Envelope optimization analysis for South Cooper Mountain High School: Sefaira web-application

Portland State University + Boora Architects Research Collaboration

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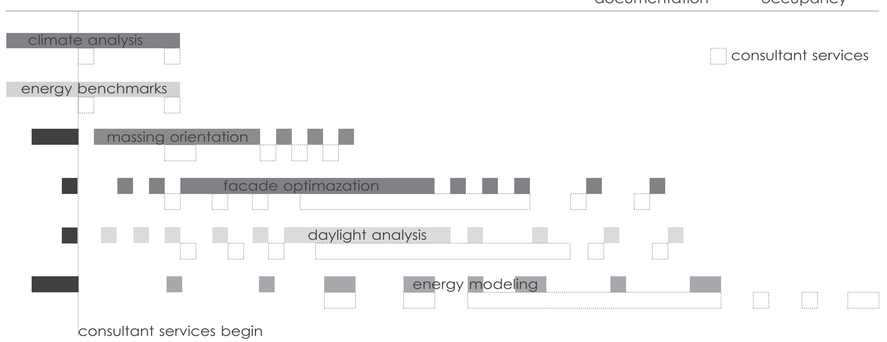
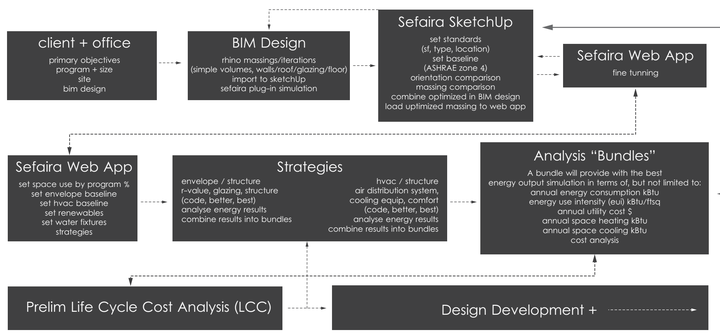
Research Goals:
1. Identify Sefaira's energy simulation limitations
2. Identify successful Sefaira strategies/setting compared to eQuest strategies/settings

Existing Analysis Process
Energy Simulation Software Proposed



Sefaira Analysis Process

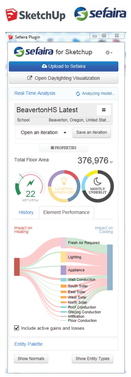


Research Findings:

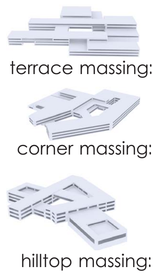
1.1 Lacks temperature setback setting
1.2 Lacks monthly space use setting
1.3 Lacks dead-band setting

2.1 After some setting adjustments, envelope analysis in the Sefaira Web-Application matches closely to eQuest envelope analysis
2.2 As a simulation tool, Sefaira makes the proper energy assumptions and simulations useful for the beginning phase of the design process
2.3 Easy to use interface

Energy modeling software:
Sefaira for SketchUp + Web Application

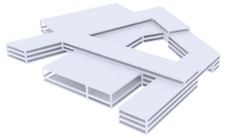


Initial Massing Studies



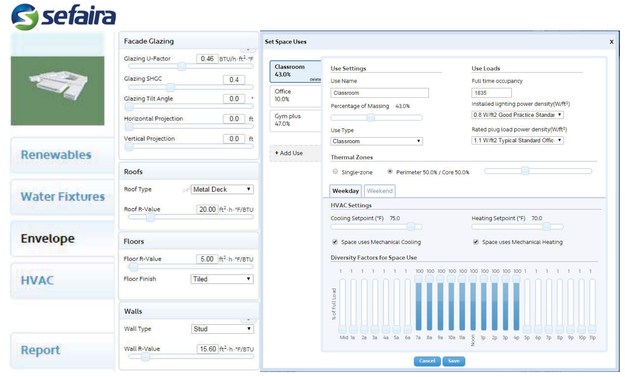
	eQuest (PAE)	Sefaira
terrace massing:	64 EUI	66 EUI
corner massing:	63 EUI	65 EUI
hilltop massing:	60 EUI	61 EUI
	-6.25%	-7.58%

Massing Optimization



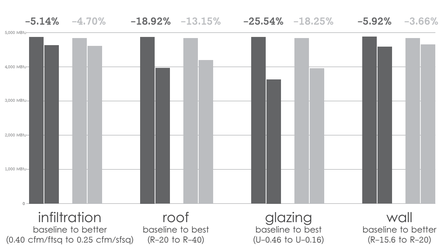
*sefaira eui shown reflects energy output after envelope + hvac settings were adjusted to match eQuest (PAE)

*proportional results were observed with initial energy readings using an ASHRAE 90.1 zone 4 baseline

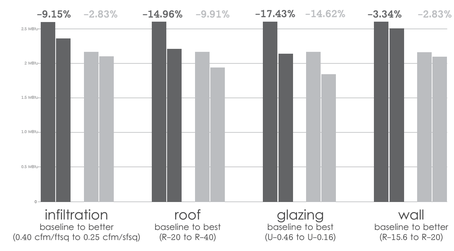


Strategies Compared: eQuest - Sefaira

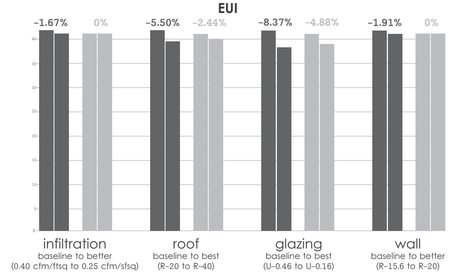
Annual Heating



Annual Peak Heating



EUI



Baseline vs Optimized Bundle