**Supplementary materials:**

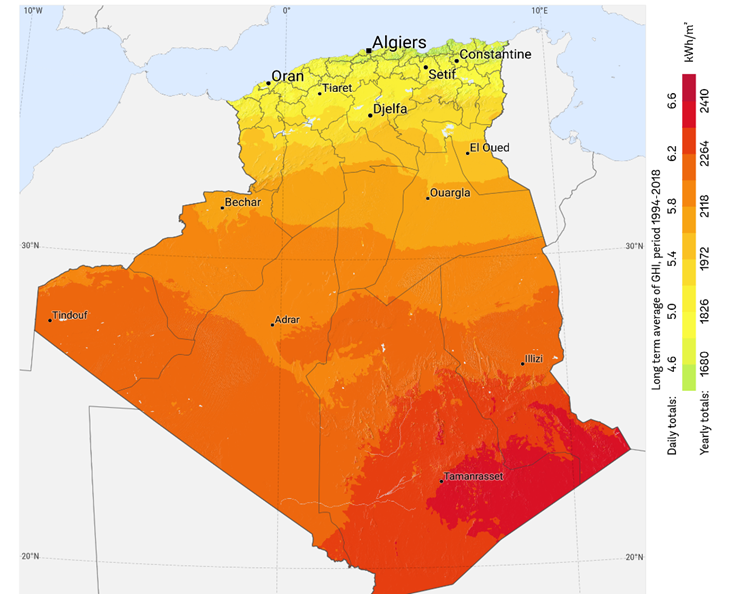


Fig. S1: Global horizontal irradiation in Algeria (‘‘Solar resource maps and GIS data) [40]

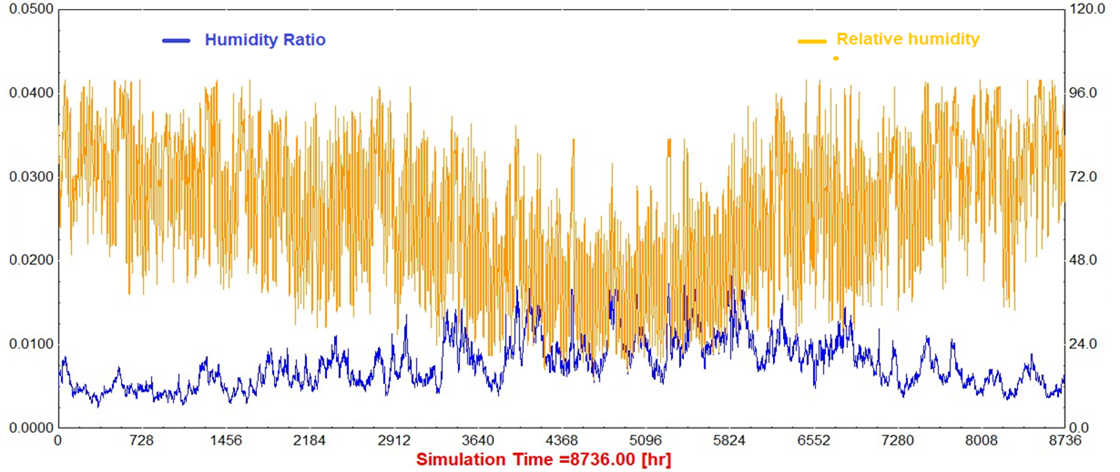


Fig. S2: Profile of the humidity of Souk Ahras.

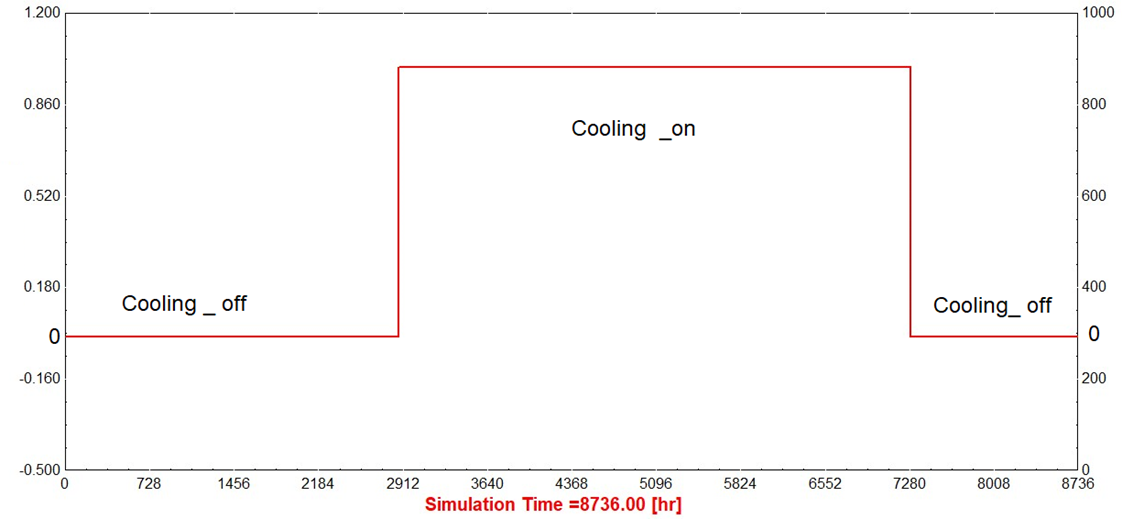


Fig. S3: The cooling season in the city of Souk Ahras.

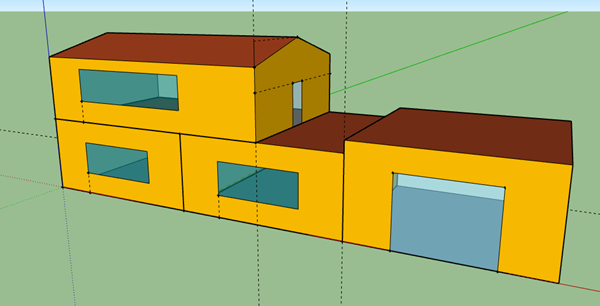


Fig. S4: Office building 3D-Modele.

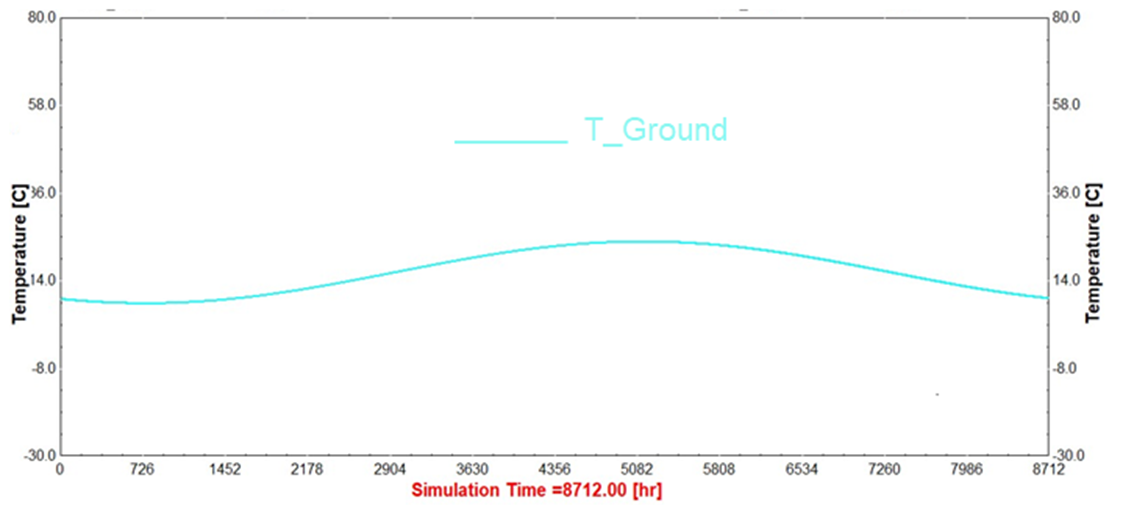


Fig. S5: variation of ground temperature

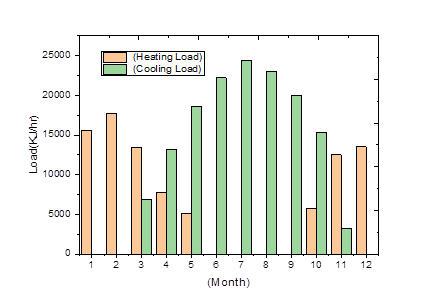
 Fig. S6: Profile of cooling and heating load variations for the whole year

Table S1 : Building parameters and materials.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| U-value  (W/m2.K) | R-value (h.m2.K/Kj) | Density  (kg/m3) | Capacity  (kj/kg.k) | Conductivity  (Kj/hr.m.k) | Thickness  (m) | layer | wall type |
| 0.25 | - | 1250 | 1.1 | 1.5 | 0.01 | Finish | Ext-Wall |
| - | 900 | 0.8 | 2.4 | 0.15 | Heavy weight concrete |
| 0.044 | - | - | - | - | Airspace |
| - | 2000 | 0.9 | 4.8 | 0.1 | Brick |
| 0.358 | - | 900 | 1 | 0.756 | 0.013 | GPIS | Aj-wall |
| - | 60 | 1 | 0.144 | 0.1 | MIWO |
| - | 900 | 1 |  | 0.013 | GPIS |
| 0.124 | - | 1250 | 1.1 | 1.5 | 0.01 | Finish | Rof |
| - | 800 | 0.6 | 2.4 | 0.12 | Light coccrete |
| - | 500 | 1 | 2 | 0.05 | Plaster |

Table S2: Dimensions of the building and rooms

|  |  |  |  |
| --- | --- | --- | --- |
| Capacitance kj/k | Volume m3 | floor area m2 |  |
| 268.8 | 224 | 64 | Zone 1 |
| 268.8 | 224 | 64 | Zone 2 |
| 403.2 | 336 | 96 | Zone 3 |
| 307.2 | 256 | 64 | Zone 4 |