2.20 Estimated carbon emissions from vehicle traffic

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Author/s and affiliations: Laura Wendling[1], Ville Rinta-Hiiro[1], Maria Dubovik[1], Arto Laikari[1], Johannes Jermakka[1], Zarrin Fatima[1], Malin zu-Castell Rüdenhausen[1], Ana Ascenso[2], Silvia Coelho[2], Ana Isabel Miranda[2], Peter Roebeling[2], Ricardo Martins[2], Rita Mendonça[2]

[1] *VTT Technical Research Centre Ltd, P.O. Box 1000 FI-02044 VTT, Finland*

[2] *CESAM – Department of Environment and Planning, University of Aveiro, Campus Universitário de Santiago, 3810-193 Aveiro, Portugal*

CO_2 emissions related to vehicle traffic	Climate Resilience
Description and justification	Vehicle traffic emissions are the fraction of greenhouse gas (GHG) emissions that can be affected by nature-based solutions in the urban environment.
Definition	CO_2 emissions related to vehicle traffic (t C/y)
Strengths and weaknesses	+ Straightforward assessment of vehicle-related GHG emissions - Requires suitable data source for estimating fuel consumption
Measurement procedure and tool	1. Suitable available data source measuring the kilometre per person transport in the area should be identified, preferentially giving estimates of consumption of gasoline, diesel, ethanol and natural gas, the most common fuels used in car and rail transport (IPCC, 2006; Toledo & Rovere, 2018). 2. These consumed fuels, as well as potential consumed electricity by electrified rail systems, are converted to emission using emission factors for different fuels. Preferred method is to locate country specific net-calorific-values and CO_2-emission factors, when available, but general default values are presented (IPCC, 2006). 3. CO_2 emissions related to vehicle traffic are calculated as follows: $$Emissions_{traffic} = Estimated\ use\ of\ fuel\ (t) \times Emission\ factor\ (t\ CO_2/t)$$ $$Decrease\ (\%) = 100\% - \left(\left(\frac{Emission_{traffic\ (after)}}{Emission_{traffic\ (before)}}\right) \times 100\%\right)$$ Emission factors for fuels, adapted from IPCC 2006 Guidelines Vol 2. Tables 1.2 & 1.4. (IPCC, 2006):

	Petrol	Diesel	Ethanol	Natural gas

	t CO_2 / t fuel	3.07	3.19	1.91	2.69
Scale of measurement	District scale				
Data source					
Required data	Fuel consumption data or travel distance data. In a community-scale study, only travel distance represented by amount of traffic measurements are seen feasible.				
Data input type	Quantitative				
Data collection frequency	Annually; at minimum, before and after NBS implementation				
Level of expertise required	Low – requires ability to follow the calculation procedure				
Synergies with other indicators	Possibility to combine with *CO_2 emissions related to building energy consumption* indicator to obtain the total decrease due to NBS implementation				
Connection with SDGs	SDG 11 Sustainable cities and communities, SDG 13 Climate action				
Opportunities for participatory data collection	No opportunities identified				
Additional information					
References	Intergovernmental Panel on Climate Change (IPCC). (2006). 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Prepared by the National Greenhouse Gas Inventories Programme, Eggleston, S., Buendia, L., Miwa, K., Ngara, T., & Tanabe, K. (Eds.). Hayama, Japan: Institute for Global Environmental Strategies (IGES). Retrieved from https://www.ipcc-nggip.iges.or.jp/public/2006gl/.				