Calculation of carbon neutrality

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Steps

1. Calculation of carbon dioxide production
2. Carbon Sequestration by a tree
3. Determination of necessary number of trees

CALCULATION OF CARBON DIOXIDE PRODUCTION

- Each journey is consists of several legs
- Each of legs differ by mode of transport and the length

Emission factor by mode of transport

mode of transport	emission factor (kg / passengerkm)
Air	0,2800[2]
Car[1]	0,1640[3]
Bus	0,0449[4]
Train	0,0400[5]
Bicycle	0,0041[6]

1estimated for occupancy by single person (emission factor should be adjusted in the case of higher occupancy).
2 www.atmosfair.de
3 2,4 kg CO2 / liter of fuel => 6,8 liters of gasoline or 6,2 liters of diesel per 100 kms (EC,2005)
4 GEMIS – bus EURO III, consumption 37 liters / 100 km; occupancy 30 persons
5 GEMIS - electric passenger train
6 GEMIS

CARBON DIOXIDE PRODUCTION

Carbon dioxide production *P* for leg *x* of journey is:

$$P_x = f_x * l_x$$

where: fx = emission factor for transport mode of leg *x*
lx = length of leg *x*

Overall carbon dioxide footprint for the whole return journey is:

$$\text{PRODUCTION } (CO_2) = 2 * \text{SUM } (P_x)$$

CARBON SEQUESTRATION BY A TREE

This method is appropriate only for calculating carbon sequestration by:

- individual (“open grown”) trees,
- such as trees typically planted along streets
- do not use it for calculating carbon sequestration by densely raised trees.

1. Each of tree species is included into categories according to tree type (hardwood/coniferous) and growth rate (slow/moderate/fast).
2. The survival factor ***S*** (% of trees estimated to survive till given age) is given for each of growth rate category.
3. Annual Sequestration Rate ***R*** for each tree age and plant type/growth rate is given as well.

CARBON SEQUESTRATION BY A TREE

The amount of Carbon (C) supposed to be sequestrated (*J*) by a tree in age *n* is:

$$J_n = S_n * R_n$$

The amount of C supposed to be sequestrated by tree during its life-time (projected 60 years):

$$J = SUM\ (J_n)$$

Conversion of C to CO_2:

$$AMOUNT(CO_2) = J * 3.67$$

DETERMINATION OF NECESSARY NUMBER OF TREES

NUMBER OF TREES = PRODUCTION (CO_2) / AMOUNT(CO_2)

Our estimation for the Workshop

Tree: Linden, little-leaf, (*Tilia cordata*)

Number: 14

More information: www.cyklostrategie.cz

THANK YOU

FOR ATTENTION

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