Environmental System I

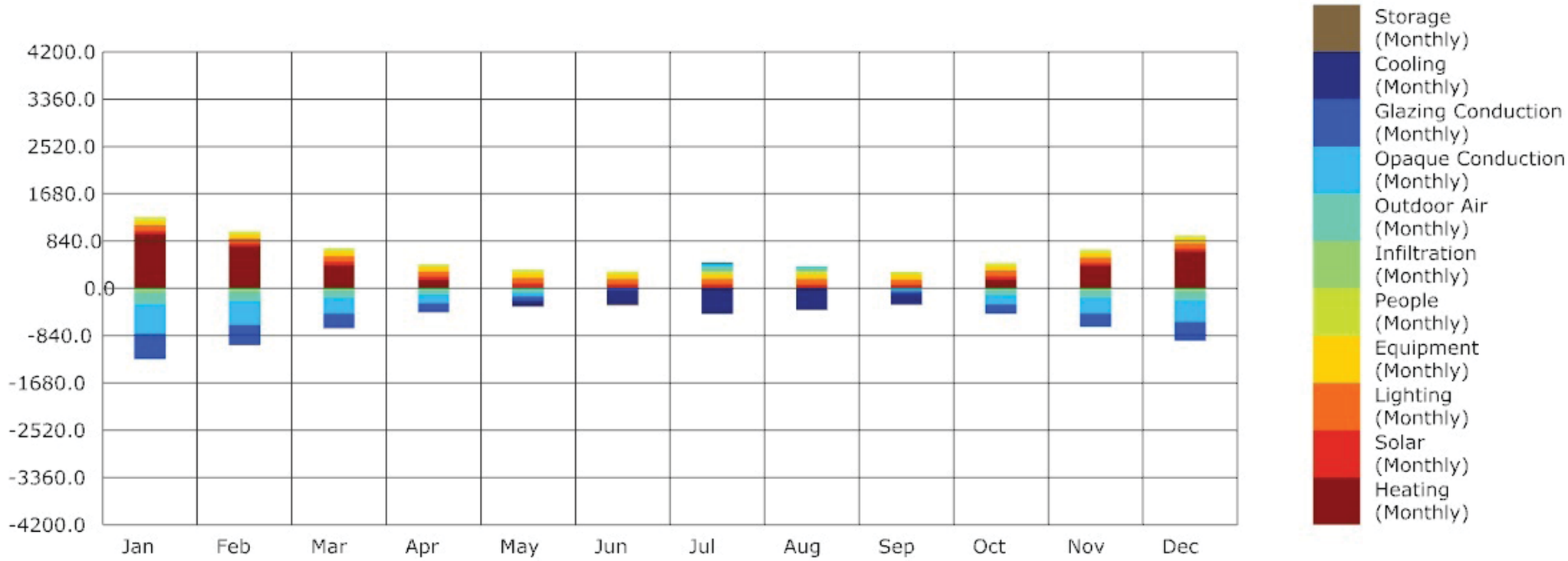
Nov 12th Assignment: Energy Balance

Bingyu Wang

Total Load

ARCH633 Environmental Systems I

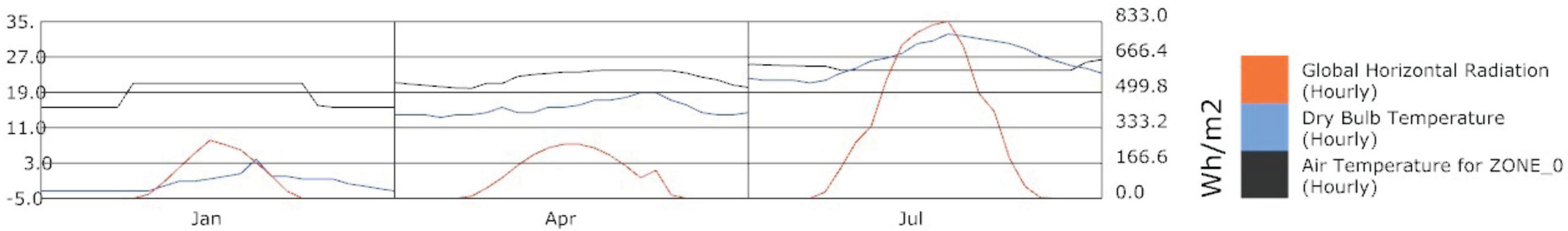
Cooling Load: 45.60 kWh/m2
Heating Load: 118.12 kWh/m2
Total Load: 163.72 kWh/m2



Based on the study, I found that the the factors that are affecting the total load of the container are Window to Wall Ratio, Blinds, Construction, and Thermal Mass. Among these factors, the most effective ones are the Exterior Wall dimension and the Exterior Roof dimension. Both these two factors have a negative relativity to the total load which means that while the thickness of the exterior wall and the thickness of the exterior roof increases, the total load of the container decreases.

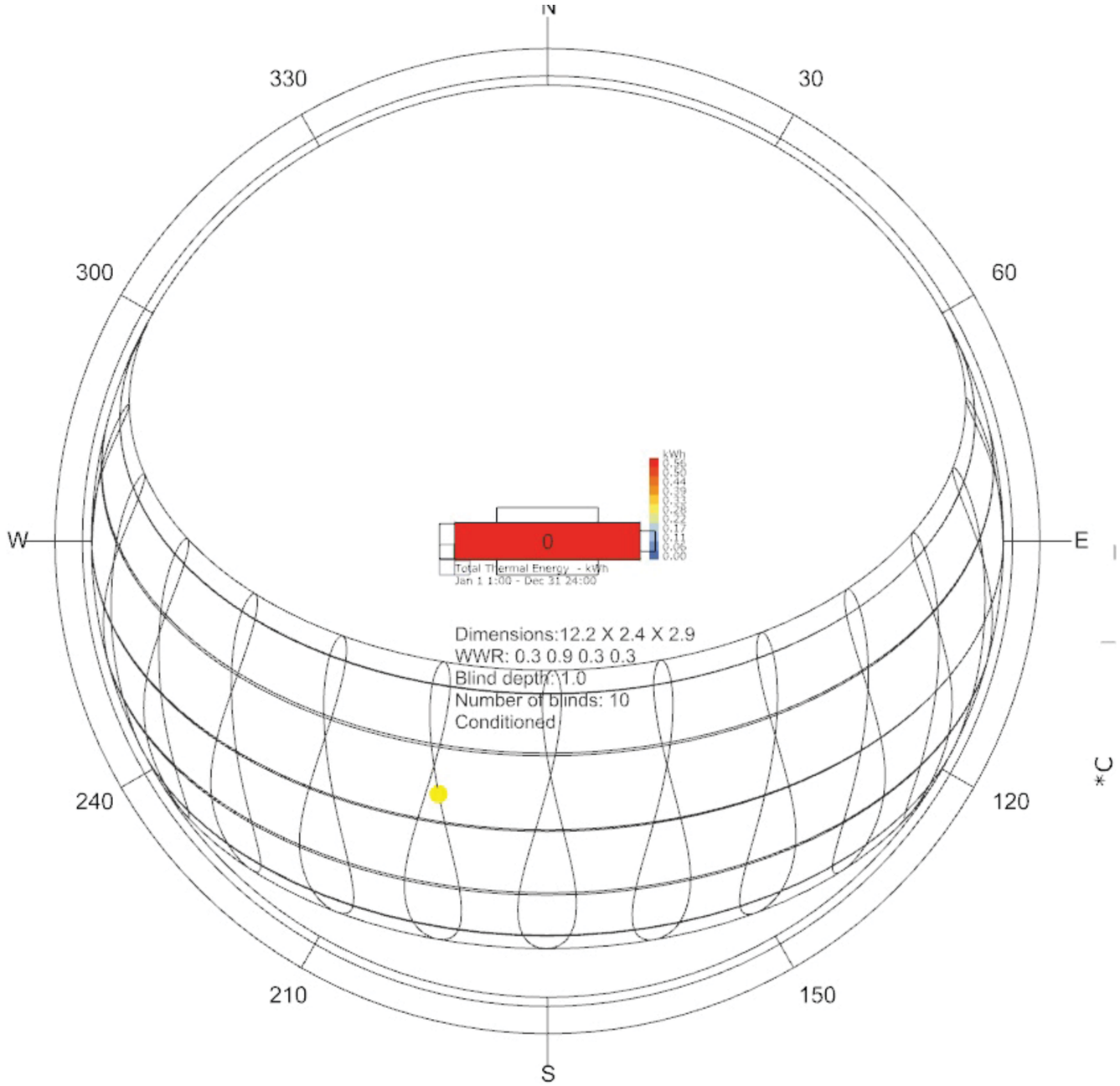
The least amount of total load I get from applying changes is 163.72 kWh/m2.

Temperature Range



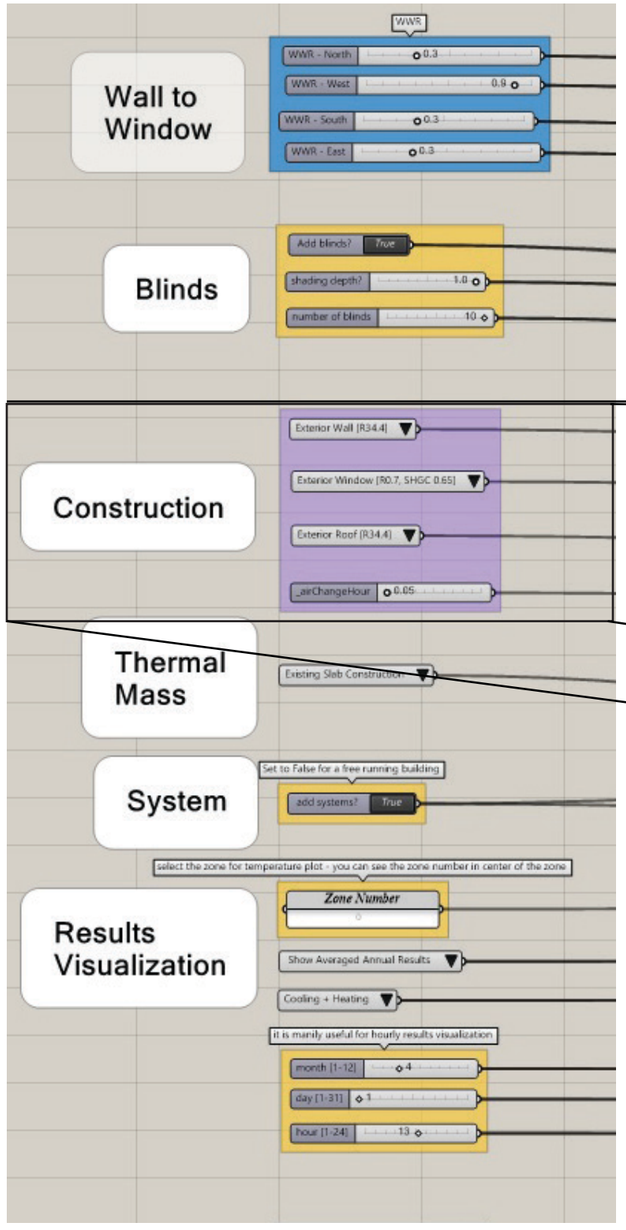
The temperature range inside the container without systems after all the changes differs from summer to winter.
The dry bulb temperature range in summer is from 23 °C to 32 °C, while in winter it is from -4 °C to 4 °C.
The air temperature for for Zone_0 in summer ranges from 24 °C to 26.5 °C, while in winter it ranges from 16 °C to 23 °C.

Sun Path Diagram



Sun-Path Diagram - Latitude: 39.87
1 APR 13:00, ALT = 52.88, AZM = 203.29

GH Script



The two most effective factors:

1) Exterior Wall Thickness
2) Exterior Roof Thickness