



ENERGY CONSCIOUS DESIGN

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The project proposes a design process for building facades, calculating the impact of the placement of openings in the façade on the energy demand of the building for heating and cooling. Flux.io is used to connect the grasshopper parametric design interface with a spreadsheet in Excel to calculate the heating and cooling demand of the building and feed this information back into an integrated optimization process in Grasshopper.

Continous Evaluation

As optimization processes produce a variety of design solutions for a certain task, these solutions are evaluated regarding their building performance to showcase the emerging improvements in performance during the design process in communication with the client. Parametric designs are often hard to predict in terms of costs, energy demand and construction time. The challenge taken in this project is to create a process for improving the sustainability of façade pattern generation for building designs, based on multi-criteria optimization in relation to radiation and energy demand of design variations.

Effective Communication

The project is presenting a solution to communicate energy efficiency and building performance effectively with the consulting engineer for building automation in early design stages, using Flux.io to provide a feedback loop consisting of relevant building data and geometry in a shared online environment. Flux.io as a communication tool allows to communicate building performance criteria between architect and engineer in early design stages and reduce design time by incorporation of additional information in optimization routines inside the design script.

Integrated Optimization

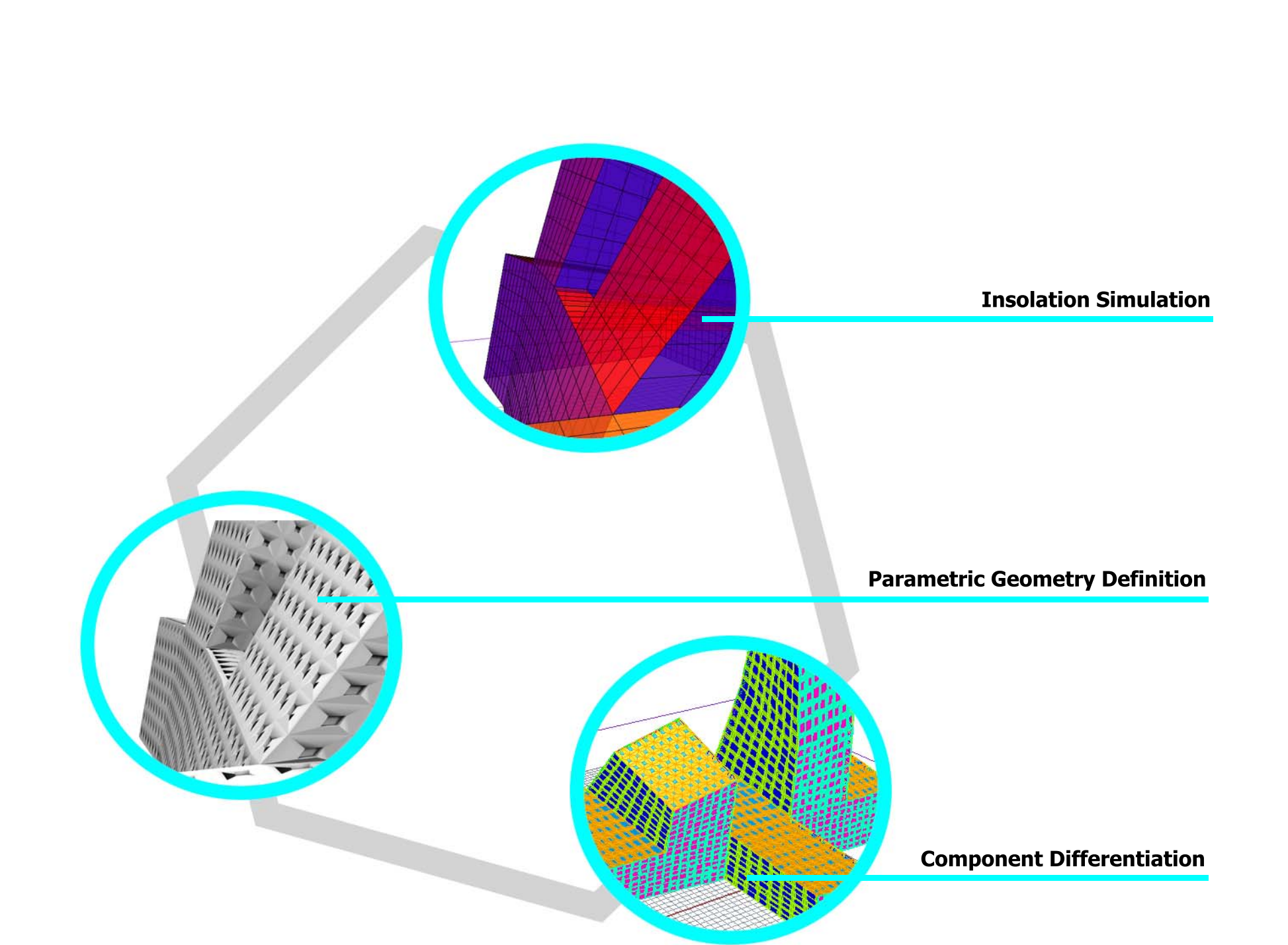
In the presented project, an initial façade design for an office building is generated in variation of the opening sizes of a façade pattern based on a rectangular grid in relation to solar radiation. This design variation is then imposed on the outcome of the energy demand optimization process, integrated in the parametric generation of the façade pattern using Flux.io.

Constant Data Feedback

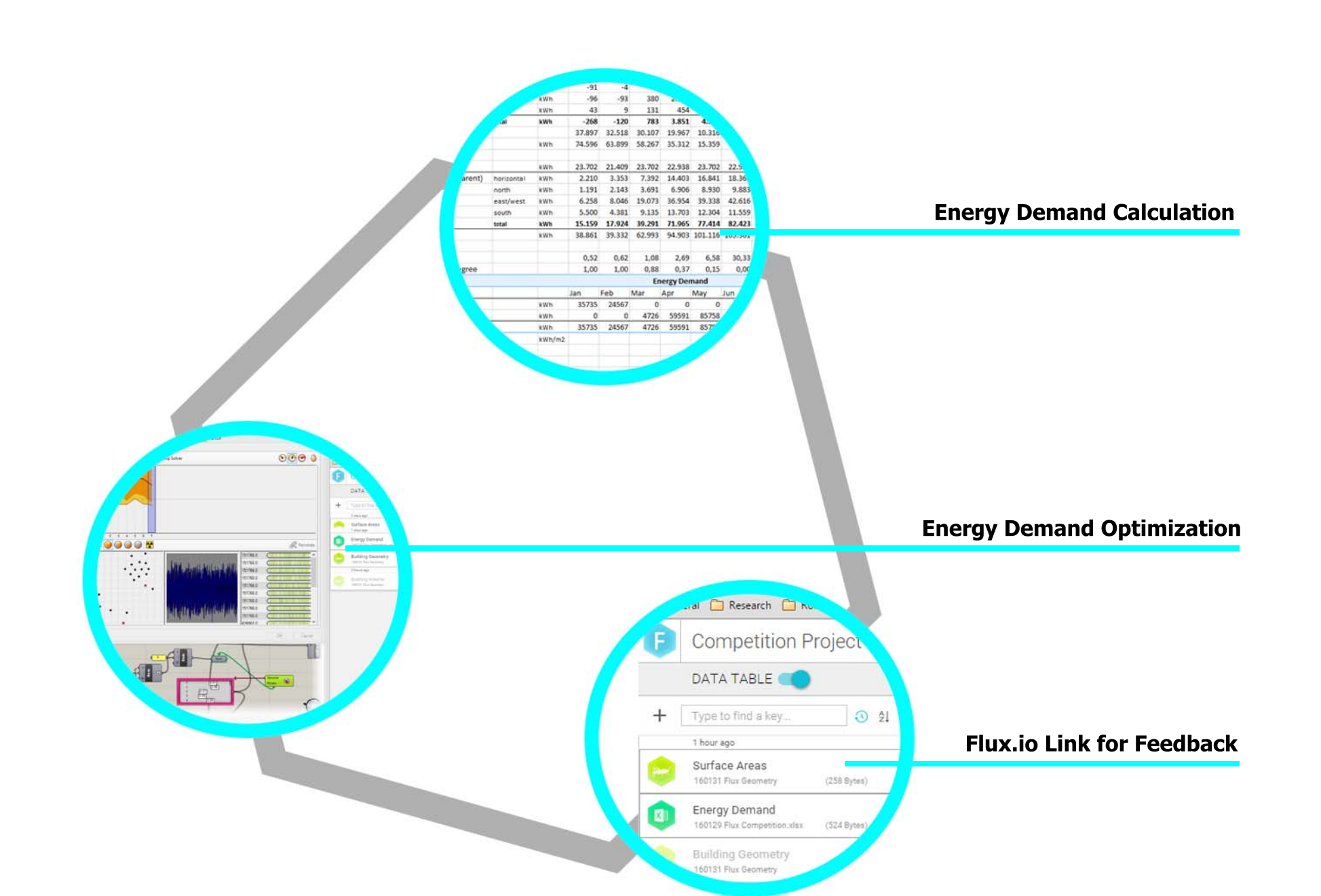
The energy demand calculation is constantly updated inside an Excel spreadsheet via Flux.io, allowing for continuous evaluation of the building performance of the referenced geometry during the design process. This process integrates building performance evaluation in a coherent design process, as a prototype for energy demand driven optimization of parametrically defined geometries.

Improving Sustainability and Affordability of Facades

Energy conscious design is a tool to improve sustainability and affordability of building designs by optimization of window sizes connected to radiation and energy demand analysis, while showcasing an online communication process between architect and engineer about building performance data in early stages of architectural design.



Geometry Preparation



Energy Demand Optimization

