Monitoring System V7

Sistema de información para el O&M en plantas solares fotovoltaicas

Portfolio

- Pantalla donde se puede ver el estado global de todos los parques en una simple vista
- Datos actualizados cada 5 segundos
- Potencia, Radiación y PR
- Ubicación en mapa
- Icono con alarmas

Portfolio

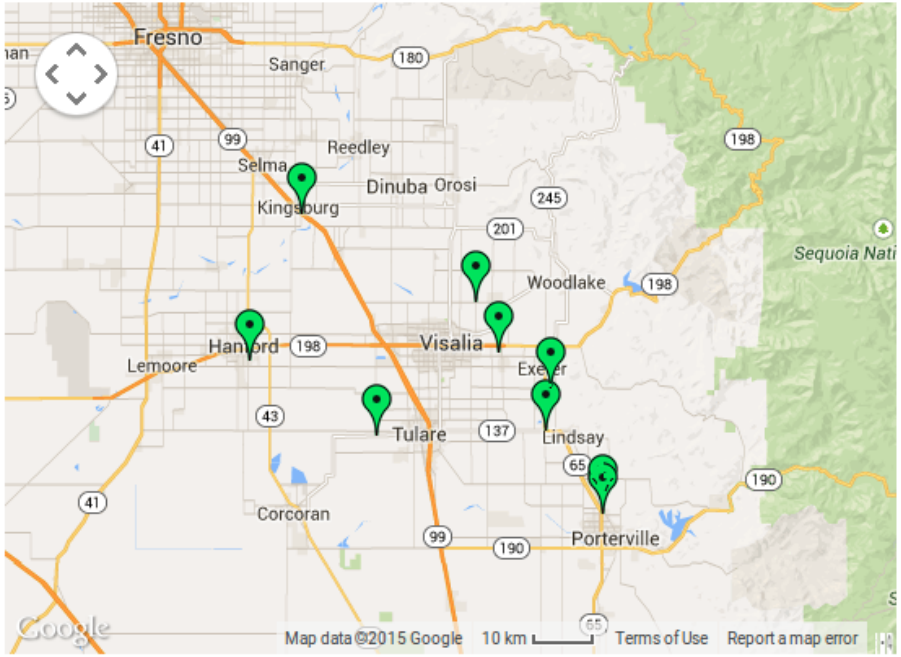
imMODO solar

SolarFarm Rooftops User: admin Logout

SolarFarms

Name	Power (kw)	Radiation	PR	
KINGSBURG	1758 kw	429 wh/m²	100 %	View
PORTERVILLE	3139 kw	885 wh/m²	74 %	View
LINDSAY	2361 kw	543 wh/m²	87 %	View
IVANHOE	2792 kw	855 wh/m²	68 %	View
EXETER	2494 kw	734 wh/m²	83 %	View
TULARE	1728 kw	524 wh/m²	92 %	View
PORTERVILLE67	2696 kw	934 wh/m²	82 %	View
FARMERSVILLE	2971 kw	609 wh/m²	91 %	View
HANFORD	1586 kw	488 wh/m²	91 %	View

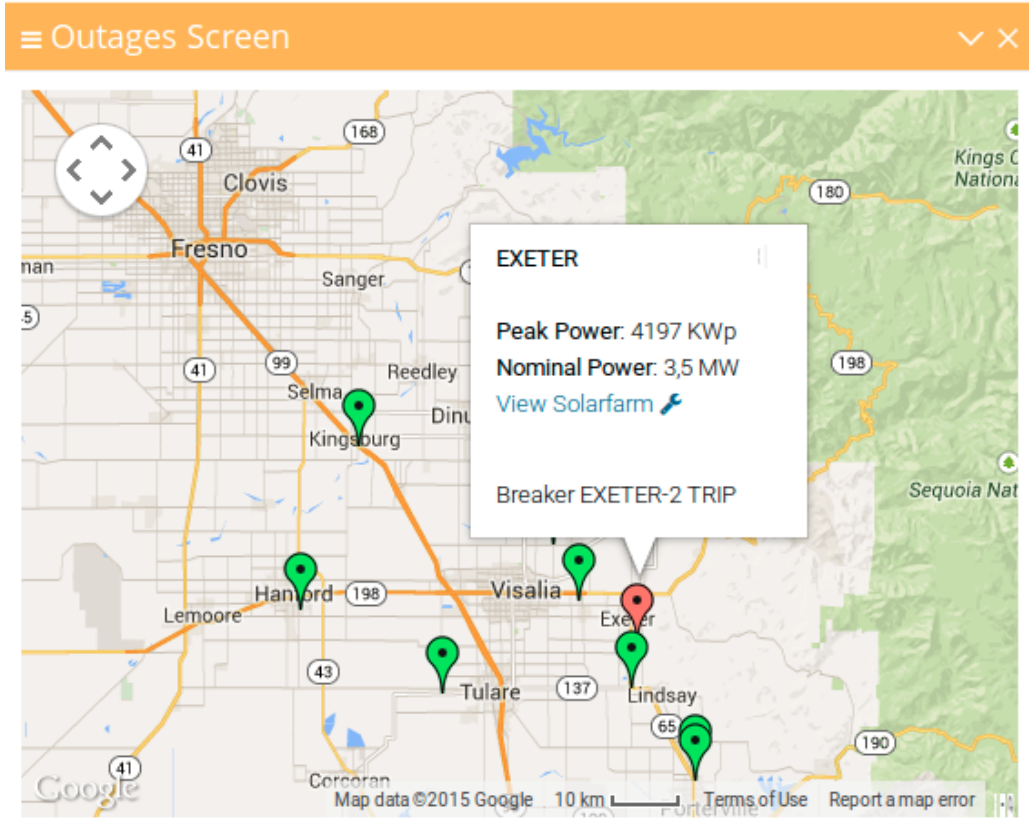
Outages Screen



Pantalla de Corte de Suministro

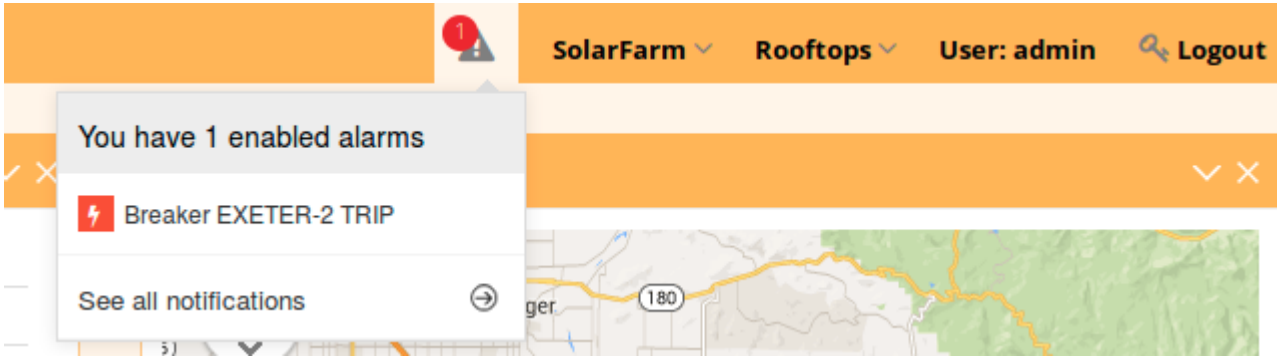
- Muestra en un mapa (color rojo) cuando hay un corte de suministro en un parque
- Pinchando en el mapa, se muestra el motivo del corte de suministro
- Actualización cada 5 segundos

Pantalla de corte de suministro



Alarmas en tiempo real

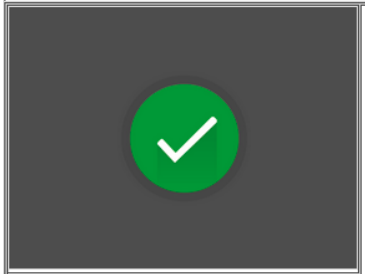
- Cada usuario puede ver alarmas a las que está suscrito
- Además el usuario podrá recibir las alarmas en su correo electrónico



Alarmas en tiempo real, correo (ej)

ImMODO
Energy Services Corporation

[SOLVED] INVERTER HANFORD-2 OFF
Problem was solved!
Used rule: HANFORD@inverter_INV-2_Real_Power_Output = 0 AND HANFORD@met_1_Solar_Radiation_POA > 50 AND
Actual Time: 10:46:47
Time error found: 10:05:02
Time error solved: 10:46:30



Email sender enabled between:
00:00:00.0 and 23:59:59.0

® Immodo Energy 2015

Dashboard en tiempo real

SNAPSHOT | POWER VS RADIATION | WEATHER STATION | PERFORMANCE RATIO | PROFIT | SOILING

POWER

1.73 MW

1.19 MWh
ENERGY TODAY

19.13 MWh
ENERGY YESTERDAY

▼ 225kWh ENERGY BELOW YESTERDAY

Performance Ratio

88.31%
TODAY

82.02%
YESTERDAY

83.3%
TWO DAYS AGO

▲ 4% ABOVE YESTERDAY

PROFIT

$/h 177.3
PROFIT NOW

$ 121.5
TODAY

0.1025
MPR*FACTOR

▼ $23 BELOW YESTERDAY

WEATHER

417
RADIATION (w/m2)

13.5°C
TEMPERATURE

25.5 °C
TEMPERATURE PANEL

26.7 m/s
WIND

STATUS DEVICES

- MET ●
- METERS ●
- BREAKERS ●
- INVERTERS ●

SOILING

1.45%
TODAY

1.36%
YESTERDAY

1.27%
TWO DAYS AGO

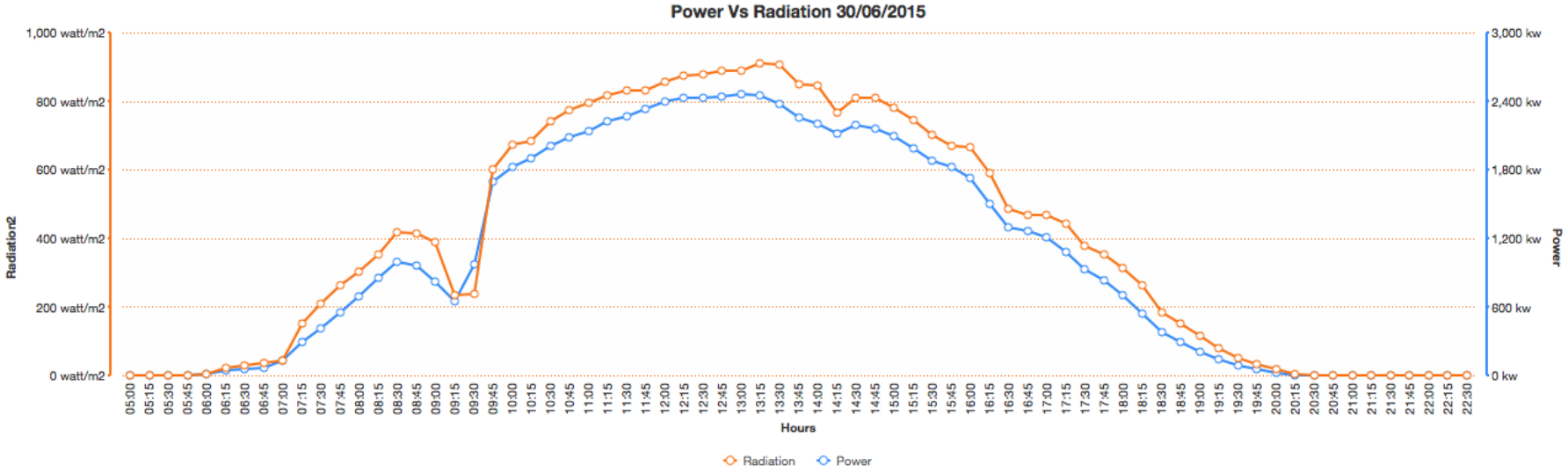
Dashboard: Potencia Vs Radiación

Power Vs Radiation

401 kWh
Energy Today

312 kW 09:00
PEAK POWER TODAY

Yesterday | Solarfarm



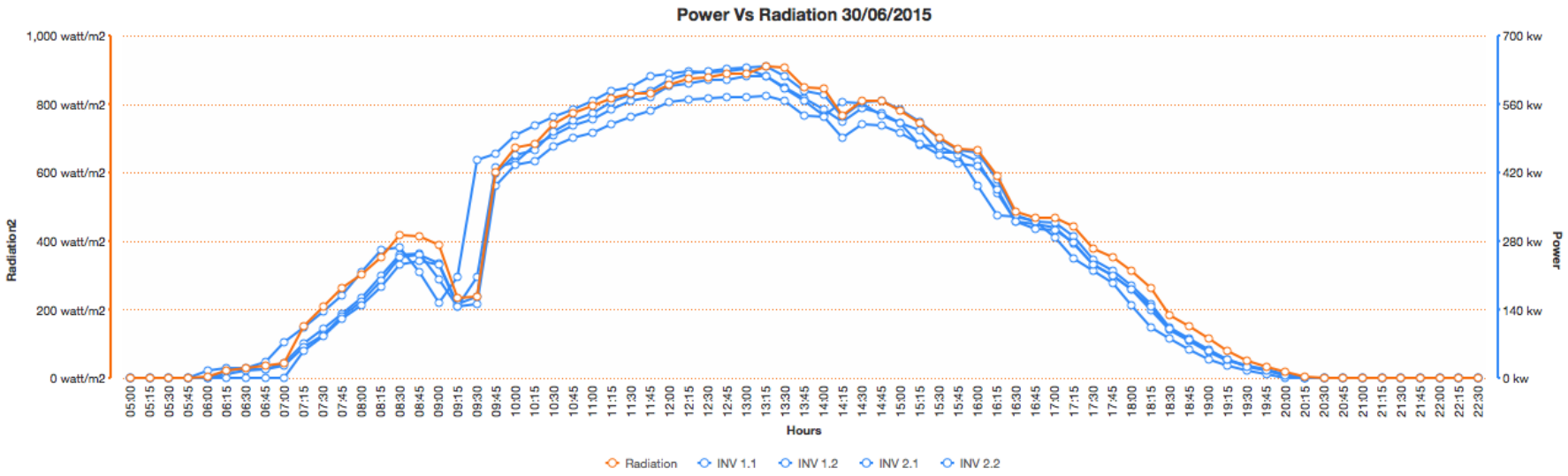
Dashboard: Potencia Vs Radiación

Power Vs Radiation

301 kWh
Energy Today

312 kW 09:00
PEAK POWER TODAY

Yesterday | Inverters



Dashboard: Estación Meteorológica

SNAPSHOT | POWER VS RADIATION | WEATHER STATION | PERFORMANCE RATIO | PROFIT | SOILING

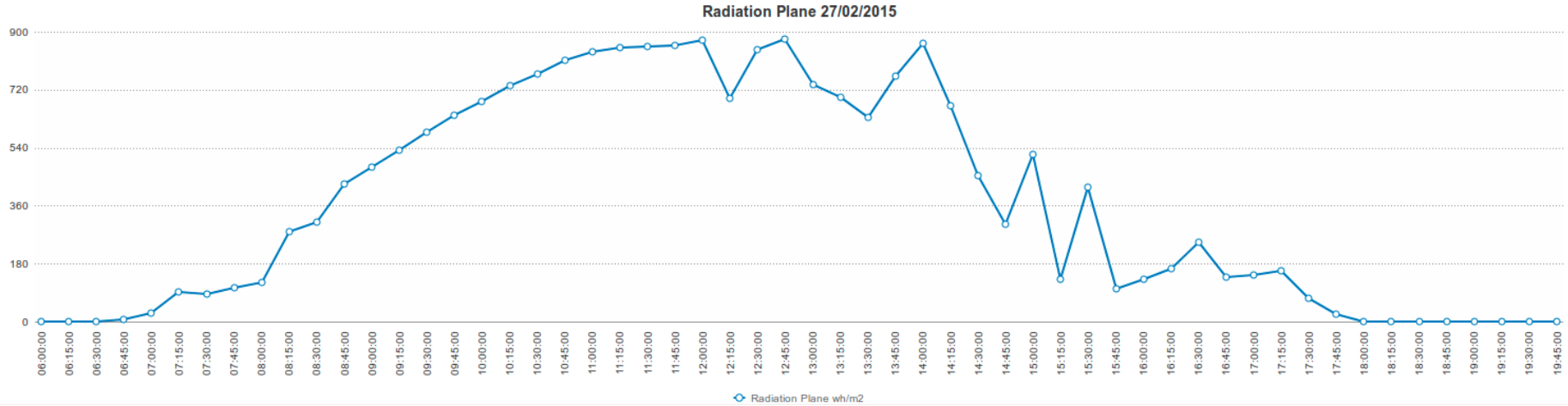
Weather Station

418 w/m2
Plane Radiation Now

25.4ºC
Plane Temperature Now

Yesterday

Radiation Plane



Dashboard: Performance Ratio

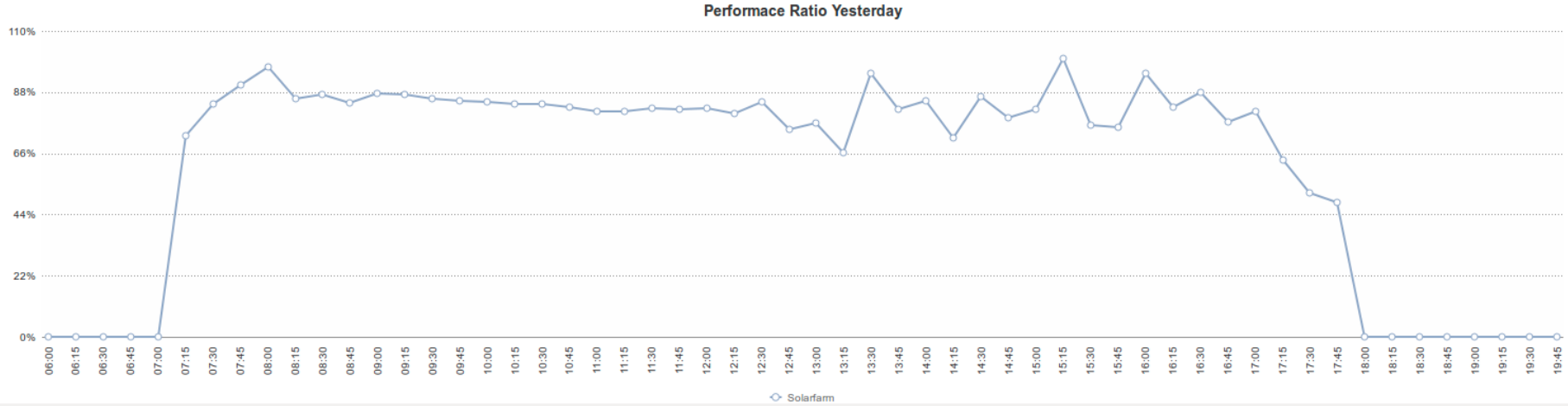
SNAPSHOT | POWER VS RADIATION | WEATHER STATION | PERFORMANCE RATIO | PROFIT | SOILING

Performance Ratio

82.02 %	81.4 %	81.3 %
PROFIT TODAY	PROFIT YESTERDAY	PROFIT 2 DAYS AGO

Yesterday

SolarFarm



Dashboard: Performance Ratio

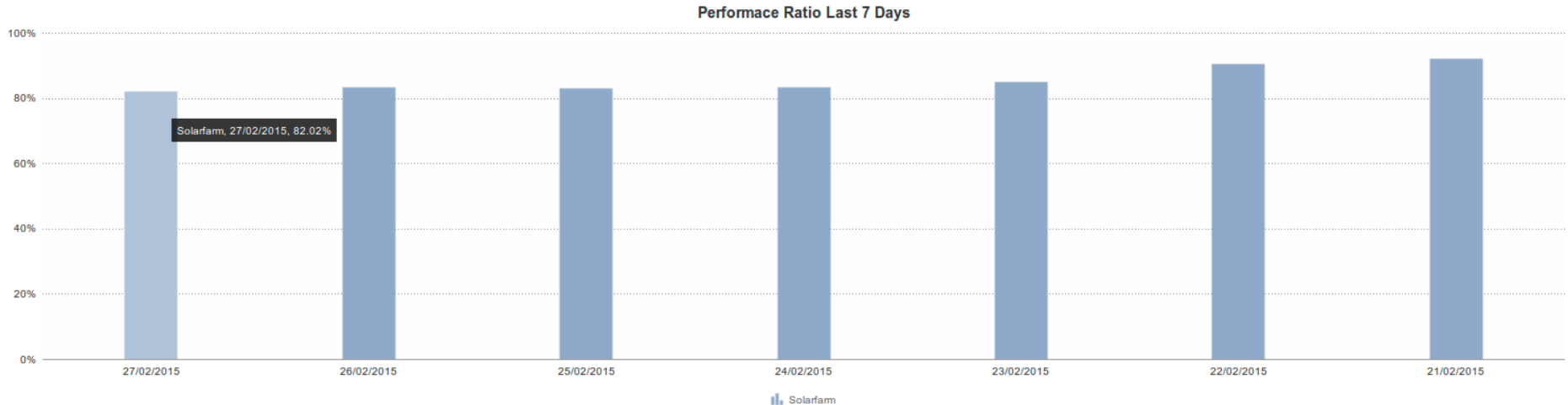
SNAPSHOT | POWER VS RADIATION | WEATHER STATION | PERFORMANCE RATIO | PROFIT | SOILING

Performance Ratio

82.02 %	81.4 %	81.3 %
PROFIT TODAY	PROFIT YESTERDAY	PROFIT 2 DAYS AGO

Last 7 Days

SolarFarm



Dashboard: Performance Ratio

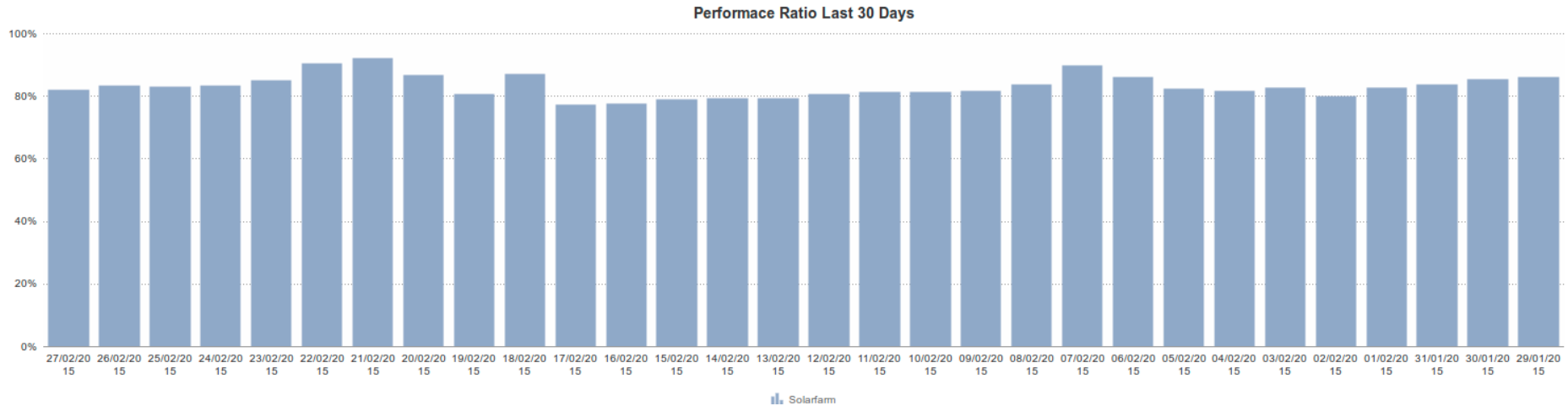
SNAPSHOT | POWER VS RADIATION | WEATHER STATION | PERFORMANCE RATIO | PROFIT | SOILING

Performance Ratio

82.02 %	81.4 %	81.3 %
PROFIT TODAY	PROFIT YESTERDAY	PROFIT 2 DAYS AGO

Last 30 Days

SolarFarm



Dashboard: Performance Ratio

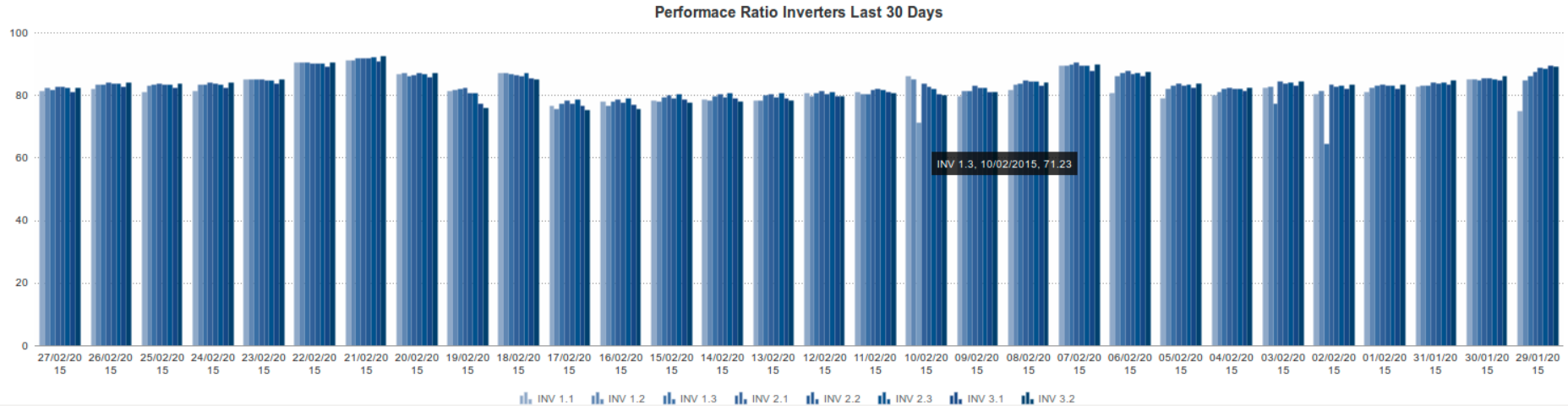
SNAPSHOT | POWER VS RADIATION | WEATHER STATION | PERFORMANCE RATIO | PROFIT | SOILING

Performance Ratio

82.02 %	81.4 %	81.3 %
PROFIT TODAY	PROFIT YESTERDAY	PROFIT 2 DAYS AGO

Last 30 Days

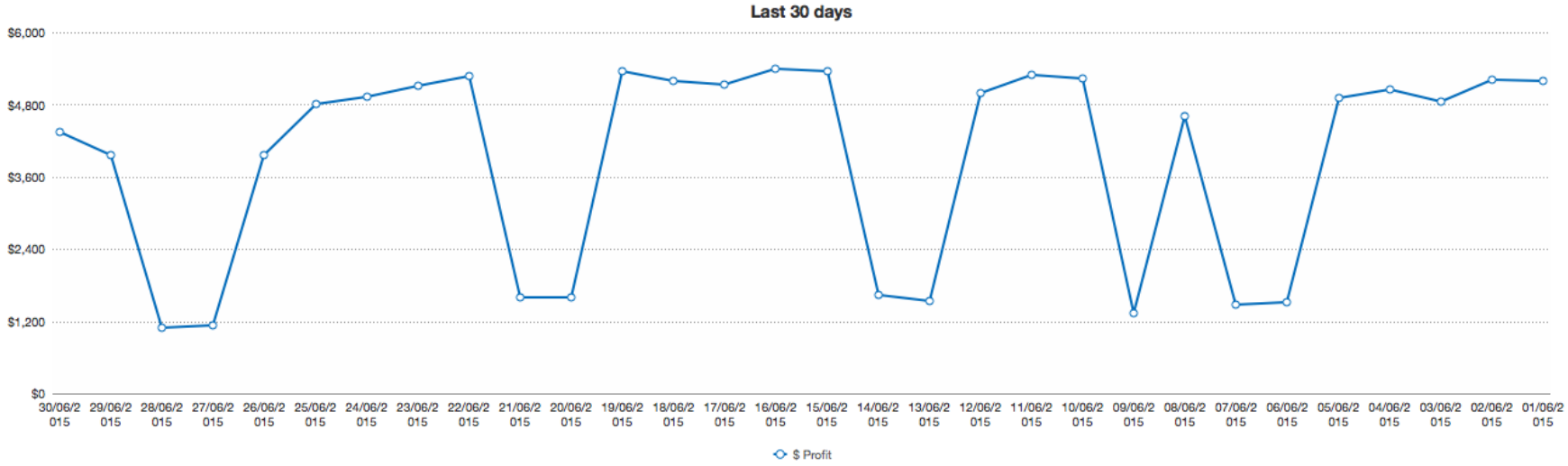
Inverters



Dashboard: Beneficios

Revenue	$ 47.43	$ 4352
	REVENUE TODAY	REVENUE YESTERDAY

Last 30 Days



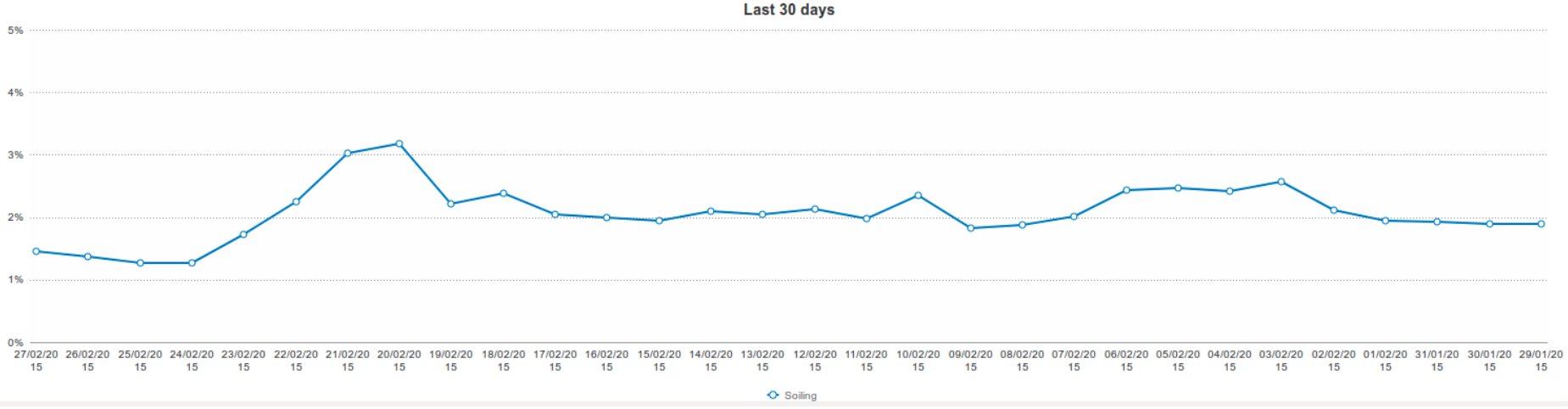
Dashboard: Sensor de suciedad

SNAPSHOT | POWER VS RADIATION | WEATHER STATION | PERFORMANCE RATIO | PROFIT | SOILING

Soiling

1.45%	1.36%	1.27%
SOILING TODAY	SOILING YESTERDAY	SOILING 2 DAYS AGO

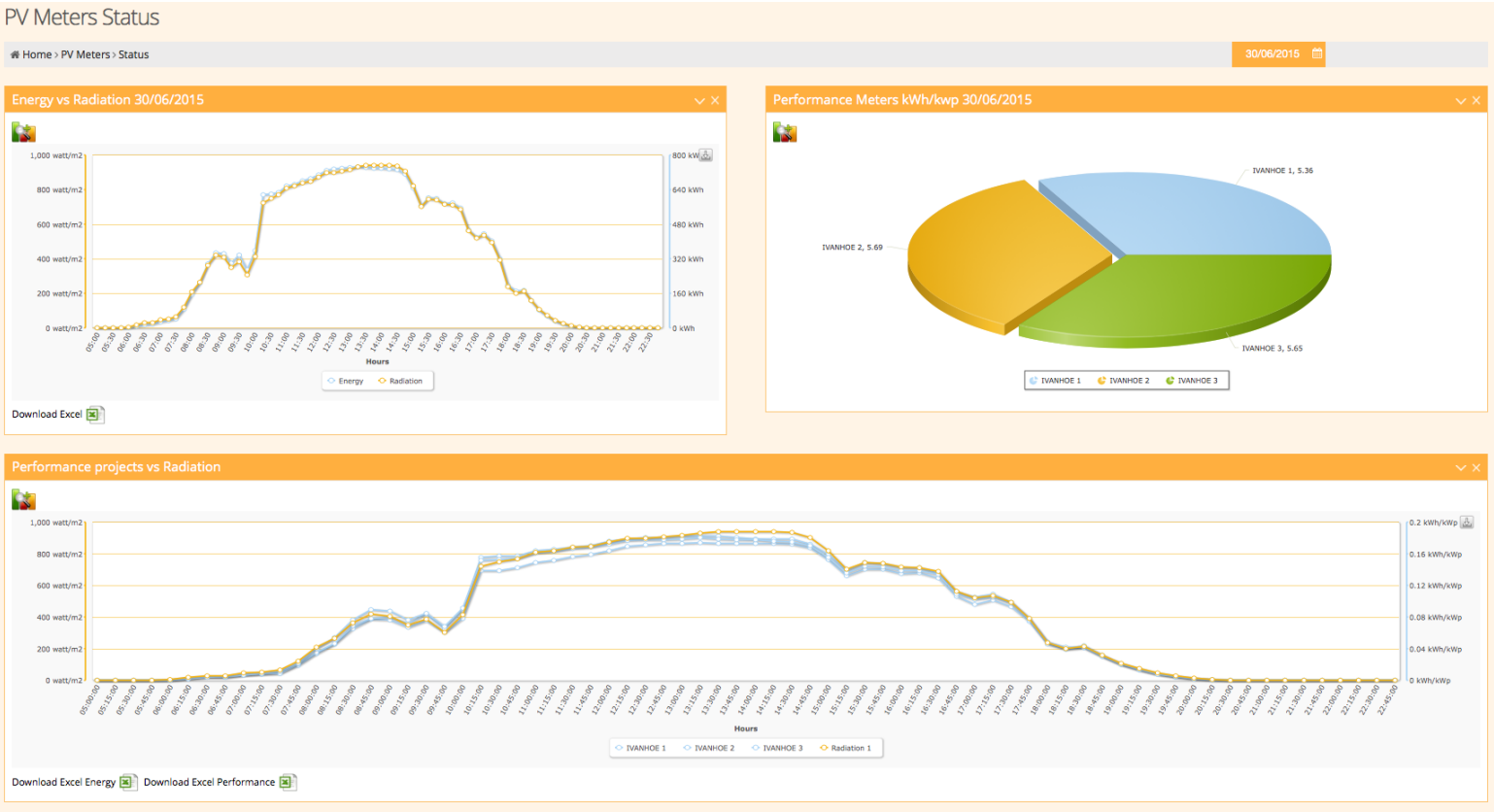
Last 30 Days



Contadores

- Monitorización de contadores de facturación
- Descarga de curva horaria y resumen diarios
- No interfiere con la lectura de la compañía eléctrica
- **Monitorización de Telemedida en tiempo real (TTR) y envío de potencia a centro de control. Trabajando actualmente con diversos centros de control (Nexus, Avanzalia, Sampol, Gnera ...)**

Contadores


PV Meters Status
Home › PV Meters › Status
30/06/2015
Energy vs Radiation 30/06/2015
1,000 watt/m2
800 watt/m2
600 watt/m2
400 watt/m2
200 watt/m2
0 watt/m2
800 kWh
640 kWh
480 kWh
320 kWh
160 kWh
0 kWh
Hours
Energy
Radiation
Download Excel
Performance Meters kWh/kwp 30/06/2015
IVANHOE 1, 5.36
IVANHOE 2, 5.69
IVANHOE 3, 5.65
IVANHOE 1
IVANHOE 2
IVANHOE 3
Performance projects vs Radiation
1,000 watt/m2
800 watt/m2
600 watt/m2
400 watt/m2
200 watt/m2
0 watt/m2
0.2 kWh/kWp
0.16 kWh/kWp
0.12 kWh/kWp
0.08 kWh/kWp
0.04 kWh/kWp
0 kWh/kWp
Hours
IVANHOE 1
IVANHOE 2
IVANHOE 3
Radiation 1
Download Excel Energy
Download Excel Performance

Inversores

- Monitorización en tiempo real de los inversores
- Lectura de múltiples parámetros de los inversores
- Descarga de datos en excel
- Múltiples gráficas para comparar parámetros de cada inversor

Inversores

Inverters

Home > Inverters > Real Time

Peak Power

INV 1.1
Ok. Awake
Power: 126 Kw
150 kWh
More

INV 1.2
Ok. Awake
Power: 130 Kw
154 kWh
More

INV 2.1
Ok. Awake
Power: 129 Kw
154 kWh
More

INV 2.2
Ok. Awake
Power: 127 Kw
152 kWh
More

INV 5.3
Ok. Awake
Power: 129 Kw
154 kWh
More

INV 5.1
Ok. Awake
Power: 132 Kw
156 kWh
More

INV 5.2
Ok. Awake
Power: 130 Kw
154 kWh
More

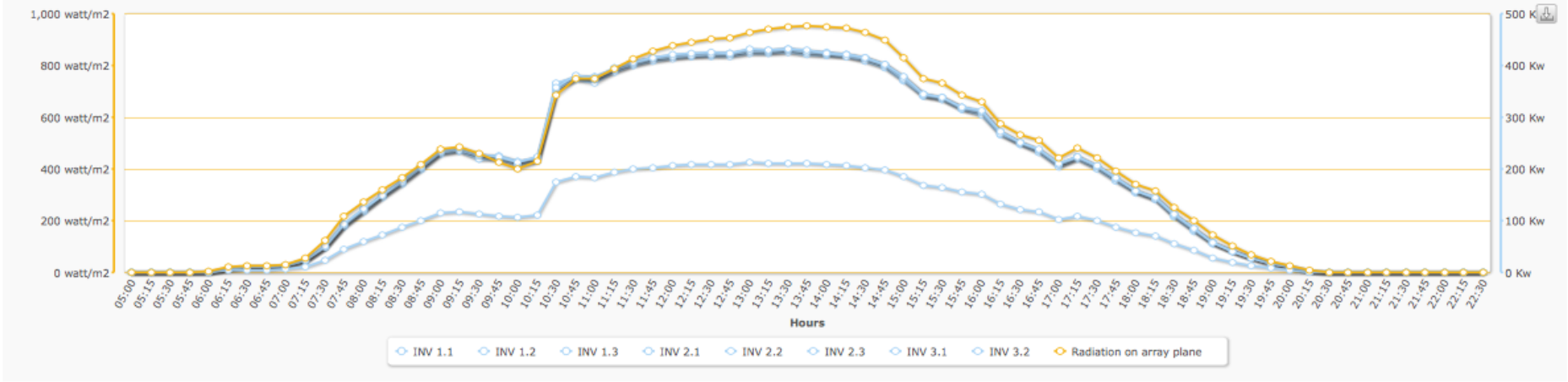
Inversores

Power each Inverter VS Radiation

Home > Inverters > Power Each Inverter

30/06/2015

Power All inverters vs Radiation



Download Excel

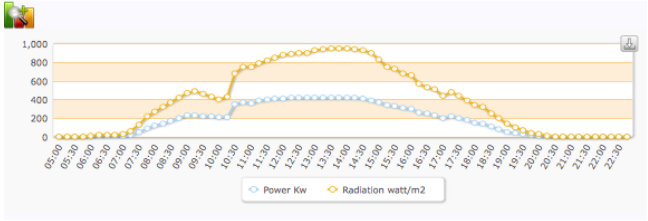
Inversores

INV 1.1 - Serial Number: 1

30/06/2015

Charts Inverter 30/06/2015

Power vs Radiation | Energy | Status

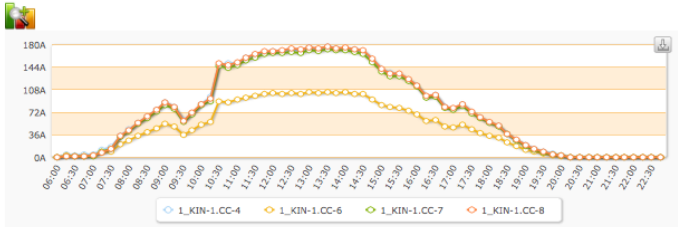


Combiner Boxes - Real Time

Status | Intensities Now

Name	Intensity	Status	
1_KIN-1.CC-4	45.333 A		More Details
1_KIN-1.CC-6	27.526 A		More Details
1_KIN-1.CC-7	43.121 A		More Details
1_KIN-1.CC-8	44.35 A		More Details

Combiner Boxes 30/06/2015 - INV 1.1



Download Excel

Spot Values -

Inverter *1*

Line *-126.5 0.3 152.4*

AC Power *126.50*

Frequency *60.04*

dqs *391 -214.7 0.3*

PV Voltage *776*

PV Current *163.30*

Common Mode V *14.8*

Ambient T *33.2*

Estación Meteorológica

- Monitorización de múltiples parámetros y sensores
- Descarga en excel de todos los parámetros por días y por horas

Estación Meteorológica

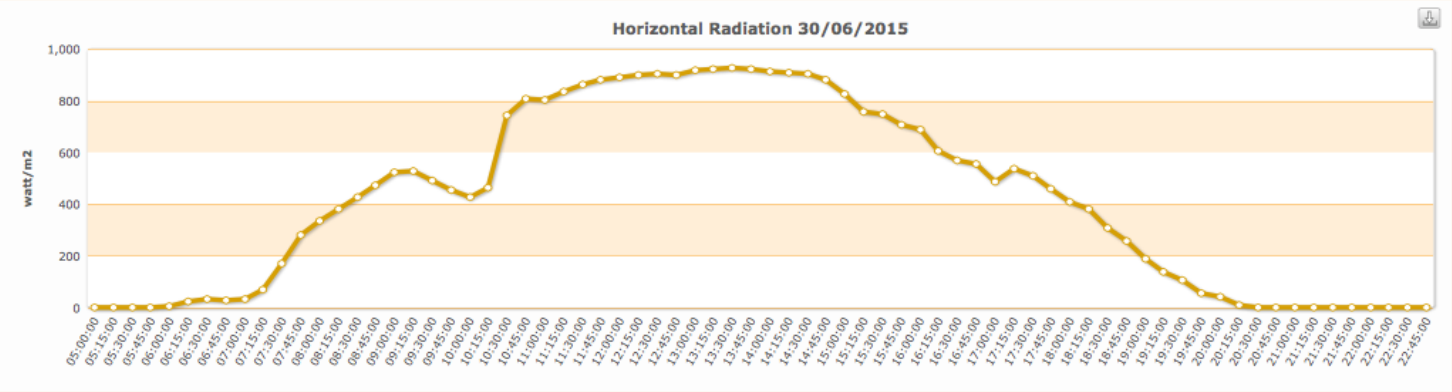
Weather Station

Home > Weather Station

30/06/2015

Meteorological Data 30/06/2015

Horizontal radiation | Inclined radiation | Temperature Amb | Temperature Panel | Wind | Cell 1 & 2 Radiation | Cell 1 & 2 Temperature



Meteorological Sensors

Time : *10:00*

Temperature : *30.06 ºC*

Radiation Pa: *255.7601 watt/m2*

Radiation Inc: *242.6393 watt/m2*

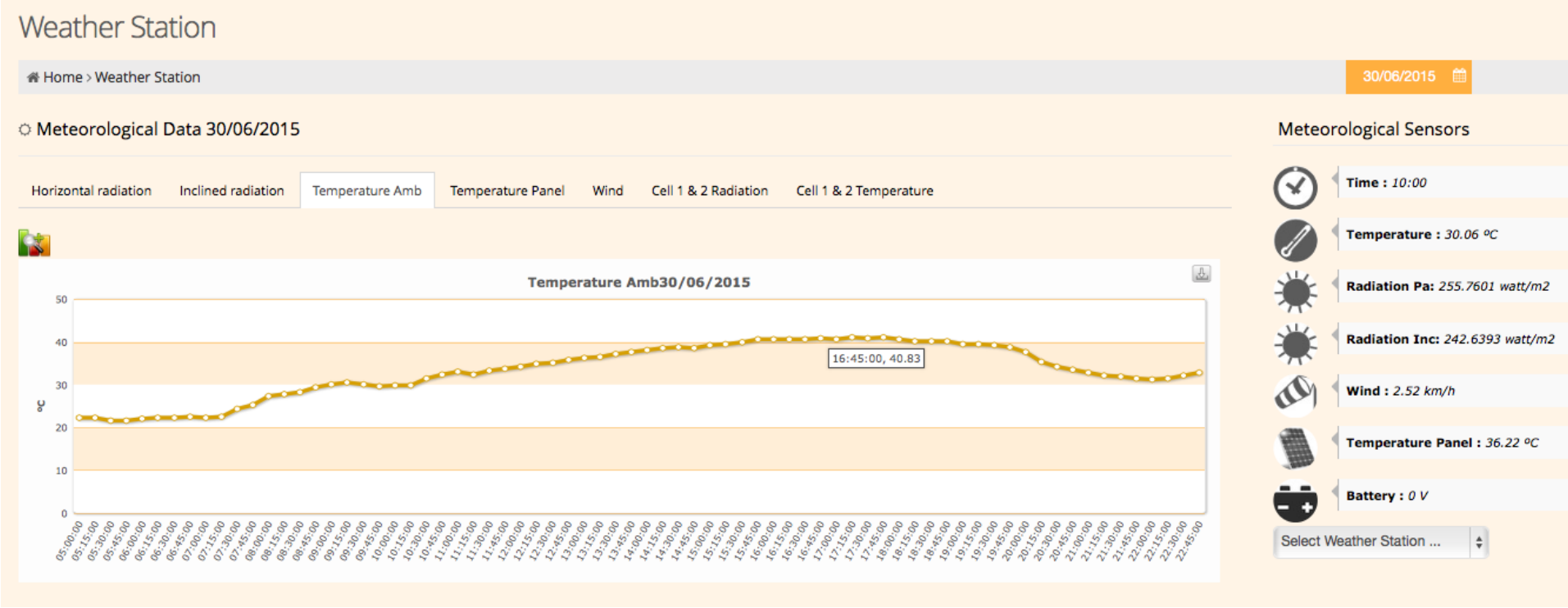
Wind : *2.52 km/h*

Temperature Panel : *36.22 ºC*

Battery : *0 V*

Select Weather Station ...

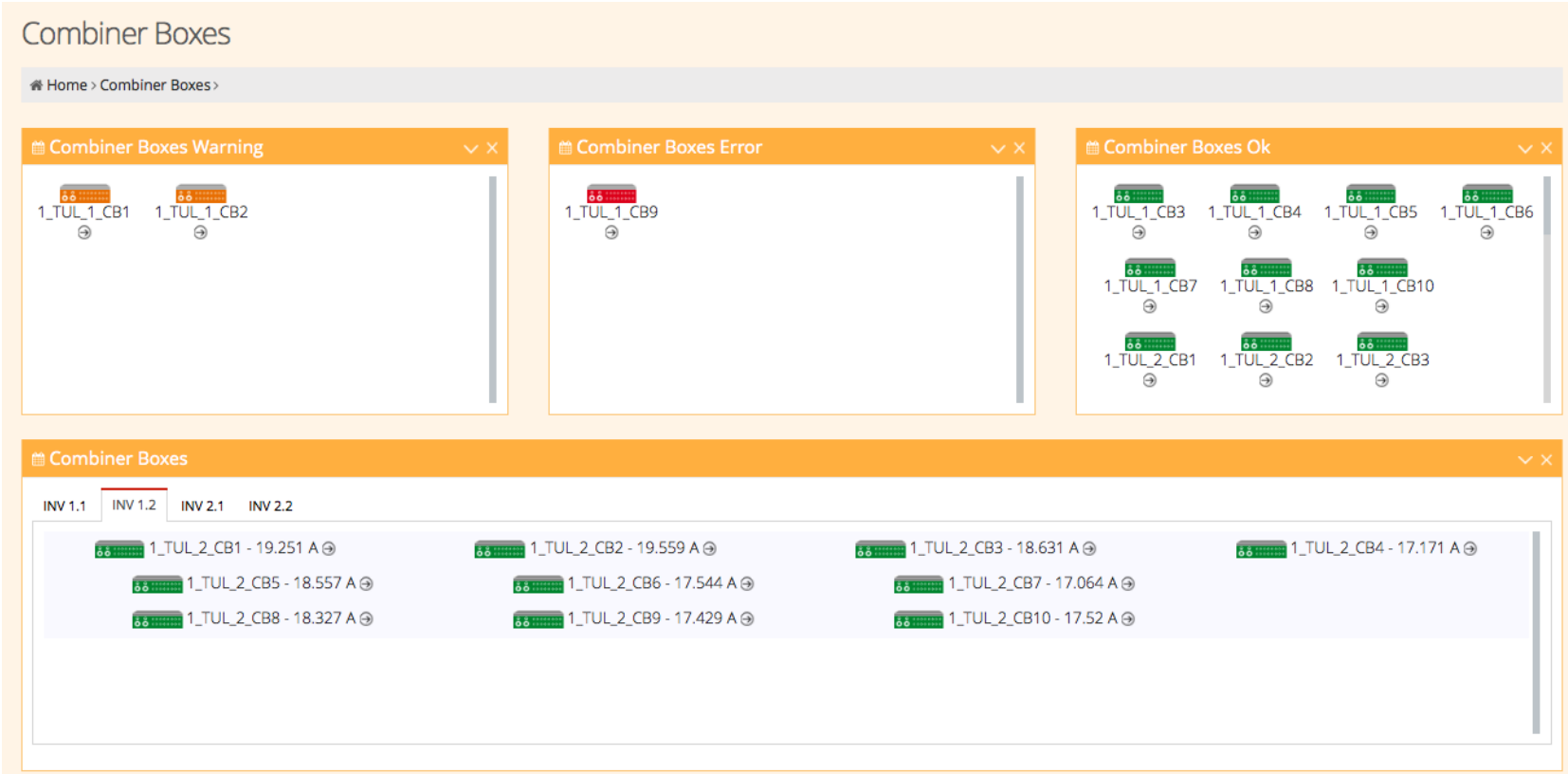
Estación Meteorológica



Cajas de Strings

- Monitorización de las series de las cajas de string de todos los inversores
- Descarga de los parámetros en excel
- Alerta (caja amarilla) cuando alguna serie produce por debajo de las demás
- Error (caja roja) cuando hay una serie en la caja apagada

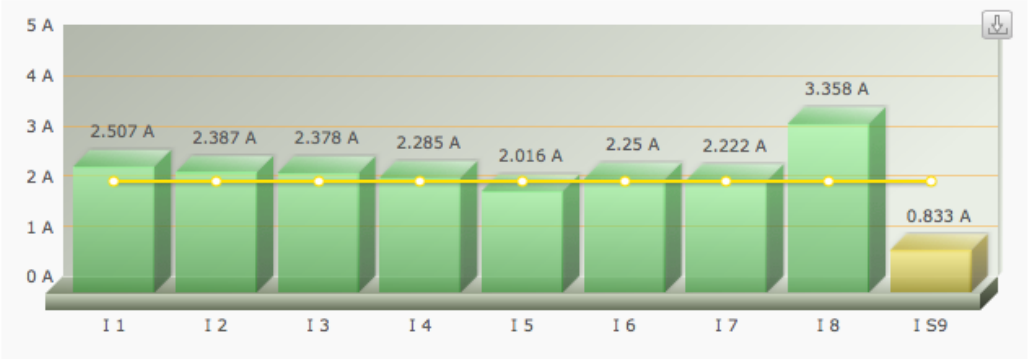
Cajas de Strings



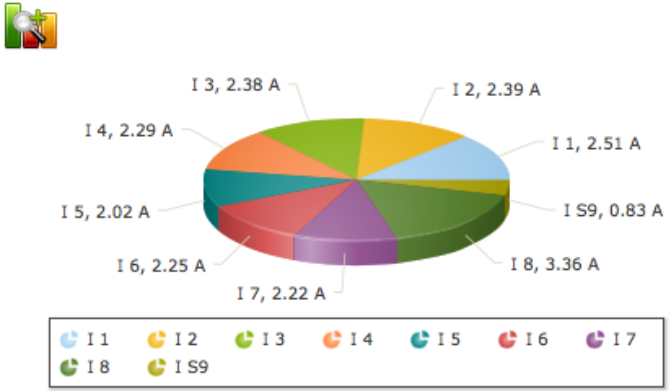
Cajas de Strings

Combiner Box - 1_TUL_1_CB1 - Real Time

Intensitives Bar Chart



Intensitives Pie Chart



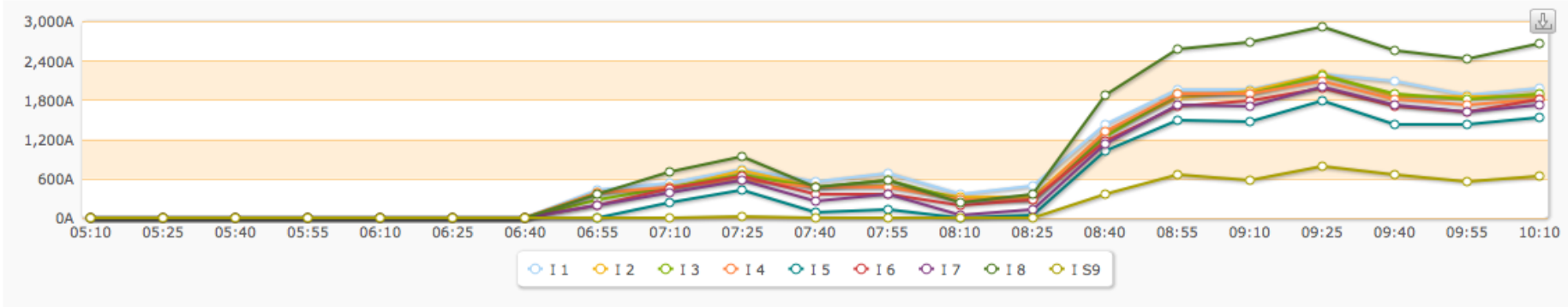
Show All Intensitives»

Cajas de Strings

Combiner Box - 1_TUL_1_CB1

01/07/2015

All Intensities 01/07/2015



Reglas principales

El usuario podrá definirse las reglas de las alarmas a su gusto.

Main Rules Manager

+ Add | Delete

15 per page

Search:

Label	Operator	Time Continue Error	Time Continue Solved	Value to compare	Send Email	Hour Begin	Hour End	
EXETER@breaker_1_Comm	<>	300	300	Ok	yes	2014-11-21 00:00:00	2014-11-21 23:59:59	Delete
LINDSAY@breaker_1_Comm	<>	300	300	Ok	yes	2014-11-21 00:00:00	2014-11-21 23:59:59	Delete
LINDSAY@breaker_3_Comm	<>	300	300	Ok	yes	2014-11-21 00:00:00	2014-11-21 23:59:59	Delete
LINDSAY@breaker_4_Comm	<>	300	300	Ok	yes	2014-11-21 00:00:00	2014-11-21 23:59:59	Delete
LINDSAY@breaker_1_Breaker_Status	<>	15	10	Ok	yes	2014-11-21 00:00:00	2014-11-21 23:59:59	Delete
LINDSAY@breaker_3_Breaker_Status	<>	15	10	Ok	yes	2014-11-21 00:00:00	2014-11-21 23:59:59	Delete
LINDSAY@breaker_4_Breaker_Status	<>	15	10	Ok	yes	2014-11-21 00:00:00	2014-11-21 23:59:59	Delete
IVANHOE@breaker_1_Comm	<>	300	300	Ok	yes	2014-11-21 00:00:00	2014-11-21 23:59:59	Delete
IVANHOE@breaker_2_Comm	<>	300	300	Ok	yes	2014-11-21 00:00:00	2014-11-21 23:59:59	Delete
IVANHOE@breaker_3_Comm	<>	300	300	Ok	yes	2014-11-21 00:00:00	2014-11-21 23:59:59	Delete
IVANHOE@breaker_1_Breaker_Status	<>	60	10	Ok	yes	2014-11-21 00:00:00	2014-11-21 23:59:59	Delete

Reglas Secundarias

Y puede mezclarlas con otras reglas (secundarias)

Secondary Rules Manager

+ Add | Delete

15 per page

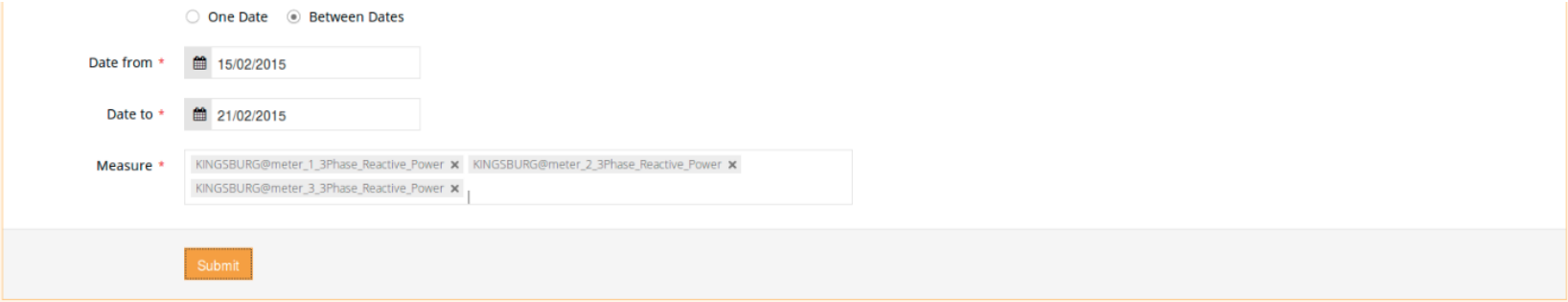
Search:

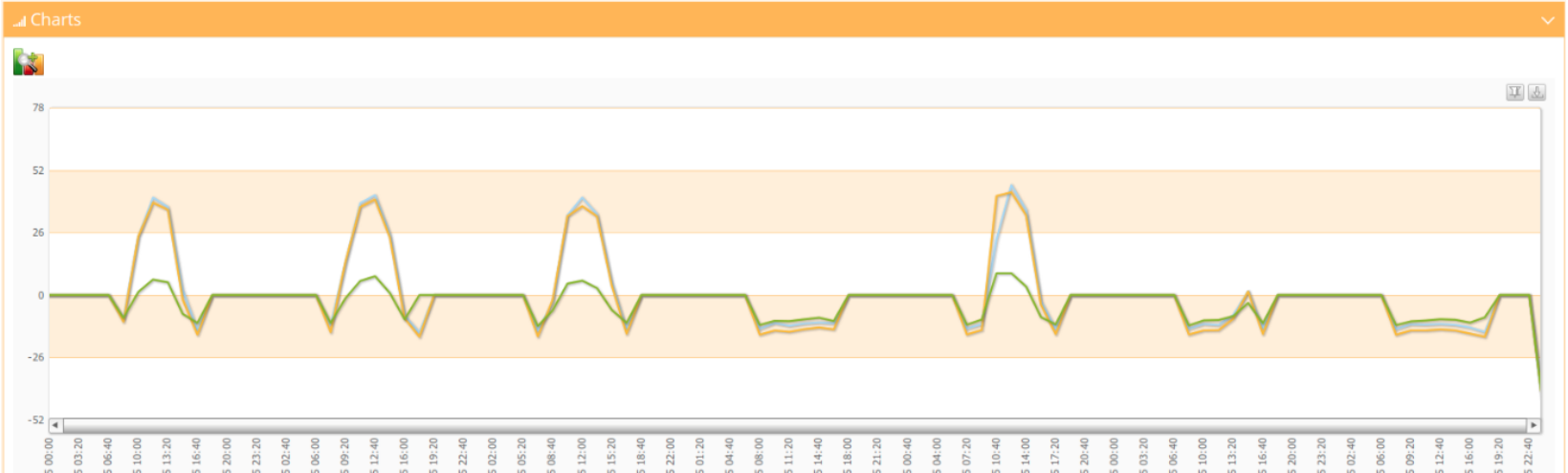
Rule 1	Rule 2	Logic Operator	Time Continue Error	Time Continue Solved	Send Email	Hour Begin	Hour End	
NOT INVERTER PORTERVILLE-1.1 COM ERROR	INVERTER PORTERVILLE-1.1 LOW PERFORMANCE	AND	120	20	yes	2014-11-17 07:30:00	2014-11-17 16:30:00	Delete
NOT INVERTER PORTERVILLE-1.2 COM ERROR	INVERTER PORTERVILLE-1.2 LOW PERFORMANCE	AND	120	20	yes	2014-11-17 07:30:00	2014-11-17 16:30:00	Delete
NOT INVERTER PORTERVILLE-2.1 COM ERROR	INVERTER PORTERVILLE-2.1 LOW PERFORMANCE	AND	120	20	yes	2014-11-17 07:30:00	2014-11-17 16:30:00	Delete
NOT INVERTER PORTERVILLE-2.2 COM ERROR	INVERTER PORTERVILLE-2.2 LOW PERFORMANCE	AND	120	20	yes	2014-11-17 07:30:00	2014-11-17 16:30:00	Delete
NOT INVERTER PORTERVILLE-5.1 COM ERROR	INVERTER PORTERVILLE-5.1 LOW PERFORMANCE	AND	120	20	yes	2014-11-17 07:30:00	2014-11-17 16:30:00	Delete
NOT INVERTER PORTERVILLE-5.2 COM ERROR	INVERTER PORTERVILLE-5.2 LOW PERFORMANCE	AND	120	20	yes	2014-11-17 07:30:00	2014-11-17 16:30:00	Delete
NOT INVERTER PORTERVILLE-5.3 COM ERROR	INVERTER PORTERVILLE-5.3 LOW PERFORMANCE	AND	120	20	yes	2014-11-17 07:30:00	2014-11-17 16:30:00	Delete
NOT INVERTER IVANHOE-1.1 COM ERROR	INVERTER IVANHOE-1.1 LOW PERFORMANCE	AND	120	20	yes	2014-11-17 07:30:00	2014-11-17 16:30:00	Delete
NOT INVERTER IVANHOE-1.2 COM ERROR	INVERTER IVANHOE-1.2 LOW PERFORMANCE	AND	120	20	yes	2014-11-17 07:30:00	2014-11-17 16:30:00	Delete
NOT INVERTER IVANHOE-1.3 COM ERROR	INVERTER IVANHOE-1.3 LOW PERFORMANCE	AND	120	20	yes	2014-11-17 07:30:00	2014-11-17 16:30:00	Delete
NOT INVERTER IVANHOE-2.1 COM ERROR	INVERTER IVANHOE-2.1 LOW PERFORMANCE	AND	120	20	yes	2014-11-17 07:30:00	2014-11-17 16:30:00	Delete

Gráficas configurables

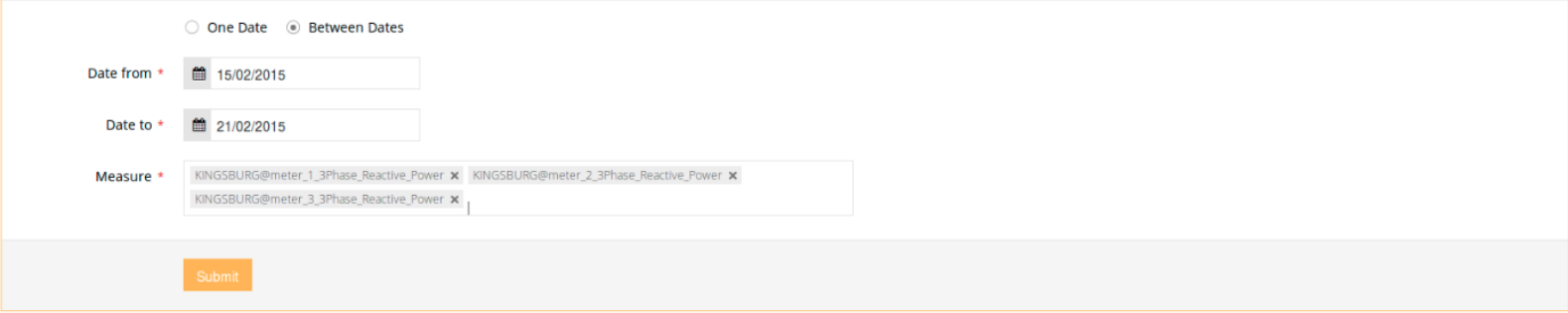
- Pantalla para realizar gráficas con distintos parámetros que el usuario seleccione
- El usuario también puede elegir medidas de distintos parques para realizar un gráfica común
- Además se genera un excel con los datos seleccionados para 5 minutos

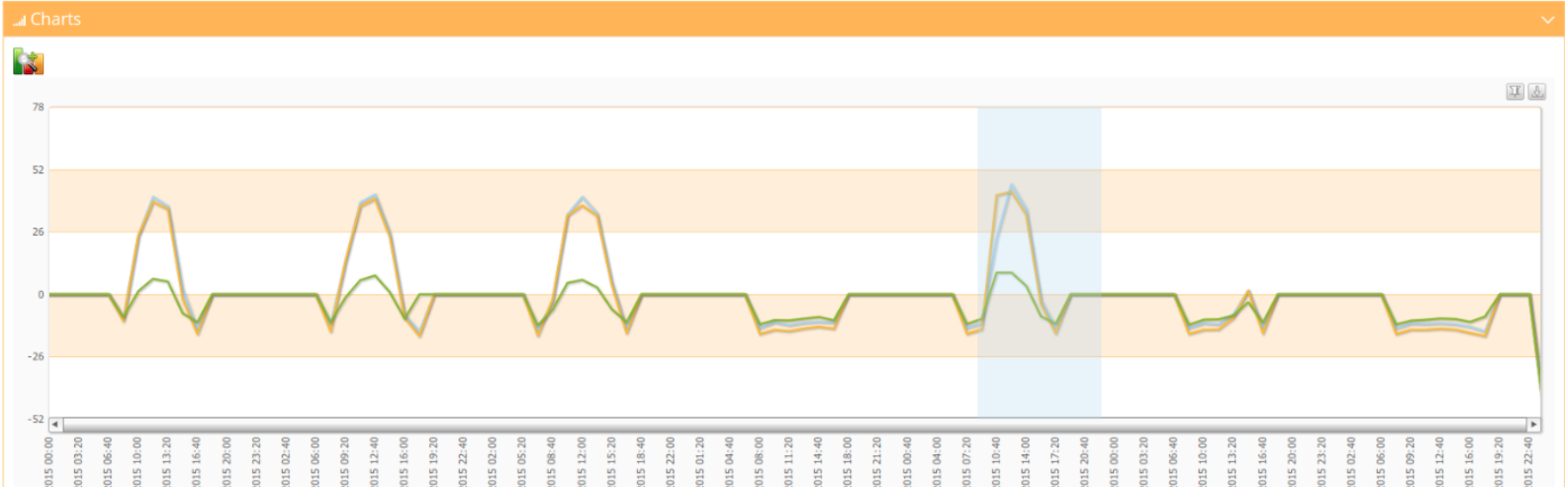
Gráficas configurables



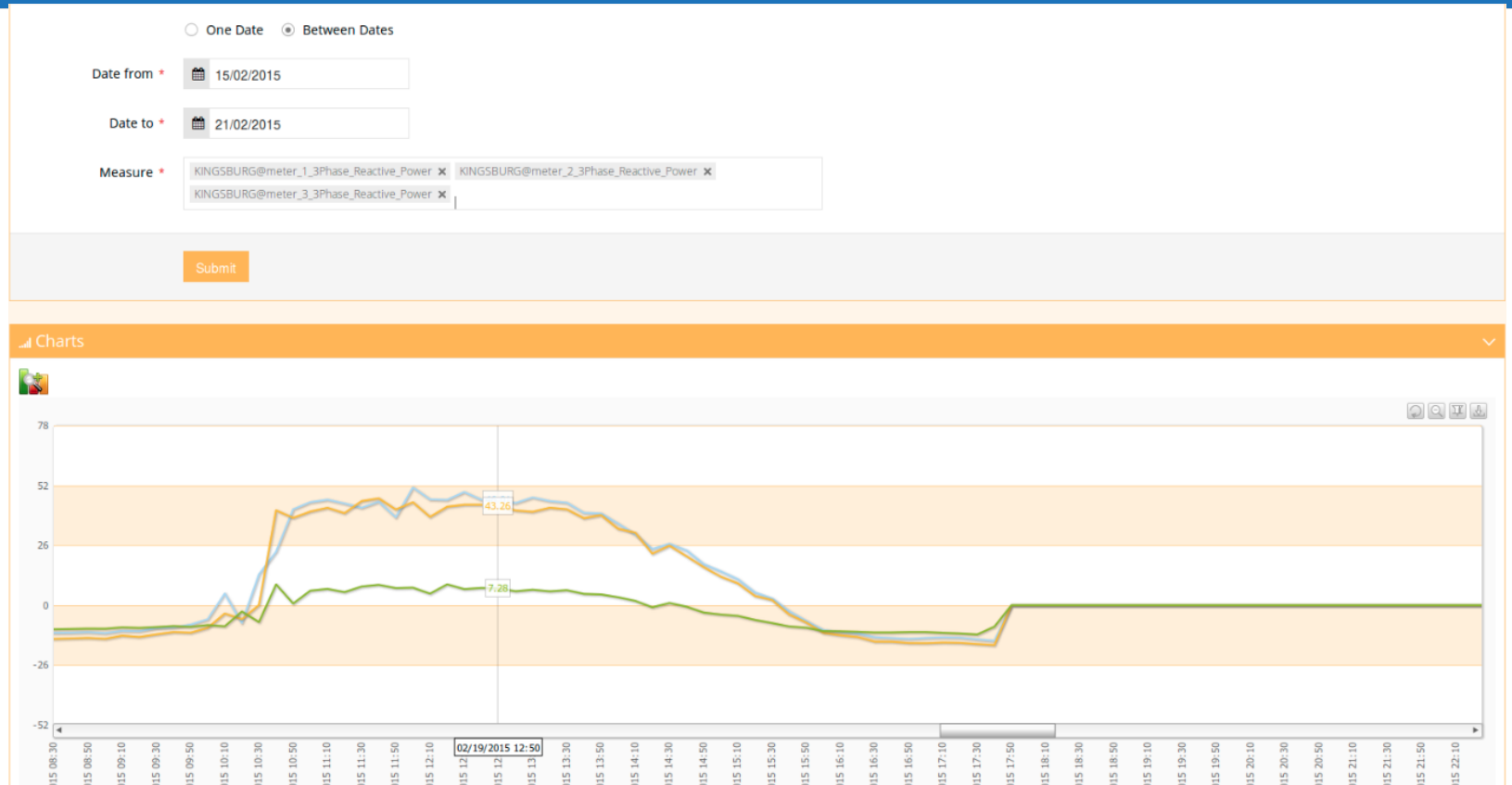


Gráficas configurables: Zoom





Gráficas configurables: Zoom



Descargas configurables

- El usuario podrá descargues los datos de cualquier dispositivo que se encuentre en el parque
- Los datos descargados tendrán medidas cada 15 minutos
- Por ejemplo: El usuario podrá descargarse en un excel los datos de un estación meteorológica del parque A, un contador del parque B y un inversor del parque C

Descargas configurables

Customizable downloads

Home > Customizable downloads

Historical

Date from * 15/02/2015

Date to * 21/02/2015

Measure * KINGSBURG METER KINGSBURG 1 × PORTERVILLE METER PORTERVILLE 1 ×

Submit

Charts

Download Report Total

Puntos de medidas: Vista en árbol

- Pantalla donde se pueden ver los datos en tiempo real de un parque
- Además también se pueden incluir los puntos de medida que el usuario se defina
- Cada dato se actualiza en tiempo real cada 2 segundos

Puntos de medidas: Vista en árbol

O & M

Home > O & M > DataPoints Manager >

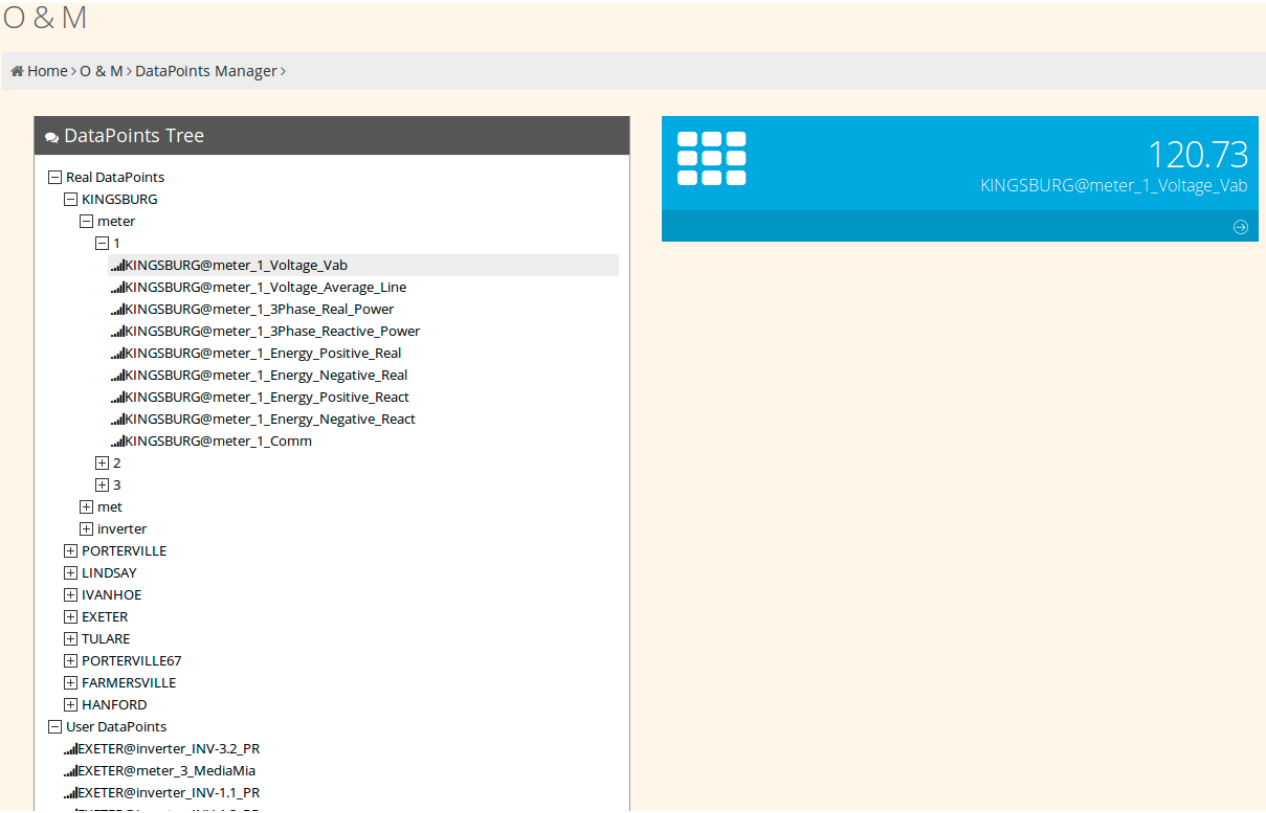
DataPoints Tree

- Real DataPoints
  - KINGSBURG
    - meter
    - met
    - inverter
  - PORTERVILLE
  - LINDSAY
  - IVANHOE
  - EXETER
  - TULARE
  - PORTERVILLE67
  - FARMERSVILLE
  - HANFORD
- User DataPoints
  - EXETER@inverter_INV-3.2_PR
  - EXETER@meter_3_MediaMia
  - EXETER@inverter_INV-1.1_PR
  - EXETER@inverter_INV-1.2_PR
  - EXETER@inverter_INV-2.1_PR
  - EXETER@inverter_INV-2.2_PR
  - EXETER@inverter_INV-3.1_PR
  - EXETER@inverter_INV-3.3_PR
  - PORTERVILLE@inverter_INV-1.1_PR

88

EXETER@inverter_INV-3.2_PR

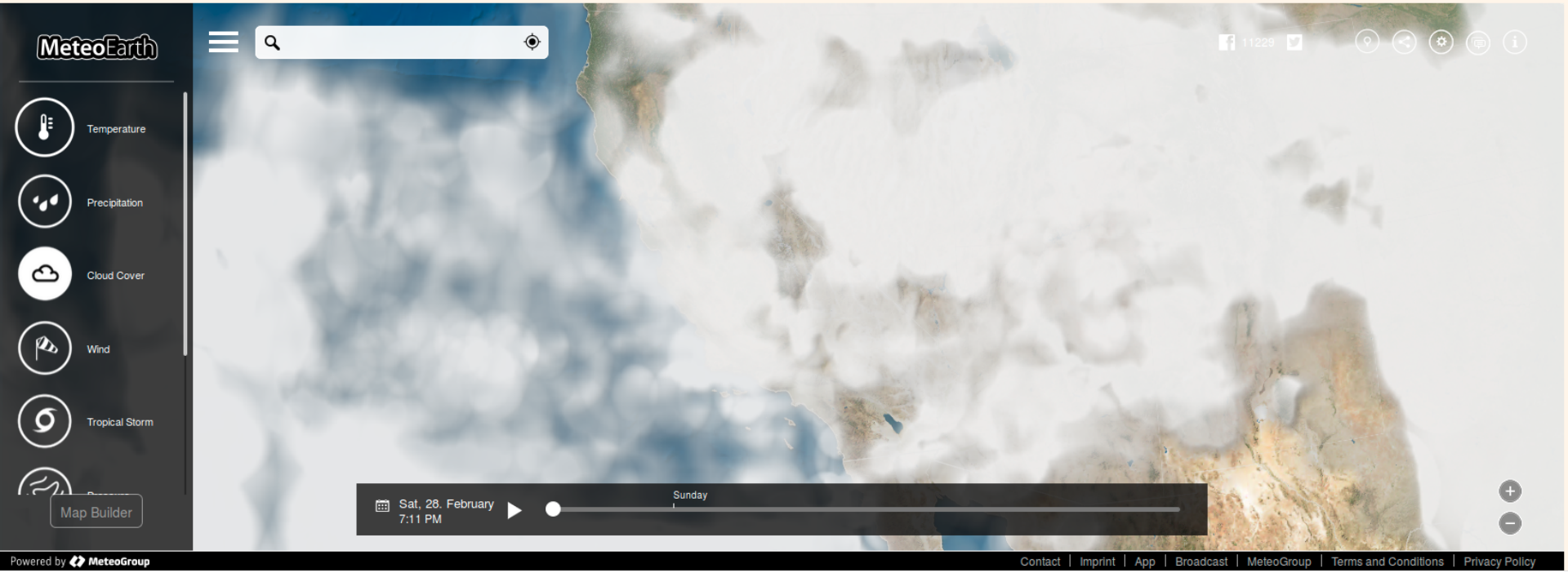
Puntos de medidas: Vista en árbol



Condiciones Meteorológicas: Real y pronóstico

- El usuario puede ver las condiciones meteorológicas de cada parque
- Además se puede ver las condiciones meteorológicas de los próximos dos días.
- Varias medidas: Precipitaciones, Nubosidad, Viento, Tormentas y Temperatura.

Condiciones Meteorológicas: Real y pronóstico



Documentos en la nube

- Permite subir y almacenar documentos de un proyecto
- Edición colaborativa
- Galería
- Calendarios
- Versionado y recuperación de borrado de documentos
- Edición y visualización de múltiples formatos (DOC, PDF ....)

Documentos en la nube

imMODO solar KINGSBURG

Summary SolarFarm Rooftops User: admin Logout

Files ▾ admin ▾

All files

Shared with you

Shared with others

Shared by link

New

Name ▲		Size	Modified
EXETER	Shared	78 MB	22 days ago
FARMERSVILLE	Shared	61.9 MB	22 days ago
HANFORD	Shared	31.3 MB	22 days ago
IVANHOE	Shared	112.6 MB	22 days ago
KINGSBURG	Shared	116 MB	22 days ago
LINDSAY	Shared	23.1 MB	22 days ago
PORTERVILLE	Shared	78.1 MB	22 days ago
PORTERVILLE67	Shared	37.9 MB	22 days ago
TULARE	Shared	40.1 MB	22 days ago
9 folders		579.1 MB	

Documentos en la nube

imMODO solar KINGSBURG

Summary SolarFarm Rooftops User: admin Logout

Files ▾ admin ▾

All files
Shared with you
Shared with others
Shared by link
Deleted files

EXETER > Exeter 1 New

Name	Size	Modified
C.1_CIVIL PLAN_20140328.dwg	175 kB	22 days ago
E.1.0 ELECTRICAL NOTES_20140328.dwg	123 kB	22 days ago
E.2.0 LOCATION PLAN_20140328.dwg	473 kB	22 days ago
E.3.0 GENERAL LAYOUT EXETER_20140328.dwg	447 kB	22 days ago
E.3.1 SPECIFICATIONS SHEETS_20140328.dwg	2.6 MB	22 days ago
E.4.0 DC SITE PLAN_20140328.dwg	445 kB	22 days ago
E.5.0 DC SITE ELECTRICAL LAYOUT_20140328.dwg	498 kB	22 days ago
E.6.0 AC SITE PLAN_20140328.dwg	451 kB	22 days ago
E.7.0 SITE TRENCHING LAYOUT_20140328.dwg	938 kB	22 days ago
E.7.1 TRENCHING LAYOUT DETAILS_20140328.dwg	207 kB	22 days ago
E.8.0 SITE GROUNDING LAYOUT_20140328.dwg	1.4 MB	22 days ago
E.8.1 PAD GROUNDING DETAILS_20140328.dwg	547 kB	22 days ago

Otras funcionalidades

- Informes diarios, mensuales y anuales
- Gestión de Stock
- Seguridad
- y muchas más características de O&M

Reportes PR

- Energía, PR y radiación seleccionados

DATE	HOUR	PR (%)	Energy (kWh)	Rdx (w/m2)	rdx(wh/m2)
01/02/2014	07:00	0	0	0	0
01/02/2014	07:15	0	20	0	0
01/02/2014	07:30	88,74	71	17,7475	70,99
01/02/2014	07:45	95,01	135	31,52	126,08
01/02/2014	08:00	100	234	48,32	193,28
01/02/2014	08:15	98,04	307	69,4625	277,85
01/02/2014	08:30	96,84	373	85,44	341,76
01/02/2014	08:45	97,67	442	100,3825	401,53
01/02/2014	09:00	95,59	497	115,34	461,36
01/02/2014	09:15	95,83	558	129,16	516,64
01/02/2014	09:30	93,79	605	143,0925	572,37
01/02/2014	09:45	91,6	645	156,1925	624,77
01/02/2014	10:15	92,29	700	168,255	673,02
01/02/2014	10:30	92,74	748	178,9175	715,67
01/02/2014	10:45	88,8	756	188,855	755,42
01/02/2014	11:00	89,8	798	197,1225	788,49
01/02/2014	11:15	89,14	821	204,3125	817,25
01/02/2014	11:30	88,02	835	210,4275	841,71
01/02/2014	11:45	87,24	846	215,1175	860,47
01/02/2014	12:00	85,01	836	218,1575	872,63
01/02/2014	12:15	85,04	846	220,68	882,72
01/02/2014	12:30	84,41	846	222,3275	889,31
01/02/2014	12:45	83,5	837	222,3575	889,43
01/02/2014	13:00	82,52	820	220,425	881,7
01/02/2014	13:15	83,26	816	217,4075	869,63
01/02/2014	13:30	82,77	796	213,3375	853,35
01/02/2014	13:45	81,99	765	206,965	827,86
01/02/2014	14:00	82,81	750	200,91	803,64
01/02/2014	14:15	81,94	713	193,015	772,06
01/02/2014	14:30	79,96	664	184,215	736,86
01/02/2014	14:45	81,17	631	172,4475	689,79
01/02/2014	15:00	81,56	600	163,1875	652,75
01/02/2014	15:15	79,91	547	151,85	607,4
01/02/2014	15:30	78,89	492	138,3425	553,37
01/02/2014	15:45	75,43	426	125,2725	501,09
01/02/2014	16:00	74,99	368	108,8625	435,45
01/02/2014	16:15	69,85	294	93,3675	373,47
01/02/2014	16:30	63,61	219	76,3775	305,51
01/02/2014	16:45	46,28	128	61,3475	245,39
01/02/2014	17:00	30,96	64	45,855	183,42
01/02/2014	17:15	17,38	22	28,0875	112,35
01/02/2014	17:30	11,28	6	11,795	47,18
01/02/2014	17:45	0	0	0	0
01/02/2014	18:00	0	0	0	0

Reportes diarios

- Enviados automáticamente al correo

1. Summary of Solarplants. (02/28/2015)

SolarPlant	Energy (kWh)	Radiation (wm2)	PR(%)	Peak Power (kW)
EXETER	17215.0	5082.37	**81.04**	4193.0
FARMERSVILLE	18157.0	3940.81	**85.89**	5389.35
HANFORD	13727.0	4515.64	**85.39**	3599.0
IVANHOE	13549.0	3856.26	**84.65**	4196.5
KINGSBURG	17731.0	4944.73	**80.63**	4508.0
LINDSAY	19801.0	5060.92	**81.99**	4795.0
PORTERVILLE	16818.0	4924.27	**82.19**	4179.0
PORTERVILLE67	13581.0	4641.36	**81.82**	3599.0
TULARE	13076.0	4300.41	**85.54**	3587.2

Seguridad

Security View

Home > Security View >

Camera Controls

Zoom in Zoom out

IrLed on

IrLed off

Main View