	of green urban infrastructure. Journal of Environmental Management, 146, 107-115. Yu, C., & Hien, W.N. (2006). Thermal benefits of city parks. Energy and Buildings, 38, 105-120.

2.13.2 Mean or peak daytime temperature - Temperature modelling

Project Name: UNaLab (Grant Agreement no. 730052)

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*

Mean or peak daytime temperature – Temperature modelling	**Climate Resilience**
Description and justification	Green urban infrastructure can significantly affect climate change adaptation by reducing air and surface temperatures with the help of shading and through increased evapotranspiration. Conversely, green urban infrastructure can also provide insulation from cold and/or shelter from wind, thereby reducing heating requirements (Cheng, Cheung, & Chu, 2010). By moderating the urban microclimate, green infrastructure can support a reduction in energy use and improved thermal comfort (Demuzere et al., 2014). The cooling effect of green space results in lower temperatures in the surrounding built environment. A simulation of the surrounding buildings showed the potential for a 10% decrease in the cooling load due to the presence of the green area in the vicinity (Yu & Hien, 2006).
Definition	Mean or peak daytime local temperature by meteorological modelling (°C)
Strengths and weaknesses	+ Allows the calculation with an hourly resolution at the grid, neighbourhood or city scale neighbourhood - Requires high level of expertise and external data
Measurement procedure and tool	Difference in temperature can be assessed through application of a meteorological model such as the Weather Research and Forecasting model (WRF) (NCAR & UCAR, n.d.; NOAA, n.d.)

Scale of measurement	District to regional scale
Required data	Initial and boundary conditions, topography, land use and urban parameters (building height, width, number of road lanes) (Emmons et al., 2010; Pineda, Jorba, Jorge & Baldasano, 2004). These data can be obtained through national statistics, municipal departments, Corine Land Cover, and a mapping application such as OpenStreetMap.
Data input type	Quantitative
Data collection frequency	Annually; at minimum before and after NBS implementation
Level of expertise required	High – requires ability to use forecasting models and assess the accuracy of results
Synergies with other indicators	Contributes to *Drought vulnerability* indicator group and to *Climate resilience strategy development* indicator
Connection with SDGs	SDG 3 Good health and well-being, SDG 11 Sustainable cities and communities, SDG 13 Climate action
Opportunities for participatory data collection	No opportunities identified
Additional information	
References	Emmons, L.K., Walters, S., Hess, P.G., Lamarque, J.-F-, Pfister, G.G., Fillmore, D. … Kloster, S. (2010). Description and evaluation of the Model for Ozone and Related chemical Tracers, version 4 (MOZART-4). *Geoscientific Model Development*, *3*, 43-67. National Center for Atmospheric Research (NCAR) & University Corporation for Atmospheric Research (UCAR). (n.d.). Weather Research and Forecasting (WRF) Model Users' Page. Retrieved from http://www2.mmm.ucar.edu/wrf/users/ National Oceanic and Atmospheric Administration (NOAA). (n.d.). Weather Research and Forecasting model coupled to Chemistry (WRF-Chem). Retrieved from https://ruc.noaa.gov/wrf/wrf-chem/ Pineda, N., Jorba, O., Jorge, J. & Baldasano, J.M. (2004). Using NOAA AVHRR and SPOT VGT data to estimate surface parameters: application to a mesoscale meteorological model. *International Journal of Remote Sensing*, *25*(1), 129–143. Weather Research and Forecasting Model (WRF): https://www.mmm.ucar.edu/weather-research-and-forecasting-model