SIMULATION OF BUILDING ENERGY PERFORMANCE VIA OPENSTUDIO

TECHNICAL ENVIRONMENTAL SYSTEM

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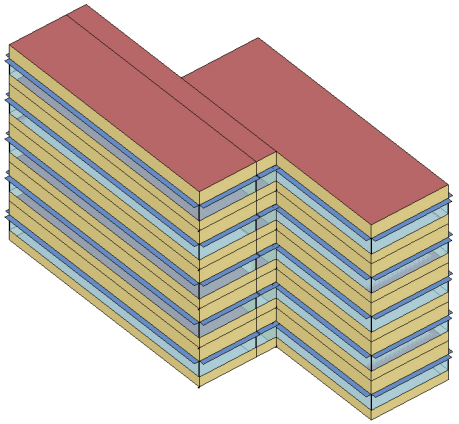
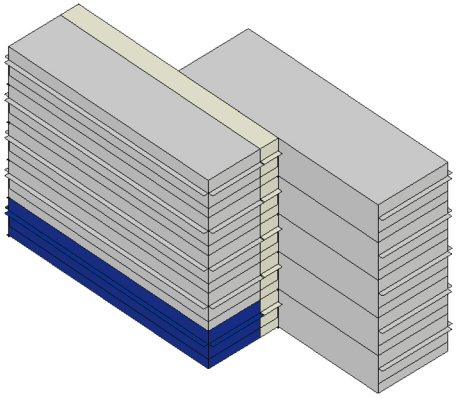


view of model



thermal zone1 (offices)
thermal zone2 (corridor)
thermal zone3 (lobby)

INTRODUCTION 01

In this report, it has decided to consider the energy consuption of an office building, with at the basement a vending and a lobby part. The area of the building is 1200 ㎡ with 4 floors mainly consisting of open office and a corridor in the central part of the building, with a groud floor of the vending and the lobby. In addition, sun-shades have benn added to allthe vertical surfaces, exceptfor the North elevation, in order to increase the sustainability.

It has been decided to locate the building in three different city in this report, Piacenza, Sydney, Hangzhou, in order to have different comparison and results, in terms of energy consuption.

It has been chosen Piacenza as basic city for building details, in terms of default condition. In order to have comparisons, it has been decided to locate the building also in Sydney and Hangzhou, which are at very different latitude, with a verydifferent weather from Piacenza.

In addition, it has been decided to change the construction of external walls, in order to enhance the possibility of sustainability and at the end make a comparison between the three different walls in each different city.

Building type: OFFICE + LOBBY +VENDING
Area: 1200 ㎡
Height: 16m
number of floors: (0 F lobby and vending 1-3F offices
City 1: Piacenza
City 2: Sydney
City 3: Hangzhou

London
Piacenza
HongKong

02

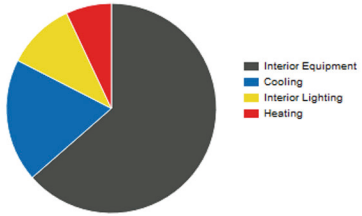
The Same Building In Different Cities Chosen

02 — London

Building Summary

Information	Value	Units
Building Name	Building 1	building_name
Net Site Energy	131,822	kBtu
Total Building Area	1,163	ft^2
EUI (Based on Net Site Energy and Total Building Area)	113.40	kBtu/ft^2
OpenStudio Standards Building Type		

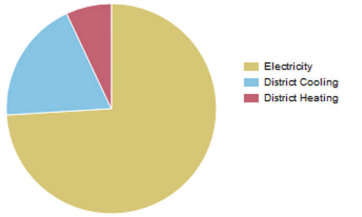
End Use - view table



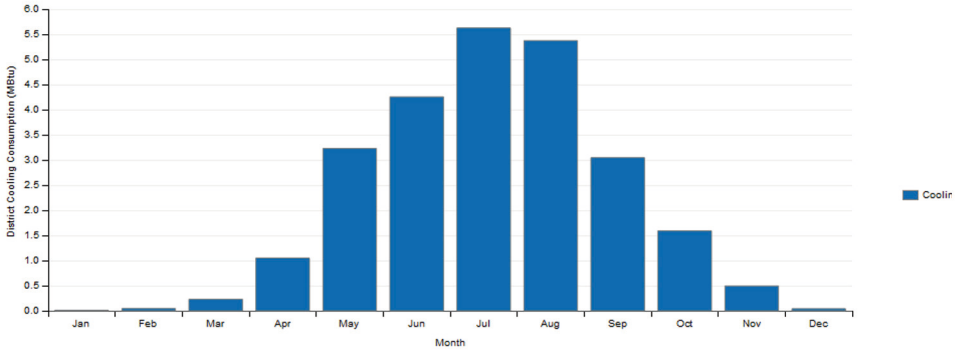
Weather Summary

	Value
Weather File	LONDON/GATWICK - GBR IWEC Data WMO#=037760
Latitude	51.15
Longitude	-0.2
Elevation	203 (ft)
Time Zone	0.00
North Axis Angle	0.00
ASHRAE Climate Zone	1A

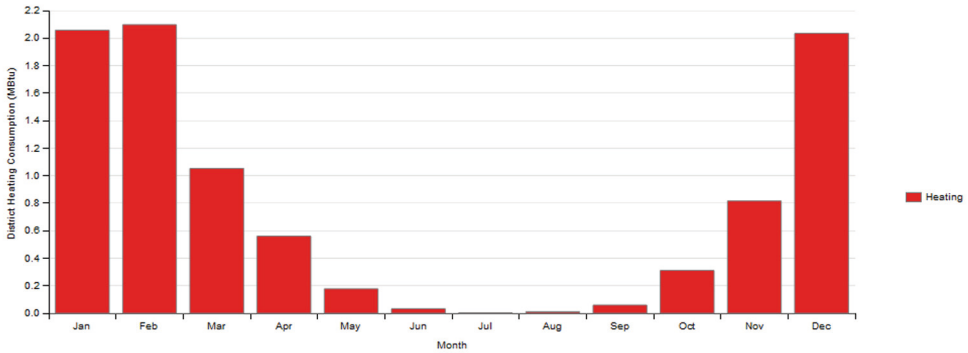
Energy Use - view table



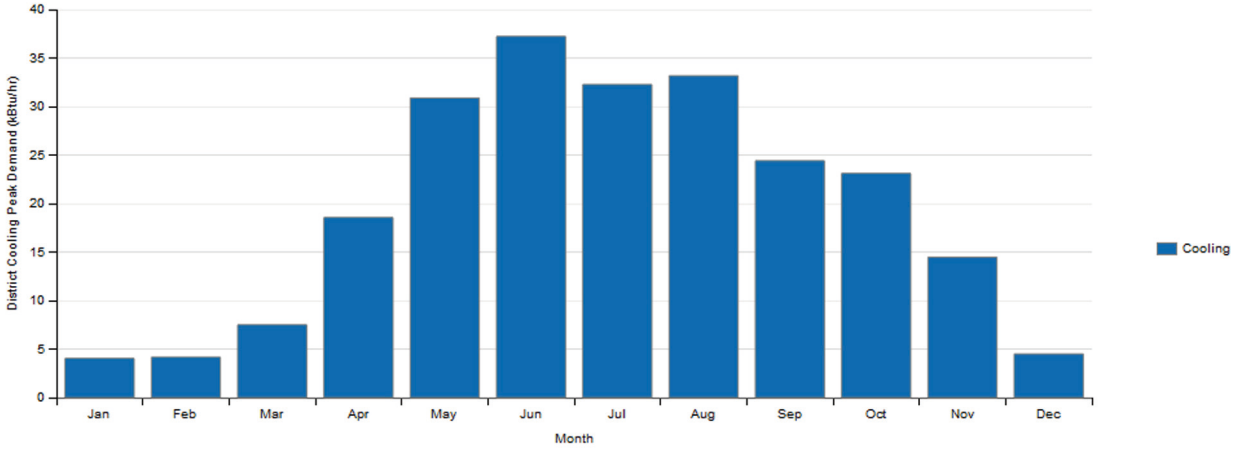
District Cooling Consumption (MBtu) - view table



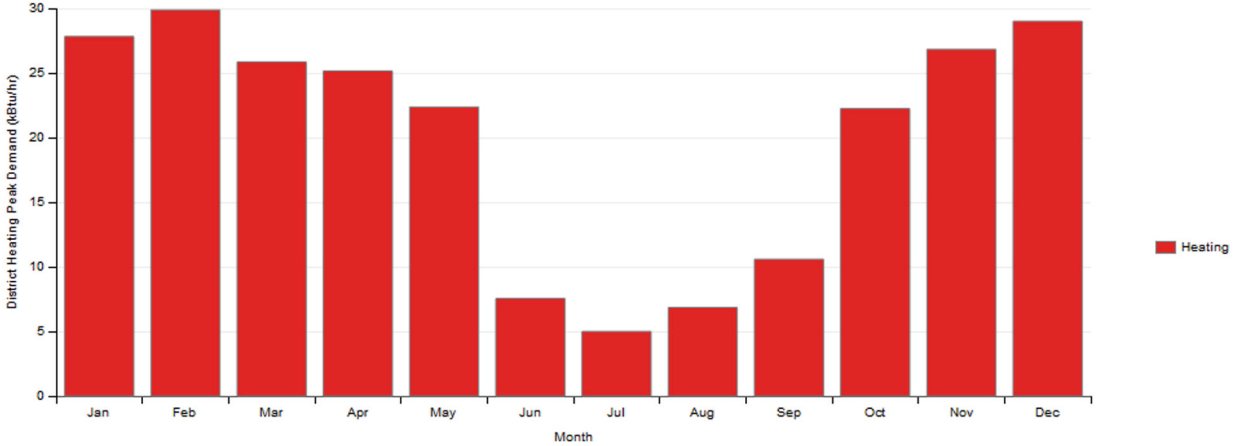
District Heating Consumption (MBtu) - view table



District Cooling Peak Demand (kBtu/hr) - view table



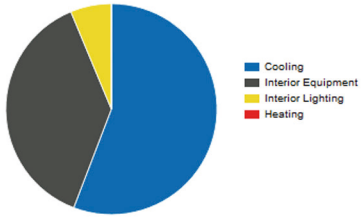
District Heating Peak Demand (kBtu/hr) - view table



Building Summary

Information	Value	Units
Building Name	Building 1	building_name
Net Site Energy	220,927	kBtu
Total Building Area	1,163	ft^2
EUI (Based on Net Site Energy and Total Building Area)	190.04	kBtu/ft^2
OpenStudio Standards Building Type		

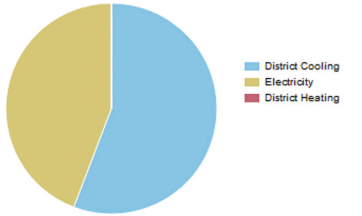
End Use - view table



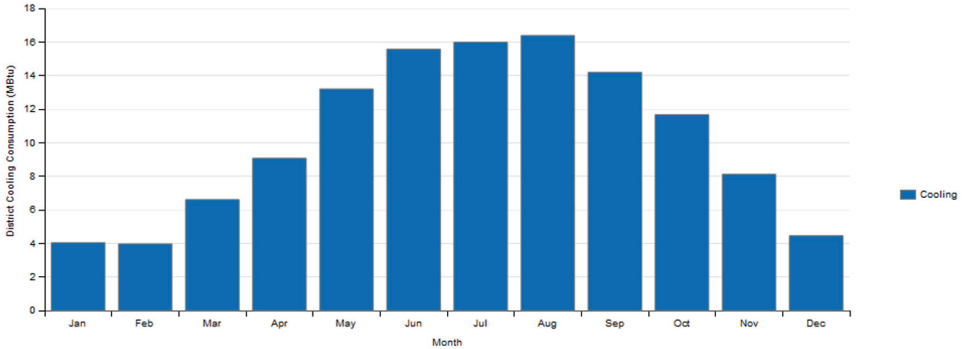
Weather Summary

	Value
Weather File	HONG KONG SAR CHN CityUHK-45007 WMO#=450070
Latitude	22.32
Longitude	114.17
Elevation	213 (ft)
Time Zone	8.00
North Axis Angle	0.00
ASHRAE Climate Zone	1A

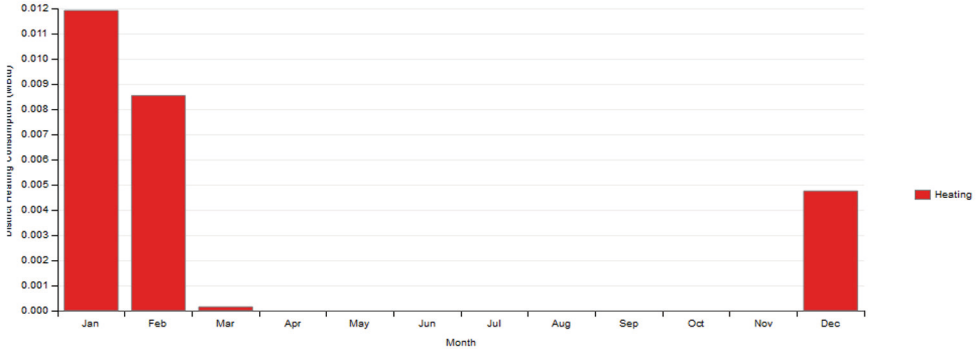
Energy Use - view table



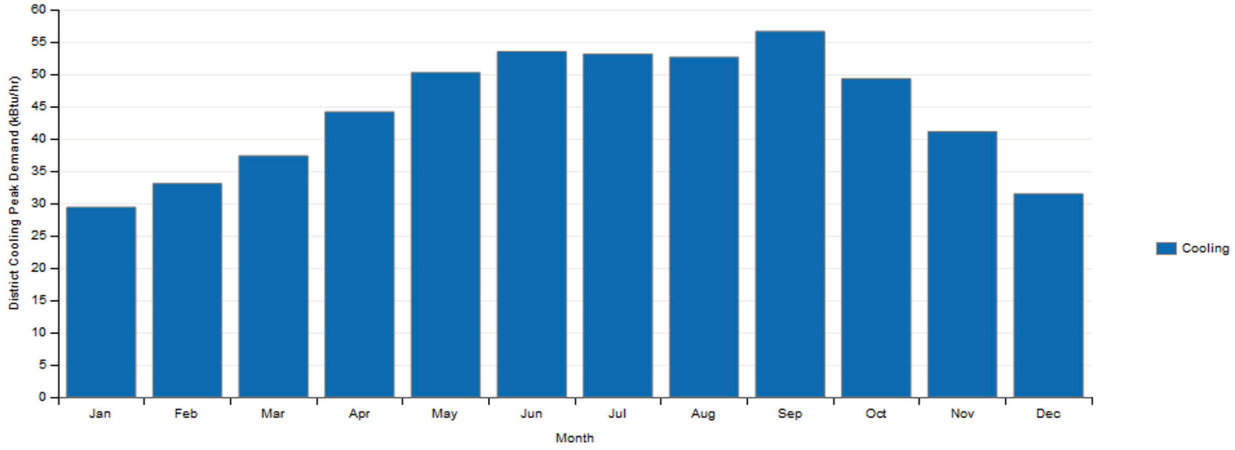
District Cooling Consumption (MBtu) - view table



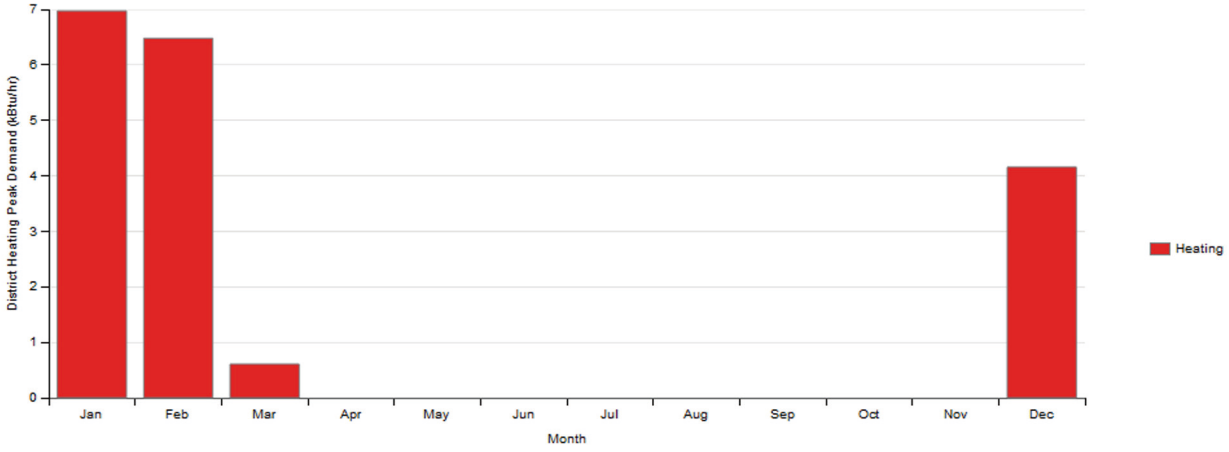
District Heating Consumption (MBtu) - view table



District Cooling Peak Demand (kBtu/hr) - view table



District Heating Peak Demand (kBtu/hr) - view table



02 — Piacenza

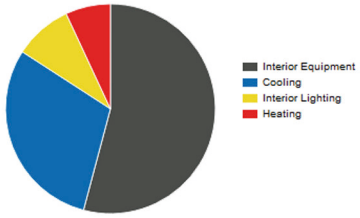
Building Summary

Information	Value	Units
Building Name	Building 1	building_name
Net Site Energy	154,779	kBtu
Total Building Area	1,163	ft^2
EUI (Based on Net Site Energy and Total Building Area)	133.14	kBtu/ft^2
OpenStudio Standards Building Type		

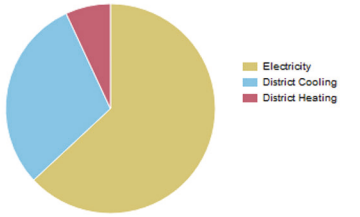
Weather Summary

	Value
Weather File	Piacenza - ITA IGDG WMO#=160840
Latitude	44.92
Longitude	9.73
Elevation	440 (ft)
Time Zone	1.00
North Axis Angle	0.00
ASHRAE Climate Zone	1A

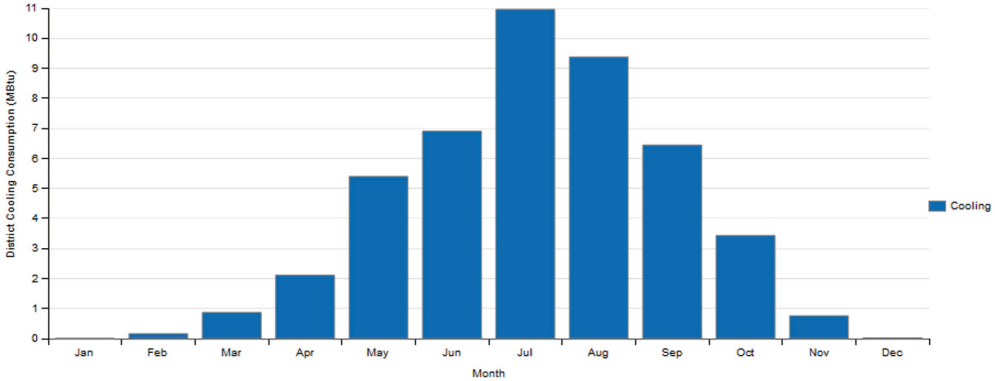
End Use - view table



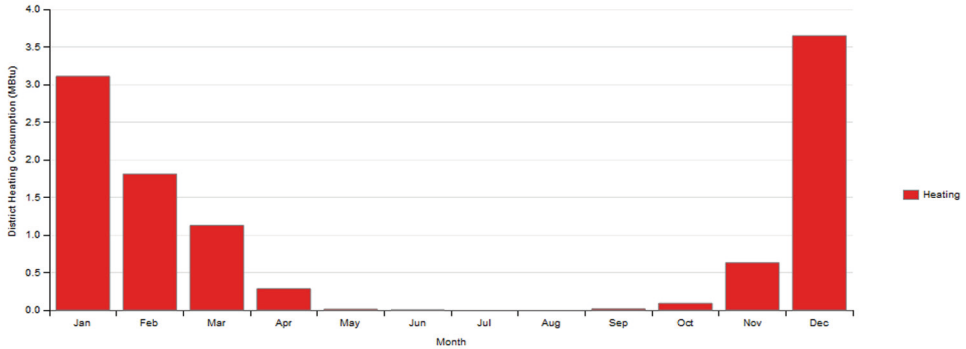
Energy Use - view table



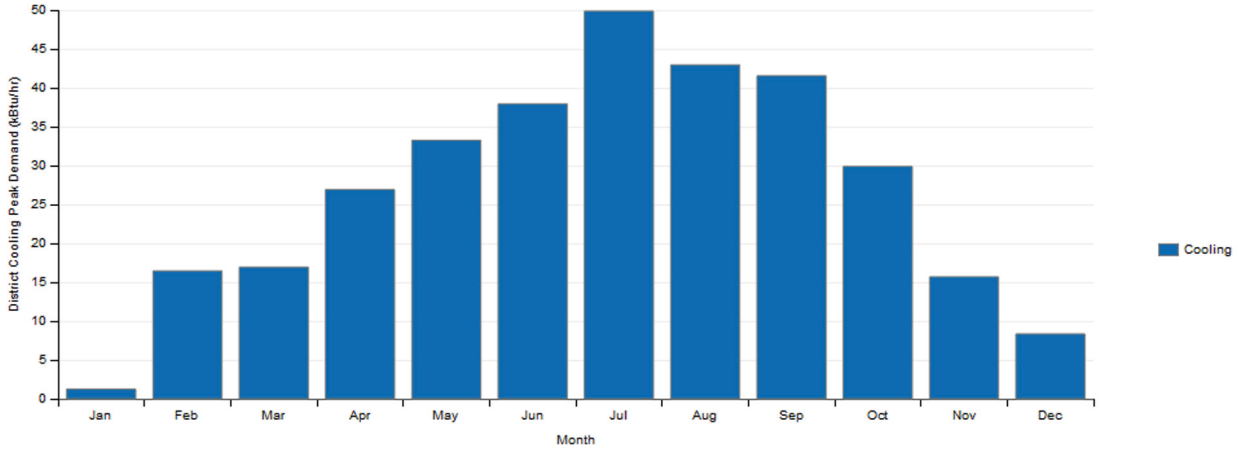
District Cooling Consumption (MBtu) - view table



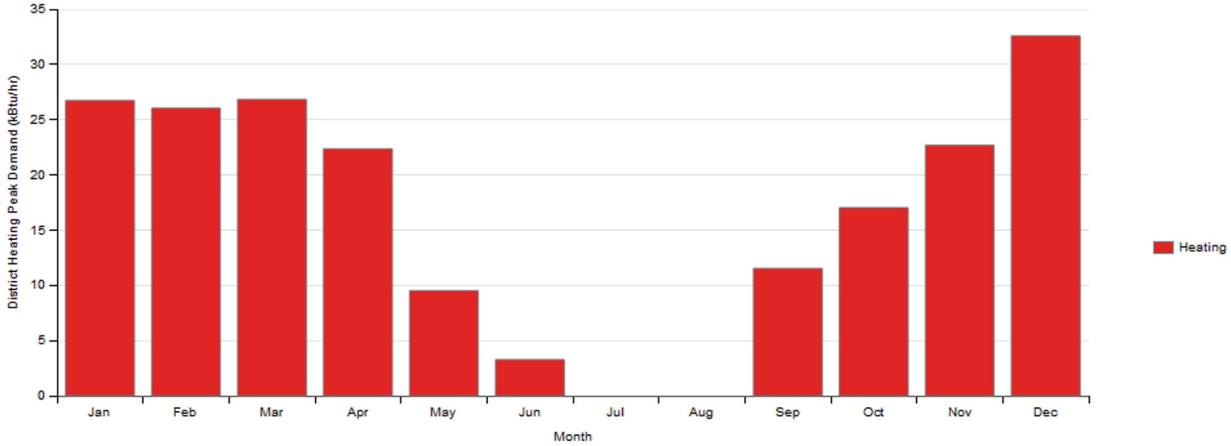
District Heating Consumption (MBtu) - view table



District Cooling Peak Demand (kBtu/hr) - view table



District Heating Peak Demand (kBtu/hr) - view table



03

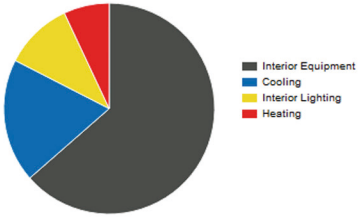
Different Cities External Walls In The Same City

03 — Wall 1

Building Summary

Information	Value	Units
Building Name	Building 1	building_name
Net Site Energy	131,822	kBtu
Total Building Area	1,163	ft^2
EUI (Based on Net Site Energy and Total Building Area)	113.40	kBtu/ft^2
OpenStudio Standards Building Type		

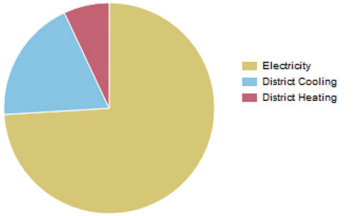
End Use - view table



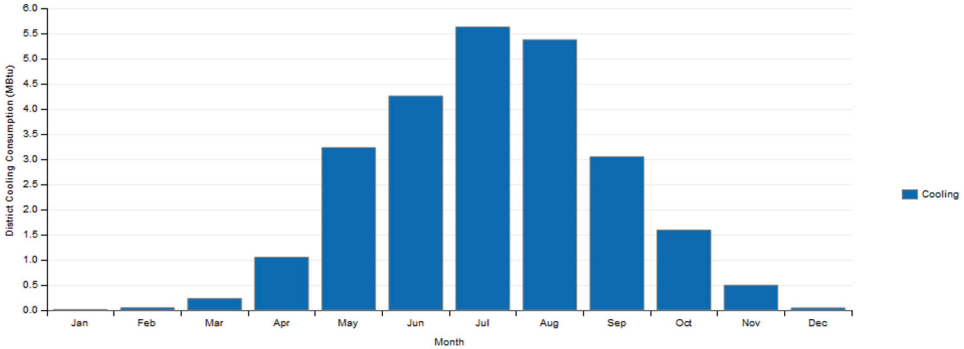
Weather Summary

	Value
Weather File	LONDON/GATWICK - GBR IWEC Data WMO#=037760
Latitude	51.15
Longitude	-0.2
Elevation	203 (ft)
Time Zone	0.00
North Axis Angle	0.00
ASHRAE Climate Zone	

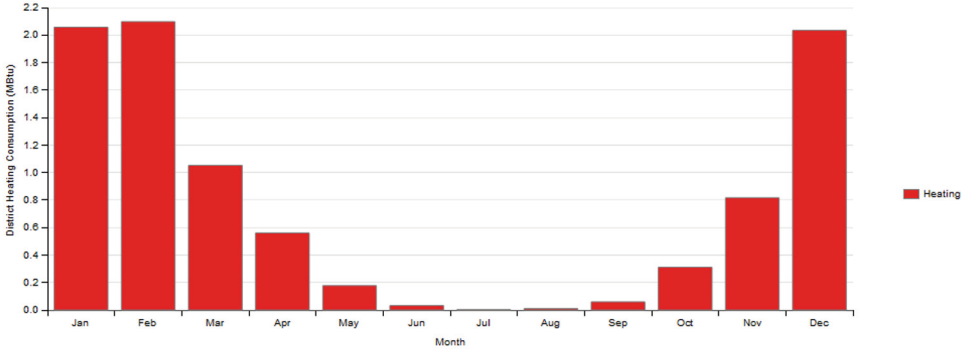
Energy Use - view table



District Cooling Consumption (MBtu) - view table



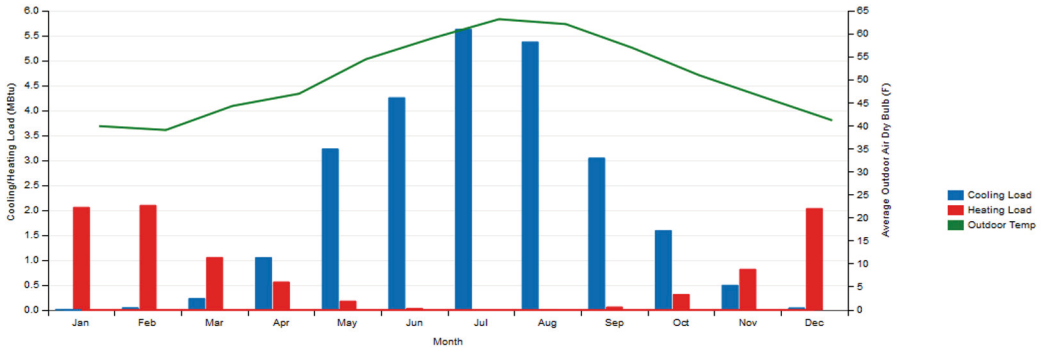
District Heating Consumption (MBtu) - view table



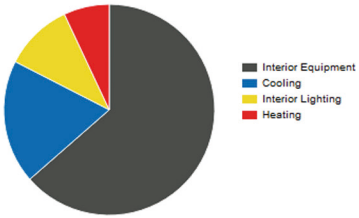
03 — Wall 1

HVAC Load Profiles

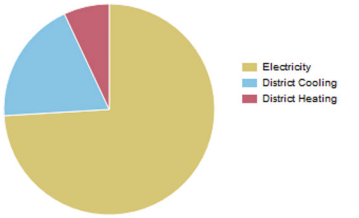
Monthly Load Profiles - view table



End Use - view table



Energy Use - view table



03 —— Wall 2

Building Summary

Information	Value	Units
Building Name	Building 1	building_name
Net Site Energy	130,202	kBtu
Total Building Area	1,163	ft^2
EUI (Based on Net Site Energy and Total Building Area)	112.00	kBtu/ft^2
OpenStudio Standards Building Type		

Weather Summary

	Value
Weather File	LONDON/GATWICK - GBR IWEC Data WMO#=037760
Latitude	51.15
Longitude	-0.2
Elevation	203 (ft)
Time Zone	0.00
North Axis Angle	0.00
ASHRAE Climate Zone	

F08 Metal surface

MAT-CC05 4 HW CONCRETE

Wall Insulation [31]

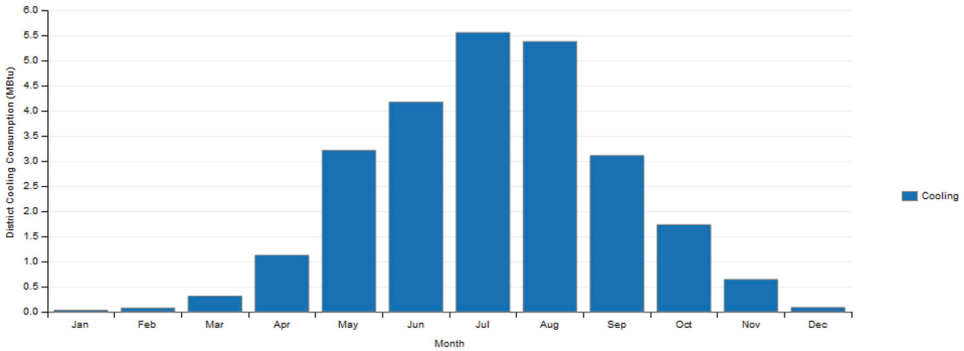
F04 Wall air space

8IN Concrete HW

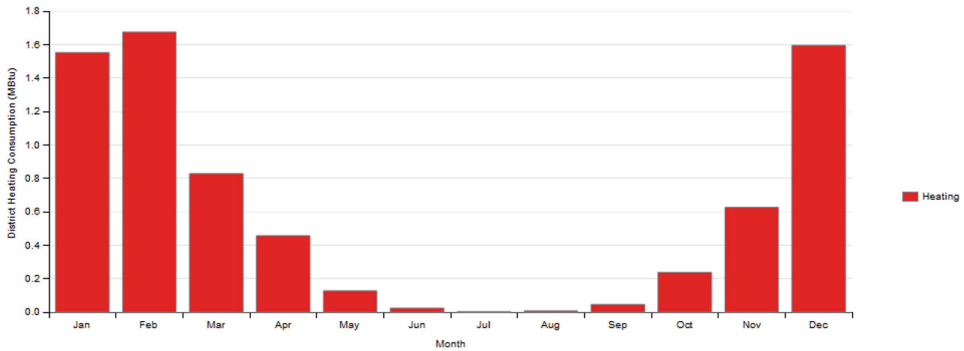
Wall Insulation [35]

1/2IN Gypsum

District Cooling Consumption (MBtu) - view table

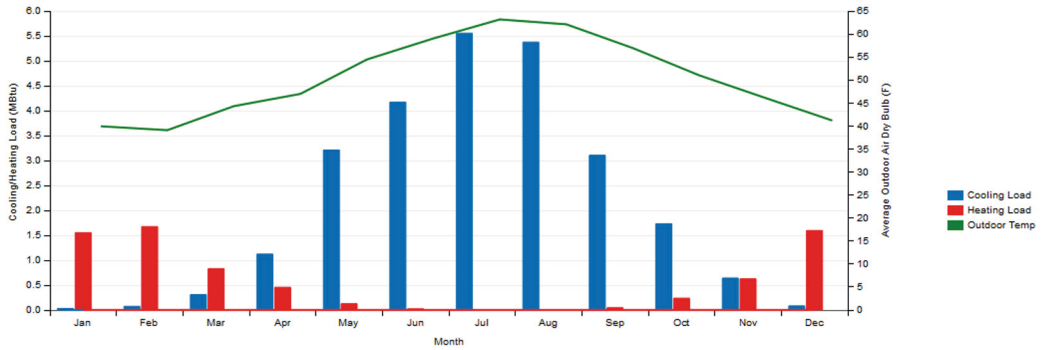


District Heating Consumption (MBtu) - view table

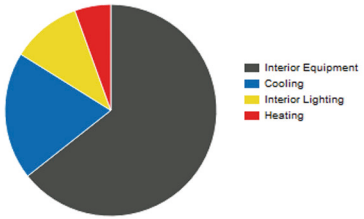


03 —— Wall 2

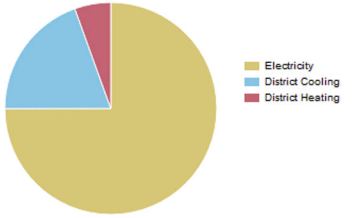
Monthly Load Profiles - view table



End Use - view table



Energy Use - view table



03 —— Wall 3

Building Summary

Information	Value	Units
Building Name	Building 1	building_name
Net Site Energy	132,448	kBtu
Total Building Area	1,163	ft^2
EUI (Based on Net Site Energy and Total Building Area)	113.93	kBtu/ft^2
OpenStudio Standards Building Type		

Weather Summary

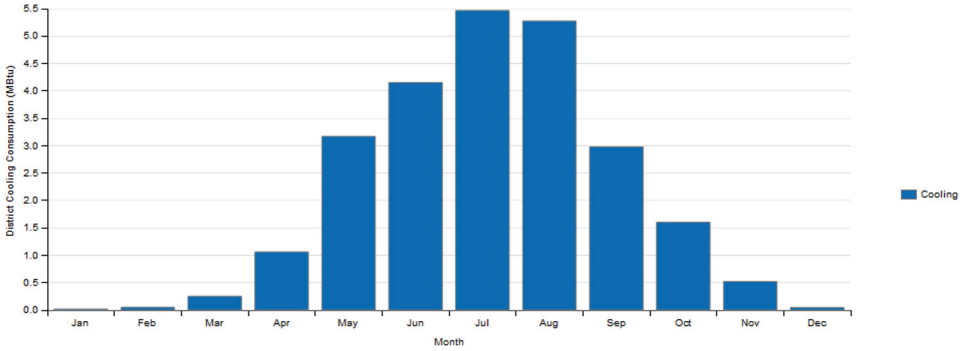
	Value
Weather File	LONDON/GATWICK - GBR IWEC Data WMO#=037760
Latitude	51.15
Longitude	-0.2
Elevation	203 (ft)
Time Zone	0.00
North Axis Angle	0.00
ASHRAE Climate Zone	

M11 100mm lightweight concrete

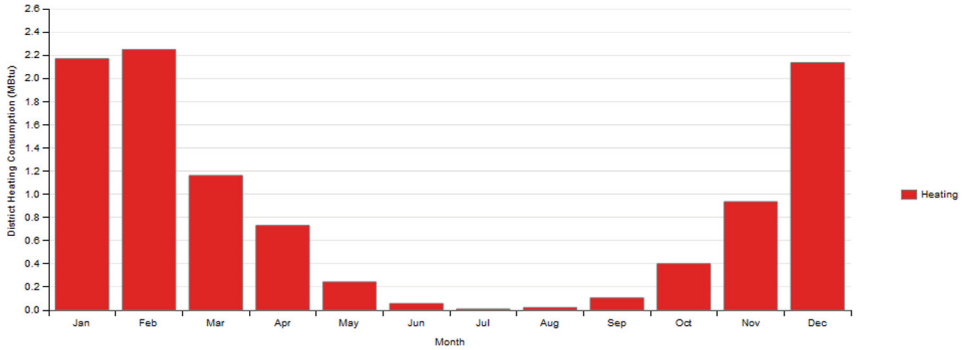
Wall Insulation [31]

1/2IN Gypsum

District Cooling Consumption (MBtu) - view table

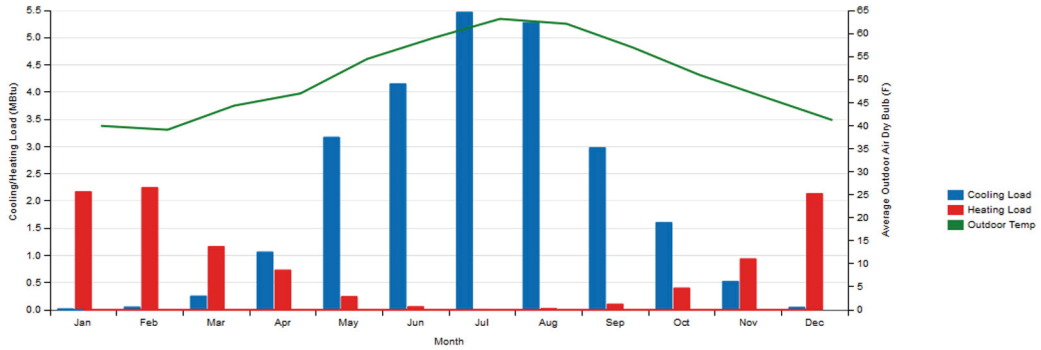


District Heating Consumption (MBtu) - view table

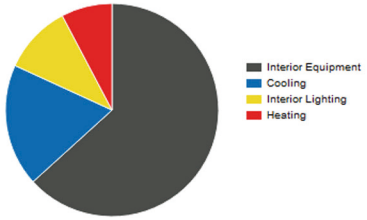


03 —— Wall 3

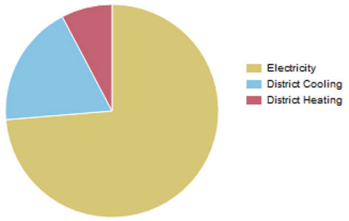
Monthly Load Profiles - view table



End Use - view table



Energy Use - view table



Thank you !