DEPARTMANT OF INFORMATION TECHNOLOGIES

Istanbul Solar Energy Potential Map General Information

1. ISTANBUL SOLAR ENERGY POTENTIAL MAP

Solar maps are a very important source of information about which solar panels, which are the first in the field of environmental energy systems, should be placed on the roofs of buildings, in which directions and in which positions.

The production parameters, legends and environmental effects used in the creation of the Istanbul Solar Energy Potential Map prepared by the Istanbul Metropolitan Municipality Information Processing Department are given in Section 1.1., Section 1.2. and available in Section 1.3.

1.1. General Information

While creating the map, the "Digital Surface Model" of 5345 km2, 25 cm sensitive, produced from the 2013 LiDAR (Light Detection and Ranging, Ray Detection) data of Istanbul was used.

The map was calculated as a result of the analysis of sunshine duration data taken every 14 days in a 6-month period (1 January - 31 June). While making the calculations, solar energy values taken in 30-minute periods from sunrise to sunset during the day were used.

The algorithm used in producing the map; It evaluates the solar energy values calculated at 30-minute intervals together. In this way, the shadow and other effects that the obstructing objects around the roofs will create on the panel are taken into account at the optimum level.

By using high-precision (25cm) Digital Surface Model (DSM) data in the calculations, the instantaneous position of the sun, the position of the calculated roof on the earth and the geometric shape, direction and rotation of the roofs were evaluated together.

1.2. Production Parameters Used

All parameters used are included in the calculations by taking the most appropriate values;

Sky wiew factor

Local sky view factor

Water vopur pressure (mbar)

Latitude (degree)

Longitude (degree)

Direct insolation

Diffuse insolation

Total insolation

Direct to diffuse ratio

Duration of insolation

Sunrise

Sunset

Solar constant- The solar energy constant was taken as 1367 (W/ m^2).

Local sky view factor parameter is taken into account.

kWh/ m^2 was used as the unit.

The latitude value was taken as 41'0"60 for the whole of Istanbul.

Planetary bending: 6 parameters

Time Period;

time period = range of days

With the energy values taken every half hour in 24 hours

Measurements made at 14-day intervals

1 january-30 june

DSM data produced from 2013 Lidar data was used.

Atmospheric effects: height of atmosphere and vapour pressure

Height of atmosphere (m): 12000

water vapour pressure (mbar): 10

1.3.   Map Addresses and Legends Used

1.3.1. Istanbul Solar Energy Potential Map Diffuse

URL	https://api.ibb.gov.tr/cbsaltlik/arcgis/services/SolarHaritaDiffuseWM/MapServer/WMSServer?request=GetCapabilities&service=WMS

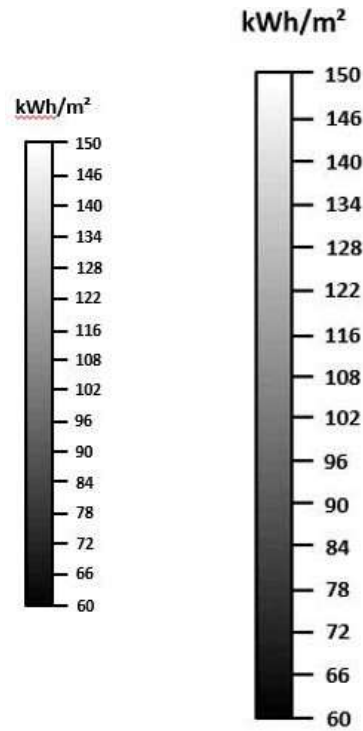The legends used in the relevant map are as follows;

Figure 1.1. Istanbul Solar Energy Potential Map Diffuse legends

1.3.2. Istanbul Solar Energy Potential Map Color

URL	https://api.ibb.gov.tr/cbsaltlik/arcgis/services/SolarHaritaRenkliWM/MapServer/WMSServer?request=GetCapabilities&service=WMS

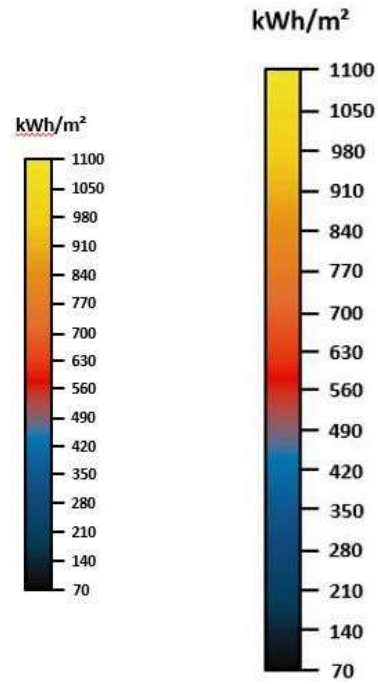The legends used in the relevant map are as follows;

Figure 1.2. Istanbul Solar Energy Potential Map Colored Legends

1.3.3. Istanbul Solar Energy Potential Map Black and White

URL	https://api.ibb.gov.tr/cbsaltlik/arcgis/services/SolarHaritaWM/MapServer/WMSServer?request=GetCapabilities&service=WMS

The legends used in the relevant map are as follows;

kWh/m²

—	1100
—	1050
—	980
—	910
—	840
—	770
—	700
—	630
—	560
—	490
—	420
—	350
—	280
—	210
—	140
—	70

kWh/m²

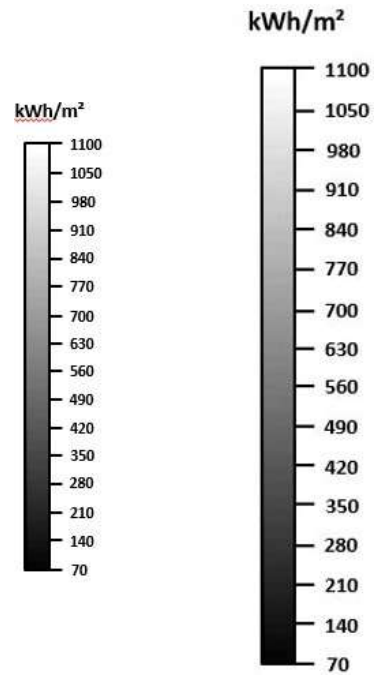|	
—	1100
—	1050
—	980
—	910
—	840
—	770
—	700
—	630
—	560
—	490
—	420
—	350
—	280
—	210
—	140
—	70

Figure 1.3. Istanbul Solar Energy Potential Map Black and White Legends