Equations

CBA methodology in the Slovak Republic

$$AFC\ M_i = AFC\ V_i * DF_i = AVFC_i * DTV_j * DF_i \quad \text{(S1)}$$

Where:

$AFC\ M_i$ is the amount of fuel consumed in mass units,
$AFC\ V_i$ is the amount of fuel consumed in volume units,
DF_i is the density of fuel,
$AVFC_i$ is the average fuel consumption,
DTV_j is the distance travelled by vehicle j.

$$AGHG\ RT_i = AFC\ M_i * EF\ GHG_{ik} \quad \text{(S2)}$$

Where:

$AGHG\ RT_i$ is the amount of greenhouse gas from road transport I,
$EF\ GHG_{ik}$ is the emission factor of the i-th type of fuel of the k-th type of GHG.

$$AGHG\ RT_{ik} = AFC\ M_i * EF\ GHG_{ik} = AVFC_i * DTV_j * DF_i * EF\ GHG_{ik} \quad \text{(S3)}$$

$$CGHG\ RT_{ik} = AGHG\ RT_{ik} * UCGHG\ RT_{ik} \quad \text{(S4)}$$

Where:

$CGHG\ RT_{ik}$ is the cost of the kth type of greenhouse gas from the consumption of the i-th type of road transport fuel,
$UCGHG\ RT_{ik}$ is the unit cost of the kth type of greenhouse gas from the consumption of the i-th type of fuel in road transport.

$$CGHG\ RT_{ik} = MGHG\ RT_{ik} * UCGHG\ RT_{ik} = AVFC_i * DTV_j * DF_i * EF\ GHG_{ik} * UCGHG\ RT_{ik} \quad \text{(S5)}$$

CBA methodology in Hungary

$$The\ cost\ of\ greenhouse\ gas\ emissions = A_{GHG} * P_{GHG} \quad \text{(S6)}$$

A_{GHG} is the change in the amount of greenhouse gas emissions caused by the project in CO_2 equivalent (ton CO_2e),
P_{GHG} is shadow price of CO_2 equivalent (HUF/ton CO_2e).

$$A\ CO_2e\ RT = EF\ CO_2\ e\ Vi * DTV_j \quad \text{(S7)}$$

Where:

$EF\ CO_2\ e\ Vi$ is the emission factor of the i-th fuel type,
DTV_j is the distance travelled by the j-th vehicle category.

CBA methodology in Austria

$$C\ CO_2RT = A\ CO_2RT * UC\ CO_2RT = A\ FC * EF\ CO_2 * UC\ CO_2RT \quad \text{(S8)}$$

Where:

$C\ CO_2RT$ is the greenhouse gas cost of road transport fuel consumption (€),
$A\ CO_2RT$ is the amount of CO_2 emissions produced from road transport (tonnes of CO_2)
$UC\ CO_2RT$ is the unit cost per tonne of CO_2 production from road transport (euro/1 tonne CO_2),
$A\ FC$ is the amount of fuel consumed in road transport (tonnes),
$EF\ CO_2$ is the CO_2 emission factor (3.15 t CO_2/1 t fuel).

$$CGHG\ RT_{\square} = AGHG\ RT_{\square} * UCGHG\ RT_{\square} \quad \text{(S9)}$$

Where:

$CGHG\ RT_{\square}$	is the cost of greenhouse gases from road transport (CZK),
$AGHG\ RT_{\square}$	is the amount of greenhouse gases from road transport (tones),
$UCGHG\ RT_{\square}$	is the unit cost of greenhouse gases from road transport (CZK/ton).

$$CGHG\ RT_i = CGHG\ HGV_i + CGHG\ LDV_{i\square} \quad \text{(S10)}$$

$$CGHG\ RT_i = (AGHG\ HGV_i * UCGHG\ HGV_i) + (AGHG\ LDV_i * UCGHG\ LDV_i)$$

$$CGHG\ RT_i = (EF\ GHG\ HDV_i * P\ HDV * UCGHG\ HDV_i) + (EF\ GHG\ LDV_i * P\ LDV * UCGHG\ LDV_i)$$

Where:

$CGHG\ HGV$	is the cost of the kth type of greenhouse gas from the use of heavy goods vehicles
$CGHG\ LDV_i$	is the cost of the kth type of greenhouse gas from the use of light-duty vehicles,
$AGHG\ HGV$	is the amount of the kth type of greenhouse gas from the use of heavy goods vehicles,
$AGHG\ LDV$	is the amount of the kth type of greenhouse gas from the use of light-duty vehicles,
$UCGHG\ HGV_i$	is the unit cost of the kth type of greenhouse gas for heavy-duty vehicles,
$UCGHG\ LDV$	is the unit cost of the kth type of greenhouse gas for light-duty vehicles,
$EF\ GHG\ HDV$	is the emission factor of the kth type of greenhouse gas for heavy-duty vehicles,
$EF\ GHG\ LDV$	is the emission factor of the kth type of greenhouse gas for light-duty vehicles,
P HDV	is the driving performance of heavy-duty vehicles,
P LDV	is the driving performance of light- duty vehicles,
i	is the type of greenhouse gas emissions, GHG includes CO_2, N_2O a CH_4.

"Notes relating to Table 7:

1. For the calculation, a capacity of 450 seats for long-distance, 240 for regional electric and 120 for regional diesel trains (units) was considered, which well describes the general situation on the Czech railway network and the most widespread use of type vehicles and units according to traction. If it is necessary to compare electric and diesel traction in a specific economic evaluation, it is necessary to consider comparable capacities in regional transport, i.e. e.g. to divide the emission factor for regional electric trains by two or to work in units of "gCO_2/seatkm".

2. In justified specific cases, a more detailed breakdown can be used, e.g. in road passenger transport to consider the share of electric and hybrid propulsion (as per Annex 1 of the EIB Project Carbon Footprint Methodologies).

3. In case a specific calculation of energy intensity must be used, e.g. in rail transport (high-speed operation with electric traction), the emission value valid for the Czech Republic considering the current energy mix (year 2022) is 461 gCO_2/kWh. Any individual calculation that works with rates other than the above-mentioned rates has to be specifically documented in detail."

„Notes relating to Table 8:

1. For an average freight train, a loading of 516 t was considered (including a balanced mix of different train types). In specific cases where the assumed load is significantly different from the above, an individual recalculation of the emission factor should be carried out considering the actual load.

2. In justified specific cases, a more detailed breakdown (according to Annex 1 of the EIB Project Carbon Footprint Methodologies) may also be used.

3. In case ***a specific calculation of energy intensity*** *must be used, e.g. for rail transport, the emission value applicable for the Czech Republic considering the current energy mix* ***(year 2022) is 461 gCO_2/kWh. Any individual calculation that works with rates other than the above-mentioned rates must be specifically documented in detail.".***

"For road infrastructure projects, both passenger and freight transport are expected to quantify the amount of individual pollutants using the EXNAD tool."