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Micro Climate Simulation in new Town 'Hashtgerd'

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One of the objectives of climatological part of project Young Cities 'Developing Energy-Efficient Urban Fabric in the Tehran-Karaj Region' is to simulate the micro climate (with 1m resolution) in 35ha of new town Hashtgerd, which is located 65 km far from mega city Tehran. The Project aims are developing, implementing and evaluating building and planning schemes and technologies which allow to plan and build sustainable, energy-efficient and climate sensible form mass housing settlements in arid and semi-arid regions ("energy-efficient fabric").
Climate sensitive form also means designing and planning for climate change and its related effects for Hashtgerd New Town. By configuration of buildings and open spaces according to solar radiation, wind and vegetation, climate sensitive urban form can create outdoor thermal comfort. To simulate the climate on small spatial scales, the micro climate model Envi-met has been used to simulate the micro climate in 35 ha. The Eulerian model ENVI-met is a micro-scale climate model which gives information about the influence of architecture and buildings as well as vegetation and green area on the micro climate up to 1 m resolution. Envi-met has been run with information from topography, downscaled climate data with neuro-fuzzy method, meteorological measurements, building height and different vegetation variants (low and high number of trees)

Through the optimal Urban Design and Planning for the 35ha area the microclimate results shows, that with vegetation the microclimate in streets will be change:

• 2 m temperature is decreased by about 2 K
• relative humidity increase by about 10 %
• soil temperature is decreased by about 3 K
• wind speed is decreased by about 60%

The style of buildings allows free movement of air, which is of high importance for fresh air supply. The increase of inbuilt areas in 35 ha reduces the heat island effect through cooling caused by vegetation and increase of air humidity which caused by trees evaporation.