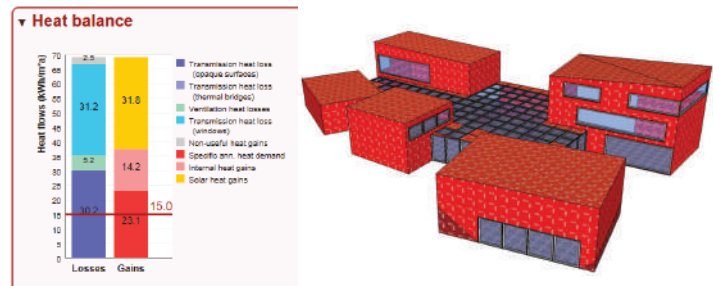
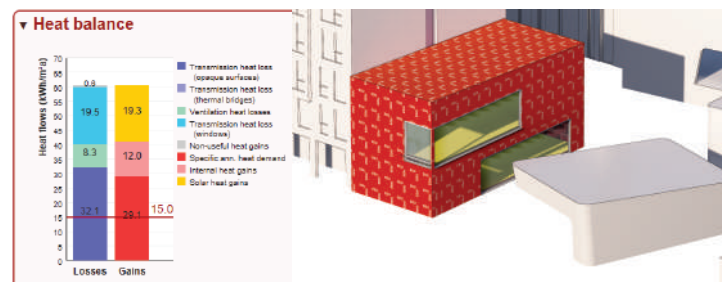


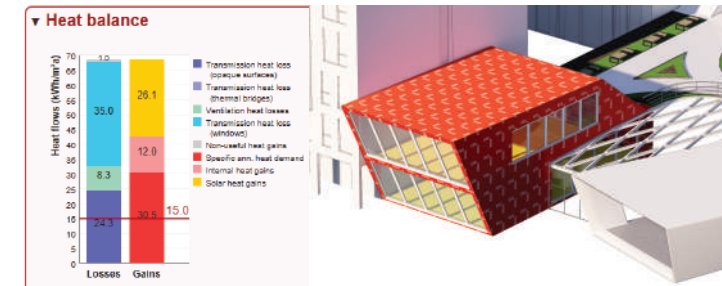
Iteration 1 - Design 1, entire building (default settings)



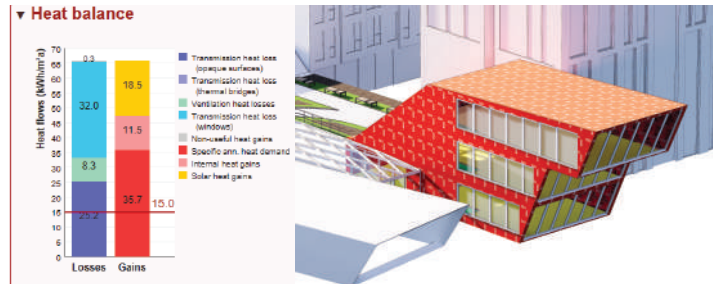
Iteration 2 - Design 1, office block 1 (default settings)



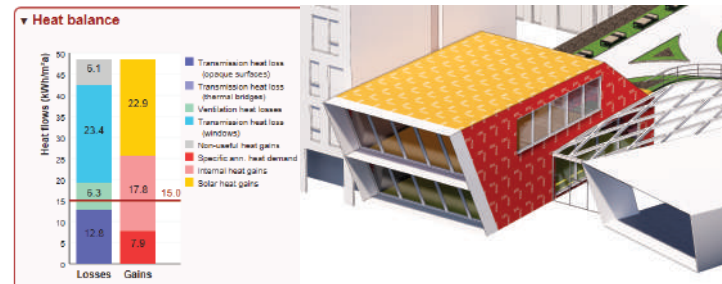
Iteration 3 - Design 2, office block 1 (default settings)



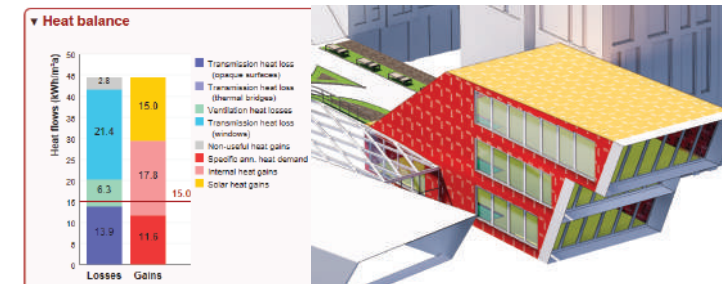
Iteration 3 - Design 2, office block 2 (default settings)



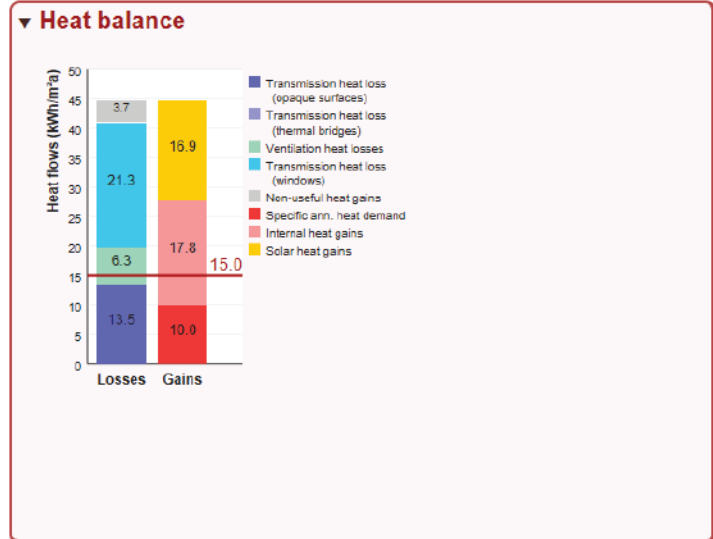
Iteration 4 - Design 3, office block 1 (custom settings)



Iteration 4 - Design 3, office block 2 (custom settings)



Iteration 5 - Design 3, office block 1 & 2 combined (custom settings)



Project overview

EDUCATIONAL LICENCE, NOT FOR PROFESSIONAL USE (expires in 106 days)

Climate: Sutton Bonnington [change](#)

Building type: Office / Admin. building [change](#)

Annual heat demand (Q_h): 10.0 kWh/m²a [details](#)

Treated Floor Area (TFA): 793 m² (Drawn TFA surfaces) [details](#)

Thermal envelope area: 1953 m² [details](#)

Heat Loss Form Factor: 2.46

Projected building footprint: -- m²

Number of windows: 73 [details](#)

Number of thermal surfaces: 37 [details](#)

Number of thermal bridges: None defined [details](#)

Thermal envelope checks

The thermal envelope appears to be incomplete!

This may be caused by incorrectly assigned non-thermal surfaces, reversed faces, a hole, glued components, or unintersected faces in the envelope.

Projection along Blue axis: 0.0% variance

Projection along Red axis: 0.0% variance

Projection along Green axis: 6.0% variance

Shading

freeze auto names

Select	Win ID	Window name	Assigned to group	Width	Height	Installed in	Shading factor (winter)	Shading factor (summer)
1	Win_001_S	4 - South Windows	1.78	3.64	_017_S	0.79	0.79	
2	Win_002_S	4 - South Windows	1.78	3.64	_017_S	0.85	0.82	
3	Win_003_S	4 - South Windows	1.78	3.64	_017_S	0.86	0.83	
4	Win_004_S	4 - South Windows	1.78	3.64	_017_S	0.85	0.82	
5	Win_005_S	4 - South Windows	1.78	3.64	_017_S	0.79	0.79	
6	Win_006_N	2 - North Windows	1.50	3.58	Roof_014_N	0.84	0.85	
7	Win_007_N	2 - North Windows	1.50	3.58	Roof_014_N	0.84	0.85	
8	Win_008_N	2 - North Windows	1.50	3.58	Roof_014_N	0.83	0.83	
9	Win_009_N	2 - North Windows	1.50	3.58	Roof_014_N	0.76	0.77	
10	Win_010_N	2 - North Windows	1.50	3.58	Roof_014_N	0.76	0.76	

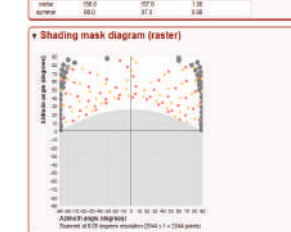
Assemblies (default)

U-value	g-value	Shading factor
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05

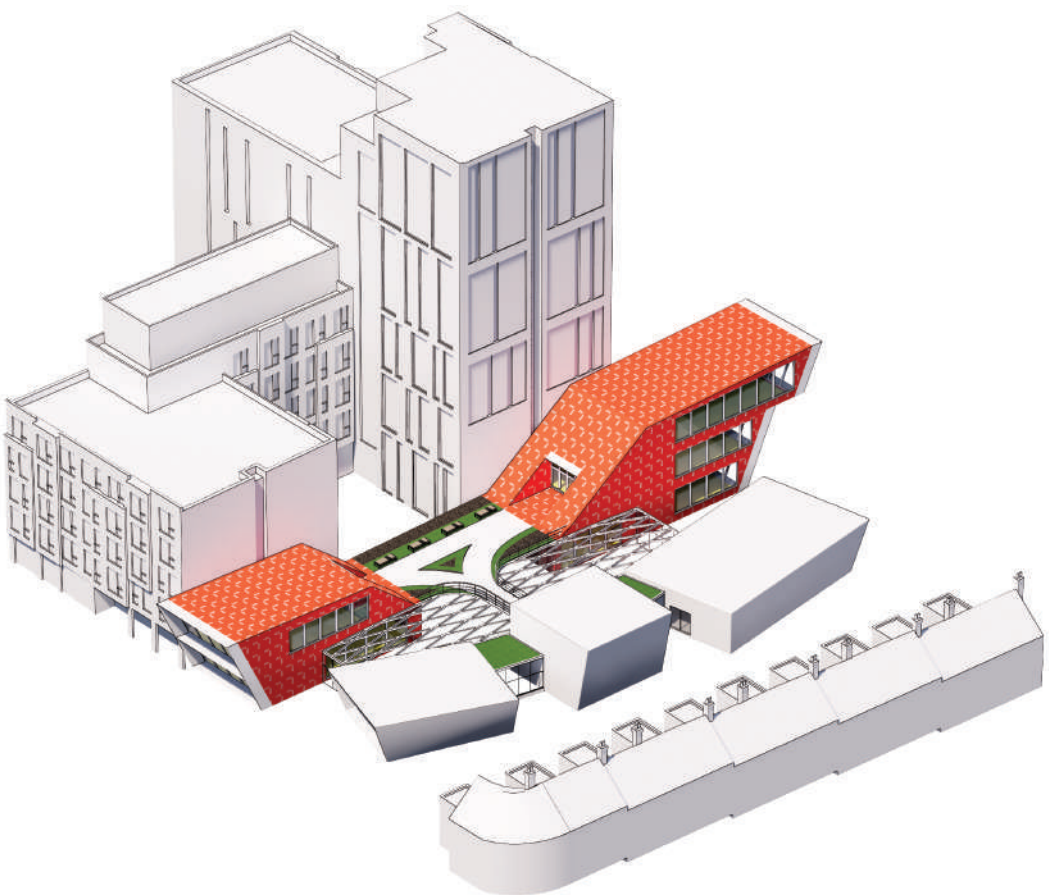
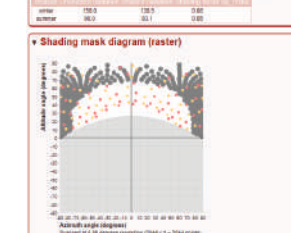
Assemblies (user-defined)

U-value	g-value	Shading factor
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05

North window unshaded



North window shaded



Glazing (user-defined)

U-value	g-value	Shading factor
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05

Frames (user-defined)

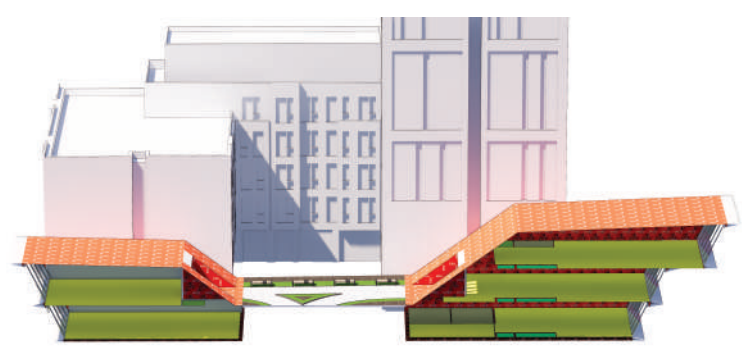
U-value	g-value	Shading factor
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05
0.05	0.05	0.05

User-defined TFA areas

freeze auto names

Select	Area	Building element	Group no.	Assigned to group	shape	Dim. A	Dim. B	Area check (m²)	Total area (m²)	Reduction factor	TFA (m²)
1	TFA_Face_001	1	1	rectangle	2.30	2.05	4.71	0.50	2.36		
2	TFA_Face_002	1	1	rectangle	4.68	4.08	19.06	0.00	11.44		
3	TFA_Face_003	1	1	rectangle	112.50	1	112.50	1	112.50		
4	TFA_Face_004	1	1	rectangle	40.82	1	40.82	1	40.82		
5	TFA_Face_005	1	1	rectangle	8.93	1.89	8.93	0.30	2.08		

841.32 793.18



Transmission heat loss (opaque surfaces)

Area group	Total area (m²)	Area weighted U-value (W/m²K)	Avg. temp. factor	Ann. hfg. degree hours (hK)	Transmission heat losses (kWh/m²a)	Q _t (kWh/m²a)
7 - External Door	0.00			60.00		
8 - External Wall - Ambient	608.48	0.11	1.00	60.00	4482.39	5.96
9 - External Wall - Ground	0.00			60.00		
10 - Roof/Ceiling - Ambient	607.29	0.11	1.00	60.00	4483.63	5.95
11 - Floor slab / Basement ceiling	390.75	0.11	0.60	60.00	1730.92	2.18
12 -	0.00			60.00		
13 -	0.00			60.00		
14 - Temperature zone X	0.00			60.00		
15 - Partition Wall to Neighbour	129.33	0.25	0.00	60.00	0.00	0.00
Total	1735.85				10706.94	13.50

Transmission heat loss (windows)

Area group	Total area (m²)	Area weighted U-value (W/m²K)	Avg. temp. factor	Ann. hfg. degree hours (hK)	Transmission heat losses (kWh/m²a)	Q _t (kWh/m²a)
2 - North Windows	120.92	0.71	1.00	69.00	5902.89	7.44
3 - East Windows	156.45	0.70	1.00	69.00	7583.09	9.56
4 - South Windows	83.09	0.70	0.84	69.00	3375.35	4.28
5 - West Windows	0.00			69.00		
6 - Horizontal Windows	0.00			69.00		
Total	360.46				16961.34	21.28

Ventilation heat losses

Ventilation system	Energy effective air change rate (1/h)	Ventilation volume (m³/s)	Heat capacity (kJ/sK)	Ann. hfg. degree hours (hK)	Ventilation heat losses (kWh/m²a)	Q _v (kWh/m²a)
Infiltration	0.0459	2379.53	0.33	69.00	2468.37	3.11
Intiltration	0.0462	2379.53	0.33	69.00	2503.21	3.15
Total	0.0918				4971.57	6.27

Solar heat gains

Area group	Win. area (m²)	Gazing area (m²)	g-value	Reduction factor	Radiation, G _s (kWh/m²a)	Solar heat gains (kWh/m²a)	Q _s (kWh/m²a)
2 - North Windows	120.92	90.66	0.50	0.45	85.50	2297.78	2.90
3 - East Windows	156.45	120.66	0.50	0.48	194.00	7955.13	8.89
4 - South Windows	83.09	62.83	0.50	0.48	185.59	4074.68	5.14
5 - West Windows	0.00	0.00			0.00	0.00	0.00
6 - Horizontal Windows	0.00	0.00			0.00	0.00	0.00
Total	360.46	273.39				13427.59	16.93

Internal heat gains

Treated Floor Area (m²)	Internal heat gain rate (W/m²)	Heating period (days)	Heating period (hours)	Internal heat gains (kWh/m²a)	Q _i (kWh/m²a)
793.18	3.50	212.00	5.09	14124.90	17.81



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