

Team project

Hybrid Renewable Modeling for Yeon Hwa Island using HOMER

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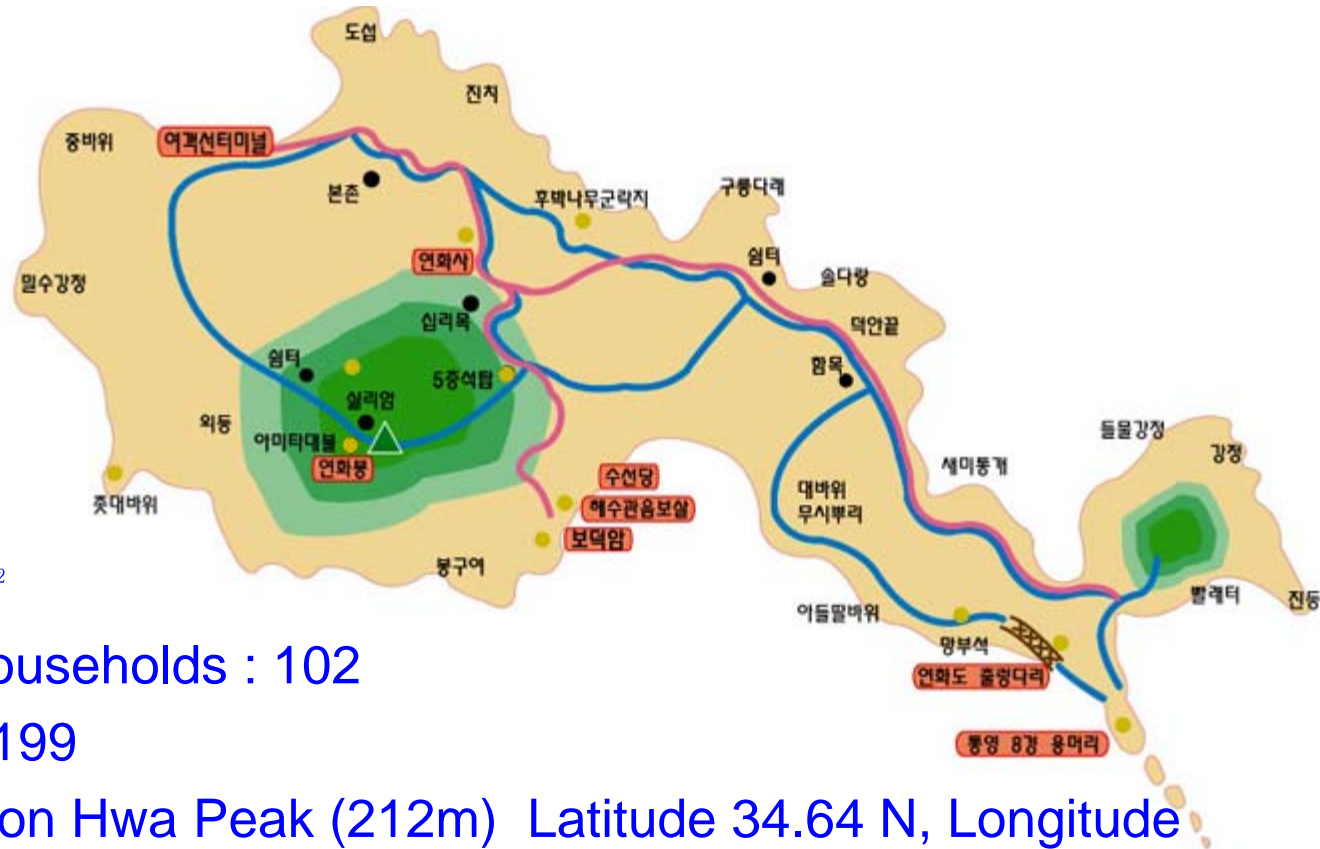
Goal

- Provide light to Yeon Hwa....

Mission

- Hybrid System Design using HOMER (Hybrid Optimization Model for Electric Renewables) for Optimal Utilization of the Renewable Energy Resources

Yeon Hwa Island



- Area : 3.41 km²
- Number of households : 102
- Population : 199
- Location : Yeon Hwa Peak (212m) Latitude 34.64 N, Longitude 128.35 E
- Costal Perimeter : 12.5km
- Tourist Facility : 16 (average 5 rooms) Home stay places
- Transportation: 1 hour by ferry from Tong Young

Primary Load Profile

Primary Load Inputs

File Edit Help

Choose a load type (AC or DC), enter 24 hourly values in the load table, and enter a scaled annual average. Each of the 24 values in the load table is the average electric demand for a single hour of the day. HOMER replicates this profile throughout the year unless you define different load profiles for different months or day types. For calculations, HOMER uses scaled data: baseline data scaled up or down to the scaled annual average value.

Hold the pointer over an element or click Help for more information.

Label: Load type: AC DC Data source: Enter daily profile(s) Import time series data file

Baseline data

Month: Day type:

Hour	Load (kW)
02:00 - 03:00	7.500
03:00 - 04:00	10.000
04:00 - 05:00	22.000
05:00 - 06:00	45.000
06:00 - 07:00	45.000
07:00 - 08:00	85.000
08:00 - 09:00	80.000
09:00 - 10:00	95.000
10:00 - 11:00	95.000
11:00 - 12:00	105.000
12:00 - 13:00	105.000
13:00 - 14:00	120.000

Daily Profile

DMap

Seasonal Profile

Random variability

Day-to-day: %

Time-step-to-time-step: %

Scaled annual average (kWh/d): {..}

	Baseline	Scaled
Average (kWh/d)	2,010	2,010
Average (kW)	83.7	83.8
Peak (kW)	268	268
Load factor	0.312	0.312

Resource Data

Latitude and Longitude Finder

연화도


Search place name or
Click on map to get lat long coordinates.

Latitude:
Longitude:

Map Mouse Over Lat & Long

Lat:
Long:

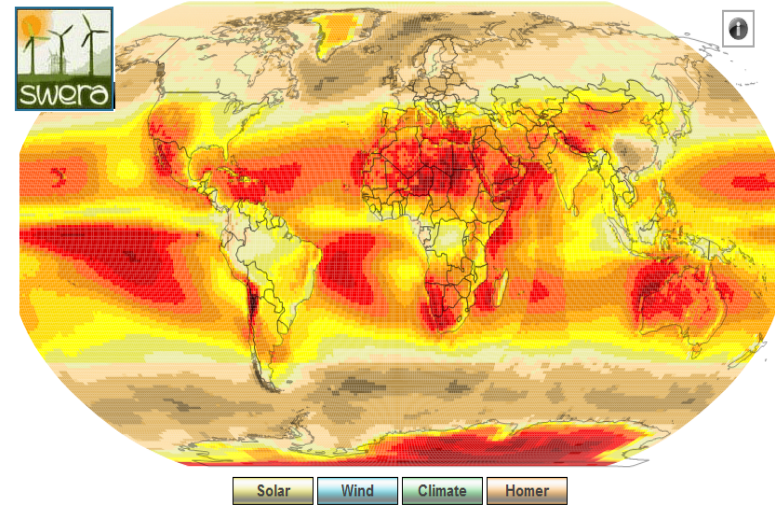
16 11
Like +1



Solar and Wind Energy Resource Assessment

A United Nations Environment Programme facilitated effort.

Getting Started Data Sets Analysis Tools About SWERA




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Solar Resource

Solar Resource Inputs

File Edit Help

 HOMER uses the solar resource inputs to calculate the PV array power for each hour of the year. Enter the latitude, and either an average daily radiation value or an average clearness index for each month. HOMER uses the latitude value to calculate the average daily radiation from the clearness index and vice-versa.

Hold the pointer over an element or click Help for more information.

Location

Latitude ° ' North South Time zone

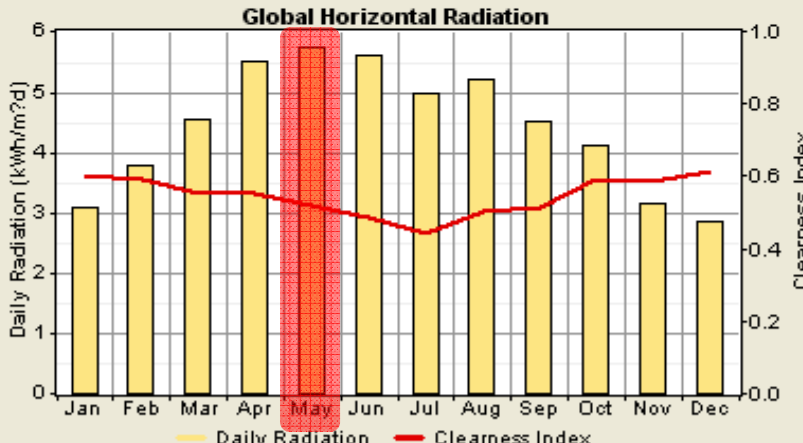
Longitude ° ' East West

Data source: Enter monthly averages Import time series data file

Baseline data

Month	Clearness Index	Daily Radiation (kWh/m ² /d)
January	0.603	3.070
February	0.589	3.780
March	0.552	4.540
April	0.552	5.500
May	0.517	5.740
June	0.485	5.590
July	0.440	4.970
August	0.504	5.220
September	0.514	4.520
October	0.593	4.110
November	0.584	3.140
December	0.611	2.860
Average:	0.531	4.422

Global Horizontal Radiation




Plot... Export... Help Cancel OK

Scaled annual average (kWh/m²/d) {..}

Wind Resource

Wind Resource Inputs

File Edit Help

 HOMER uses wind resource inputs to calculate the wind turbine power each hour of the year. Enter the average wind speed for each month. For calculations, HOMER uses scaled data: baseline data scaled up or down to the scaled annual average value. The advanced parameters allow you to control how HOMER generates the 8760 hourly values from the 12 monthly values in the table.

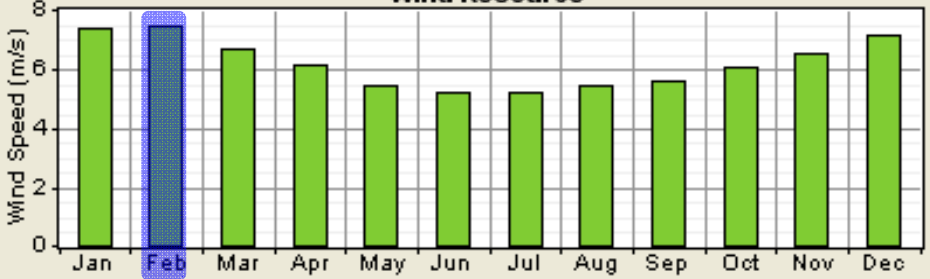
Hold the pointer over an element or click Help for more information.

Data source: Enter monthly averages Import time series data file

Baseline data

Month	Wind Speed (m/s)
January	7.360
February	7.490
March	6.690
April	6.100
May	5.420
June	5.170
July	5.220
August	5.430
September	5.620
October	6.070
November	6.510
December	7.110
Annual average:	6.175

Wind Resource



Other parameters

Altitude (m above sea level)

Anemometer height (m)

Advanced parameters

Weibull k

Autocorrelation factor

Diurnal pattern strength

Hour of peak windspeed

Scaled annual average (m/s) {2}

HOMER Code and simulation



Conclusions

- Zero-Energy Energy-Independence is difficult to achieve even with very good resource condition
- Economical Fuel Cells are key to future promise
- Possible Environmental and Aesthetic Concerns
- More detailed costs are needed to be embedded with HOMER software.
- Extra cost of delivering equipment would be another deterrent
- Good learning experience