COPERT Training

7. Energy Balance

Automated energy balance (1/3)

- In COPERT 4 by providing statistical fuel consumption and performing a fuel balance CO_2 and fuel consumption dependant emissions were corrected accordingly
- COPERT 5 compares statistical and calculated energy consumption, modifies a number of input data (eg mileage, blend share) and recalculates emissions

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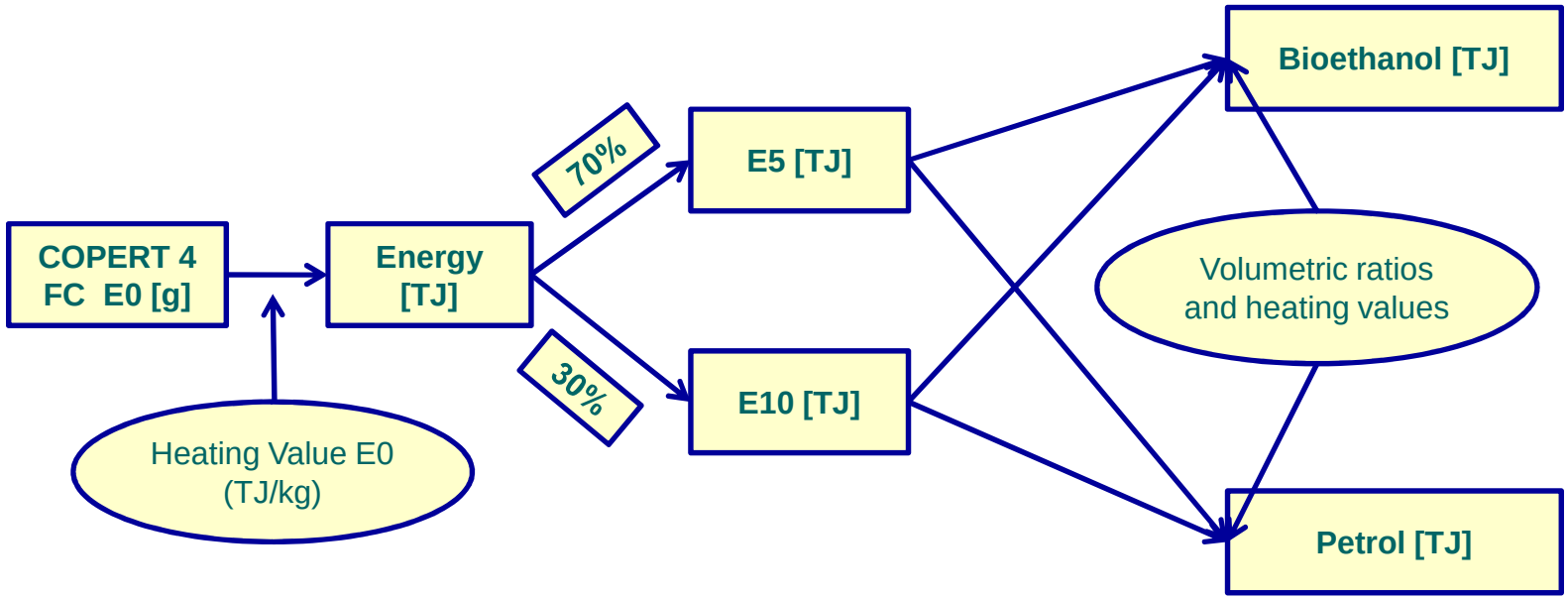
Automated energy balance (2/3)

- Assumptions
  - Fuel consumption calculated with COPERT 4 functions comes from 100% fossil fuel
  - Vehicle **efficiency does not** depend on fuel blend used (i.e. specific energy consumption independent of fuel blend)
  - Fossil / Renewable statistical **ratio** per fuel type will also hold for the calculated consumption

Automated energy balance (3/3)

- Adjustments
  1. Blends energy share (e.g. 70/30 -> 72/28)
  2. Blending ratio (e.g. E5 -> E4.5)
  3. Mileage adjusted so that calculated energy per fuel type matches statistical energy per fuel type
- Finally:
  - Energy and pollutant emission based on the new mileage (and blends)

Energy allocation: From end to primary fuels



COPERT 4 original fuel consumption functions [g/km] converted to [GJ/km] by user specific heating values [TJ/kg]

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Algorithm for adjustments of bio/fossil

- Ratio of sold (biofuel/fossil) fuel energy has to be respected by calculated consumption

- Algorithm steps:
  1. The blend energy share reported by the user first modified

if not enough

  2. The blending ratio modified

until solution is found

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Last step of energy balance

Once bio/fossil ratio adjusted, mileage is adjusted to match total energy consumption:

$$MCF_i = \frac{Energy\_sold_i}{Energy\_calculated_i}$$

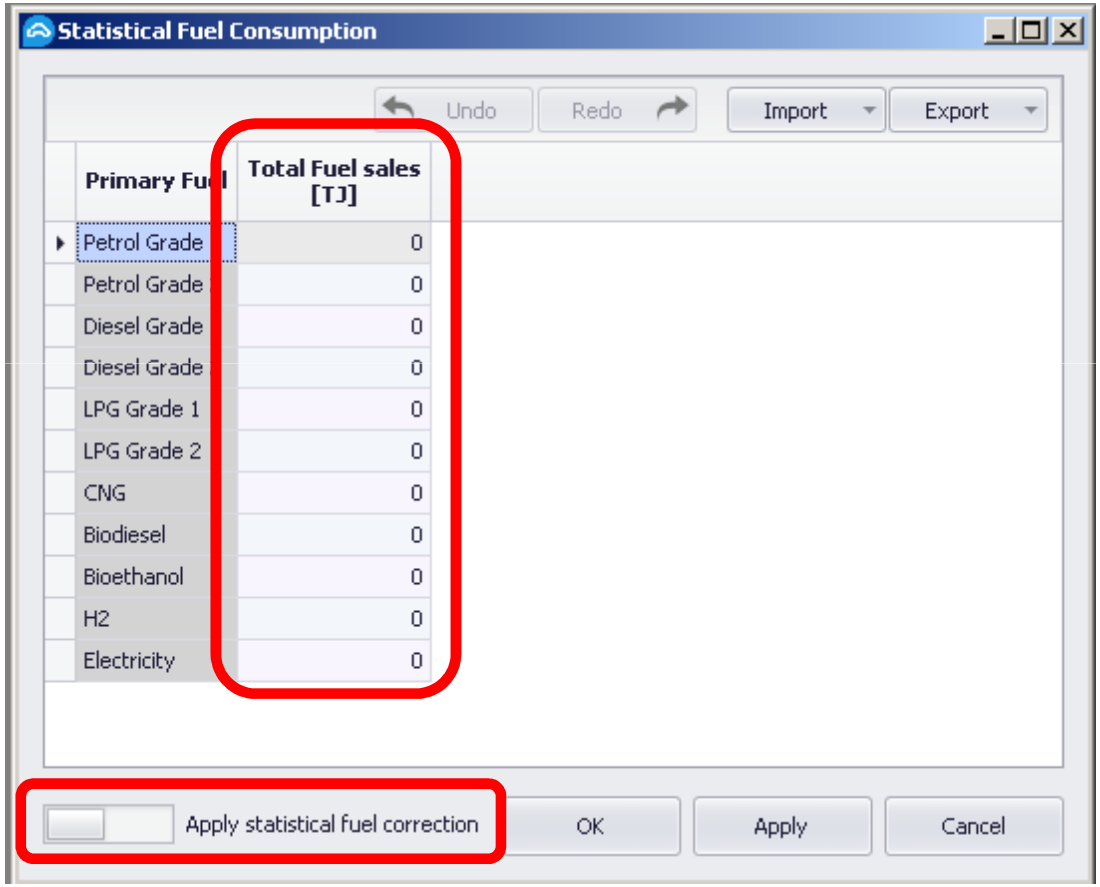
$$NewMileage_j = MCF_i \cdot Mileage_j$$

where

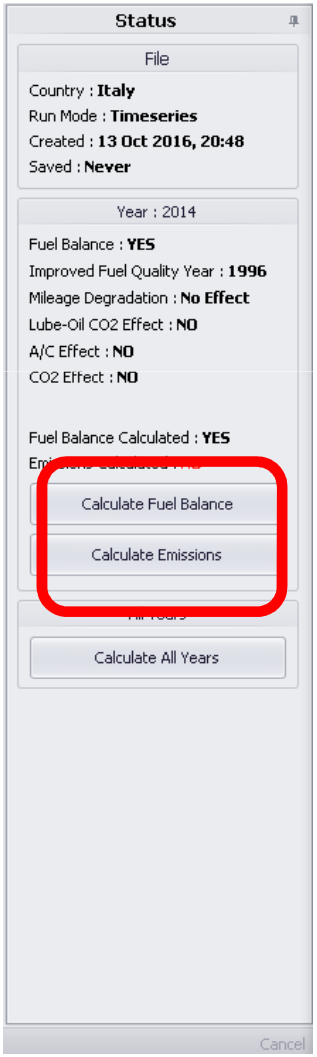
i is either petrol or diesel

j individual vehicle type

Related forms in COPERT 5 (1/4)



Related forms in COPERT 5 (2/4)



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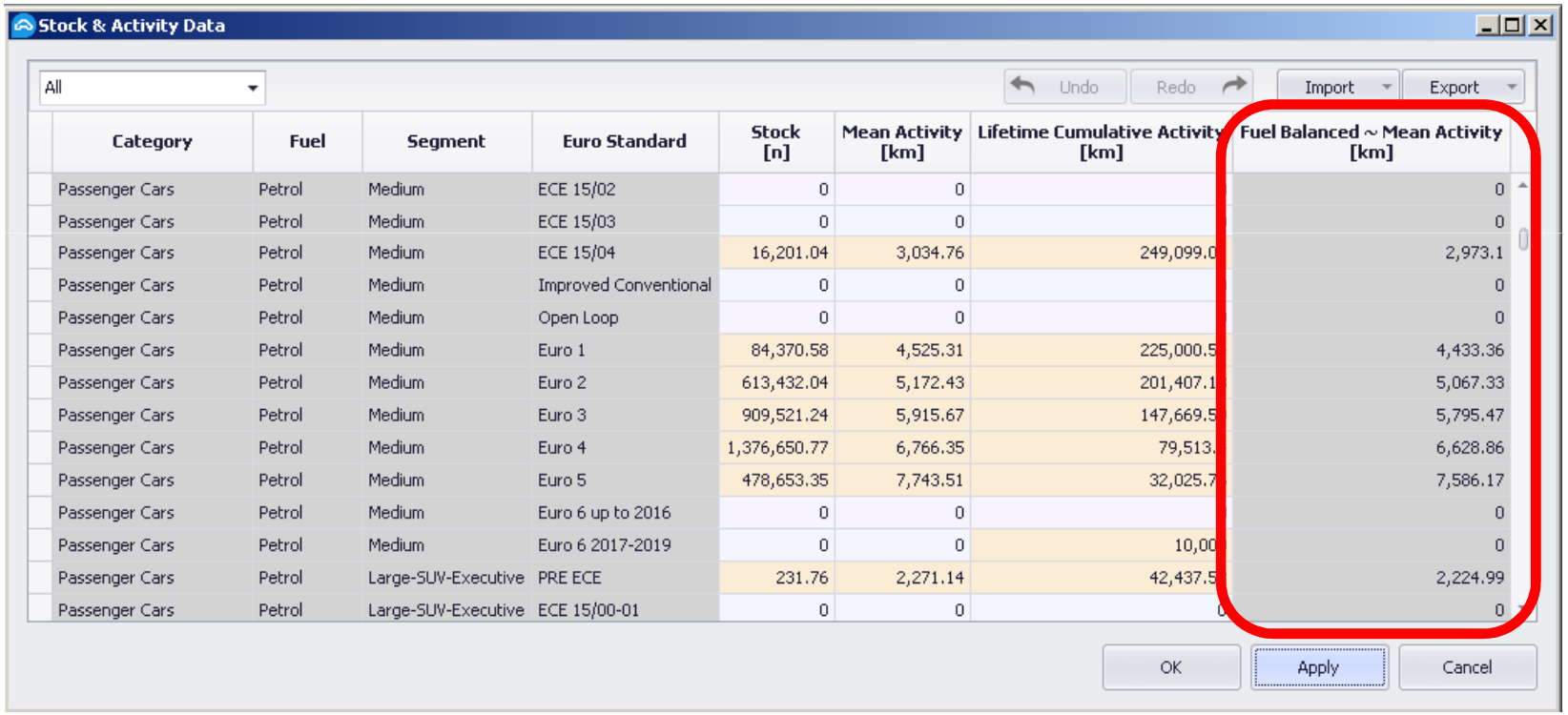
Related forms in COPERT 5 (3/4)



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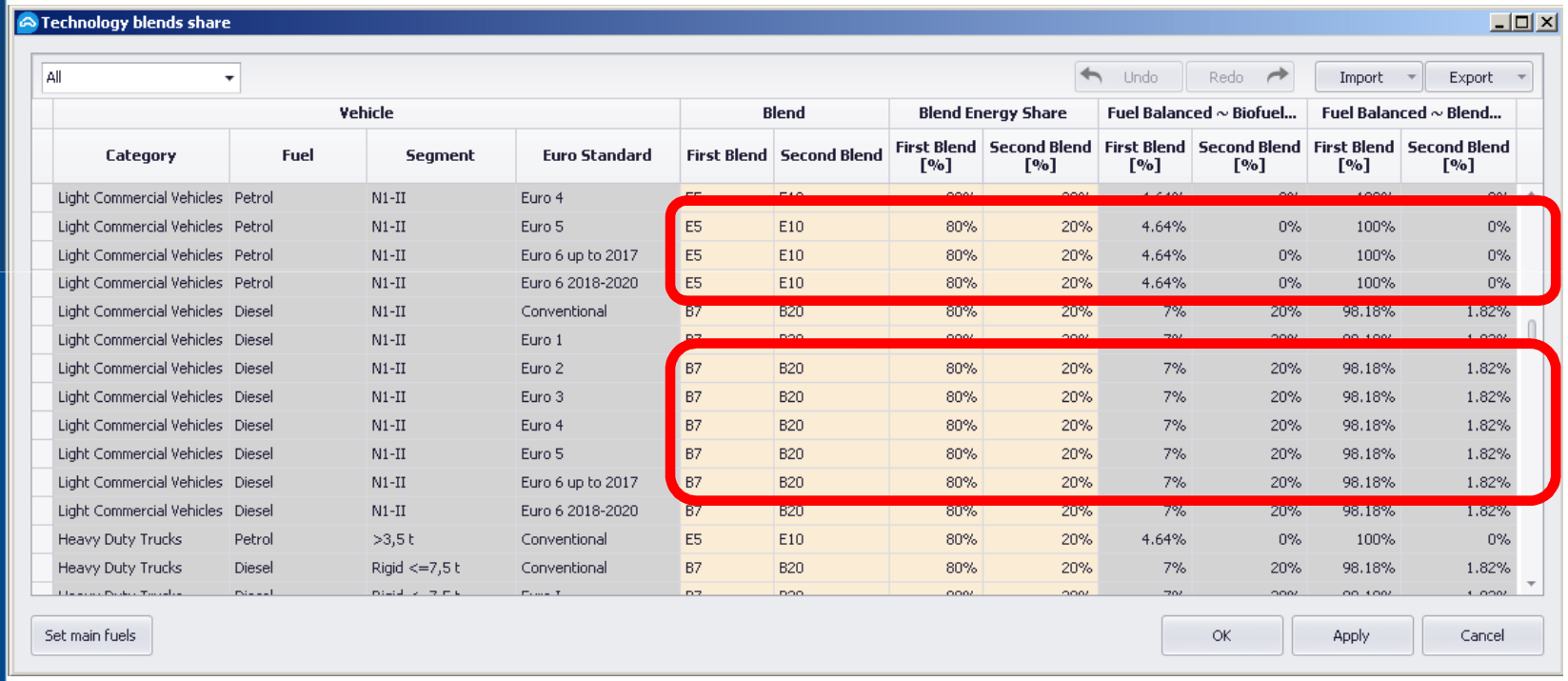
Related forms in COPERT 5 (4/5)



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Thank you for your attention!

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