USER MANUAL

CUSTOMIZABLE LOGIN MASK

CONTENTS

Rif. 081_ma Doc. PT/08-51 Rev. 0 Del: 20/06/2016	Realizzato da: L. Gramegna - D. Aquiletta	Approvato da: M. Bianchi

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Introduction

"Energy Sentinel WEB" is a powerful software which allows you to program, manage and monitor a plant in which are installed power generation and energy management systems, cost centers, which may include different fields as: solar energy and photo-voltaic; methane; water; steam; temperature and any form of energy.

The purpose of ES-WEB is to manage energy consumptions and productions, divide into "cost centers" the different energy sources in the "macro-areas", define the energy cost per unit of product, alert the user to any consumption considered "abnormal", create reports (sometimes custom) and also send them automatically through E-Mail. These are just some of the functions that ES-WEB is able to perform.

By using any Browser, ES-WEB becomes a powerful tool to the user's service, with only purpose to provide all that is useful to optimize its energy needs, thus saving production costs.

This is a multi-user system; permission management doesn't have limits in the use and the purpose of this manual is to lead the user to set all functions, even a not-specialist user, for which it isn't required the knowledge of technical parameters or electronic parts.

IMPORTANT NOTE:
Software "Energy Sentinel WEB" is installed on a "concentrator" to which are also connected other modules (for example: X-Meter, and other). The concentrator acquires and stores data sent by these modules, for this reason the user has to let it turned ON always, 24 hours/24. In order to get an useful displaying of the stored data and the online measurements, a Web interface is displayed.

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Software and computer features

Before showing the detailed use of " Energy Sentinel WEB " software, let's introduce the main features of the system, describing in this paragraph the general aspects, in order to get them knowable also for a not-expert user, skipping the constructive part about electrical connections and particulars of the software. This part is described on the installer's manual.

An important thing to remember: this software can't be installed into a normal PC, it's only in the EBox module. This is an industrial computer, both for the aspect and for internal components, portable and easily installable, only the power supply is separate by UPS module. On a side of it, you can easily recognize all the interfaces of a normal computer, such as: Serial Ports (COM) RS232; USB Port; PS/3 Port (for connecting a mouse or a keyboard with a dated terminal); outlet for connecting a monitor; intake for electrical network; start button; Wi-Fi. A type of configuration may be the following:

– By means of the data outlet, it's possible to connect EBox to a switch module or router which also receives signals and connections from other PC, as firm's network. The software of EBox can be examined by means of Web page, typing in the relative URL bar the numerical network address of the EBox (Clearly after setting the right network parameters, but this job is carried out by the system administrator).

– The USB/485(XM2) converter is connected to USB outlet. By means of this configuration is possible communicating, for instance, with an X-Meter connected to a photovoltaic plant or with an Inverter or an electrical switchboard (connected to some panels); all these components must be equipped by serial output.

Start of "Energy Sentinel WEB" and main screen

Open a Web page and key into "http" bar the **numerical address**, then press **ENTER.** The following login screen will be displayed and **User Name** and **Password** will be asked. It's also possible to change the parameters and to choose the menu language.

Once logged, a new menu is displayed, by means of which it's possible to get the access to another submenu. On the main toolbar you can recognize three items. By clicking on each of them, a drop down menu is displayed where is possible selecting the interested function or getting the access to a submenu. Exactly:

Real time: It displays different options such as: possibility to see in real time the variation of the parameters detected on the plant (power, energy, etc); the "pie chart" on the real time values, the operating status of the plant and the panels.

Historical data: It includes all the functions for analyzing and displaying the stored data, for example: it's possible to display all data stored, Alarms, LOG recorded by the equipment; Harmonics analysis, etc.

Manage: It includes all the functions for programming and setting all configurations of the plant, such as: Equipment configuration; Alarm setting; System setting; Access management; Scheduled activities; etc. For this menu, we refer to Installer Manual.

Let's describe the icons shown at the top right of the toolbar:

: To exit from the software and return to main login screen.

: To duplicate the session, it opens another page in which the screens can be displayed. By means of this button, it's possible to use simultaneously different screens.

: To open a screen displaying all active connections (this function is typically used to manage the connection to GSM numbers).

: To display the full-screen view.

: To display all equipment and IP addresses which don't answer to Server.
N.B. This Icon can be visible if you have enabled the display in the user's preferences, within the menu Management.

: To view all alarms currently present. On the panel displayed, by clicking on "View log alarms", it's possible to get the access to a historical archive showing all errors and alarms occurred.

N.B. This icon can be visible if you enabled the display in the user preferences within the menu Management.

The voices just commented, in addition to appear on the toolbar with the respective drop-down menu, are also displayed as icons on the main screen. By clicking on these icons, it's always possible to get the access to same menu, also represented by large icons and more detailed symbols. Everything for your convenience:
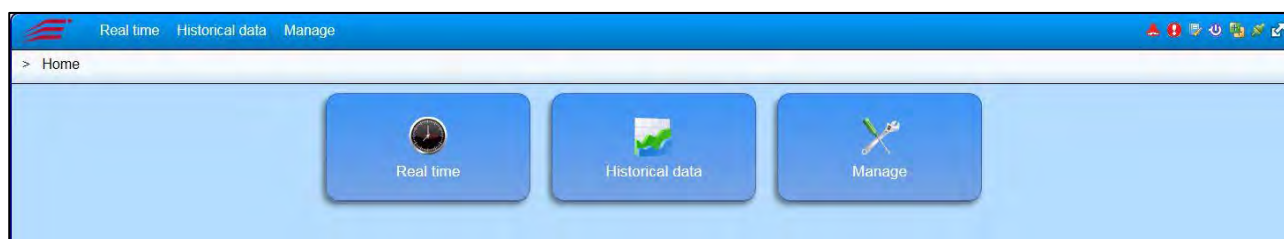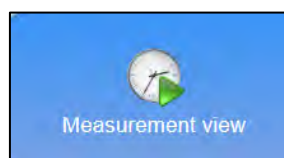

1   "Real Time" menu

Thanks to this menu, you can display all instantaneous measurement performed by the Server, when it contacts cyclically the devices. Now we go into detail and explain in the best possible way all the menu relative:

1.1 View Measurement
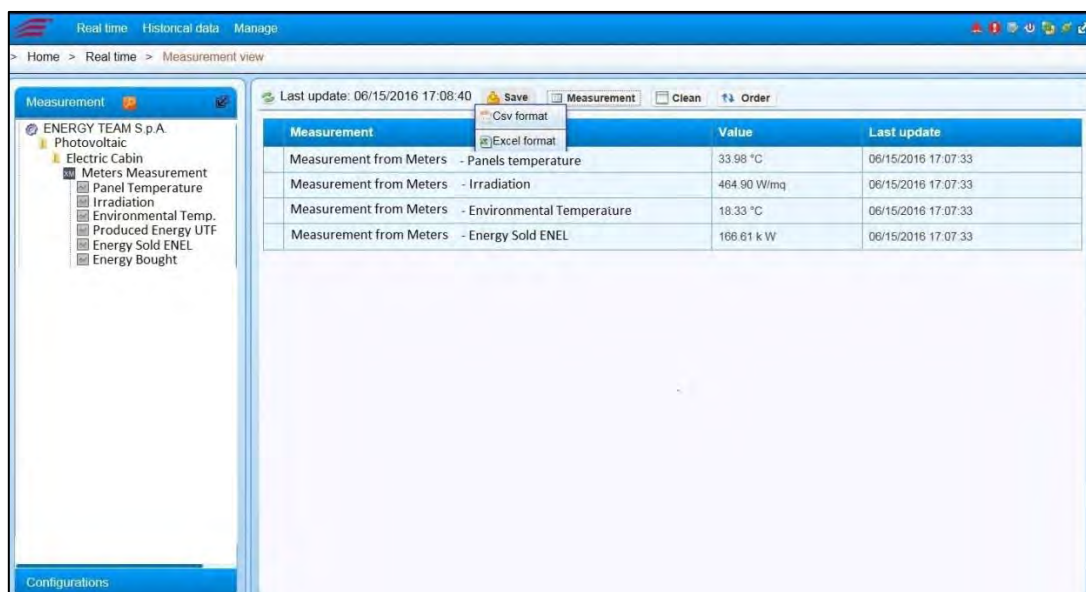
From **Real Time** menu, by selecting **View Measurements**, the "tree structure" of the plant is displayed on the left side. Then, it's possible to expand the "tree" by means of 1 Click and display the content. Instead, by means of a double click, it's possible to select the measurement to display on the right side of the monitor. From this menu, it's possible to select the channels ⊡; mathematical modules ⬤; link 🔗; External values peripheral 🔴; Day Shift ⏩. When the user has selected the peripherals he want to see, a screen like this will be displayed:
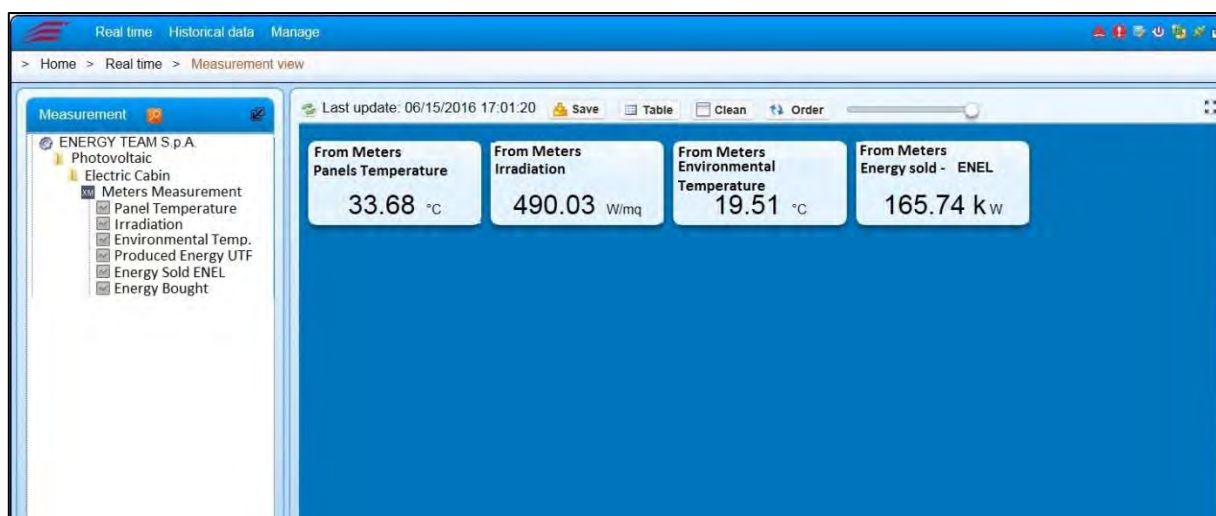
As shown, the user can create a synoptic as he wishes, then save it (and recall it) from setting menu. By means of Alarm managing mechanism, the Server is able to inform the user if a measure is in the alarm state. Furthermore, it's possible to give some commands, then pilot the output of an X-Meter or another device.

Furthermore, it's possible to give the commands, then drive an X-Meter's output; the same thing is also valid for another device. Obviously, if an user logs, he must be enables as "Operator", otherwise the command will not be executed by the server. For example: the user "Guest" who holds only the "viewer" permission, won't be able to send the command (he only can display the output state).

By clicking on ⊞ **Table** , it's possible to display all the values in a table-format and export this Table in .csv or .xls format by selecting the menu "**Save**", see the example below:

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NOTE:

It's possible select simultaneously more channels, also belonging to different devices and multiple modes of communication. For each selection, the respective label will be displayed next to the others. It's also possible to clear a channel, by clicking twice on the respective item. If the value is displayed in red colour, the date is "older" than 5 minutes. The update times depend by the query times set into Polling in the Setup menu. For this last part, we refer to specific "polling" menu.

In the bottom of the "tree structure" is a button called "Configurations".

The user can save the settings, so as not to expand the "tree structure" when he decides to select the various channels usually viewed. To access into this menu, select the item "Configurations" on the left bottom. The user can create freely his own structure for the configurations. Thanks to this function it's possible to speed extremely the data analyzed and, eventually, save them in an Excel or "csv" file.

1.2 Device View

In this menu it's possible to select exclusively the "Devices" (example: XM, W̄ₑ, RWU) and all the channels read by the device are proposed. To access this menu, select **Real time** and click on **Device View**. In the following example, the user selected the peripheral "**CED**":
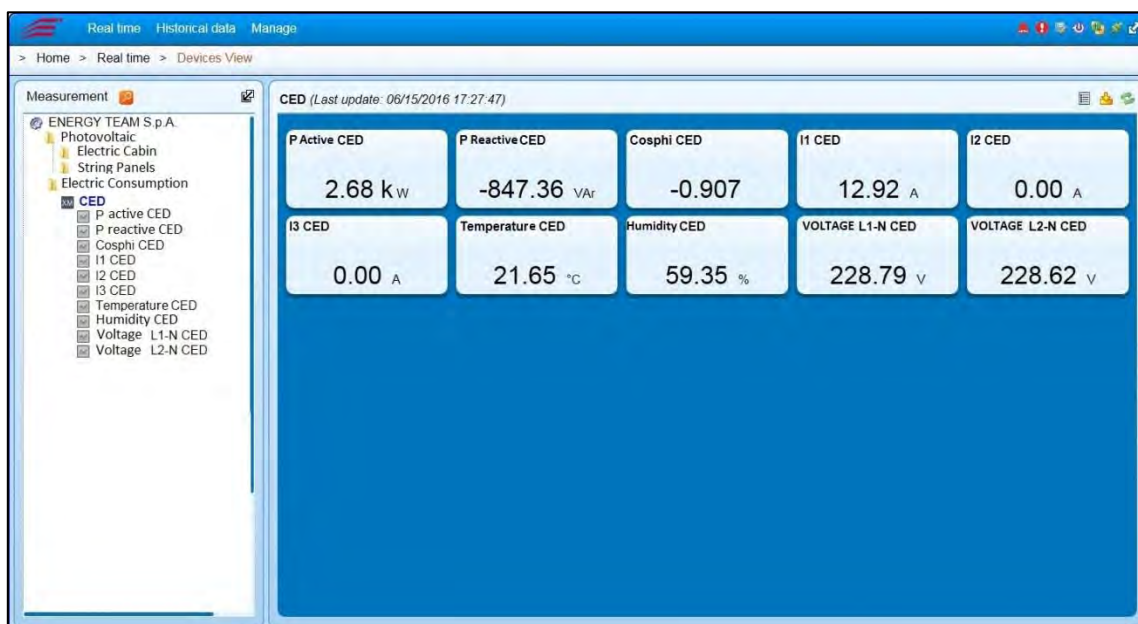
This function is very useful to monitor data trend in real-time (instantaneous power, values, temperatures, etc.) occurring during the communication between the Server and the equipment connected to it through serial modules "XM2", "Nport MOXA", network boards, etc. Obviously,   the infrastructure of existing Company's network, can be used.

On the left side, below the item "Measurement", is displayed the tree structure just illustrated. This is explained in detail at the next paragraph. In order to make some variations in this structure and create other groups, you must access to "**Configuration equipment**" menu, you must enter the "**Configuration equipment**" menu, which functions are detailed explained afterwards.

Data are updated according to times set in "polling", as in the preview menu. Instead, if a polling isn't enabled or isn't present, you can start some manual connections. Therefore, it's possible to start a manual connection to a GSM device.

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These functions can also be activated by using the icons on the right of the toolbar:

If the selected equipment is connected to a BUS (direct serial or LAN), the server starts automatically the communication. The user can decide freely to stop or start the polling.

If the device selected is connected to an END-POINT (may be GSM, LAN or direct Serial), the communication is disabled as default. Only, if the user has the permissions as "Operator", he can enable a manual connection to the device and share this connection with other users. Once enabled the connection, a POP-UP is open (it's also possible to recall it through the key

, to eventually end the connection). In the absence of this POP-UP, the server ends the connection after one minute. So that the connection remains active, it's necessary to keep this window open.

Save: To download a screenshot in "png" format.

Update values: To update the displayed values, with every click.

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1.3 Pie Chart
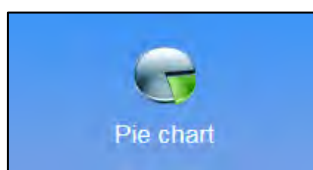
Pie chart

It 'a menu very similar to the "**View Measurements**", but the data are displayed as a "pie chart". To access into this menu, click on **Real Time** and select **Pie Chart**. Then, in the field "Measurement", select again the channels interested.
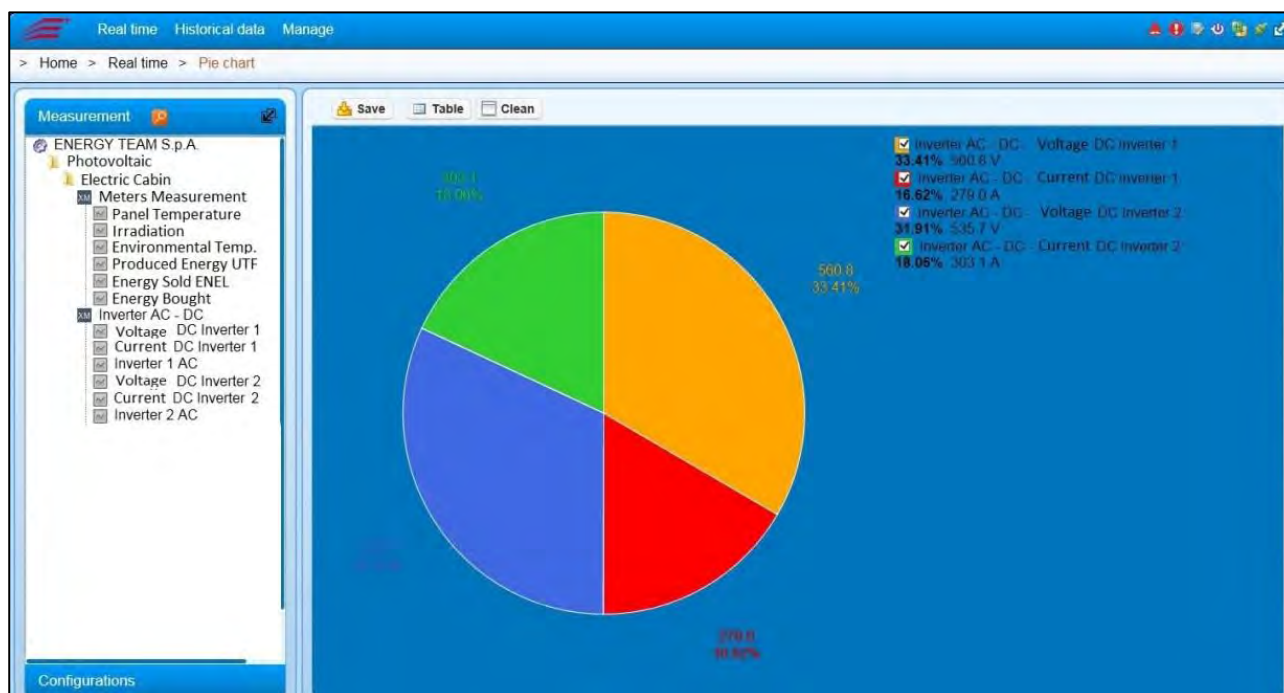
This graphical representation is useful when, for example, the user wants to view Cost Centre consumption trends. At each section, in different colours, are visible the values of the interested sizes, both quantities and percentage of total.

These values are also displayed in a frame by placing the mouse cursor on the interested area.
Let's explain the functions of the buttons on the screen:

Table: To switch from the diagram to numeric values in a table, and vice versa.

Save: To save the configuration created as a "png" file.

Clean: To clear the chart displayed on the screen.

At the bottom side of the tree-structure, there's the "Configurations" button.
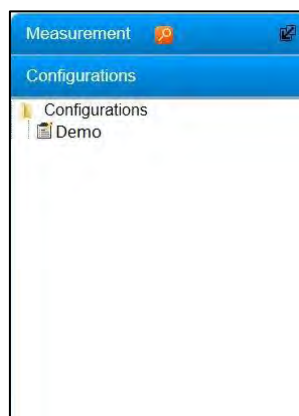
The user can save the settings, so as not to expand the "tree structure" when he decides to select the various channels usually viewed. To access into this menu, select the item "Configurations" on the left bottom. The user can create freely his own structure for the configurations. Thanks to this function it's possible to speed extremely the data analyzed and, eventually, save them in an Excel or "csv" file.

1.4 Plant viewing (for photovoltaic plants)
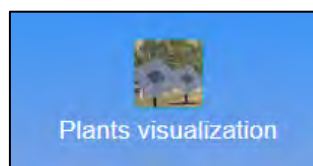
Thanks to this function it's possible to inform the user about the good working of a photovoltaic plant. In this page, the user can know if there's an active alarm connected to the photovoltaic system selected.

From the top toolbar, click on **Real Time** and select **Plant viewing**.

From the "tree menu", it's possible to select the plant and, afterwards, (if it's present) the sub-fields. Then, it's possible to select the Inverters and the parallel switchboards, until to the string. This representation is obviously settable and must correspond to the same electrical connections of the photovoltaic plant to be monitored. The sub-field "identifies" the solar exposure. If a plant has more exposures, each exposure must contain the related sub-field.

Click twice on the example "Demo Fiera KWp 380". Next to the tree-structure, you can see the Total Power produced by the plant, included the Power sold and bought:
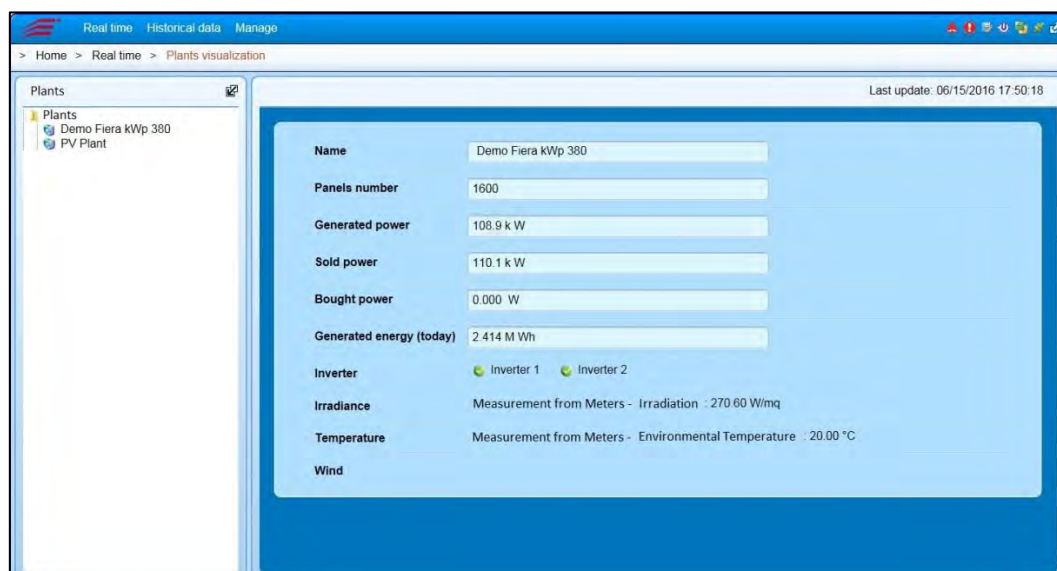
This section of the plant includes 2 Inverters and, each of them, connects some strings. You can see the total power produced by this section.

For example: by clicking twice the label referred to Inverter 2 (Inverter 1.2) you can see the total power produced by the string system connected to this switchboard, with other parameters, in addition to working state of the strings.

NOTE:
During the switchboard and string monitoring, when "Energy Sentinel WEB" detects an anomaly in the measured sizes, alerts through an Alarm which symbol is in <u>red color</u> and is displayed next to the string or the Inverter, with an error message. It's also possible to silence it by means of the button on the right. If eventually the alarm ceases, the message will disappear automatically. The alarm state is stored into the menu "Alarm history". Why is activated or not the alarm, it all depends by the configuration created in the "Configuring Alarms" menu and its Customization.

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2 "Historical data" Menu

By means of this menu it's possible to access to all historical data stored in the server. The image below shows all the menu in the system. Some of these functions are available for specific applications as Photovoltaic.
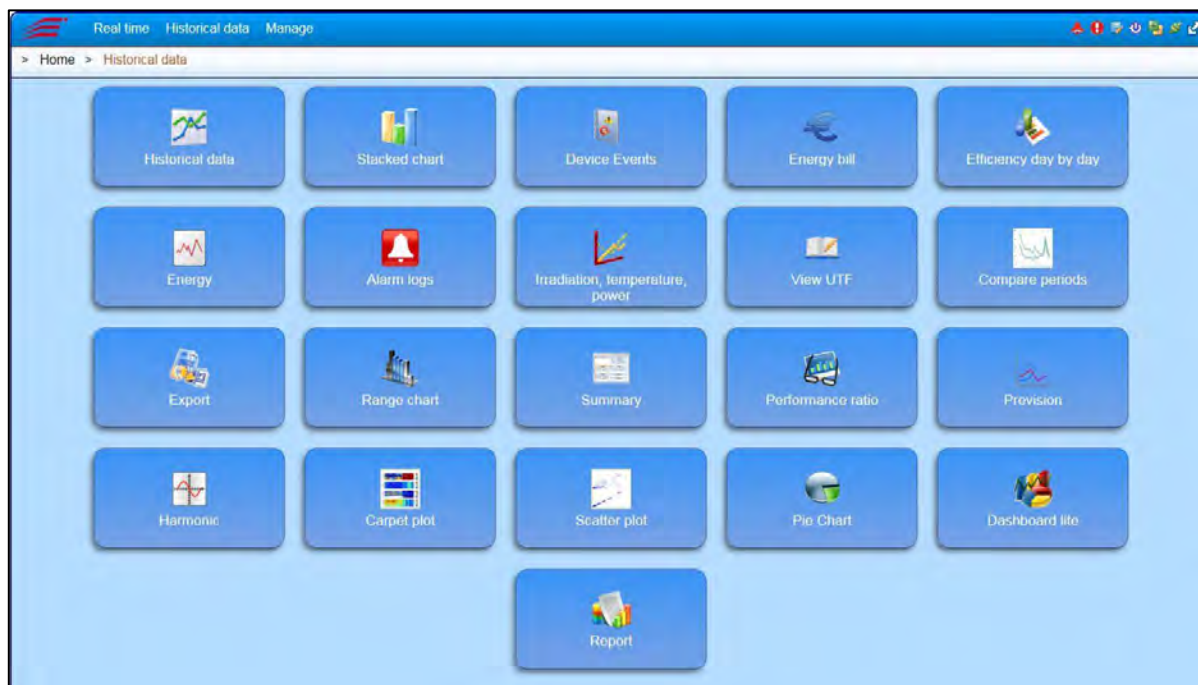
2.1 Historical data
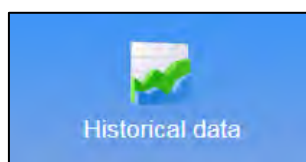
On the top toolbar, click on **Historical data** and select the same item (**Historical data**) from the drop down menu. From the "tree menu", by using the same procedure, select progressively the groups, until to the interested one. From this menu, it's possible to select: channels ⬜; mathematical modules; 🔵 links 🔗; Peripheral devices and external values 🔴. This functions allows you to examine all the archives of stored data about the sizes monitored in all the channels. By selecting the interested size, next to it will be displayed the diagram showing the trend with the time. Then, by setting "**Enable multiple values**", it is possible to make visible simultaneously diagrams of all the selected variables. The user has four vertical axes, then he can assign up to 4 magnitudes of different order among them.

Clearly, if you select the same axis for different sizes, the system adjusts the scale according to the size by taking the minimum and maximum values. It's possible to see automatically the value of the sizes in every moment by placing the cursor on an interested point of the function. It's also possible to clear a function by clicking twice on the respective item below the label "Enable multiple values". The example below shows a multiple chart where these sizes are inserted:

- 1st left axis: electrical measurement in a compressor room.
- 1st right axis: the measurement of the air flow produced by the compressor room.
- 2nd left axis, the mathematical module which calculates the efficiency, that is the number of **Wh** necessaries to produce n° 1 **Nmc** of air.
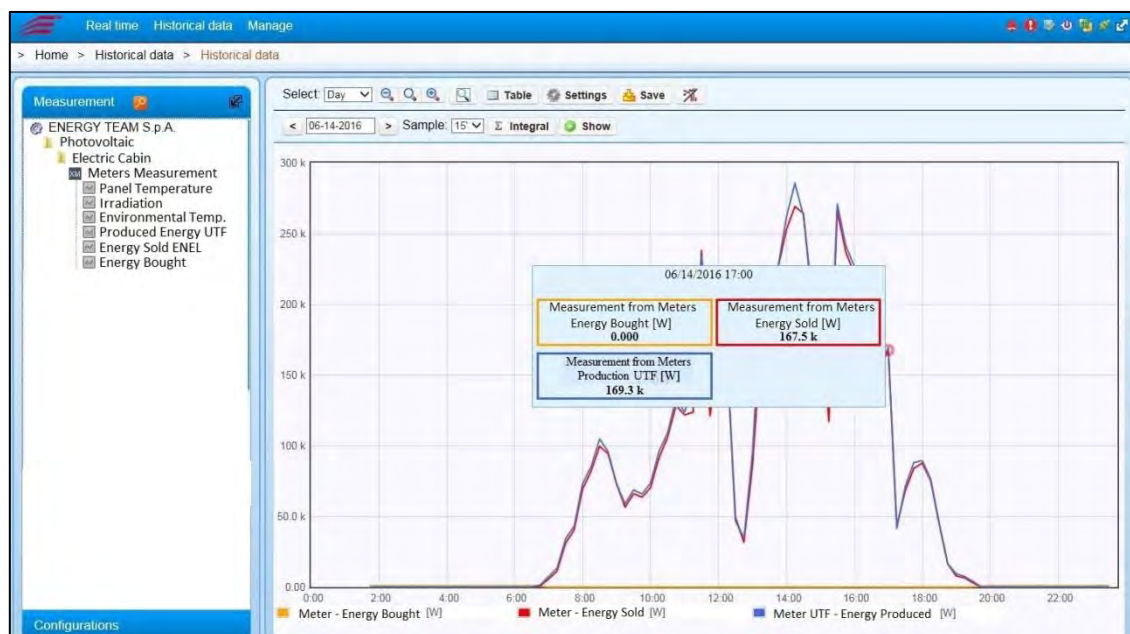
In this example, the user can understand how a compressor room is more efficient when working towards 100%. In the menu located above the graphs we have the possibility to select different display modes depending by the time we want. We see each function:

Select:

From the respective drop-down menu, you can select different modalities to display the trend of the function, according to chosen time period. The default modality is always "Day" and it is referred to the archive of the previous day. The other modalities are: "Week"; "Month"; "Year"; "Years"; "Free". For those modalities whose duration is greater than the day, it's possible to select the start date or the reference month, or the start and end date.
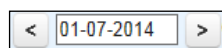
 With the "Select" menu set on "Day", you can select the values concerning the interested day by using the two lateral arrows. This field varies according to drop-down menu in "Select": for example, by selecting "Week", two fields will be displayed, respectively indicated by "From" and "To", for setting the week time. Instead, by selecting "Month", will be displayed the option about the choice of the interested year and month.

Samples: By means of the drop-down menu, it's possible to set different data distributions. According to interval selected, the following combinations are available:
Day: 1 minute; 15 minutes; 60 minutes.
Week: 15 minutes; 60 minutes; Day.
Month: 15 minutes; 60 minutes; Day; Week.
Year: Day; Week; Month.
Years: Month; Year.
Free: 15 minutes; 60 minutes; Day; Week.
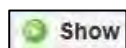
: To display the selected data distribution in the form of the diagram.
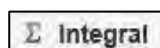
: (**Power/Energy** or **Flow/Volume**): To display alternately two charts within the selected interval: the Power in function of time; the Energy.

 (**Zoom -**) ; (**Zoom +**): With these buttons you can increase or restrict the zoom of the chart. Furthermore, by placing the mouse cursor at the center and holding the left mouse button, you can scroll to the right or left the same.

 (**100%**): After making several zoom of the function (for example: by pressing many times Zoom+ to display a more detailed trend and displaying on the abscissa intervals increasingly smaller), click on this button to return to main screen.
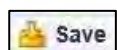
 (**Active Zoom Area**): To enlarge the function within a determined range of area. After clicking on this button, place the mouse arrow on a point of the chart and, holding the left mouse button, drag the pointer until to enclose into the area the interested part of the function. Then, release the mouse button to see the part of function enlarged.
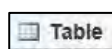
: To display alternately the chart and the table of numeric values, and vice-versa. The table shows, for each selected channel, the minimum, the average and the maximum value. In addition, if the unit of measure is "integrable", will be calculated the integral within the time interval. In the remaining part of the table, for each single aggregation selected, is shown the respective value.
The example below shows the data displayed as a table format and the procedure to save them as "csv" or "xls" format:
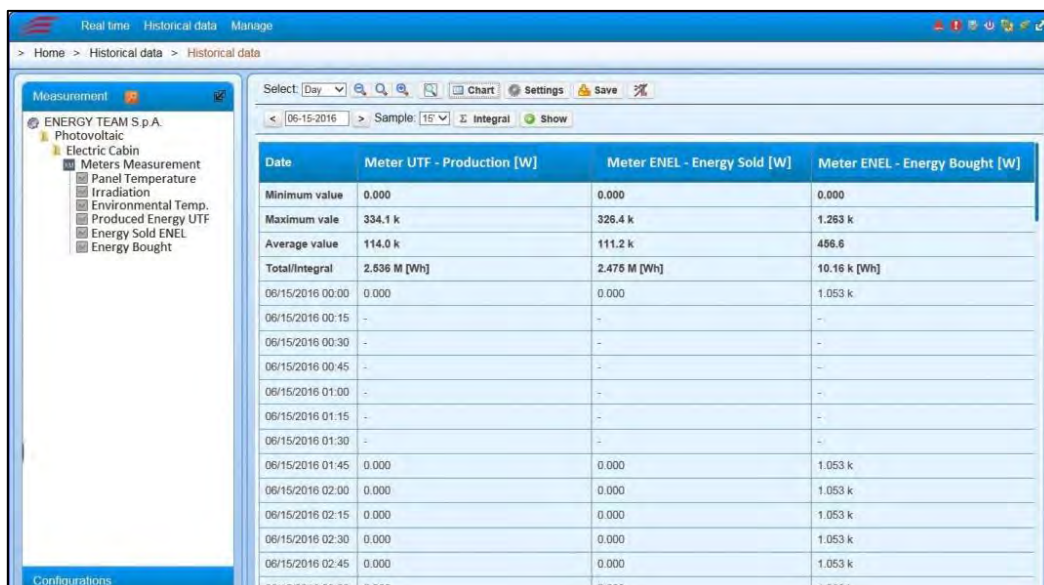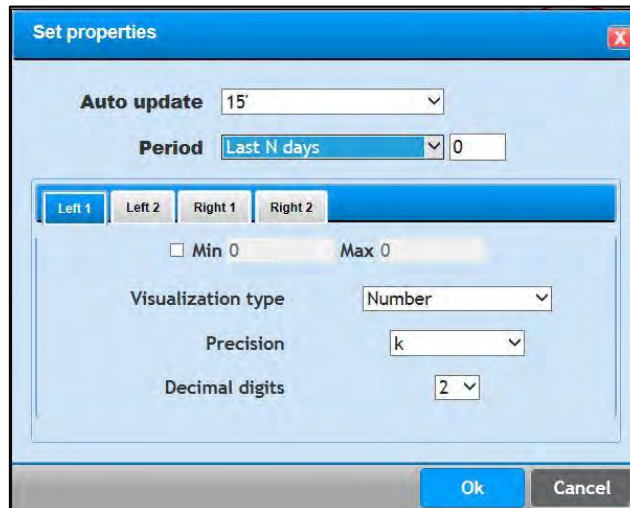
Save: Click this button to save the displayed chart as a "png" image-file. If the table is displayed you can export it (see preview example).

(**Bar graph/Line**): To change the graph display, representing it as a line or as a histogram.

Settings: To configure the properties of the grap and/or the table. A panel is displayed, with the following fields:
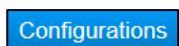
Automatic update:

If you want to update manually the measured sizes, select "Never", otherwise "15' " to refresh automatically every quarter of hour. If the browser updates automatically the graph, you can select the update interval among these options: "**Steady**"; "**Current day**"; "**Last N days**"; "**Current month**".
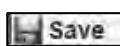
Below, 4 "TAB" are displayed and, for each vertical axis, you can decide eventually to "force" the minimum and the maximum values.

It's also possible choosing a graph and a table display different from the default. In fact, in the default view, all values are represented as 4 floating point digits and the system adds the suffix "K, M, etc." depending by the measured size.

Once this configuration is completed, Click on "Ok" to save the setting or "Clear" to exit without saving. You can save your configurations, so as to allow a quick consultation without having to select each time the channels of the tree-structure and without having to configure the display modes in the "Setup menu".

Once you have created your configuration, press the button "**Configurations**" on the left bottom side.

Configurations : To access into menu. Press the button "**Save**" on the left bottom side.

Save : To insert the name and save within the tree-structure some configurations.

Select the configuration with a double click, then press the button "**Manage**".

Manage : The user can decide if:

- Clear the configuration *(there's a difference between "**Remove from the tree**" and "**Remove permanently**" because, in the first case, the configuration is cleared only for the user who received the permission to access, Instead the second option clears the configuration eventually shared with other users).*
- Move the configuration to another folder.
- Share his configuration with another user, assigning some permissions (when the user decides to share a configuration with another user, it's necessary to assign some permissions in **Reading**, **Sharing**, **Modifying**, **Clearing**).
- Manage eventual permission assigned to other users.

2.2 Compare periods
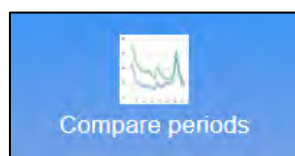
The purpose of this module is to compare the consumption/production of a plant (hence the same channel) in 2 different time intervals.

To access to this function, select from the top toolbar **Historical Data** the item "**Compare periods**". The working of this module is completely similar to that previously described, only that in the upper menu the following screen is displayed:

From this menu, the user can select a time interval of analysis, precisely: day; week; month; year; years; free, then compare the values, until two intervals. In the example above shown, the user wants to compare 2 different days with aggregation 1/4 hourly from ENEL meter, concerning the energy bought. The final result will be:

The user can move with the mouse in the area of the graph and, when the pointer is located next a line, is automatically displayed the "tooltip" with the measurement on the 1/4 hour (in this example the quarter of hour is from 9.45 to 10.00) in the T1 and T2 time intervals. Is also displayed the difference in percentage (in this example: during this time interval, the absorption in T2 is 55,17% higher than T1) and the numeric difference obtained by making T2-T1 is -72 kW.

If selecting "Display T2/T1", the system displays on the graph only the relationship between the two curves. The example below shows the same quarter of hour:

As shown in this example, the tooltip reports the same data of the previous screen. If the user selects the table, will be displayed all data contained in the selected aggregation/intervals and it's possible to save the table in "csv" or "xls" format. See the example below:

As in the previous module, you can use the Zoom + or – buttons, select zoom and area. You can also set any automatic update and fix the minimum and maximum values for full-scale.

It's also possible to enable multiple channels. The procedure to save the configurations is the same described in the preview paragraph.

You can save your configurations, so as to allow a quick consultation without having to select each time the channels of the tree-structure and without having to configure the display modes in the "Setup menu"

Once you have created your configuration, press the button "**Configurations**" on the left bottom side.

Configurations : To access to menù. On the bottom side in the right, press "**Save**", then digit the name to be saved into tree structure of the configurations.
Select the configuration with a double click, then click the button "**Manage**".

Manage : The user can decide if:

- Clear the configuration *(there's a difference between "**Remove from the tree**" and "**Remove permanently**" because, in the first case, the configuration is cleared only for the user who received the permission to access, Instead the second option clears the configuration eventually shared with other users).*
- Move the configuration to another folder.
- Share his configuration with another user, assigning some permissions (when the user decides to share a configuration with another user, it's necessary to assign some permissions in **Reading**, **Sharing**, **Modifying**, **Clearing**).
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2.3 Stacked chart

One of the purposes of this module, is to split for cost centers the trend of the total electric consumption.
In the top toolbar, click on **Historical Data** and select **Stacked Chart**.
All modalities of selection and the functions on the menu, are the same described in the preview paragraph.
The only difference is that, by selecting from time to time each channel, the respective sizes aren't displayed as function charts, but as coloured bars, where each colour corresponds to the size of the selected channel. They are "stacked" so as to make a single column, for each sampling interval. The picture below shows clearly the concept:

In this example, if the user wants to see how the electrical consumption is split for 3 cost centers, in this case: Thermal Central, Armoured Bar 3 and 4 .
Obviously, by selecting the table, the user can get all the information about the selected interval (in the example below, the interval is a day).

The information shown in the table, refer to consumptions of the selected channels with the relative "weight" in percent compared to total. As seen from the example, this table can be extract directly in "csv" or "xls" format.

You can save your configurations, so as to allow a quick consultation without having to select each time the channels of the tree-structure and without having to configure the display modes in the "Setup menu"

Once you have created your configuration, press the button "**Configuration**" on the left bottom side.

Configurations : To access to menu. On the bottom side in the right, press "**Save**", then digit the name to be saved into tree structure of the configurations.
Select the configuration with a double click, then click the button "**Manage**".

Manage : The user can decide if:

- Clear the configuration *(there's a difference between "**Remove from the tree**" and "**Remove permanently**" because, in the first case, the configuration is cleared only for the user who received the permission to access, Instead the second option clears the configuration eventually shared with other users).*
- Move the configuration to another folder.
- Share his configuration with another user, assigning some permissions (when the user decides to share a configuration with another user, it's necessary to assign some permissions in **Reading**, **Sharing**, **Modifying**, **Clearing**).
- Manage eventual permission assigned to other users.

2.4 Range Chart
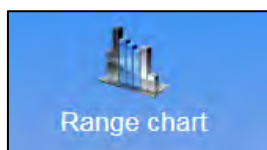
From this menu, the user can share his consumption according to tariff band decided by the authority or according to shifts. With the exception of the bands of system, the user can program freely his band.

From the top toolbar, click on **Historical data** and select **Chart bands**.

On the left side is displayed the "usual" tree-structure, through which it's possible to select the trend of a selected measure. For example: Active Power, Voltage, Current, Energy. By selecting a channel (example: Active Power), the following chart is displayed:
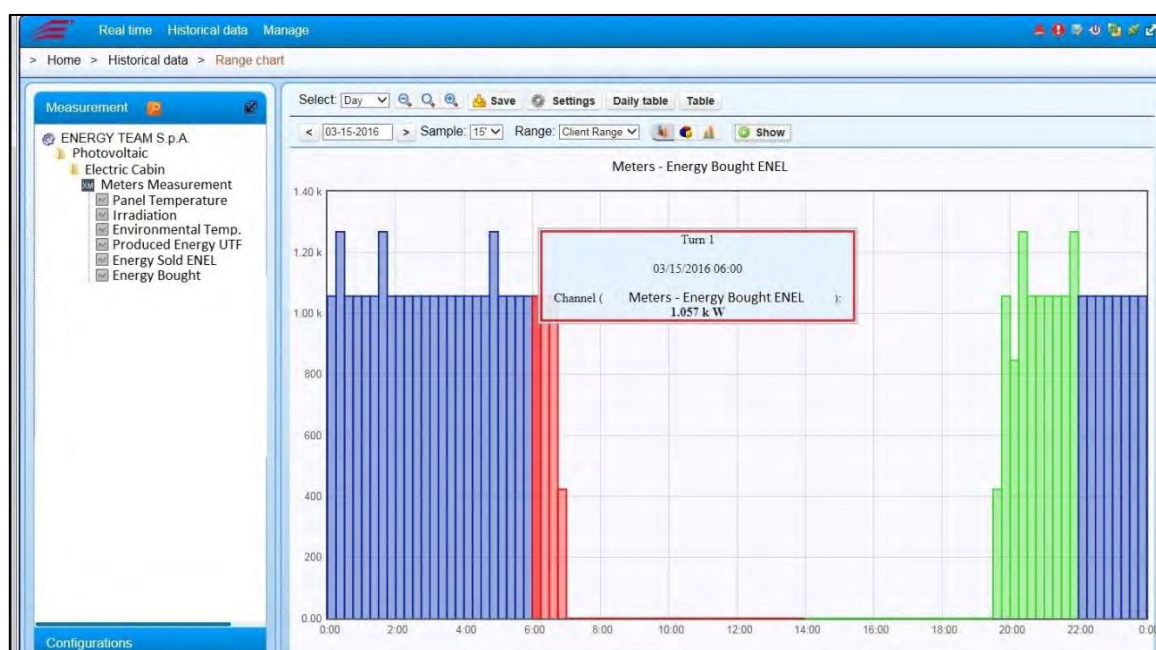
The functions of the buttons shown on the top menu were already described at the paragraph "Historic Data"; we describe only the new fields:

Settings : By clicking on this button, you can insert an eventual "profile" (typically it's equivalent to the Contractual Power with the Company supplier), and insert the number of maximum samplings to be displayed with the relative tariff band.

It is therefore evident that the information of the too-ltip changes, because of the "differences" between the actual consumption and the predetermined profile. The user can also inserti values which changers every 1/4 of hour (and then define up to 96 levels of daily Power).

Range: F123 Italy : Select a band among the ones set in the menu "Band setting". When "single-band" isn't selected, may appear bars of different color, depending by the tariff band considered. We specify thet the tariff band is customizable by the user; for example: it may coincide with the work shifts.

: By means of these buttons, the user can display the chart in different modalities, therefore as a rod (as shown in the previous screens, as Pie or Level).

Table : By means of this button, the user will obtain a table similar to the following:

> Home > Historical data > Range chart

Select: Day Save Settings Chart Daily table

< 06-15-2016 > Sample: 60' Range: F123 Italy Show

Meters - Energy Produced, UTF Meter

	F1	F2	F3	Average/Total
Meters UTF Production Meter [W]	228.0 k	5.586 k	27.44	114.0 k
Meters UTF Production Meter [Wh]	2.508 M	27.93 k	171.5	2.536 M

Measurement
- ENERGY TEAM S.p.A.
  - Photovoltaic
    - Electric Cabin
      - Meters Measurement
        - Panel Temperature
        - Irradiation
        - Environmental Temp.
        - Produced Energy UTF
        - Energy Sold ENEL
        - Energy Bought
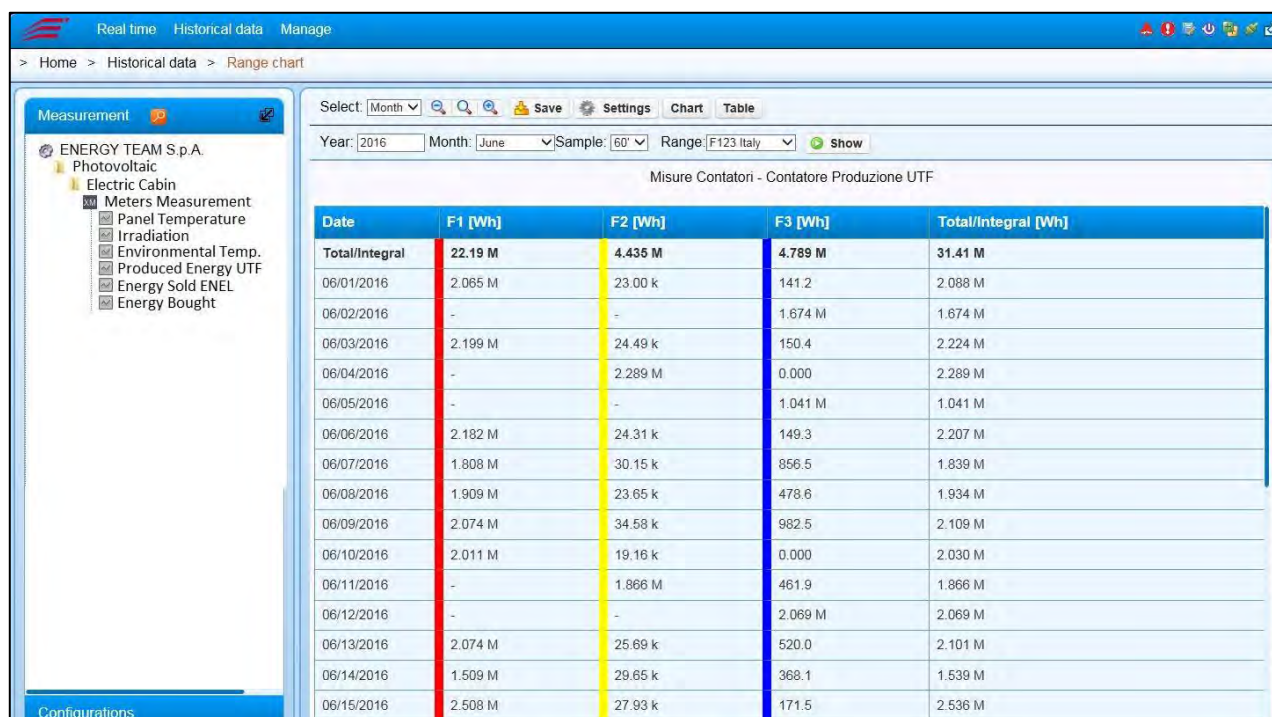
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In essence, in the table are displayed the Average Powers and the Energies in the time interval (this example shows the consumptions of August 2014), compared with the interested profile. In addition, are declared the highest absorption peaks recorded during the time interval (therefore: the N highest 1/4 hour recorded in the time interval), for single tariff band.

This table can be saves as "csv" format, considering the measures extracted with the Unit of Measure in the International System. (for example: W or Wh).

Daily table : By pressing this button, it's possible to get a daily distribution in energy, divided by tariff band, as shown in the example below:

This example shows the daily consumption divided by band of July. Obviously, also this table can be saved as "csv" format.

The user can save his configuration, so as to allow a quick consultation without having to select the channels of the tree structure and without having to configure in the "Setup menu" his display modalities.

Once you have created your configuration, press the button "**Configurations**" on the left bottom side.

Configurations : To access to menù. On the bottom side in the right, press "**Save**", then digit the name to be saved into tree structure of the configurations.

Select the configuration with a double click, then click the button "**Manage**".

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Manage The user can decide if:

- Clear the configuration *(there's a difference between "Remove from the tree" and "Remove permanently" because, in the first case, the configuration is cleared only for the user who received the permission to access, Instead the second option clears the configuration eventually shared with other users).*
- Move the configuration to another folder.
- Share his configuration with another user, assigning some permissions (when the user decides to share a configuration with another user, it's necessary to assign some permissions in **Reading**, **Sharing**, **Modifying**, **Clearing**).
- Manage eventual permission assigned to other users.

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2.5 Pie Chart

Pie Chart

This graphic representation is entirely similar to the same real-time menu (Pie Chart), but it refers obviously to final data.

The use of this form is for those who want to understand how the consumption is shared by Cost Centers: for example, the consumption in a month. When the user gets the access into menu, through a double click he can select the channels or the mathematical modules which identify the Cost Centers. The final result may be similar to the example shown below:
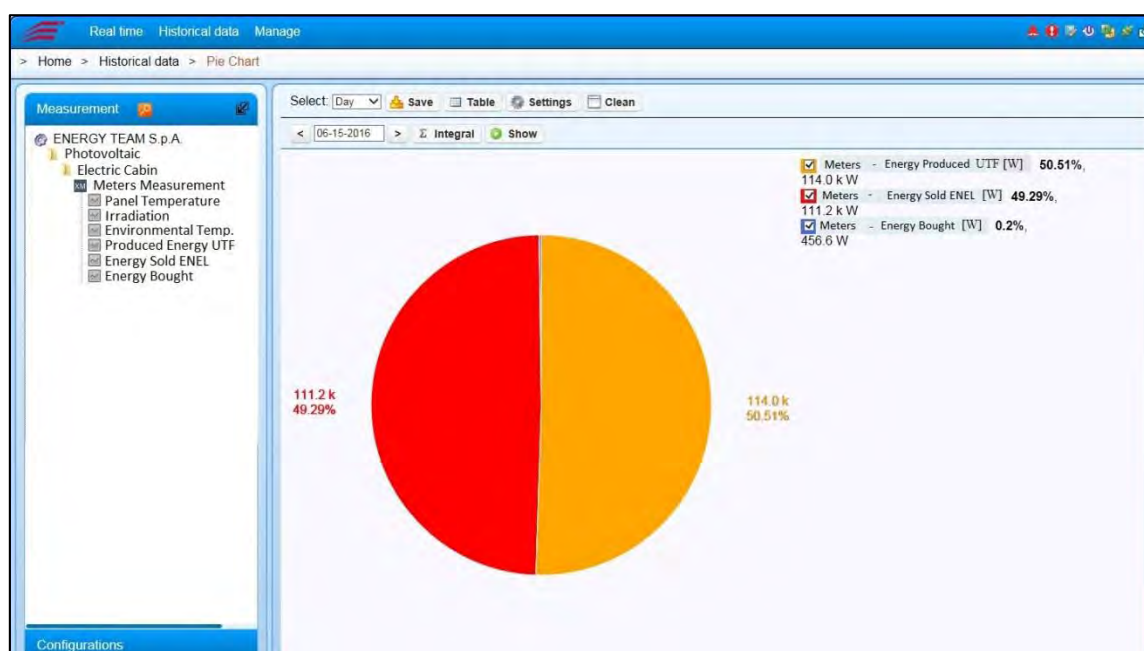
As can be seen, the system carries out the sum of the inserted channels and calculates the "piece" of the interested cost center. The plant in this example absorbs the 23,09% of the total energetic consumption in the month of July. On the toolbar is displayed the following menu, by means of which it's possible:

- Select the interested time interval, with the same modalities described in Historical data (See "selection").
- Save: If the graph is displayed, this function will save the image. Instead, if the table is displayed, this function will save the data as "csv" or "xls" format.

- <u>Setup</u>: it's possible to set an update for the graph, automatically every 1/4 of hour. It's also possible to clear eventual channels.

- <u>Clear</u>: to make the cleaning of all the pre-selected channels.

- <u>Integral</u>: to make the integration, for the measuring units that allow it.
  (for example: it's possible to display alternately the Power and the Energy).

- <u>Display</u>: Press it each time a change has occurred.

The user can save his configuration, so as to allow a quick consultation without having to select the channels of the tree structure and without having to configure in the "Setup menu" his display modalities.

Once you have created your configuration, press the button "**Configuration**" on the left bottom side.

Configurations : To access to menù. On the bottom side in the right, press "**Save**", then digit the name to be saved into tree structure of the configurations.
Select the configuration with a double click, then click the button "**Manage**".

Manage : The user can decide if:

- Clear the configuration *(there's a difference between "**Remove from the tree**" and "**Remove permanently**" because, in the first case, the configuration is cleared only for the user who received the permission to access, Instead the second option clears the configuration eventually shared with other users).*

- Move the configuration to another folder.

- Share his configuration with another user, assigning some permissions (when the user decides to share a configuration with another user, it's necessary to assign some permissions in **Reading**, **Sharing**, **Modifying**, **Clearing**).

- Manage eventual permission assigned to other users.

2.6 Summary of periods
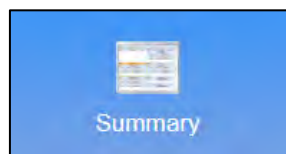
Summary

This module shows in a unique screenshot the summary of the quantities divided per tariff band (tariff bands can also be defined by the user) there could be more different tariff bands, as for example general withdrawal about ENEL, Methane and about all the quantities which should be displayed by the user. Click on **Historical Data** and select **Summary of Periods** from the top toolbar.

Click on [Settings] to set the quantities you want to display, and you will see the following window:
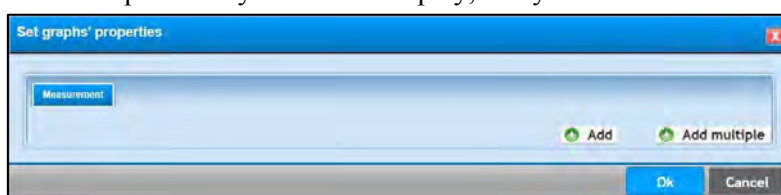
Click on **Add** to see the plant **"tree structure"** where you can find the channels you want to display by a double click (ex: Active power). Press the button **Add** for each channel to be inserted. All the channels will be displayed in a panel, on each line or in Tab format.

If you press the button Tab of the desired channel, the panel will change as it follows:
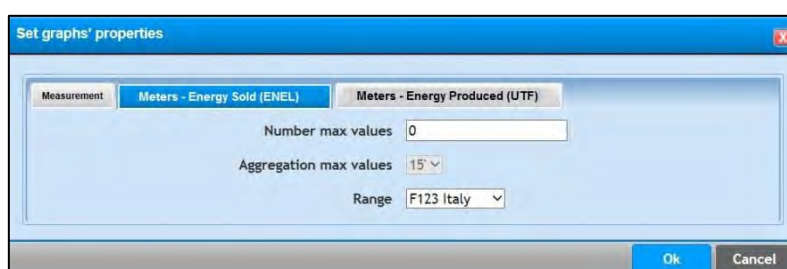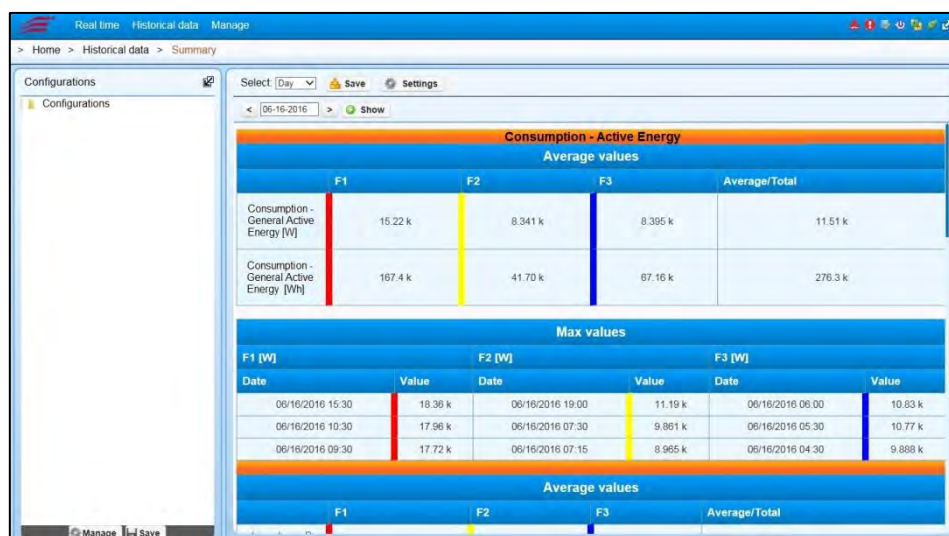
Here you can set up:
- **Number of Maximum Values**: Put the number of maximum values, that is to say how many samples you want to display in a table.
- **Maximum values aggregation:** Select an integration range between 15' e 60', on which you want to make measurement to calculate the maximum value.
- **Band**: Choose the desired tariff band.

Finally press the button **Ok** to save settings and to display the screenshot, or **Cancel** to quit without saving it.

From the menu Properties Configuration, select **Add Multiple** if you want to select more channels and make the same operations.

Once you've made the configuration of the desired channels, you will see the following table:

From the screenshot above you can see the maximum and minimum average value of a certain quantity referred to Power and Energy, divided into bands.

The above mentioned buttons and fields has got the following function:

Select: Day From the respective drop down menu you can select different displaying options according to the chosen period. The standard option is "Day" and it is referred to the previous day archive. The other options are: "Week"; "Month"; "Year"; "Years"; "Free" and they will ask the user to set the starting date or the referring month or the starting / ending date.

If you select "Free" you will be able to set also a period starting/ending hour

Show: It allows to display values in the different bands, after the periods have been selected.

Save: It allows to save displayed configuration in Excel or Csv, considering that the measuremnts will be extracted with the International System Measurement (for example W or Wh).
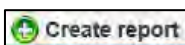
2.7 Report
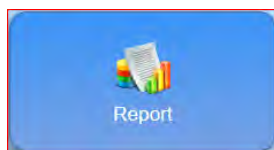
This function allows easy and immediate elaboration of energy data through an Excel file. The **system can automatically send** (by "Activities planning") **an email with the configured report, to get consumption data** without accessing the WEB-Server.

Here you can see how to make independent Report configurations and share them with other users.

Select **Report** from the Historical Data menu. On the left, you will see the tree structure of all configured Reports. If the user who enters the system has the permissions to create new reports (*please have a look at*

"Accesses Configuration"). This icon will be shown: [⊕ Create report]

The following data will be required:
- Report name
- Eventual notes
- Language
- Type of report, the kind of file to be generated. The system provides a set format and other ones can be implemented.
- The folder to save the report in. Each user can create their own tree structure of reports.

Click "Save" to see the Report in the tree structure on the left. Double click on the report you've just created and you'll see the "**Execute**" and "**Configurations**" TABs with other eventual ones according to the type of report created.

The "**Execute**" TAB allows executing a configured report, insert the date and click "**Execute**". The Server will start data elaboration and to produce a complete Excel file.

The "Configurations" TAB, allows configuring your own report, which is to say that, inserting the various channels to elaborate and produce an Excel file. The channels can also be "virtual" ones, mathematical modules defined by the user. This menu changes according to the type of report.

Click "Change tree", to enter a submenu and:

- Share your own report, thanks to the "Share report" function. Select the reports you intend to share and assign a specific permissions to each user. For example, "admin" users can configure reports, and share them with "guest" ones that will only be entitled to execute them. (They cannot cancel edit or share the report).

User	Read	Share	Change	Delete	Execute	Change special	Delete special
guest	☑	☐	☐	☐	☑	☐	☐

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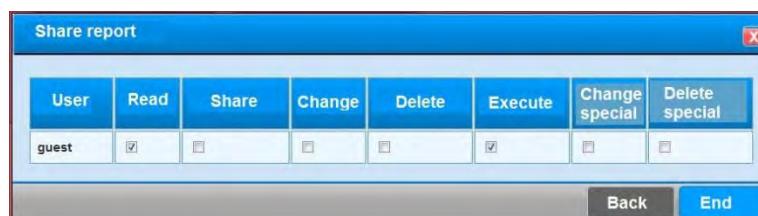
- Create a folder to put the records in.
- Cancel to return to the previous menu.

In addition, (if you are in the "Edit tree structure" submenu) double click on the report to:

- Move the report into a different folder.
- Edit the report, i.e. change its name.
- Remove the report from the user's own tree structure. If it has been shared, the report will be available to other users.
- Delete the report permanently even if it has been shared with other users.
- Manage permissions given to other Users to change them.

Please find here below the most used and available "format".

2.7.1 Total Consumption Report

The main purpose of the "Total Consumption" format is to show total consumption in a certain period selected by the user. In the example below, the period selected by the user is from 00.00 on 1st to 24.00 on 30th June.

> The file elaborated is divided into 2 areas: Electricity and Methane one. The user can configure all channels for each section and there are no limits (if not the Server's performance ones) in the number of sections.
>
> See here below an example chart elaborated by the Software:

from 01 /06/2014 to 30/06/2014	
Electricity [kWh]	**379593.5**
Compressors Room - Active Power [kWh]	**39067.4**
Active Power [kWh]	**113378.9**
Active Power - Busbar 3 [kWh]	**83445.7**
Active Power - Busbar 3 2 [kWh]	**1830.9**
Active Power - Busbar 3 4 [kWh]	**86531.3**
Active Power – Total Furnaces [kWh]	**39985.9**
Active Power Total Galvanisation [kWh]	**15353.3**
Gas – Total Methane [Sm^3]	**127571.0**
Correct Methane Flow - Furnace [Sm^3]	**48249.0**
Correct Methane Flow - Laboratories [Sm^3]	**0.0**
Correct Flow - Heating system [Sm^3]	**6942.5**
Correct Flow - Nickel plating [Sm^3]	**0.0**

2.7.2 Bands Hour Report

This is a single Excel file with a sheet per every channel selected by the user. The consumption of each channel is divided into 24 columns (1 per hour) with summary ones at the end giving the day's peak withdraw per hour and total consumption divided in to tariff bands.

Here below an example of the generated report:

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	P.Max	F1	F2	F3	F4	Total
01/08/2014	49.7	50.2	50.5	50.3	50.4	50.4	56.6	51.2	62.4	63.3	63.0	62.9	62.9	62.0	62.5	61.7	56.3	58.5	59.1	58.0	57.9	57.3			63.4		284.8	415.3		1383.4
02/08/2014	57.2	57.4	58.2	57.5	57.4	56.5	55.5	56.0	54.7	54.6	56.0	55.3	50.7	45.1	44.2	44.2	44.5	44.8	44.3	44.5	44.3	44.2	44.5	44.5	58.2		771.9	444.1		1216.0
03/08/2014	44.2	44.7	44.6	44.3	44.9	44.4	44.5	44.4	44.8	44.5	44.5	44.3	44.6	44.6	44.3	44.9	44.1	44.5	44.0	44.8	44.0	45.6	46.5	46.3	46.5		0.0	1072.3		1072.3
04/08/2014	46.3	45.6	45.2	45.3	45.4	45.5	50.8	55.8	69.0	63.2	62.3	62.6	62.6	62.4	63.3	58.5	51.0	51.9	51.3	51.3	51.5	46.9	45.9	45.7	69.0		251.3	369.9		1279.2
05/08/2014	46.0	46.2	48.0	47.3	46.6	46.6	52.4	54.4	65.7	74.2	74.0	52.9	53.3	53.4	51.8	54.5	55.8	55.6	55.6	54.4	62.5	60.3	46.8	46.6	74.2		278.4	379.6		1304.9
06/08/2014	46.4	46.6	49.0	48.1	47.9	47.9	52.3	55.4	52.9	54.7	54.4	60.0	57.2	58.3	57.2	57.2	56.7	53.7	50.0	50.6	49.1	44.9	45.3	45.0	60.0		245.3	383.2		1240.7
07/08/2014	44.8	45.1	45.5	44.8	45.2	45.3	49.6	51.0	50.8	51.0	50.9	50.6	50.1	55.8	56.2	56.7	63.3	58.2	56.3	56.7	55.9	51.5	51.5	51.7	63.3		266.7	372.0		1238.6
08/08/2014	51.3	51.8	51.7	51.1	51.9	51.2	56.6	56.5	55.3	49.3	48.6	48.8	44.2	42.5	41.3	42.2	41.9	40.5	40.6	41.2	40.6	40.8	40.7	40.2	56.6		219.8	405.7		1120.8
09/08/2014	40.9	40.8	41.0	40.8	40.6	40.6	40.9	40.7	40.6	41.0	41.1	40.5	40.9	40.8	40.2	40.8	40.7	40.7	40.6	41.1	40.8	40.8	40.5	40.8	41.1		651.7	326.4		978.1
10/08/2014	41.0	40.7	40.8	40.4	41.1	40.8	40.6	40.9	40.8	40.6	40.8	40.2	41.0	40.8	40.5	40.7	40.6	40.8	40.9	40.9	40.7	40.8			41.1		0.0	977.5		977.5
11/08/2014	41.0	40.6	40.9	41.0	40.5	40.9	40.9	41.0	41.2	41.4	41.8	41.6	42.5	42.5	41.8	41.5	41.5	40.8	40.7	40.4	40.4	40.6	40.5	40.5	42.5		202.9	326.2		985.6
12/08/2014	40.4	40.5	40.5	40.4	40.5	40.4	40.2	40.7	41.0	41.5	41.1	39.8	40.2	39.2	39.6	38.8	36.2	35.6	34.6	34.5	34.3	34.4	33.8	34.6	41.5		177.6	317.4		922.5
13/08/2014	34.1	34.2	34.8	34.3	34.8	34.2	34.6	34.3	31.7	14.6	14.6	28.5	30.6	31.7	32.2	33.0	32.3	32.3	32.6	30.1	30.1	30.2	29.7	29.8	34.8		154.5	270.7		739.4
14/08/2014	30.2	29.7	30.2	30.1	30.1	30.1	29.8	29.7	30.1	29.8	7.7	28.5	30.6	15.2	29.3	29.4	29.2	29.3	28.7	28.8	29.4	29.3	29.0	29.0	30.6		146.2	239.2		613.9
15/08/2014	29.1	28.9	29.7	28.9	29.4	29.5	29.1	28.7	29.3	29.1	29.4	28.5	29.6	29.0	29.0	29.4	29.2	28.6	29.0	28.9	29.1	29.0	29.3	28.9	29.7		0.0	698.2		698.2
16/08/2014	29.4	29.0	28.6	29.4	29.0	29.3	29.3	28.8	29.4	29.1	28.6	29.5	28.8	29.0	29.0	29.3	29.1	28.4	29.3	29.0	29.2	29.4	29.2	28.7	29.5		465.0	232.7		697.7
17/08/2014	29.1	29.3	28.8	29.3	29.4	29.2	29.1	28.5	29.4	29.1	28.7	29.0	29.0	29.0	29.2	29.1	29.0	11.8	4.7	4.6	4.6	4.6	4.6	4.6	29.4		0.0	533.9		533.9
18/08/2014	4.6	4.6	4.6	4.6	4.6	4.7	21.7	31.3	30.6	32.6	31.4	32.3	30.7	31.8	32.0	32.8	32.0	31.6	31.5	31.6	31.6	31.5			32.8		158.1	80.8		589.4
19/08/2014	31.4	31.6	31.5	31.9	31.7	31.5	31.4	32.0	31.2	32.5	31.9	33.5	30.5	31.2	30.7	31.1	34.1	34.1	32.4	32.3	32.2	32.6	32.2	32.5	34.1		161.3	253.7		768.1
20/08/2014	32.0	32.5	32.9	31.9	32.5	32.2	32.8	32.0	35.5	35.3	34.9	35.6	34.8	34.6	32.5	35.8	38.0	34.7	34.8	35.1	34.6	35.0	34.7	34.6	38.0		171.4	261.4		819.4
21/08/2014	35.2	34.6	34.8	35.1	34.5	35.0	34.6	34.8	33.1	33.1	29.6	29.2	29.4	29.1	29.5	29.8	29.1	29.1	28.3	29.0	28.9	28.7	28.9	28.3	35.2		150.3	272.2		751.8
22/08/2014	28.9	28.4	28.4	28.6	28.5	28.4	29.1	28.4	28.7	29.0	29.1	28.5	29.0	28.2	29.3	31.0	31.9	41.7	42.8	29.7	28.7	27.7	27.8	27.0	42.8		142.4	227.4		718.9
23/08/2014	27.9	27.2	27.6	27.3	27.3	27.4	27.9	27.3	27.5	27.6	27.3	27.7	27.4	27.2	27.7	27.0	27.0	27.9	27.5	27.4	27.5	27.2	27.6	27.1	27.9		439.6	219.7		659.3
24/08/2014	27.5	27.2	27.6	27.3	27.7	27.2	27.2	27.5	27.4	27.6	26.8	27.5	28.1	26.8	27.5	27.4	27.7	27.3	27.6	29.9	30.3	30.8	30.1	30.0	30.8		0.0	672.0		672.0
25/08/2014	30.4	28.9	28.8	29.2	28.9	28.8	30.0	29.9	30.5	33.3	31.6	38.9	43.1	52.8	33.7	34.8	33.2	33.9	33.4	33.3	33.5	33.6	34.1	34.0	52.8		164.4	239.0		802.7
26/08/2014	33.9	34.2	33.9	33.8	33.9	34.5	42.4	52.0	53.9	55.6	58.5	61.1	56.1	55.0	56.2	56.6	56.9	57.0	56.1	56.7	55.9	52.1	50.9	50.4	61.1		267.7	296.9		1187.7
27/08/2014	50.9	50.8	50.8	50.4	51.4	50.9	56.8	56.2	58.0	68.7	66.6	66.4	67.0	67.3	67.4	68.6	67.0	65.2	62.1	56.6	57.6	51.1	49.5	49.7	68.7		271.1	411.7		1407.2
28/08/2014	50.1	50.0	50.1	51.3	50.4	50.7	55.6	57.5	57.6	66.3	60.0	57.6	58.1	58.7	56.8	57.3	58.1	58.1	58.8	57.4	58.0	57.1	56.9	58.0	66.3		286.8	416.1		1350.2
29/08/2014	56.9	56.9	56.5	56.8	56.5	56.5	58.0	58.2	65.9	61.3	59.0	62.3	60.4	59.5	58.0	58.6	57.3	58.6	57.4	57.8	58.1	51.1	49.1	49.6	65.9		274.3	447.6		1380.1
30/08/2014	49.2	49.4	50.3	50.4	50.4	50.7	54.4	61.3	61.7	61.6	59.1	59.0	47.1	42.8	43.0	43.0	43.0	43.2	43.3	43.2	43.5	43.2	43.3	43.7	61.7		781.6	398.3		1179.9
31/08/2014	43.4	43.4	43.8	43.4	43.5	43.3	43.6	43.1	43.6	43.6	43.5	43.5	39.6	38.9	38.9	37.8	37.4	37.9	38.2	38.1	38.9	38.0	38.0	37.4	43.8		0.0	980.9		980.9
																											7384.9	12942.4		30270.5

2.7.3 Hour Summary Report

In this case, a single Excel sheet is created; all data are divided into each column while, lines are for hour consumption for each hour of the selected day. See an example of a report here below:

Date	Hour	P active compressors [kW]	P active production 1 [kW]	P active ovens [kW]	P active Services [kW]	Plant's water [mc/h]
01/07/2014	00:00	57.8	143.9	29.1	99.7	7.2
01/07/2014	01:00	57.7	129.2	31.4	98.8	7.1
01/07/2014	02:00	59.0	146.8	84.2	100.0	7.3
01/07/2014	03:00	57.0	137.2	100.9	99.6	7.2
01/07/2014	04:00	57.6	162.2	102.6	99.6	7.2
01/07/2014	05:00	57.2	151.0	91.1	102.1	7.2
01/07/2014	06:00	58.7	135.4	82.3	107.5	7.3
01/07/2014	07:00	61.2	165.0	75.8	110.3	7.2
01/07/2014	08:00	60.2	157.1	69.4	108.1	7.2
01/07/2014	09:00	61.0	157.1	46.5	108.5	7.2
01/07/2014	10:00	61.2	134.3	52.9	105.3	7.2
01/07/2014	11:00	60.8	132.6	46.9	105.2	7.2
01/07/2014	12:00	59.6	165.9	79.3	105.6	7.2
01/07/2014	13:00	59.7	152.9	92.3	102.9	7.2
01/07/2014	14:00	59.4	140.8	102.8	102.0	7.2
01/07/2014	15:00	58.3	163.1	87.5	109.6	7.2
01/07/2014	16:00	59.4	152.8	71.7	107.4	7.2
01/07/2014	17:00	58.3	147.1	38.9	105.8	7.2
01/07/2014	18:00	58.7	168.0	40.5	105.0	7.2
01/07/2014	19:00	58.9	152.3	37.1	103.6	7.2
01/07/2014	20:00	58.5	180.1	36.8	105.7	7.2
01/07/2014	21:00	58.0	180.2	31.9	104.3	7.2
01/07/2014	22:00	58.1	165.9	31.8	88.1	7.2
01/07/2014	23:00	60.2	142.6	32.3	85.0	7.1
02/07/2014	00:00	57.9	169.8	32.5	85.4	6.9

2.7.4 Cost Centers Summary Report

This format shows the final costs of Electricity in the customer's own "Cost Centers". Thanks to the WEB interface, the user can load Electricity costs in to the Server (The user must have the permissions to edit the Report). Regardless of the required period, an annual file is generated as the one here below:
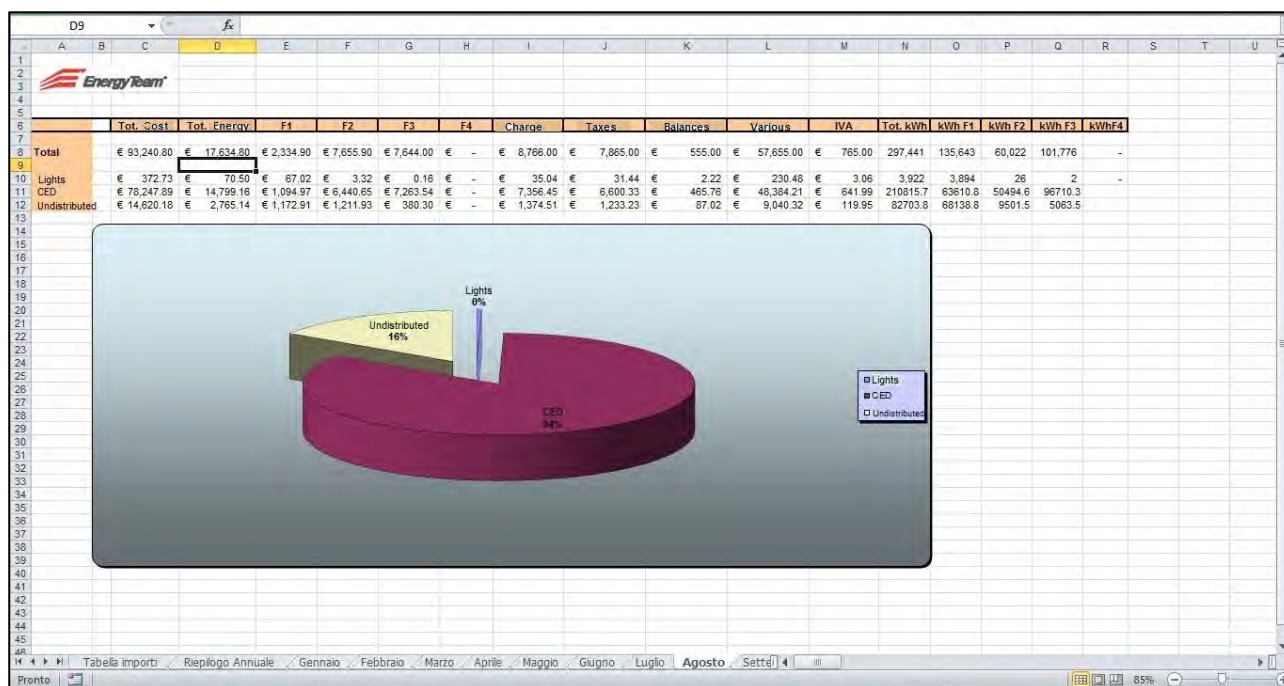
Click on the link below to see the demo version and to check the files that have been generated:

http://demo.energyteam.it:8080/html/main.jsp

2.7.5 Power Factor Fines Calculation
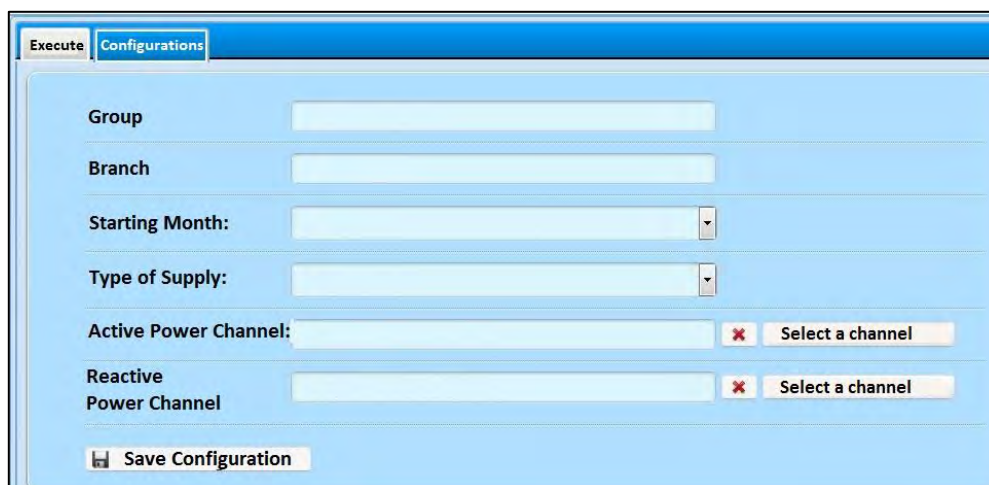
Thanks to this report you can calculate eventual fines paid by the customer due to low power factor correction. This way, users can check eventual invoiced fines and take precautions to make savings

Create a new Report, select *"Power Factor Fines Calculation"* and Save.

After the configuration, you will obtain an annual file containing all monthly data.

Group: Energy Team S.p.A.						
Branch: Trezzano S/N						
Month	Power factor	LV Fine (€)	Active Energy (kWh)	Reactive Power (kVArh)	Maximum power (kW)	*Ri-phasing power 0(kVAr)
January 2015	0.753	€ 21.64	2,133	1,866	3	2
February 2015	0.753	€ 114.11	8,903	7,790	130	71
March 2015	0.753	€ 768.86	72,254	63,222	130	71
April 2015	0.753	€ 790.13	78,523	68,708	122	67
May 2015	0.753	€ 673.83	67,057	58,674	141	77
June 2015	0.753	€ 398.91	37,593	32,894	127	70
July 2015	0.753	€ 431.66	38,109	33,345	149	81
August 2015	0.753	€ 472.95	44,480	38,919	142	77
September 2015	0.753	€ 541.74	50,063	43,805	133	73
October 2015	0.753	€ 690.52	61,511	53,822	126	69
November 2015	0.753	€ 896.69	85,096	74,459	131	71
December 2015	0.872	€ 238.25	58,243	32,771	126	30
Total	**0.764**	**6,039**	**603,964**	**510,275**	**1,460**	**81**

After creating the report, enter the "Configurations" TAB to configure it:

- **Group**: Put the name of the Group / Company (optional parameter)
- **Branch**: Put the name of the branch (optional parameter)
- **Starting Month**: Set the starting month of the desired year. The system shows January as default.
- **Type of Supply**: Select the type of Supply; choose between Low and medium Voltage. This parameter influences the final €/Mvarh cost calculation.
- **Active Power Channel**: Select Active Power channel.
- **Reactive Power Channel**: Select Reactive Power Channel

Click "*Save configuration*". Select the desired month in the "Perform" TAB; the system allows downloading an Excel file as the above mentioned.

N.B. The declared values should be considered as indicative estimate.

2.7.6 Thermal Day Summary Report

This report provides the final consumption referred to a thermal day, which is to say from 6:00 of one day to 5:59 of the following one. This report is typically used for Gas Meters.

Select "**Thermal Day Summary Report**" to create a new Report and Save.

This is an annual report, made of 12 sheets (one per month) with each sheet showing daily consumption. Please find an example below:
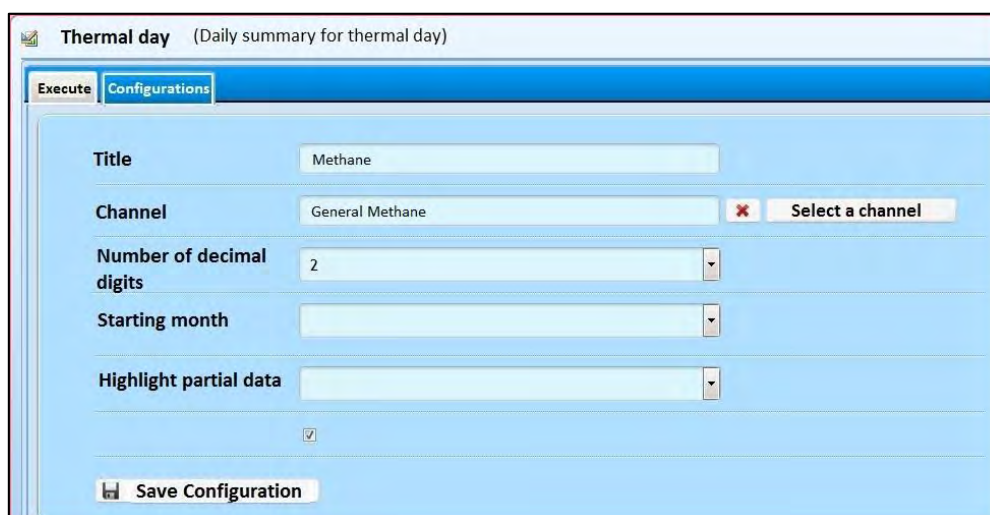
Title: Methane

Days	Methane - General [Sm^3]
01/07/2015	18,187.38
02/07/2015	27,156.07
03/07/2015	28,896.85
04/07/2015	29,841.21
05/07/2015	31,126.14
06/07/2015	27,210.87
07/07/2015	29,708.46
08/07/2015	30,518.46
09/07/2015	29,127.80
10/07/2015	29,341.83
11/07/2015	29,614.08
12/07/2015	29,512.33
13/07/2015	30,593.72
14/07/2015	27,817.39
15/07/2015	31,408.00
16/07/2015	26,735.32
17/07/2015	28,839.00
18/07/2015	28,891.40
19/07/2015	32,648.58
20/07/2015	33,289.88
21/07/2015	32,135.09
22/07/2015	30,755.84
23/07/2015	29,552.78
24/07/2015	28,800.27
25/07/2015	30,462.10
26/07/2015	28,860.79
27/07/2015	30,035.44
28/07/2015	30,834.12
29/07/2015	29,919.32
30/07/2015	30,027.63
31/07/2015	29,435.29
Total [Smc]	907,264.01
Average [Smc]	29,266.58

General Methane [Smc]
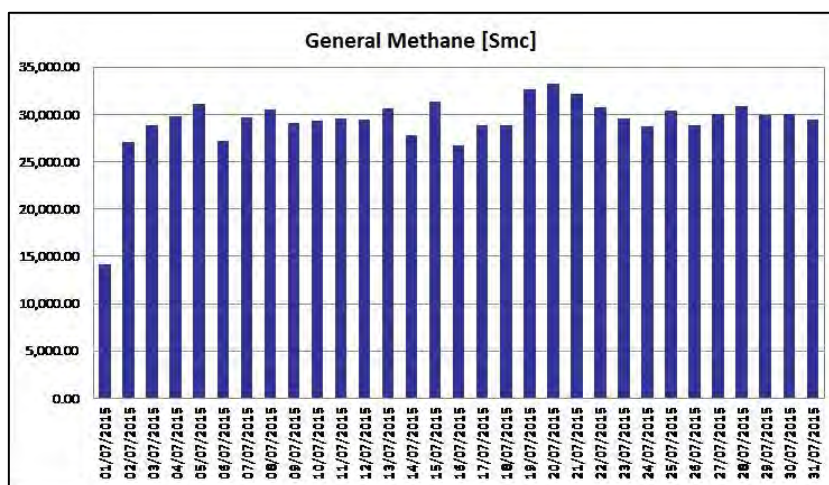
The chart above shows daily consumption and it points out if the data is complete or not according to the cell formatting. If the cell is red, it means that some daily samples are missing. This setting can be configured enabling the *"Highlight partial data"* option. Use the "Configurations" TAB to set:

- **Title**: Put an eventual title (optional field)
- **Channel**: Configure the desired channel from the tree structure
- **Number of Decimal Digits**: Configure the desired quantity of decimal digits available in the report This setting only affects cells formatting.
- **Unit Measure Multiplier**: selecting "None" means the measures will refer to the International Measurement, otherwise, set a multiplier.
- **Starting month**: Since this is an annual report, the user must select a starting month. The report will show January as default month.
- **Highlight partial data**: tick the box if you wish the cell for any missing data to appear red.

Click "*Save configuration*" to store the settings. Access the "Perform" TAB to select the desired month; the system will allow downloading an Excel file like the one pictured above.

2.7.7 Duration Curve

This report underlines consumptions differences over the analysis period. All the period's consumptions are placed in descending order. This way the user can immediately check their consumptions to see if there is a constant load over time or, on the contrary if it is strongly dynamic.
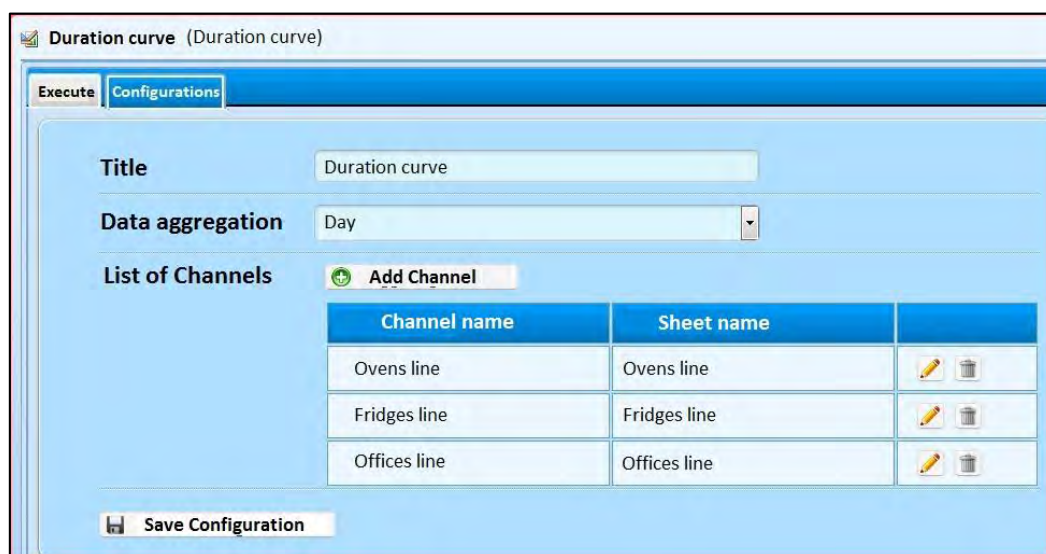
Create a new Report, selecting *"Duration Curve"* and save. The server generates this report instantaneously; the dates will be set by the user. Here below an example:
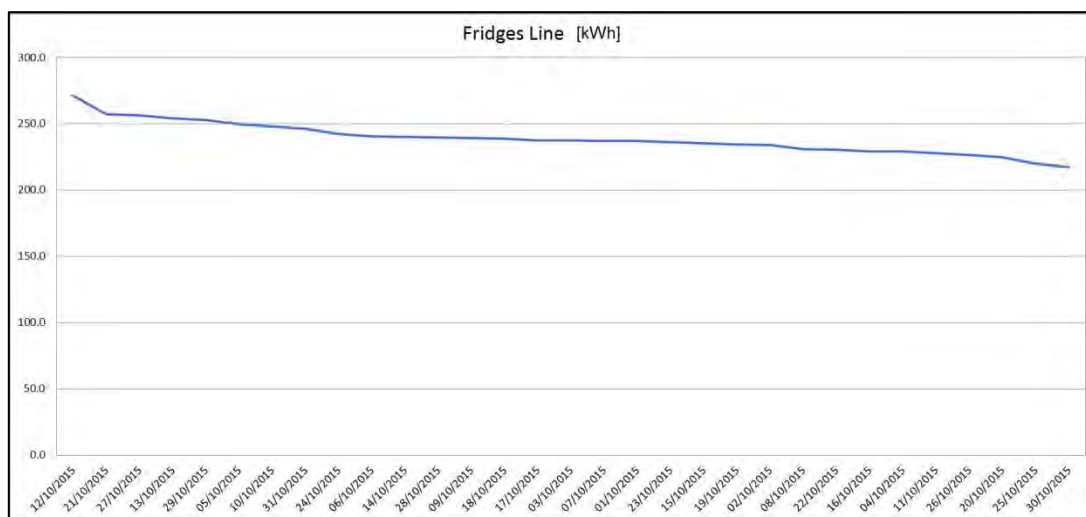
Date	Fridges [kWh]
12/10/2015	271.2
21/10/2015	257.2
27/10/2015	256.4
13/10/2015	254.3
29/10/2015	252.7
05/10/2015	249.7
10/10/2015	248.1
31/10/2015	246.3
24/10/2015	242.1
06/10/2015	240.3
14/10/2015	240.1
28/10/2015	239.8
09/10/2015	239.4
18/10/2015	239.0
17/10/2015	237.6
03/10/2015	237.3
07/10/2015	237.2
01/10/2015	237.0
23/10/2015	236.1
15/10/2015	235.4
19/10/2015	234.2
02/10/2015	234.1
08/10/2015	230.9
22/10/2015	230.5
16/10/2015	229.3
04/10/2015	229.2
11/10/2015	227.6
26/10/2015	226.3
20/10/2015	224.8
25/10/2015	220.1
30/10/2015	217.2

The user can decide which aggregation period to set, in the example above it's "Day" with a set integration. Each sample corresponds to the daily energy consumed by the user.

In the "Configurations" TAB you can set:

- **Title**: the eventual title for each sheet of the Report
- **Data aggregation**: Choose data aggregation among 1, 5, 10, 15, 60 minutes or a day.
- **List of Channels**: click "Add channel" to put select channels. The server will create a sheet for each channel with their data. Moreover, for each channel you can set its name, sheet's name, multiplication factor, and the number of decimal digits, then you can export or not its integration (in vase of Electricity you can extract average power or energy during aggregation period). For each channel, you can change or cancel the desired one.

Click "**Save configuration**" once the setting id finished. Select the desired month from the "Perform" Tab and then click "Perform" to download an Excel file like the one pictured above.

| Rif. 081_ma | Doc. PT/08-51 | Rev. 0 | Del: 20/06/2016 | Realizzato da: L. Gramegna - D. Aquiletta | Approvato da: M. Bianchi |

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2.7.8 Monthly Summary Cost Centers

This report allows the user to monitor their consumptions divided per cost centers.

Select *"Monthly Summary Cost Centers"* to create a new Report and save.

This is an annual report, made of 12 sheets (one per month) and each sheet shows daily consumption referred to each configured cost centre. Here below an example:

Title: Cost Centers

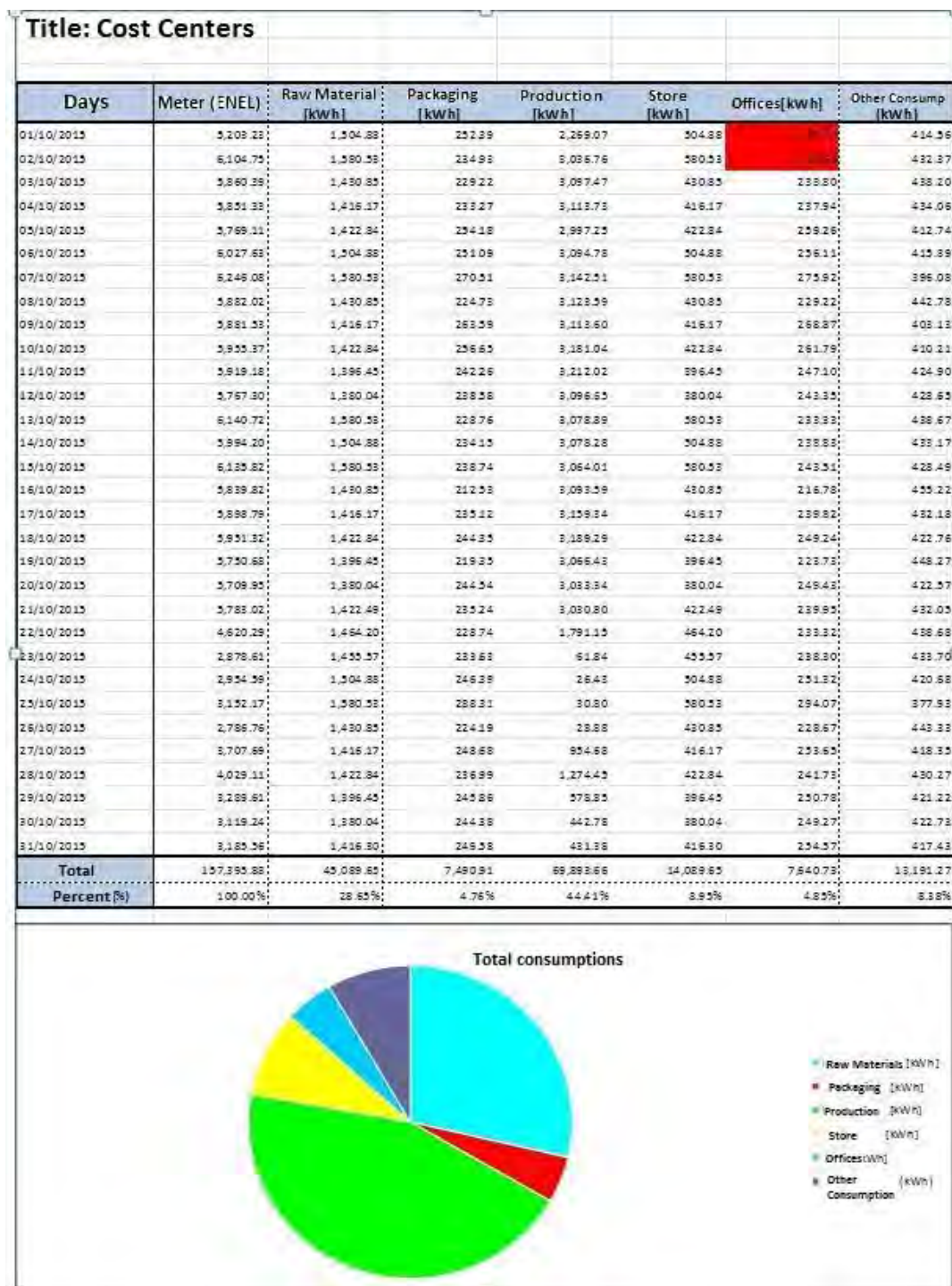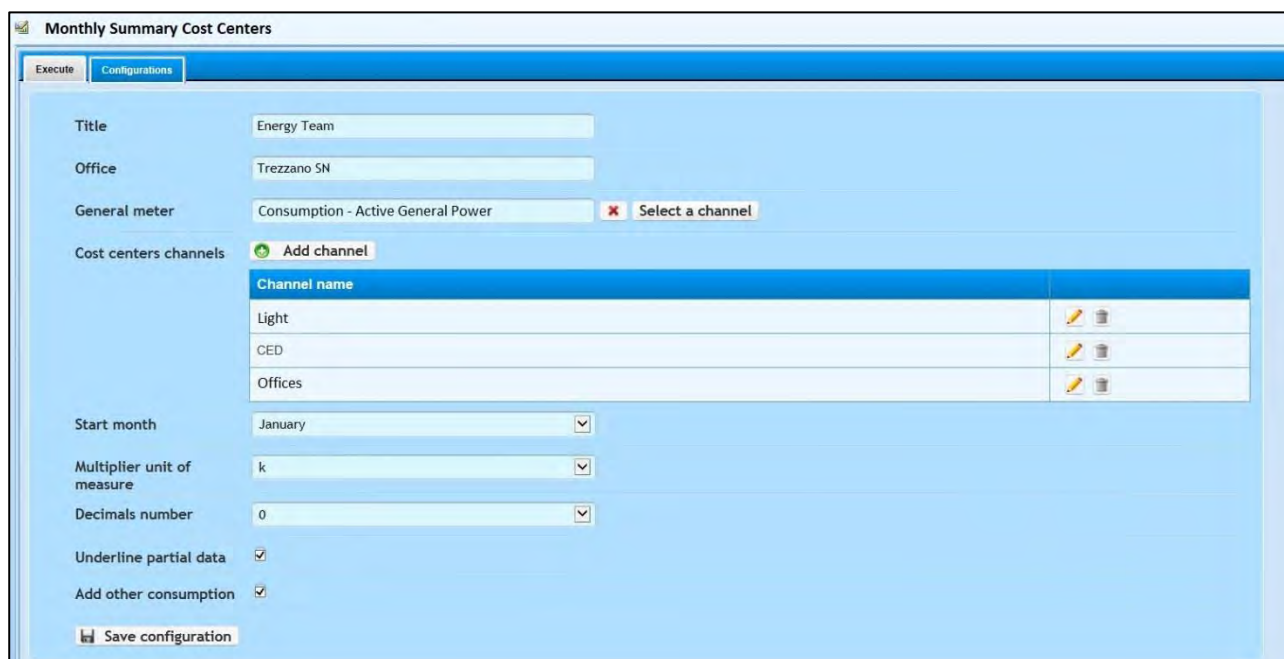| Days	Meter (ENEL)	Raw Material [kWh]	Packaging [kWh]	Production [kWh]	Store [kWh]	Offices[kwh]	Other Consump [kWh]
01/10/2015	5,203.28	1,504.88	252.39	2,269.07	504.88		414.56
02/10/2015	6,104.75	1,580.53	234.93	3,036.76	580.53		432.37
03/10/2015	5,860.39	1,430.85	229.22	3,097.47	430.85	238.80	438.20
04/10/2015	5,851.33	1,416.17	233.27	3,113.73	416.17	237.94	434.06
05/10/2015	5,769.11	1,422.84	234.18	2,997.25	422.84	259.26	412.74
06/10/2015	6,027.63	1,504.88	231.09	3,094.78	504.88	256.11	415.89
07/10/2015	6,246.08	1,580.53	270.51	3,142.51	580.53	275.92	396.08
08/10/2015	5,882.02	1,430.85	224.73	3,123.59	430.85	229.22	442.78
09/10/2015	5,881.53	1,416.17	263.59	3,113.60	416.17	268.87	403.13
10/10/2015	5,955.37	1,422.84	236.65	3,181.04	422.84	261.79	410.21
11/10/2015	5,919.18	1,396.45	242.26	3,212.02	396.45	247.10	424.90
12/10/2015	5,767.30	1,380.04	238.58	3,096.65	380.04	243.35	428.63
13/10/2015	6,140.72	1,580.53	228.76	3,078.89	580.53	233.33	438.67
14/10/2015	5,994.20	1,504.88	234.15	3,078.28	504.88	238.83	433.17
15/10/2015	6,135.82	1,580.53	238.74	3,064.01	580.53	243.51	428.49
16/10/2015	5,839.82	1,430.85	212.53	3,093.59	430.85	216.78	455.22
17/10/2015	5,898.79	1,416.17	235.12	3,159.34	416.17	239.82	432.18
18/10/2015	5,951.32	1,422.84	244.35	3,189.29	422.84	249.24	422.76
19/10/2015	5,750.68	1,396.45	219.35	3,066.43	396.45	223.73	448.27
20/10/2015	5,709.95	1,380.04	244.54	3,033.34	380.04	249.43	422.57
21/10/2015	5,783.02	1,422.49	235.24	3,030.80	422.49	239.95	432.05
22/10/2015	4,620.29	1,464.20	228.74	1,791.15	464.20	233.32	438.68
23/10/2015	2,878.61	1,455.57	233.63	61.84	455.57	238.30	433.70
24/10/2015	2,954.59	1,504.88	246.39	26.43	504.88	251.32	420.68
25/10/2015	3,152.17	1,580.53	288.31	30.80	580.53	294.07	377.93
26/10/2015	2,786.76	1,430.85	224.19	28.88	430.85	228.67	443.33
27/10/2015	3,707.69	1,416.17	248.68	954.68	416.17	253.65	418.35
28/10/2015	4,029.11	1,422.84	236.99	1,274.43	422.84	241.73	430.27
29/10/2015	3,289.61	1,396.45	245.86	578.85	396.45	250.78	421.22
30/10/2015	3,119.24	1,380.04	244.38	442.78	380.04	249.27	422.73
31/10/2015	3,185.56	1,416.30	249.58	431.38	416.30	254.57	417.43
Total	157,395.88	45,089.85	7,490.91	69,893.66	14,089.85	7,640.73	13,191.27
Percent (%)	100.00%	28.65%	4.76%	44.41%	8.95%	4.85%	8.38%

Total consumptions

- Raw Materials [kWh]
- Packaging [kWh]
- Production [kWh]
- Store [kWh]
- Offices [kWh]
- Other Consumption [kWh]

In the "Configurations" TAB you can set:

- **Title**: Optional field
- **Office**: Optional field
- **General Meter**: configure the channel representing the demand in the plant.
- **Cost centers channels**: click "Add channel" to configure all the channels representing the Cost Center. For each channel it will be required a name that will be used in the report.
- **Start month**: the default month is January; the user can set the desired month.
- **Multiplier unit of measure**: Set a desired multiplier factor. In this example, in the example, "k" represents all kWh exported consumptions.
- **Decimal number:** set the number of decimal digits to format the displaying in the cells.
- **Underline partial data**: tick the box to enable the red highlighting of the cell in case of missing / not complete data. The system can check if all data are available.
- **Add other consumption**: tick this box, to create the "Other consumptions" column in the Excel sheet. This is given by the difference between general meter and/or the plant demand minus all other utilities. The same one will appear also in the pie chart.

Click "*Save configuration*". Select the desired month in the "Perform" TAB and click "Perform".
The system allows downloading an Excel file like the one pictured above.

2.7.9 Monthly Summary for range

This report is for a fast checking of the supplier invoice. All monthly consumptions can be spread over 3 tariff ranges (sheet 1), on Peak of Peak ranges (sheet 2) and for work shifts (Sheet 3) with fixed time ranges (6-14; 14-22; 22-6).

The duration curve of sheet n° 4 allows the user to understand which is the "typical" consumption of the electrical meter.

Create a new Report, select "**Monthly Summary for range**" and Save.

In sheets n° 1 and n° 2 (see the following picture) you can see a daily summary of Active and Reactive Energy divided by tariff ranges. In addition the report calculates real power factor for single range. Ultimately, the chart shows minimum, maximum and medium power for each range. At the bottom of the table there are monthly total calculations. Finally, you will find a small table and a chart showing consumption distribution for each tariff range.
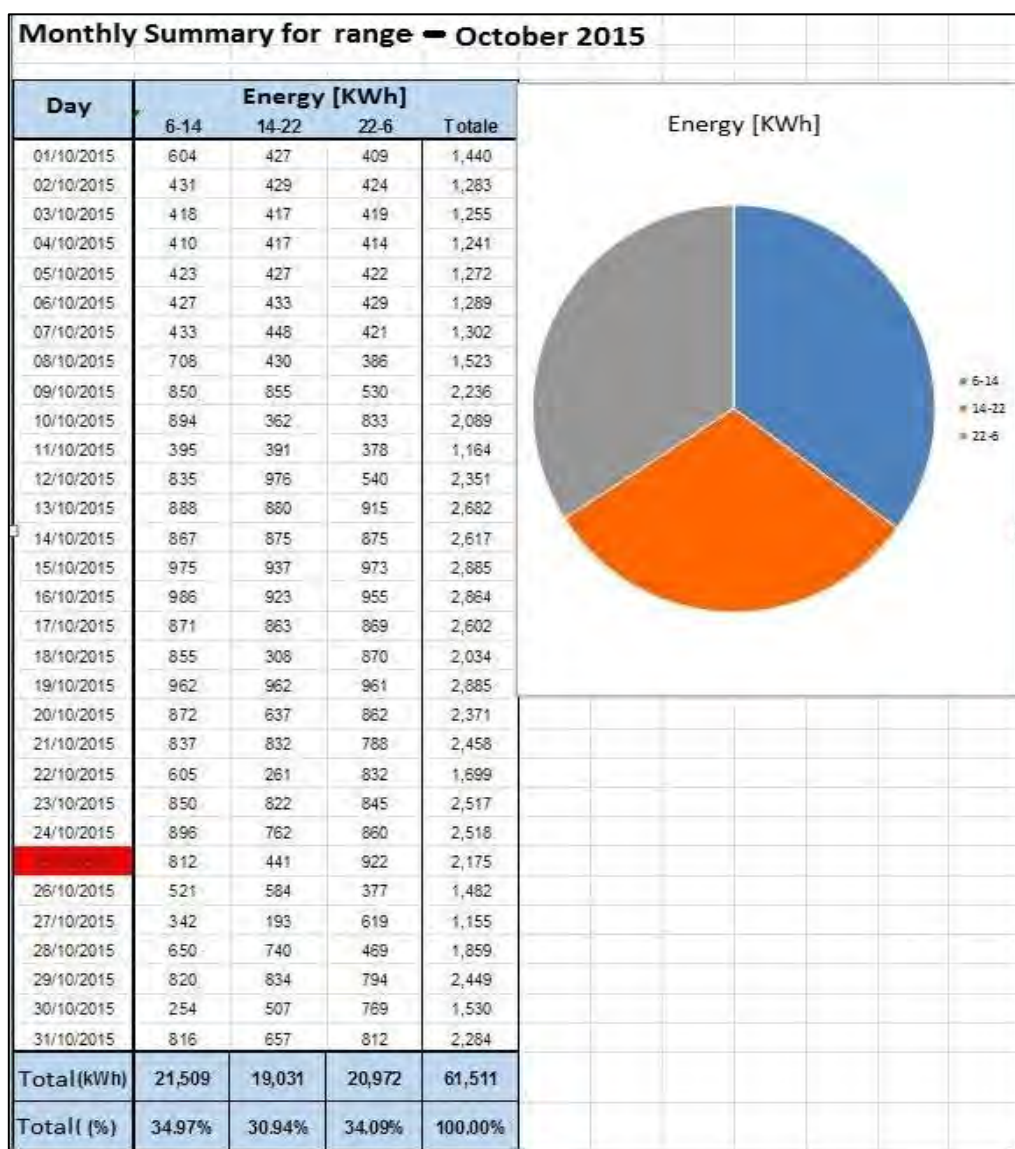
Monthly Summary for range - October 2015

F1: Peak hours	F2: Mid hours	F3: Off-peak hours
lun-ven: 8.00-18.59	lun-ven: 7.00-8.00, 19.00-22.59 - sab: 7.00-22.59	lun-sab: 0.00-6.59, 23.00-24.00 -Sun; Hol. (*)0.00-24.00

(*) Considering Holidays: 1 Jan; 6 Jan; Easter Monday; 25 Apr; 1 May; 2 Jun; 15 Aug; 1 Nov; 8 Dec; 25 Dec; 26 Dec.
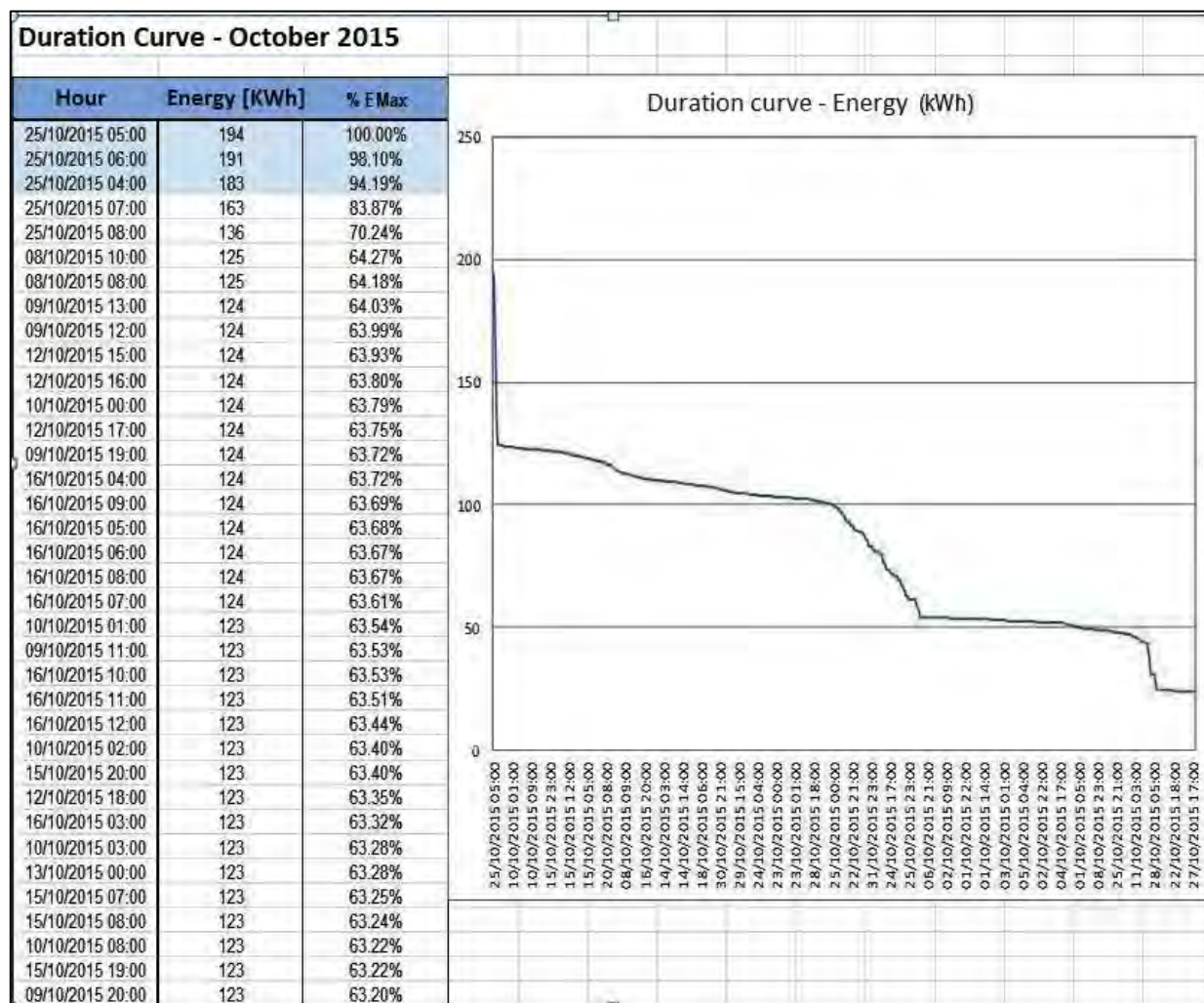
Day	Active Energy (kWh) F1	Active Energy (kWh) F2	Active Energy (kWh) F3	Total Active Energy (kWh)	Reactive Energy (kVArh) F1	Reactive Energy (kVArh) F2	Reactive Energy (kVArh) F3	Total Reactive Energy (kVArh)	Cos fi F1	Cos fi F2	Cos fi F3	Total Day Cos fi	Pmin F1 (kW)	P average F1 (kW)	PMax F1 (kW)	Pmin F2 (kW)	P average F2 (kW)	PMax F2 (kW)	Pmin F3 (kW)	P average F3 (kW)	PMax F3 (kW)	PMax (kW)
01/10/2015	708	328	404	1,440	619	287	353	1,260	0.753	0.753	0.753	0.753	47	64	125	53	66	123	46	50	54	125
02/10/2015	592	266	425	1,283	518	233	372	1,123	0.753	0.753	0.753	0.753	53	54	54	51	53	54	50	53	54	54
03/10/2015	0	836	419	1,255	0	731	367	1,098	0.000	0.753	0.753	0.753				51	52	53	51	52	53	53
04/10/2015	0	0	1,241	1,241	0	0	1,086	1,086	0.000	0.000	0.753	0.753							49	52	53	53
05/10/2015	585	266	421	1,272	512	233	388	1,113	0.753	0.753	0.753	0.753	52	53	54	52	53	54	52	53	53	54
06/10/2015	590	271	429	1,289	516	237	375	1,128	0.753	0.753	0.753	0.753	52	54	54	54	54	54	53	54	54	54
07/10/2015	622	253	426	1,302	544	222	373	1,139	0.753	0.753	0.753	0.753	51	57	125	47	51	54	45	53	54	125
08/10/2015	825	315	383	1,523	722	276	335	1,333	0.753	0.753	0.753	0.753	51	75	125	50	63	126	46	48	50	126
09/10/2015	1,172	606	458	2,236	1,025	530	401	1,956	0.753	0.753	0.753	0.753	42	107	126	101	121	124	47	57	124	126
10/10/2015	0	1,185	904	2,089	0	1,037	791	1,828	0.000	0.753	0.753	0.753				42	74	123	46	113	124	124
11/10/2015	0	0	1,164	1,164	0	0	1,019	1,019	0.000	0.000	0.753	0.753							44	49	73	73
12/10/2015	1,287	596	468	2,351	1,126	521	410	2,057	0.753	0.753	0.753	0.753	99	117	124	93	119	123	48	59	123	124
13/10/2015	1,215	551	916	2,682	1,064	482	802	2,347	0.753	0.753	0.753	0.753	108	110	112	109	110	111	108	115	123	123
14/10/2015	1,196	545	877	2,617	1,046	476	767	2,290	0.753	0.753	0.753	0.753	107	109	111	107	109	111	108	110	118	118
15/10/2015	1,299	614	972	2,885	1,137	537	850	2,524	0.753	0.753	0.753	0.753	73	118	124	122	123	123	119	121	123	124
16/10/2015	1,330	565	969	2,864	1,164	495	848	2,506	0.753	0.753	0.753	0.753	112	121	124	109	113	124	109	121	124	124
17/10/2015	0	1,733	870	2,602	0	1,516	761	2,277	0.000	0.753	0.753	0.753				105	108	110	106	109	110	110
18/10/2015	0	0	2,034	2,034	0	0	1,780	1,780	0.000	0.000	0.753	0.753							24	85	122	122
19/10/2015	1,325	596	964	2,885	1,159	522	844	2,524	0.753	0.753	0.753	0.753	117	120	123	118	119	123	115	121	123	123
20/10/2015	1,041	431	899	2,371	911	377	787	2,074	0.753	0.753	0.753	0.753	48	95	118	46	86	118	71	112	122	122
21/10/2015	1,174	492	792	2,458	1,027	430	693	2,151	0.753	0.753	0.753	0.753	101	107	122	58	98	118	49	99	112	122
22/10/2015	521	346	832	1,699	456	303	728	1,487	0.753	0.753	0.753	0.753	24	47	115	24	89	105	102	104	110	115
23/10/2015	1,135	536	845	2,517	993	469	740	2,202	0.753	0.753	0.753	0.753	81	103	117	102	107	118	101	106	118	118
24/10/2015	0	1,659	859	2,518	0	1,452	752	2,203	0.000	0.753	0.753	0.753				61	104	117	100	107	123	123
25/10/2015	0	0	2,175	2,175	0	0	1,903	1,903	0.000	0.000	0.753	0.753							24	49	102	102
26/10/2015	718	444	320	1,482	628	389	280	1,297	0.753	0.753	0.753	0.753	24	65	125	41	89	122	24	40	103	125
27/10/2015	395	121	639	1,155	346	106	559	1,011	0.753	0.753	0.753	0.753	24	36	102	24	24	24	24	80	103	103
28/10/2015	1,031	360	469	1,859	902	315	410	1,627	0.753	0.753	0.753	0.753	35	94	124	24	72	104	24	59	126	126
29/10/2015	1,138	516	796	2,449	995	451	696	2,143	0.753	0.753	0.753	0.753	79	103	105	93	103	105	45	99	107	107
30/10/2015	397	393	740	1,530	347	344	647	1,339	0.753	0.753	0.753	0.753	24	36	107	24	79	107	24	92	106	107
31/10/2015	0	1,473	811	2,284	0	1,289	710	1,999	0.000	0.753	0.753	0.753				24	92	121	24	101	106	121
Total	20,294	16,298	24,920	61,511	17,757	14,281	21,805	53,822	0.753	0.753	0.753	0.753	24	84	126	24	86	126	24	80	126	126

	Total (kWh)	Percent (%)
Active Energy F1	20,294	32.99%
Active Energy F2	16,298	26.50%
Active Energy F3	24,920	40.51%

Sheet n° 3 "Shifts Summary", shows Active Energy divided by work shifts. See the picture below:
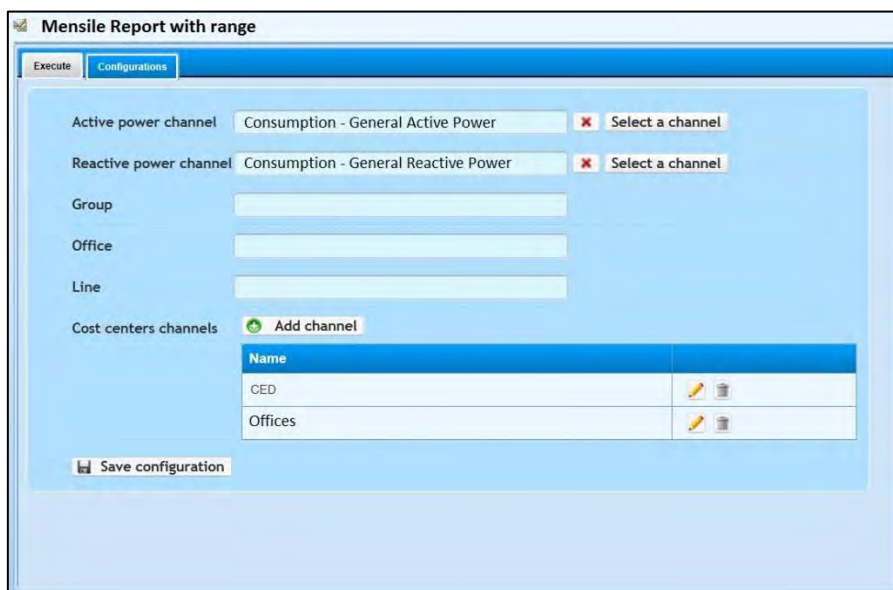
Monthly Summary for range ➡ October 2015

Day	Energy [KWh]			
	6-14	14-22	22-6	Totale
01/10/2015	604	427	409	1,440
02/10/2015	431	429	424	1,283
03/10/2015	418	417	419	1,255
04/10/2015	410	417	414	1,241
05/10/2015	423	427	422	1,272
06/10/2015	427	433	429	1,289
07/10/2015	433	448	421	1,302
08/10/2015	708	430	386	1,523
09/10/2015	850	855	530	2,236
10/10/2015	894	362	833	2,089
11/10/2015	395	391	378	1,164
12/10/2015	835	976	540	2,351
13/10/2015	888	880	915	2,682
14/10/2015	867	875	875	2,617
15/10/2015	975	937	973	2,885
16/10/2015	986	923	955	2,864
17/10/2015	871	863	869	2,602
18/10/2015	855	308	870	2,034
19/10/2015	962	962	961	2,885
20/10/2015	872	637	862	2,371
21/10/2015	837	832	788	2,458
22/10/2015	605	261	832	1,699
23/10/2015	850	822	845	2,517
24/10/2015	896	762	860	2,518
	812	441	922	2,175
26/10/2015	521	584	377	1,482
27/10/2015	342	193	619	1,155
28/10/2015	650	740	469	1,859
29/10/2015	820	834	794	2,449
30/10/2015	254	507	769	1,530
31/10/2015	816	657	812	2,284
Total(kWh)	21,509	19,031	20,972	61,511
Total((%)	34.97%	30.94%	34.09%	100.00%

Energy [KWh]

- 6-14
- 14-22
- 22-6

Sheet n° 5 shows a duration curve of Active Energy "hour" consumptions (of the whole month):

Duration Curve - October 2015

Hour	Energy [KWh]	% EMax
25/10/2015 05:00	194	100.00%
25/10/2015 06:00	191	98.10%
25/10/2015 04:00	183	94.19%
25/10/2015 07:00	163	83.87%
25/10/2015 08:00	136	70.24%
08/10/2015 10:00	125	64.27%
08/10/2015 08:00	125	64.18%
09/10/2015 13:00	124	64.03%
09/10/2015 12:00	124	63.99%
12/10/2015 15:00	124	63.93%
12/10/2015 16:00	124	63.80%
10/10/2015 00:00	124	63.79%
12/10/2015 17:00	124	63.75%
09/10/2015 19:00	124	63.72%
16/10/2015 04:00	124	63.72%
16/10/2015 09:00	124	63.69%
16/10/2015 05:00	124	63.68%
16/10/2015 06:00	124	63.67%
16/10/2015 08:00	124	63.67%
16/10/2015 07:00	124	63.61%
10/10/2015 01:00	123	63.54%
09/10/2015 11:00	123	63.53%
16/10/2015 10:00	123	63.53%
16/10/2015 11:00	123	63.51%
16/10/2015 12:00	123	63.44%
10/10/2015 02:00	123	63.40%
15/10/2015 20:00	123	63.40%
12/10/2015 18:00	123	63.35%
16/10/2015 03:00	123	63.32%
10/10/2015 03:00	123	63.28%
13/10/2015 00:00	123	63.28%
15/10/2015 07:00	123	63.25%
15/10/2015 08:00	123	63.24%
10/10/2015 08:00	123	63.22%
15/10/2015 19:00	123	63.22%
09/10/2015 20:00	123	63.20%

Duration curve - Energy (kWh)

The table shows all samples between 90 and 100%.
Finally, if center costs have been configured, in the report you will find a sheet with monthly consumption of different channels, divided by each tariff range.

Please enter "Configurations" TAB to make the report configuration:

- **Active power channel**: Set Active Power Channel, this is usually the Electricity meter's.
- **Reactive power channel**: Set Reactive Power Channel, this is usually the Electricity meter's.
- **Group, Branch, Line**: Set Group, branch and the monitored Line. These labels will appear in the generated report.
- **Cost centers channels**: OPTIONAL field, click "Add channel" to add channels linked to the Company's cost centers.

When finished click "**Save configuration**" to store the settings. Select the desired month, click "Perform" to download an Excel file as the one mentioned above.

2.8   Scatter Plot
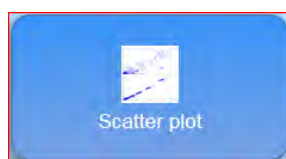
The **"Scatter Plot"** shows 2 variables of a data in a Cartesian plan.

Data are displayed through a collection of points each one with a position on the horizontal axis defined by a variable and on the vertical axis defined by the other one.

Another example is the trend analysis of the following variables: energy produced by a photovoltaic panel and the solar irradiation on it. Pick which one should be on the abscissa (or "x") and which one on the ordinate ("y"). The most important variable (dependent) is usually on "y" , for this reason: if you need to show how the energy (or the power) produced changes according to irradiation, the independent variable should go on the "x" axis:
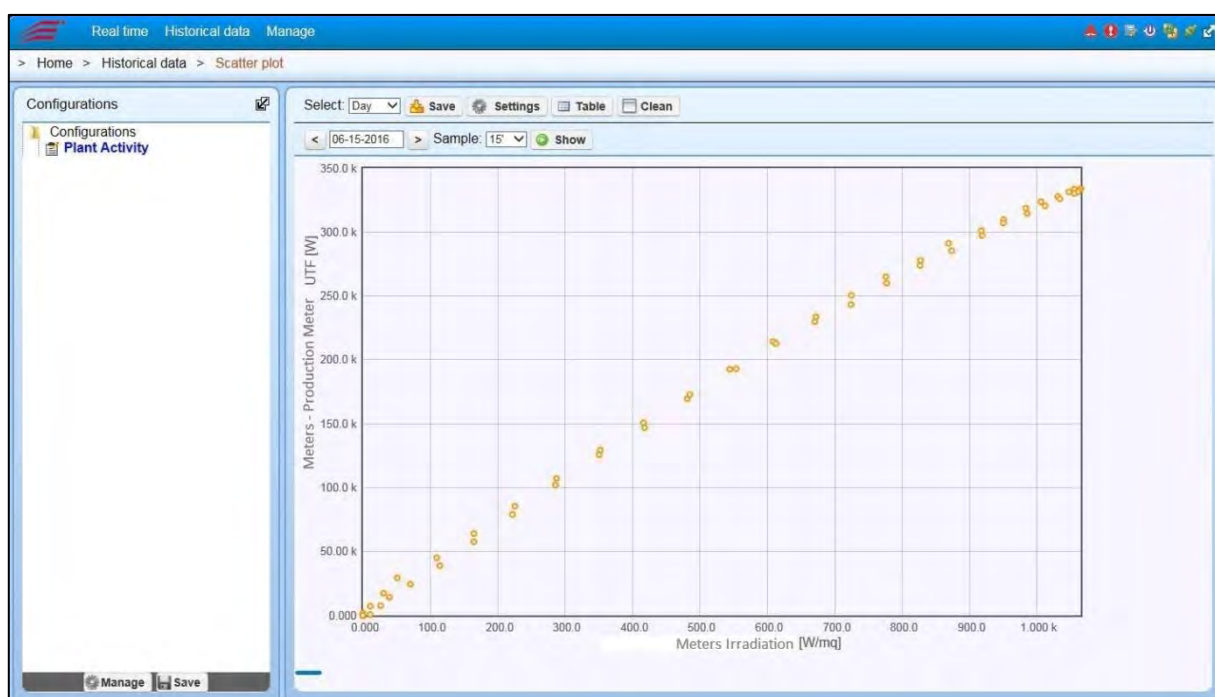
In this example, you can see the close dependence (thus efficiency) between solar irradiation on the panel and the energy (or power) produced by it. Let's see how to configure the chart.

Select **Scatter plot** from the **Historical data** menu; this will show the saved configuration on the left hand side of the monitor. To configure a chart, click [Settings] and then **Add** on the next pop-up . Here, select the 2 desired channels from the tree structure.

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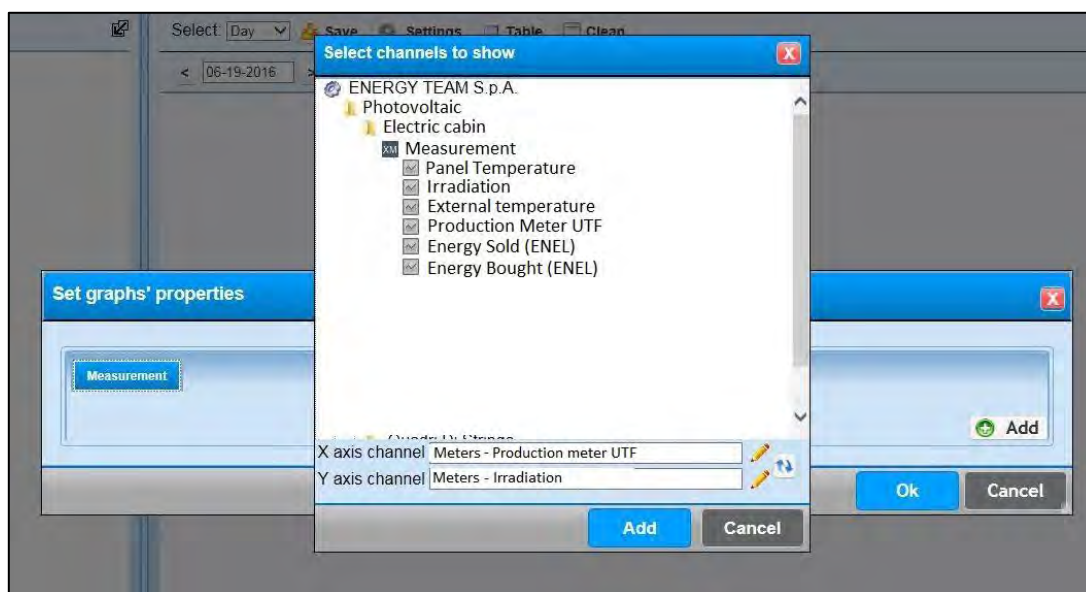
You can reverse the order referred to data displaying and once it has been configured, select Add. Then you can add a new chart or enter its properties as it follows:
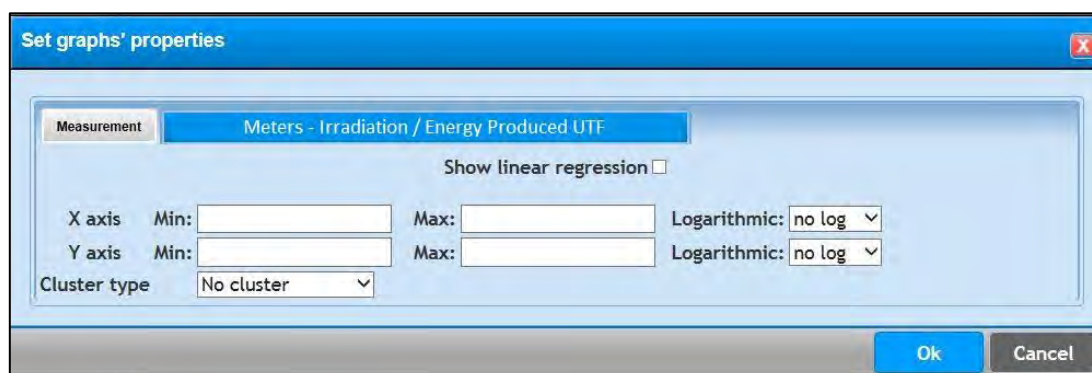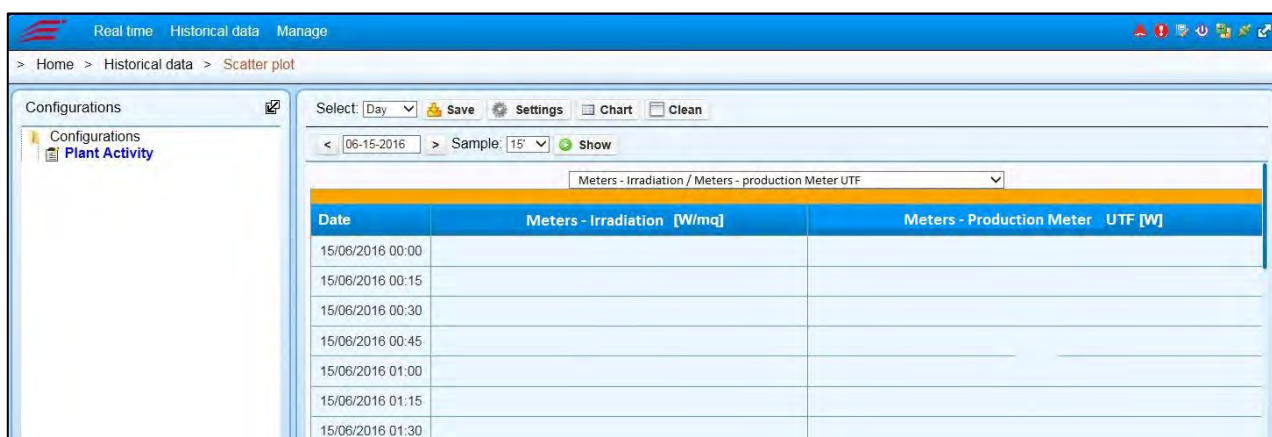
As you can see from the picture above, the user can set some data visualisation features i.e:
- Set Regression line displaying
- Set Minimum and Maximum values for each axis
- Set Type of Cluster (correlate the data according to the tariff bands)
- Set visualisation on a logarithmic scale

Select OK once done setting. Select displaying period, sampling, press **Display** and the system will show the data in a chart as shown in the 1st example above.

Click [Table], to view the data on a chart as shown it the example below.

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Click **Save** to save this table in CSV format.

Users can save their configuration for a quick consultation without having to select the channels from the tree structure nor configure the displaying mode from the "Settings" menu.

Click [Configurations] to enter the menu, then [Save] ; name the configuration and save it in your Configurations Tree structure.

Double click on the configuration, then click [Manage] to:

- Delete the configuration *("**Delete from the tree**" will delete the configuration only for the user that logged in to the software while "**Delete permanently**", will delete the configuration even it's been shared with other users).*
- Move the configuration to another folder.
- Share your own configuration with other users giving them permissions (when you decide to share a configuration with other users, they have to be allowed **Reading, Sharing, Editing, Deleting**).
- Manage eventual permissions given to other users.
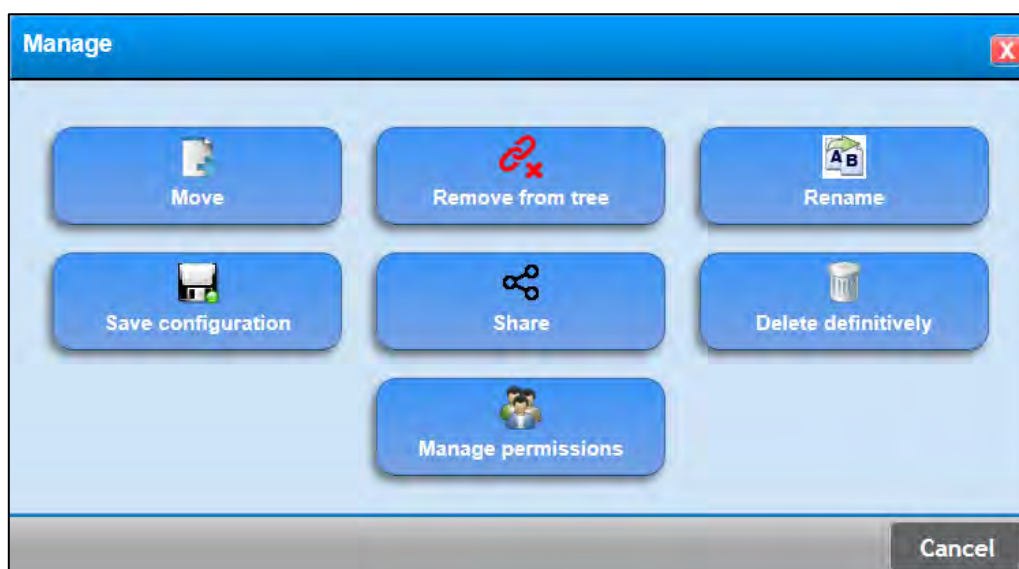
2.9 Carpet Plot
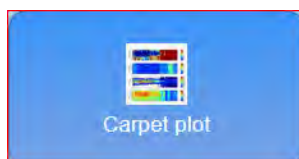
This module allows displaying a vast quantity of data in a colour scale, to make an immediate analysis and identify eventual consumption anomalies. Select **Carpet Plot** from the **Historical data** menu to enter this function. See an example here below:
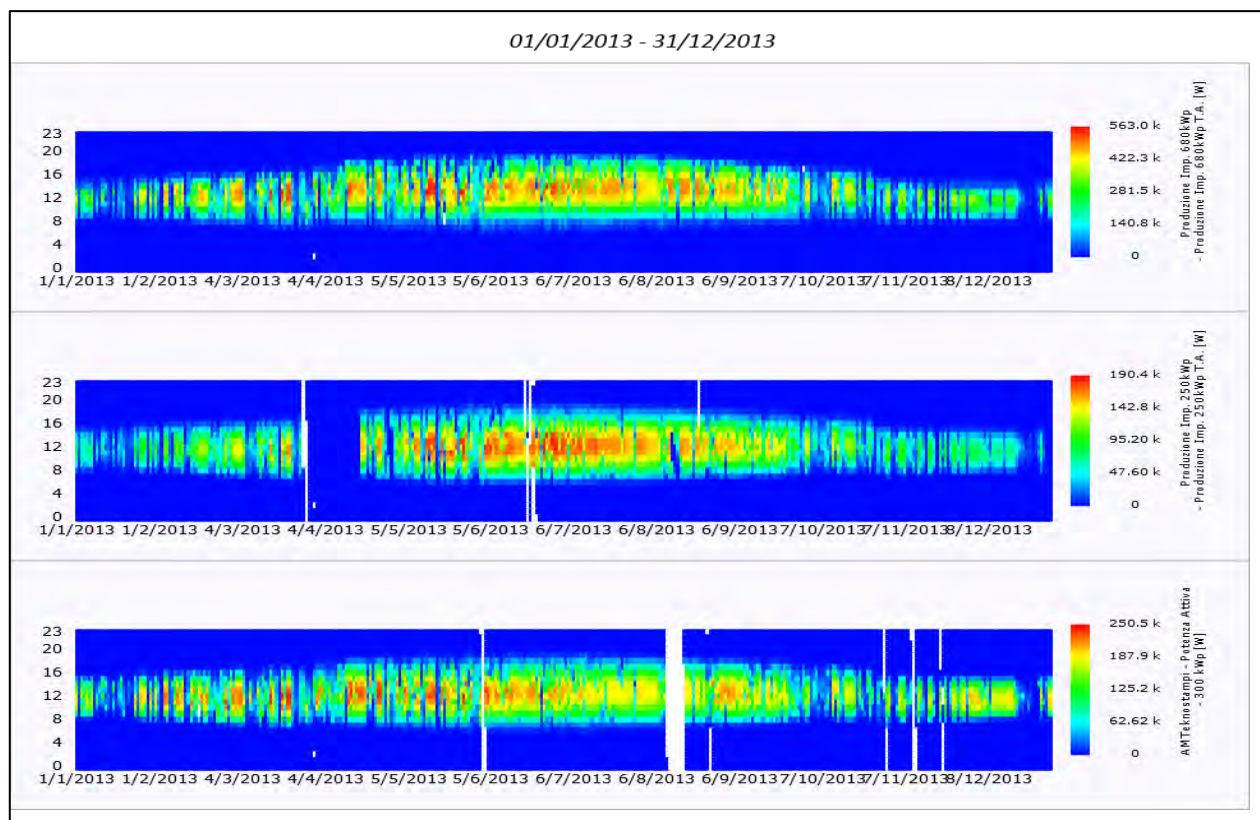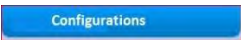
The user can select the channel from the tree structure on the left, and the system will automatically assign a numeric value to a colour scale on the right. The user can define, of course, certain chart properties, clicking on "Settings" a window as the one below will open:
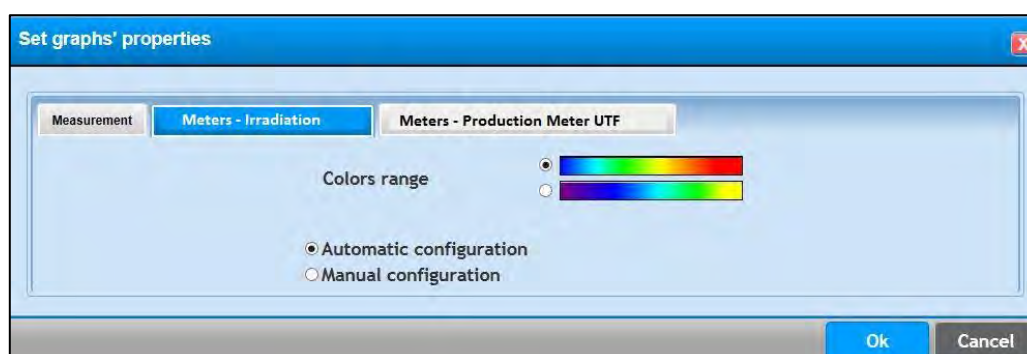
In this menu the user can delete eventual "exceeding" channels configured in the chart and for each channel (shown in the usual TAB menu) they can choose the desired type of colour scale. In addition you can force minimum and maximum values, that is to say you can assign the colour of beginning and end scale to some programmable numeric values.

Users can save their configuration for a quick consultation without having to select the channels from the tree structure nor configure the displaying mode from the "Settings" menu.

Click [Configurations] to enter the menu; then [Save]; name the configuration and save it in your Configurations Tree structure.

Double click on the configuration and then click [Manage] to:

- Delete the configuration *("**Delete from the tree**" will delete the configuration only for the user that logged in to the software while "**Delete permanently**", will delete the configuration even it's been shared with other users).*
- Move the configuration to another folder.
- Share your own configuration with other users giving them permissions (when you decide to share a configuration with other users, they have to be allowed **Reading, Sharing, Editing, Deleting**).
- Manage eventual permissions given to other users.
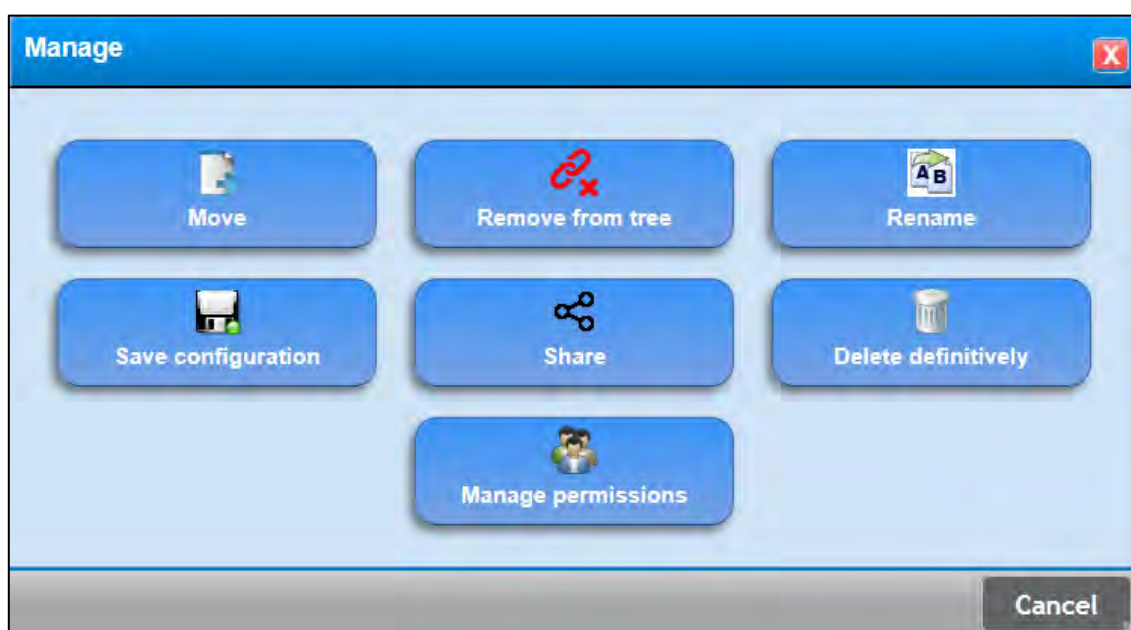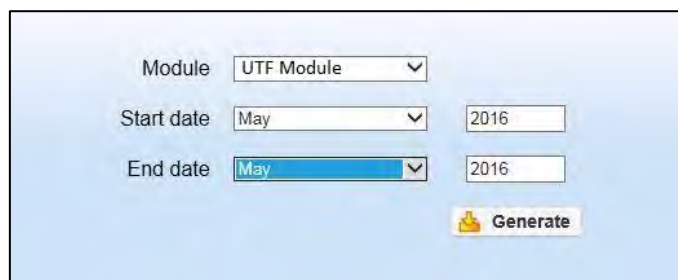
2.10 UTF Viewing
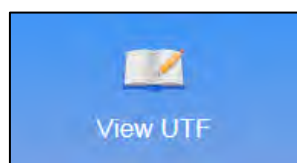
This function allows you to make a daily storage of the data referred to different meters on a register provided by UTF (**U**fficio **T**ecnico **F**inanze- Finance Technical Office). This storage is written and registered in a document Excel.

From the top toolbar, click on **Historical Data** and select **View UTF**. You will see the following menu:

This function becomes operative, after generating the desired configurations from the **"UTF Configuration"** menu. In this menu you can also "realign" the numerators of the counter units. The fields are the following ones:

Module: choose, from the drop down menu, the UTF module to generate according to the ones configured in the **"UTF Configuration"** menu.

Start date: select the starting date of the period you want to see values for (month and year).

End date: select the ending date of this period (month and year); the chart will display the values within the set period.

Generate: Every time we generate a module, it will be an Excel one. Click the button to open the submenu here below:

(The menu below and the language may be different, it depends by the operative system)

Click **Save** to store the generated chart (Excel). It can be also elaborated and printed. The button **open** allows directly displaying of the chart:

DATE	Electric Energy Meter 1, Serial Number 1 12345		Electric Energy Meter 2, Serial Number 2 23456				
	Unit - meter	Tot kWh	Unit - meter	Tot kWh	F1	F2	F3
Preview	962,4		2422,8		2346,6	67,2	9,0
01/06/2014	962,5	405,2	2422,8	314,1	2346,6	67,2	9,0
02/06/2014	962,5	403,6	2422,8	308,3	2346,6	67,2	9,0
03/06/2014	962,5	393,1	2422,8	298,7	2346,6	67,2	9,0
04/06/2014	962,6	389,2	2422,8	296,0	2346,6	67,2	9,0
05/06/2014	962,6	386,4	2422,8	294,0	2346,6	67,2	9,0
06/06/2014	962,6	383,1	2422,9	292,0	2346,6	67,2	9,0
07/06/2014	962,7	389,4	2422,9	291,3	2346,6	67,2	9,0
08/06/2014	962,7	385,7	2422,9	285,3	2346,6	67,2	9,1
09/06/2014	962,7	366,0	2422,9	271,2	2346,6	67,2	9,1
10/06/2014	962,8	361,6	2422,9	265,7	2346,6	67,2	9,1
11/06/2014	962,8	362,4	2422,9	265,9	2346,6	67,2	9,1
12/06/2014	962,8	356,9	2422,9	261,1	2346,6	67,2	9,1
13/06/2014	962,8	357,0	2422,9	259,7	2346,6	67,2	9,1
14/06/2014	962,9	369,5	2423,0	265,5	2346,6	67,3	9,1
15/06/2014	962,9	369,8	2423,0	254,0	2346,6	67,3	9,1
16/06/2014	962,9	356,0	2423,0	241,0	2346,6	67,3	9,1
17/06/2014	963,0	354,6	2423,0	238,1	2346,6	67,3	9,1
18/06/2014	963,0	352,5	2423,0	231,7	2346,6	67,3	9,1
19/06/2014	963,0	350,6	2423,0	227,2	2346,6	67,3	9,1
20/06/2014	963,0	347,7	2423,0	222,5	2346,6	67,3	9,1
21/06/2014	963,1	357,6	2423,0	231,6	2346,6	67,3	9,1
22/06/2014	963,1	361,0	2423,0	233,6	2346,6	67,3	9,1
23/06/2014			2423,0	225,8	2346,6	67,3	9,1
24/06/2014	963,2	655,1	2423,1	224,2	2346,6	67,3	9,1
25/06/2014	963,3	856,3	2423,1	223,2	2346,7	67,3	9,1
26/06/2014	963,3	770,9	2423,1	928,4	2346,7	67,3	9,2
27/06/2014	963,4	731,5	2423,2	2673,3	2346,7	67,3	9,2
28/06/2014	963,4	772,5	2423,3	2385,1	2346,7	67,4	9,2
29/06/2014	963,5	769,2	2423,4	2290,6	2346,7	67,4	9,3
30/06/2014	963,6	1345,2	2423,5	2188,1	2346,8	67,4	9,3
Difference	1,2		0,7		0,2	0,2	0,3
Total		14399,2		16987,3			

In this example they have been elaborated 2 fiscal meters, and the Meter 1 has got a unique numerator (which is in Medium Voltage), while the Meter 2 has got 3 totalizers (according to the tariff band). For each day it is extracted the quantity of calculated energy, and the relative numerator which refers to a reading of the hour 24.00 of the declared day.

The Web-Server makes a reconstruction of the on-board totalizer, according to the daily calculated energy. Some discrepancies between the meter actual reading and the declared one are allowed.

NOTES:
Red columns point out the complete or partial lack of the data referred to the considered day, meaning that some of all 96 daily quarters of an hour are missing.

2.11 Dashboard Lite
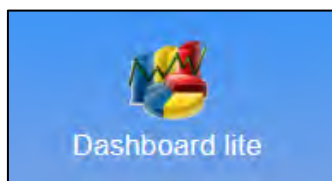
This page displays the synoptic previously configured in the "Management" menu.

This function allows displaying your own synoptic, so after logging in, click *"Historical Data"* and then *"Dashboard lite"*. Now, select one or more synoptic from the drop down menu at the top right.
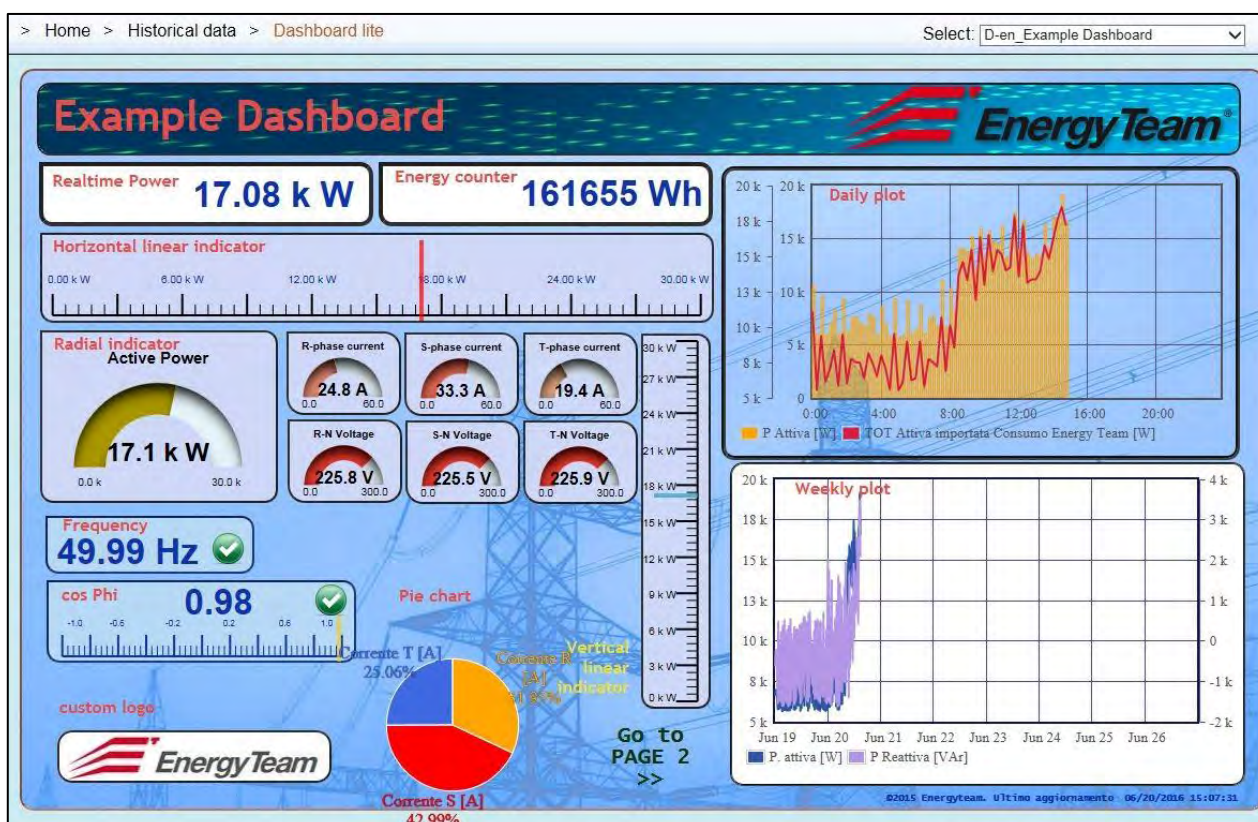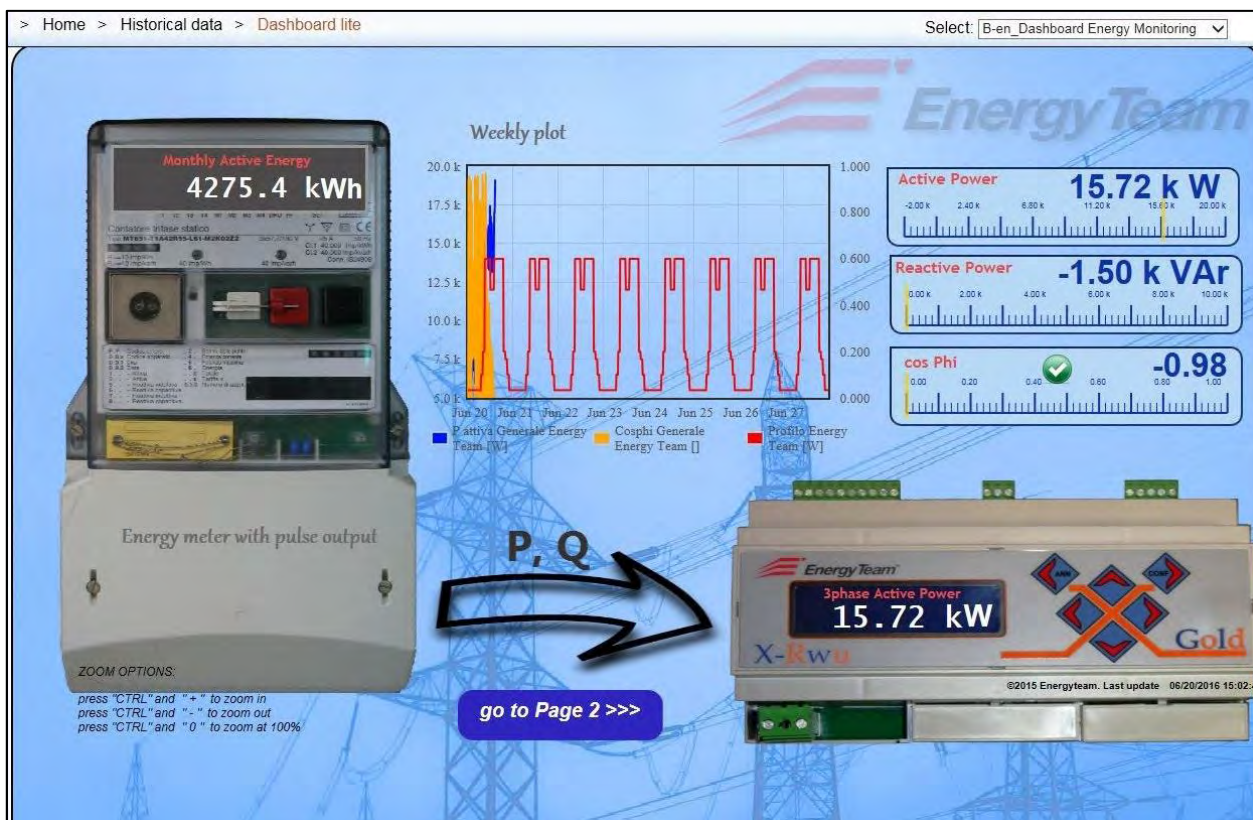
You can also use an external player, which will automatically login to perform the desired synoptic full screen. The use of this player is provided when, for example, you need to install some televisions in the plant to display the desired synoptic.

In the synoptic module, the user can insert components and pictures to get the desired synoptic.

Here below some examples of synoptic configured by novice users:

Weekly plot

Monthly Active Energy
4275.4 kWh

Energy meter with pulse output

ZOOM OPTIONS:
press "CTRL" and " + " to zoom in
press "CTRL" and " - " to zoom out
press "CTRL" and " 0 " to zoom at 100%

P, Q

go to Page 2 >>>

Active Power   **15.72 k W**

Reactive Power   **-1.50 k VAr**

cos Phi   **-0.98**

3phase Active Power
15.72 kW

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Example Dashboard

Realtime Power   **17.08 k W**
Energy counter   **161655 Wh**

Horizontal linear indicator

Radial indicator
Active Power
17.1 k W

R-phase current **24.8 A**
S-phase current **33.3 A**
T-phase current **19.4 A**

R-N Voltage **225.8 V**
S-N Voltage **225.5 V**
T-N Voltage **225.9 V**

Frequency
49.99 Hz

cos Phi   **0.98**

Pie chart

custom logo

Corrente T [A] 25.06%

Consumo R [A] 31.95%

Vertical linear indicator

Corrente S [A] 42.99%

Daily plot

P Attiva [W]   TOT Attiva importata Consumo Energy Team [W]

Weekly plot

P. attiva [W]   P Reattiva [VAr]

Jun 19 Jun 20 Jun 21 Jun 22 Jun 23 Jun 24 Jun 25 Jun 26

Go to
PAGE 2
>>

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These examples are of synoptic fully designed by existing customers.

This function allows you displaying both historical and real time data making it possible to manage some outputs (i.e. the X-Meter's outputs to control lighting switching ON and OFF).

Click the link below to see how these synoptic work

http://demo.energyteam.it:8080

and enter the above mentioned menu.

2.12 Events Log

This menu allows accessing the events recorded by the devices (i.e. the X-Meter). It also allows seeing some micro-interruptions registered by the device.

Some other information, such as instrument switching off and on, alarm status recording, etc. can be available.

To enter this menu, select **Device Events** from the **Historical Data** menu:
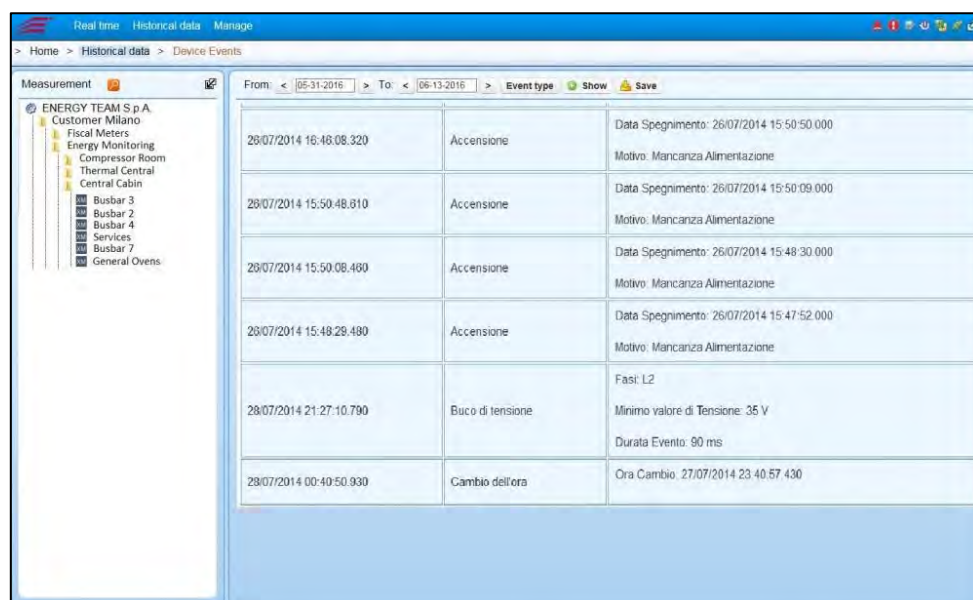
As you can see from the picture above, the user selected an analysis period (with a maximum duration of 32 days) double clicking the desired device, in this case Busbar n° 3.

You can now see the on board clock synchronizations, or micro-interruptions of the L2 phase (90 mSec). The user can get further details double clicking on the event so to see the following window:
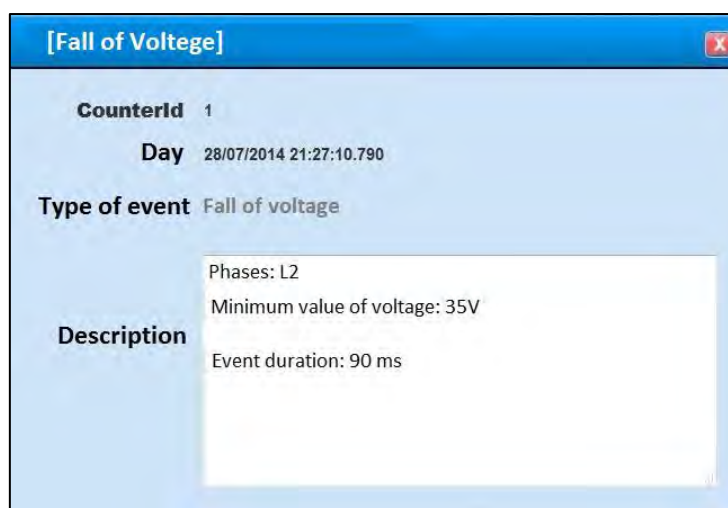
Note: You need the remote reading module to download these data. You can't use polling.

2.13 Harmonics
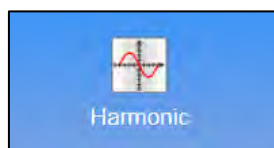
This menu allows monitoring total currents and voltages harmonic distortion and to analyse voltage and currents values of the first 25 harmonics. This menu currently gives support only to X-meter device with the module XM6.

Select "**Historical Data**" and then "**Harmonics**" to enter the menu. From the usual tree structure on the left, select the desired device (measuring and a recording harmonics distortion) and you will get the following chart:
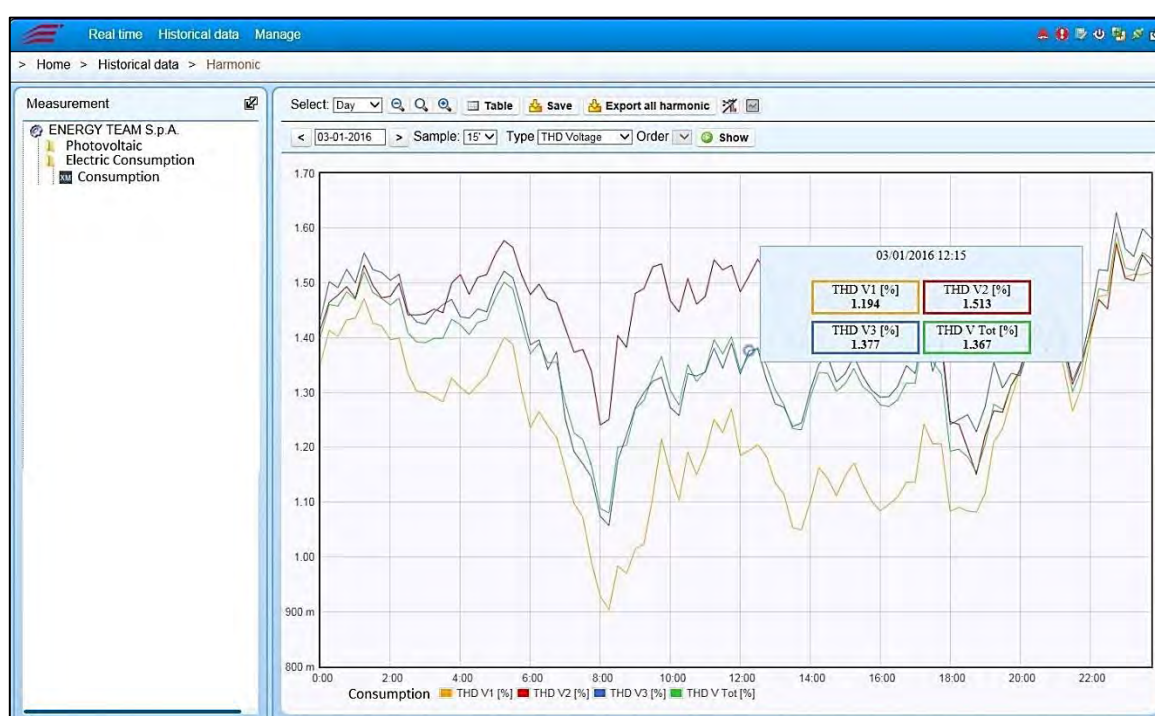
This chart shows total harmonic distortion of single voltages (it is also possible to select the desired measurement from the **"type"** menu). If "*Voltages L123*" are selected, the user can choose the harmonics to display, so to analyse, all the harmonics until the 25th.

The displaying of these data depends on the programming of the X-Meter's.

It is not possible to display all available directories of the list since the device has not enough memory available to store all data at once.

Click "Table" to see the data in a table like the one here below:

You can save a CSV file with the data, or click "Export all harmonics", to create a CSV file containing all harmonic analysis of the selected period.

Note: You need the remote reading module to download this data. You can't use polling.

2.14 Alarms History
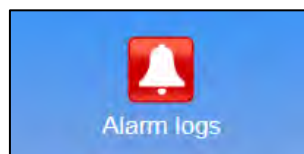
Via this menu, the user enters a chart showing all stored occurred alarms. This function becomes operational after setting the alarm in the "**Alarm logs**" menu.

Select **Historical Data** from the **Alarm logs** menu on the top toolbar to view the detail LOG.

Name	Date	Return date	Severity	Message
Communication Error	06/20/2016 16:03:30		Error	Consumo Energy Team
Communication Error	06/20/2016 13:11:30		Error	192.168.3.103:9000
Communication Error	06/20/2016 13:10:30		Error	CED
Communication Error	06/20/2016 13:04:30		Error	192.168.1.200:9000

Once entered this menu, the user can select the desired period of time and the system will display all the alarms occurred in it, specifying the alarm's name, date and time the alarm occurred, its level and the message. All these parameters are taken from the configurations created in the **"Alarms Configuration"** menu.

Every time a period is selected, it becomes operative after clicking **View**. The periods are displayed from the more recent to the less.

Please Note: the "Alarm Severity" function is only useful when the WEB Server has to inform an External Server.

During alarms configuration, the user can choose one of the alarm "Severity" settings, this way, should the Web Server inform a "central" system it will immediately send the message without waiting for the ordinary sending.

see "Alarms Configuration" for further information.

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2.15 Maps Viewing

This function is very useful for multi-site users; in fact, it allows viewing a geographical map of all monitored branches.

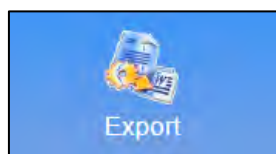Select **"Maps viewing"** from the **"Historical Data"** menu to open a window like the one here below:
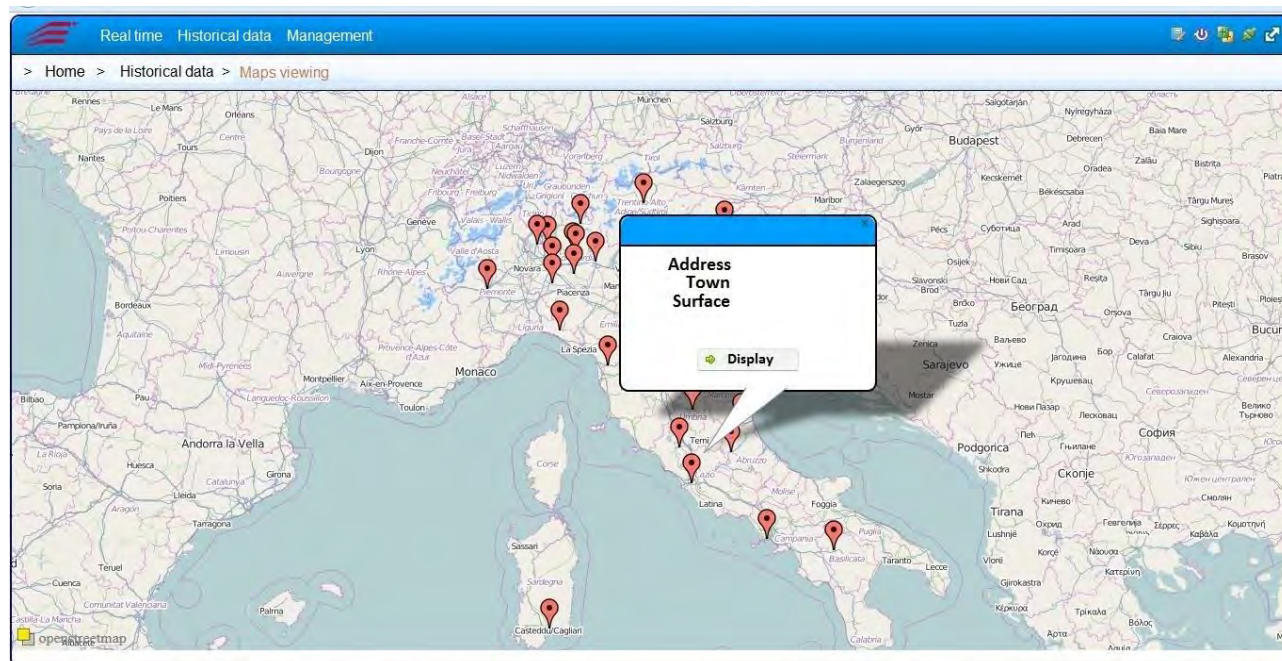
Each pinpoint represents a monitored site and the user can enter historical or real time data of the desired one just clicking on any one of them and select "view".
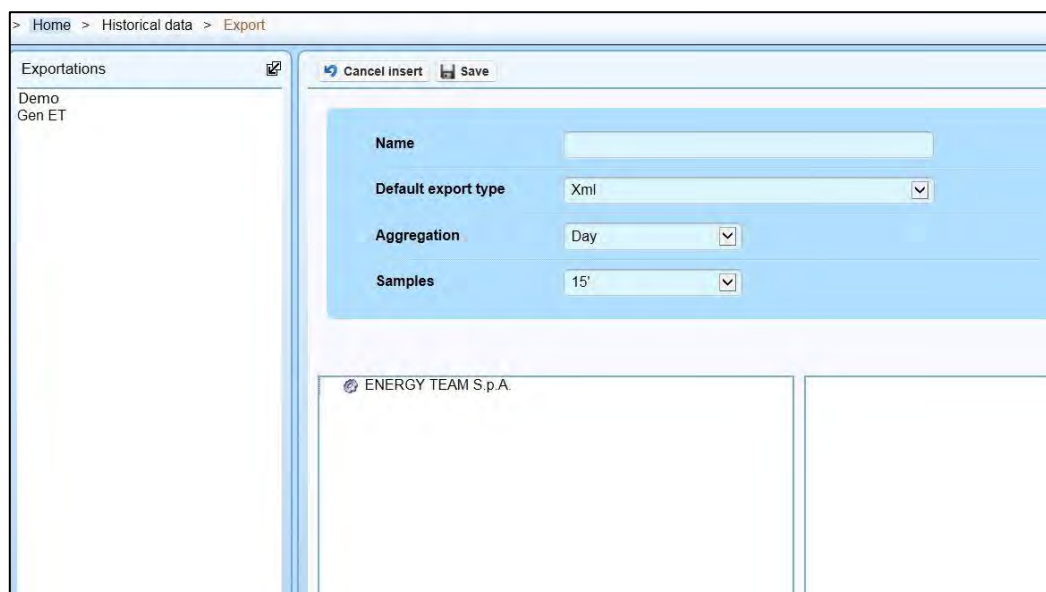
The map must be pre-configured from the "**Management → Maps**" menu where users can add information about each site such as address, surface, etc. the user should then put each reference in to the peripheral tree structure.

Note: you can configure more than one map and for each map, there are no limits to the number of branches to add.

2.16 Export

Select **Export** from the **Historical Data** menu on the top toolbar.
Click "Add" (bottom left) and select the desired channels.
A menu like the one pictured here below will open.

Use his menu to select channels from the plant to export their monitored values in a "Xml" file.
Double click on the desired channel in the tree structure to add it to the "Xml" file. Double click to delete it.

See the description of each field here below:

Name: give a name to the export. This will appear in the "Exports" column when accessing the menu.
Default export type: XML, (Excel standard format), or Csv1 format.
Samples: select the sample range within getting readings, storing and power calculus in.
Select one of the standards values: 1, 15, 60 minutes, 1 day. This is only possible selecting "Day" in the "Aggregation" field.
Aggregation: to include all data monitored during a week, a month or a year in the Export file.
Click **Save** to store the new configuration to be exported or **Cancel Insertion** to quit without saving.

Double click on the configuration on the left to complete export procedure. A menu showing the new fields **"From"** and **"To"** will open; this is to select respectively starting and ending dates of the time range within which export the data.

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The new **Id** field, is assigned automatically and it represents the configuration identification code. Please note this menu too allows editing the fields clicking on **Edit** or **Cancel** to delete the configuration.

Finally click on **Export** to export the data. You will see the following panel:

(The menu below and the language may be different, it depends by the operative system)

Open or Save **Monitoring** 1_15072014102508.xml da 192.168.3.208?   Open   Save ▼   Clean   ×

Click **Save** to save directly the file with the data of the selected channels, click **Open** to see the generated Xml file structure:

```
<value time="250520110645" status="3" id="89">7918.4541015625</value>
<value time="250520110700" status="3" id="89">19866.943359375</value>
<value time="250520110715" status="3" id="89">36450.44140625</value>
<value time="250520110730" status="3" id="89">64443.6328125</value>
<value time="250520110745" status="3" id="89">102963.84375</value>
<value time="250520110800" status="3" id="89">149391.078125</value>
<value time="250520110815" status="3" id="89">195908.734375</value>
<value time="250520110830" status="3" id="89">246313.375</value>
```

Please find below a short description of the parameters:

id="89": is the univocal number for the configured channel.

time="250520110645": is the chosen sampling detail day/month/minutes; this numeric string shows 25 (day), 05(month), 2011 (year) and 645 (hour – 06:45), the moment the value was captured.

As far as time is concerned, "hour" is considered as 15 min periods so, the one in the example will go from 06:45 to 07:00.

status="3" >7918 … Average value of the measurement stored within said quarter of an hour.

2.17 Energy Bill (for PV plants)

Select **Energy Bill** from the **Historical data** menu on the toolbar.

The respective menu allows immediate displaying of typical energy parameters of the selected plant. This menu becomes operational after setting the configurations needed in the **"Economical Calculation"** menu (see Installer Manual). The histogram below represents the day-by-day economic value referred to the production plant:
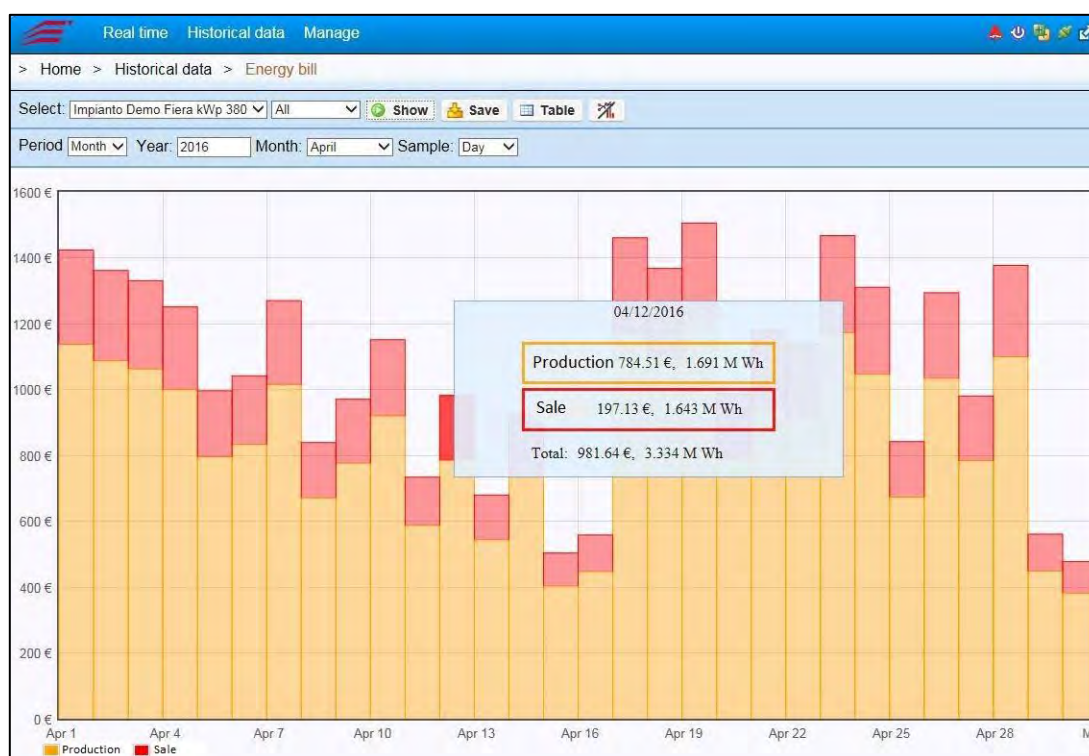
Example: *the histogram above shows day by day Produced Energy remuneration trend (together with the energy delivered to the agency, on the same bar with different colours) from the selected plant, distributed all over April 2011. Place the mouse cursor on the bar for daily details (example 9th April 2011) and you will automatically see quantity of energy, equivalent earning for each portion (both produced and delivered one) and daily total.*

Menu buttons:

Select: select the desired PV plant from the drop down menu.
Choose displaying period from the **Period** drop down menu.
Save: to save the displayed histogram.
Table: to see the data trend in numeric format (from the function table you can save a "csv" file). Please refer to the table here below:

| Real time | Historical data | Manage |

> Home > Historical data > Energy bill

Select: Impianto Demo Fiera kWp 380 ∨ All ∨ ● Show 🔖 Save ☐ Chart ✖

Period Month ∨ Year: 2016 Month: April ∨ Sample: Day ∨

Date	Produzione - Energy (Wh)	Produzione - Euro	Vendita - Energy (Wh)	Vendita - Euro	Total produced - Energy (Wh)	Total produced - Euro
Minimum value	1.137 k	381.53	286.8	95.40	1.617 M	476.93
Maximum vale	2.590 M	1201.79	2.528 M	303.33	5.118 M	1505.12
Average value	1.834 M	851.08	1.785 M	214.15	3.619 M	1065.24
Total	55.03 M	25532.50	53.54 M	6424.60	108.6 M	31957.10
Total from start	3.794 G	1760219.72	3.690 G	442797.67	7.484 G	2203017.39
04/01/2016	2.450 M	1136.68	2.390 M	286.83	4.840 M	1423.51
04/02/2016	2.343 M	1087.02	2.286 M	274.36	4.629 M	1361.39
04/03/2016	2.289 M	1062.09	2.234 M	268.07	4.523 M	1330.16
04/04/2016	2.153 M	998.89	2.100 M	251.94	4.252 M	1250.83
04/05/2016	1.714 M	795.42	1.672 M	200.62	3.386 M	996.04
04/06/2016	1.795 M	832.92	1.737 M	208.48	3.533 M	1041.41
04/07/2016	2.185 M	1013.84	2.132 M	255.83	4.317 M	1269.67
04/08/2016	1.445 M	670.64	1.399 M	167.86	2.844 M	838.51

NOTE: As you can see, the table shows total energy and remuneration from the plant start-up.

2.18 Daily Efficiency (for PV plants)

Select **Efficiency day by day** from the **Historical Data** menu on the toolbar.

The displayed histogram represents the trend of the **PRIm** coefficient in percentage value, referred to the day-by-day efficiency / performance of our production plant. This menu becomes operational after creating the configurations you need from the **"Efficiency Calculation"** menu (see installer Manual). Before explaining the meaning of the coefficient PRIm (Performance Ratio and measured pursuit) with the respective formula, please find below an example of this histogram with the menu's main functions:
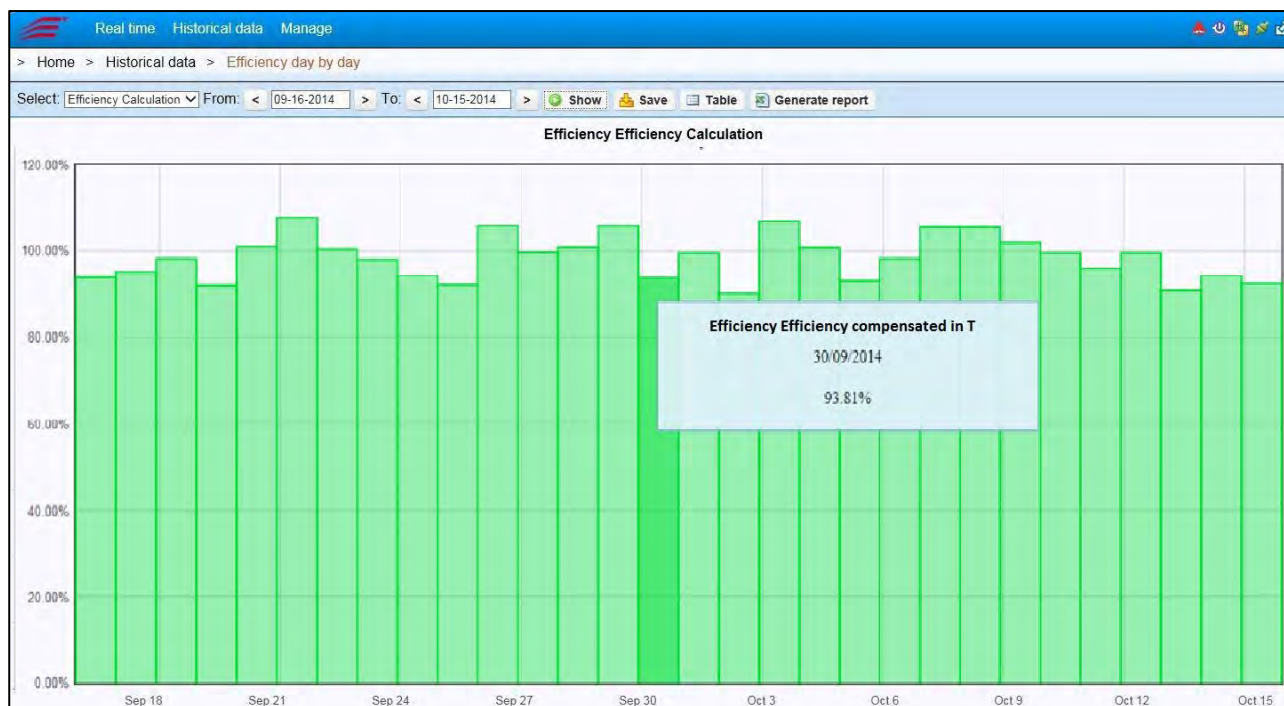
Select: select the desired PV plant from the drop down menu. Click the "**From**" and "**To**" menus to select the distribution time window shown by the histograms. Click "**Display**" to make the selections operational.

Save: to save a ".png" file of the histogram.

Table: to see the data trend in numeric format (from the function table you can save a "csv" file).

Generate Report: to save an Excel file with the whole trend of monitored data according to the time.

"Performance Ratio and measured pursuit (PRIm)"

Let's have a look at the following parameters:

$$PRIm = \frac{Em}{Pnom} * \frac{Istc}{H} * 100$$

PRIm: "Performance Ratio Measured", expressed in percentage.

Em: Total (KWh) energy produced by the plant, measured to the fiscal production meter, valid according to the recognition of the incentive in "Energy Bill" released by "GSE", with a class Cl-2 meter.

Pnom: Nominal power (kWp) of the PV generator.

H: Solar energy (kWh/m^2) which influences the whole active surface of the solar panels, it is measured with a radiation sensor which must have the same inclination as the panels themselves.

Istc: 1000 W/m^2, standard radiation (STC).

For example:

Note: 500 KWp PV Plant. With a constant 1000 W/m² solar radiation for 1 hour and a constant 25°C temperature on the PV modules, with "ideal" condition it would produce 500 KWh total energy, with PRIm of 100%.

Performance Ratio in temperature compensation (PRCT)

The mathematical formula will be:

$$P_{nom\_corretta} = (1 - P_{tpv} - \frac{C_{perdite}}{100}) * P_{nom}$$

Considering that:

$$P_{tpv} = (T_{Pannello} - 25) * \frac{\gamma}{100}$$

It's the same of the previous formula, but it is adjusted to the plant total power considering the temperature measured by the panel and considering the "range" (the panel's loss of performance).

2.19 Performance Ratio (for PV plants)
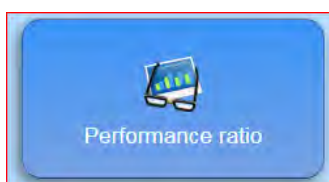
The icon above allows to configure (or to require) the "PERFORMANCE RATIO" calculation that is to say the calculation which allows to display PV plant Efficiency. <u>This calculation is made both "globally" and on a "single inverter".</u>

To better adequate the SW to the needs of different plants, 2 different calculation methods have been implemented:

- **1st Method: the system uses Plant/Subfield level programmed data**
- **2nd Method: the system uses String Panel level programmed data**

The first method would be the more used one in "standard" PV plants, since it is generally used by a single type of panel (one maximum deliverable power and one " γ " value or loss of performances according to the temperature).
The second method is the one to use in case of "different" types of PV panels contained in the same subfield. Let's see which are the data used by the system and where to program them in the *"plant configuration"* menu.

2.19.1 Data used by the System

The system needs the following data:

1. **Active Power generated by the PV plant**, or the related "subfield" (that is to say meter production)
2. **Active Power generated by a Single Inverter**
3. **Radiation**, data supplied by the <u>solarimeter mounted with the PV modules same inclination.</u>
4. **Panel Temperature**, data generally supplied by a temperature probe mounted on the back or in the centre of a PV panel.
5. **Technical data of the panels**, it is indispensable to know *maximum deliverable power and "γ" value* that is to say the loss of performances (and which is the reduction of the maximum power) according to the temperature.

All data used by the system should be programmed in *"plant configuration"*. With each calculation method you have to configure:

- *Active Power Generated by the PV plant* to configure in the "*Generated Power Channel"* field of the desired plant or Subfield.
- *Active Power Generated by a Single Inverter* to configure in the inverter's "*Instantaneous power*" channel.
- *Technical Data of the Panels:* they should be put in a separate menu by selecting Management and then Types of Panel. Complete all the fields and give a name to the different types of panels. Afterwards it will be possible to select the name of the panel from the plant configuration.

Radiation, **Type of Panel** and **Panel Temperature channels** will be configured in different points according to the calculation method the user intends to use. The configuration should be done as it follows:
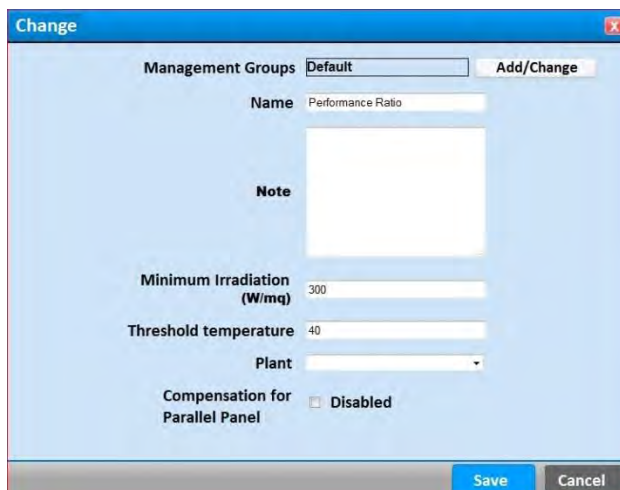
- In the **1ˢᵗ Method of** Calculation:
  - **Radiation**: to be configured in the radiation channels of the plant/Subfield (if you have more solarimeters you will see an average of the read values).
  - **Type of panel**: to be configured in the plant/subfield
  - **Panel temperature sensor**: it can be configured <u>only in the 1ˢᵗ string of the 1ˢᵗ PV plant string panel</u> (the system spreads automatically this information towards the strings related to the plant/Subfield).

- In the **2ⁿᵈ Method** of calculation:
  - **Radiation**: to be configured in each inverter of the plant/Subfields.
  - **Type of Panel**: to be configured in each string panel of the plant.
  - **Panel temperature sensor**: it should be configured in the <u>1ˢᵗ string of each plant string panel</u>.

After that, you can set up and use the module.

2.19.2 Programming and Use of the Module

Find the icon at the beginning of the section in the "Historical Data" section in the "Management" menu. From the "Management" menu the user can create, edit, delete and require this calculation to the System, use the "Historical Data" Menu only to require PR calculations to the system.

Enter the "Management" menu to configure this calculation, select the icon above and then click "Add". A window like the one here below will appear.

fig. 2.19.1

Fill in with the following parameters:
- **Name**: put the name. You can configure different modules
- **Minimum radiation**: a minimum medium radiation of about 300 W/sqm is set
- **Threshold temperature**: it is set at 40°C. Should the integration period (15 mins) average temperature surpass said threshold value, the system will "compensate" considering the PV plant's technical features.

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- **Plant**: it identifies the plant to study. Access the "plants Configuration" menu and select the desired plant to see its "ID". Generally, only one plant has been configured, this ID number will be 1.
- **Compensation for parallel panel**: tick this box to select the most suitable calculation method. (Otherwise the system will use the calculation method n. 1 previously described).

Once all data is complete, click "save" and select the "Display Report" icon here below (Central Icon):

fig. 2.19.2

The first icon on the left allows to "reset" the parameters previously added (picture 1.1), while, clicking the 3rd icon, all programmed calculation will be deleted after confirmation.

Click "Display Report" (central icon) to enter a sub-menu, select "add" and set the period to study. Once set, the Server will make the calculation; when ready, click the yellow icon to download the Excel file.

Please find below an example showing a period from 1st to 8th October 2011.

Plant Demo ENERGY TEAM kWp 360
PRODUCTION FROM 01/10/2011 TO 08/10/2011

Produced Energy kWh 15561   PR CALCULATED 95.81%

Counted Energy kWh 13113

Inverter	Power AC (kW) nominal	Power DC (kW) nominal	Solarimeter	Irradiation kWh/mq	Temperature Probe	Average Temperature	Ideal Energy kWh	Effective Energy kWh	Efficiency %
Inverter 1	150.0	144.0	Irradiation	39.7	Panel Temperature	36.4	5474.52	5343.89	97.61%
Inverter 2	220.0	216.0	Irradiation	39.7	Panel Temperature	36.4	8211.78	8100.48	98.64%
TOTAL	370	360.0		79.5		36.4	13686.30	13444.37	98.23%

Fig. 2.19.3

Please notice that the studied PV plant has the following features:
- 360 kWp total power with a unique exposure.
- A Production Meter, of which the system takes the measurement.
- 2 Inverters, of which the system takes the production measurement.
- 1 Solarimeter (which measures radiation and with the same inclination of the PV plants).
- 1 Panel temperature sensor.
- We know the total number of panels (1600 panels) and their technical features, in particular the peak power of any single panel (225 Wp) and T coefficient on the Power (-0,4%).

Refer to picture 2.19.3 to see all data published "only" by Inverter 1. Here you can see, power nominal value of the inverter, (in this case inverter 1 = 150 kW). This data is not used in the PR calculation.

In the next cell you can see the data of the PV field peak power, in this case we have 144 kWp of panels which are actually connected (and configured) to that inverter.

Consequently, <u>radiation energy</u> that invested the solarimeter (and the PV plant) will be calculated. This portion of energy is calculated at the net of radiations, lower than the average of <u>300 w/mq and of 75Wh/mq in a quarter of hour</u>. This value is programmable and it is set up at the beginning (see picture 2.19.1). In this case 39,7 kWh is the radiation energy recorded during the period.

All other data are taken into account if the average radiation of a quarter of hour is over 300 W/sqm (75 Wh/sqm in a quarter of hour). <u>All temperature values and energies referred to a lower radiation are excluded.</u>

The next field is the average temperature of the panels recorded in the period, in our case 39,7 °C

"Ideal Energy" represents the portion of energy the plant should produce were it ideal itself. The bill is made multiplying <u>DC Nominal Power</u> and <u>radiation energy</u>. Bear in mind that the system verifies, every 15 minutes, if the temperature is higher than the set threshold or not (set at 40°C) to correct (reducing it) DC Nominal Power adjusting it to the panel's technical feature.

"Actual Energy" is measured in the inverter output at the net of radiations lower than the average of <u>300 w/sqm and of 75Wh/sqm in a quarter of an hour</u>. The "excluded" portion will be discounted from the production meter, we shall see this later on in the manual.
PR is now calculated dividing "Real Energy" by "Ideal Energy". It's 97,61 % in picture 2.19.3.

The sheet shows Total Produced Energy detected by the production meter. In this case, the meter recorded 15561 kWh of real total production.

"Calculated energy" is obtained by deducing from the "Produced Energy" all the portion of Energy which has been "excluded" from single inverters because represents a portion of energy produced with an average radiation lower than 300 W/sqm. So the difference (15561 – 13113 = 2448 kWh) is the sum of the produced energies from n.2 inverters with an average radiation lower than 300 W/sqm. PR will be given by the relationship between "Calculated Energy" and "Ideal Energies" sum. In picture n. 1.3 is about 95,81%. Here below the mathematical calculation:

$$(13113/13686,3*100= 95,81\%)$$

The plant configuration is made by different subfields (this configuration should be made when there are more production meters); a unique Excel file will be generated, made by more sheets and one summary one. See picture 2.19.4 here below.

PLANT ENERGY TEAM PRODUCTION FROM 01/10/2011 TO 08/10/2011				
Subfield/Cabin	DC Power Nominal (kW)	Ideal DC Energy (kWh)	AC Energy (kWh)	PR %
Plant A	19.32	410.66	393.38	95.79%
Plant B	19.32	410.66	392.10	95.48%
Plant C	19.32	410.66	389.53	94.85%
TOTAL	57.96	1231.99	1175.01	95.37%

fig.2.19.4

This summary is about a plant with 3 Subfields (and 3 production meters). In the same file there are 3 Sheets called "Plant A", "Plant B" and "Plant C" containing the same information (and the same calculations) than the ones at picture 1.3.
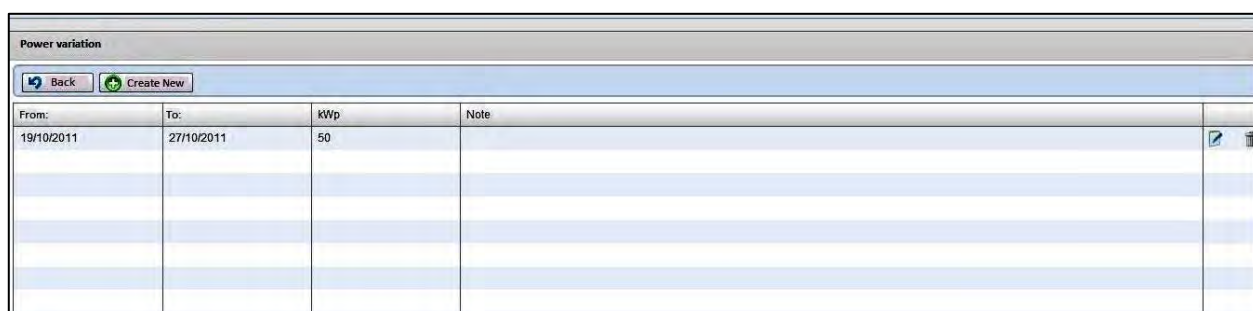
DC power installed under each inverter can easily be modified. This function is important in case if, for any reason and, for a set period of time (defined by the user), the number of panels connected to the inverter, is different from those configured on the original plant (i.e. following an electrical fault).

There are 2 ways to edit this value according to the type of desired calculation. The first one being through selecting the inverter to be modified in the "Plant configuration" menu and change its "Power Variation". The second way is to select the "string panel" and then "Power variation". In both cases you'll see the following window:

fig. 2.19.5

Users will simply have to select the period and set up how many kWp are actually connected to that inverter/ string panel. PR calculation will make all the counts considering the new peak power installed during the period.

fig. 2.19.6

Picture 2.19.6 shows a power variation of 50 kWp for the period from 19th to 27th October 2011. It is still possible to edit, cancel or add other values to get a "historic" of the variations made during over the time.

2.20 Project Forecast (for PV plants)

Introduction

"Project Forecast" allows comparing theoretical data of production and radiation provided during the project (predictive values) with the real detected ones (measured values) calculating the amplitude of variances, in order to get eventual faults.

Select "**Prevision**" from "**Historical data**" menu. The following window will appear:

The chart here above is about an example of application called: "Demo Fiera kWp 380"

Year: the selected year will show

Month: All months of the selected year are automatically displayed; there, check theoretical and detected values of daily produced energy and total energy, during the month. As well as the radiation.

Let's have a look at the other fields:

Energy (kWh) day

Daily forecast: calculated theoretical value of the produced daily energy displayed, next to each month

Monthly forecast: Theoretical value of total produced energy in the selected month, obtained by multiplying daily theoretical values by the number of days of the month.

Monthly production: Measured value of total produced energy for the selected month.

Daily Production: Daily produced energy: this is an average value obtained dividing the month's measured produced energy (field "Monthly Production") by the number of the days in it.

Difference (%): Percentage variation between measured and theoretical values. You'll get the same number by making calculations both on the monthly total energy and on the daily energy. Based on the report: *100*(Measured Value – Project Value) / Project Value.*

Radiation (kWh/sqm) day

Daily forecast: It shows, next to each month, the forecast theoretical value of daily radiation.

Monthly forecast: total radiation value forecast in the selected month, it is obtained by multiplying the daily forecast by the number of days of the month.

Monthly Production: Measured Value of total radiation during the selected month.

Daily Production: actual daily radiation: this is an average value obtained dividing Produced total radiation over the whole month (field "Monthly Production") this is an average value obtained dividing produced total radiation during the whole month (field "Monthly Production") by the number of days of the selected month.

Difference (%): Variation percentage between measured and theoretical values. You get the same number both calculating Monthly total radiation and daily total. It is based on the calculation:

$$100*(Measured\ Value - Project\ Value) / Project\ Value.$$

At the bottom of each column, (Energy provided, Produced Energy, Provided Radiation), Total annual value of the desired parameter, obtained by the sum of monthly parameters are displayed; with overall variation included.

Functions in the top toolbar:
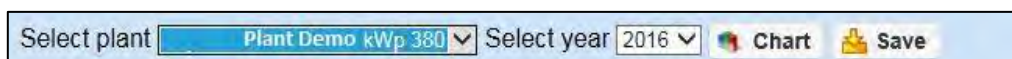
Select plant: From the drop down menu, select the plant (or portion of it) to be monitored.

Year: Select the year of which you want to check the plant parameters.

Save: to save all values in a file, see the table here below.

Chart: This function allows displaying values distribution with histogram bars, see, for each month of the selected year, Energy Forecast and Energy total Production, represented by 2 different coloured bars *(point the mouse on each bar to see a window showing the right value).*

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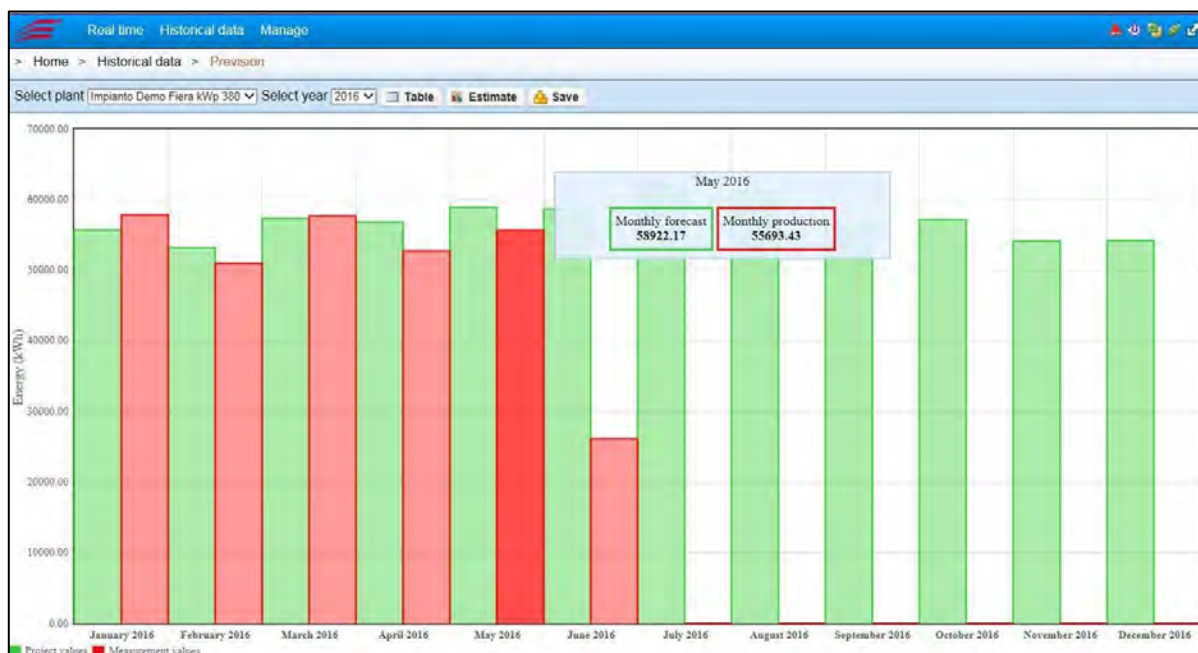
The top toolbar changes according to the new functions:

Table: to go back to table format data representation, in the beginning window.
Save: to save data with an histogram chart.
Estimate: to display the histogram showing both Energy and Radiation, percentage month by month variation.
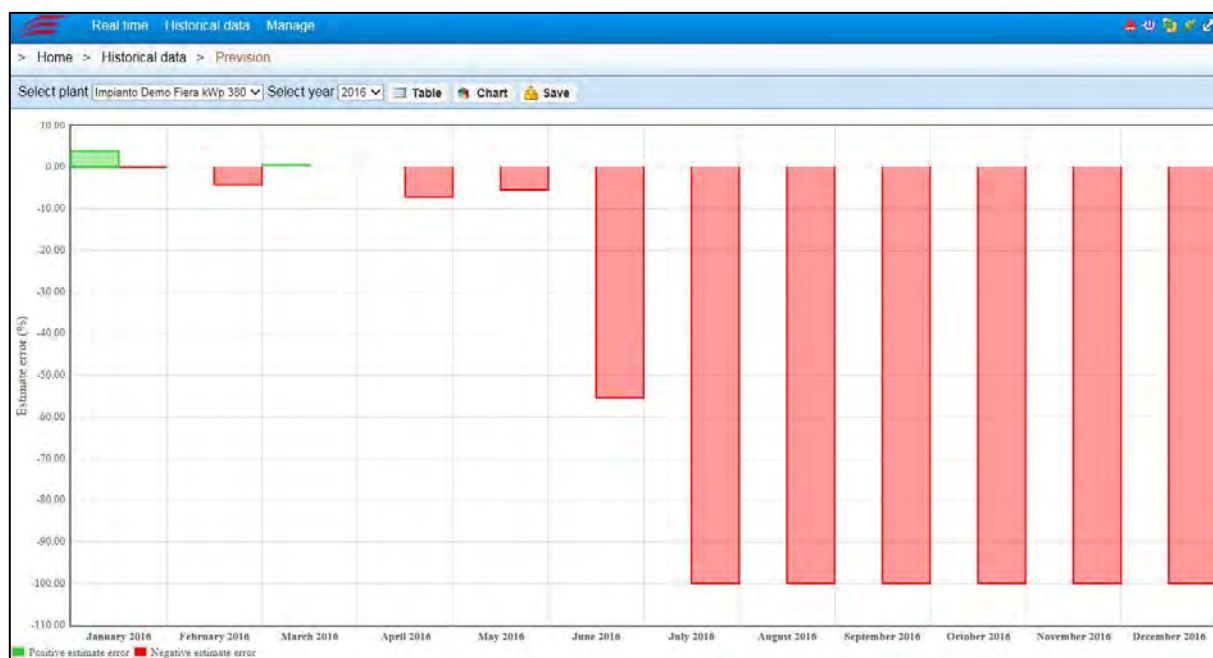
Click "**Chart**" to go back to the previous bars histogram, or "**Save**" to save the file showing this last variation diagram.

2.20.1 Insertion of Project values

The following procedure allows putting project values that will appear in the forecast columns, both for Energy and Radiation.

Select "**Plants Configuration**" from the main "**Management**" menu.
On the left side of the Browser you can find the plant "tree structure".
Double click on desired plant (in this example "Impianto Demo Fiera kWp 380"), to see the following menu:

INSERTION OF MEASURED VALUES

Click "**Edit**" to enable the buttons next to the desired parameters. "Channel of Generated Power" and "Channels of radiation" in the example above.
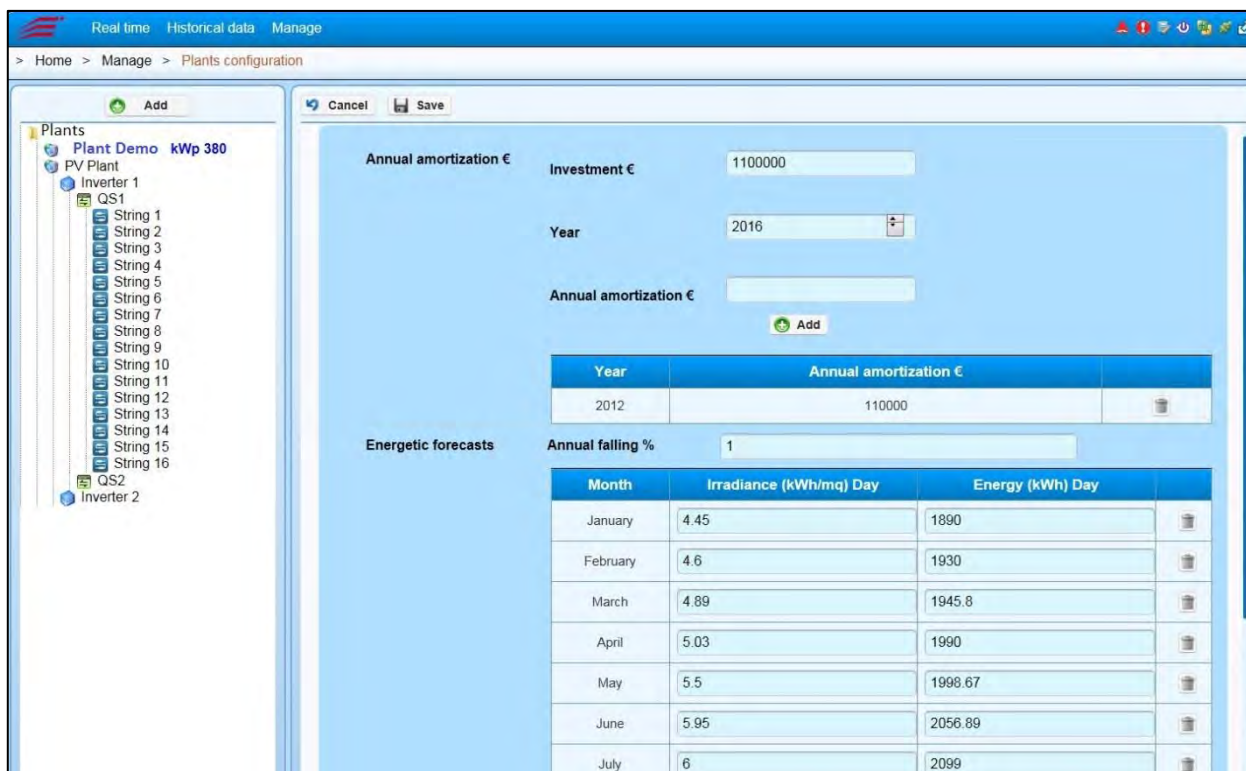
Click "**Choose**" (**"Add"** for the Radiation channels) to open a window showing the plant tree structure; click on each group, until you reach the desired device where you can find the quantities you want to measure (i.e.: CM2 connected to a string; etc.) → Finally double click on the desired quantity.

Click "**Save**" to store the new setting or "**Cancel**" to exit without saving. Repeat the same procedure to change other values or channels.

INSERTION OF THEORETICAL VALUES:

Click **"Project Estimates"** to open a configuration window.

For each month, in the fields regarding Radiation and Energy, click on the value to put the desired one. Here below the other fields:

Annual falling %: It allows to monitor calculations related to the panels efficiency percentage decrease, due to different reasons such as aging, exposure to bad weather conditions or other. Please consider nominal values of the panel and statistical results of other plants to get the value.

In the fields grouped under the voice **"Annual amortization"**, you should put the commercial parameters, according to the costs or to the stipulated contracts, as the amount spent for the investment of the plant and the Annual depreciation. Currently it is simply a predisposition.

NOTE: project data to be inserted are Daily Radiation and Produced Daily Value.

Click "**Save**" to store the new setting; "Cancel" to quit without saving. Repeat the procedure to edit other values or channels.

2.21 Energy (for PV Plants)

This module shows a sort of "Energy Balance" for customers with a PV plant. In this module you can display in a chart or in a table how much energy has been generated, delivered and purchased daily. Select "Energy" from the "Historical Data" menu to get a chart like the one here below:
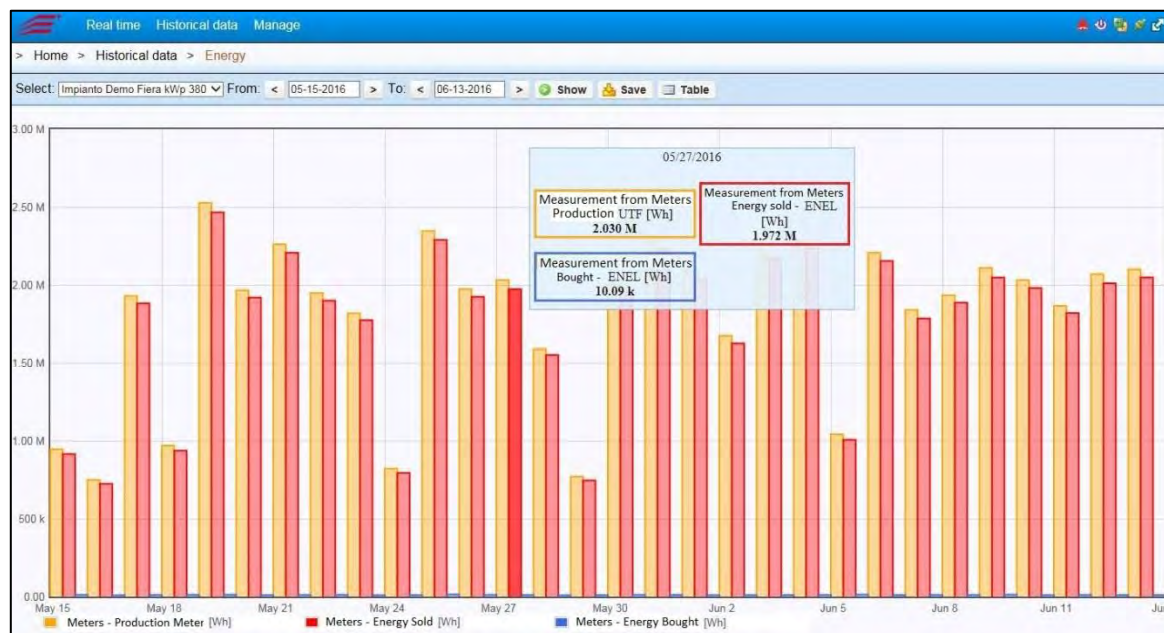
This chart shows daily energies of the 3 measured quantities. Each column triplet represents production, the purchase and delivery of a day. Move the mouse on a columns triplet to see daily the information.

Here below the functions represented in this menu:

they are the same ones of the paragraph "Efficiency day by day".

If you consider the values trend in numeric format through the "**Table**" function they will appear as it follows:

Date	Misure Contatori - Contatore Produzione UTF [Wh]	Misure Contatori - Contatore Ceduta ENEL [Wh]	Misure Contatori - Contatore Acquisto ENEL [Wh]
Minimum value	749.3 k	724.4 k	8.700 k
Maximum vale	2.527 M	2.466 M	13.62 k
Average value	1.813 M	1.766 M	10.74 k
Total/Integral	54.40 M [Wh]	52.98 M [Wh]	322.3 k [Wh]
05/15/2016	946.3 k	914.9 k	11.54 k
05/16/2016	749.3 k	724.4 k	9.134 k
05/17/2016	1.930 M	1.882 M	11.20 k
05/18/2016	968.8 k	936.6 k	11.81 k
05/19/2016	2.527 M	2.466 M	12.09 k
05/20/2016	1.966 M	1.919 M	9.407 k
05/21/2016	2.261 M	2.206 M	10.82 k
05/22/2016	1.948 M	1.899 M	11.30 k
05/23/2016	1.819 M	1.774 M	8.700 k
05/24/2016	821.0 k	793.8 k	10.01 k
05/25/2016	2.347 M	2.289 M	13.62 k
05/26/2016	1.973 M	1.924 M	11.44 k

Here you can find only the information related to the daily produced, purchased and delivered energy. You can save the table in .CSV format.

2.22 Radiation Power Temperature (for PV Plants)

This menu allows seeing on a single page the three above mentioned quantities and the diagrams which show their trend over time. Select **"Irradiation; temperature; power"** From the **"Historical Data"** menu on the toolbar.


At the bottom left, you can find a legend which shows the colour for to each quantity in order to distinguish them.

For each quantity, you can see its axis of ordinates and its values while the abscissa shows monitoring time. In this example, there is a time range of 2 hours and it displays the whole trend in a day.

If you move the mouse in a certain point of the function, you can read automatically average value of the integration period corresponding that point, including the corresponding dates and time.

All functions are available in the following menu:
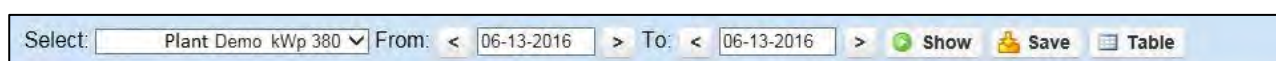
They are the same ones pointed out in the paragraph "Efficiency day by day ".

2.23 Alarm for sites

Introduction:

The plant configuration called "Alarms Supervision" occurs when each concentrator referred to a certain plant and which contains the Log where the alarms are scheduled, depends on a main concentrator coordinating the whole system.

The main concentrator interrogates "Energy Sentinel PV" ones to receive data of all alarms with a precise range of time.

All types of alarms with the configuration and management modes are described in the Installer Manual.

As for "Supervision Alarms", the new managed alarms are the two following ones: system log (the same one of "Energy Sentinel WEB/PV") and ETL sites import".

For "Energy Sentinel PV", for each plant of the Customer, alarms get sent to the main concentrator every half an hour (or every hour). If an "Energy Sentinel WEB/PV" concentrator doesn't send alarms for a whole day (from.0:00 to h. 24:00), a warning will be sent reporting an import problem.

This software allows to monitor and manage these two types of alarms, included the geographical location of the plants where they occurred.

Here below the layout of the above mentioned configuration:
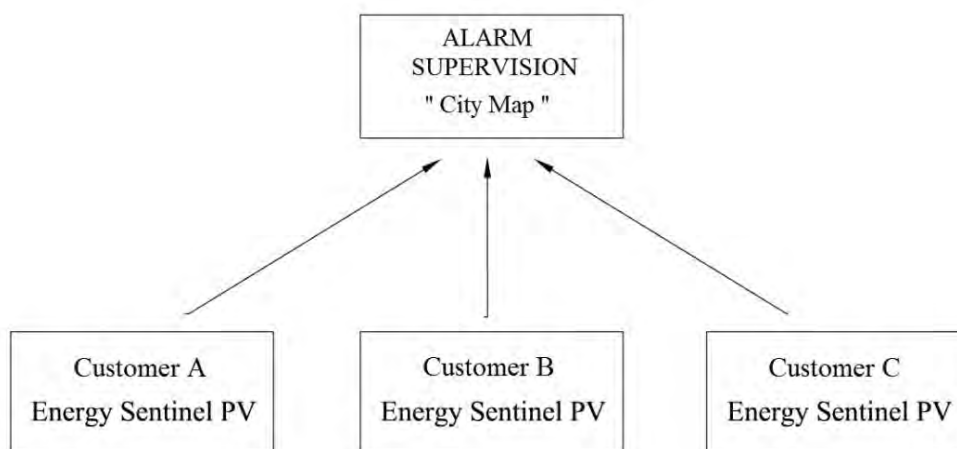
Example: Click on **Historical Data** and then on **Alarms History**, and you will see:
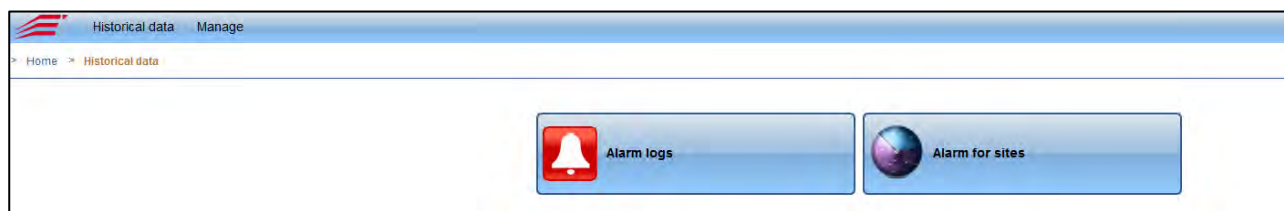> Home > Historical data > History of Alarms

NOTE:
This manual only shows the functions contained in "Historical Data", concerning alarms displaying and scheduling. The functions under "Management" regarding alarms configuration, are pointed out in another section.

Click on **Historical Data** from the main menu, to enter the following submenu:

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Click then **Alarm logs**. The following menu will open; it shows the alarms occurred in the customer plants, the name of the plant itself. In addition, it shows date and time of the event, error report and the type of alarm, with IP address of the "Energy Sentinel PV" concentrator which sent the data:
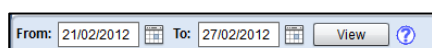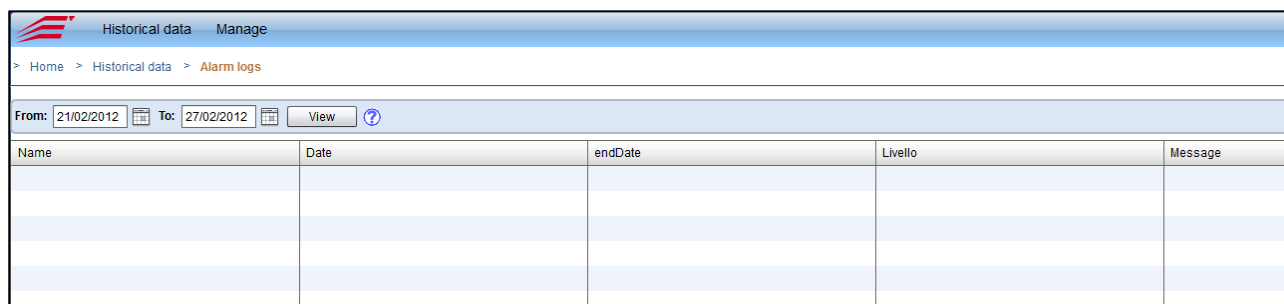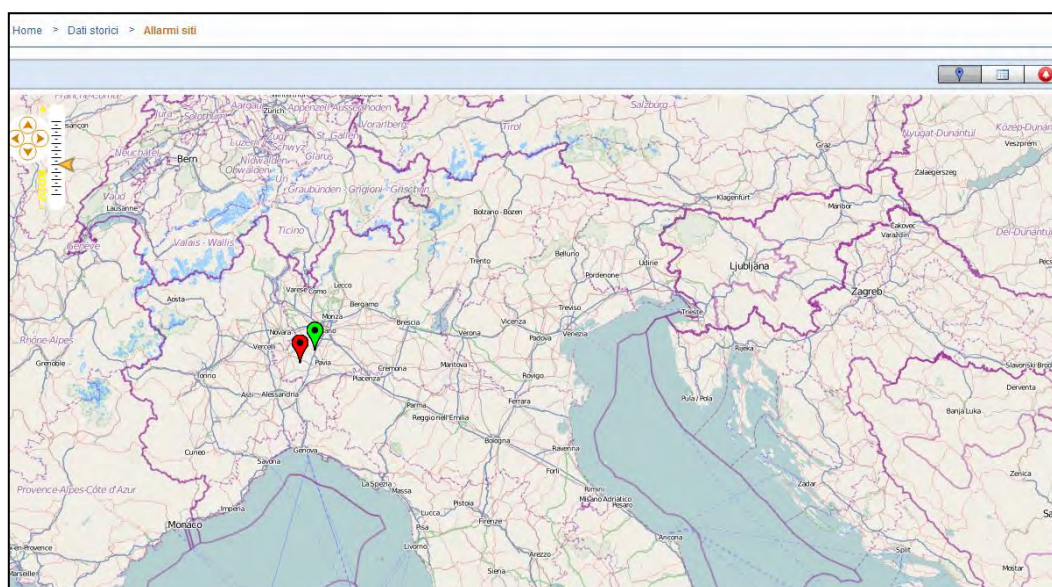

 Select the beginning and the end date of the time range within which you need to display the alarms. One day is set by default.

: It allows displaying all the alarms after a range of time was selected.

2.23.1 Sites displaying and alarms checking

Click **Sites Alarms** from the main menu.

The map of a wide area will appear; work with the 4 cursors at the top left corner to edit the map according to the user's needs:

The "Flags" point out the plants monitored at the Customers, including all the information about their alarm states. First, an immediate indication is given by the color:

Green: No alarm has occurred of the problem about the alarms has been solved and the condition is reported to normality.

Red: It alerts if some alarms occurred or if the previous alarms are still on.

NOTE: The page will automatically refresh every minute.

Click on the desired pin, to open a window showing the Customer name and the alarms that have been not been managed yet. For example, in this case:

Click **"Go to site"** to enter the "Energy Sentinel PV" SW of said customer, this will open the list of alarms and their reason.

Click **"Go to alarms detail"** to enter the menu showing all the alarms status:

This menu, represents the same one showing all Customers status and types of alarms; users can as well filter the desired ones. From the top toolbar:

: Select the alarm you wish to view: "**New**" for those just occurred; "**Management**" for the already reported ones still waiting for a solution; "**Closed**" for the solved ones.
If not interested in any kind of distinction, select **"All".**

: Select the beginning and end date of the time range to display alarms.

: Select "**All**" if you need to display all customers alarms; otherwise, only select the desired customer of which you want to see the alarms of, as for the previous case: for example "**Customer B**".

: To display all alarms once the range of time is selected.

2.23.2 Change of alarms status

If the alarm has been solved or it is going to be solved shortly, change its type of report, from the menu. The corresponding line will become green and it will send the information to the indicator of the geographical plant in a minute. When all Customer's alarms are solved, the corresponding indicator will become green too.

Select the line corresponding to the desired alarm from the above-mentioned **"Sites Alarms"** menu by ticking the first box on the left.
Click on the ![edit button] button to open the following window:

From the drop down menu, please select:
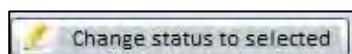**New**: if it's a new alarm and it has not been solved yet.
Pending: if the alarm is still to be solved.
Solved: If the alarm has been solved.
Ignored: to ignore the alarm

The box below is for eventual notes and comments.

Press **Save** to store the settings that <u>can be changed by repeating the procedure already described.</u>

![Change status to selected button]: To change the status of more alarms, after selecting them ticking the corresponding boxes .

Other buttons available:

Click on [icon] to open a window like the following one where you can see the power values that overcome the threshold, in correspondence of the desired alarm:
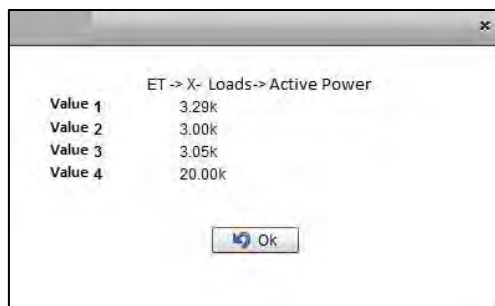
[icon]: To come back to the geographical map.

[icon]: To display the list of Customer sites with their alarms status, as table format instead of a geographical plant.

Site	Alarm	kWp
Customer A	There aren't alarms for this site	500
Customer B	There are 17 alarms unmanaged	1000

Click twice on the field of each Customer to enter his alarm menu, already explained.