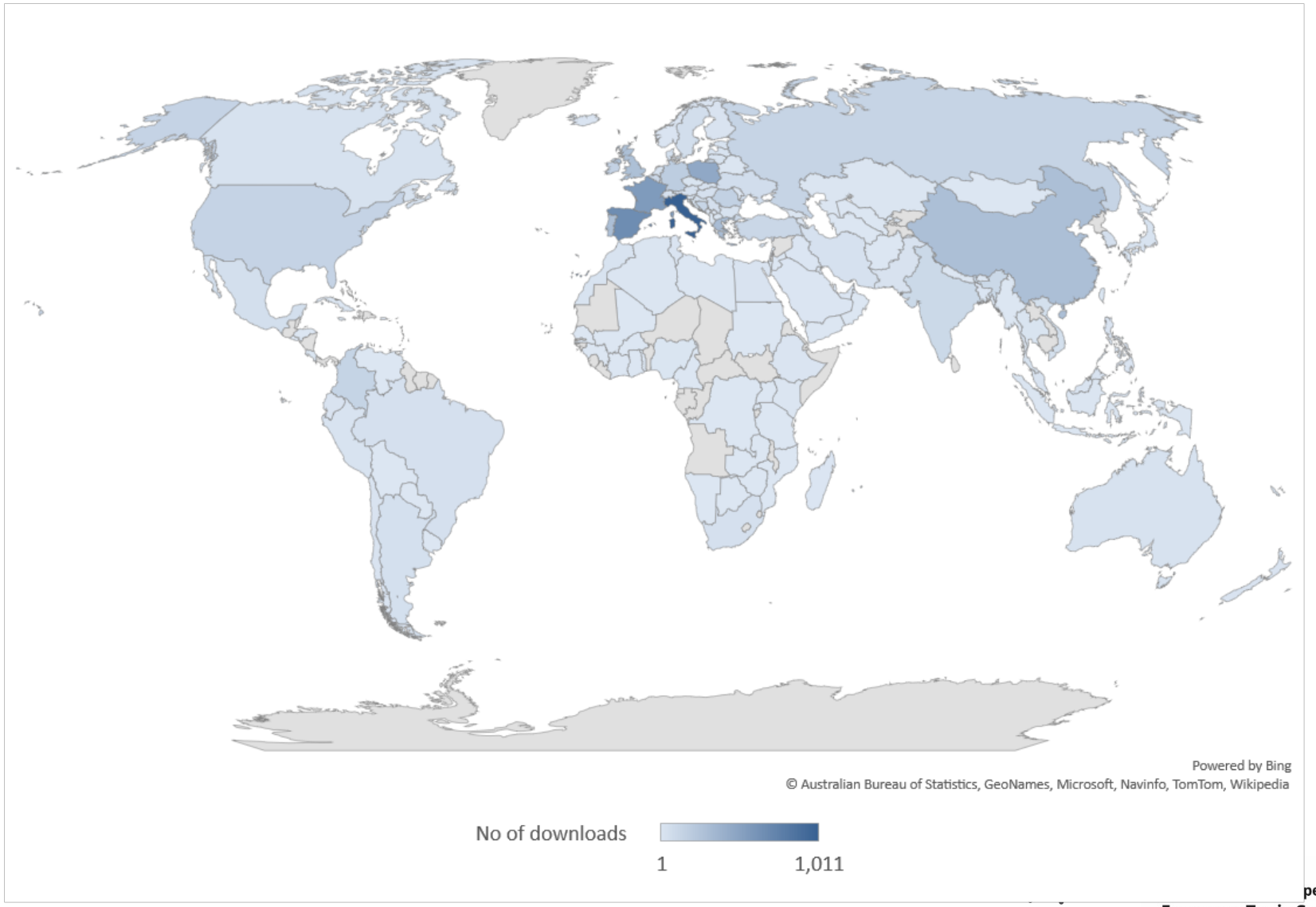
COPERT downloads around the world



Statistics from 2012 to 2020

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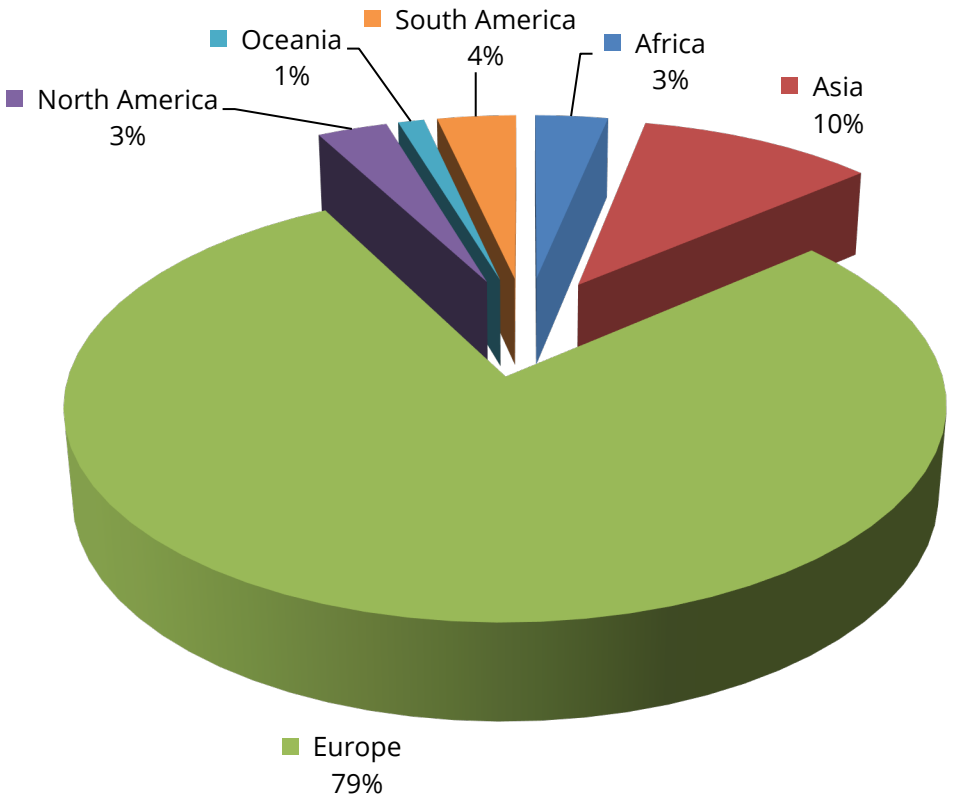
Users: Continent Distribution



Based on ~800 unique downloads/year

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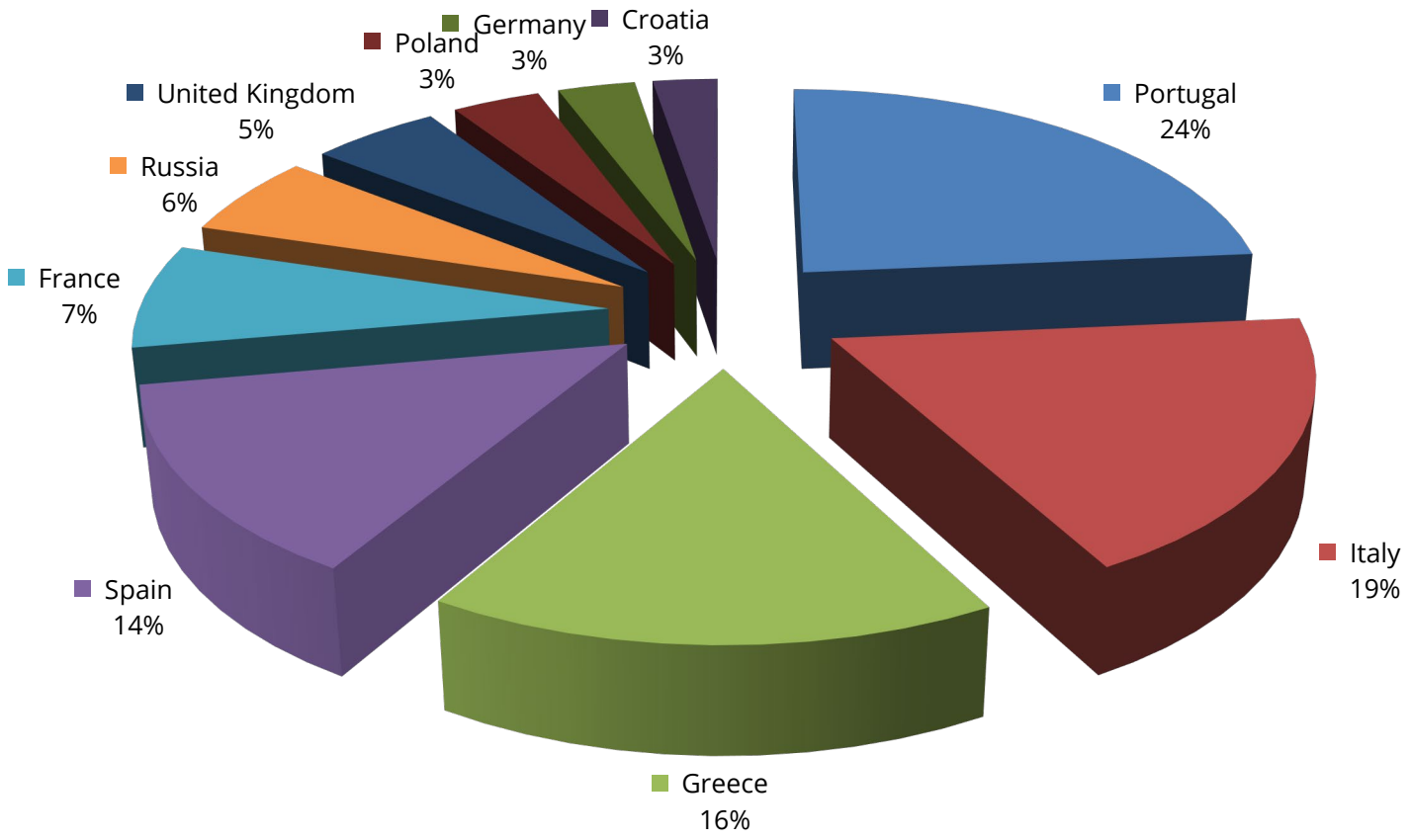
Distribution of users from Europe



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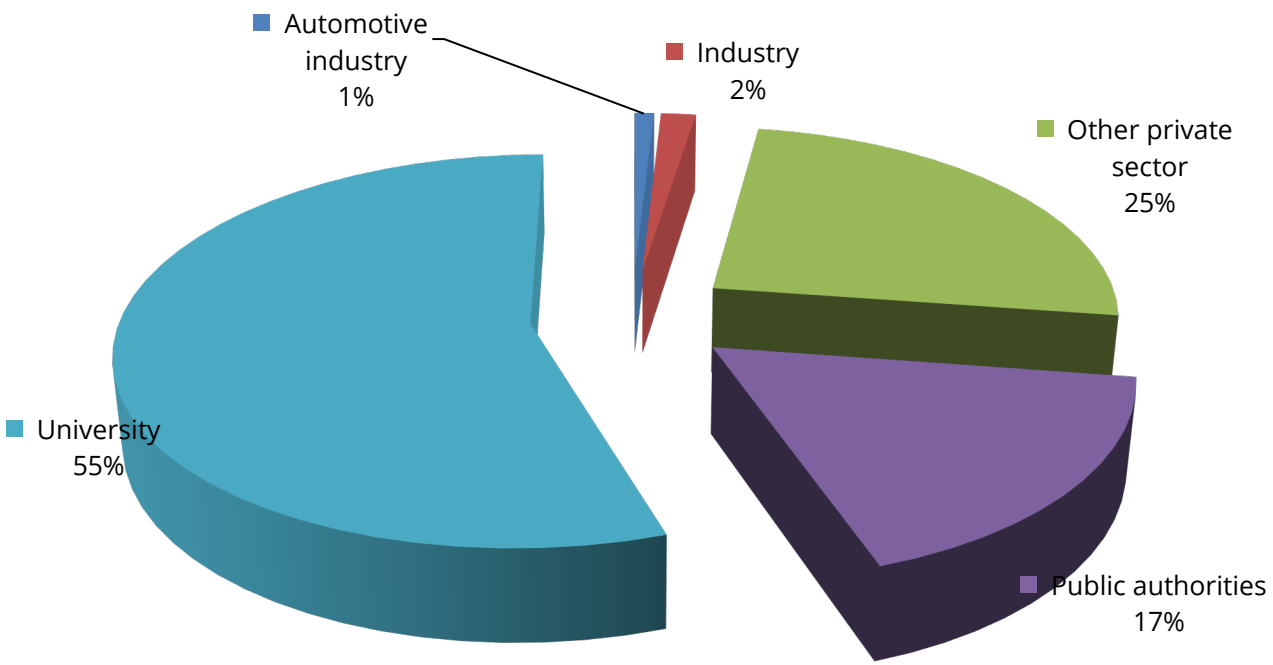
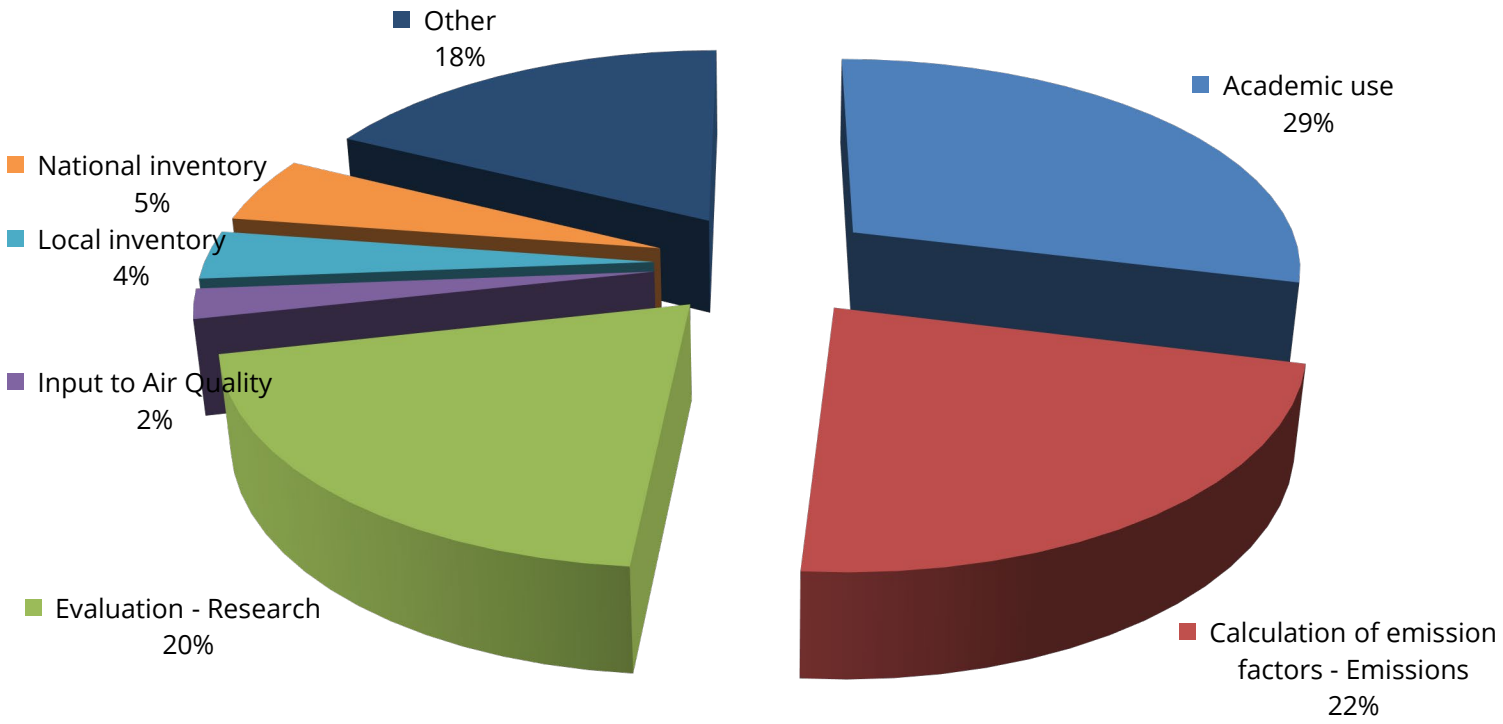
User Affiliation



- Private sector includes consultants, construction companies, emission and transport research, etc.
- International organizations include fuel, insurance and transport companies and authorities
- Local authorities mainly include regional environmental offices

Applications



- Academic use is for lectures, courses, theses
- Evaluation / research : General application not specified in more detail by the users
- Emissions / emission factors: Application on particular studies necessitating total estimates or just derivation of emission factors

Summary of COPERT application

- There is a great interest for the new emission factors
- There is a great interest for GHGs emissions
- Some new MSs and neighboring countries still consider that input data are difficult to collect
  - How to allocate technology classes
  - How to estimate mileage and road shares
  - Sometimes use “rule of thumb” methods of questionable quality
- Several “advanced” countries hesitate using a common methodology
  - Have developed own tools and are familiar with
  - Trust own methods provide more accurate results than a more international model
  - Politics and priorities may also play a role

Individual applications

- Air quality and impact assessments
- Projections (energy, CO_2 emissions, air pollutants)
- Urban/regional inventories
- New road (road section) construction
- Airports (ground traffic)
- Captive fleets (refuse trucks, private fleets, taxis)
- Optimisation of loading capacity of HDVs

Scientific literature (1/2)

Evaluation of COPERT

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Ioannis Kioutsioukis, Stefano Tarantola, Andrea Saltelli, Debora Gatelli, Uncertainty and global sensitivity analysis of road transport emission estimates, Atmospheric Environment, Volume 38, Contains Special Issue section on Measuring the composition of Particulate Matter in the EU, December 2004, Pages 6609-6620.

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M. Pujadas, L. Nunez, J. Plaza, J. C. Bezares, J. M. Fernandez, Comparison between experimental and calculated vehicle idle emission factors for Madrid fleet, Science of The Total Environment, Volumes 334-335, Highway and Urban Pollution, December 2004, Pages 133-140.

R. Smit, A.L. Brown, Y.C. Chan, Do air pollution emissions and fuel consumption models for roadways include the effects of congestion in the roadway traffic flow?, Environmental Modelling & Software, Volume 23, October-November 2008, Pages 1262-1270.

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Morten Winther, Petrol passenger car emissions calculated with different emission models, The Science of The Total Environment, Volume 224, Issues 1-3, 11 December 1998, Pages 149-160.

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Hao Cai, Shaodong Xie, Estimation of vehicular emission inventories in China from 1980 to 2005, Atmospheric Environment, Volume 41, December 2007, Pages 8963-8979.

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R. Bellasio, R. Bianconi, G. Corda, P. Cucca, Emission inventory for the road transport sector in Sardinia (Italy), Atmospheric Environment, Volume 41, February 2007, Pages 677-691.

Pavlos Kassomenos, Spyros Karakitsios, Costas Papaloukas, Estimation of daily traffic emissions in a South-European urban agglomeration during a workday. Evaluation of several 'what if' scenarios, Science of The Total Environment, Volume 370, November 2006, Pages 480-490.

G. Lonati, M. Giugliano, S. Cernuschi, The role of traffic emissions from weekends' and weekdays' fine PM data in Milan, Atmospheric Environment, Volume 40, Issue 31, 13th International Symposium on Transport and Air Pollution (TAP-2004), October 2006, Pages 5998-6011.

R. Berkowicz, M. Winther, M. Ketzel, Traffic pollution modelling and emission data, Environmental Modelling & Software, Volume 21, Issue 4.

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COPERT spin-offs

- Estimates emissions from on-road vehicles in Australia
- Developed in collaboration with Queensland Government
- Official method in National Pollutant Inventory (NPI)
- Commercially available

- Includes historic and projected stock and activity data
- Delivers alternative scenarios for energy and emissions
- Includes advanced technologies and mobility patterns
- Commercially available

Thank you for your attention!