Parametric City Scale Energy Modeling Perspectives on using Termite in city scaled models

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Termite is a parametric tool using the Danish building performance simulation engine Be10 written for the Grasshopper3D/Rhino3D environment. The tool Be10 is originally intended for building energy frame calculations and is required by Danish law when constructing new buildings. Termite opens up for fully parametric district- and city-size simulations of yearly building energy consumption with the same precisions of energy use as the tool simulates on each and every building. The poster demonstrates some of the parametric flexibilities in using Termite e.g. planning for optimal synergetic envelope requirements, placing solar energy production facilities etc.

Termite is able to simulate the dynamics of building energy consumption over the year, which includes thermal transport, natural and mechanical ventilation, cooling and heating systems, heatpumps, solar cells and much more.

Termite makes people work together to design better buildings

Termite uses the calculation engine of Be10 that accepts every input as a parametric variable in the programmable scripting environment of Grasshopper. Basically all geometric relationships can be modelled and visualized in the CAD environment of Rhino, while user defined algorithms can handle any system setting and input in Be10. While the tool is originally intended to be used in calculating the energy consumption of single buildings, Termite opens up for multiple building simulations, thus providing a very efficient tool for city scale energy analysis.

Termite is being built by Ph.D candidate Kristoffer Negendahl in collaboration with Grontmij Architectural Engineering Denmark in the quest for qualifying sustainable buildings, districts and cities in the early stages of the design process.

Termite provides very detailed toolsets to model and analyze large scale building energy problems. Effects from building-to-building relationships can be defined by custom user-algorithms with Grasshopper while utilizing Termite to provide valid feedback of each building energy production and consumption. Energy reductions/increases can easily be visualized and Termite may be used as an effective tool for energy planning purposes.

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