Towards Context & Climate Sensitive Urban Design An integrated simulation and parametric design approach

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**SYNTHESIS**

**Parametric generation of the urban environment**

The parametric modeling capacities of the software suite Rhino/Grasshopper are used to generate synthetically modelled urban elements. The different urban elements are connected with each other in an algorithmic relation.

**ANALYSIS**

& simulation of the outdoor and indoor conditions

The complex relationships between form and environmental performance are analyzed thanks to several parametric models with different level of detail. All analysis models use the unique parametric synthesis urban model so that any morphological, topographical or data change will influence the whole data.

**PARAMETRIC STUDY**

Impact of modelling simplification on solar potential

The parametric generation of the urban environment and its constitutive elements allows running urban simulation with various scenarios. Here the most detailed 3D model is simplified gradually to assess the impact of each modeling scenario on the solar potential of more detailed ones.

**DESIGN PLATFORM & FRAMEWORK**

Supporting urban bioclimatic design

To implement the concept of integrated design, an urban modeling, simulation and design platform was developed. It embeds a design framework built upon the strengths of parametric modeling and existing building performance simulation tools.

**A2**

Two-directional maximum insulation on the facade and roof reduces the thermal mass.

**A4**

Output of outdoor and indoor thermal control. Schematic of the urban microclimate and effects on outdoor and indoor conditions is captured by using specific simulation tools (EnergyPlus for indoor and outdoor thermal conditions).

**A3**

The parametric generation of the urban environment and its constitutive elements allows running urban simulation with various scenarios. Here the most detailed 3D model is simplified gradually to assess the impact of each modeling scenario on the solar potential of more detailed ones.