

expertpower™



ExpertPower 5.x User Manual

Copyright Notice

Copyright © by SATEC, 2016. All rights reserved. No part of this document may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form by any means without the express written permission of SATEC.

Disclaimer

This documentation is provided for information purposes. SATEC makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. SATEC shall not be liable for errors, omissions, or inconsistencies which may be contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material. Information in this document is subject to change without notice and does not represent a commitment on the part of SATEC.

Contents

Overview	5
Manager Menu.....	5
Main/My View.....	5
Box view	5
Map View.....	6
Device Selection Tree:	7
Single.....	7
Devices	7
Search the Tree.....	8
Device selection.....	9
Energy View	9
Readings.....	10
Last reading.....	10
History	10
Date selection	10
Data table	11
Max Demands	12
Consumption.....	13
Energy / Total	14
Energy TOU Import/Export	15
Energy TOU/Total distribution	16
Event View.....	17
Event Log.....	17
Event Summary	18
Notifications.....	18
Analyzed Events.....	18
Notification settings.....	19
Reports.....	19
Energy Intelligence.....	22
Object selector.....	22
Date selector	23
User defined Dashboards	23
Calculation formula.....	25
Accessing the formula engine	25

Creating a new formula:.....	25
Common commands:.....	39
Resolution:	40
Duplicate a Formula	46
Full Screen.....	47

Overview

This manual is intended to help new users become familiar with the main functions and pages of the ExpertPower Energy management web application.

Note that installation and setup topics are covered by other dedicated materials.

Manager Menu

Main/My View

The main view is a configurable personalized switchboard allowing to present information in various ways.

Layouts

The main view has two optional layouts – the Box view and the Map view. The Box view allows you to concurrently present data from multiple devices, and the Map view show a map of your metering devices. You can switch between the two via the Choose layout menu on the upper right corner.



Box view

The main screen allows viewing four smaller independent screens. Data is shown in either a table grid, or as a line diagram or a bar chart. The screens are defined for every user according to his or her permissions.

Click the pencil icon to edit the specific box device selection and change the view settings.

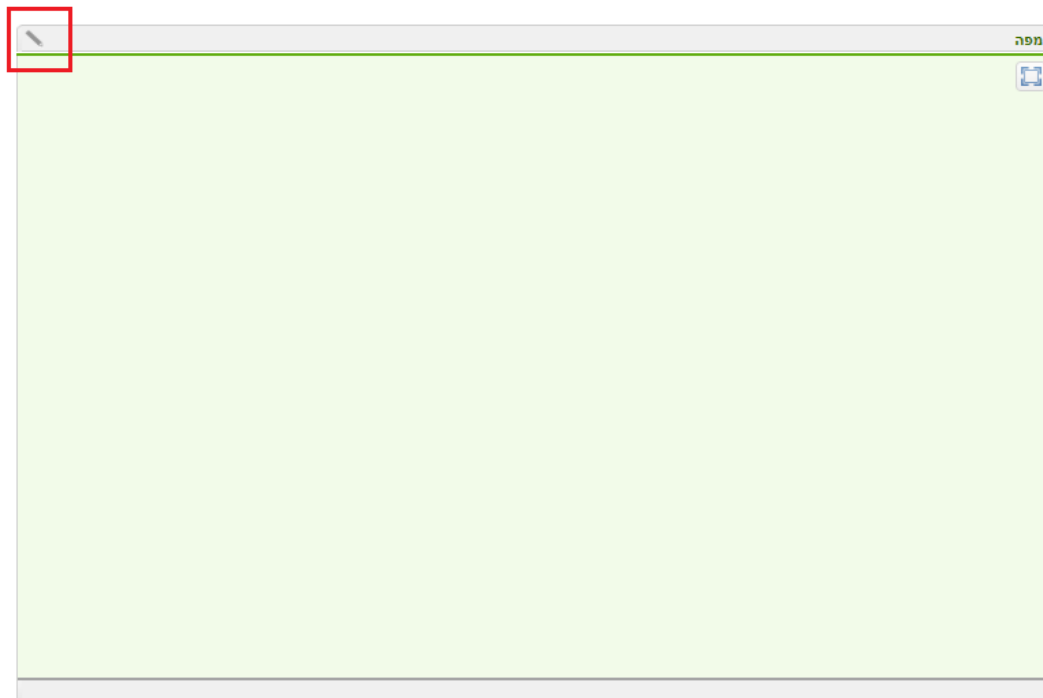


1. Select the view contents according to the current user permissions
- 2 Select the devices of choice from the device selection tree
- 3 Select the type of information to show
- 4 Click Add to complete
- 5 Click Cancel to cancel out

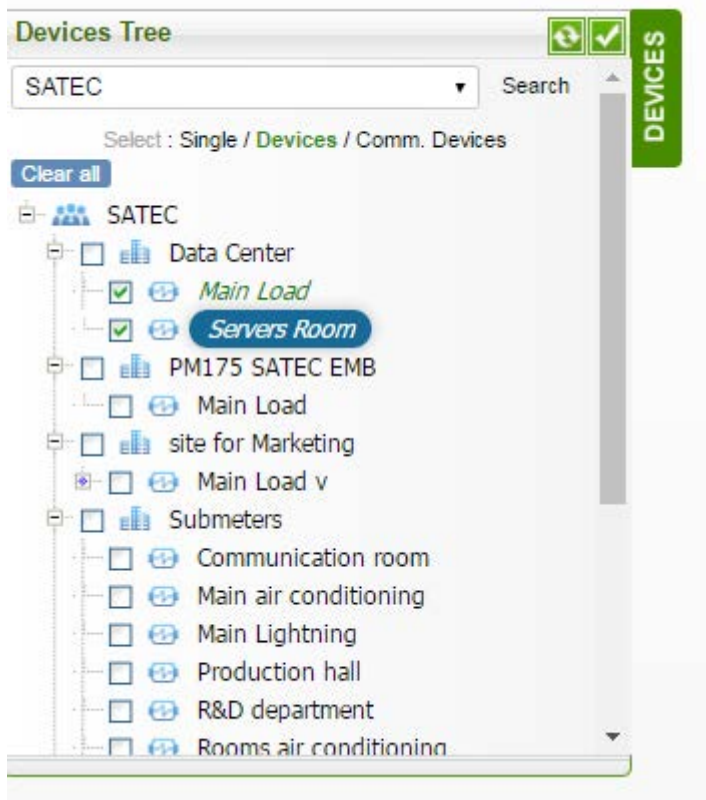
Click the View button at the bottom of every box to zoom in on that box by going to the dedicated specific page related to it. For example – clicking on View below the Last reading box will open a tab with the Last reading page for the device defined for the box.

Map View

Map view allows to graphically navigate between the devices defined for the customer. The Map provides a tree like layout of multiple devices. Clicking on one group will show the sub group of devices under it. Clicking on one device will move to a page presenting that specific device. The Edit button on the upper right corner allows to switch between several maps for the user.



Device Selection Tree:



Single

Allow to select a single Customer/Device/Comm Device from the tree.

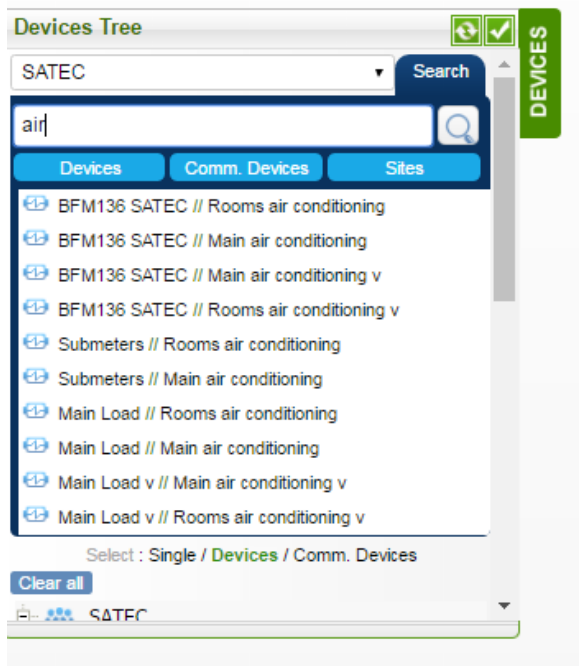
Devices

Allow to select one or more device from the tree.

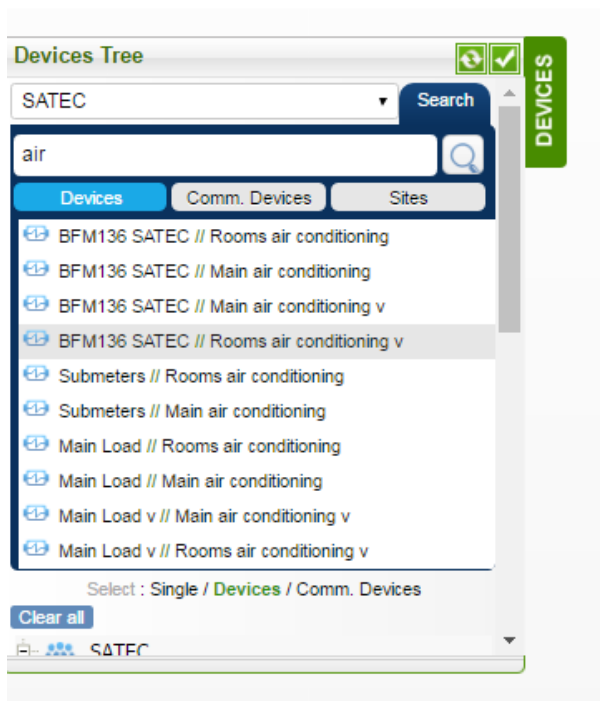
Comm. devices

Allow to select one or more communication device.


Search the Tree

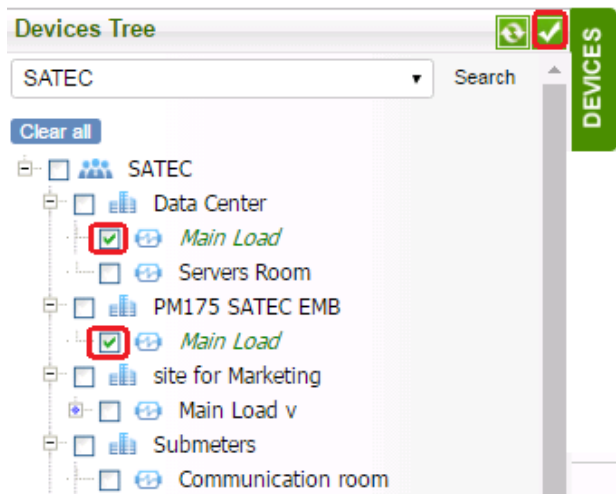


The Search option appears on the top of the Device selection tree. It applies to one or more of the three categories: Devices, Comm. Devices and Sites. Only selected categories (appearing in blue) will be included in the search. In order to exclude a category from the search, click it and it will turn white. For example, the following image shows the search tree after clicking the Comm. Devices and Sites top buttons, to make them grey and exclude them from the search:



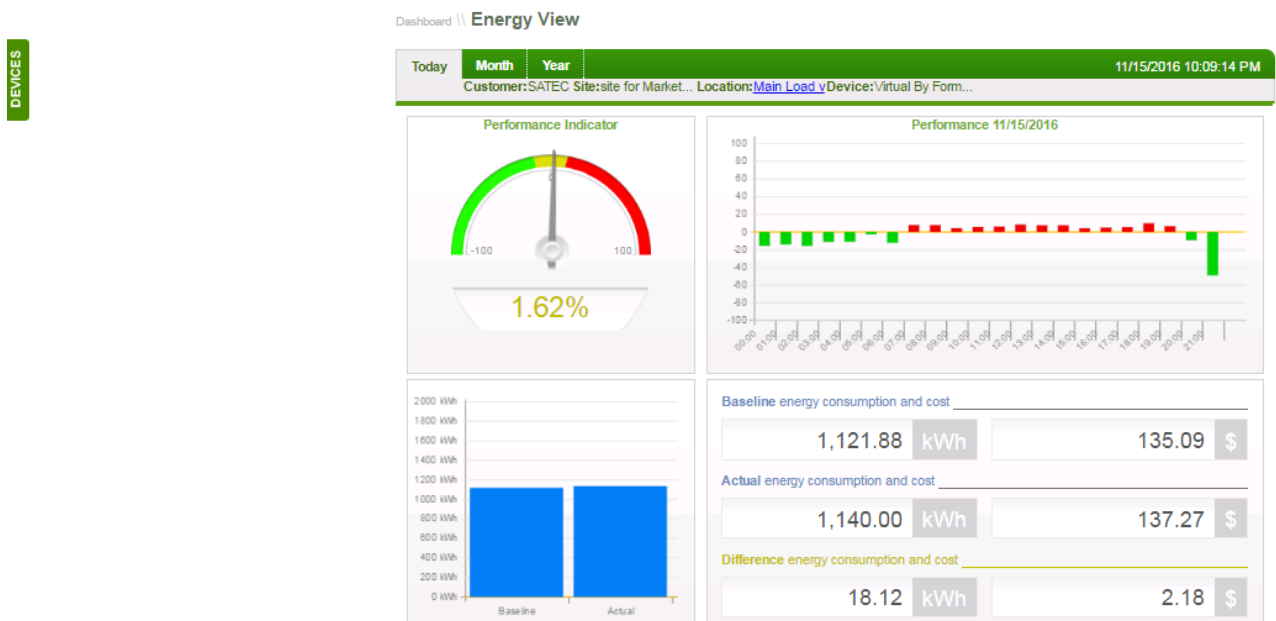
Device selection

Click the checkmark of one or more specific devices or sites of choice, and then for the selection to take place, click the green checkmark on the top  right:



Energy View

This page provides a picture about a certain device in terms of performance, consumptions and cost



Readings

Readings pages are used to present various devices from the following aspects:

- Last reading
- History
- Max demands
- Data logs

Last reading

This screen shows the last reading from the device. You can browse between the different readings using the arrow button. At the upper part of every data group you can find a link to the history page. Clicking the parameter will also open the History page at the related parameter location.

Readings \ Last Reading

Browse readings

Customer:SATEC Site:site for Market... Location:Main Load y Device:Virtual By Form... 11/15/2016 22:30

Phase Basic Measurements					History
Phase	L1	L2	L3	Unit	
Voltage (Primary)	235	237	236	V	
Current (Primary)	64.68	37	31.59	A	
Active Power	15.2	8.64	7.45	kW	
Reactive Power	0.298	1.49	0.298	kvar	
Apparent Power	15.2	8.77	7.46	kVA	
PF	1.0	0.985	0.999	PF	

Total			History
Name	Value	Unit	
Active Power	31.29	kW	
Reactive Power	2.09	kvar	
Apparent Power	31.36	kVA	
PF	0.998	PF	

Total Demands			History
Name	Value	Unit	
Power Demand	31.29	kW	
kVA Demand	31.29	kVA	

Link to History

History

This screen shows the device historical readings. You can select Phase or Power & Demand tabs on the top, or the Customize tab in order to select specific fields: Check the specific fields and Submit to view their information.

Date selection

Dates can be selected by clicking the date selector from the upper right corner.

Graph

The top of the graph area has a show/hide button on the right, and a parameter selection on the left.

Readings \ History

Parameter tabs

Date: 11/9/2016 - 11/16/2016

Phase Power & Demand Customize

Customer:SATEC Site:site for Market... Location:Main Load y Device:Virtual By Form...

Graph

Select Parameter

Display/Hide graph

Voltage Trend

Voltage

Current

Active Power

Reactive Power

Apparent Power

PF

225

Data table

The table shows the selected reading fields. In order to see the details of a specific reading, click on its record time:

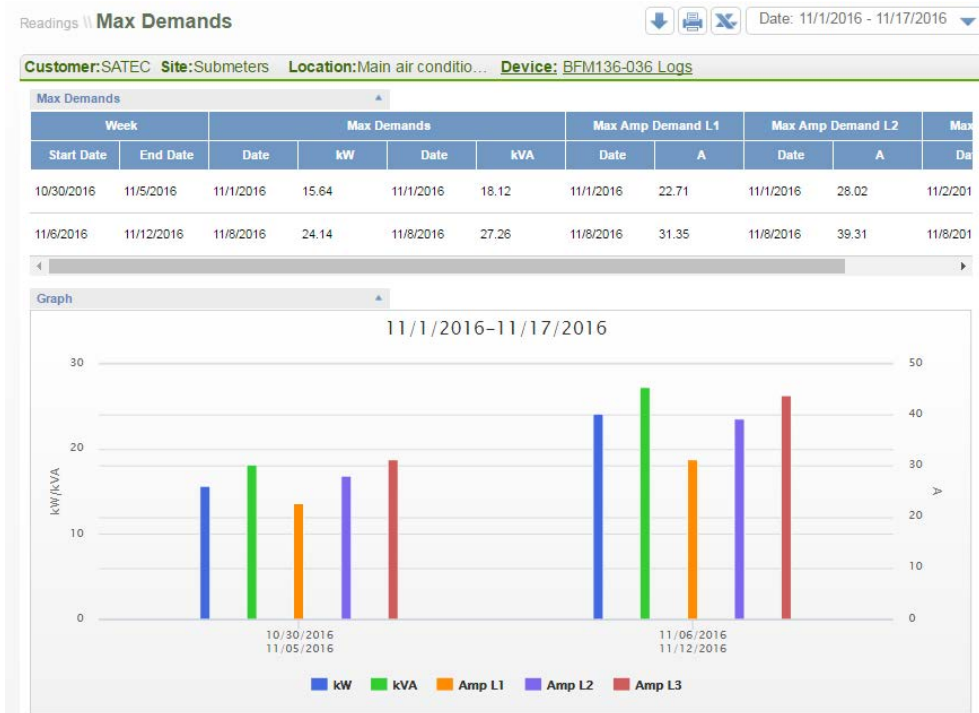
Record Time	Voltage LN, V			Current, A			Active Power, kW			L1
	L1	L2	L3	L1	L2	L3	L1	L2	L3	
11/16/2016 15:30:22	233.2	234.9	234.5	7.72	14.52	21.64	1.39	3.22	4.94	1.2
11/16/2016 15:01:52	233.3	234.7	234.1	7.72	14.56	21.56	1.39	3.22	4.94	1.2
11/16/2016 14:30:20	233.6	235.2	235	0	6.32	13.84	0	1.49	3.22	0
11/16/2016 14:02:04	233.7	234.8	234.5	0	6.28	13.88	0	1.49	3.22	0
11/16/2016 13:30:27	232.5	234.1	233.8	12.84	19.56	27.4	2.45	4.18	6.19	1.78
11/16/2016 13:01:49	232	233.8	233.1	0	6.28	13.88	0	1.49	3.22	0
11/16/2016 12:30:20	233.1	234.5	233.7	4.36	10.6	18.52	0.816	2.45	4.27	0.528
11/16/2016 12:01:58	233.3	234.8	234.5	8.72	15.36	13.64	1.68	3.41	2.93	1.2

As a result, the following details are shown for that reading:

Readings \ Last Reading

Max Demands

In this page you can see the Max Demand data, in a table and a graph across a Day/Month/Year according to the selected resolution, during the selected date range.



Clicking on the upper right data range selector, opens a menu for selecting a specific date range:

Readings \ Max Demands Download Print Close Date: 11/1/2016 - 11/17/2016

Time Range | Fixed Time

Start Date: 11/1/2016 End Date: 11/17/2016 Resolution: Weeks

Update Cancel

If you select the Fixed Time option, you can select a specific year of choice from a dropdown:

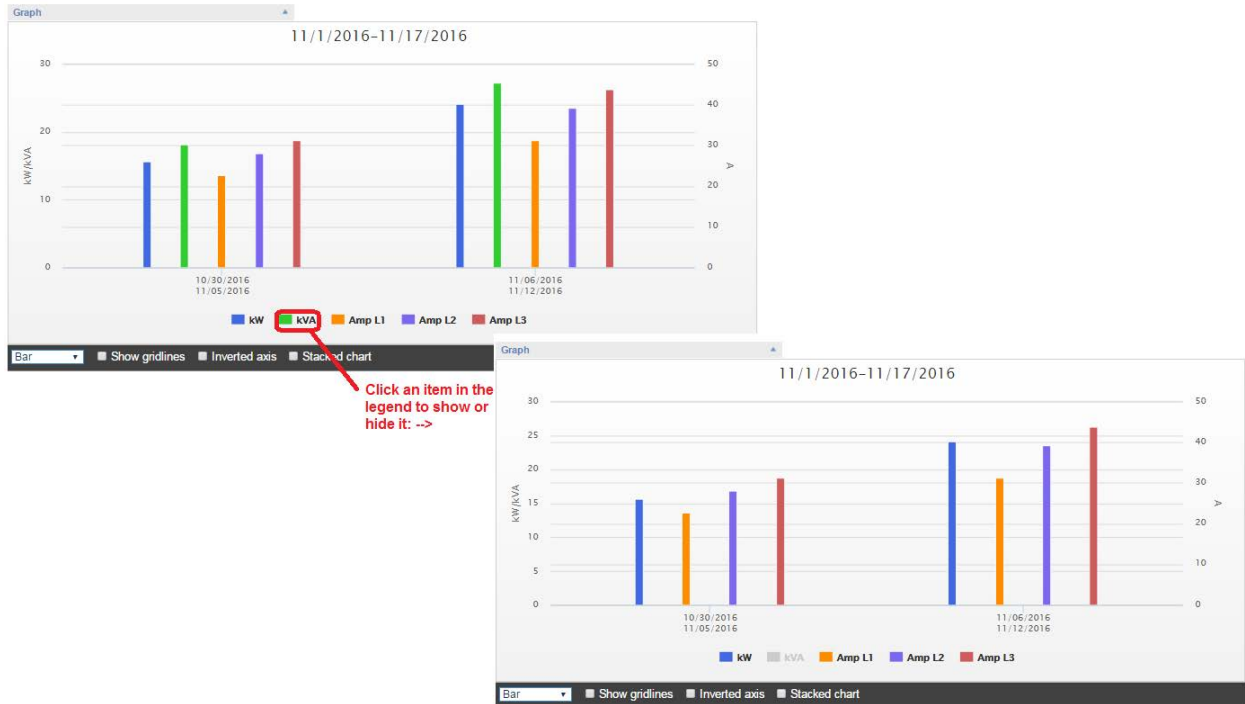
Readings \ Max Demands Previous Next Download Print Close Date: 11/1/2016 - 11/17/2016

Time Range | Fixed Time

Year: 2016 Resolution: Months

Update Cancel

The graph legend allows to hide or show specific parameters:



Consumption

Consumption pages offer various views around energy consumption measured by the metering devices. When selecting the Consumption tab, first select the usage type of choice: Electric energy, Gas, Water etc. and then select the duration and resolution for which you want to see the data:

expertpower™ Manager Administrator

Dashboard Readings Events **Consumption** Power Quality Billing Generators Reports

DEVICES

Energy	Total
Water	TOU Import
Air Condition Usage	TOU Export
Gas	Total Distribution
Fuel	TOU Distribution
kWh Export	

Location: HIT

Previous

526,303

174,107

0

Energy / Total

In this page you can display total consumption on a daily or monthly basis for one or multiple devices. Information is displayed in both a data table and a graph. The top of the page shows the total consumption in the selected period and the table below shows specific numbers according to the selected duration and resolution.

Consumption \ Energy \ **Total** Download Print Refresh Date: 11/1/2016 - 11/18/2016

Time Range | Fixed Time

Start Date: 11/1/2016 00:00 End Date: 11/18/2016 00:00 Resolution: Days Update Cancel

Customer: SATEC Site: Data Center Location: Main Load Device: PM175

Energy	Previous	Present	Usage	Cost (NIS)
kWh Import	1,275,690	1,294,703	19,013	2,289.35
kvarh Import	200,917	203,241	2,324	
kWh Export	0	0	0	

Demand Data	Value	Date
kW Max DMD Import	129.383	11/8/2016 10:45:00
kVA Max DMD	133.713	11/8/2016 10:45:00
kW Max DMD Export	0	11/1/2016 00:00:00

Power Factor 0.993

Breakdown

Day of month	kWh Import	kvarh Import	kWh Export	Cost (NIS)	Power Factor	kW Max DMD Import	kVA Max DMD	kW Max DMD Export
11/1/2016	1,167	83	0	140.52	0.997	87.537	92.032	0
11/2/2016	1,324	276	0	159.42	0.979	92.061	93.744	0
11/3/2016	1,320	231	0	158.94	0.985	91.435	94.3	0
11/4/2016	635	45	0	76.46	0.997	26.783	26.858	0
11/5/2016	630	46	0	75.86	0.997	26.795	26.868	0
11/6/2016	1,224	60	0	147.38	0.999	82.439	82.586	0
11/7/2016	1,360	187	0	163.76	0.991	121.84	125.89	0
11/8/2016	1,449	155	0	174.47	0.994	129.383	133.713	0
11/9/2016	1,288	105	0	155.09	0.997	85.422	85.831	0
11/10/2016	1,237	189	0	148.95	0.989	124.227	129.923	0
11/11/2016	723	104	0	87.06	0.99	32.822	33.16	0

Energy TOU Import/Export

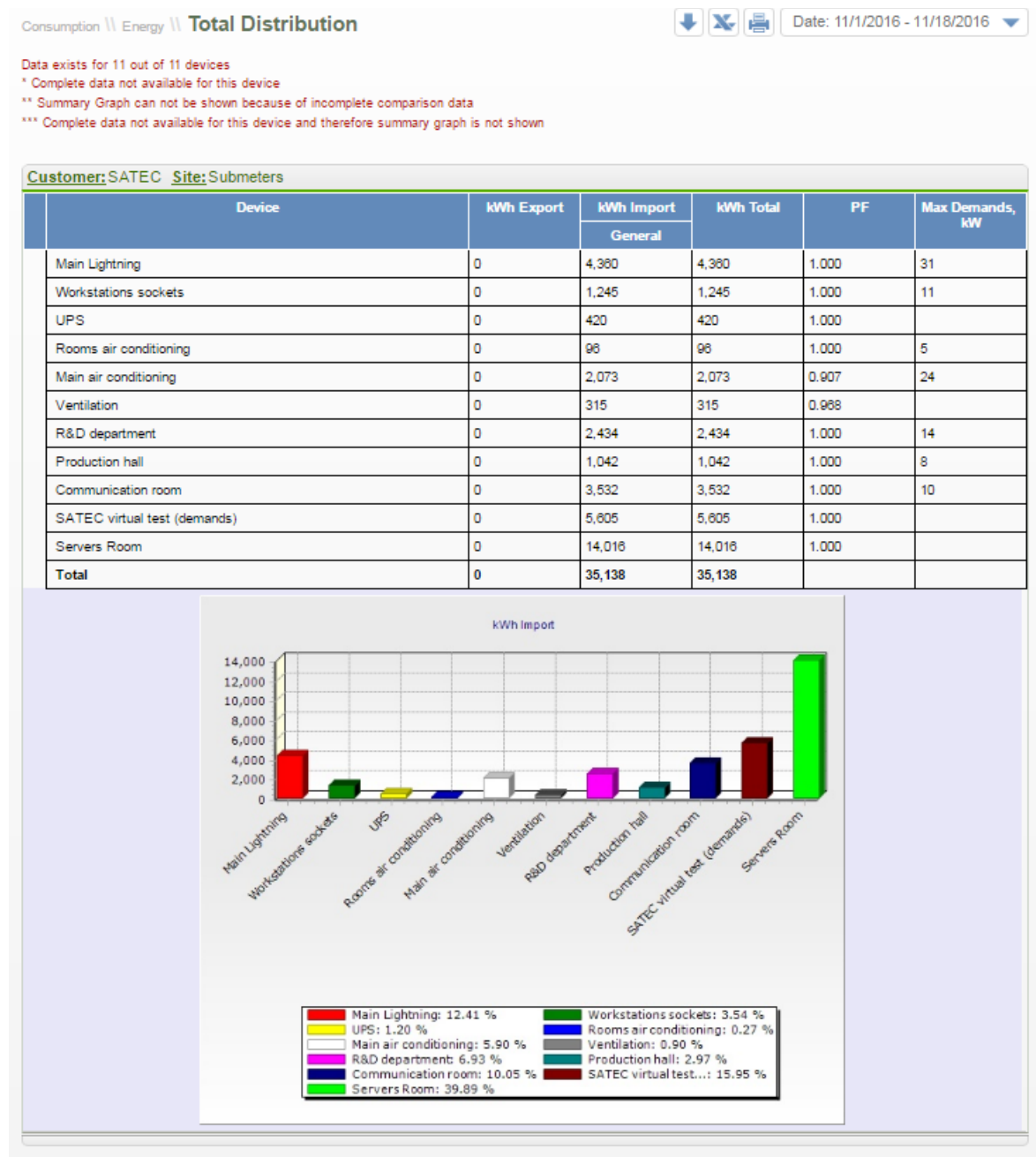
These pages show consumption according to Time Of Use Peak, High and Low tariff durations throughout the day, in a monthly or daily resolution, shown as a data grid as well as a graph.

The top of the page shows the total per TOU tariff duration:



Energy TOU/Total distribution

These pages graphically highlight the distribution between multiple devices:



Event View

ExpertPower can detect various types of configurable events, such as disconnections, failures or exceptional consumption. Events can also trigger notifications via emails or SMS messages.

Events are shown on the Event View page for the selected date duration, under 3 categories: Info, Warning or Critical. Clicking on the blue/orange/red category buttons on the top right, will filter the shown events accordingly.

Note: in order to see events the user needs to first define their triggering conditions in the administrator menu for any site or device.

Events \ **Event View** Download Print Date: 9/5/2016 - 9/12/2016

Customer:SATEC **Site:**Submeters **Location:**Main air conditio... **Device:** BFM136-036 Logs

Info Warning Critical

Type	Date	Category	SubCategory	Description	Info	Source	Duration	Value	Mail	Sms
	9/11/2016 07:52:30.163	Application	Communication	No connection to device	Communication Device BFM136 SATEC	Main air conditioning	39:42.3 min			
	9/10/2016 09:11:03.000	Application	Communication	No connection to device	Communication Device BFM136 SATEC	Main air conditioning	22.0 Hours			
	9/9/2016 08:11:02.740	Application	Communication	No connection to device	Communication Device BFM136 SATEC	Main air conditioning	1:42:47 Hours			

Event Log

This page shows the event log for the selected meter or communication device. The events are shown on a table. The table header provides a list of event types for selection and display on the table, once you check and click Submit.

Events \ **Event Log** Download Print Date: 9/4/2016 - 9/12/2016

Customer:SATEC **Site:**Submeters **Location:**Main air conditio... **Device:** BFM136-036 Logs

Select Event Types

<input checked="" type="checkbox"/> Setpoint Event	<input checked="" type="checkbox"/> Setpoint activity	<input checked="" type="checkbox"/> Comm. activity	<input checked="" type="checkbox"/> Front panel activity
<input checked="" type="checkbox"/> Self-check	<input checked="" type="checkbox"/> Self-update	<input checked="" type="checkbox"/> Run-time Error	<input checked="" type="checkbox"/> Hardware Event
<input checked="" type="checkbox"/> External Event	<input checked="" type="checkbox"/> Corrupted		

Submit

Drag a column header here to group by that column

No	Date / Time	Description	Details	Value
222808846	9/11/2016 08:30:27.014	Comm. activity: DATA KEEPING	CLR TOU DEMD	
222808842	9/11/2016 08:30:25.493	Comm. activity: DATA KEEPING	CLR DEMANDS VOLT/AMPERE	
222808839	9/11/2016 08:30:25.427	Comm. activity: DATA KEEPING	CLR DEMANDS POWER	
222808838	9/11/2016 00:01:13.328	Comm. activity: DATA KEEPING	CLR TOU DEMD	

Event Summary

This page shows specific important daily events from all customer devices which should be taken care of and resolved. Click the arrow button on the right of the event type to see specific events and their device and time information.



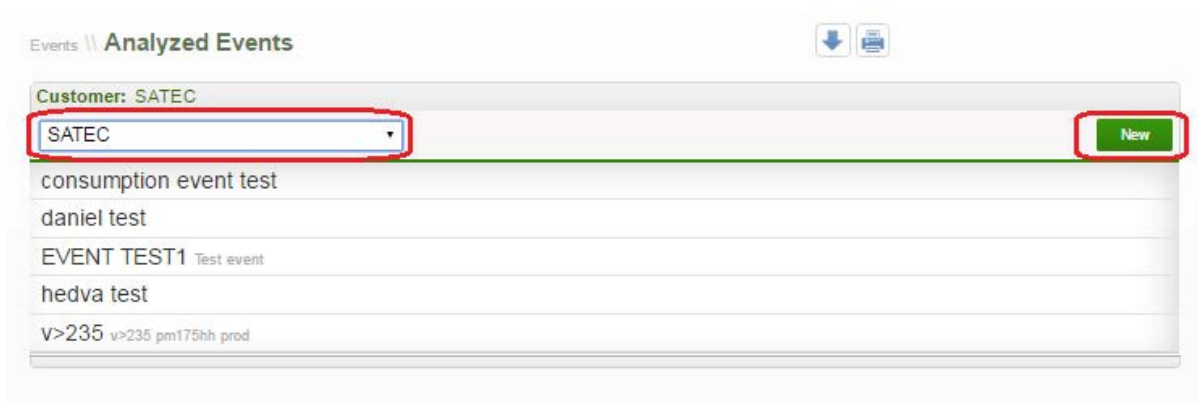
Notifications

This page shows all notifications which were sent to the customer via email or SMS.

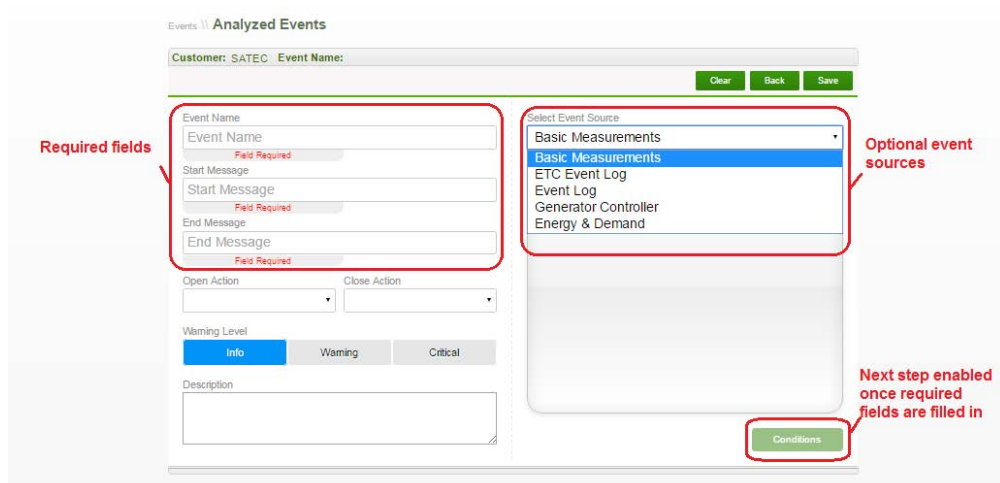
Analyzed Events

Adminsitrator > Events > Analyzed Events

1. First select a customer and hit "New":



2. Fill in the mandatory fields – Event name, Start message to show or send upon opening the event, End message, Source and specific device from the selection tree on the right, and click "Conditions":



- Click Add to create an event triggering condition. You can add multiple conditions with AND or OR relation between them:

Events \ **Analyzed Events**

Customer: Test_QA_plus Event Name:

Define Event Criteria Define Time Criteria Remove **Add** Back Save

kWh import Starting Threshold >= 1000 kWh Ending Threshold >= 1000 kWh

AND Power factor L1 Starting Threshold <= 0.9 PF Ending Threshold >= 0.9 PF

By selecting Define Time Criteria you can also set time specific conditions, such as for the event to be only considered during daytime hours, or only during a weekend such as the following:

Events \ **Analyzed Events**

Customer: Test_QA_plus Event Name:

Define Time Criteria Define Event Criteria Remove Add Save

Day of week Starting Threshold >= Saturday Ending Threshold >= Sunday

Always remember to click Save in order to complete the analyzed event definition and save your work.

Notification settings

Administrator > Events > Notifications

This page allows administrators to define sending email or SMS notifications upon triggering of various events.

Reports

Reports are first defined by going through the Report Wizard, then they can be saved, and regenerated, exported or edited from the Report list:

Manager Administrator

Consumption Power Quality Billing Generators **Reports**

Reports \ **Report Wizard** Reports Wizard Reports List

Set report title

Choose report type

Select report items

Select dates

When going to the Report Wizard, give your new report a name and select its type from the drop down. Now appropriate fields required for that report, will be shown such as source, graph type, start/end time etc.

In most cases you need to also select the device/s for the report, and the duration. Once you are done filling in all required fields, for some reports you may have to go through additional wizard cards, such as in the example below to allow grouping several devices into one or more groups:

The screenshot shows the 'Report Wizard' interface with four main sections: 'Set report title', 'Select report items', 'Select dates', and 'Schedule'. The 'Select report items' section is active, featuring a 'Select device' button highlighted with a red rectangle and a red arrow pointing to a 'Devices Tree' modal window. The modal lists a hierarchy of devices: Riverwalk Point, Roy test, SATEC, Data Center (with sub-items Main Load and Servers Room), PM175 SATEC EMB (with sub-item Main Load), site for Marketing (with sub-item Main Load v), Submeters, Communication room, and Main air conditioning. The 'Set report title' section has a text input with 'My single period report'. The 'Choose report type' section has a dropdown set to 'Single period comparison' and a 'Stacked' dropdown. A checkbox for 'Normalize consumption data by total area' is present. The 'Select dates' section has radio buttons for 'Time Range' (selected) and 'Fixed Time', a 'Resolution' dropdown set to 'hourly quarter', and 'Start' and 'End' date pickers. The 'Schedule' section has radio buttons for 'Periodic' and 'One-Time'. A green 'Next' button is at the bottom right.

This screenshot shows the 'My single period report' configuration screen. It features a green header bar with the title. Below it is a box labeled 'Add Group +'. Underneath, there is a checkbox labeled 'Main Load'. At the bottom right, there are two green buttons: 'Previous' and 'Next'.

Click Next to select data source fields. Click "Add" for every field you want to add:

My single period report

Group: Basic Measurements

Field: Accum. kVA Demand

Aggregate method: Minimum

Series type: Line

Previous Add Create Finish

Register group name	Usage Type	Tariff	Status Value	Field Name	Series	Aggregate	Value difference	Percent difference	Action
Basic Measurements				kWh import	Line	Minimum	×	×	Delete Edit

Once you are done, click Finish to save the report, or Create to generate and save it.

Saved reports are then appearing on the Report List to allow they further reuse:

Reports **Reports List** [+ Filter List](#)

User: mls

Number	Name	Type	Last Updated	Periodic	Completed	Action
3553	My single period report	Single period comparison	11/17/2016 6:20:56 PM	×	✓	Generate

Click the Action selection for the following options and click the green triangle for the action to take place:

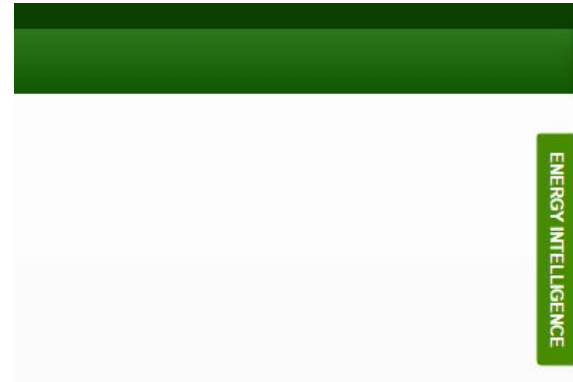
Action

- Generate
- Update
- Save As
- Delete
- Share
- Generate
- Export To PDF
- Export to Excel

Energy Intelligence

The Energy Intelligence module provides strong and simple data analysis tools, such as configurable dashboards, allowing to quickly gain consumption insights from your site or any group of meters of choice.

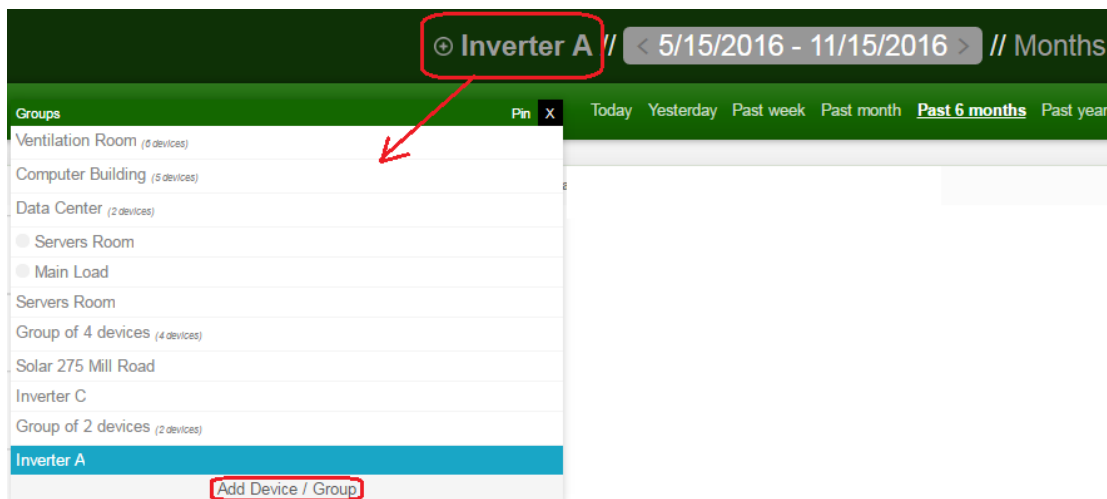
Open the Energy Intelligence module by clicking the vertical Energy Intelligence on the right hand side of the screen:



Following is a description of the various module components:

Object selector

All Energy Intelligence charts are always reflecting the selected device / group, dates and resolution that appears on the top toolbar. Click the device name on the top toolbar, for the object selector to open up, showing existing group definitions added by the current user, also allowing to Add Device or Group

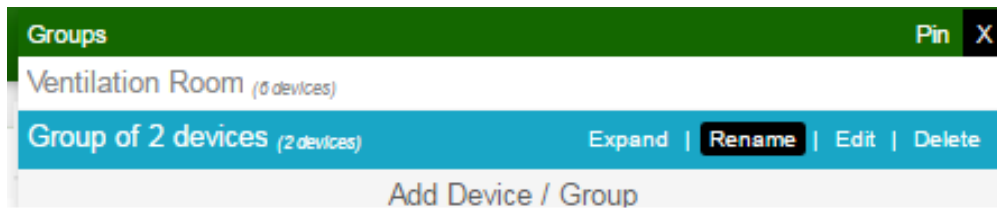


Upon clicking the Add Device/Group, the Device selection tree opens up.

The device selection tree will also open directly if you click the round plus icon to the left of the current device on the top toolbar.

You can use the tree's top search option or just scroll and click on any device or site once to select it, or click it again to exclude it from the current selection which appears below the selection tree. Click the green bottom "Select" button for your selection to appear on the group list and close the tree.

Once selecting more than one device, a default group name will appear on the list, which you can rename according to your requirements (e.g. 'Building A' for a group of all that building meters):

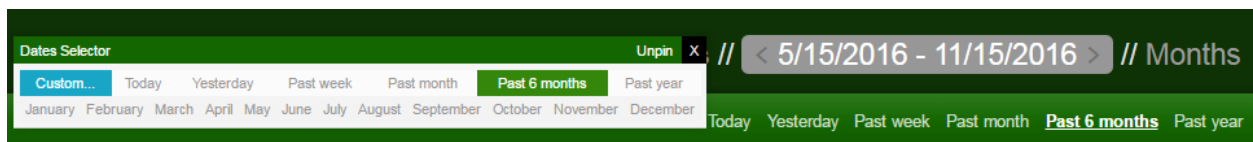


These device selection groups will remain defined under your user account unless if you decide to use the Delete option on the right hand side (see below) to delete it.

Date selector

You make changes to the duration/resolution selection in one of 3 ways:

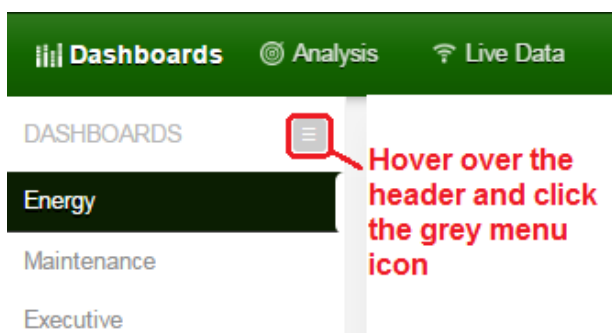
- Click the current date duration appearing on the top toolbar
- Click the current resolution
- Click any fixed duration from the list: Today, Yesterday, Past week, Past month, Past 6 months or Past year.



The date selector also provides a 'Custom...' option to select specific days / hours for the start and end times.

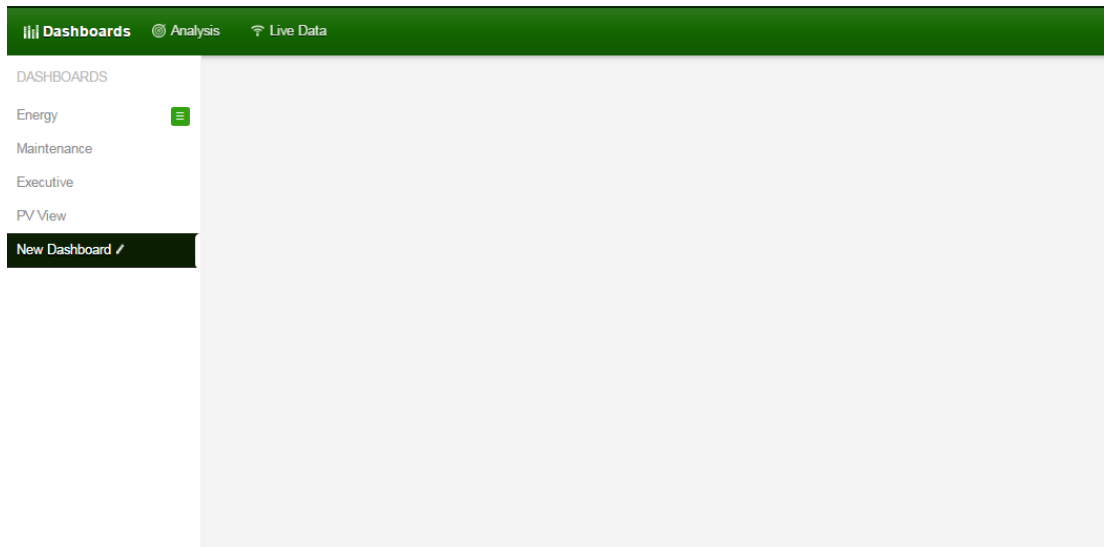
User defined Dashboards

You can make you own dashboards mixing any of the dozens of available widgets, to best suit your needs:

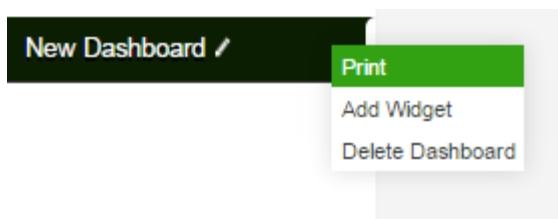


Once you click the above grey menu icon, select the Add Dashboard option that will pop up.

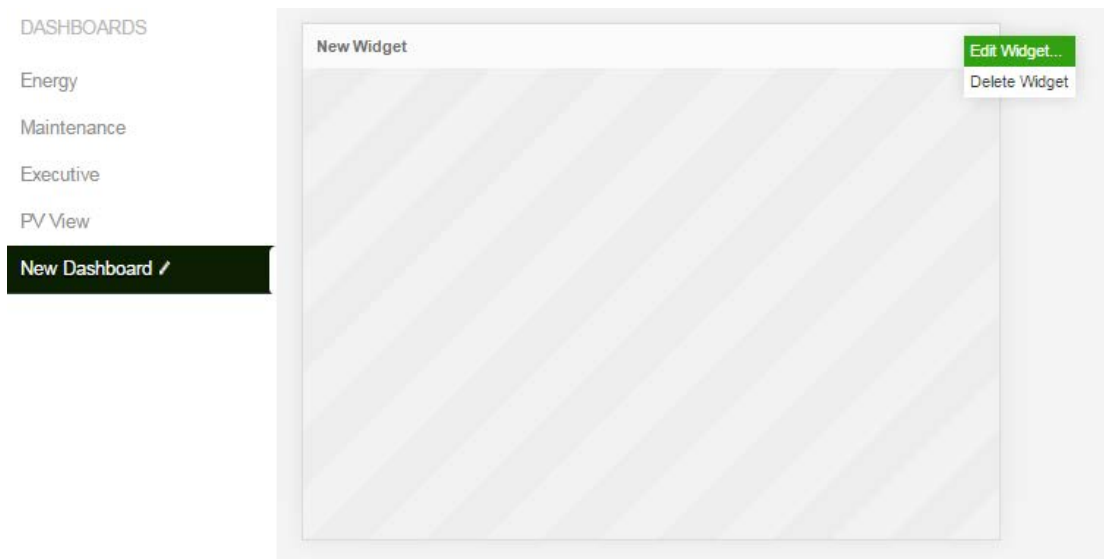
At this point a blank "New Dashbord" will become available on the left. Click to select it:



Click the green menu icon on that dashboard in order to Add a Widget:



Once you click the Add Widget, an empty area is created for the widget on the blank canvas. Click Edit Widget, to select the type of widgets from the dropdown.



Once you selected a widget and it is displayed, you can hover over its boundaries to see a double sided icon that can be dragged in order to stretch or move the widget around the canvas.

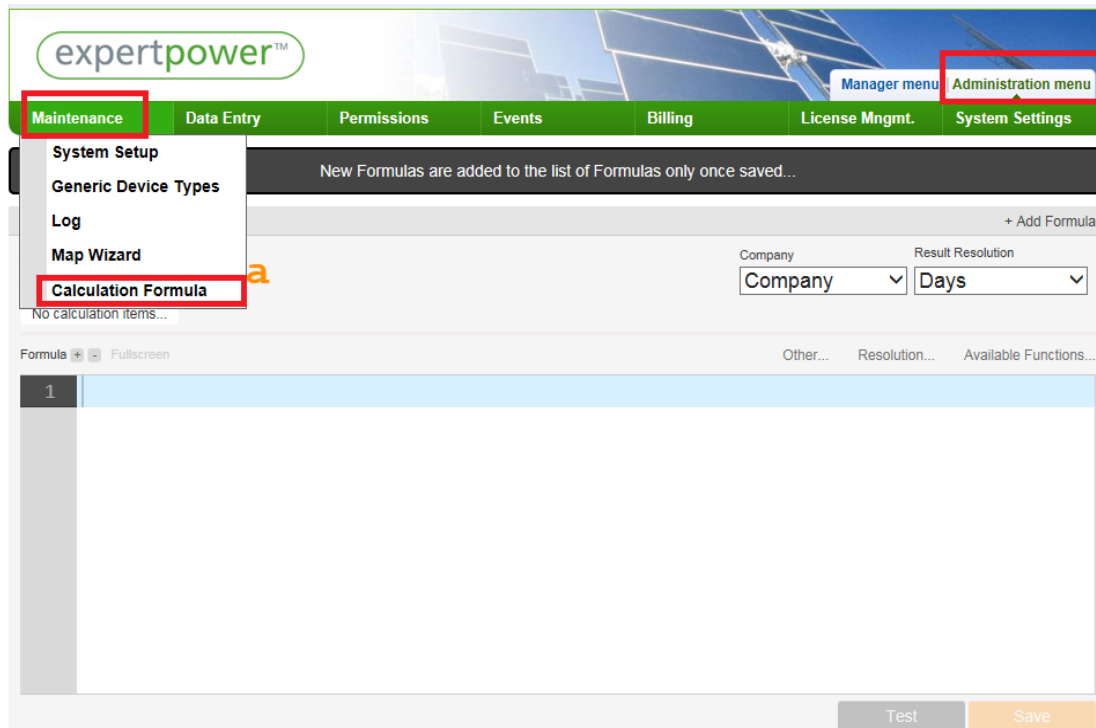
Repeat the steps above to add more widgets to your dashboard. From the menu icon on the dashboard name you can Print it over to PDF or rename it as needed.

Calculation formula

Administration Menu > Maintenance > Calculation Formula

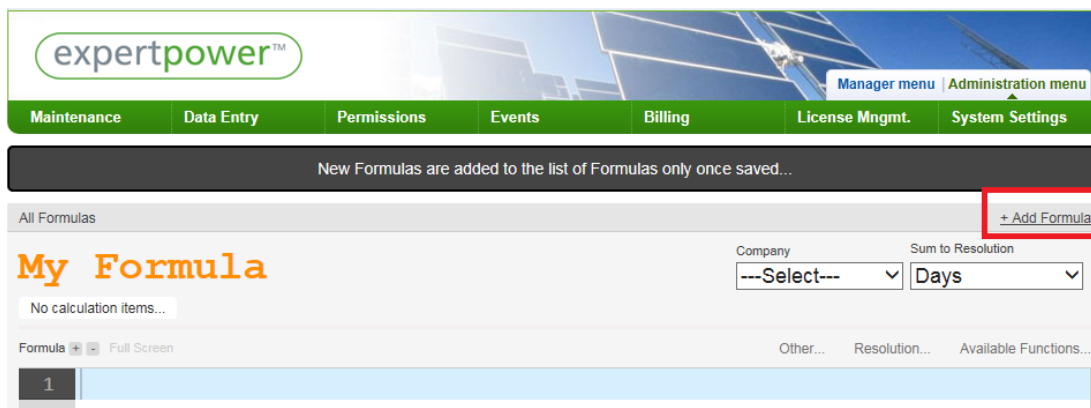
ExpertPower 5.0 presents a new module - a calculation formula engine. The motivation is to consolidate all the required formula definitions in a single location. A formula represents a set of one or more conditions. The conditions are written in a script like supported language, as explained below. The formula can be used as a billing calculation or as consumption event criteria.

Accessing the formula engine



Creating a new formula:

To create a new formula you must click on "Add formula"



1. Enter a formula name and click on Save

In the first stage, please enter a unique name for the formula and click "save."

The screenshot shows the 'All Formulas' page in the ExpertPower application. At the top, there is a navigation bar with the 'expertpower™' logo and a menu with 'Maintenance', 'Data Entry', 'Permissions', 'Events', 'Billing', 'License Mngmt.', and 'System Settings'. Below this is a dark banner that reads 'New Formulas are added to the list of Formulas only once saved...'. The main area is titled 'All Formulas' and includes a '+ Add Formula' button. A text input field contains 'My New Test Formula' followed by an 'X' icon. To the right of the input field are two dropdown menus: 'Company' (set to '---Select---') and 'Sum to Resolution' (set to 'Days'). Below the input field are 'Clear' and 'Save' buttons. A red box highlights the text input field and the 'Save' button. A red arrow points from the text 'Click on the X -Clean the Text Box' to the 'X' icon. Below the input field, there is a section for 'No calculation items...' and a 'Formula' list with a 'Full Screen' button. The 'Formula' list shows a single item '1'.

2. Add an Item:

An item represents a type of data you want to include and use in the formula. See below for details regarding each available item type.

The screenshot shows the 'All Formulas' page in the ExpertPower application, now with the formula name 'My New Test Formula' and a 'Duplicate' button. The 'Company' dropdown is set to '---Select---' and the 'Sum to Resolution' dropdown is set to 'Days'. Below the input field, there is a '+ Add Item' button. A red box highlights the '+ Add Item' button and the dropdown menu that appears below it. The dropdown menu lists the following items: 'Calculation', 'Compare Limit', 'Cost', 'EPI', 'Prices', 'Site', 'Status', 'Status Value', 'Threshold', 'TOU Profiles', 'Usage' (highlighted in blue), 'Usage Type Calculation', and 'Active Energy Import'. The 'Formula' list on the left shows a single item '1'.

A. Clicking on Add Item opens a window:

The screenshot shows the ExpertPower software interface. At the top is a header with the 'expertpower™' logo and navigation links for 'Manager menu' and 'Administration menu'. Below this is a green navigation bar with tabs: 'Maintenance', 'Data Entry', 'Permissions', 'Events', 'Billing', 'License Mngmt.', and 'System Settings'. The main area is titled 'All Formulas' and contains a text input field with 'My new test Formula', a 'Clear' button, and a 'Save' button. To the right are dropdown menus for 'Company' (set to 'Company') and 'Result Resolution' (set to 'Days'). Below the text field is a '+ Add Item' button. A modal window titled 'Calculation Formula Item' is open, highlighted with a red border. It contains fields for 'Item Name' (filled with 'activeEnergy'), 'Item Type' (set to 'Usage'), 'Usage Type' (set to 'Active Energy Import'), and 'Tariff' (empty). At the bottom of the modal are 'Cancel' and 'Add' buttons. The background interface also shows a table with one row and a 'Test' button.

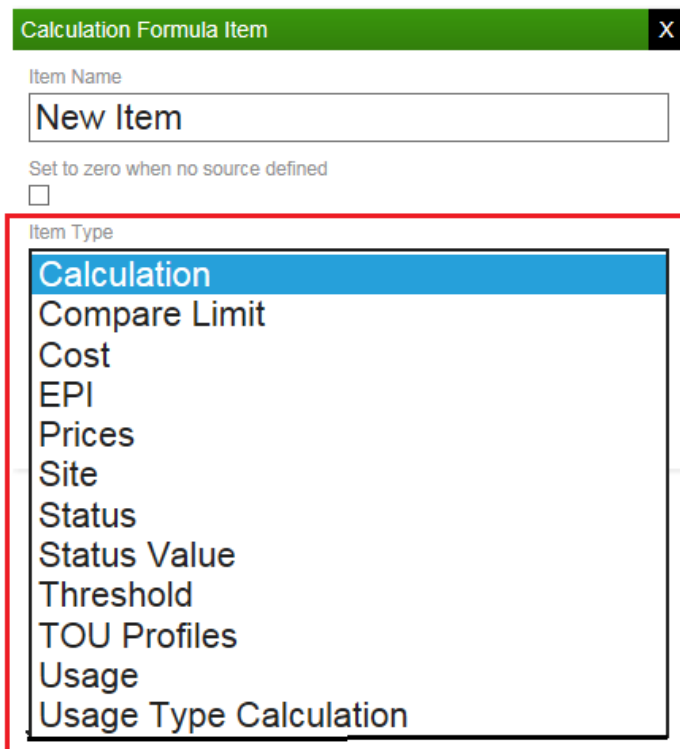
Enter an Item Name:

Please enter a unique name for the item. You can enter spaces.

This screenshot is similar to the previous one but shows the 'Add Item' window with a callout. The main interface now shows 'My New Test Formula' with a 'Duplicate' link. The 'Add Item' window is open, and the 'Item Name' field contains 'activeEnergy'. A red box highlights this field, and a black callout box with a red arrow points to it, containing the text: 'Please enter a unique name for the item. You can enter spaces.' The 'Item Type' is 'Usage', 'Usage Type' is 'Active Energy Import', and 'Tariff' is 'General'. The 'Add' button is visible at the bottom of the modal.

Item Type

Clicking on Item Type opens a list of available item types:



Calculation Formula Item [X]

Item Name
New Item

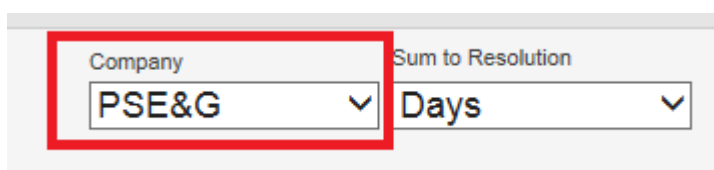
Set to zero when no source defined
☐

Item Type
Calculation
Compare Limit
Cost
EPI
Prices
Site
Status
Status Value
Threshold
TOU Profiles
Usage
Usage Type Calculation

1. Usage – Usage represents data read from a device such as active energy import, export, max demands etc. After selecting the usage type, a tariff can be selected.

If you need to associate the tariff based on what is defined in the price for each line in the payment program, you must select the "From Variables" options.

Please note: The tariffs list is presented , once you set up the relevant Electric Company



Company
PSE&G

Sum to Resolution
Days

2. Usage Type Calculation – represents a calculation performed on usage data. A list of available calculations appears below.

Usage Type and Tariff is Active : According to Usage Type and tariff I chose Returns true if the tariff is active.

Active tariff for device in date: Summarizes the number of times the tariff is active for the device in date.

Proportional number of tariff days in period: Summarizes the proportional number of days in the period, to the same tariff

The screenshot shows the 'expertpower™' web interface. At the top, there's a navigation bar with links like 'Maintenance', 'Data Entry', 'Permissions', 'Events', 'Billing', 'License Mngmt.', and 'System Settings'. Below this, the 'All Formulas' section is active, displaying 'My new test Formula'. The 'Company' is set to 'Israel Electric C' and 'Result Resolution' is 'Days'. A dropdown menu for 'Usage Type' is open, showing options like 'Active Energy Import', 'From Variables' (highlighted with a red box), 'Peak Summer', 'High Summer', 'Low Summer', 'Peak Winter', 'High Winter', 'Low Winter', 'Peak Fall/Spring', 'High Fall/Spring', and 'Low Fall/Spring'. The 'Test' and 'Save' buttons are visible at the bottom right of the form.

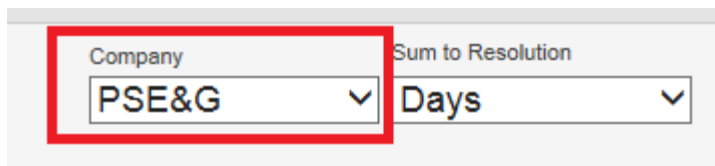
Friday or the eve of holiday: Summarizes the energy on Fridays and holiday eves when the tariff is special

Saturday or Holiday: Summarizes the energy on Saturday and holiday when the tariff is special

This is a close-up of the 'Calculation Formula Item' form. The 'Item Name' is 'activeEnergy'. The 'Item Type' is 'Usage Type Calculation'. The 'Usage Type' is 'Active Energy Import'. The 'Tariff' dropdown menu is open, showing 'From Variables' as the selected option. Below the dropdown, a red box highlights a list of usage types: 'Usage Type Calculation', 'Usage Type and Tariff is active', 'Active tariff for device in date', 'Proportional number of tariff days in period', 'Friday or the eve of a holiday', and 'Saturday or the Holiday'.

3. Threshold - Threshold from the available thresholds list.

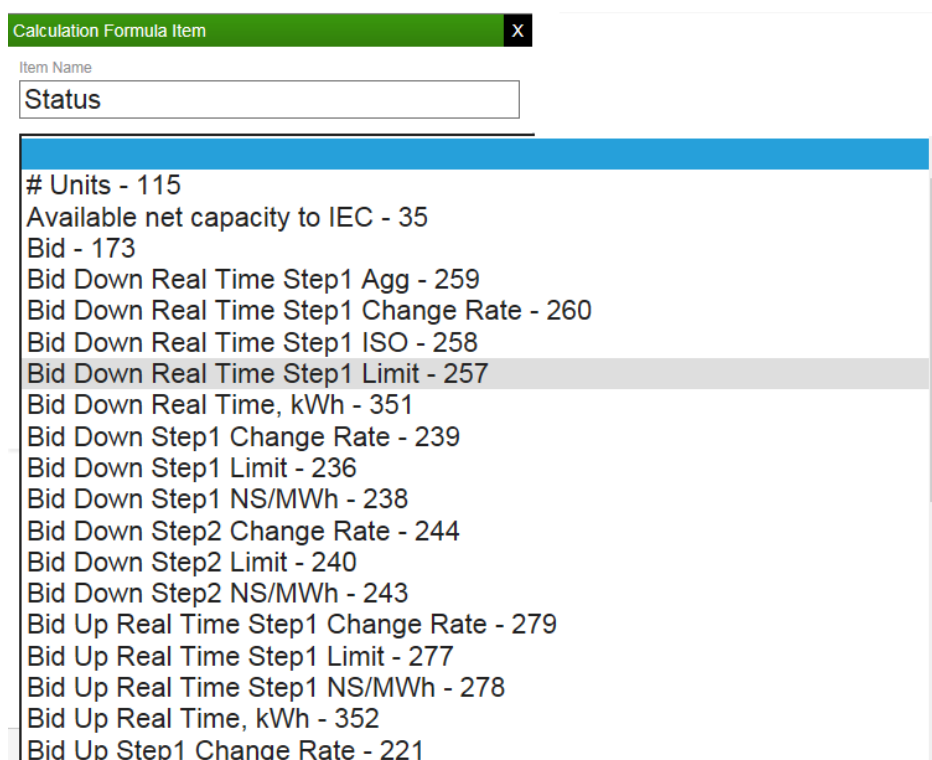
Please note: The threshold list is presented, once you set up the relevant Electric Company.



Company
PSE&G

Sum to Resolution
Days

4. Status – A status represents an object from a selection of available objects definitions. Its value is entered by external interfaces and is mainly used in power plant management projects. Next to each status appears its identification number.

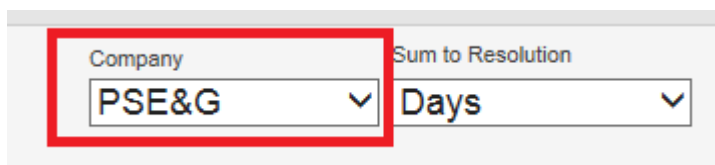


Calculation Formula Item

Item Name
Status

- # Units - 115
- Available net capacity to IEC - 35
- Bid - 173
- Bid Down Real Time Step1 Agg - 259
- Bid Down Real Time Step1 Change Rate - 260
- Bid Down Real Time Step1 ISO - 258
- Bid Down Real Time Step1 Limit - 257
- Bid Down Real Time, kWh - 351
- Bid Down Step1 Change Rate - 239
- Bid Down Step1 Limit - 236
- Bid Down Step1 NS/MWh - 238
- Bid Down Step2 Change Rate - 244
- Bid Down Step2 Limit - 240
- Bid Down Step2 NS/MWh - 243
- Bid Up Real Time Step1 Change Rate - 279
- Bid Up Real Time Step1 Limit - 277
- Bid Up Real Time Step1 NS/MWh - 278
- Bid Up Real Time, kWh - 352
- Bid Up Step1 Change Rate - 221

Please note: The status list is Presented , once you set up the relevant Electric Company.



Company
PSE&G

Sum to Resolution
Days

5. Status Value - statuses have a choice of several options. The Item returns a value of true if the status has the value of the selected option.

The screenshot shows the 'Calculation Formula Item' dialog box. The 'Item Name' field is 'Status'. The 'Item Type' dropdown is set to 'Status Value'. The 'Source' dropdown is set to 'Billing'. The 'Status' dropdown is set to 'Production Limitation Type - 312'. The 'Value' dropdown is open, showing a list of options: Acceptance Tests, Change Frequency, Dispatcher Order, Force Majeure, Grid Failure, INGL Error, No Limitation, Planned Outage, Responsibility, and Unscheduled Outage. The 'Set to zero when no source defined' checkbox is unchecked.

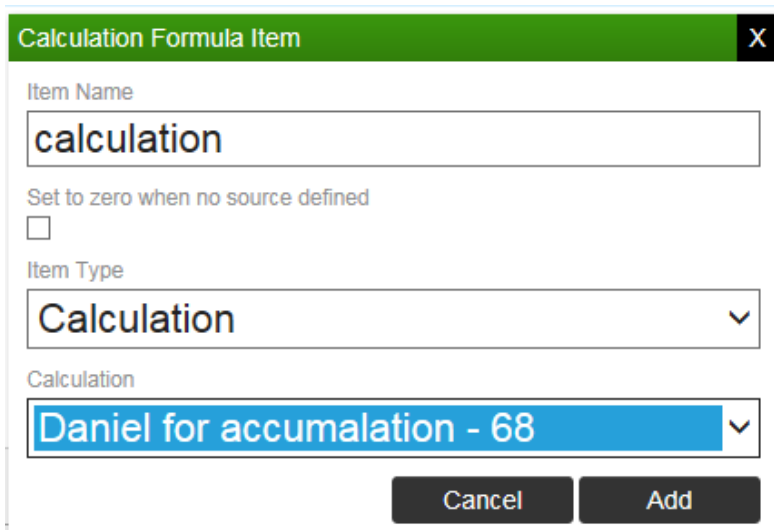
6. Compare Limit – this is a set of values used to transform a result.

e.g. in the example below a value of 10 to 15 will be transformed to 50. A value between 10 and 30 will be transformed to $(50 + (100 - 50) * (\text{value} - 10) / (30 - 10))$

The screenshot shows the 'Calculation Formula Item' dialog box. The 'Item Name' field is 'New Item'. The 'Item Type' dropdown is set to 'Compare Limit'. The 'Compare Limit' dropdown is set to 'Temperature Coefficient cycle open / closed'. The 'Set to zero when no source defined' checkbox is unchecked. At the bottom, there are 'Cancel' and 'Add' buttons.

LowerLimit	UpperLimit	Value
	10	50
10	30	100
30	50	300
50	70	500
70	1000	700
100		1000

7. **Calculation** - using another formula's results as the base data.



Calculation Formula Item

Item Name
calculation

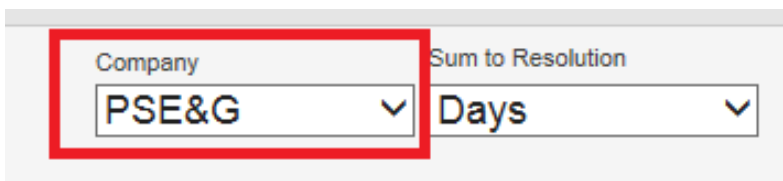
Set to zero when no source defined
☐

Item Type
Calculation

Calculation
Daniel for accumulation - 68

Cancel Add

8. **TOU Profile** – the TOU Profiles list is based on the selected Electric Company.



Company
PSE&G

Sum to Resolution
Days

+ Add Formula

Company
PSE&G ▼

Sum to Resolution
Days ▼

Calculation Formula Item
X

Item Name

Set to zero when no source defined
☐

Item Type
TOU Profiles ▼

Usage Type
Active Energy Import ▼

TOU Profiles
Working Days Summer
Sat,Sun Summer
Working Days Winter
Sat,Sun Winter

Billing \ Administration \ Companies \ TOU Profiles

↓
🖨
Show TOU Calendar
+ Add New Definition

Details	Season	Tariff	TOU Profiles	Price Lists	Calculation	Thresholds	Factors	Payment Programs
Company: PSE&G				Usage Type: Active Energy Import ▼				
ID	Name	Season						
1	Working Days Summer	Summer				Hours Days		Edit
2	Sat,Sun Summer	Summer				Hours Days		Edit
3	Working Days Winter	Winter				Hours Days		Edit
4	Sat,Sun Winter	Winter				Hours Days		Edit

* TOU Profile can not be deleted if Hours / Days defined

9. **Prices** - The prices list is based on the selected electric company.

Company
PSE&G ▼

Sum to Resolution
Days ▼

This item is based on the price lists that were defined for the company.

Calculation Formula Item

Item Name

Prices

Set to zero when no source defined

☐

Item Type

Prices

Price

price list

Items

item 1

Cancel

Add

Billing \ Administration \ Companies \ Price Lists



+ Add New Definition

Details	Season	Tariff	TOU Profiles	Price Lists	Calculation	Thresholds	Factors	Payment Programs
Company: PSE&G								
ID	Name					Items Prices Current Prices		Action
138	price list							Edit

* Price List can not be deleted if Items / Prices defined

10. EPI- EPI (Energy Performance Indicators) data are additional data properties for customer / device. They can be used for the calculation.

Calculation Formula Item

Item Name

EPI

Set to zero when no source defined

☐

Hourly Production

Heating Degree Days

Cooling Degree Days

Total Area

Temperature

Number of Rooms

Number of Computers

Weekly Hours of Occupancy

11. Site – Selecting a site. The site can then be used to sum data for all the devices in the site.

After creating an item of type "Site", click on the Item to choose the source of the data. Clicking on the item will open a popup window. Click on "Add Source":

The screenshot shows the ExpertPower web interface. At the top, there's a navigation bar with 'expertpower™' logo and links for 'Manager menu' and 'Administration menu'. Below this is a menu bar with 'Maintenance', 'Data Entry', 'Permissions', 'Events', 'Billing', 'License Mngmt.', and 'System Settings'. The main content area is titled 'All Formulas' and shows a formula named 'My new test Formula'. A red box highlights the 'Site' item in the formula list. Another red box highlights the 'Add Source' button in the 'Calculation Formula Item' popup window. The popup window has fields for 'Item Name' (Site), 'Add Source' button, 'Item Type' (Site), and 'Cancel'/'Save' buttons.

Steps to set a data source for site item:

1. Select the customer
2. Select the device you want to associate with a source site. If the same definition is needed to all the customers' device, select "All..."
3. Select the site.

The screenshot shows the ExpertPower web interface. At the top, there's a navigation bar with 'expertpower™' logo and links for 'Manager menu' and 'Administration menu'. Below this is a menu bar with 'Maintenance', 'Data Entry', 'Permissions', 'Events', 'Billing', 'License Mngmt.', and 'System Settings'. The main content area is titled 'All Formulas' and shows a formula named 'My New Test Formula'. A red box highlights the 'Site' item in the formula list. Another red box highlights the 'Add Source' button in the 'Calculation Formula Item' popup window. A third red box highlights the 'Sources' popup window, which shows a list of sources including 'Customer name', 'All...', and 'Site...'. The 'Sources' popup window has a 'Close' button.

For Example: Make a summary of all the results that obtained with calculation 66 for each device in “site a”

The screenshot shows a software interface with a formula editor at the top and a 'Calculation Formula Item' dialog box open in the center.

Formula Editor: The formula bar contains the text: `SumDevicesInSite(sum_all_consumers, calc66)`. Above the formula bar, there are several buttons: `import_minus_OverMaxConsumer_device`, `import_melison_total`, `sum_all_consumers`, `Export_ge2PlusGe3`, `calc66`, and `+ Add Item`.

Calculation Formula Item Dialog: The dialog has a title bar 'Calculation Formula Item' with a close button 'X'. It contains the following fields and controls:

- Item Name:** A text field containing 'sum_all_consumers'.
- Item Sources:** A table with columns: Customer, Device, Source, and Delete?.

Customer	Device	Source	Delete?
customer	All	site a	X

Below the table is an 'Add Source' button. There is also a checkbox labeled 'Set to zero when no source defined' which is currently unchecked. At the bottom, there is an 'Item Type' dropdown menu set to 'Site', and 'Cancel' and 'Save' buttons.

Adding a data source

Because the formulas are general formulas and can be used for different customers and different devices , the source of the data can be set for each customer / device.

The option to add source is possible for each Item, and it is optional.

If you do not enter the source, the source will be the device for which the invoice is being produced for.

Steps to set a data source:

1. Click on the Item
2. Click on "Add Source"
3. Select the customer
4. Select the device for which you will select the source. If you want the same source for the whole customer - select “All”.
5. Select the device.

My New Test Formula [Duplicate](#)

General ☐ Customers

activeEnergyImport [X](#) [+ Add Item](#)

Calculation Formula Item [X](#)

Item Name: **activeEnergyImport**

[Add Source \(Optional\)](#)

Set to zero when no source defined: ☐

Item Type: **Usage**

Usage Type: **Active Energy Import**

Tariff: **General**

Sources [X](#)

Customer: **customer name**

Device: **All...**

Source Device: **Select device...**

[Close](#)

[Cancel](#) [Save](#)

After entering the source, click on Add.

You can enter multiple sources at one time.

Calculation Formula Item [X](#)

Item Name: **activeEnergyImport** [Delete Item](#)

Item Sources

Customer	Device	Source	Delete?
Customer name	All	GE2+GE3	X

[Add Source \(Optional\)](#)

Set to zero when no source defined: ☐

Item Type: **Usage**

Usage Type: **Active Energy Import**

Tariff: **General**

Sources [X](#)

Customer: **Customer name**

Device: **All...**

Source Device: **GE2+GE3**

[Close](#) [Add](#)

[Cancel](#) [Save](#)

Set to Zero When no source defined

Use this option if you want the data to be retrieved only for devices for which you have defined a source. For other devices the data will be set to zero. This is in order to create a formula in which there are devices that have two sources and devices with a single source.

The screenshot shows a form titled "Calculation Formula Item" with a close button (X). The form contains the following fields:

- Item Name:** activeEnergyImport
- Add Source (Optional):** A button.
- Set to zero when no source defined:** A checkbox, which is highlighted with a red rectangular box.
- Item Type:** Usage
- Usage Type:** Active Energy Import
- Tariff:** General
- Buttons:** Cancel and Save.

3. The construction of the formula

Building formula is done using the following window:

The screenshot shows the "expertpower" interface for building a formula. The top navigation bar includes "Maintenance", "Data Entry", "Permissions", "Events", "Billing", "License Mngmt.", and "System Settings". The main window is titled "My new test Formula" and includes a "Company" dropdown set to "Israel Electric C" and a "Result Resolution" dropdown set to "Days". Below the formula name, there are "Clear" and "Save" buttons. The formula editor area, which is highlighted with a red rectangular box, contains a single line with the number "1". At the bottom right, there are "Test" and "Save" buttons.

The formula is a script-like definition. The script is written using the various functions and objects that are available on the lists. As well as all the items that were added in the previous step.

Available Functions:



Hovering over “Available functions” will display a window with the available functions.

Common commands:

The creation of **conditions**:

if (condition, on-true, on-false)

This function evaluates the condition if it evaluates to true it returns the “on true” expression otherwise it returns the “on false” expression.

For example: If the export less or equal to threshold 18 the result is item calc66 else the result is item sumcslc66

```
if (activeEnergyExport <= tr18,
    calc66, SumCalc66)
```

Min0 (exp1)

if the result of the expression **exp1** is negative return 0 .

For example: The following expression will return 0.

```
Min0( -1)
```

SumDevicesInSite (Site, Expression)

Summarizes the value of **Expression** for all the devices in the chosen site.

For example:

`SumDevicesInSite(site1, calc66)`

accum (expression, accum Resolution, result Resolution)

This function returns the accumulated value of “**expression**” from the beginning of the period. The beginning of the period is defined by “**accum Resolution**”. The “**result Resolution**” is the resolution of the results.

For example: Return the sum of “**activeEnergy**” from the beginning of the year for each month.

`accum(activeEnergy, year, month)`

min (a, b) / max (a, b)

Min / max between the two parameters.

For example: The next expression will return 1.

`min(1,2)`

min (expression, resolution) / max (expression, resolution)

Checking the minimum / maximum within a certain date range.

For example: Show me the maximum value of the item max demand over the last year

`max(MaxDemand,year)`

sum (dataItem, resolution)

Summarize data within the date range defined by the resolution.

For example: Sum all data in item “deviation” for each month.

`sum(Deviation, month)`

First Exists (exp1, exp2)

Returns the value of the first expression which evaluates to a value that is not null (i.e. has data).

For example: The next expression will return 1

`FirstExists(null, null, 1)`

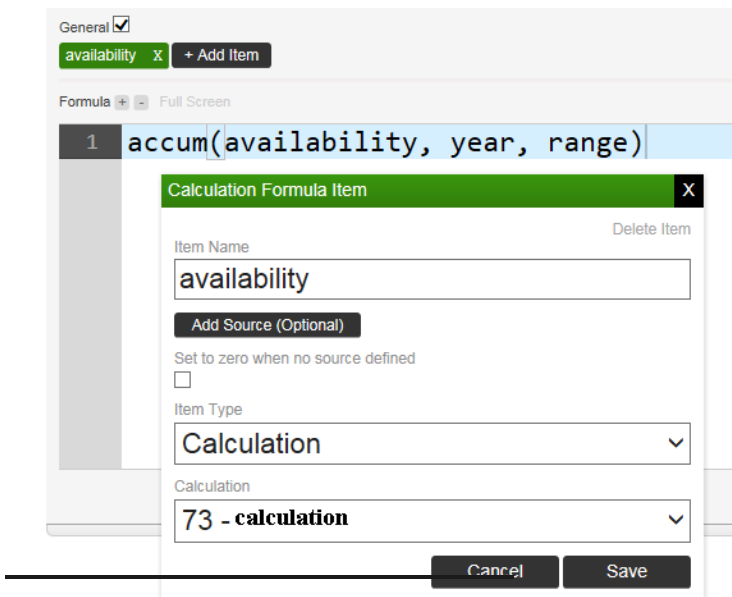
Resolution:

The list of resolutions is : “half hour”, “hour”, “day”, “month”, “year”, “range”.



Other

For example: Accumulate values from the beginning of each year.



Other: More options of expressions that can be used in the formula for calculation



For example: If any (one of the items) exist so give 1 if not 0

`if(SF354UO or SF353PO or SF318PO,1,0)`

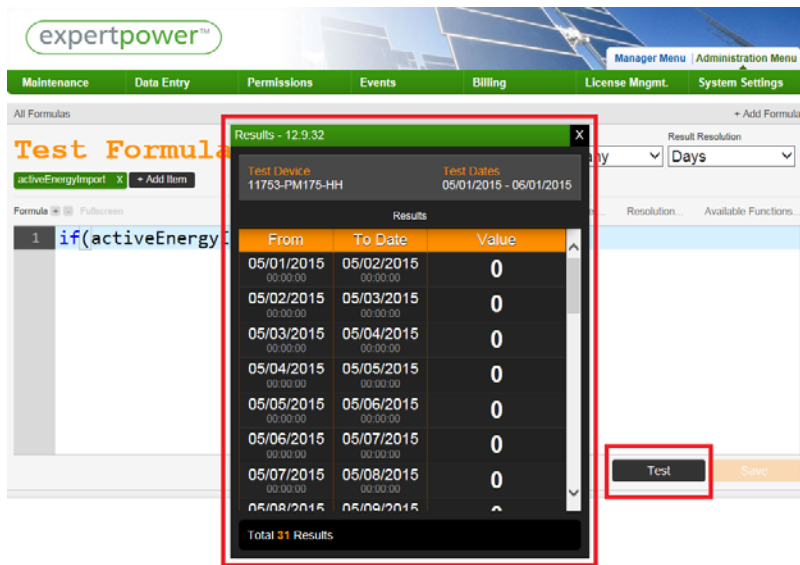
4. After creating the formula, click Save



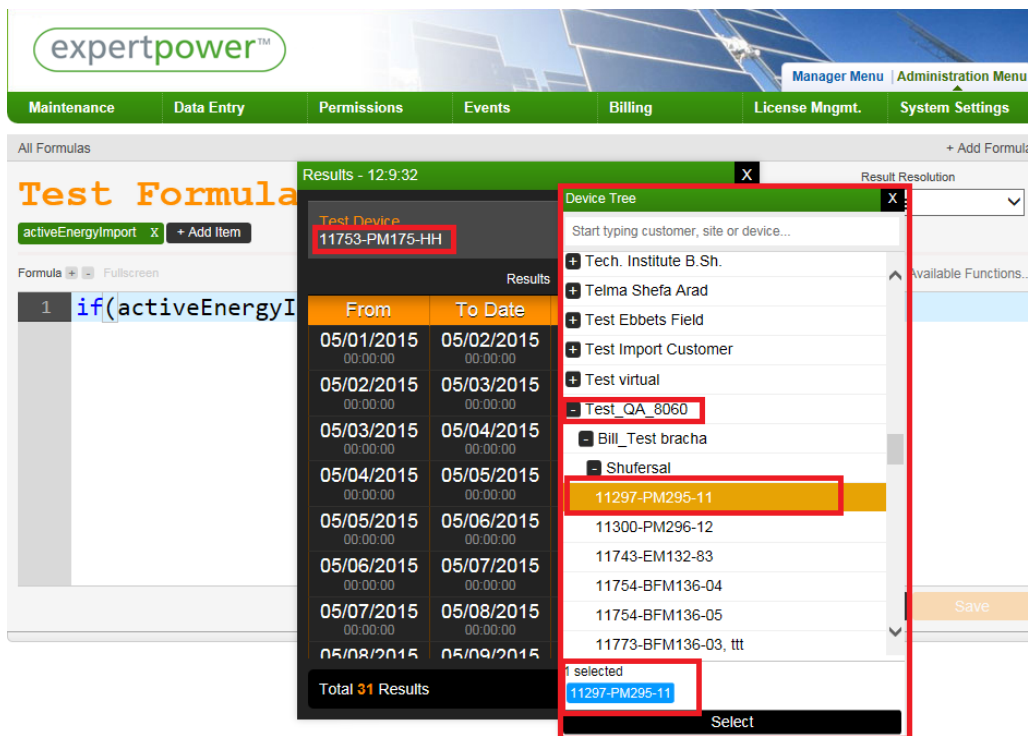
After saving, the "Test" button is enabled. This serves as a test tool to see the formula results in action.

5. Test

Clicking on testing opens the results window



Clicking on the name of the device opens a window that allows changing the tested device. Choosing a new device, and pressing the "Select" changes the selected device and the results are updated accordingly:



Clicking on the “Test Dates” allows changing the tested date period:

The screenshot shows the ExpertPower web interface. The 'Test Dates' field is highlighted with a red box. A calendar pop-up is displayed, showing the months of May and June 2015. The 'Test Dates' field is labeled 'Test Dates' and the selected date range is '05/01/2015 - 06/01/2015'.

From	To Date	Value
05/01/2015 00:00:00	05/02/2015 00:00:00	
05/02/2015 00:00:00	05/03/2015 00:00:00	
05/03/2015 00:00:00	05/04/2015 00:00:00	
05/04/2015 00:00:00	05/05/2015 00:00:00	
05/05/2015 00:00:00	05/06/2015 00:00:00	
05/06/2015 00:00:00	05/07/2015 00:00:00	
05/07/2015 00:00:00	05/08/2015 00:00:00	
05/08/2015 00:00:00	05/09/2015 00:00:00	

Total 31 Results

Control Refresh - To refresh the test results after making some changes.

The screenshot shows the ExpertPower web interface. The 'Results (Refresh)' button is highlighted with a red box. The 'Test Dates' field is labeled 'Test Dates' and the selected date range is '05/01/2015 - 01/12/2016'.

From	To Date	Value
05/01/2015 00:00:00	01/01/2016 00:00:00	115
01/01/2016 00:00:00	01/12/2016 00:00:00	107

Total 2 Results

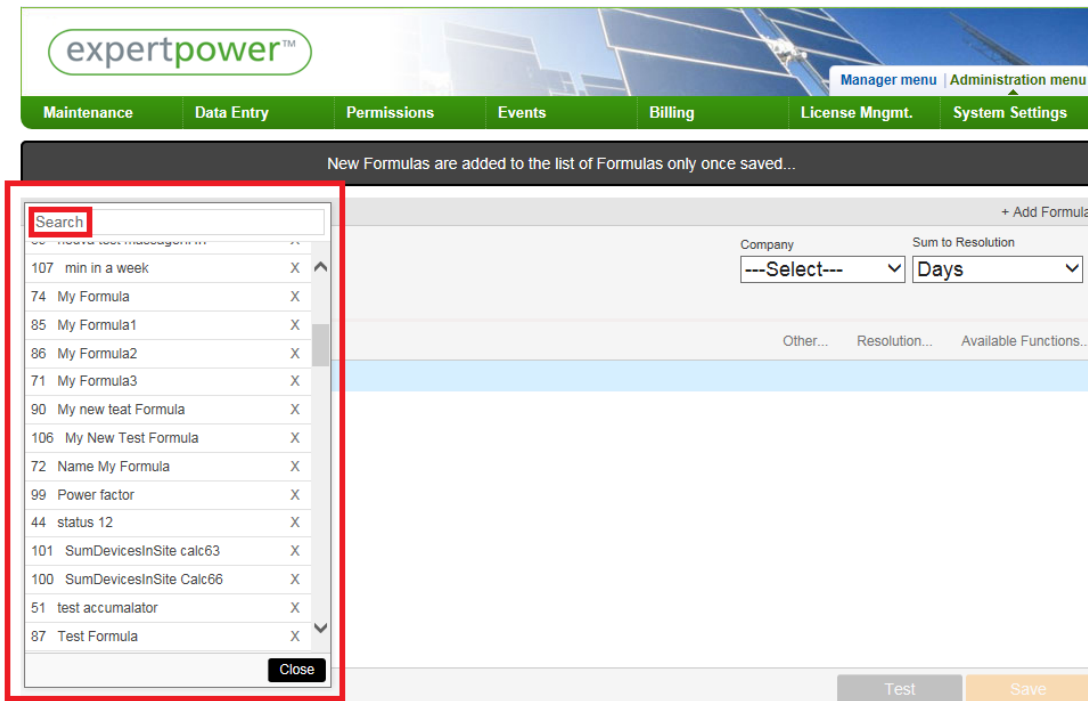
You can export the results of the Test **Excel** file

The screenshot shows the ExpertPower web interface. The 'Export to Excel' button is highlighted with a red box. The 'Test Dates' field is labeled 'Test Dates' and the selected date range is '05/01/2015 - 01/12/2016'.

Clicking on "All Formulas" displays the list of all available formulas with the number of formula.



You can search for a formula exists, by using the "Search"



To Add a new formula click on "Add formula".

expertpower™

Manager menu Administration menu

Maintenance Data Entry Permissions Events Billing License Mngmt. System Settings

New Formulas are added to the list of Formulas only once saved...

All Formulas + Add Formula

My Formula

No calculation items...

Company ---Select--- Sum to Resolution Days

Formula + Full Screen Other... Resolution... Available Functions...

1

Test Save

Duplicate a Formula

You can duplicate an existing formula, by clicking on Duplicate. When clicked, a new identical formula is created.

expertpower™

Manager Menu Administration Menu

Maintenance Data Entry Permissions Events Billing License Mngmt. System Settings

All Formulas + Add Formula

Test Formula Duplicate

activeEnergyImport X + Add Item

Company Company Result Resolution Days

Formula + Fullscreen Other... Resolution... Available Functions...

1 if(activeEnergyImport>1000,1,0)

Test Save

Full Screen

You can click on **full screen**, to switch into full screen mode.



To return to normal screen mode, click on "**Exit full screen**"

