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TECHNICAL SYSTEMS  
ENVIRONMENTAL  
DEC | 2018

ENERGETIC SIMULATION OF A BUILDING IN DIFFERENT LOCATIONS



POLITECNICO  
MILANO 1863

## INTRODUCTION

Computer Modelling and Simulation of how a building performs in terms of energy consumption is extremely important for designers, users and especially developers. The key reason is to understand the building condition and run an analysis against utility bills with the aim of reducing the energy consumption of the buildings and achieve a more sustainable and efficient design. There're many software available, in this case a computer modeled and simulated building was performed in Sketchup, OpenStudio and Energy Plus. Energy Plus provides an integrated simulation for accurate temperature and comfort prediction. The simulation was performed in several locations during the whole year in order to compare the different values between diverse climates. It has a special focus in the city of Oslo, Norway, where bad, normal and good insulation characteristics were included to find the most efficient choice.

The offices modeled building is three stories high and has a standard construction with concrete aggregate exterior walls that vary in insulation properties, drywall interior walls and exterior shading with the exception of the north facade are included in the model. The input data were building constructional records, local climate data, occupancy, internal load, HVAC and lighting component data, equipment data etc. Three Different thermal zones were taken into consideration in order to achieve a more accurate analysis.

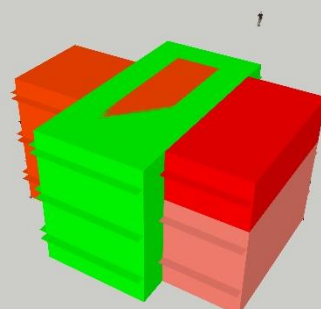
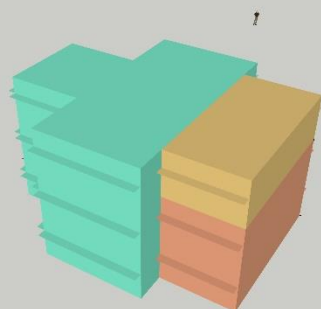
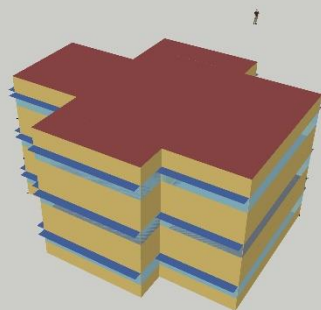


AHMEDABAD.....

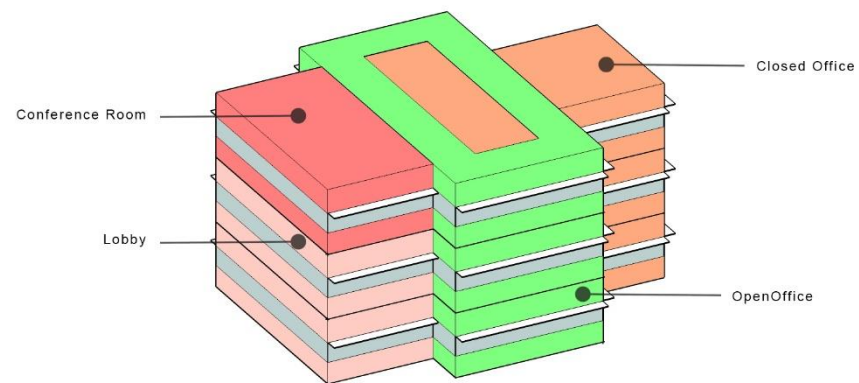
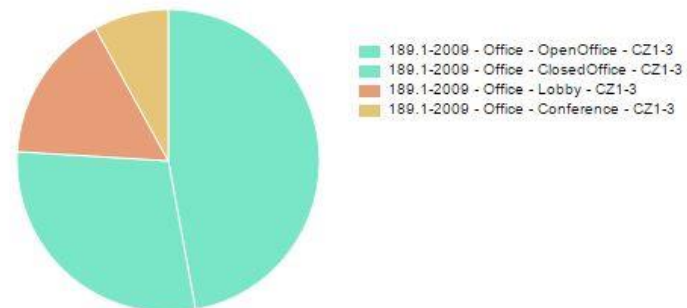
MELBOURNE.....

WINNIPEG.....

# THE MODEL



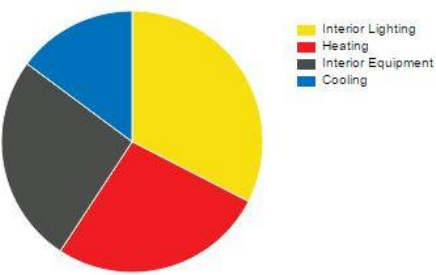
Space Type Breakdown - view table



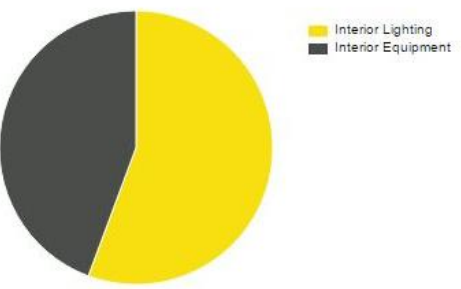
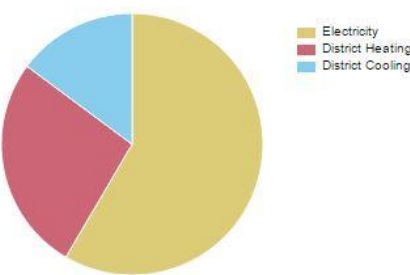


# Annual Overview

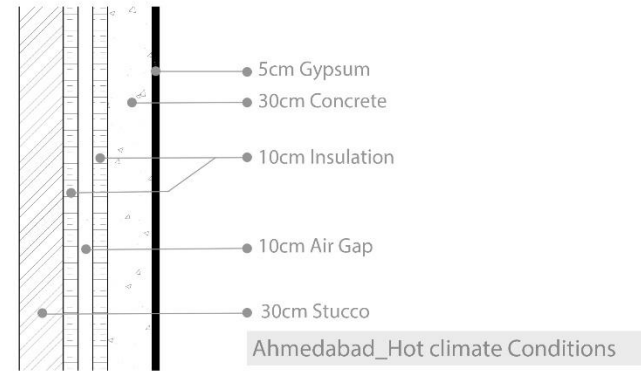
End Use - view table



Energy Use - view table



EUI - Gas - view table



## 1-AHMEDABAD QUITO - EC

### End Uses

|                    | Electricity [GJ] | Natural Gas [GJ] | Additional Fuel [GJ] | District Cooling [GJ] | District Heating [GJ] | Water [m3] |
|--------------------|------------------|------------------|----------------------|-----------------------|-----------------------|------------|
| Heating            | 0.00             | 0.00             | 0.00                 | 0.00                  | 1.62                  | 0.00       |
| Cooling            | 0.00             | 0.00             | 0.00                 | 456.32                | 0.00                  | 0.00       |
| Interior Lighting  | 80.58            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Lighting  | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Interior Equipment | 64.14            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Equipment | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Fans               | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Pumps              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Rejection     | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Humidification     | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Recovery      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Water Systems      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Refrigeration      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Generators         | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
|                    |                  |                  |                      |                       |                       |            |
| Total End Uses     | 144.72           | 0.00             | 0.00                 | 456.32                | 1.62                  | 0.00       |

Note: District heat appears to be the principal heating source based on energy usage.

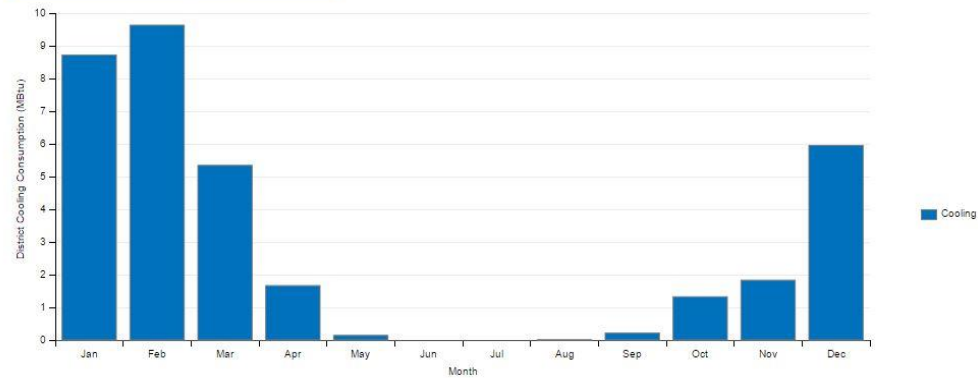
## End Uses

|                    | Electricity [GJ] | Natural Gas [GJ] | Additional Fuel [GJ] | District Cooling [GJ] | District Heating [GJ] | Water [m3] |
|--------------------|------------------|------------------|----------------------|-----------------------|-----------------------|------------|
| Heating            | 0.00             | 0.00             | 0.00                 | 0.00                  | 1.39                  | 0.00       |
| Cooling            | 0.00             | 0.00             | 0.00                 | 377.73                | 0.00                  | 0.00       |
| Interior Lighting  | 80.58            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Lighting  | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Interior Equipment | 64.14            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Equipment | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Fans               | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Pumps              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Rejection     | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Humidification     | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Recovery      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Water Systems      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Refrigeration      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Generators         | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
|                    |                  |                  |                      |                       |                       |            |
| Total End Uses     | 144.72           | 0.00             | 0.00                 | 377.73                | 1.39                  | 0.00       |

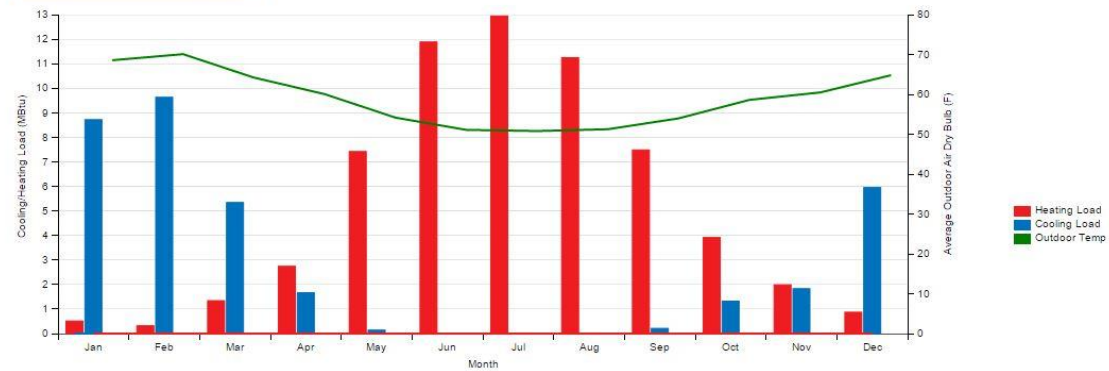
*Note: District heat appears to be the principal heating source based on energy usage.*

# 1-AHMEDABAD QUITO - EC

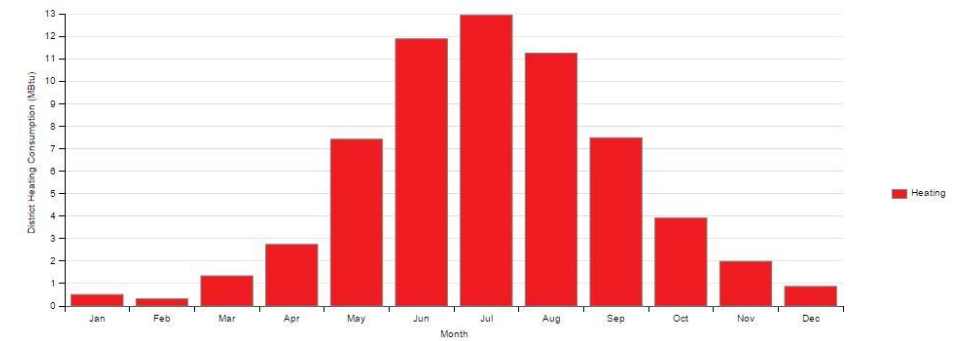
District Cooling Consumption (MBtu) - view table



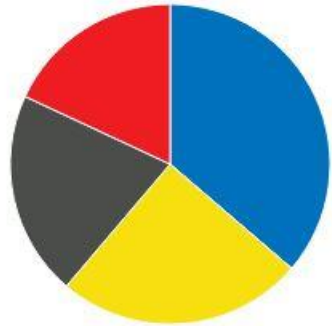
Monthly Load Profiles - view table



District Heating Consumption (MBtu) - view table

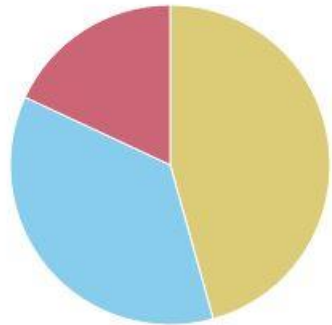


End Use - view table

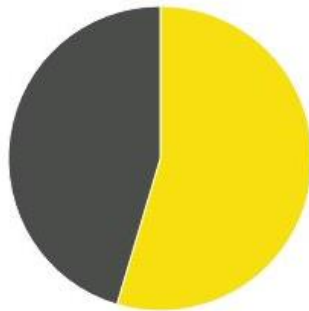


Cooling  
 Interior Lighting  
 Interior Equipment  
 Heating

Energy Use - view table



Electricity  
 District Cooling  
 District Heating

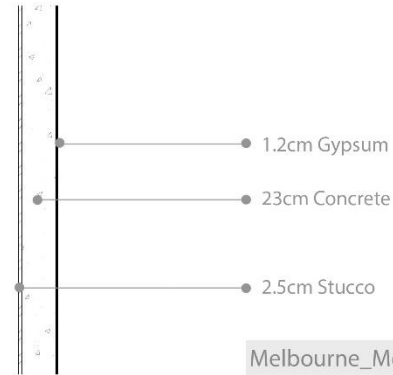


Interior Lighting  
 Interior Equipment

EUI - Gas - view table

## Building Area

|                               | Area [m2] |
|-------------------------------|-----------|
| Total Building Area           | 624.00    |
| Net Conditioned Building Area | 624.00    |
| Unconditioned Building Area   | 0.00      |



Melbourne\_Moderate climate Conditions



## 2-MELBOURNE QUITO - EC

## End Uses

|                    | Electricity [GJ] | Natural Gas [GJ] | Additional Fuel [GJ] | District Cooling [GJ] | District Heating [GJ] | Water [m3] |
|--------------------|------------------|------------------|----------------------|-----------------------|-----------------------|------------|
| Heating            | 0.00             | 0.00             | 0.00                 | 0.00                  | 80.99                 | 0.00       |
| Cooling            | 0.00             | 0.00             | 0.00                 | 50.97                 | 0.00                  | 0.00       |
| Interior Lighting  | 80.58            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Lighting  | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Interior Equipment | 64.14            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Equipment | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Fans               | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Pumps              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Rejection     | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Humidification     | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Recovery      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Water Systems      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Refrigeration      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Generators         | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Total End Uses     | 144.72           | 0.00             | 0.00                 | 50.97                 | 80.99                 | 0.00       |

Note: District heat appears to be the principal heating source based on energy usage.



### Building Area

|                               | Area [m2] |
|-------------------------------|-----------|
| Total Building Area           | 624.00    |
| Net Conditioned Building Area | 624.00    |
| Unconditioned Building Area   | 0.00      |

### End Uses

|                    | Electricity [GJ] | Natural Gas [GJ] | Additional Fuel [GJ] | District Cooling [GJ] | District Heating [GJ] | Water [m3] |
|--------------------|------------------|------------------|----------------------|-----------------------|-----------------------|------------|
| Heating            | 0.00             | 0.00             | 0.00                 | 0.00                  | 55.85                 | 0.00       |
| Cooling            | 0.00             | 0.00             | 0.00                 | 112.27                | 0.00                  | 0.00       |
| Interior Lighting  | 77.16            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Lighting  | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Interior Equipment | 64.14            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Equipment | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Fans               | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Pumps              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Rejection     | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Humidification     | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Recovery      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Water Systems      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Refrigeration      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Generators         | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
|                    |                  |                  |                      |                       |                       |            |
| Total End Uses     | 141.30           | 0.00             | 0.00                 | 112.27                | 55.85                 | 0.00       |

Note: District heat appears to be the principal heating source based on energy usage.

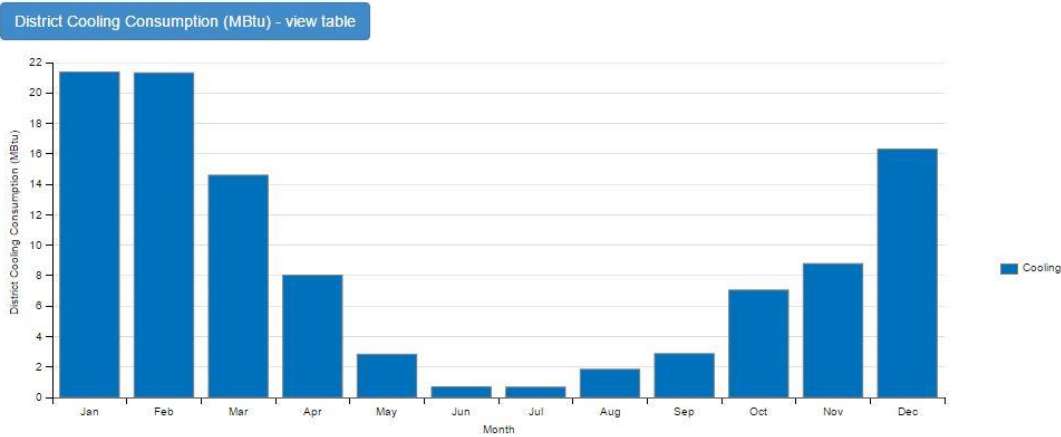
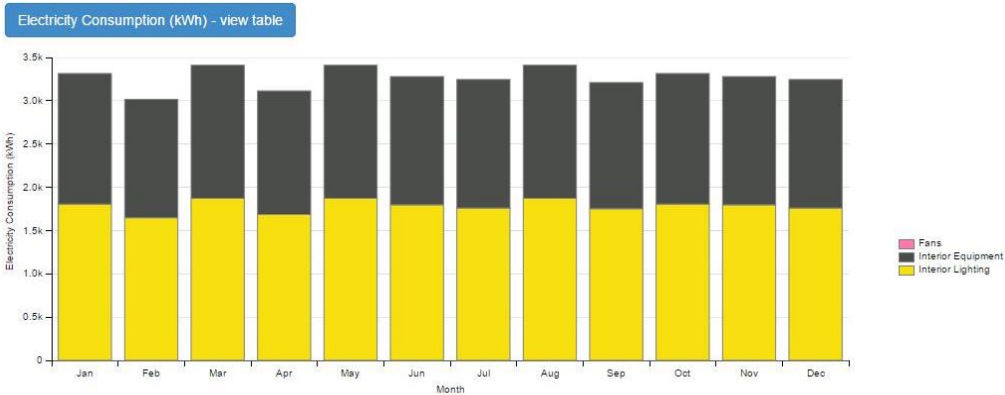


**2-MELBOURNE  
QUITO - EC**

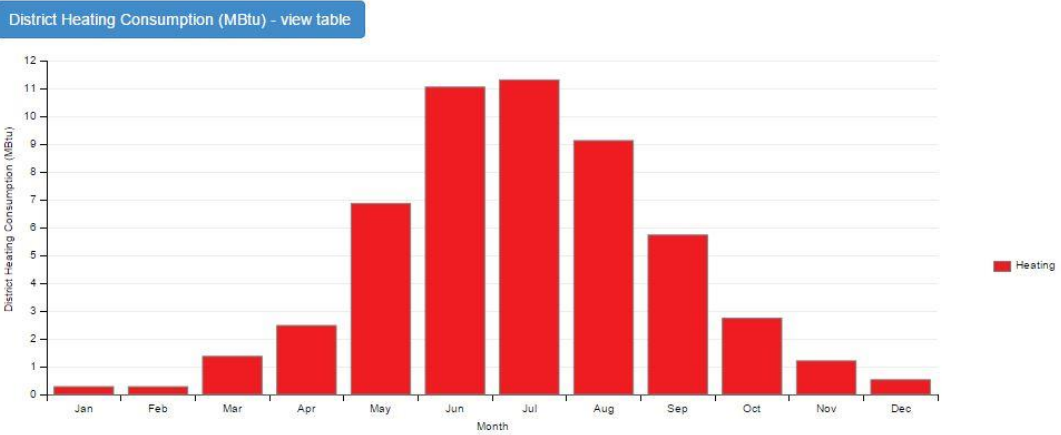
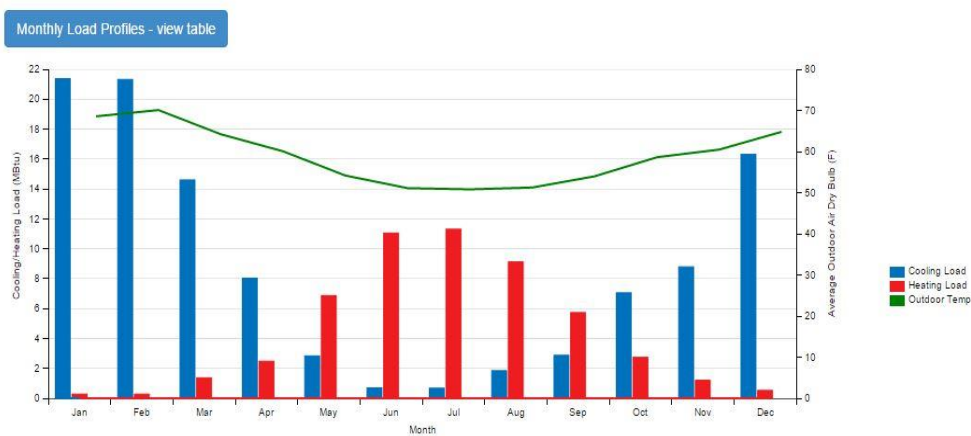


# 2-MELBOURNE QUITO - EC

## Monthly Overview



## HVAC Load Profiles



2-MELBOURNE  
QUITO - EC

MELBOURNE: RESULTS WITH DEFAULT CONSTRUCTION SET

Program Version:EnergyPlus, Version 8.9.0-eba93e8e1b, YMD=2018.12.20 21:32

Tabular Output Report in Format: HTML

Building: Building 1

Environment: RUN PERIOD 1 \*\* Melbourne VIC AUS RMY WMO#=948680

Simulation Timestamp: 2018-12-20 21:32:57

Report: Annual Building Utility Performance Summary

For: Entire Facility

Timestamp: 2018-12-20 21:32:57

Values gathered over 8760.00 hours

Site and Source Energy

|                     | Total Energy [GJ] | Energy Per Total Building Area [MJ/m2] | Energy Per Conditioned Building Area [MJ/m2] |
|---------------------|-------------------|--|--|
| Total Site Energy   | 276.68            | 443.39                                 | 443.39                                       |
| Net Site Energy     | 276.68            | 443.39                                 | 443.39                                       |
| Total Source Energy | 804.76            | 1289.68                                | 1289.68                                      |
| Net Source Energy   | 804.76            | 1289.68                                | 1289.68                                      |

End Uses By Subcategory

|                    | Subcategory          | Electricity [GJ] | Natural Gas [GJ] | Additional Fuel [GJ] | District Cooling [GJ] | District Heating [GJ] | Water [m3] |
|--------------------|----------------------|------------------|------------------|----------------------|-----------------------|-----------------------|------------|
| Heating            | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | \$0.99                | 0.00       |
| Cooling            | General              | 0.00             | 0.00             | 0.00                 | \$0.97                | 0.00                  | 0.00       |
| Interior Lighting  | General              | 80.58            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Lighting  | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Interior Equipment | General              | 64.14            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Equipment | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Fans               | Ventilation (simple) | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Pumps              | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Rejection     | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Humidification     | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Recovery      | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Water Systems      | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Refrigeration      | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Generators         | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |

Normalized Metrics

Utility Use Per Conditioned Floor Area

|          | Electricity Intensity [MJ/m2] | Natural Gas Intensity [MJ/m2] | Additional Fuel Intensity [MJ/m2] | District Cooling Intensity [MJ/m2] | District Heating Intensity [MJ/m2] | Water Intensity [m3/m2] |
|----------|-------------------------------|-------------------------------|-----------------------------------|------------------------------------|------------------------------------|-------------------------|
| Lighting | 129.13                        | 0.00                          | 0.00                              | 0.00                               | 0.00                               | 0.00                    |
| HVAC     | 0.00                          | 0.00                          | 0.00                              | \$1.69                             | 129.78                             | 0.00                    |
| Other    | 102.78                        | 0.00                          | 0.00                              | 0.00                               | 0.00                               | 0.00                    |
| Total    | 231.92                        | 0.00                          | 0.00                              | \$1.69                             | 129.78                             | 0.00                    |

MELBOURNE: RESULTS WITH CUSTOM CONSTRUCTION SET

Program Version:EnergyPlus, Version 8.9.0-eba93e8e1b, YMD=2018.12.20 21:21

Tabular Output Report in Format: HTML

Building: Building 1

Environment: RUN PERIOD 1 \*\* Melbourne VIC AUS RMY WMO#=948680

Simulation Timestamp: 2018-12-20 21:21:36

Report: Annual Building Utility Performance Summary

For: Entire Facility

Timestamp: 2018-12-20 21:21:36

Values gathered over 8760.00 hours

Site and Source Energy

|                     | Total Energy [GJ] | Energy Per Total Building Area [MJ/m2] | Energy Per Conditioned Building Area [MJ/m2] |
|---------------------|-------------------|--|--|
| Total Site Energy   | 309.42            | 495.86                                 | 495.86                                       |
| Net Site Energy     | 309.42            | 495.86                                 | 495.86                                       |
| Total Source Energy | 767.83            | 1230.49                                | 1230.49                                      |
| Net Source Energy   | 767.83            | 1230.49                                | 1230.49                                      |

End Uses By Subcategory

|                    | Subcategory          | Electricity [GJ] | Natural Gas [GJ] | Additional Fuel [GJ] | District Cooling [GJ] | District Heating [GJ] | Water [m3] |
|--------------------|----------------------|------------------|------------------|----------------------|-----------------------|-----------------------|------------|
| Heating            | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | \$5.85                | 0.00       |
| Cooling            | General              | 0.00             | 0.00             | 0.00                 | 112.27                | 0.00                  | 0.00       |
| Interior Lighting  | General              | 77.16            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Lighting  | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Interior Equipment | General              | 64.14            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Equipment | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Fans               | Ventilation (simple) | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Pumps              | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Rejection     | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Humidification     | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Recovery      | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Water Systems      | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Refrigeration      | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Generators         | General              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |

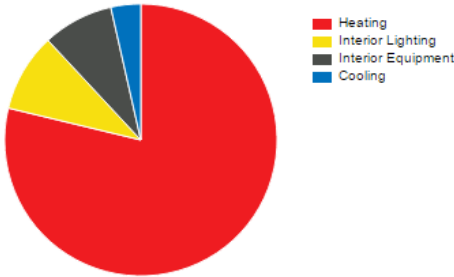
Normalized Metrics

Utility Use Per Conditioned Floor Area

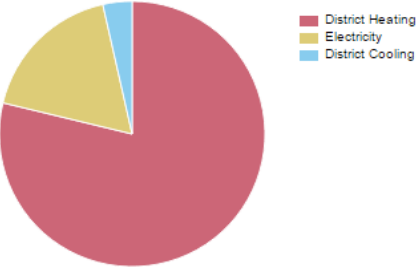
|          | Electricity Intensity [MJ/m2] | Natural Gas Intensity [MJ/m2] | Additional Fuel Intensity [MJ/m2] | District Cooling Intensity [MJ/m2] | District Heating Intensity [MJ/m2] | Water Intensity [m3/m2] |
|----------|-------------------------------|-------------------------------|-----------------------------------|------------------------------------|------------------------------------|-------------------------|
| Lighting | 123.66                        | 0.00                          | 0.00                              | 0.00                               | 0.00                               | 0.00                    |
| HVAC     | 0.00                          | 0.00                          | 0.00                              | 179.91                             | \$9.51                             | 0.00                    |
| Other    | 102.78                        | 0.00                          | 0.00                              | 0.00                               | 0.00                               | 0.00                    |
| Total    | 226.44                        | 0.00                          | 0.00                              | 179.91                             | \$9.51                             | 0.00                    |

Annual Overview

End Use - view table

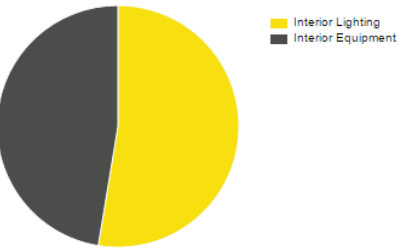


Energy Use - view table

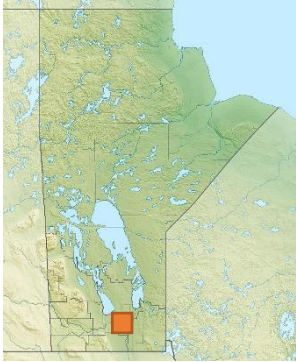
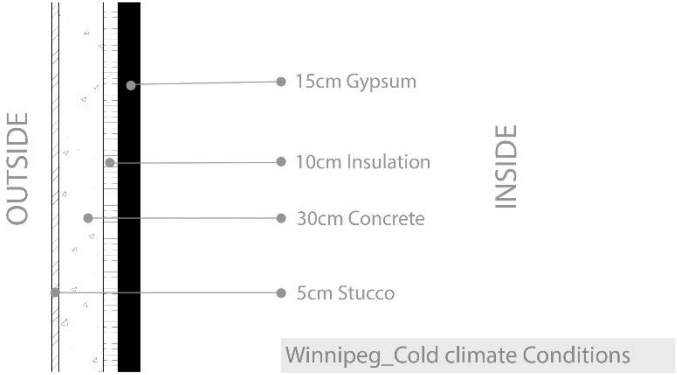


EUI - Electricity - view table

EUI - Electricity - view table



EUI - Gas - view table



3-WINNIPEG  
QUITO - EC

End Uses

|                    | Electricity [GJ] | Natural Gas [GJ] | Additional Fuel [GJ] | District Cooling [GJ] | District Heating [GJ] | Water [m3] |
|--------------------|------------------|------------------|----------------------|-----------------------|-----------------------|------------|
| Heating            | 0.00             | 0.00             | 0.00                 | 0.00                  | 679.17                | 0.00       |
| Cooling            | 0.00             | 0.00             | 0.00                 | 35.14                 | 0.00                  | 0.00       |
| Interior Lighting  | 80.58            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Lighting  | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Interior Equipment | 64.14            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Equipment | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Fans               | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Pumps              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Rejection     | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Humidification     | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Recovery      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Water Systems      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Refrigeration      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Generators         | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
|                    |                  |                  |                      |                       |                       |            |
| Total End Uses     | 144.72           | 0.00             | 0.00                 | 35.14                 | 679.17                | 0.00       |

Note: District heat appears to be the principal heating source based on energy usage.



### 3-WINNIPEG QUITO - EC

#### End Uses

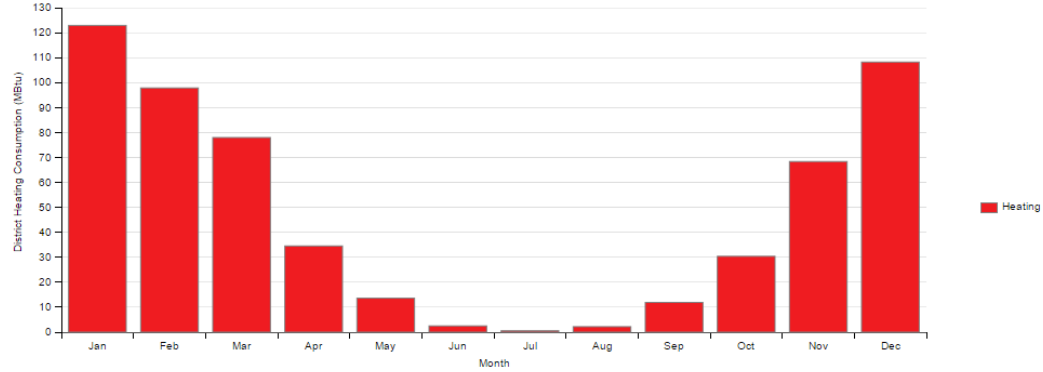
|                    | Electricity [GJ] | Natural Gas [GJ] | Additional Fuel [GJ] | District Cooling [GJ] | District Heating [GJ] | Water [m3] |
|--------------------|------------------|------------------|----------------------|-----------------------|-----------------------|------------|
| Heating            | 0.00             | 0.00             | 0.00                 | 0.00                  | 602.46                | 0.00       |
| Cooling            | 0.00             | 0.00             | 0.00                 | 27.08                 | 0.00                  | 0.00       |
| Interior Lighting  | 71.19            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Lighting  | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Interior Equipment | 64.14            | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Exterior Equipment | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Fans               | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Pumps              | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Rejection     | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Humidification     | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Heat Recovery      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Water Systems      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Refrigeration      | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
| Generators         | 0.00             | 0.00             | 0.00                 | 0.00                  | 0.00                  | 0.00       |
|                    |                  |                  |                      |                       |                       |            |
| Total End Uses     | 135.32           | 0.00             | 0.00                 | 27.08                 | 602.46                | 0.00       |

*Note: District heat appears to be the principal heating source based on energy usage.*

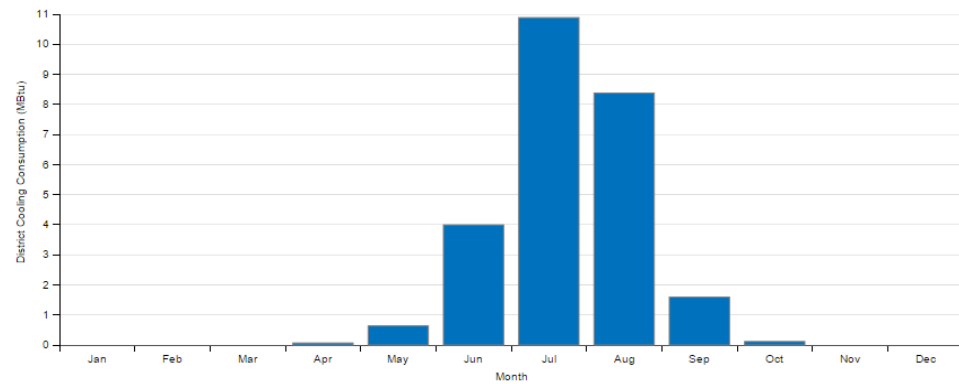


# 3-WINNIPEG QUITO - EC

District Heating Consumption (MBtu) - view table



District Cooling Consumption (MBtu) - view table



## HVAC Load Profiles

Monthly Load Profiles - view table

