.

# ANEJO Nº 10

# DIMENSIONAMIENTO DE LA INSTALACIÓN FOTOVOLTAICA

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# 1 CARACTERIZACIÓN DEL CONSUMO ELÉCTRICO

En la actualidad la Colectividad de Cuevas del Campo no dispone de ningún consumo eléctrico para el bombeo de agua de forma conjunta para toda la zona regable, ya que los regantes que tienen instalados riegos presurizados tienen bombeos individuales accionados con grupos electrógenos.

En el proyecto de la Fase I sólo se contemplaba un pequeño consumo para los servicios mínimos de la nave, tales como iluminación, alimentación de elementos de automatización y maniobras de válvulas motorizadas. Todo esto se solventó con una pequeña instalación fotovoltaica en cubierta con baterías para almacenamiento con una potencia de 5,40 kWp (módulos) / 5,00 kW (inversor) y apoyo grupo electrógeno diésel 12,5/13,1 kVA.

Sin embargo, en el presente proyecto de Fase II (y futura Fase III) se contempla la instalación de un conjunto de bombas que abastecerán el sector de bombeo, por lo que será necesario contar con un suministro de electricidad para su funcionamiento. La alternativa elegida será la autoproducción de energía mediante una instalación solar fotovoltaica con apoyo de energía eléctrica convencional (instalación de autoconsumo conectada a red).

# 2 PREDISEÑO DE LA POTENCIA A INSTALAR EN EL CAMPO FOTOVOLTAICO

En el Anejo nº 9 «Dimensionamiento del sistema de bombeo» se ha realizado la justificación y el dimensionamiento de las nuevas instalaciones de bombeo. Se pretende optimizar el consumo energético y para ello se dividirá el sistema de bombeo en dos grupos independientes de bombas, que darán lugar a dos subsectores: subsector de bombeo bajo (BB) y subsector de bombeo alto (BA).

En el presente proyecto de la Fase II se instarán los grupos de bombeo que abastecerán al subsector de bombeo bajo (BB), si bien el diseño del campo fotovoltaico hay que hacerlo en principio para la totalidad de potencia (por las canalizaciones, zanjas, conductores, tamaño de cuadros eléctricos, etc.), para posteriormente incluir en esta Fase II la parte que corresponda al bombeo bajo.

Con base en las bombas diseñadas se determina la potencia total, tanto instalada (potencia de motor) como consumida (potencia demandada en el punto de funcionamiento de la bomba), que servirá para el dimensionamiento de la instalación eléctrica y de las instalaciones de generación de energía (campo fotovoltaico y centro de transformación).

**Tabla 1**. Potencias de los grupos de bombeo

| | Q (l/s) | H (mca) | Potencia hidráulica (kW) | Potencia eléctrica (kW) | Potencia eléctrica mayorada (kW) (*) | Potencia motor (kW) |
|---|---|---|---|---|---|---|
| **BOMBEO BAJO** | 210 | 25 | 58,81 | 61,91 | 65 | 75,00 |
| **BOMBEO ALTO** | 130 | 50 | 77,69 | 81,78 | 85,87 | 90,00 |

(*) Se mayora un 5% la potencia eléctrica absorbida en el punto de funcionamiento

La potencia máxima instalada será:

**Potencia máxima instalada** = 75 kW x 2 bombas + 90 kW x 2 bombas = **330 kW**

La potencia máxima demandada en el punto de funcionamiento de la bomba:

**Potencia máxima demandada** = 65 kW x 2 bombas + 85,87 kW x 2 bombas = **301,74 kW**

**Como potencia máxima demandada (absorbida realmente por la bomba) se tomará 305 kW para compensar las pérdidas en cableados interiores de la estación de bombeo hasta los variadores de frecuencia.**

Las campañas de riego comienzan en marzo-abril dependiendo de la climatología de cada año y se extienden hasta mitad-finales de octubre, si las precipitaciones se retrasan. El presente proyecto se plantea con una planta fotovoltaica en autoconsumo sin excedentes, por lo que la energía generada se consumirá exclusivamente para alimentar las estaciones de bombeo. A tales efectos, se tomará como campaña de riegos los meses de marzo-abril-mayo-junio-julio-agosto-septiembre-octubre (8 meses en total).

El dimensionamiento del campo fotovoltaico se realizará de forma que la energía eléctrica a tomar de la red convencional sea la mínima posible y que este consumo de energía casi sólo se produzca por labores de mantenimiento del campo solar o por necesidades de riego tras varios días nublados con baja radiación.

De la instalación fotovoltaica saldrán los conductores con corriente continua hasta llegar a los variadores de frecuencia híbridos. Estos variadores tienen dos entradas de corriente: Una continua y otra alterna. El variador hace de inversor y convierte la corriente continua en alterna. La salida del variador irá directamente a alimentar una de las bombas. Si se desea mantener el sistema de bombeo funcionando en unas condiciones estables de caudal-presión, si la producción de energía del campo solar fuera más baja que la demandada por las bombas, tomará la energía restante de la red eléctrica.

La disponibilidad de una parcela con unas dimensiones y topografía adecuadas nos permite dimensionar una planta de aproximadamente 900 kWp. Esta planta se ejecutará en dos fases: una primera de unos 400 kWp para abastecer el subsector de bombeo bajo (correspondiente con este proyecto) y una segunda de unos 500 kWp que se incluirá en la Fase III del proyecto de modernización de la Colectividad de Cuevas del Campo. Se proyectan módulos fotovoltaicos de 615 Wp. Se considerará una inclinación de 15º, pues con ella se consigue un óptimo entre la producción de marzo hasta octubre, que será máxima coincidiendo con las máximas demandas de energía del bombeo.

Con el diseño eléctrico del número de paneles por lazo en función de las características de cada módulo fotovoltaico y los variadores a emplear se determinará la potencia exacta del campo fotovoltaico (se recoge en el Anejo nº 11 «Electrificación. Cálculos eléctricos»), que será de 885,6 kWp cuando esté ejecutado completamente (para abastecer al subsector de bombeo bajo y al alto) y de 393,6 kWp para abastecer sólo al subsector de bombeo bajo, que será el objeto del presente proyecto.

# 3 CÁLCULO DE LA PRODUCCIÓN ENERGÉTICA

Una vez definido el sistema fotovoltaico y el resto de materiales y equipos, se realiza una simulación para estimar el rendimiento energético de la instalación.

Para analizar la producción del sistema fotovoltaico se utilizarán hojas Excel (apéndices 2 y 3) realizadas por Agrimensur Consulting S.L., las cuales han sido aplicadas en muchos proyectos similares ya en funcionamiento.

Para el cálculo de la energía generada por el sistema fotovoltaico, se considerarán los siguientes factores clave que se desarrollan en la hoja Excel:

- Irradiación solar (G, en W/m$^2$) en la ubicación del sitio fotovoltaico por tramos cuartohorarios, con el correspondiente factor de producción (Fp en %)
- Máxima energía-potencia teórica producida en función de las características del campo fotovoltaico.
- Pérdidas del campo fotovoltaico y pérdidas CA hasta el punto de conexión a la red. Rendimiento energético de las diferentes partes del sistema fotovoltaico.
- Cálculo de la energía-potencia real producida detraídas las pérdidas.
- Determinación de la energía aprovechable para autoconsumo por la estación de bombeo

Los datos meteorológicos considerados de la radiación solar en el sitio, junto con las características del campo fotovoltaico descrito, representan los datos de entrada para calcular las pérdidas del sistema y los rendimientos energéticos, como se explica en los siguientes apartados.

## 3.1 FUENTES DE DATOS DE RADIACIÓN Y TEMPERATURAS

La radiación solar y temperatura del emplazamiento de la instalación viene dada por datos estadísticos medidos durante años. Para realizar el estudio de producción de la instalación fotovoltaica se consideran como punto de partida los datos obtenidos de programa PVGIS (Photovoltaic Geographical Information System).

PVGIS ha sido desarrollado en el Centro Común de Investigación de la Comisión Europea. El enfoque de PVGIS es la investigación en evaluación de recursos solares, estudios de rendimiento fotovoltaico (PV) y la difusión de conocimientos y datos sobre radiación solar y rendimiento.

Los datos de radiación solar de PVGIS-SARAH disponibles se derivan de la primera versión del registro de datos de radiación solar de SARAH proporcionado por EUMETSAT Climate Monitoring Satellite Application Facility .(CM SAF). Las principales diferencias con el registro de datos CM-SAF-SARAH son que PVGIS-SARAH utiliza las imágenes de los dos satélites geoestacionarios METEOSAT (0° y 57°E) que cubren Europa, África y Asia, y que los valores horarios se calculan directamente a partir de una sola Imagen de satélite.

Esta aplicación permite la descarga de los datos horarios mensuales de radiación para una ubicación concreta, tenido en cuenta datos de entrada del programa como son la orientación del campo solar y la inclinación de los módulos fotovoltaicos en la estructura soporte.

En el Apéndice 1 «Datos de radiación y temperatura obtenidos del programa PVGIS» de este anejo se recogen las salidas de los datos generados por el programa PVGIS para las dos instalaciones proyectadas (la planta de 885,6 kWp, que es la planta completa para el funcionamiento del bombeo completo que se construirá entre las Fases II y III, y la planta de 393,6 kWp, que es la prevista en la Fase II para el bombeo bajo, el objeto del presente proyecto). Los datos de entrada son de acimut 0º e inclinación de módulos 15º. Se toma para la irradiancia los valores de G(i) (Global irradiance on a fixed plane W/m$^2$ y para las temperaturas los datos de T2m (Daily average temperature °C).

## 3.2 CÁLCULO DE LA ENERGÍA TEÓRICA Y REAL PRODUCIDA

En primer lugar, se determinará la producción de energía máxima teórica (correspondiente a una eficiencia del 100 %). La ecuación a emplear será la siguiente:

$$Y_r = P_{STC} \times \frac{G}{G_{STC}}$$

Dónde:

- Yr: Producción de referencia (Reference Yield)
- PSTC: Suma de la potencia nominal de los módulos en condiciones STC (Condiciones normalizadas para el ensayo de paneles: Radiación solar de 1000 W/m², temperatura de la célula fotovoltaica 25°C, Valor espectral = 1,5 AM)
- G: Irradiación global en el plano inclinado (plano de los módulos) sin considerar las pérdidas por sombreamiento interno o externo
- GSTC: Irradiancia en condiciones STC (1000 W/m2)

El factor de producción (Fp) recoge el porcentaje de la relación entre G y GSTC

$$Fp\ (\%) \quad = 100 \times \frac{G}{G_{STC}}$$

Como en la instalación se producen pérdidas de energía por distintos motivos, la producción de referencia habrá que reducirla. La producción real de energía será:

$$Producción\ de\ energía\ real = Y_r \times (1 - Total\ de\ pérdidas)$$

En los siguientes apartados se describen los factores de pérdida considerados para el cálculo de la producción de energía real.

## 3.3 PÉRDIDAS DE ENERGÍA

Con el fin de hacer un estudio adecuado y detallado de la previsión energética, es necesario definir las pérdidas del sistema fotovoltaico. En los siguientes apartados se describen los factores de pérdida considerados para el cálculo de la producción de energía. Para ello se consideran, por un lado, las pérdidas en el sistema de captación solar (sombras, eficiencia, temperatura) y, por otro, las pérdidas en la entrega de energía al inversor, las que se producen en el propio inversor y las que se producen en la conexión de entrega de energía a la red.

### 3.3.1 Pérdidas por sombreados

Para obtener un cálculo de sombreado adecuado, es necesario representar la geometría exacta del campo fotovoltaico.

#### *3.3.1.1 Distancia entre filas, orientación e inclinación*

Tanto la inclinación como la orientación se conseguirán gracias a la estructura portante que tendrá que asegurar la continuidad de estos parámetros mientras esté activa la instalación.

El generador fotovoltaico está dispuesto con acimut 0º según la orientación de la parcela y dispone de una inclinación de 15°. La distancia entre filas permite que queden 3 m de separación libres y se diseña expresamente para que no se produzcan sombras en el periodo de funcionamiento de la instalación de autoconsumo (de marzo a octubre).

Se han tenido en cuenta las condiciones concretas de la estructura, diseñada para tal fin, tratando de obtener la mejor integración en la parcela con la mínima pérdida de rendimiento del sistema.

#### *3.3.1.2 Cálculo de sombreado*

Para calcular la distancia mínima entre módulos, de manera que no se produzcan sombras, partimos del cálculo de la altura solar en el lugar de emplazamiento.

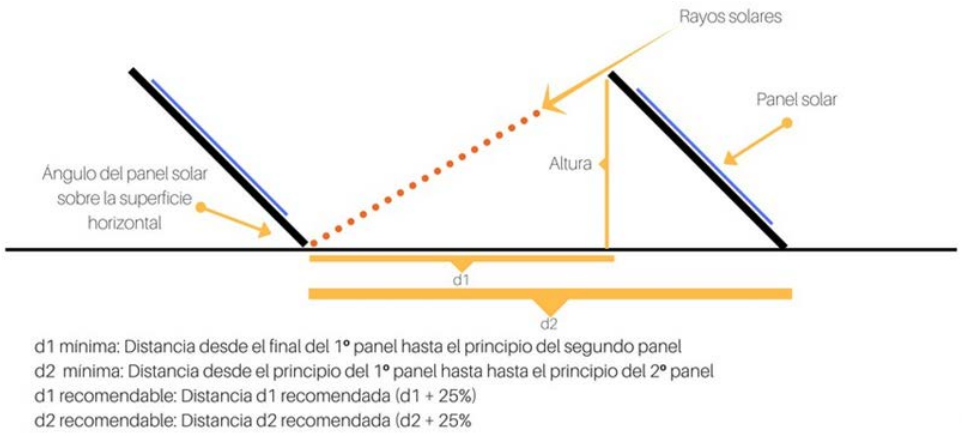



**Figura 1.** Cálculo geométrico de la distancia entre filas de módulos

$$d_1 = \frac{Altura}{\tan(61º - \text{latitud})}$$

La latitud de la zona donde se ubican los paneles es 37,66 º. Por tanto, la distancia mínima entre filas de paneles será:

$$d_1 = \frac{1{,}2522}{\tan(61º - 37{,}66º)} = 2{,}90\ m$$

En este caso, la separación de 3 m entre filas supone un 3,44 % superior a la distancia mínima recomendable. Por tanto, no se producirá ninguna pérdida por sombreado.

### 3.3.2 Pérdidas por no cumplimiento de la potencia nominal

Los módulos FV obtenidos de un proceso de fabricación industrial no son todos idénticos, sino que su potencia nominal referida a las condiciones estándar de medida, STC, presenta una determinada dispersión. Se tomará el 1 % de pérdidas.

### 3.3.3 Pérdidas de mismatch o de conexionado.

Son pérdidas energéticas originadas por la conexión de módulos fotovoltaicos de potencias ligeramente diferentes para formar un generador fotovoltaico. Esto tiene su origen en que si conectamos dos módulos en serie con diferentes corrientes (por muy pequeñas que sean las diferencias), el módulo de menor corriente limitará la corriente de la serie. De modo semejante ocurre para la tensión de la conexión de módulos en paralelo.

Resultando que la potencia de un generador FV es inferior (o en un caso ideal, igual) a la suma de las potencias de cada uno de los módulos FV que lo componen. Se tomará el 1 % de pérdidas.

### 3.3.4 Pérdidas por polvo y suciedad

Tienen su origen en la disminución de la potencia de un generador FV por la deposición de polvo y suciedad en la superficie de los módulos FV. Cabría destacar dos aspectos: por un lado, la presencia de una suciedad uniforme da lugar a una disminución de la corriente y tensión entregada por el generador FV y, por otro lado, la presencia de suciedades localizadas (como puede ser el caso de excrementos de aves) da lugar a un aumento de las pérdidas de mismatch y a las pérdidas por formación de puntos calientes. Se tomará el 1 % de pérdidas.

### 3.3.5 Pérdidas LID (Light Induced Degradation)

La Degradación Inducida por la Luz es una pérdida de rendimiento que surge en las primeras horas de exposición al sol, con módulos cristalinos. Es decir, puede afectar el rendimiento y la potencia reales con respecto a los datos finales de las pruebas de flash de fábrica entregados por los fabricantes. El agotamiento se crea durante los primeros meses de exposición a la radiación solar.

La pérdida de LID está relacionada con la calidad de la fabricación de la oblea y puede ser del orden del 1 % al 3 %. Los módulos fotovoltaicos de última generación con base en los que se redacta el proyecto permitirán tomar el 1 % de pérdidas.

### 3.3.6 Pérdidas por rendimiento AC/DC del inversor-variador

El inversor-variador fotovoltaico se puede caracterizar por la curva de rendimiento en función de la potencia de operación. Para el modelo que se ha diseñado el proyecto, el fabricante indica una eficiencia del 98,69 %. En cualquier caso, se tomará el 2 % de pérdidas.

### 3.3.7 Pérdidas por rendimiento de seguimiento del Punto de Máxima Potencia (MPPT) del generador FV

El inversor-variador fotovoltaico opera directamente conectado al generador FV y tiene un dispositivo electrónico de seguimiento del punto de máxima potencia del generador FV (este punto de máxima potencia cambia con la irradiancia y la temperatura) cuyos algoritmos de control pueden variar entre diferentes modelos y fabricantes.

Se puede caracterizar al inversor-variador por una curva de rendimiento de seguimiento del punto de máxima potencia, definida como el cociente entre la energía que el inversor es capaz de extraer del generador FV y la energía que se extraería en un seguimiento ideal. Un problema adicional puede surgir cuando hay sombras sobre el generador FV. En este caso puede haber escalones en la curva I/V y el inversor-variador operar en un punto que no es el de máxima potencia. Se tomará el 2 % de pérdidas.

### 3.3.8 Pérdidas por caídas óhmicas en el cableado

Tanto en la parte DC como en la parte AC (desde la salida de los inversores hasta la conexión a la estación de bombeo) de la instalación se producen unas pérdidas energéticas originadas por las caídas de tensión cuando una determinada corriente circula por un conductor de un material y sección determinados. Estas pérdidas se minimizan dimensionando adecuadamente la sección de los conductores en función de la corriente que por ellos circula.

Los conductores serán de cobre o aluminio y tendrán la sección adecuada para evitar caídas de tensión y calentamientos. Concretamente, para cualquier condición de trabajo, los conductores deberán tener la sección suficiente para que la caída de tensión sea inferior del 1,5 %. Se tomará el 1,5 % de pérdidas.

### 3.3.9 Pérdidas en el transformador

En las instalaciones fotovoltaicas proyectadas, el transformador no es parte del inversor, sino un dispositivo externo conectado directamente a la red de MT. Por tanto, no generará pérdidas en la producción del campo fotovoltaico.

### 3.3.10 Pérdidas por nivel de temperatura

Las condiciones de prueba estándar se especifican para una temperatura de celda de 25 °C, pero los módulos generalmente funcionan a temperaturas mucho más altas. La pérdida térmica se calcula siguiendo el modelo de un diodo.

La temperatura afecta principalmente a la curva de tensión I/V del módulo como se muestra en la figura siguiente. Se puede observar cómo la disminución de la temperatura afecta en gran medida a la tensión de funcionamiento del panel, provocando sobretensiones.

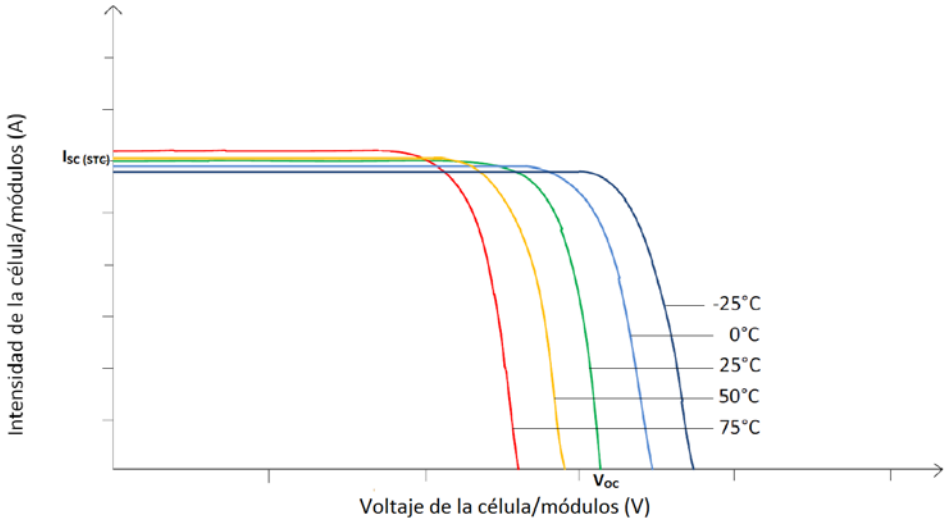



**Figura 2.** Curva I/V para distintas temperaturas

Las pérdidas efectivas dependen en gran medida de la sobretensión del conjunto con respecto a la tensión de funcionamiento. Esta pérdida se puede contabilizar por el coeficiente de temperatura del módulo de Voc como se indica en su hoja de datos (ficha técnica). El coeficiente de temperatura Voc indica la pérdida porcentual de tensión de circuito abierto de la placa solar por cada grado de diferencia entre la temperatura ambiente de referencia 25 ºC y la temperatura de operación de las células.

El comportamiento térmico del campo, que influye fuertemente en el rendimiento eléctrico, está determinado por un balance de energía entre la temperatura ambiente y el calentamiento de la celda debido a la radiación incidente.

La temperatura afecta principalmente a los valores de voltaje y tiene su mayor influencia en el voltaje de circuito abierto, aunque también modifica los valores del punto de máxima potencia y el valor de Icc.

Para determinar la temperatura de célula utilizaremos la fórmula:

$$T_c = T_{amb} + \frac{I_{inc} \times (TONC - 20)}{800}$$

Donde:

- $T_C$: Temperatura de célula (ºC)
- $T_{amb}$: Temperatura ambiente (ºC)
- $I_{inc}$: Irradiancia (W/m$^2$)
- TONC: Temperatura de operación nominal de la célula (ºC)

En la siguiente tabla se calculan las temperaturas máximas estimadas en celda para cada mes del año partiendo de los datos del PVGIS para irradiancia y temperatura ambiente:

**Tabla 2**.Temperaturas máxima en celda

| | **Irradiancia (W/m$^2$)** | **Tamb (ºC)** | **TONC (ºC)** | **Tc (ºC)** |
|---|---|---|---|---|
| ENERO | 522 | 10,83 | 45 | 27,14 |
| FEBRERO | 636 | 12 | 45 | 31,88 |
| MARZO | 705 | 15,26 | 45 | 37,29 |
| ABRIL | 777 | 18,65 | 45 | 42,93 |
| MAYO | 879 | 23,93 | 45 | 51,40 |
| JUNIO | 942 | 29,43 | 45 | 58,87 |
| JULIO | 999 | 34,32 | 45 | 65,54 |
| AGOSTO | 961 | 33,41 | 45 | 63,44 |
| SEPTIEMBRE | 846 | 27,27 | 45 | 53,71 |
| OCTUBRE | 687 | 22,46 | 45 | 43,93 |
| NOVIEMBRE | 560 | 14,85 | 45 | 32,35 |
| DICIEMBRE | 496 | 11,8 | 45 | 27,30 |

Las características de los módulos fotovoltaicos se proporcionan a una temperatura de 25 ºC. Si estas condiciones varían, el módulo fotovoltaico proporcionará una tensión y potencia inferior a la obtenida en condiciones estándar. Las fichas técnicas de los módulos fotovoltaicos incluyen

coeficiente de pérdida de potencia por cada grado de mayor temperatura de celda que los citados 25 ºC. Para el módulo de 615 Wp, el coeficiente será -0,3 %/ºC, lo que equivale a perder 1,845 Wp de potencia por cada grado de temperatura de celda superior a 25 ºC. En la siguiente tabla se calcula la pérdida de potencia para cada mes por efecto de la temperatura.

**Tabla 3.**Pérdida de potencia por mes

| | Potencia (W) | Diferencia W/ºC | Temp. nominal (ºC) | T real Celda (ºC) | Perdida Potencia (W) | Potencia real (W) | Rendimiento (%) |
|---|---|---|---|---|---|---|---|
| ENERO | 615 | -1,845 | 25 | 27,14 | 3,95 | 611,05 | 99,36% |
| FEBRERO | 615 | -1,845 | 25 | 31,88 | 12,68 | 602,32 | 97,94% |
| MARZO | 615 | -1,845 | 25 | 37,29 | 22,68 | 592,32 | 96,31% |
| ABRIL | 615 | -1,845 | 25 | 42,93 | 33,08 | 581,92 | 94,62% |
| MAYO | 615 | -1,845 | 25 | 51,40 | 48,71 | 566,29 | 92,08% |
| JUNIO | 615 | -1,845 | 25 | 58,87 | 62,49 | 552,51 | 89,84% |
| JULIO | 615 | -1,845 | 25 | 65,54 | 74,79 | 540,21 | 87,84% |
| AGOSTO | 615 | -1,845 | 25 | 63,44 | 70,92 | 544,08 | 88,47% |
| SEPTIEMBRE | 615 | -1,845 | 25 | 53,71 | 52,97 | 562,03 | 91,39% |
| OCTUBRE | 615 | -1,845 | 25 | 43,93 | 34,92 | 580,08 | 94,32% |
| NOVIEMBRE | 615 | -1,845 | 25 | 32,35 | 13,56 | 601,44 | 97,80% |
| DICIEMBRE | 615 | -1,845 | 25 | 27,30 | 4,24 | 610,76 | 99,31% |

Se puede observar que el rendimiento del módulo fotovoltaico tiene una importante caída en su rendimiento en los meses de más altas temperaturas. Para estimar una pérdida de rendimiento media se tomarán por un lado los meses de mayo, junio, julio, agosto y septiembre (por ser los meses de mayor temperatura con una mayor caída del rendimiento) y, por otro lado, los meses de marzo, abril y octubre. El resultado es un rendimiento medio en los meses de verano del 89,92 % en los meses de verano, lo que equivale a unas pérdidas del 10,08 %. En los meses de marzo-abril-octubre el rendimiento medio es del 95,08 %, lo que equivale a unas pérdidas del 4,92 %.

### 3.3.11 Pérdida de rendimiento durante la vida útil de la planta

Las pérdidas de producción que se pueden producir por efecto del envejecimiento del sistema a lo largo del tiempo están motivadas principalmente por la degradación natural del módulo fotovoltaico. La degradación anual de las células fotovoltaicas es un efecto inevitable y está definido por los fabricantes. Además, este efecto se establece mediante garantías de producción o garantías de potencia limitada.

La Tasa de Degradación no deberá exceder el 1 % en el primer año a partir de la Fecha de Inicio (este valor se calcula a partir de la pérdida LID del 1,0%) y un 0,5 % adicional cada año a partir del comienzo del segundo año hasta 25 años después de la Fecha de Inicio. Con estos valores

se obtiene que la Potencia de Salida Máxima en el año 25 no será inferior al 87 % de la potencia inicial del módulo fotovoltaico.

Esto supone una caída del rendimiento del 12 % en 24 años. Para fijar las pérdidas por el descenso del rendimiento se tomará un valor medio, lo que equivale a considerar unas pérdidas del 6 %.

### 3.3.12 Resumen de las pérdidas de producción de energía

En la siguiente tabla se recoge un resumen con las pérdidas consideradas para calcular la producción de energía de los campos fotovoltaicos proyectados.

**Tabla 4**. Pérdidas en %

| | Pérdidas (%) Verano | Pérdidas (%) resto año |
|---|---|---|
| Pérdidas por sombreados | 0 | 0 |
| Pérdidas por no cumplimiento de la potencia nominal: | 1 | 1 |
| Pérdidas de mismatch o de conexionado. | 1 | 1 |
| Pérdidas por polvo y suciedad | 1 | 1 |
| Pérdidas LID (Light Induced Degradation) | 1 | 1 |
| Pérdidas por rendimiento AC/DC del inversor | 2 | 2 |
| Pérdidas por rendimiento de seguimiento del Punto de | 2 | 2 |
| Pérdidas por caídas ohmicos en el cableado | 1,5 | 1,5 |
| Pérdidas en el transformador | 0 | 0 |
| Pérdidas por nivel de temperatura | 10,08 | 4,92 |
| Pérdida de rendimiento durante la vida útil de la planta | 6 | 6 |
| **TOTAL PERDIDAS** | **25,58** | **20,42** |

**Por tanto, para todos los cálculos de producción de energía se considerarán unas pérdidas acumuladas del 25,58 % en los meses de verano y del 20,42 % en el resto.**

## 3.4 ESTIMACIÓN DE LA PRODUCCIÓN MENSUAL Y ANUAL

Teniendo en cuenta el diseño de la planta junto con los datos de radiación (Apéndice 1 «Datos de radiación y temperatura obtenidos del programa PVGIS») y las pérdidas estipuladas tomadas por diferentes factores, se procede a calcular la producción de energía de las instalaciones.

Con los datos horarios mensuales de radiación se interpolan para sacar datos cuartohorarios y en base a la potencia del campo fotovoltaico se obtiene la potencia máxima teórica generada en cada cuarto de hora con la ecuación antes citada

$$Y_r = P_{STC} \times \frac{G}{G_{STC}}$$

Dónde:

- Yr: Producción de referencia (Reference Yield)
- PSTC: Suma de la potencia nominal de los módulos en condiciones STC (Condiciones normalizadas para el ensayo de paneles: Radiación solar de 1000 W/m², temperatura de la célula fotovoltaica 25°C, Valor espectral = 1,5 AM)
- G: Irradiación global en el plano inclinado (plano de los módulos) sin considerar las pérdidas por sombreamiento interno o externo
- GSTC: Irradiancia en condiciones STC (1000 W/m2)

La potencia máxima obtenida se verá afectada por las pérdidas que se dan (solo se aprovecha el 74,42 % en los meses de verano y el 79,58 % en marzo-abril-octubre). La producción real de energía será:

$$Producción\ de\ energía\ real = Y_r \times (1 - Total\ de\ pérdidas)$$

En el Apéndice 2 «Cálculos justificativos de potencia bruta, potencia neta y autoconsumo campo fotovoltaico de 885,6 kWp» se desarrollan todos los cálculos justificativos para la planta de 885,6 kWp (planta completa para el funcionamiento del bombeo completo que se construirá entre las Fases II y III) y en el Apéndice 3 «Cálculos justificativos de potencia bruta, potencia neta y autoconsumo campo fotovoltaico de 393,6 kWp» se desarrollan todos los cálculos justificativos para la planta de 393,6 kWp (la prevista en la Fase II para el bombeo bajo). En las siguientes tablas se muestran los resultados de producción estimados mensualmente para las plantas fotovoltaicas.

**Tabla 5.** Datos de producción de energía campo FV completo (885,6 kWp)

| Mes | Campo 885,6 kWp | |
|---|---|---|
| | Energía producida bruta (kWh) | Energía producida neta (kWh) |
| Enero | 99.749 | 77.540 |
| Febrero | 107.668 | 85.682 |
| Marzo | 146.304 | 116.428 |
| Abril | 168.129 | 133.797 |
| Mayo | 196.746 | 146.419 |
| Junio | 206.653 | 153.791 |
| Julio | 219.093 | 163.049 |
| Agosto | 203194 | 151.217 |
| Septiembre | 165525 | 123.184 |
| Octubre | 144845 | 115.268 |
| Noviembre | 99673 | 79.320 |
| Diciembre | 94.317 | 75.057 |
| Totales | **1.851.897** | **1.420.752** |

**Tabla 6.** Datos de producción de energía campo FV del proyecto de Fase II (393,6 kWp)

| Mes | Campo 393,6 kWp | |
|---|---|---|
| | Energía producida bruta (kWh) | Energía producida neta (kWh) |
| Enero | 44.333 | 34.462 |
| Febrero | 47.852 | 38.081 |
| Marzo | 65.024 | 51.746 |
| Abril | 74.724 | 59.465 |
| Mayo | 87.443 | 65.075 |
| Junio | 91.846 | 68.351 |
| Julio | 97.375 | 72.466 |
| Agosto | 90309 | 67.208 |
| Septiembre | 73567 | 54.748 |
| Octubre | 64376 | 51.230 |
| Noviembre | 44299 | 35.253 |
| Diciembre | 41.919 | 33.359 |
| Totales | **823.065** | **631.445** |

# 4 ESTIMACION DE LA ENERGIA AUTOCONSUMIDA

En el epígrafe anterior se ha calculado la energía mensual y anual que pueden producir los campos fotovoltaicos, pero como el destino de esta energía es el autoconsumo en las estaciones de bombeo, tienen que estar en funcionamiento para que la energía producida se pueda usar.

Las estaciones de bombeo están en funcionamiento durante la campaña de riego para lo cual se consideran los meses de marzo, abril, mayo, junio, julio, agosto, septiembre y octubre. La energía que se produce en el resto de meses no se usará para el bombeo.

Además, hay que considerar que la producción del campo fotovoltaico es mayor que el consumo de la estación de bombeo (que es de 305 kW cuando esté completa la estación de bombeo en fases futuras y de 130 kW con las bombas del subsector de bombeo bajo contempladas en el presente proyecto de Fase II) a partir de un cierto valor de radiación relativamente bajo, pues se tiene como objetivo consumir el mínimo posible de energía de red convencional. Luego tampoco se aprovechará toda la energía producida.

Por último, aunque la energía producida mensualmente sea menor que la consumida no tiene por qué coincidir instantáneamente, ya que el consumo de las estaciones de bombeo cambia constantemente al funcionar a la demanda.

Como se justificó en el Anejo nº 7 «Criterios de diseño y cálculos hidráulicos», el riego del sector de bombeo se ha diseñado para ser realizado desde marzo a octubre durante 8 horas al día (8,5 horas en junio y julio) coincidiendo con la franja horaria de mayor radiación que son las horas de mayor producción de energía. Con el periodo de riego previsto y los caudales de las bombas se podrían llegar a proporcionar un máximo de 4.995,5 $m^3$/ha.año, lo cual no es posible ya que la dotación autorizada por la concesión de aguas es de 3.546 $m^3$/ha.año. Esto quiere decir que se tiene capacidad para generar más energía de la que realmente se puede consumir a lo largo del año (aunque no puntualmente por ser un riego a la demanda dentro de las 8-8,5 horas establecidas para el funcionamiento), luego un 29 % de la energía autoproducida no se podrá consumir por estar limitada la dotación de agua.

En los Apéndices 2 «Cálculos justificativos de potencia bruta, potencia neta y autoconsumo campo fotovoltaico de 885,6 kWp» y 3 «Cálculos justificativos de potencia bruta, potencia neta y autoconsumo campo fotovoltaico de 393,6 kWp», se calcula la energía-potencia producida por periodos cuartohorarios y se determina el número de horas que el campo fotovoltaico estaría produciendo energía para el bombeo dentro de la franja prevista. Con estos parámetros podemos determinar para cada mes, cuál es la energía que se puede autoconsumir de la energía producida. En las siguientes tablas se muestran por meses los resultados de la producción neta

de los campos fotovoltaicos, el autoconsumo potencial (máximo que se podría dar) y real (el que realmente se puede producir) estimados mensualmente.

**Tabla 7.** Datos de autoconsumo para campo FV completo (885,6 kWp)

| Mes | Energía producida neta (kWh) | Autoconsumo kWh | Autoconsumo real kWh |
|---|---|---|---|
| Enero | 77.540 | 0 | 0 |
| Febrero | 85.682 | 0 | 0 |
| Marzo | 116.428 | 73.967 | 52.516 |
| Abril | 133.797 | 73.011 | 51.838 |
| Mayo | 146.419 | 75.640 | 53.704 |
| Junio | 153.791 | 77.775 | 55.220 |
| Julio | 163.049 | 80.368 | 57.061 |
| Agosto | 151.217 | 75.640 | 53.704 |
| Septiembre | 123.184 | 72.284 | 51.321 |
| Octubre | 115.268 | 72.305 | 51.336 |
| Noviembre | 79.320 | 0 | 0 |
| Diciembre | 75.057 | 0 | 0 |
| Totales | **1.420.752** | **600.989** | **426.702** |

**Tabla 8.** Datos de autoconsumo del proyecto de Fase II (393,6 kWp)

| Mes | Energía producida neta (kWh) | Autoconsumo kWh | Autoconsumo real kWh |
|---|---|---|---|
| Enero | *34.462* | 0 | 0 |
| Febrero | *38.081* | 0 | 0 |
| Marzo | 51.746 | 31.703 | 22.509 |
| Abril | 59.465 | 31.158 | 22.122 |
| Mayo | 65.075 | 32.240 | 22.890 |
| Junio | 68.351 | 33.150 | 23.537 |
| Julio | 72.466 | 34.255 | 24.321 |
| Agosto | 67.208 | 32.240 | 22.890 |
| Septiembre | 54.748 | 30.938 | 21.966 |
| Octubre | 51.230 | 31.040 | 22.038 |
| Noviembre | 35.253 | 0 | 0 |
| Diciembre | 33.359 | 0 | 0 |
| Totales | **631.445** | **256.724** | **182.274** |

En los Apéndices 2 «Cálculos justificativos de potencia bruta, potencia neta y autoconsumo campo fotovoltaico de 885,6 kWp» y 3 «Cálculos justificativos de potencia bruta, potencia neta y autoconsumo campo fotovoltaico de 393,6 kWp», se desarrollan todos los cálculos justificativos.

El consumo de energía de apoyo de la red convencional sería muy bajo y también se estima en los Apéndices 2 «Cálculos justificativos de potencia bruta, potencia neta y autoconsumo campo fotovoltaico de 885,6 kWp» y 3 «Cálculos justificativos de potencia bruta, potencia neta y autoconsumo campo fotovoltaico de 393,6 kWp». Habría que añadir el consumo que se produzca por días nublados de baja radiación en los que se pretenda regar, que no se contempla en la siguiente tabla.

**Tabla 9.** Datos de consumo de energía de apoyo

| | Consumo de energía de red (kW) para campo FV de 393,6 kWp | Consumo de energía de red (kW) para campo FV de 885,6 kWp |
|---|---|---|
| ENERO | 0 | 0 |
| FEBRERO | 0 | 0 |
| MARZO | 537 | 1.673 |
| ABRIL | 44 | 195 |
| MAYO | 0 | 0 |
| JUNIO | 0 | 0 |
| JULIO | 0 | 0 |
| AGOSTO | 0 | 0 |
| SEPTIEMBRE | 279 | 947 |
| OCTUBRE | 1200 | 3335 |
| NOVIEMBRE | 0 | 0 |
| DICIEMBRE | 0 | 0 |
| **TOTAL** | **2.059** | **6.151** |

## 5 AHORRO DE ENERGIA Y DE EMISIONES DE $CO_2$

El ahorro de energía que se alcanzará con el presente proyecto al sustituir los bombeos particulares de cada regante (alimentados por grupos electrógenos) por un bombeo colectivo sería de 182.274 kWh, que corresponde con el autoconsumo estimado real que se puede dar y que se ha calculado anteriormente.

Además de los ahorros económicos que conlleva la instalación de un generador fotovoltaico, también hay que sumarle el beneficio medioambiental que esta lleva consigo, contribuyendo medioambientalmente a generar una energía limpia que posteriormente será consumida, evitando así las emisiones perjudiciales a la atmósfera típicas de las energías convencionales.

Todo esto hace que el generador fotovoltaico propuesto posea una calidad medioambiental excepcional.

La energía generada en un generador fotovoltaico está libre de toda emisión de $CO_2$. En esto, y su carácter distribuido y modular, radica la ventaja que esta fuente energética tiene sobre las fuentes convencionales.

Al ser esta un energía limpia y libre de emisiones, se está evitando anualmente una emisión de un total de 45.568,5 kg de $CO_2$ (considerando un coeficiente de paso de $CO_2$/energía de 0,25 kg $CO_2$/kWh).

Reducción kg de $CO_2$ anual = 182.274 kWh x 0,25 kg $CO_2$/kWh = 45.568,5 kg de $CO_2$

El ahorro de $CO_2$ corresponde al autoconsumo calculado (Tabla 8) del proyecto de la Fase II (planta fotovoltaica de 393,6 kWp).

Por tanto, con la actuación proyectada se está contribuyendo positivamente a la lucha contra el cambio climático y sus consecuencias.

# APÉNDICE Nº 1

# DATOS DE RADIACIÓN Y TEMPERATURA OBTENIDOS DEL PROGRAMA PVGIS

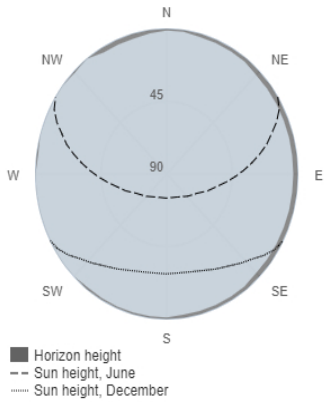
# Daily irradiance data

PVGIS-5 geo-temporal irradiation database

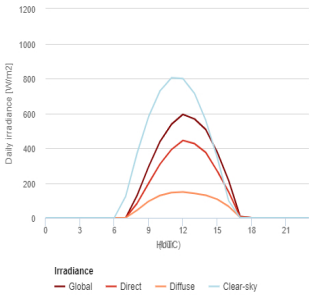
## Provided inputs

| | |
|---|---|
| Latitude/Longitude: | 37.661,-2.913 |
| Horizon: | Calculated |
| Database used | PVGIS-SARAH2 |
| Month: | January |

## Outline of horizon at chosen location:




## Daily average irradiance on fixed plane with slope 15° and azimuth 0°

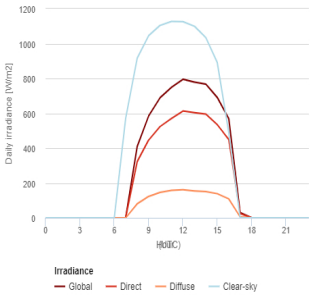



### Irradiance on a fixed plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 | 294 | 438 | 537 | 594 | 568 | 506 | 375 | 213 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gb(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 84 | 198 | 309 | 391 | 444 | 426 | 375 | 268 | 148 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gd(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 94 | 129 | 144 | 148 | 140 | 130 | 107 | 65 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gcs(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 124 | 373 | 581 | 729 | 803 | 799 | 715 | 559 | 345 | 97 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

G(i): Global irradiance on a fixed plane [W/m2].
Gb(i): Direct irradiance on a fixed plane [W/m2].
Gd(i): Diffuse irradiance on a fixed plane [W/m2].
Gcs(i): Global Clear-sky irradiance on a fixed plane [W/m2].

## Daily average irradiance on sun-tracking plane

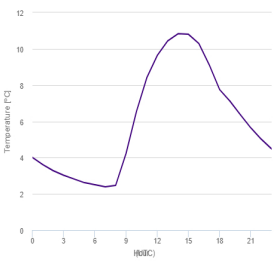



### Irradiance on sun-tracking plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 408 | 584 | 689 | 749 | 795 | 779 | 767 | 691 | 569 | 29 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gb(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 322 | 447 | 524 | 570 | 613 | 604 | 595 | 534 | 449 | 24 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gd(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 80 | 122 | 146 | 158 | 161 | 155 | 151 | 138 | 109 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gcs(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 570 | 915 | 1045 | 1104 | 1127 | 1126 | 1099 | 1034 | 891 | 488 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

G(n): Global irradiance on a 2-axis tracking plane [W/m2].
Gb(n): Direct normal irradiance [W/m2].
Gd(n): Diffuse irradiance on a 2-axis tracking plane [W/m2].
Gcs(n): Global Clear-sky irradiance on a 2-axis tracking plane [W/m2].

## Daily average temperature




### Daily average temperature

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **T2m** | 4.01 | 3.61 | 3.28 | 3.03 | 2.82 | 2.62 | 2.51 | 2.39 | 2.47 | 4.23 | 6.54 | 8.41 | 9.63 | 10.43 | 10.83 | 10.8 | 10.29 | 9.12 | 7.75 | 7.11 | 6.36 | 5.64 | 5.02 | 4.48 |

T2m: Daily average temperature [°C].

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Joint Research Centre

Report generated on 2022/06/24

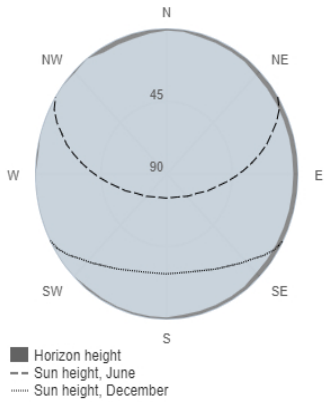
# Daily irradiance data

PVGIS-5 geo-temporal irradiation database

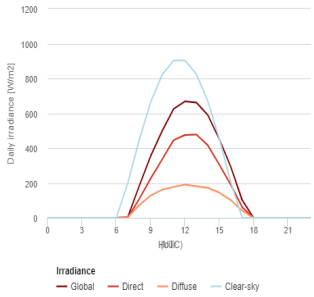
## Provided inputs

| | |
|---|---|
| Latitude/Longitude: | 37.661,-2.913 |
| Horizon: | Calculated |
| Database used | PVGIS-SARAH2 |
| Month: | February |

## Outline of horizon at chosen location:




## Daily average irradiance on fixed plane with slope 15° and azimuth 0°

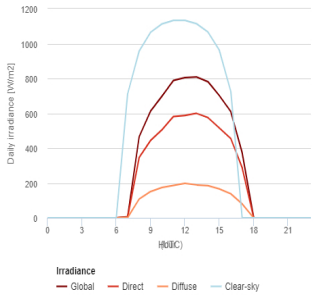



### Irradiance on a fixed plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 181 | 354 | 497 | 624 | 668 | 661 | 589 | 451 | 293 | 101 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gb(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 108 | 225 | 335 | 445 | 475 | 478 | 416 | 305 | 190 | 61 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gd(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 73 | 128 | 161 | 177 | 191 | 181 | 172 | 144 | 102 | 40 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gcs(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 197 | 446 | 663 | 820 | 902 | 904 | 824 | 670 | 455 | 206 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

G(i): Global irradiance on a fixed plane [W/m2].
Gb(i): Direct irradiance on a fixed plane [W/m2].
Gd(i): Diffuse irradiance on a fixed plane [W/m2].
Gcs(i): Global Clear-sky irradiance on a fixed plane [W/m2].

## Daily average irradiance on sun-tracking plane

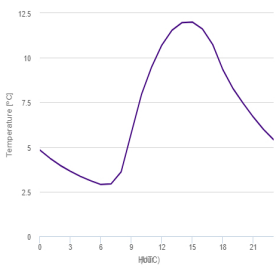



### Irradiance on sun-tracking plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 464 | 613 | 699 | 788 | 805 | 809 | 781 | 701 | 610 | 373 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gb(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 346 | 444 | 505 | 581 | 587 | 600 | 575 | 515 | 456 | 287 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gd(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 107 | 151 | 174 | 186 | 198 | 189 | 185 | 166 | 138 | 80 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gcs(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 713 | 957 | 1064 | 1113 | 1133 | 1133 | 1114 | 1066 | 963 | 727 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

G(n): Global irradiance on a 2-axis tracking plane [W/m2].
Gb(n): Direct normal irradiance [W/m2].
Gd(n): Diffuse irradiance on a 2-axis tracking plane [W/m2].
Gcs(n): Global Clear-sky irradiance on a 2-axis tracking plane [W/m2].

## Daily average temperature




### Daily average temperature

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **T2m** | 4.83 | 4.37 | 3.97 | 3.64 | 3.35 | 3.11 | 2.9 | 2.93 | 3.61 | 5.79 | 7.94 | 9.49 | 10.71 | 11.54 | 11.97 | 12 | 11.61 | 10.75 | 9.34 | 8.28 | 7.45 | 6.68 | 5.99 | 5.41 |

T2m: Daily average temperature [°C].

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Report generated on 2022/06/24

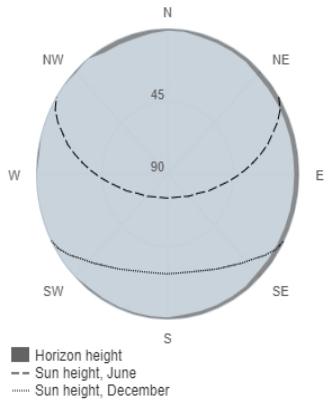
# Daily irradiance data

PVGIS-5 geo-temporal irradiation database

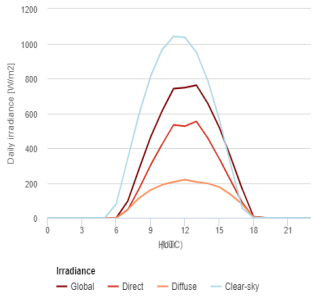
## Provided inputs

| | |
|---|---|
| Latitude/Longitude: | 37.661,-2.913 |
| Horizon: | Calculated |
| Database used | PVGIS-SARAH2 |
| Month: | March |

## Outline of horizon at chosen location:




## Daily average irradiance on fixed plane with slope 15° and azimuth 0°

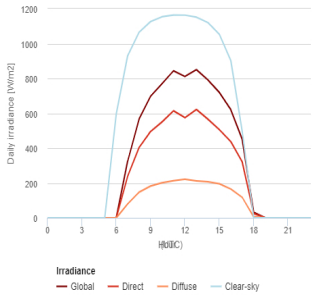



### Irradiance on a fixed plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 95 | 282 | 464 | 612 | 741 | 747 | 762 | 657 | 518 | 348 | 165 | 6 | 0 | 0 | 0 | 0 | 0 |
| **Gb(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 | 167 | 303 | 421 | 533 | 525 | 553 | 458 | 339 | 213 | 87 | 1 | 0 | 0 | 0 | 0 | 0 |
| **Gd(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 | 114 | 160 | 189 | 206 | 219 | 206 | 197 | 177 | 134 | 78 | 4 | 0 | 0 | 0 | 0 | 0 |
| **Gcs(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 80 | 340 | 597 | 813 | 965 | 1041 | 1035 | 949 | 788 | 565 | 305 | 55 | 0 | 0 | 0 | 0 | 0 | 0 |

G(i): Global irradiance on a fixed plane [W/m2].
Gb(i): Direct irradiance on a fixed plane [W/m2].
Gd(i): Diffuse irradiance on a fixed plane [W/m2].
Gcs(i): Global Clear-sky irradiance on a fixed plane [W/m2].

## Daily average irradiance on sun-tracking plane

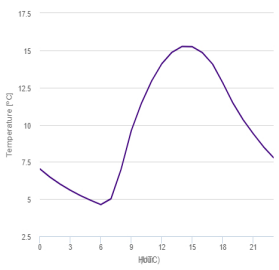



### Irradiance on sun-tracking plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 326 | 567 | 697 | 770 | 844 | 811 | 850 | 792 | 720 | 621 | 451 | 32 | 0 | 0 | 0 | 0 | 0 |
| **Gb(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 239 | 404 | 495 | 550 | 614 | 575 | 622 | 566 | 506 | 438 | 322 | 25 | 0 | 0 | 0 | 0 | 0 |
| **Gd(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 80 | 147 | 182 | 201 | 213 | 222 | 212 | 207 | 195 | 165 | 118 | 6 | 0 | 0 | 0 | 0 | 0 |
| **Gcs(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 596 | 931 | 1065 | 1126 | 1154 | 1164 | 1163 | 1151 | 1121 | 1053 | 903 | 497 | 0 | 0 | 0 | 0 | 0 | 0 |

G(n): Global irradiance on a 2-axis tracking plane [W/m2].
Gb(n): Direct normal irradiance [W/m2].
Gd(n): Diffuse irradiance on a 2-axis tracking plane [W/m2].
Gcs(n): Global Clear-sky irradiance on a 2-axis tracking plane [W/m2].

## Daily average temperature




### Daily average temperature

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **T2m** | 7.03 | 6.47 | 6 | 5.59 | 5.23 | 4.92 | 4.63 | 5.02 | 7.02 | 9.61 | 11.45 | 12.94 | 14.1 | 14.87 | 15.26 | 15.24 | 14.84 | 14.07 | 12.81 | 11.45 | 10.33 | 9.39 | 8.52 | 7.78 |

T2m: Daily average temperature [°C].

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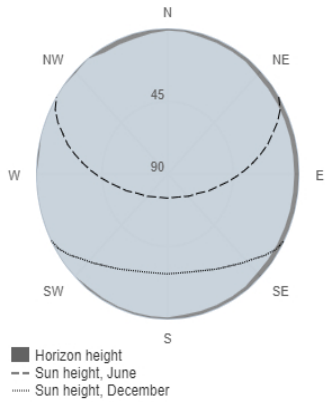
# Daily irradiance data

PVGIS-5 geo-temporal irradiation database

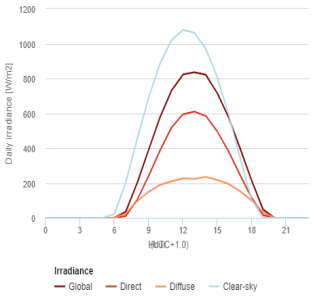
## Provided inputs

| | |
|---|---|
| Latitude/Longitude: | 37.661,-2.913 |
| Horizon: | Calculated |
| Database used | PVGIS-SARAH2 |
| Month: | April |

## Outline of horizon at chosen location:




## Daily average irradiance on fixed plane with slope 15° and azimuth 0°

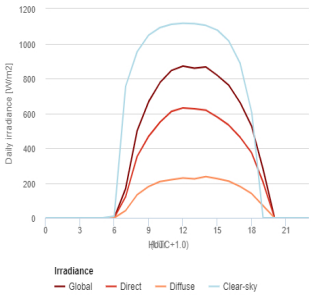



### Irradiance on a fixed plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 199 | 390 | 577 | 730 | 822 | 835 | 821 | 715 | 576 | 397 | 215 | 48 | 0 | 0 | 0 | 0 |
| **Gb(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 103 | 240 | 386 | 518 | 594 | 610 | 584 | 495 | 380 | 244 | 115 | 16 | 0 | 0 | 0 | 0 |
| **Gd(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 95 | 149 | 189 | 210 | 226 | 223 | 235 | 218 | 194 | 152 | 99 | 32 | 0 | 0 | 0 | 0 |
| **Gcs(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 201 | 451 | 690 | 886 | 1019 | 1079 | 1062 | 969 | 808 | 590 | 341 | 105 | 0 | 0 | 0 | 0 | 0 |

G(i): Global irradiance on a fixed plane [W/m2].
Gb(i): Direct irradiance on a fixed plane [W/m2].
Gd(i): Diffuse irradiance on a fixed plane [W/m2].
Gcs(i): Global Clear-sky irradiance on a fixed plane [W/m2].

## Daily average irradiance on sun-tracking plane

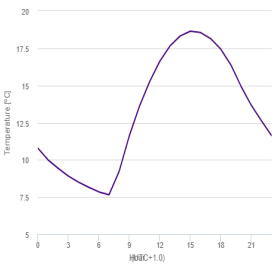



### Irradiance on sun-tracking plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 168 | 500 | 666 | 777 | 846 | 871 | 858 | 865 | 818 | 761 | 660 | 526 | 279 | 0 | 0 | 0 | 0 |
| **Gb(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 123 | 353 | 468 | 549 | 611 | 631 | 626 | 618 | 578 | 532 | 462 | 372 | 205 | 0 | 0 | 0 | 0 |
| **Gd(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 133 | 179 | 208 | 219 | 229 | 223 | 237 | 225 | 210 | 179 | 139 | 70 | 0 | 0 | 0 | 0 |
| **Gcs(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 756 | 954 | 1048 | 1092 | 1110 | 1116 | 1115 | 1104 | 1077 | 1015 | 886 | 606 | 0 | 0 | 0 | 0 | 0 |

G(n): Global irradiance on a 2-axis tracking plane [W/m2].
Gb(n): Direct normal irradiance [W/m2].
Gd(n): Diffuse irradiance on a 2-axis tracking plane [W/m2].
Gcs(n): Global Clear-sky irradiance on a 2-axis tracking plane [W/m2].

## Daily average temperature




### Daily average temperature

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **T2m** | 10.79 | 10 | 9.43 | 8.91 | 8.5 | 8.16 | 7.85 | 7.65 | 9.23 | 11.62 | 13.61 | 15.26 | 16.63 | 17.66 | 18.33 | 18.65 | 18.56 | 18.15 | 17.44 | 16.38 | 14.93 | 13.67 | 12.63 | 11.63 |

T2m: Daily average temperature [°C].

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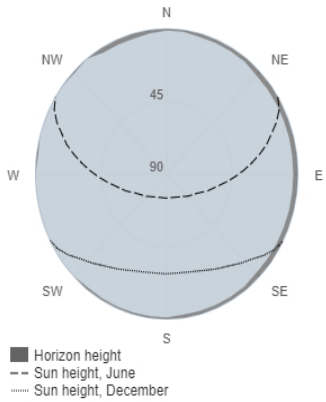
# Daily irradiance data

PVGIS-5 geo-temporal irradiation database

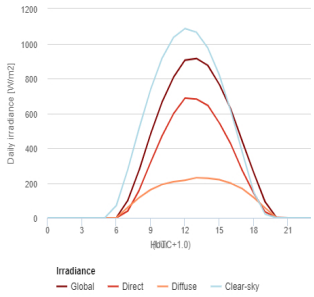
## Provided inputs

| | |
|---|---|
| Latitude/Longitude: | 37.661,-2.913 |
| Horizon: | Calculated |
| Database used | PVGIS-SARAH2 |
| Month: | May |

## Outline of horizon at chosen location:




## Daily average irradiance on fixed plane with slope 15° and azimuth 0°

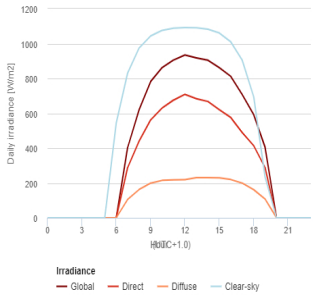



### Irradiance on a fixed plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 98 | 274 | 481 | 663 | 806 | 905 | 914 | 875 | 766 | 625 | 441 | 261 | 92 | 1 | 0 | 0 | 0 |
| **Gb(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 157 | 318 | 470 | 597 | 687 | 681 | 645 | 544 | 424 | 272 | 143 | 34 | 0 | 0 | 0 | 0 |
| **Gd(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 116 | 161 | 191 | 207 | 216 | 230 | 227 | 219 | 199 | 168 | 117 | 57 | 1 | 0 | 0 | 0 |
| **Gcs(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 69 | 276 | 514 | 737 | 915 | 1035 | 1086 | 1065 | 975 | 820 | 614 | 379 | 150 | 21 | 0 | 0 | 0 | 0 |

G(i): Global irradiance on a fixed plane [W/m2].
Gb(i): Direct irradiance on a fixed plane [W/m2].
Gd(i): Diffuse irradiance on a fixed plane [W/m2].
Gcs(i): Global Clear-sky irradiance on a fixed plane [W/m2].

## Daily average irradiance on sun-tracking plane

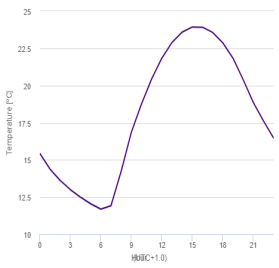



### Irradiance on sun-tracking plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 405 | 620 | 781 | 862 | 905 | 934 | 918 | 905 | 861 | 812 | 708 | 593 | 405 | 0 | 0 | 0 | 0 |
| **Gb(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 289 | 440 | 562 | 630 | 675 | 709 | 683 | 668 | 621 | 575 | 489 | 414 | 288 | 0 | 0 | 0 | 0 |
| **Gd(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 106 | 163 | 199 | 215 | 218 | 219 | 230 | 230 | 229 | 219 | 199 | 162 | 107 | 0 | 0 | 0 | 0 |
| **Gcs(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 545 | 832 | 974 | 1044 | 1076 | 1088 | 1092 | 1090 | 1083 | 1061 | 1010 | 905 | 696 | 234 | 0 | 0 | 0 | 0 |

G(n): Global irradiance on a 2-axis tracking plane [W/m2].
Gb(n): Direct normal irradiance [W/m2].
Gd(n): Diffuse irradiance on a 2-axis tracking plane [W/m2].
Gcs(n): Global Clear-sky irradiance on a 2-axis tracking plane [W/m2].

## Daily average temperature




### Daily average temperature

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **T2m** | 15.43 | 14.38 | 13.62 | 13 | 12.49 | 12.05 | 11.69 | 11.92 | 14.24 | 16.85 | 18.76 | 20.44 | 21.84 | 22.89 | 23.59 | 23.93 | 23.92 | 23.57 | 22.87 | 21.84 | 20.4 | 18.86 | 17.62 | 16.47 |

T2m: Daily average temperature [°C].

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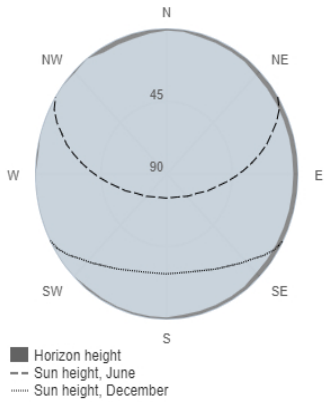
# Daily irradiance data

PVGIS-5 geo-temporal irradiation database

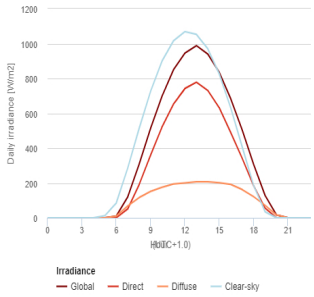
## Provided inputs

| | |
|---|---|
| Latitude/Longitude: | 37.661,-2.913 |
| Horizon: | Calculated |
| Database used | PVGIS-SARAH2 |
| Month: | June |

## Outline of horizon at chosen location:




## Daily average irradiance on fixed plane with slope 15° and azimuth 0°

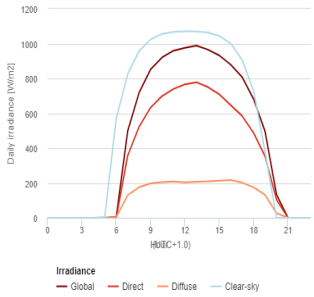



### Irradiance on a fixed plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 120 | 307 | 514 | 698 | 850 | 946 | 988 | 940 | 835 | 683 | 504 | 307 | 128 | 16 | 0 | 0 | 0 |
| **Gb(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51 | 190 | 360 | 521 | 652 | 742 | 778 | 730 | 631 | 489 | 340 | 184 | 56 | 0 | 0 | 0 | 0 |
| **Gd(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 68 | 116 | 152 | 175 | 194 | 200 | 207 | 207 | 201 | 192 | 162 | 121 | 72 | 16 | 0 | 0 | 0 |
| **Gcs(i)** | 0 | 0 | 0 | 0 | 0 | 11 | 85 | 285 | 513 | 727 | 899 | 1016 | 1068 | 1053 | 970 | 826 | 632 | 407 | 185 | 34 | 0 | 0 | 0 | 0 |

G(i): Global irradiance on a fixed plane [W/m2].
Gb(i): Direct irradiance on a fixed plane [W/m2].
Gd(i): Diffuse irradiance on a fixed plane [W/m2].
Gcs(i): Global Clear-sky irradiance on a fixed plane [W/m2].

## Daily average irradiance on sun-tracking plane

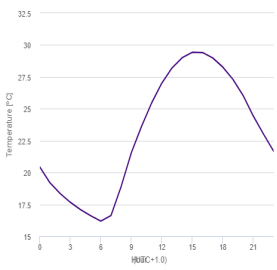



### Irradiance on sun-tracking plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 498 | 719 | 852 | 920 | 959 | 975 | 988 | 965 | 932 | 879 | 807 | 681 | 495 | 132 | 0 | 0 | 0 |
| **Gb(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 357 | 523 | 633 | 698 | 740 | 766 | 778 | 750 | 709 | 646 | 585 | 487 | 352 | 104 | 0 | 0 | 0 |
| **Gd(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 129 | 176 | 198 | 204 | 209 | 204 | 207 | 210 | 213 | 216 | 202 | 175 | 131 | 27 | 0 | 0 | 0 |
| **Gcs(n)** | 0 | 0 | 0 | 0 | 0 | 5 | 570 | 824 | 957 | 1024 | 1055 | 1067 | 1071 | 1070 | 1063 | 1044 | 999 | 906 | 727 | 378 | 0 | 0 | 0 | 0 |

G(n): Global irradiance on a 2-axis tracking plane [W/m2].
Gb(n): Direct normal irradiance [W/m2].
Gd(n): Diffuse irradiance on a 2-axis tracking plane [W/m2].
Gcs(n): Global Clear-sky irradiance on a 2-axis tracking plane [W/m2].

## Daily average temperature




### Daily average temperature

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **T2m** | 20.43 | 19.19 | 18.35 | 17.66 | 17.09 | 16.61 | 16.19 | 16.62 | 18.91 | 21.55 | 23.61 | 25.46 | 27.01 | 28.2 | 29 | 29.43 | 29.41 | 28.99 | 28.27 | 27.3 | 26.04 | 24.43 | 23.02 | 21.67 |

T2m: Daily average temperature [°C].

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Report generated on 2022/06/24

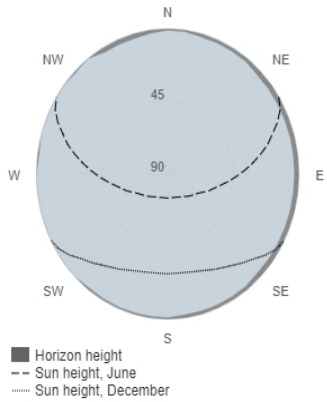
# Daily irradiance data

PVGIS-5 geo-temporal irradiation database

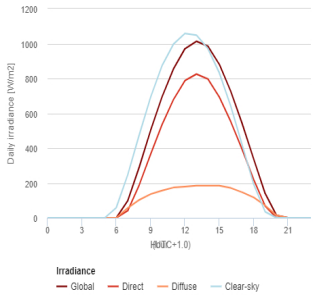
## Provided inputs

| | |
|---|---|
| Latitude/Longitude: | 37.661,-2.913 |
| Horizon: | Calculated |
| Database used | PVGIS-SARAH2 |
| Month: | July |

## Outline of horizon at chosen location:




## Daily average irradiance on fixed plane with slope 15° and azimuth 0°

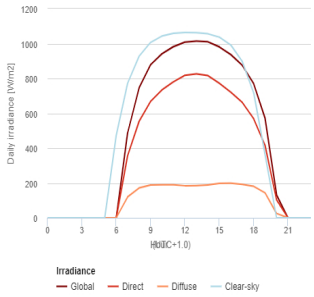



### Irradiance on a fixed plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 97 | 290 | 502 | 694 | 855 | 970 | 1013 | 985 | 881 | 726 | 541 | 339 | 140 | 15 | 0 | 0 | 0 |
| **Gb(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | 186 | 365 | 535 | 679 | 787 | 825 | 797 | 693 | 553 | 392 | 220 | 69 | 0 | 0 | 0 | 0 |
| **Gd(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 56 | 102 | 136 | 157 | 174 | 179 | 185 | 185 | 185 | 171 | 147 | 117 | 71 | 14 | 0 | 0 | 0 |
| **Gcs(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 58 | 246 | 475 | 693 | 873 | 997 | 1057 | 1049 | 972 | 833 | 641 | 418 | 193 | 35 | 0 | 0 | 0 | 0 |

G(i): Global irradiance on a fixed plane [W/m2].
Gb(i): Direct irradiance on a fixed plane [W/m2].
Gd(i): Diffuse irradiance on a fixed plane [W/m2].
Gcs(i): Global Clear-sky irradiance on a fixed plane [W/m2].

## Daily average irradiance on sun-tracking plane

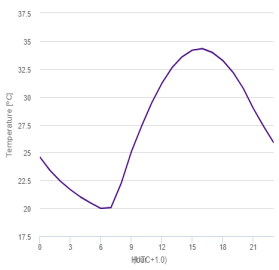



### Irradiance on sun-tracking plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 489 | 746 | 879 | 942 | 982 | 1009 | 1015 | 1010 | 981 | 937 | 876 | 771 | 571 | 131 | 0 | 0 | 0 |
| **Gb(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 358 | 555 | 668 | 734 | 780 | 818 | 826 | 816 | 773 | 721 | 663 | 569 | 415 | 104 | 0 | 0 | 0 |
| **Gd(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 120 | 171 | 188 | 189 | 190 | 184 | 185 | 188 | 198 | 199 | 191 | 181 | 143 | 25 | 0 | 0 | 0 |
| **Gcs(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 474 | 773 | 928 | 1006 | 1043 | 1058 | 1063 | 1062 | 1056 | 1037 | 992 | 898 | 717 | 363 | 0 | 0 | 0 | 0 |

G(n): Global irradiance on a 2-axis tracking plane [W/m2].
Gb(n): Direct normal irradiance [W/m2].
Gd(n): Diffuse irradiance on a 2-axis tracking plane [W/m2].
Gcs(n): Global Clear-sky irradiance on a 2-axis tracking plane [W/m2].

## Daily average temperature




### Daily average temperature

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **T2m** | 24.6 | 23.4 | 22.45 | 21.68 | 21.02 | 20.48 | 20 | 20.07 | 22.24 | 25.07 | 27.35 | 29.44 | 31.2 | 32.61 | 33.59 | 34.18 | 34.32 | 33.96 | 33.25 | 32.2 | 30.78 | 28.96 | 27.38 | 25.9 |

T2m: Daily average temperature [°C].

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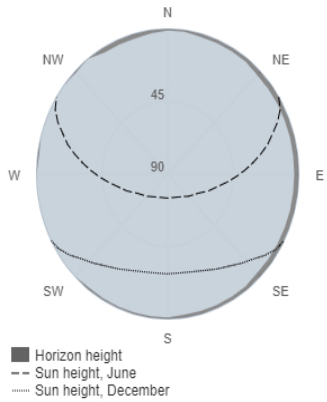
# Daily irradiance data

PVGIS-5 geo-temporal irradiation database

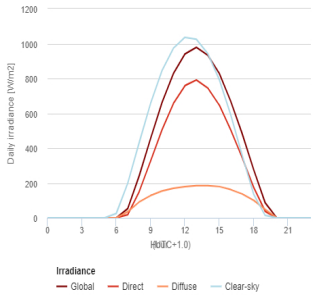
## Provided inputs

| | |
|---|---|
| Latitude/Longitude: | 37.661,-2.913 |
| Horizon: | Calculated |
| Database used | PVGIS-SARAH2 |
| Month: | August |

## Outline of horizon at chosen location:




## Daily average irradiance on fixed plane with slope 15° and azimuth 0°

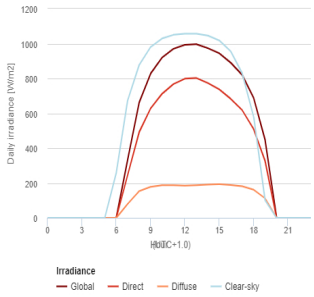



### Irradiance on a fixed plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 | 240 | 456 | 661 | 829 | 940 | 978 | 932 | 829 | 669 | 483 | 277 | 87 | 0 | 0 | 0 | 0 |
| **Gb(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 148 | 327 | 505 | 657 | 759 | 791 | 744 | 647 | 505 | 344 | 175 | 38 | 0 | 0 | 0 | 0 |
| **Gd(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 91 | 128 | 154 | 170 | 178 | 184 | 185 | 179 | 162 | 137 | 101 | 49 | 0 | 0 | 0 | 0 |
| **Gcs(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 199 | 431 | 658 | 845 | 975 | 1036 | 1025 | 942 | 793 | 592 | 359 | 135 | 14 | 0 | 0 | 0 | 0 |

G(i): Global irradiance on a fixed plane [W/m2].
Gb(i): Direct irradiance on a fixed plane [W/m2].
Gd(i): Diffuse irradiance on a fixed plane [W/m2].
Gcs(i): Global Clear-sky irradiance on a fixed plane [W/m2].

## Daily average irradiance on sun-tracking plane

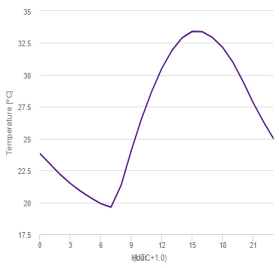



### Irradiance on sun-tracking plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 333 | 661 | 827 | 919 | 970 | 993 | 996 | 973 | 944 | 890 | 820 | 689 | 448 | 0 | 0 | 0 | 0 |
| **Gb(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 247 | 491 | 628 | 712 | 768 | 798 | 802 | 774 | 737 | 683 | 618 | 509 | 327 | 0 | 0 | 0 | 0 |
| **Gd(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 80 | 153 | 178 | 187 | 187 | 185 | 187 | 190 | 193 | 188 | 181 | 161 | 112 | 0 | 0 | 0 | 0 |
| **Gcs(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 258 | 675 | 877 | 980 | 1029 | 1050 | 1057 | 1056 | 1046 | 1018 | 956 | 829 | 580 | 100 | 0 | 0 | 0 | 0 |

G(n): Global irradiance on a 2-axis tracking plane [W/m2].
Gb(n): Direct normal irradiance [W/m2].
Gd(n): Diffuse irradiance on a 2-axis tracking plane [W/m2].
Gcs(n): Global Clear-sky irradiance on a 2-axis tracking plane [W/m2].

## Daily average temperature




### Daily average temperature

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **T2m** | 23.83 | 23.01 | 22.19 | 21.48 | 20.88 | 20.36 | 19.9 | 19.62 | 21.36 | 24.08 | 26.55 | 28.69 | 30.51 | 31.92 | 32.91 | 33.41 | 33.38 | 32.92 | 32.14 | 30.98 | 29.47 | 27.8 | 26.33 | 24.99 |

T2m: Daily average temperature [°C].

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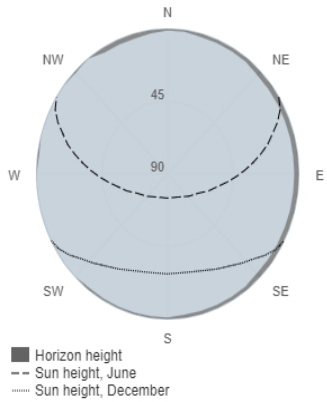
# Daily irradiance data

PVGIS-5 geo-temporal irradiation database

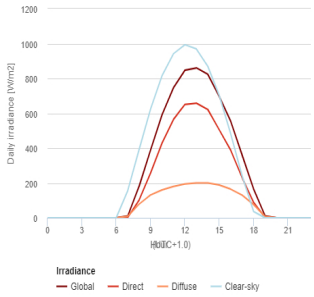
## Provided inputs

| | |
|---|---|
| Latitude/Longitude: | 37.661,-2.913 |
| Horizon: | Calculated |
| Database used | PVGIS-SARAH2 |
| Month: | September |

## Outline of horizon at chosen location:




## Daily average irradiance on fixed plane with slope 15° and azimuth 0°

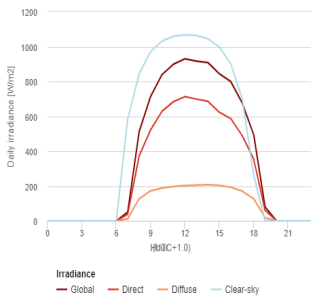



### Irradiance on a fixed plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 181 | 390 | 591 | 747 | 847 | 860 | 824 | 695 | 554 | 360 | 165 | 10 | 0 | 0 | 0 | 0 |
| **Gb(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 102 | 258 | 429 | 565 | 651 | 658 | 622 | 505 | 388 | 229 | 88 | 3 | 0 | 0 | 0 | 0 |
| **Gd(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 79 | 131 | 160 | 180 | 194 | 200 | 200 | 189 | 164 | 130 | 76 | 7 | 0 | 0 | 0 | 0 |
| **Gcs(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 155 | 393 | 626 | 815 | 941 | 994 | 969 | 869 | 701 | 481 | 239 | 36 | 0 | 0 | 0 | 0 | 0 |

G(i): Global irradiance on a fixed plane [W/m2].
Gb(i): Direct irradiance on a fixed plane [W/m2].
Gd(i): Diffuse irradiance on a fixed plane [W/m2].
Gcs(i): Global Clear-sky irradiance on a fixed plane [W/m2].

## Daily average irradiance on sun-tracking plane

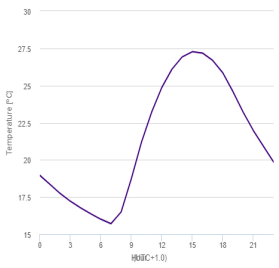



### Irradiance on sun-tracking plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 512 | 714 | 839 | 899 | 930 | 917 | 909 | 844 | 800 | 678 | 495 | 79 | 0 | 0 | 0 | 0 |
| **Gb(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 373 | 522 | 629 | 684 | 712 | 698 | 686 | 623 | 587 | 488 | 356 | 60 | 0 | 0 | 0 | 0 |
| **Gd(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 127 | 172 | 189 | 196 | 202 | 205 | 207 | 203 | 192 | 170 | 127 | 18 | 0 | 0 | 0 | 0 |
| **Gcs(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 583 | 844 | 970 | 1032 | 1059 | 1067 | 1064 | 1044 | 998 | 901 | 702 | 261 | 0 | 0 | 0 | 0 | 0 |

G(n): Global irradiance on a 2-axis tracking plane [W/m2].
Gb(n): Direct normal irradiance [W/m2].
Gd(n): Diffuse irradiance on a 2-axis tracking plane [W/m2].
Gcs(n): Global Clear-sky irradiance on a 2-axis tracking plane [W/m2].

## Daily average temperature




### Daily average temperature

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **T2m** | 18.96 | 18.35 | 17.74 | 17.22 | 16.78 | 16.38 | 16.01 | 15.71 | 16.5 | 18.73 | 21.19 | 23.21 | 24.87 | 26.1 | 26.92 | 27.27 | 27.18 | 26.69 | 25.85 | 24.59 | 23.21 | 21.98 | 20.91 | 19.85 |

T2m: Daily average temperature [°C].

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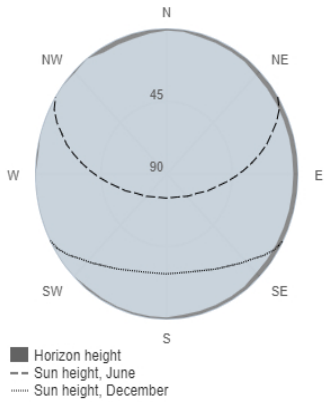
# Daily irradiance data

PVGIS-5 geo-temporal irradiation database

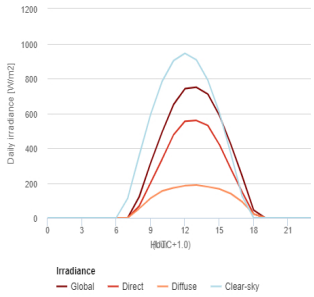
## Provided inputs

| | |
|---|---|
| Latitude/Longitude: | 37.661,-2.913 |
| Horizon: | Calculated |
| Database used | PVGIS-SARAH2 |
| Month: | October |

## Outline of horizon at chosen location:




## Daily average irradiance on fixed plane with slope 15° and azimuth 0°

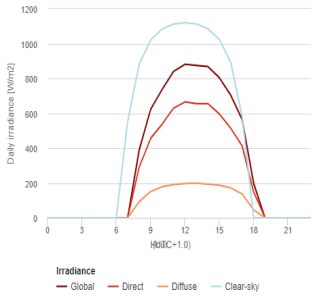



### Irradiance on a fixed plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 120 | 315 | 490 | 650 | 741 | 749 | 710 | 588 | 423 | 240 | 44 | 0 | 0 | 0 | 0 | 0 |
| **Gb(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 67 | 202 | 335 | 476 | 554 | 558 | 530 | 421 | 283 | 147 | 22 | 0 | 0 | 0 | 0 | 0 |
| **Gd(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 | 112 | 154 | 172 | 184 | 189 | 178 | 166 | 139 | 92 | 22 | 0 | 0 | 0 | 0 | 0 |
| **Gcs(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 112 | 357 | 594 | 782 | 902 | 944 | 906 | 790 | 605 | 371 | 124 | 0 | 0 | 0 | 0 | 0 | 0 |

G(i): Global irradiance on a fixed plane [W/m2].
Gb(i): Direct irradiance on a fixed plane [W/m2].
Gd(i): Diffuse irradiance on a fixed plane [W/m2].
Gcs(i): Global Clear-sky irradiance on a fixed plane [W/m2].

## Daily average irradiance on sun-tracking plane

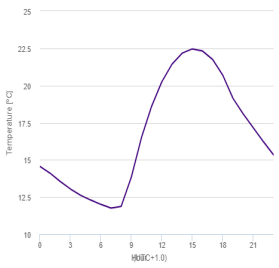



### Irradiance on sun-tracking plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 389 | 622 | 736 | 840 | 881 | 874 | 868 | 804 | 704 | 564 | 196 | 0 | 0 | 0 | 0 | 0 |
| **Gb(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 289 | 455 | 537 | 628 | 664 | 655 | 655 | 596 | 513 | 412 | 148 | 0 | 0 | 0 | 0 | 0 |
| **Gd(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 92 | 150 | 178 | 190 | 197 | 199 | 192 | 187 | 171 | 137 | 45 | 0 | 0 | 0 | 0 | 0 |
| **Gcs(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 553 | 881 | 1019 | 1083 | 1111 | 1120 | 1112 | 1085 | 1024 | 891 | 580 | 0 | 0 | 0 | 0 | 0 | 0 |

G(n): Global irradiance on a 2-axis tracking plane [W/m2].
Gb(n): Direct normal irradiance [W/m2].
Gd(n): Diffuse irradiance on a 2-axis tracking plane [W/m2].
Gcs(n): Global Clear-sky irradiance on a 2-axis tracking plane [W/m2].

## Daily average temperature




### Daily average temperature

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **T2m** | 14.56 | 14.11 | 13.55 | 13.05 | 12.62 | 12.3 | 12.01 | 11.76 | 11.87 | 13.84 | 16.5 | 18.61 | 20.25 | 21.43 | 22.17 | 22.46 | 22.32 | 21.75 | 20.69 | 19.14 | 18.1 | 17.16 | 16.22 | 15.33 |

T2m: Daily average temperature [°C].

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Report generated on 2022/06/24

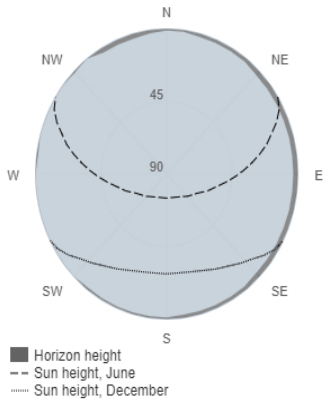
# Daily irradiance data

PVGIS-5 geo-temporal irradiation database

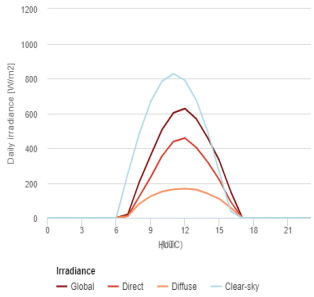
## Provided inputs

| | |
|---|---|
| Latitude/Longitude: | 37.661,-2.913 |
| Horizon: | Calculated |
| Database used | PVGIS-SARAH2 |
| Month: | November |

## Outline of horizon at chosen location:




## Daily average irradiance on fixed plane with slope 15° and azimuth 0°

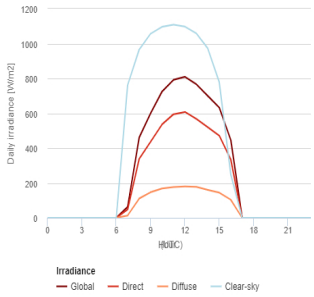



### Irradiance on a fixed plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 202 | 358 | 506 | 602 | 627 | 567 | 458 | 328 | 151 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gb(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 122 | 232 | 355 | 438 | 458 | 403 | 318 | 218 | 92 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gd(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 80 | 124 | 150 | 163 | 168 | 162 | 138 | 109 | 58 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gcs(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 251 | 481 | 666 | 784 | 826 | 788 | 674 | 492 | 263 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

G(i): Global irradiance on a fixed plane [W/m2].
Gb(i): Direct irradiance on a fixed plane [W/m2].
Gd(i): Diffuse irradiance on a fixed plane [W/m2].
Gcs(i): Global Clear-sky irradiance on a fixed plane [W/m2].

## Daily average irradiance on sun-tracking plane

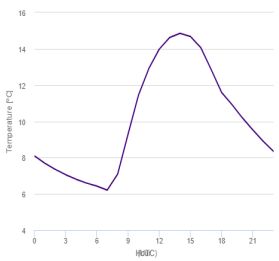



### Irradiance on sun-tracking plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 63 | 460 | 600 | 724 | 792 | 809 | 766 | 699 | 632 | 448 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gb(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 | 338 | 436 | 536 | 595 | 607 | 568 | 519 | 471 | 336 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gd(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 110 | 147 | 168 | 176 | 180 | 177 | 160 | 144 | 104 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gcs(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 763 | 965 | 1056 | 1096 | 1108 | 1097 | 1059 | 972 | 778 | 248 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

G(n): Global irradiance on a 2-axis tracking plane [W/m2].
Gb(n): Direct normal irradiance [W/m2].
Gd(n): Diffuse irradiance on a 2-axis tracking plane [W/m2].
Gcs(n): Global Clear-sky irradiance on a 2-axis tracking plane [W/m2].

## Daily average temperature




### Daily average temperature

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **T2m** | 8.1 | 7.69 | 7.35 | 7.06 | 6.81 | 6.6 | 6.43 | 6.21 | 7.09 | 9.29 | 11.44 | 12.91 | 13.98 | 14.62 | 14.85 | 14.68 | 14.06 | 12.85 | 11.59 | 10.92 | 10.19 | 9.53 | 8.9 | 8.34 |

T2m: Daily average temperature [°C].

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Report generated on 2022/06/24

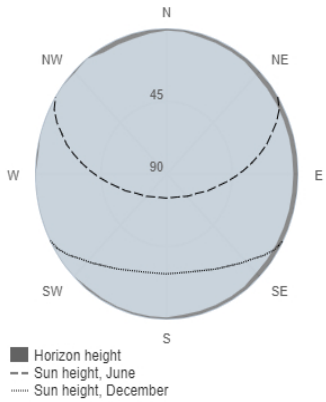
# Daily irradiance data

PVGIS-5 geo-temporal irradiation database

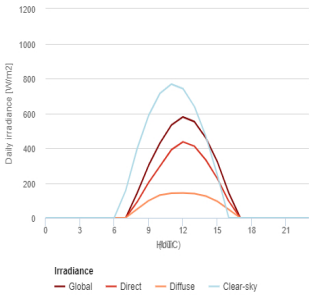
## Provided inputs

| | |
|---|---|
| Latitude/Longitude: | 37.661,-2.913 |
| Horizon: | Calculated |
| Database used | PVGIS-SARAH2 |
| Month: | December |

## Outline of horizon at chosen location:




## Daily average irradiance on fixed plane with slope 15° and azimuth 0°

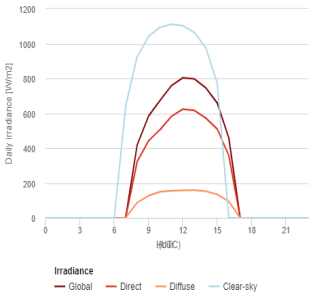



### Irradiance on a fixed plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 141 | 301 | 430 | 533 | 579 | 552 | 459 | 321 | 144 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gb(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 91 | 202 | 298 | 391 | 436 | 411 | 332 | 226 | 96 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gd(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 99 | 131 | 141 | 142 | 139 | 125 | 95 | 48 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gcs(i)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 157 | 397 | 588 | 715 | 767 | 741 | 639 | 468 | 247 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

G(i): Global irradiance on a fixed plane [W/m2].
Gb(i): Direct irradiance on a fixed plane [W/m2].
Gd(i): Diffuse irradiance on a fixed plane [W/m2].
Gcs(i): Global Clear-sky irradiance on a fixed plane [W/m2].

## Daily average irradiance on sun-tracking plane

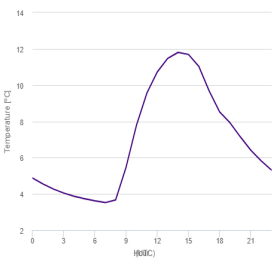



### Irradiance on sun-tracking plane

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 417 | 584 | 674 | 758 | 804 | 797 | 745 | 659 | 459 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gb(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 322 | 442 | 506 | 582 | 624 | 616 | 572 | 509 | 358 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gd(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 88 | 127 | 149 | 156 | 158 | 159 | 152 | 134 | 94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gcs(n)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 640 | 925 | 1041 | 1094 | 1111 | 1103 | 1064 | 975 | 771 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

G(n): Global irradiance on a 2-axis tracking plane [W/m2].
Gb(n): Direct normal irradiance [W/m2].
Gd(n): Diffuse irradiance on a 2-axis tracking plane [W/m2].
Gcs(n): Global Clear-sky irradiance on a 2-axis tracking plane [W/m2].

## Daily average temperature




### Daily average temperature

| Time | 00:45 | 01:45 | 02:45 | 03:45 | 04:45 | 05:45 | 06:45 | 07:45 | 08:45 | 09:45 | 10:45 | 11:45 | 12:45 | 13:45 | 14:45 | 15:45 | 16:45 | 17:45 | 18:45 | 19:45 | 20:45 | 21:45 | 22:45 | 23:45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **T2m** | 4.88 | 4.55 | 4.27 | 4.05 | 3.87 | 3.74 | 3.62 | 3.52 | 3.67 | 5.47 | 7.78 | 9.55 | 10.72 | 11.47 | 11.8 | 11.69 | 11.03 | 9.67 | 8.52 | 7.92 | 7.14 | 6.41 | 5.82 | 5.31 |

T2m: Daily average temperature [°C].

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# APÉNDICE Nº 2

# CÁLCULOS JUSTIFICATIVOS DE POTENCIA BRUTA, POTENCIA NETA Y AUTOCONSUMO CAMPO FOTOVOLTÁICO DE 885,6 kWp

| Potencia FV (Wp) |
|---|
| 885.600 |

| PRODUCCION ANUAL | Energía producida bruta (kWh) | Energía producida neta (kWh) | Energia autoconsumida (kW) | Energia autoconsumida real (kW) | Consumo de energia de red (kW) |
|---|---|---|---|---|---|
| ENERO | 99.749 | 77.540 | 0 | 0 | 0 |
| FEBRERO | 107.668 | 85.682 | 0 | 0 | 0 |
| MARZO | 146.304 | 116.428 | 73.967 | 52.516 | 1.673 |
| ABRIL | 168.129 | 133.797 | 73.011 | 51.838 | 195 |
| MAYO | 196.746 | 146.419 | 75.640 | 53.704 | 0 |
| JUNIO | 206.653 | 153.791 | 77.775 | 55.220 | 0 |
| JULIO | 219.093 | 163.049 | 80.368 | 57.061 | 0 |
| AGOSTO | 203194 | 151.217 | 75.640 | 53.704 | 0 |
| SEPTIEMBRE | 165525 | 123.184 | 72.284 | 51.321 | 947 |
| OCTUBRE | 144845 | 115.268 | 72.305 | 51.336 | 3335 |
| NOVIEMBRE | 99673 | 79.320 | 0 | 0 | 0 |
| DICIEMBRE | 94.317 | 75.057 | 0 | 0 | 0 |
| **TOTAL** | **1.851.897** | **1.420.752** | **600.989** | **426.702** | **6.151** |

# ENERO

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 885,6 kW | Potencia generada neta Campo FV 885,6 kW |
|---|---|---|---|---|
| 8:15 | 0 | 0 | 0 | 0 |
| 8:30 | 96 | 9,6 | 85 | 68 |
| 8:45 | 128 | 12,8 | 113 | 90 |
| 9:00 | 170 | 16,95 | 150 | 119 |
| 9:15 | 211 | 21,1 | 187 | 149 |
| 9:30 | 253 | 25,25 | 224 | 178 |
| 9:45 | 294 | 29,4 | 260 | 207 |
| 10:00 | 330 | 33 | 292 | 233 |
| 10:15 | 366 | 36,6 | 324 | 258 |
| 10:30 | 402 | 40,2 | 356 | 283 |
| 10:45 | 438 | 43,8 | 388 | 309 |
| 11:00 | 463 | 46,275 | 410 | 326 |
| 11:15 | 488 | 48,75 | 432 | 344 |
| 11:30 | 512 | 51,225 | 454 | 361 |
| 11:45 | 537 | 53,7 | 476 | 378 |
| 12:00 | 551 | 55,125 | 488 | 388 |
| 12:15 | 566 | 56,55 | 501 | 399 |
| 12:30 | 580 | 57,975 | 513 | 409 |
| 12:45 | 594 | 59,4 | 526 | 419 |
| 13:00 | 588 | 58,75 | 520 | 414 |
| 13:15 | 581 | 58,1 | 515 | 409 |
| 13:30 | 575 | 57,45 | 509 | 405 |
| 13:45 | 568 | 56,8 | 503 | 400 |
| 14:00 | 553 | 55,25 | 489 | 389 |
| 14:15 | 537 | 53,7 | 476 | 378 |
| 14:30 | 522 | 52,15 | 462 | 368 |
| 14:45 | 506 | 50,6 | 448 | 357 |
| 15:00 | 473 | 47,325 | 419 | 334 |
| 15:15 | 441 | 44,05 | 390 | 310 |
| 15:30 | 408 | 40,775 | 361 | 287 |
| 15:45 | 375 | 37,5 | 332 | 264 |
| 16:00 | 335 | 33,45 | 296 | 236 |
| 16:15 | 294 | 29,4 | 260 | 207 |
| 16:30 | 254 | 25,35 | 224 | 179 |
| 16:45 | 213 | 21,3 | 189 | 150 |
| 17:00 | 162 | 16,15 | 143 | 114 |
| 17:15 | 110 | 11 | 97 | 78 |
| 17:30 | 59 | 5,85 | 52 | 41 |
| 17:45 | 7 | 0,7 | 6 | 5 |
| 18:00 | 0 | 0 | 0 | 0 |
| | | | **12.871** | **10.005** |

# FEBRERO

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 885,6 kW | Potencia generada neta Campo FV 885,6 kW |
|---|---|---|---|---|
| 8:15 | 0 | 0 | 0 | 0 |
| 8:30 | 115 | 11,5 | 102 | 81 |
| 8:45 | 181 | 18,1 | 160 | 128 |
| 9:00 | 224 | 22,425 | 199 | 158 |
| 9:15 | 268 | 26,75 | 237 | 189 |
| 9:30 | 311 | 31,075 | 275 | 219 |
| 9:45 | 354 | 35,4 | 314 | 249 |
| 10:00 | 390 | 38,975 | 345 | 275 |
| 10:15 | 426 | 42,55 | 377 | 300 |
| 10:30 | 461 | 46,125 | 408 | 325 |
| 10:45 | 497 | 49,7 | 440 | 350 |
| 11:00 | 529 | 52,875 | 468 | 373 |
| 11:15 | 561 | 56,05 | 496 | 395 |
| 11:30 | 592 | 59,225 | 524 | 417 |
| 11:45 | 624 | 62,4 | 553 | 440 |
| 12:00 | 635 | 63,5 | 562 | 448 |
| 12:15 | 646 | 64,6 | 572 | 455 |
| 12:30 | 657 | 65,7 | 582 | 463 |
| 12:45 | 668 | 66,8 | 592 | 471 |
| 13:00 | 666 | 66,625 | 590 | 470 |
| 13:15 | 665 | 66,45 | 588 | 468 |
| 13:30 | 663 | 66,275 | 587 | 467 |
| 13:45 | 661 | 66,1 | 585 | 466 |
| 14:00 | 643 | 64,3 | 569 | 453 |
| 14:15 | 625 | 62,5 | 554 | 440 |
| 14:30 | 607 | 60,7 | 538 | 428 |
| 14:45 | 589 | 58,9 | 522 | 415 |
| 15:00 | 555 | 55,45 | 491 | 391 |
| 15:15 | 520 | 52 | 461 | 366 |
| 15:30 | 486 | 48,55 | 430 | 342 |
| 15:45 | 451 | 45,1 | 399 | 318 |
| 16:00 | 412 | 41,15 | 364 | 290 |
| 16:15 | 372 | 37,2 | 329 | 262 |
| 16:30 | 333 | 33,25 | 294 | 234 |
| 16:45 | 293 | 29,3 | 259 | 206 |
| 17:00 | 245 | 24,5 | 217 | 173 |
| 17:15 | 197 | 19,7 | 174 | 139 |
| 17:30 | 149 | 14,9 | 132 | 105 |
| 17:45 | 101 | 10,1 | 89 | 71 |
| 18:00 | 0 | 0 | 0 | 0 |
| | | | **15.381** | **12.240** |

# MARZO

| POTENCIA BOMBEO (kW) | 305 |
|---|---|

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 885,6 kW | Potencia generada neta Campo | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 7:45 | 0 | 0 | 0 | 0 | | |
| 8:00 | 24 | 2,375 | 21 | 17 | | |
| 8:15 | 48 | 4,75 | 42 | 33 | | |
| 8:30 | 71 | 7,125 | 63 | 50 | | |
| 8:45 | 95 | 9,5 | 84 | 67 | | |
| 9:00 | 142 | 14,175 | 126 | 100 | | |
| 9:15 | 189 | 18,85 | 167 | 133 | | |
| 9:30 | 235 | 23,525 | 208 | 166 | | |
| 9:45 | 282 | 28,2 | 250 | 199 | | |
| 10:00 | 328 | 32,75 | 290 | 231 | -74,19 | 231 |
| 10:15 | 373 | 37,3 | 330 | 263 | -42,12 | 262,88 |
| 10:30 | 419 | 41,85 | 371 | 295 | -10,06 | 294,94 |
| 10:45 | 464 | 46,4 | 411 | 327 | | 305,00 |
| 11:00 | 501 | 50,1 | 444 | 353 | | 305,00 |
| 11:15 | 538 | 53,8 | 476 | 379 | | 305,00 |
| 11:30 | 575 | 57,5 | 509 | 405 | | 305,00 |
| 11:45 | 612 | 61,2 | 542 | 431 | | 305,00 |
| 12:00 | 644 | 64,425 | 571 | 454 | | 305,00 |
| 12:15 | 677 | 67,65 | 599 | 477 | | 305,00 |
| 12:30 | 709 | 70,875 | 628 | 499 | | 305,00 |
| 12:45 | 741 | 74,1 | 656 | 522 | | 305,00 |
| 13:00 | 743 | 74,25 | 658 | 523 | | 305,00 |
| 13:15 | 744 | 74,4 | 659 | 524 | | 305,00 |
| 13:30 | 746 | 74,55 | 660 | 525 | | 305,00 |
| 13:45 | 747 | 74,7 | 662 | 526 | | 305,00 |
| 14:00 | 751 | 75,075 | 665 | 529 | | 305,00 |
| 14:15 | 755 | 75,45 | 668 | 532 | | 305,00 |
| 14:30 | 758 | 75,825 | 672 | 534 | | 305,00 |
| 14:45 | 762 | 76,2 | 675 | 537 | | 305,00 |
| 15:00 | 736 | 73,575 | 652 | 519 | | 305,00 |
| 15:15 | 710 | 70,95 | 628 | 500 | | 305,00 |
| 15:30 | 683 | 68,325 | 605 | 482 | | 305,00 |
| 15:45 | 657 | 65,7 | 582 | 463 | | 305,00 |
| 16:00 | 622 | 62,225 | 551 | 439 | | 305,00 |
| 16:15 | 588 | 58,75 | 520 | 414 | | 305,00 |
| 16:30 | 553 | 55,275 | 490 | 390 | | 305,00 |
| 16:45 | 518 | 51,8 | 459 | 365 | | 305,00 |
| 17:00 | 476 | 47,55 | 421 | 335 | | 305,00 |
| 17:15 | 433 | 43,3 | 383 | 305 | | 305,00 |
| 17:30 | 391 | 39,05 | 346 | 275 | -29,79 | 275,21 |
| 17:45 | 348 | 34,8 | 308 | 245 | -59,74 | 245 |
| 18:00 | 302 | 30,225 | 268 | 213 | | |
| 18:15 | 257 | 25,65 | 227 | 181 | | |
| 18:30 | 211 | 21,075 | 187 | 149 | | |
| 18:45 | 165 | 16,5 | 146 | 116 | | |
| | | | **18.878** | **15.023** | | **9.544** |

| | |
|---|---|
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia)** | **54** |

| | |
|---|---|
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes)** | **1.673** |

# ABRIL

| POTENCIA BOMBEO (kW) | 305 |
|---|---|

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 885,6 kW | Potencia generada neta Campo FV 885,6 kW | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 7:45 | 34 | 3,4 | 30 | 24 | | |
| 8:00 | 75 | 7,525 | 67 | 53 | | |
| 8:15 | 117 | 11,65 | 103 | 82 | | |
| 8:30 | 158 | 15,775 | 140 | 111 | | |
| 8:45 | 199 | 19,9 | 176 | 140 | | |
| 9:00 | 247 | 24,675 | 219 | 174 | | |
| 9:15 | 295 | 29,45 | 261 | 208 | | |
| 9:30 | 342 | 34,225 | 303 | 241 | | |
| 9:45 | 390 | 39 | 345 | 275 | | |
| 10:00 | 437 | 43,675 | 387 | 308 | | 305,0000 |
| 10:15 | 484 | 48,35 | 428 | 341 | | 305,0000 |
| 10:30 | 530 | 53,025 | 470 | 374 | | 305,0000 |
| 10:45 | 577 | 57,7 | 511 | 407 | | 305,0000 |
| 11:00 | 615 | 61,525 | 545 | 434 | | 305,0000 |
| 11:15 | 654 | 65,35 | 579 | 461 | | 305,0000 |
| 11:30 | 692 | 69,175 | 613 | 488 | | 305,0000 |
| 11:45 | 730 | 73 | 646 | 514 | | 305,0000 |
| 12:00 | 753 | 75,3 | 667 | 531 | | 305,0000 |
| 12:15 | 776 | 77,6 | 687 | 547 | | 305,0000 |
| 12:30 | 799 | 79,9 | 708 | 563 | | 305,0000 |
| 12:45 | 822 | 82,2 | 728 | 579 | | 305,0000 |
| 13:00 | 825 | 82,525 | 731 | 582 | | 305,0000 |
| 13:15 | 829 | 82,85 | 734 | 584 | | 305,0000 |
| 13:30 | 832 | 83,175 | 737 | 586 | | 305,0000 |
| 13:45 | 835 | 83,5 | 739 | 588 | | 305,0000 |
| 14:00 | 832 | 83,15 | 736 | 586 | | 305,0000 |
| 14:15 | 828 | 82,8 | 733 | 584 | | 305,0000 |
| 14:30 | 825 | 82,45 | 730 | 581 | | 305,0000 |
| 14:45 | 821 | 82,1 | 727 | 579 | | 305,0000 |
| 15:00 | 795 | 79,45 | 704 | 560 | | 305,0000 |
| 15:15 | 768 | 76,8 | 680 | 541 | | 305,0000 |
| 15:30 | 742 | 74,15 | 657 | 523 | | 305,0000 |
| 15:45 | 715 | 71,5 | 633 | 504 | | 305,0000 |
| 16:00 | 680 | 68,025 | 602 | 479 | | 305,0000 |
| 16:15 | 646 | 64,55 | 572 | 455 | | 305,0000 |
| 16:30 | 611 | 61,075 | 541 | 430 | | 305,0000 |
| 16:45 | 576 | 57,6 | 510 | 406 | | 305,0000 |
| 17:00 | 531 | 53,125 | 470 | 374 | | 305,0000 |
| 17:15 | 487 | 48,65 | 431 | 343 | | 305,0000 |
| 17:30 | 442 | 44,175 | 391 | 311 | | 305,0000 |
| 17:45 | 397 | 39,7 | 352 | 280 | -25,21 | 280 |
| 18:00 | 352 | 35,15 | 311 | 248 | | |
| 18:15 | 306 | 30,6 | 271 | 216 | | |
| 18:30 | 261 | 26,05 | 231 | 184 | | |
| 18:45 | 215 | 21,5 | 190 | 152 | | |
| 19:00 | 173 | 17,325 | 153 | 122 | | |
| 19:15 | 132 | 13,15 | 116 | 93 | | |
| 19:30 | 90 | 8,975 | 79 | 63 | | |
| 19:45 | 48 | 4,8 | 43 | 34 | | |
| | | | **22.417** | **17.840** | | **9.735** |

| | |
|---|---|
| ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia) | 6 |
| | |
| ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes) | 195 |

# MAYO

| POTENCIA BOMBEO (kW) | 305 |
|---|---|

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 885,6 kW | Potencia generada neta Campo FV 885,6 kW | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 6:45 | 0 | 0 | 0 | 0 | | |
| 7:00 | 25 | 2,45 | 22 | 16 | | |
| 7:15 | 49 | 4,9 | 43 | 32 | | |
| 7:30 | 74 | 7,35 | 65 | 48 | | |
| 7:45 | 98 | 9,8 | 87 | 65 | | |
| 8:00 | 142 | 14,2 | 126 | 94 | | |
| 8:15 | 186 | 18,6 | 165 | 123 | | |
| 8:30 | 230 | 23 | 204 | 152 | | |
| 8:45 | 274 | 27,4 | 243 | 181 | | |
| 9:00 | 326 | 32,575 | 288 | 215 | | |
| 9:15 | 378 | 37,75 | 334 | 249 | | |
| 9:30 | 429 | 42,925 | 380 | 283 | | |
| 9:45 | 481 | 48,1 | 426 | 317 | | 305,00 |
| 10:00 | 527 | 52,65 | 466 | 347 | | 305,00 |
| 10:15 | 572 | 57,2 | 507 | 377 | | 305,00 |
| 10:30 | 618 | 61,75 | 547 | 407 | | 305,00 |
| 10:45 | 663 | 66,3 | 587 | 437 | | 305,00 |
| 11:00 | 699 | 69,875 | 619 | 461 | | 305,00 |
| 11:15 | 735 | 73,45 | 650 | 484 | | 305,00 |
| 11:30 | 770 | 77,025 | 682 | 508 | | 305,00 |
| 11:45 | 806 | 80,6 | 714 | 531 | | 305,00 |
| 12:00 | 831 | 83,075 | 736 | 548 | | 305,00 |
| 12:15 | 856 | 85,55 | 758 | 564 | | 305,00 |
| 12:30 | 880 | 88,025 | 780 | 580 | | 305,00 |
| 12:45 | 905 | 90,5 | 801 | 596 | | 305,00 |
| 13:00 | 907 | 90,725 | 803 | 598 | | 305,00 |
| 13:15 | 910 | 90,95 | 805 | 599 | | 305,00 |
| 13:30 | 912 | 91,175 | 807 | 601 | | 305,00 |
| 13:45 | 914 | 91,4 | 809 | 602 | | 305,00 |
| 14:00 | 904 | 90,425 | 801 | 596 | | 305,00 |
| 14:15 | 895 | 89,45 | 792 | 590 | | 305,00 |
| 14:30 | 885 | 88,475 | 784 | 583 | | 305,00 |
| 14:45 | 875 | 87,5 | 775 | 577 | | 305,00 |
| 15:00 | 848 | 84,775 | 751 | 559 | | 305,00 |
| 15:15 | 821 | 82,05 | 727 | 541 | | 305,00 |
| 15:30 | 793 | 79,325 | 703 | 523 | | 305,00 |
| 15:45 | 766 | 76,6 | 678 | 505 | | 305,00 |
| 16:00 | 731 | 73,075 | 647 | 482 | | 305,00 |
| 16:15 | 696 | 69,55 | 616 | 458 | | 305,00 |
| 16:30 | 660 | 66,025 | 585 | 435 | | 305,00 |
| 16:45 | 625 | 62,5 | 554 | 412 | | 305,00 |
| 17:00 | 579 | 57,9 | 513 | 382 | | 305,00 |
| 17:15 | 533 | 53,3 | 472 | 351 | | 305,00 |
| 17:30 | 487 | 48,7 | 431 | 321 | | 305,00 |
| 17:45 | 441 | 44,1 | 391 | 291 | | |
| 18:00 | 396 | 39,6 | 351 | 261 | | |
| 18:15 | 351 | 35,1 | 311 | 231 | | |
| 18:30 | 306 | 30,6 | 271 | 202 | | |
| 18:45 | 261 | 26,1 | 231 | 172 | | |
| 19:00 | 219 | 21,875 | 194 | 144 | | |
| 19:15 | 177 | 17,65 | 156 | 116 | | |
| 19:30 | 134 | 13,425 | 119 | 88 | | |
| 19:45 | 92 | 9,2 | 81 | 61 | | |
| | | | **25.387** | **18.893** | | **9.760** |

| | |
|---|---|
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia)** | **0** |
| | |
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes)** | **0** |

| JUNIO | POTENCIA BOMBEO (kW) | 305 |
|---|---|---|

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 885,6 kW | Potencia generada neta Campo FV 885,6 kW | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 6:45 | 10 | 1 | 9 | 7 | | |
| 7:00 | 38 | 4 | 33 | 25 | | |
| 7:15 | 65 | 7 | 58 | 43 | | |
| 7:30 | 93 | 9 | 82 | 61 | | |
| 7:45 | 120 | 12 | 106 | 79 | | |
| 8:00 | 167 | 17 | 148 | 110 | | |
| 8:15 | 214 | 21 | 189 | 141 | | |
| 8:30 | 260 | 26 | 230 | 172 | | |
| 8:45 | 307 | 31 | 272 | 202 | | |
| 9:00 | 359 | 36 | 318 | 236 | | |
| 9:15 | 411 | 41 | 364 | 271 | | |
| 9:30 | 462 | 46 | 409 | 305 | | 305,00 |
| 9:45 | 514 | 51 | 455 | 339 | | 305,00 |
| 10:00 | 560 | 56 | 496 | 369 | | 305,00 |
| 10:15 | 606 | 61 | 537 | 399 | | 305,00 |
| 10:30 | 652 | 65 | 577 | 430 | | 305,00 |
| 10:45 | 698 | 70 | 618 | 460 | | 305,00 |
| 11:00 | 736 | 74 | 652 | 485 | | 305,00 |
| 11:15 | 774 | 77 | 685 | 510 | | 305,00 |
| 11:30 | 812 | 81 | 719 | 535 | | 305,00 |
| 11:45 | 850 | 85 | 753 | 560 | | 305,00 |
| 12:00 | 874 | 87 | 774 | 576 | | 305,00 |
| 12:15 | 898 | 90 | 795 | 592 | | 305,00 |
| 12:30 | 922 | 92 | 817 | 608 | | 305,00 |
| 12:45 | 946 | 95 | 838 | 623 | | 305,00 |
| 13:00 | 957 | 96 | 847 | 630 | | 305,00 |
| 13:15 | 967 | 97 | 856 | 637 | | 305,00 |
| 13:30 | 978 | 98 | 866 | 644 | | 305,00 |
| 13:45 | 988 | 99 | 875 | 651 | | 305,00 |
| 14:00 | 976 | 98 | 864 | 643 | | 305,00 |
| 14:15 | 964 | 96 | 854 | 635 | | 305,00 |
| 14:30 | 952 | 95 | 843 | 627 | | 305,00 |
| 14:45 | 940 | 94 | 832 | 620 | | 305,00 |
| 15:00 | 914 | 91 | 809 | 602 | | 305,00 |
| 15:15 | 888 | 89 | 786 | 585 | | 305,00 |
| 15:30 | 861 | 86 | 763 | 568 | | 305,00 |
| 15:45 | 835 | 84 | 739 | 550 | | 305,00 |
| 16:00 | 797 | 80 | 706 | 525 | | 305,00 |
| 16:15 | 759 | 76 | 672 | 500 | | 305,00 |
| 16:30 | 721 | 72 | 639 | 475 | | 305,00 |
| 16:45 | 683 | 68 | 605 | 450 | | 305,00 |
| 17:00 | 638 | 64 | 565 | 421 | | 305,00 |
| 17:15 | 594 | 59 | 526 | 391 | | 305,00 |
| 17:30 | 549 | 55 | 486 | 362 | | 305,00 |
| 17:45 | 504 | 50 | 446 | 332 | | 305,00 |
| 18:00 | 455 | 45 | 403 | 300 | | |
| 18:15 | 406 | 41 | 359 | 267 | | |
| 18:30 | 356 | 36 | 315 | 235 | | |
| 18:45 | 307 | 31 | 272 | 202 | | |
| 19:00 | 262 | 26 | 232 | 173 | | |
| 19:15 | 218 | 22 | 193 | 143 | | |
| 19:30 | 173 | 17 | 153 | 114 | | |
| 19:45 | 128 | 13 | 113 | 84 | | |
| | | | **27.554** | **20.505** | | **10.370** |

| | |
|---|---|
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia)** | **0** |
| | |
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes)** | **0** |

| JULIO | POTENCIA BOMBEO (kW) | 305 |
|---|---|---|

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 885,6 kW | Potencia generada neta Campo FV 885,6 kW | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 6:45 | 0 | 0 | 0 | 0 | | |
| 7:00 | 24 | 2,425 | 21 | 16 | | |
| 7:15 | 49 | 4,85 | 43 | 32 | | |
| 7:30 | 73 | 7,275 | 64 | 48 | | |
| 7:45 | 97 | 9,7 | 86 | 64 | | |
| 8:00 | 145 | 14,525 | 129 | 96 | | |
| 8:15 | 194 | 19,35 | 171 | 128 | | |
| 8:30 | 242 | 24,175 | 214 | 159 | | |
| 8:45 | 290 | 29 | 257 | 191 | | |
| 9:00 | 343 | 34,3 | 304 | 226 | | |
| 9:15 | 396 | 39,6 | 351 | 261 | | |
| 9:30 | 449 | 44,9 | 398 | 296 | | |
| 9:45 | 502 | 50,2 | 445 | 331 | | 305,00 |
| 10:00 | 550 | 55 | 487 | 362 | | 305,00 |
| 10:15 | 598 | 59,8 | 530 | 394 | | 305,00 |
| 10:30 | 646 | 64,6 | 572 | 426 | | 305,00 |
| 10:45 | 694 | 69,4 | 615 | 457 | | 305,00 |
| 11:00 | 734 | 73,425 | 650 | 484 | | 305,00 |
| 11:15 | 775 | 77,45 | 686 | 510 | | 305,00 |
| 11:30 | 815 | 81,475 | 722 | 537 | | 305,00 |
| 11:45 | 855 | 85,5 | 757 | 563 | | 305,00 |
| 12:00 | 884 | 88,375 | 783 | 582 | | 305,00 |
| 12:15 | 913 | 91,25 | 808 | 601 | | 305,00 |
| 12:30 | 941 | 94,125 | 834 | 620 | | 305,00 |
| 12:45 | 970 | 97 | 859 | 639 | | 305,00 |
| 13:00 | 981 | 98,075 | 869 | 646 | | 305,00 |
| 13:15 | 992 | 99,15 | 878 | 653 | | 305,00 |
| 13:30 | 1002 | 100,225 | 888 | 661 | | 305,00 |
| 13:45 | 1013 | 101,3 | 897 | 668 | | 305,00 |
| 14:00 | 1006 | 100,6 | 891 | 663 | | 305,00 |
| 14:15 | 999 | 99,9 | 885 | 658 | | 305,00 |
| 14:30 | 992 | 99,2 | 879 | 654 | | 305,00 |
| 14:45 | 985 | 98,5 | 872 | 649 | | 305,00 |
| 15:00 | 959 | 95,9 | 849 | 632 | | 305,00 |
| 15:15 | 933 | 93,3 | 826 | 615 | | 305,00 |
| 15:30 | 907 | 90,7 | 803 | 598 | | 305,00 |
| 15:45 | 881 | 88,1 | 780 | 581 | | 305,00 |
| 16:00 | 842 | 84,225 | 746 | 555 | | 305,00 |
| 16:15 | 804 | 80,35 | 712 | 530 | | 305,00 |
| 16:30 | 765 | 76,475 | 677 | 504 | | 305,00 |
| 16:45 | 726 | 72,6 | 643 | 478 | | 305,00 |
| 17:00 | 680 | 67,975 | 602 | 448 | | 305,00 |
| 17:15 | 634 | 63,35 | 561 | 418 | | 305,00 |
| 17:30 | 587 | 58,725 | 520 | 387 | | 305,00 |
| 17:45 | 541 | 54,1 | 479 | 357 | | 305,00 |
| 18:00 | 491 | 49,05 | 434 | 323 | | 305,00 |
| 18:15 | 440 | 44 | 390 | 290 | | |
| 18:30 | 390 | 38,95 | 345 | 257 | | |
| 18:45 | 339 | 33,9 | 300 | 223 | | |
| 19:00 | 289 | 28,925 | 256 | 191 | | |
| 19:15 | 240 | 23,95 | 212 | 158 | | |
| 19:30 | 190 | 18,975 | 168 | 125 | | |
| 19:45 | 140 | 14 | 124 | 92 | | |
| | | | **28.270** | **21.039** | | **10.370** |

| | |
|---|---|
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia)** | **0** |
| | |
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes)** | **0** |

## AGOSTO

| POTENCIA BOMBEO (kW) | 305 |
|---|---|

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 885,6 kW | Potencia generada neta Campo FV 885,6 kW | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 6:45 | 0 | 0 | 0 | 0 | | |
| 7:00 | 13 | 1,325 | 12 | 9 | | |
| 7:15 | 27 | 2,65 | 23 | 17 | | |
| 7:30 | 40 | 3,975 | 35 | 26 | | |
| 7:45 | 53 | 5,3 | 47 | 35 | | |
| 8:00 | 100 | 9,975 | 88 | 66 | | |
| 8:15 | 147 | 14,65 | 130 | 97 | | |
| 8:30 | 193 | 19,325 | 171 | 127 | | |
| 8:45 | 240 | 24 | 213 | 158 | | |
| 9:00 | 294 | 29,4 | 260 | 194 | | |
| 9:15 | 348 | 34,8 | 308 | 229 | | |
| 9:30 | 402 | 40,2 | 356 | 265 | | |
| 9:45 | 456 | 45,6 | 404 | 301 | | |
| 10:00 | 507 | 50,725 | 449 | 334 | | 305,00 |
| 10:15 | 559 | 55,85 | 495 | 368 | | 305,00 |
| 10:30 | 610 | 60,975 | 540 | 402 | | 305,00 |
| 10:45 | 661 | 66,1 | 585 | 436 | | 305,00 |
| 11:00 | 703 | 70,3 | 623 | 463 | | 305,00 |
| 11:15 | 745 | 74,5 | 660 | 491 | | 305,00 |
| 11:30 | 787 | 78,7 | 697 | 519 | | 305,00 |
| 11:45 | 829 | 82,9 | 734 | 546 | | 305,00 |
| 12:00 | 857 | 85,675 | 759 | 565 | | 305,00 |
| 12:15 | 885 | 88,45 | 783 | 583 | | 305,00 |
| 12:30 | 912 | 91,225 | 808 | 601 | | 305,00 |
| 12:45 | 940 | 94 | 832 | 620 | | 305,00 |
| 13:00 | 950 | 94,95 | 841 | 626 | | 305,00 |
| 13:15 | 959 | 95,9 | 849 | 632 | | 305,00 |
| 13:30 | 969 | 96,85 | 858 | 638 | | 305,00 |
| 13:45 | 978 | 97,8 | 866 | 645 | | 305,00 |
| 14:00 | 967 | 96,65 | 856 | 637 | | 305,00 |
| 14:15 | 955 | 95,5 | 846 | 629 | | 305,00 |
| 14:30 | 944 | 94,35 | 836 | 622 | | 305,00 |
| 14:45 | 932 | 93,2 | 825 | 614 | | 305,00 |
| 15:00 | 906 | 90,625 | 803 | 597 | | 305,00 |
| 15:15 | 881 | 88,05 | 780 | 580 | | 305,00 |
| 15:30 | 855 | 85,475 | 757 | 563 | | 305,00 |
| 15:45 | 829 | 82,9 | 734 | 546 | | 305,00 |
| 16:00 | 789 | 78,9 | 699 | 520 | | 305,00 |
| 16:15 | 749 | 74,9 | 663 | 494 | | 305,00 |
| 16:30 | 709 | 70,9 | 628 | 467 | | 305,00 |
| 16:45 | 669 | 66,9 | 592 | 441 | | 305,00 |
| 17:00 | 623 | 62,25 | 551 | 410 | | 305,00 |
| 17:15 | 576 | 57,6 | 510 | 380 | | 305,00 |
| 17:30 | 530 | 52,95 | 469 | 349 | | 305,00 |
| 17:45 | 483 | 48,3 | 428 | 318 | | 305,00 |
| 18:00 | 432 | 43,15 | 382 | 284 | | |
| 18:15 | 380 | 38 | 337 | 250 | | |
| 18:30 | 329 | 32,85 | 291 | 217 | | |
| 18:45 | 277 | 27,7 | 245 | 183 | | |
| 19:00 | 230 | 22,95 | 203 | 151 | | |
| 19:15 | 182 | 18,2 | 161 | 120 | | |
| 19:30 | 135 | 13,45 | 119 | 89 | | |
| 19:45 | 87 | 8,7 | 77 | 57 | | |
| | | | **26219** | **19512** | | **9760** |

| | |
|---|---|
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia)** | **0** |
| | |
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes)** | **0** |

## SEPTIEMBRE

| | | |
|---|---|---|
| POTENCIA BOMBEO (kW) | | 305 |

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 885,6 kW | Potencia generada neta Campo FV 885,6 kW | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 6:45 | 0 | 0 | 0 | 0 | | |
| 7:00 | 3 | 0,25 | 2 | 2 | | |
| 7:15 | 5 | 0,5 | 4 | 3 | | |
| 7:30 | 8 | 0,75 | 7 | 5 | | |
| 7:45 | 10 | 1 | 9 | 7 | | |
| 8:00 | 53 | 5,275 | 47 | 35 | | |
| 8:15 | 96 | 9,55 | 85 | 63 | | |
| 8:30 | 138 | 13,825 | 122 | 91 | | |
| 8:45 | 181 | 18,1 | 160 | 119 | | |
| 9:00 | 233 | 23,325 | 207 | 154 | | |
| 9:15 | 286 | 28,55 | 253 | 188 | | |
| 9:30 | 338 | 33,775 | 299 | 223 | | |
| 9:45 | 390 | 39 | 345 | 257 | | |
| 10:00 | 440 | 44,025 | 390 | 290 | -15 | 290,15 |
| 10:15 | 491 | 49,05 | 434 | 323 | | 305,00 |
| 10:30 | 541 | 54,075 | 479 | 356 | | 305,00 |
| 10:45 | 591 | 59,1 | 523 | 390 | | 305,00 |
| 11:00 | 630 | 63 | 558 | 415 | | 305,00 |
| 11:15 | 669 | 66,9 | 592 | 441 | | 305,00 |
| 11:30 | 708 | 70,8 | 627 | 467 | | 305,00 |
| 11:45 | 747 | 74,7 | 662 | 492 | | 305,00 |
| 12:00 | 772 | 77,2 | 684 | 509 | | 305,00 |
| 12:15 | 797 | 79,7 | 706 | 525 | | 305,00 |
| 12:30 | 822 | 82,2 | 728 | 542 | | 305,00 |
| 12:45 | 847 | 84,7 | 750 | 558 | | 305,00 |
| 13:00 | 850 | 85,025 | 753 | 560 | | 305,00 |
| 13:15 | 854 | 85,35 | 756 | 563 | | 305,00 |
| 13:30 | 857 | 85,675 | 759 | 565 | | 305,00 |
| 13:45 | 860 | 86 | 762 | 567 | | 305,00 |
| 14:00 | 851 | 85,1 | 754 | 561 | | 305,00 |
| 14:15 | 842 | 84,2 | 746 | 555 | | 305,00 |
| 14:30 | 833 | 83,3 | 738 | 549 | | 305,00 |
| 14:45 | 824 | 82,4 | 730 | 543 | | 305,00 |
| 15:00 | 792 | 79,175 | 701 | 522 | | 305,00 |
| 15:15 | 760 | 75,95 | 673 | 501 | | 305,00 |
| 15:30 | 727 | 72,725 | 644 | 479 | | 305,00 |
| 15:45 | 695 | 69,5 | 615 | 458 | | 305,00 |
| 16:00 | 660 | 65,975 | 584 | 435 | | 305,00 |
| 16:15 | 625 | 62,45 | 553 | 412 | | 305,00 |
| 16:30 | 589 | 58,925 | 522 | 388 | | 305,00 |
| 16:45 | 554 | 55,4 | 491 | 365 | | 305,00 |
| 17:00 | 506 | 50,55 | 448 | 333 | | 305,00 |
| 17:15 | 457 | 45,7 | 405 | 301 | -4 | 301,19 |
| 17:30 | 409 | 40,85 | 362 | 269 | -36 | 269 |
| 17:45 | 360 | 36 | 319 | 237 | -68 | 237 |
| 18:00 | 311 | 31,125 | 276 | 205 | | |
| 18:15 | 263 | 26,25 | 232 | 173 | | |
| 18:30 | 214 | 21,375 | 189 | 141 | | |
| 18:45 | 165 | 16,5 | 146 | 109 | | |
| 19:00 | 126 | 12,625 | 112 | 83 | | |
| 19:15 | 88 | 8,75 | 77 | 58 | | |
| 19:30 | 49 | 4,875 | 43 | 32 | | |
| 19:45 | 10 | 1 | 9 | 7 | | |
| | | | **22070** | **16425** | | **9638** |

| | |
|---|---|
| ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia) | 31 |
| | |
| ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes) | 947 |

## OCTUBRE

| POTENCIA BOMBEO (kW) | 305 |
|---|---|

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 885,6 kW | Potencia generada neta Campo FV 885,6 kW | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 6:45 | 0 | 0 | 0 | 0 | | |
| 7:00 | 3 | 0,25 | 2 | 2 | | |
| 7:15 | 5 | 0,5 | 4 | 4 | | |
| 7:30 | 8 | 0,75 | 7 | 5 | | |
| 7:45 | 10 | 1 | 9 | 7 | | |
| 8:00 | 38 | 3,75 | 33 | 26 | | |
| 8:15 | 65 | 6,5 | 58 | 46 | | |
| 8:30 | 93 | 9,25 | 82 | 65 | | |
| 8:45 | 120 | 12 | 106 | 85 | | |
| 9:00 | 169 | 16,875 | 149 | 119 | | |
| 9:15 | 218 | 21,75 | 193 | 153 | | |
| 9:30 | 266 | 26,625 | 236 | 188 | | |
| 9:45 | 315 | 31,5 | 279 | 222 | | |
| 10:00 | 359 | 35,875 | 318 | 253 | -52 | 253 |
| 10:15 | 403 | 40,25 | 356 | 284 | -21 | 284 |
| 10:30 | 446 | 44,625 | 395 | 314 | | 305,00 |
| 10:45 | 490 | 49 | 434 | 345 | | 305,00 |
| 11:00 | 530 | 53 | 469 | 374 | | 305,00 |
| 11:15 | 570 | 57 | 505 | 402 | | 305,00 |
| 11:30 | 610 | 61 | 540 | 430 | | 305,00 |
| 11:45 | 650 | 65 | 576 | 458 | | 305,00 |
| 12:00 | 673 | 67,275 | 596 | 474 | | 305,00 |
| 12:15 | 696 | 69,55 | 616 | 490 | | 305,00 |
| 12:30 | 718 | 71,825 | 636 | 506 | | 305,00 |
| 12:45 | 741 | 74,1 | 656 | 522 | | 305,00 |
| 13:00 | 743 | 74,3 | 658 | 524 | | 305,00 |
| 13:15 | 745 | 74,5 | 660 | 525 | | 305,00 |
| 13:30 | 747 | 74,7 | 662 | 526 | | 305,00 |
| 13:45 | 749 | 74,9 | 663 | 528 | | 305,00 |
| 14:00 | 739 | 73,925 | 655 | 521 | | 305,00 |
| 14:15 | 730 | 72,95 | 646 | 514 | | 305,00 |
| 14:30 | 720 | 71,975 | 637 | 507 | | 305,00 |
| 14:45 | 710 | 71 | 629 | 500 | | 305,00 |
| 15:00 | 680 | 67,95 | 602 | 479 | | 305,00 |
| 15:15 | 649 | 64,9 | 575 | 457 | | 305,00 |
| 15:30 | 619 | 61,85 | 548 | 436 | | 305,00 |
| 15:45 | 588 | 58,8 | 521 | 414 | | 305,00 |
| 16:00 | 547 | 54,675 | 484 | 385 | | 305,00 |
| 16:15 | 506 | 50,55 | 448 | 356 | | 305,00 |
| 16:30 | 464 | 46,425 | 411 | 327 | | 305,00 |
| 16:45 | 423 | 42,3 | 375 | 298 | -7 | 298 |
| 17:00 | 377 | 37,725 | 334 | 266 | -39 | 266 |
| 17:15 | 332 | 33,15 | 294 | 234 | -71 | 234 |
| 17:30 | 286 | 28,575 | 253 | 201 | -104 | 201 |
| 17:45 | 240 | 24 | 213 | 169 | -136 | 169 |
| 18:00 | 221 | 22,125 | 196 | 156 | | |
| 18:15 | 203 | 20,25 | 179 | 143 | | |
| 18:30 | 184 | 18,375 | 163 | 129 | | |
| 18:45 | 165 | 44 | 390 | 310 | | |
| 19:00 | 126 | 12,625 | 112 | 89 | | |
| 19:15 | 88 | 8,75 | 77 | 62 | | |
| 19:30 | 49 | 4,875 | 43 | 34 | | |
| 19:45 | 10 | 1 | 9 | 7 | | |
| | | | **18690** | **14873** | | **9.330** |

| | |
|---|---|
| ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia) | 108 |
| | |
| ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes) | 3335 |

# NOVIEMBRE

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 885,6 kW | Potencia generada neta Campo FV 885,6 kW |
|---|---|---|---|---|
| 8:15 | 0 | 0 | 0 | 0 |
| 8:30 | 96 | 9,6 | 85 | 68 |
| 8:45 | 202 | 20,2 | 179 | 142 |
| 9:00 | 241 | 24,1 | 213 | 170 |
| 9:15 | 280 | 28 | 248 | 197 |
| 9:30 | 319 | 31,9 | 283 | 225 |
| 9:45 | 358 | 35,8 | 317 | 252 |
| 10:00 | 395 | 39,5 | 350 | 278 |
| 10:15 | 432 | 43,2 | 383 | 304 |
| 10:30 | 469 | 46,9 | 415 | 331 |
| 10:45 | 506 | 50,6 | 448 | 357 |
| 11:00 | 530 | 53 | 469 | 374 |
| 11:15 | 554 | 55,4 | 491 | 390 |
| 11:30 | 578 | 57,8 | 512 | 407 |
| 11:45 | 602 | 60,2 | 533 | 424 |
| 12:00 | 608 | 60,825 | 539 | 429 |
| 12:15 | 615 | 61,45 | 544 | 433 |
| 12:30 | 621 | 62,075 | 550 | 437 |
| 12:45 | 627 | 62,7 | 555 | 442 |
| 13:00 | 612 | 61,2 | 542 | 431 |
| 13:15 | 597 | 59,7 | 529 | 421 |
| 13:30 | 582 | 58,2 | 515 | 410 |
| 13:45 | 567 | 56,7 | 502 | 400 |
| 14:00 | 540 | 53,975 | 478 | 380 |
| 14:15 | 513 | 51,25 | 454 | 361 |
| 14:30 | 485 | 48,525 | 430 | 342 |
| 14:45 | 458 | 45,8 | 406 | 323 |
| 15:00 | 426 | 42,55 | 377 | 300 |
| 15:15 | 393 | 39,3 | 348 | 277 |
| 15:30 | 361 | 36,05 | 319 | 254 |
| 15:45 | 328 | 32,8 | 290 | 231 |
| 16:00 | 284 | 28,375 | 251 | 200 |
| 16:15 | 240 | 23,95 | 212 | 169 |
| 16:30 | 195 | 19,525 | 173 | 138 |
| 16:45 | 151 | 15,1 | 134 | 106 |
| 17:00 | 115 | 11,5 | 102 | 81 |
| 17:15 | 79 | 7,9 | 70 | 56 |
| 17:30 | 43 | 4,3 | 38 | 30 |
| 17:45 | 7 | 0,7 | 6 | 5 |
| 18:00 | 0 | 0 | 0 | 0 |
| | | | **13289,756** | **10575,988** |

# DICIEMBRE

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 885,6 kW | Potencia generada neta Campo FV 885,6 kW |
|---|---|---|---|---|
| 8:15 | 0 | 0 | 0 | 0 |
| 8:30 | 96 | 9,6 | 85 | 68 |
| 8:45 | 141 | 14,1 | 125 | 99 |
| 9:00 | 181 | 18,1 | 160 | 128 |
| 9:15 | 221 | 22,1 | 196 | 156 |
| 9:30 | 261 | 26,1 | 231 | 184 |
| 9:45 | 301 | 30,1 | 267 | 212 |
| 10:00 | 333 | 33,325 | 295 | 235 |
| 10:15 | 366 | 36,55 | 324 | 258 |
| 10:30 | 398 | 39,775 | 352 | 280 |
| 10:45 | 430 | 43 | 381 | 303 |
| 11:00 | 456 | 45,575 | 404 | 321 |
| 11:15 | 482 | 48,15 | 426 | 339 |
| 11:30 | 507 | 50,725 | 449 | 357 |
| 11:45 | 533 | 53,3 | 472 | 376 |
| 12:00 | 545 | 54,45 | 482 | 384 |
| 12:15 | 556 | 55,6 | 492 | 392 |
| 12:30 | 568 | 56,75 | 503 | 400 |
| 12:45 | 579 | 57,9 | 513 | 408 |
| 13:00 | 572 | 57,225 | 507 | 403 |
| 13:15 | 566 | 56,55 | 501 | 399 |
| 13:30 | 559 | 55,875 | 495 | 394 |
| 13:45 | 552 | 55,2 | 489 | 389 |
| 14:00 | 529 | 52,875 | 468 | 373 |
| 14:15 | 506 | 50,55 | 448 | 356 |
| 14:30 | 482 | 48,225 | 427 | 340 |
| 14:45 | 459 | 45,9 | 406 | 323 |
| 15:00 | 425 | 42,45 | 376 | 299 |
| 15:15 | 390 | 39 | 345 | 275 |
| 15:30 | 356 | 35,55 | 315 | 251 |
| 15:45 | 321 | 32,1 | 284 | 226 |
| 16:00 | 277 | 27,675 | 245 | 195 |
| 16:15 | 233 | 23,25 | 206 | 164 |
| 16:30 | 188 | 18,825 | 167 | 133 |
| 16:45 | 144 | 14,4 | 128 | 101 |
| 17:00 | 110 | 10,975 | 97 | 77 |
| 17:15 | 76 | 7,55 | 67 | 53 |
| 17:30 | 41 | 4,125 | 37 | 29 |
| 17:45 | 7 | 0,7 | 6 | 5 |
| 18:00 | 0 | 0 | 0 | 0 |
| | | | **12.170** | **9.685** |

# APÉNDICE Nº 3

# CÁLCULOS JUSTIFICATIVOS DE POTENCIA BRUTA, POTENCIA NETA Y AUTOCONSUMO CAMPO FOTOVOLTÁICO DE 393,6 kWp

| Potencia FV (Wp) |
|---|
| 393.600 |

**RESUMEN**

| PRODUCCION ANUAL | Energía producida bruta (kWh) | Energía producida neta (kWh) | Energia autoconsumida (kW) | Energia autoconsumida real (kW) | Consumo de energia de red (kW) |
|---|---|---|---|---|---|
| ENERO | 44.333 | 34.462 | 0 | 0 | 0 |
| FEBRERO | 47.852 | 38.081 | 0 | 0 | 0 |
| MARZO | 65.024 | 51.746 | 31.703 | 22.509 | 537 |
| ABRIL | 74.724 | 59.465 | 31.158 | 22.122 | 44 |
| MAYO | 87.443 | 65.075 | 32.240 | 22.890 | 0 |
| JUNIO | 91.846 | 68.351 | 33.150 | 23.537 | 0 |
| JULIO | 97.375 | 72.466 | 34.255 | 24.321 | 0 |
| AGOSTO | 90309 | 67.208 | 32.240 | 22.890 | 0 |
| SEPTIEMBRE | 73567 | 54.748 | 30.938 | 21.966 | 279 |
| OCTUBRE | 64376 | 51.230 | 31.040 | 22.038 | 1200 |
| NOVIEMBRE | 44299 | 35.253 | 0 | 0 | 0 |
| DICIEMBRE | 41.919 | 33.359 | 0 | 0 | 0 |
| **TOTAL** | **823.065** | **631.445** | **256.724** | **182.274** | **2.059** |

# ENERO

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 393,6 kW | Potencia generada neta Campo FV 393,6 kW |
|---|---|---|---|---|
| 8:15 | 0 | 0 | 0 | 0 |
| 8:30 | 96 | 9,6 | 38 | 30 |
| 8:45 | 128 | 12,8 | 50 | 40 |
| 9:00 | 170 | 16,95 | 67 | 53 |
| 9:15 | 211 | 21,1 | 83 | 66 |
| 9:30 | 253 | 25,25 | 99 | 79 |
| 9:45 | 294 | 29,4 | 116 | 92 |
| 10:00 | 330 | 33 | 130 | 103 |
| 10:15 | 366 | 36,6 | 144 | 115 |
| 10:30 | 402 | 40,2 | 158 | 126 |
| 10:45 | 438 | 43,8 | 172 | 137 |
| 11:00 | 463 | 46,275 | 182 | 145 |
| 11:15 | 488 | 48,75 | 192 | 153 |
| 11:30 | 512 | 51,225 | 202 | 160 |
| 11:45 | 537 | 53,7 | 211 | 168 |
| 12:00 | 551 | 55,125 | 217 | 173 |
| 12:15 | 566 | 56,55 | 223 | 177 |
| 12:30 | 580 | 57,975 | 228 | 182 |
| 12:45 | 594 | 59,4 | 234 | 186 |
| 13:00 | 588 | 58,75 | 231 | 184 |
| 13:15 | 581 | 58,1 | 229 | 182 |
| 13:30 | 575 | 57,45 | 226 | 180 |
| 13:45 | 568 | 56,8 | 224 | 178 |
| 14:00 | 553 | 55,25 | 217 | 173 |
| 14:15 | 537 | 53,7 | 211 | 168 |
| 14:30 | 522 | 52,15 | 205 | 163 |
| 14:45 | 506 | 50,6 | 199 | 158 |
| 15:00 | 473 | 47,325 | 186 | 148 |
| 15:15 | 441 | 44,05 | 173 | 138 |
| 15:30 | 408 | 40,775 | 160 | 128 |
| 15:45 | 375 | 37,5 | 148 | 117 |
| 16:00 | 335 | 33,45 | 132 | 105 |
| 16:15 | 294 | 29,4 | 116 | 92 |
| 16:30 | 254 | 25,35 | 100 | 79 |
| 16:45 | 213 | 21,3 | 84 | 67 |
| 17:00 | 162 | 16,15 | 64 | 51 |
| 17:15 | 110 | 11 | 43 | 34 |
| 17:30 | 59 | 5,85 | 23 | 18 |
| 17:45 | 7 | 0,7 | 3 | 2 |
| 18:00 | 0 | 0 | 0 | 0 |
| | | | **5.720** | **4.447** |

# FEBRERO

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 393,6 kW | Potencia generada neta Campo FV 393,6 kW |
|---|---|---|---|---|
| 8:15 | 0 | 0 | 0 | 0 |
| 8:30 | 115 | 11,5 | 45 | 36 |
| 8:45 | 181 | 18,1 | 71 | 57 |
| 9:00 | 224 | 22,425 | 88 | 70 |
| 9:15 | 268 | 26,75 | 105 | 84 |
| 9:30 | 311 | 31,075 | 122 | 97 |
| 9:45 | 354 | 35,4 | 139 | 111 |
| 10:00 | 390 | 38,975 | 153 | 122 |
| 10:15 | 426 | 42,55 | 167 | 133 |
| 10:30 | 461 | 46,125 | 182 | 144 |
| 10:45 | 497 | 49,7 | 196 | 156 |
| 11:00 | 529 | 52,875 | 208 | 166 |
| 11:15 | 561 | 56,05 | 221 | 176 |
| 11:30 | 592 | 59,225 | 233 | 186 |
| 11:45 | 624 | 62,4 | 246 | 195 |
| 12:00 | 635 | 63,5 | 250 | 199 |
| 12:15 | 646 | 64,6 | 254 | 202 |
| 12:30 | 657 | 65,7 | 259 | 206 |
| 12:45 | 668 | 66,8 | 263 | 209 |
| 13:00 | 666 | 66,625 | 262 | 209 |
| 13:15 | 665 | 66,45 | 262 | 208 |
| 13:30 | 663 | 66,275 | 261 | 208 |
| 13:45 | 661 | 66,1 | 260 | 207 |
| 14:00 | 643 | 64,3 | 253 | 201 |
| 14:15 | 625 | 62,5 | 246 | 196 |
| 14:30 | 607 | 60,7 | 239 | 190 |
| 14:45 | 589 | 58,9 | 232 | 184 |
| 15:00 | 555 | 55,45 | 218 | 174 |
| 15:15 | 520 | 52 | 205 | 163 |
| 15:30 | 486 | 48,55 | 191 | 152 |
| 15:45 | 451 | 45,1 | 178 | 141 |
| 16:00 | 412 | 41,15 | 162 | 129 |
| 16:15 | 372 | 37,2 | 146 | 117 |
| 16:30 | 333 | 33,25 | 131 | 104 |
| 16:45 | 293 | 29,3 | 115 | 92 |
| 17:00 | 245 | 24,5 | 96 | 77 |
| 17:15 | 197 | 19,7 | 78 | 62 |
| 17:30 | 149 | 14,9 | 59 | 47 |
| 17:45 | 101 | 10,1 | 40 | 32 |
| 18:00 | 0 | 0 | 0 | 0 |
| | | | **6.836** | **5.440** |

# MARZO

| POTENCIA BOMBEO (kW) | 130 |
|---|---|

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 393,6 kW | Potencia generada neta Campo FV 393,6 kW | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 7:45 | 0 | 0 | 0 | 0 | | |
| 8:00 | 24 | 2,375 | 9 | 7 | | |
| 8:15 | 48 | 4,75 | 19 | 15 | | |
| 8:30 | 71 | 7,125 | 28 | 22 | | |
| 8:45 | 95 | 9,5 | 37 | 30 | | |
| 9:00 | 142 | 14,175 | 56 | 44 | | |
| 9:15 | 189 | 18,85 | 74 | 59 | | |
| 9:30 | 235 | 23,525 | 93 | 74 | | |
| 9:45 | 282 | 28,2 | 111 | 88 | | |
| 10:00 | 328 | 32,75 | 129 | 103 | -27,42 | 103 |
| 10:15 | 373 | 37,3 | 147 | 117 | -13,17 | 117 |
| 10:30 | 419 | 41,85 | 165 | 131 | | 130 |
| 10:45 | 464 | 46,4 | 183 | 145 | | 130 |
| 11:00 | 501 | 50,1 | 197 | 157 | | 130 |
| 11:15 | 538 | 53,8 | 212 | 169 | | 130 |
| 11:30 | 575 | 57,5 | 226 | 180 | | 130 |
| 11:45 | 612 | 61,2 | 241 | 192 | | 130 |
| 12:00 | 644 | 64,425 | 254 | 202 | | 130 |
| 12:15 | 677 | 67,65 | 266 | 212 | | 130 |
| 12:30 | 709 | 70,875 | 279 | 222 | | 130 |
| 12:45 | 741 | 74,1 | 292 | 232 | | 130 |
| 13:00 | 743 | 74,25 | 292 | 233 | | 130 |
| 13:15 | 744 | 74,4 | 293 | 233 | | 130 |
| 13:30 | 746 | 74,55 | 293 | 234 | | 130 |
| 13:45 | 747 | 74,7 | 294 | 234 | | 130 |
| 14:00 | 751 | 75,075 | 295 | 235 | | 130 |
| 14:15 | 755 | 75,45 | 297 | 236 | | 130 |
| 14:30 | 758 | 75,825 | 298 | 238 | | 130 |
| 14:45 | 762 | 76,2 | 300 | 239 | | 130 |
| 15:00 | 736 | 73,575 | 290 | 230 | | 130 |
| 15:15 | 710 | 70,95 | 279 | 222 | | 130 |
| 15:30 | 683 | 68,325 | 269 | 214 | | 130 |
| 15:45 | 657 | 65,7 | 259 | 206 | | 130 |
| 16:00 | 622 | 62,225 | 245 | 195 | | 130 |
| 16:15 | 588 | 58,75 | 231 | 184 | | 130 |
| 16:30 | 553 | 55,275 | 218 | 173 | | 130 |
| 16:45 | 518 | 51,8 | 204 | 162 | | 130 |
| 17:00 | 476 | 47,55 | 187 | 149 | | 130 |
| 17:15 | 433 | 43,3 | 170 | 136 | | 130 |
| 17:30 | 391 | 39,05 | 154 | 122 | -7,68 | 122 |
| 17:45 | 348 | 34,8 | 137 | 109 | -21,00 | 109 |
| 18:00 | 302 | 30,225 | 119 | 95 | | |
| 18:15 | 257 | 25,65 | 101 | 80 | | |
| 18:30 | 211 | 21,075 | 83 | 66 | | |
| 18:45 | 165 | 16,5 | 65 | 52 | | |
| | | | **8.390** | **6.677** | | **4091** |

| | |
|---|---|
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia)** | **17,32** |
| | |
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes)** | **536,82** |

# ABRIL

| POTENCIA BOMBEO (kW) | 130 |
|---|---|

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 393,6 kW | Potencia generada neta Campo FV 393,6 kW | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 7:45 | 34 | 3,4 | 13 | 11 | | |
| 8:00 | 75 | 7,525 | 30 | 24 | | |
| 8:15 | 117 | 11,65 | 46 | 36 | | |
| 8:30 | 158 | 15,775 | 62 | 49 | | |
| 8:45 | 199 | 19,9 | 78 | 62 | | |
| 9:00 | 247 | 24,675 | 97 | 77 | | |
| 9:15 | 295 | 29,45 | 116 | 92 | | |
| 9:30 | 342 | 34,225 | 135 | 107 | | |
| 9:45 | 390 | 39 | 154 | 122 | | |
| 10:00 | 437 | 43,675 | 172 | 137 | | 130 |
| 10:15 | 484 | 48,35 | 190 | 151 | | 130 |
| 10:30 | 530 | 53,025 | 209 | 166 | | 130 |
| 10:45 | 577 | 57,7 | 227 | 181 | | 130 |
| 11:00 | 615 | 61,525 | 242 | 193 | | 130 |
| 11:15 | 654 | 65,35 | 257 | 205 | | 130 |
| 11:30 | 692 | 69,175 | 272 | 217 | | 130 |
| 11:45 | 730 | 73 | 287 | 229 | | 130 |
| 12:00 | 753 | 75,3 | 296 | 236 | | 130 |
| 12:15 | 776 | 77,6 | 305 | 243 | | 130 |
| 12:30 | 799 | 79,9 | 314 | 250 | | 130 |
| 12:45 | 822 | 82,2 | 324 | 257 | | 130 |
| 13:00 | 825 | 82,525 | 325 | 258 | | 130 |
| 13:15 | 829 | 82,85 | 326 | 260 | | 130 |
| 13:30 | 832 | 83,175 | 327 | 261 | | 130 |
| 13:45 | 835 | 83,5 | 329 | 262 | | 130 |
| 14:00 | 832 | 83,15 | 327 | 260 | | 130 |
| 14:15 | 828 | 82,8 | 326 | 259 | | 130 |
| 14:30 | 825 | 82,45 | 325 | 258 | | 130 |
| 14:45 | 821 | 82,1 | 323 | 257 | | 130 |
| 15:00 | 795 | 79,45 | 313 | 249 | | 130 |
| 15:15 | 768 | 76,8 | 302 | 241 | | 130 |
| 15:30 | 742 | 74,15 | 292 | 232 | | 130 |
| 15:45 | 715 | 71,5 | 281 | 224 | | 130 |
| 16:00 | 680 | 68,025 | 268 | 213 | | 130 |
| 16:15 | 646 | 64,55 | 254 | 202 | | 130 |
| 16:30 | 611 | 61,075 | 240 | 191 | | 130 |
| 16:45 | 576 | 57,6 | 227 | 180 | | 130 |
| 17:00 | 531 | 53,125 | 209 | 166 | | 130 |
| 17:15 | 487 | 48,65 | 191 | 152 | | 130 |
| 17:30 | 442 | 44,175 | 174 | 138 | | 130 |
| 17:45 | 397 | 39,7 | 156 | 124 | -5,65 | 124 |
| 18:00 | 352 | 35,15 | 138 | 110 | | |
| 18:15 | 306 | 30,6 | 120 | 96 | | |
| 18:30 | 261 | 26,05 | 103 | 82 | | |
| 18:45 | 215 | 21,5 | 85 | 67 | | |
| 19:00 | 173 | 17,325 | 68 | 54 | | |
| 19:15 | 132 | 13,15 | 52 | 41 | | |
| 19:30 | 90 | 8,975 | 35 | 28 | | |
| 19:45 | 48 | 4,8 | 19 | 15 | | |
| | | | **9.963** | **7.929** | | **4154** |

| | |
|---|---|
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia)** | **1,41** |
| | |
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes)** | **43,78** |

# MAYO

| POTENCIA BOMBEO (kW) | 130 |
|---|---|

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 393,6 kW | Potencia generada neta Campo FV 393,6 kW | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 6:45 | 0 | 0 | 0 | 0 | | |
| 7:00 | 25 | 2,45 | 10 | 7 | | |
| 7:15 | 49 | 4,9 | 19 | 14 | | |
| 7:30 | 74 | 7,35 | 29 | 22 | | |
| 7:45 | 98 | 9,8 | 39 | 29 | | |
| 8:00 | 142 | 14,2 | 56 | 42 | | |
| 8:15 | 186 | 18,6 | 73 | 54 | | |
| 8:30 | 230 | 23 | 91 | 67 | | |
| 8:45 | 274 | 27,4 | 108 | 80 | | |
| 9:00 | 326 | 32,575 | 128 | 95 | | |
| 9:15 | 378 | 37,75 | 149 | 111 | | |
| 9:30 | 429 | 42,925 | 169 | 126 | | |
| 9:45 | 481 | 48,1 | 189 | 141 | | 130,00 |
| 10:00 | 527 | 52,65 | 207 | 154 | | 130,00 |
| 10:15 | 572 | 57,2 | 225 | 168 | | 130,00 |
| 10:30 | 618 | 61,75 | 243 | 181 | | 130,00 |
| 10:45 | 663 | 66,3 | 261 | 194 | | 130,00 |
| 11:00 | 699 | 69,875 | 275 | 205 | | 130,00 |
| 11:15 | 735 | 73,45 | 289 | 215 | | 130,00 |
| 11:30 | 770 | 77,025 | 303 | 226 | | 130,00 |
| 11:45 | 806 | 80,6 | 317 | 236 | | 130,00 |
| 12:00 | 831 | 83,075 | 327 | 243 | | 130,00 |
| 12:15 | 856 | 85,55 | 337 | 251 | | 130,00 |
| 12:30 | 880 | 88,025 | 346 | 258 | | 130,00 |
| 12:45 | 905 | 90,5 | 356 | 265 | | 130,00 |
| 13:00 | 907 | 90,725 | 357 | 266 | | 130,00 |
| 13:15 | 910 | 90,95 | 358 | 266 | | 130,00 |
| 13:30 | 912 | 91,175 | 359 | 267 | | 130,00 |
| 13:45 | 914 | 91,4 | 360 | 268 | | 130,00 |
| 14:00 | 904 | 90,425 | 356 | 265 | | 130,00 |
| 14:15 | 895 | 89,45 | 352 | 262 | | 130,00 |
| 14:30 | 885 | 88,475 | 348 | 259 | | 130,00 |
| 14:45 | 875 | 87,5 | 344 | 256 | | 130,00 |
| 15:00 | 848 | 84,775 | 334 | 248 | | 130,00 |
| 15:15 | 821 | 82,05 | 323 | 240 | | 130,00 |
| 15:30 | 793 | 79,325 | 312 | 232 | | 130,00 |
| 15:45 | 766 | 76,6 | 301 | 224 | | 130,00 |
| 16:00 | 731 | 73,075 | 288 | 214 | | 130,00 |
| 16:15 | 696 | 69,55 | 274 | 204 | | 130,00 |
| 16:30 | 660 | 66,025 | 260 | 193 | | 130,00 |
| 16:45 | 625 | 62,5 | 246 | 183 | | 130,00 |
| 17:00 | 579 | 57,9 | 228 | 170 | | 130,00 |
| 17:15 | 533 | 53,3 | 210 | 156 | | 130,00 |
| 17:30 | 487 | 48,7 | 192 | 143 | | 130,00 |
| 17:45 | 441 | 44,1 | 174 | 129 | | |
| 18:00 | 396 | 39,6 | 156 | 116 | | |
| 18:15 | 351 | 35,1 | 138 | 103 | | |
| 18:30 | 306 | 30,6 | 120 | 90 | | |
| 18:45 | 261 | 26,1 | 103 | 76 | | |
| 19:00 | 219 | 21,875 | 86 | 64 | | |
| 19:15 | 177 | 17,65 | 69 | 52 | | |
| 19:30 | 134 | 13,425 | 53 | 39 | | |
| 19:45 | 92 | 9,2 | 36 | 27 | | |
| | | | **11.283** | **8.397** | | **4.160** |

| | |
|---|---|
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia)** | **0** |
| | |
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes)** | **0** |

# JUNIO

| POTENCIA BOMBEO (kW) | 130 |
|---|---|

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 393,6 kW | Potencia generada neta Campo FV 393,6 kW | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 6:45 | 10 | 1 | 4 | 3 | | |
| 7:00 | 38 | 4 | 15 | 11 | | |
| 7:15 | 65 | 7 | 26 | 19 | | |
| 7:30 | 93 | 9 | 36 | 27 | | |
| 7:45 | 120 | 12 | 47 | 35 | | |
| 8:00 | 167 | 17 | 66 | 49 | | |
| 8:15 | 214 | 21 | 84 | 63 | | |
| 8:30 | 260 | 26 | 102 | 76 | | |
| 8:45 | 307 | 31 | 121 | 90 | | |
| 9:00 | 359 | 36 | 141 | 105 | | |
| 9:15 | 411 | 41 | 162 | 120 | | |
| 9:30 | 462 | 46 | 182 | 135 | | 130,00 |
| 9:45 | 514 | 51 | 202 | 151 | | 130,00 |
| 10:00 | 560 | 56 | 220 | 164 | | 130,00 |
| 10:15 | 606 | 61 | 239 | 178 | | 130,00 |
| 10:30 | 652 | 65 | 257 | 191 | | 130,00 |
| 10:45 | 698 | 70 | 275 | 204 | | 130,00 |
| 11:00 | 736 | 74 | 290 | 216 | | 130,00 |
| 11:15 | 774 | 77 | 305 | 227 | | 130,00 |
| 11:30 | 812 | 81 | 320 | 238 | | 130,00 |
| 11:45 | 850 | 85 | 335 | 249 | | 130,00 |
| 12:00 | 874 | 87 | 344 | 256 | | 130,00 |
| 12:15 | 898 | 90 | 353 | 263 | | 130,00 |
| 12:30 | 922 | 92 | 363 | 270 | | 130,00 |
| 12:45 | 946 | 95 | 372 | 277 | | 130,00 |
| 13:00 | 957 | 96 | 376 | 280 | | 130,00 |
| 13:15 | 967 | 97 | 381 | 283 | | 130,00 |
| 13:30 | 978 | 98 | 385 | 286 | | 130,00 |
| 13:45 | 988 | 99 | 389 | 289 | | 130,00 |
| 14:00 | 976 | 98 | 384 | 286 | | 130,00 |
| 14:15 | 964 | 96 | 379 | 282 | | 130,00 |
| 14:30 | 952 | 95 | 375 | 279 | | 130,00 |
| 14:45 | 940 | 94 | 370 | 275 | | 130,00 |
| 15:00 | 914 | 91 | 360 | 268 | | 130,00 |
| 15:15 | 888 | 89 | 349 | 260 | | 130,00 |
| 15:30 | 861 | 86 | 339 | 252 | | 130,00 |
| 15:45 | 835 | 84 | 329 | 245 | | 130,00 |
| 16:00 | 797 | 80 | 314 | 233 | | 130,00 |
| 16:15 | 759 | 76 | 299 | 222 | | 130,00 |
| 16:30 | 721 | 72 | 284 | 211 | | 130,00 |
| 16:45 | 683 | 68 | 269 | 200 | | 130,00 |
| 17:00 | 638 | 64 | 251 | 187 | | 130,00 |
| 17:15 | 594 | 59 | 234 | 174 | | 130,00 |
| 17:30 | 549 | 55 | 216 | 161 | | 130,00 |
| 17:45 | 504 | 50 | 198 | 148 | | 130,00 |
| 18:00 | 455 | 45 | 179 | 133 | | |
| 18:15 | 406 | 41 | 160 | 119 | | |
| 18:30 | 356 | 36 | 140 | 104 | | |
| 18:45 | 307 | 31 | 121 | 90 | | |
| 19:00 | 262 | 26 | 103 | 77 | | |
| 19:15 | 218 | 22 | 86 | 64 | | |
| 19:30 | 173 | 17 | 68 | 51 | | |
| 19:45 | 128 | 13 | 50 | 37 | | |
| | | | **12.246** | **9.114** | | **4.420** |

| | |
|---|---|
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia)** | **0** |
| | |
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes)** | **0** |

# JULIO

| POTENCIA BOMBEO (kW) | 130 |
|---|---|

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 393,6 kW | Potencia generada neta Campo FV 393,6 kW | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 6:45 | 0 | 0 | 0 | 0 | | |
| 7:00 | 24 | 2,425 | 10 | 7 | | |
| 7:15 | 49 | 4,85 | 19 | 14 | | |
| 7:30 | 73 | 7,275 | 29 | 21 | | |
| 7:45 | 97 | 9,7 | 38 | 28 | | |
| 8:00 | 145 | 14,525 | 57 | 43 | | |
| 8:15 | 194 | 19,35 | 76 | 57 | | |
| 8:30 | 242 | 24,175 | 95 | 71 | | |
| 8:45 | 290 | 29 | 114 | 85 | | |
| 9:00 | 343 | 34,3 | 135 | 100 | | |
| 9:15 | 396 | 39,6 | 156 | 116 | | |
| 9:30 | 449 | 44,9 | 177 | 132 | | |
| 9:45 | 502 | 50,2 | 198 | 147 | | 130,00 |
| 10:00 | 550 | 55 | 216 | 161 | | 130,00 |
| 10:15 | 598 | 59,8 | 235 | 175 | | 130,00 |
| 10:30 | 646 | 64,6 | 254 | 189 | | 130,00 |
| 10:45 | 694 | 69,4 | 273 | 203 | | 130,00 |
| 11:00 | 734 | 73,425 | 289 | 215 | | 130,00 |
| 11:15 | 775 | 77,45 | 305 | 227 | | 130,00 |
| 11:30 | 815 | 81,475 | 321 | 239 | | 130,00 |
| 11:45 | 855 | 85,5 | 337 | 250 | | 130,00 |
| 12:00 | 884 | 88,375 | 348 | 259 | | 130,00 |
| 12:15 | 913 | 91,25 | 359 | 267 | | 130,00 |
| 12:30 | 941 | 94,125 | 370 | 276 | | 130,00 |
| 12:45 | 970 | 97 | 382 | 284 | | 130,00 |
| 13:00 | 981 | 98,075 | 386 | 287 | | 130,00 |
| 13:15 | 992 | 99,15 | 390 | 290 | | 130,00 |
| 13:30 | 1002 | 100,225 | 394 | 294 | | 130,00 |
| 13:45 | 1013 | 101,3 | 399 | 297 | | 130,00 |
| 14:00 | 1006 | 100,6 | 396 | 295 | | 130,00 |
| 14:15 | 999 | 99,9 | 393 | 293 | | 130,00 |
| 14:30 | 992 | 99,2 | 390 | 291 | | 130,00 |
| 14:45 | 985 | 98,5 | 388 | 289 | | 130,00 |
| 15:00 | 959 | 95,9 | 377 | 281 | | 130,00 |
| 15:15 | 933 | 93,3 | 367 | 273 | | 130,00 |
| 15:30 | 907 | 90,7 | 357 | 266 | | 130,00 |
| 15:45 | 881 | 88,1 | 347 | 258 | | 130,00 |
| 16:00 | 842 | 84,225 | 332 | 247 | | 130,00 |
| 16:15 | 804 | 80,35 | 316 | 235 | | 130,00 |
| 16:30 | 765 | 76,475 | 301 | 224 | | 130,00 |
| 16:45 | 726 | 72,6 | 286 | 213 | | 130,00 |
| 17:00 | 680 | 67,975 | 268 | 199 | | 130,00 |
| 17:15 | 634 | 63,35 | 249 | 186 | | 130,00 |
| 17:30 | 587 | 58,725 | 231 | 172 | | 130,00 |
| 17:45 | 541 | 54,1 | 213 | 158 | | 130,00 |
| 18:00 | 491 | 49,05 | 193 | 144 | | 130,00 |
| 18:15 | 440 | 44 | 173 | 129 | | |
| 18:30 | 390 | 38,95 | 153 | 114 | | |
| 18:45 | 339 | 33,9 | 133 | 99 | | |
| 19:00 | 289 | 28,925 | 114 | 85 | | |
| 19:15 | 240 | 23,95 | 94 | 70 | | |
| 19:30 | 190 | 18,975 | 75 | 56 | | |
| 19:45 | 140 | 14 | 55 | 41 | | |
| | | | **12.564** | **9.351** | | **4.420** |

| | |
|---|---|
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia)** | **0** |
| | |
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes)** | **0** |

# AGOSTO

| POTENCIA BOMBEO (kW) | 130 |
|---|---|

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 393,6 kW | Potencia generada neta Campo FV 393,6 kW | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 6:45 | 0 | 0 | 0 | 0 | | |
| 7:00 | 13 | 1,325 | 5 | 4 | | |
| 7:15 | 27 | 2,65 | 10 | 8 | | |
| 7:30 | 40 | 3,975 | 16 | 12 | | |
| 7:45 | 53 | 5,3 | 21 | 16 | | |
| 8:00 | 100 | 9,975 | 39 | 29 | | |
| 8:15 | 147 | 14,65 | 58 | 43 | | |
| 8:30 | 193 | 19,325 | 76 | 57 | | |
| 8:45 | 240 | 24 | 94 | 70 | | |
| 9:00 | 294 | 29,4 | 116 | 86 | | |
| 9:15 | 348 | 34,8 | 137 | 102 | | |
| 9:30 | 402 | 40,2 | 158 | 118 | | |
| 9:45 | 456 | 45,6 | 179 | 134 | | |
| 10:00 | 507 | 50,725 | 200 | 149 | | 130,00 |
| 10:15 | 559 | 55,85 | 220 | 164 | | 130,00 |
| 10:30 | 610 | 60,975 | 240 | 179 | | 130,00 |
| 10:45 | 661 | 66,1 | 260 | 194 | | 130,00 |
| 11:00 | 703 | 70,3 | 277 | 206 | | 130,00 |
| 11:15 | 745 | 74,5 | 293 | 218 | | 130,00 |
| 11:30 | 787 | 78,7 | 310 | 231 | | 130,00 |
| 11:45 | 829 | 82,9 | 326 | 243 | | 130,00 |
| 12:00 | 857 | 85,675 | 337 | 251 | | 130,00 |
| 12:15 | 885 | 88,45 | 348 | 259 | | 130,00 |
| 12:30 | 912 | 91,225 | 359 | 267 | | 130,00 |
| 12:45 | 940 | 94 | 370 | 275 | | 130,00 |
| 13:00 | 950 | 94,95 | 374 | 278 | | 130,00 |
| 13:15 | 959 | 95,9 | 377 | 281 | | 130,00 |
| 13:30 | 969 | 96,85 | 381 | 284 | | 130,00 |
| 13:45 | 978 | 97,8 | 385 | 286 | | 130,00 |
| 14:00 | 967 | 96,65 | 380 | 283 | | 130,00 |
| 14:15 | 955 | 95,5 | 376 | 280 | | 130,00 |
| 14:30 | 944 | 94,35 | 371 | 276 | | 130,00 |
| 14:45 | 932 | 93,2 | 367 | 273 | | 130,00 |
| 15:00 | 906 | 90,625 | 357 | 265 | | 130,00 |
| 15:15 | 881 | 88,05 | 347 | 258 | | 130,00 |
| 15:30 | 855 | 85,475 | 336 | 250 | | 130,00 |
| 15:45 | 829 | 82,9 | 326 | 243 | | 130,00 |
| 16:00 | 789 | 78,9 | 311 | 231 | | 130,00 |
| 16:15 | 749 | 74,9 | 295 | 219 | | 130,00 |
| 16:30 | 709 | 70,9 | 279 | 208 | | 130,00 |
| 16:45 | 669 | 66,9 | 263 | 196 | | 130,00 |
| 17:00 | 623 | 62,25 | 245 | 182 | | 130,00 |
| 17:15 | 576 | 57,6 | 227 | 169 | | 130,00 |
| 17:30 | 530 | 52,95 | 208 | 155 | | 130,00 |
| 17:45 | 483 | 48,3 | 190 | 141 | | 130,00 |
| 18:00 | 432 | 43,15 | 170 | 126 | | |
| 18:15 | 380 | 38 | 150 | 111 | | |
| 18:30 | 329 | 32,85 | 129 | 96 | | |
| 18:45 | 277 | 27,7 | 109 | 81 | | |
| 19:00 | 230 | 22,95 | 90 | 67 | | |
| 19:15 | 182 | 18,2 | 72 | 53 | | |
| 19:30 | 135 | 13,45 | 53 | 39 | | |
| 19:45 | 87 | 8,7 | 34 | 25 | | |
| | | | **11653** | **8672** | | **4160** |

| | |
|---|---|
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia)** | **0** |
| | |
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes)** | **0** |

# SEPTIEMBRE

| POTENCIA BOMBEO (kW) | 130 |
|---|---|

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 393,6 kW | Potencia generada neta Campo FV 393,6 kW | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 6:45 | 0 | 0 | 0 | 0 | | |
| 7:00 | 3 | 0,25 | 1 | 1 | | |
| 7:15 | 5 | 0,5 | 2 | 1 | | |
| 7:30 | 8 | 0,75 | 3 | 2 | | |
| 7:45 | 10 | 1 | 4 | 3 | | |
| 8:00 | 53 | 5,275 | 21 | 15 | | |
| 8:15 | 96 | 9,55 | 38 | 28 | | |
| 8:30 | 138 | 13,825 | 54 | 40 | | |
| 8:45 | 181 | 18,1 | 71 | 53 | | |
| 9:00 | 233 | 23,325 | 92 | 68 | | |
| 9:15 | 286 | 28,55 | 112 | 84 | | |
| 9:30 | 338 | 33,775 | 133 | 99 | | |
| 9:45 | 390 | 39 | 154 | 114 | | |
| 10:00 | 440 | 44,025 | 173 | 129 | -1 | 130,00 |
| 10:15 | 491 | 49,05 | 193 | 144 | | 130,00 |
| 10:30 | 541 | 54,075 | 213 | 158 | | 130,00 |
| 10:45 | 591 | 59,1 | 233 | 173 | | 130,00 |
| 11:00 | 630 | 63 | 248 | 185 | | 130,00 |
| 11:15 | 669 | 66,9 | 263 | 196 | | 130,00 |
| 11:30 | 708 | 70,8 | 279 | 207 | | 130,00 |
| 11:45 | 747 | 74,7 | 294 | 219 | | 130,00 |
| 12:00 | 772 | 77,2 | 304 | 226 | | 130,00 |
| 12:15 | 797 | 79,7 | 314 | 233 | | 130,00 |
| 12:30 | 822 | 82,2 | 324 | 241 | | 130,00 |
| 12:45 | 847 | 84,7 | 333 | 248 | | 130,00 |
| 13:00 | 850 | 85,025 | 335 | 249 | | 130,00 |
| 13:15 | 854 | 85,35 | 336 | 250 | | 130,00 |
| 13:30 | 857 | 85,675 | 337 | 251 | | 130,00 |
| 13:45 | 860 | 86 | 338 | 252 | | 130,00 |
| 14:00 | 851 | 85,1 | 335 | 249 | | 130,00 |
| 14:15 | 842 | 84,2 | 331 | 247 | | 130,00 |
| 14:30 | 833 | 83,3 | 328 | 244 | | 130,00 |
| 14:45 | 824 | 82,4 | 324 | 241 | | 130,00 |
| 15:00 | 792 | 79,175 | 312 | 232 | | 130,00 |
| 15:15 | 760 | 75,95 | 299 | 222 | | 130,00 |
| 15:30 | 727 | 72,725 | 286 | 213 | | 130,00 |
| 15:45 | 695 | 69,5 | 274 | 204 | | 130,00 |
| 16:00 | 660 | 65,975 | 260 | 193 | | 130,00 |
| 16:15 | 625 | 62,45 | 246 | 183 | | 130,00 |
| 16:30 | 589 | 58,925 | 232 | 173 | | 130,00 |
| 16:45 | 554 | 55,4 | 218 | 162 | | 130,00 |
| 17:00 | 506 | 50,55 | 199 | 148 | | 130,00 |
| 17:15 | 457 | 45,7 | 180 | 134 | | 130,00 |
| 17:30 | 409 | 40,85 | 161 | 120 | -10 | 120 |
| 17:45 | 360 | 36 | 142 | 105 | -25 | 105 |
| 18:00 | 311 | 31,125 | 123 | 91 | | |
| 18:15 | 263 | 26,25 | 103 | 77 | | |
| 18:30 | 214 | 21,375 | 84 | 63 | | |
| 18:45 | 165 | 16,5 | 65 | 48 | | |
| 19:00 | 126 | 12,625 | 50 | 37 | | |
| 19:15 | 88 | 8,75 | 34 | 26 | | |
| 19:30 | 49 | 4,875 | 19 | 14 | | |
| 19:45 | 10 | 1 | 4 | 3 | | |
| | | | **9809** | **7300** | | **4125** |

| | |
|---|---|
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia)** | **8,98** |
| | |
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes)** | **278,51** |

# OCTUBRE

| POTENCIA BOMBEO (kW) | 130 |
|---|---|

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 393,6 kW | Potencia generada neta Campo FV 393,6 kW | Potencia tomada red electrica (kW) | Energia autoconsumida (kW) |
|---|---|---|---|---|---|---|
| 6:45 | 0 | 0 | 0 | 0 | | |
| 7:00 | 3 | 0,25 | 1 | 1 | | |
| 7:15 | 5 | 0,5 | 2 | 2 | | |
| 7:30 | 8 | 0,75 | 3 | 2 | | |
| 7:45 | 10 | 1 | 4 | 3 | | |
| 8:00 | 38 | 3,75 | 15 | 12 | | |
| 8:15 | 65 | 6,5 | 26 | 20 | | |
| 8:30 | 93 | 9,25 | 36 | 29 | | |
| 8:45 | 120 | 12 | 47 | 38 | | |
| 9:00 | 169 | 16,875 | 66 | 53 | | |
| 9:15 | 218 | 21,75 | 86 | 68 | | |
| 9:30 | 266 | 26,625 | 105 | 83 | | |
| 9:45 | 315 | 31,5 | 124 | 99 | | |
| 10:00 | 359 | 35,875 | 141 | 112 | -18 | 112 |
| 10:15 | 403 | 40,25 | 158 | 126 | -4 | 126 |
| 10:30 | 446 | 44,625 | 176 | 140 | | 130,00 |
| 10:45 | 490 | 49 | 193 | 153 | | 130,00 |
| 11:00 | 530 | 53 | 209 | 166 | | 130,00 |
| 11:15 | 570 | 57 | 224 | 179 | | 130,00 |
| 11:30 | 610 | 61 | 240 | 191 | | 130,00 |
| 11:45 | 650 | 65 | 256 | 204 | | 130,00 |
| 12:00 | 673 | 67,275 | 265 | 211 | | 130,00 |
| 12:15 | 696 | 69,55 | 274 | 218 | | 130,00 |
| 12:30 | 718 | 71,825 | 283 | 225 | | 130,00 |
| 12:45 | 741 | 74,1 | 292 | 232 | | 130,00 |
| 13:00 | 743 | 74,3 | 292 | 233 | | 130,00 |
| 13:15 | 745 | 74,5 | 293 | 233 | | 130,00 |
| 13:30 | 747 | 74,7 | 294 | 234 | | 130,00 |
| 13:45 | 749 | 74,9 | 295 | 235 | | 130,00 |
| 14:00 | 739 | 73,925 | 291 | 232 | | 130,00 |
| 14:15 | 730 | 72,95 | 287 | 228 | | 130,00 |
| 14:30 | 720 | 71,975 | 283 | 225 | | 130,00 |
| 14:45 | 710 | 71 | 279 | 222 | | 130,00 |
| 15:00 | 680 | 67,95 | 267 | 213 | | 130,00 |
| 15:15 | 649 | 64,9 | 255 | 203 | | 130,00 |
| 15:30 | 619 | 61,85 | 243 | 194 | | 130,00 |
| 15:45 | 588 | 58,8 | 231 | 184 | | 130,00 |
| 16:00 | 547 | 54,675 | 215 | 171 | | 130,00 |
| 16:15 | 506 | 50,55 | 199 | 158 | | 130,00 |
| 16:30 | 464 | 46,425 | 183 | 145 | | 130,00 |
| 16:45 | 423 | 42,3 | 166 | 132 | | 130,00 |
| 17:00 | 377 | 37,725 | 148 | 118 | -12 | 118 |
| 17:15 | 332 | 33,15 | 130 | 104 | -26 | 104 |
| 17:30 | 286 | 28,575 | 112 | 90 | -40 | 90 |
| 17:45 | 240 | 24 | 94 | 75 | -55 | 75 |
| 18:00 | 221 | 22,125 | 87 | 69 | | |
| 18:15 | 203 | 20,25 | 80 | 63 | | |
| 18:30 | 184 | 18,375 | 72 | 58 | | |
| 18:45 | 165 | 44 | 173 | 138 | | |
| 19:00 | 126 | 12,625 | 50 | 40 | | |
| 19:15 | 88 | 8,75 | 34 | 27 | | |
| 19:30 | 49 | 4,875 | 19 | 15 | | |
| 19:45 | 10 | 1 | 4 | 3 | | |
| | | | **8307** | **6610** | | **4.005** |

| | |
|---|---|
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/dia)** | **39** |
| | |
| **ENERGIA NECESARIA DE LA RED ELECTRICA (kWh/mes)** | **1200** |

## NOVIEMBRE

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 393,6 kW | Potencia generada neta Campo FV 393,6 kW |
|---|---|---|---|---|
| 8:15 | 0 | 0 | 0 | 0 |
| 8:30 | 96 | 9,6 | 38 | 30 |
| 8:45 | 202 | 20,2 | 80 | 63 |
| 9:00 | 241 | 24,1 | 95 | 75 |
| 9:15 | 280 | 28 | 110 | 88 |
| 9:30 | 319 | 31,9 | 126 | 100 |
| 9:45 | 358 | 35,8 | 141 | 112 |
| 10:00 | 395 | 39,5 | 155 | 124 |
| 10:15 | 432 | 43,2 | 170 | 135 |
| 10:30 | 469 | 46,9 | 185 | 147 |
| 10:45 | 506 | 50,6 | 199 | 158 |
| 11:00 | 530 | 53 | 209 | 166 |
| 11:15 | 554 | 55,4 | 218 | 174 |
| 11:30 | 578 | 57,8 | 228 | 181 |
| 11:45 | 602 | 60,2 | 237 | 189 |
| 12:00 | 608 | 60,825 | 239 | 191 |
| 12:15 | 615 | 61,45 | 242 | 192 |
| 12:30 | 621 | 62,075 | 244 | 194 |
| 12:45 | 627 | 62,7 | 247 | 196 |
| 13:00 | 612 | 61,2 | 241 | 192 |
| 13:15 | 597 | 59,7 | 235 | 187 |
| 13:30 | 582 | 58,2 | 229 | 182 |
| 13:45 | 567 | 56,7 | 223 | 178 |
| 14:00 | 540 | 53,975 | 212 | 169 |
| 14:15 | 513 | 51,25 | 202 | 161 |
| 14:30 | 485 | 48,525 | 191 | 152 |
| 14:45 | 458 | 45,8 | 180 | 143 |
| 15:00 | 426 | 42,55 | 167 | 133 |
| 15:15 | 393 | 39,3 | 155 | 123 |
| 15:30 | 361 | 36,05 | 142 | 113 |
| 15:45 | 328 | 32,8 | 129 | 103 |
| 16:00 | 284 | 28,375 | 112 | 89 |
| 16:15 | 240 | 23,95 | 94 | 75 |
| 16:30 | 195 | 19,525 | 77 | 61 |
| 16:45 | 151 | 15,1 | 59 | 47 |
| 17:00 | 115 | 11,5 | 45 | 36 |
| 17:15 | 79 | 7,9 | 31 | 25 |
| 17:30 | 43 | 4,3 | 17 | 13 |
| 17:45 | 7 | 0,7 | 3 | 2 |
| 18:00 | 0 | 0 | 0 | 0 |
| | | | **5906,558** | **4700,439** |

## DICIEMBRE

| HORA LOCAL | G (W/m$^2$) | Fp (%) | Potencia generada bruta Campo FV 393,6 kW | Potencia generada neta Campo FV 393,6 kW |
|---|---|---|---|---|
| 8:15 | 0 | 0 | 0 | 0 |
| 8:30 | 96 | 9,6 | 38 | 30 |
| 8:45 | 141 | 14,1 | 55 | 44 |
| 9:00 | 181 | 18,1 | 71 | 57 |
| 9:15 | 221 | 22,1 | 87 | 69 |
| 9:30 | 261 | 26,1 | 103 | 82 |
| 9:45 | 301 | 30,1 | 118 | 94 |
| 10:00 | 333 | 33,325 | 131 | 104 |
| 10:15 | 366 | 36,55 | 144 | 114 |
| 10:30 | 398 | 39,775 | 157 | 125 |
| 10:45 | 430 | 43 | 169 | 135 |
| 11:00 | 456 | 45,575 | 179 | 143 |
| 11:15 | 482 | 48,15 | 190 | 151 |
| 11:30 | 507 | 50,725 | 200 | 159 |
| 11:45 | 533 | 53,3 | 210 | 167 |
| 12:00 | 545 | 54,45 | 214 | 171 |
| 12:15 | 556 | 55,6 | 219 | 174 |
| 12:30 | 568 | 56,75 | 223 | 178 |
| 12:45 | 579 | 57,9 | 228 | 181 |
| 13:00 | 572 | 57,225 | 225 | 179 |
| 13:15 | 566 | 56,55 | 223 | 177 |
| 13:30 | 559 | 55,875 | 220 | 175 |
| 13:45 | 552 | 55,2 | 217 | 173 |
| 14:00 | 529 | 52,875 | 208 | 166 |
| 14:15 | 506 | 50,55 | 199 | 158 |
| 14:30 | 482 | 48,225 | 190 | 151 |
| 14:45 | 459 | 45,9 | 181 | 144 |
| 15:00 | 425 | 42,45 | 167 | 133 |
| 15:15 | 390 | 39 | 154 | 122 |
| 15:30 | 356 | 35,55 | 140 | 111 |
| 15:45 | 321 | 32,1 | 126 | 101 |
| 16:00 | 277 | 27,675 | 109 | 87 |
| 16:15 | 233 | 23,25 | 92 | 73 |
| 16:30 | 188 | 18,825 | 74 | 59 |
| 16:45 | 144 | 14,4 | 57 | 45 |
| 17:00 | 110 | 10,975 | 43 | 34 |
| 17:15 | 76 | 7,55 | 30 | 24 |
| 17:30 | 41 | 4,125 | 16 | 13 |
| 17:45 | 7 | 0,7 | 3 | 2 |
| 18:00 | 0 | 0 | 0 | 0 |
| | | | **5.409** | **4.304** |