

expertpower™



 **SATEC**
Powerful Solutions

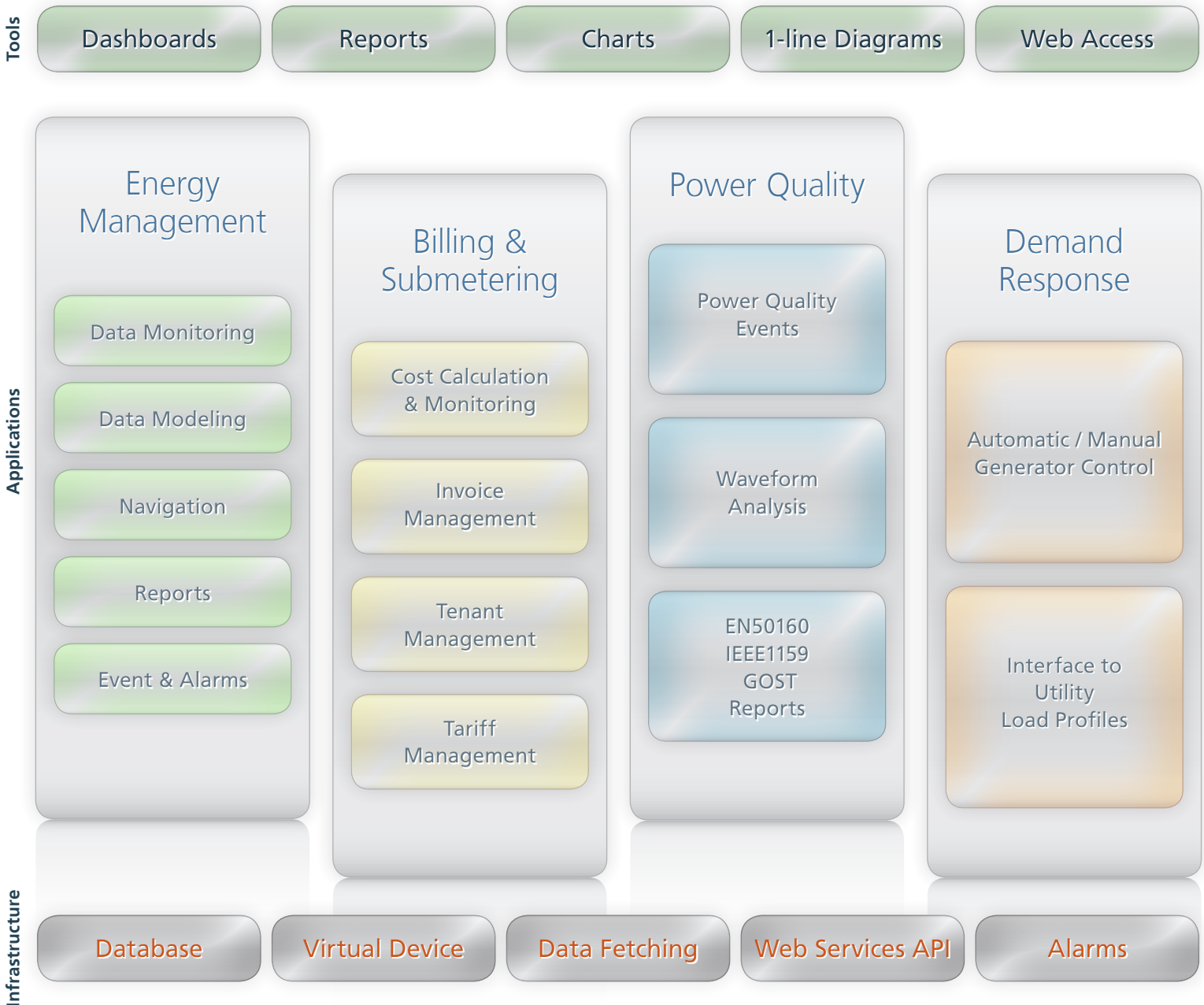
Energy Management System (EMS)
Comprehensive Power Quality Analysis
Customer Billing and Invoicing

expertpower™ at a Glance

ExpertPower™ software solution provides comprehensive energy management, billing, demand response, power quality analysis and generator control. ExpertPower™ is available either as an on-line service (Service Edition) or as a stand-alone package (Pro Edition). SATEC's complete solution includes our wide range of analyzers combined with ExpertPower™ software, providing the information and analytics to improve the efficiency, reliability, security and profitability of our customers' energy system. ExpertPower™ uses a standard web browser as user interface, for both local installations and Internet remote installations. This

reduces the total cost of ownership (TCO) by eliminating the need for training and special client hardware and software. With ExpertPower™ Service, there is no need for server hardware and software or on-site IT experts, while the standalone Pro version reduces monthly charges.

With installations of over 30,000 managed devices at one site, ExpertPower™ is the most powerful energy management solution in the market. Its scalability allows you to start with small installations and to expand as your business grows.



Main Features

Data Collection

- Automatic data collection from energy meters (electricity, water, gas etc.), power quality analyzers and substation automation controllers
- Complex calculations from two or more devices
- Easy configuration of new devices, communication server and Modbus mapping

Presentation

- View all data in your browser—no software installation, no employee training
- Customized dashboards, single line diagrams with real time data, graphs with status indications (color, icon)
- Multi-user, multi-security level

Historical information

- All data is logged in the database
- Graph any parameters
- Monitor trends to identify potential problems

Reports

- Manual, automatic or scheduled reports
- Preconfigured or customized reports
- HTML, Export to MS Excel and PDF formats

Alarms and Events

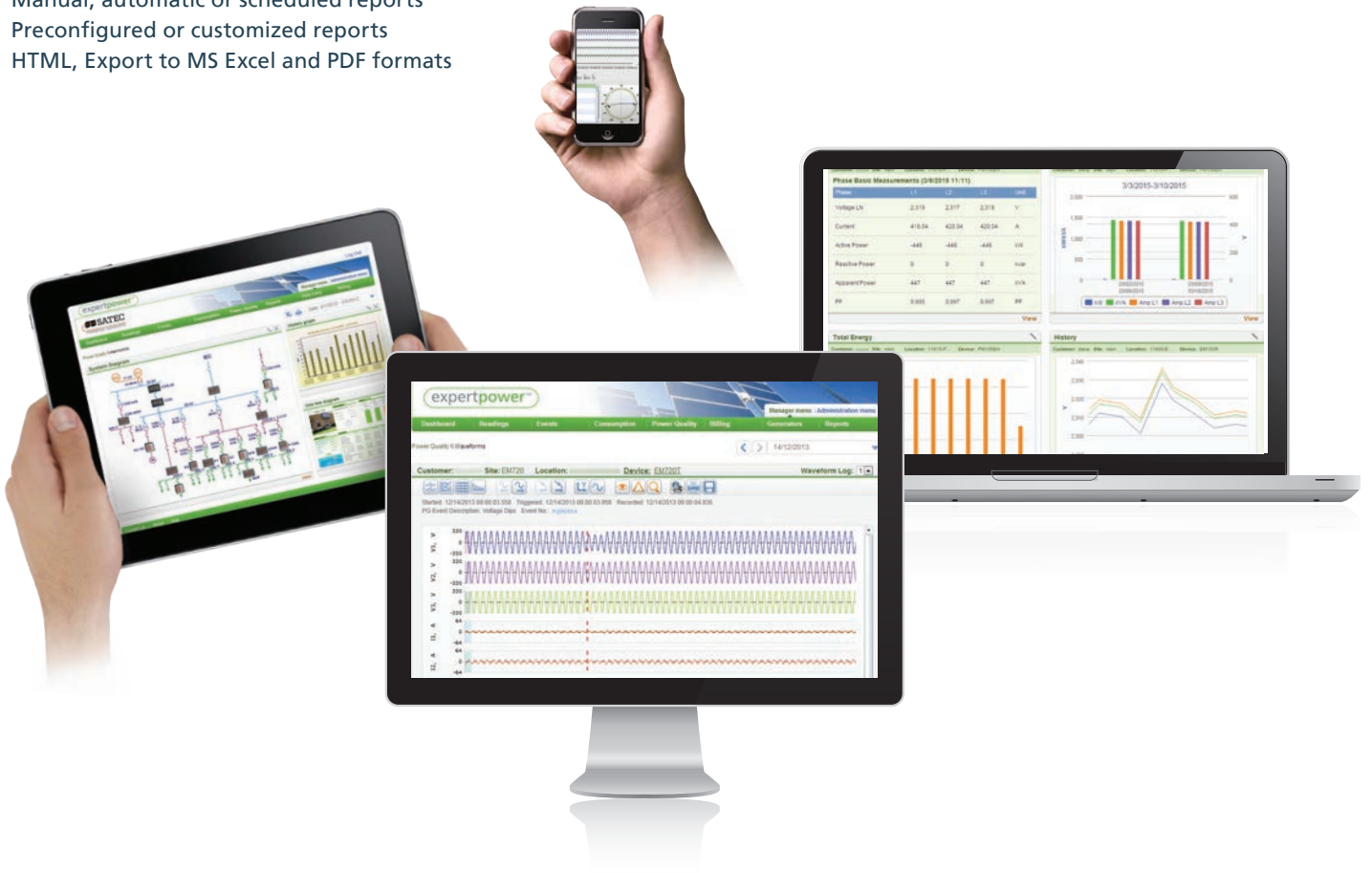
- Multi-level thresholds for complex criteria
- Messaging, emails and SMS alarms
- Log all alarms
- Request user acknowledgement

Connectivity & Interoperability

- Integrate all energy management, automation system and billing into one web based system
- Built-in data export to different formats (Excel, PDF etc.)
- Web interface optional module allows integration with third party enterprise applications (BMS, SCADA, ERP, CRM, Accounting)

Architecture

- Complete web based design with multi-browser support (Internet Explorer, Firefox, Chrome, Opera, Safari)
- Grow as you go architecture—from single device to thousands
- Distributed servers—support for server virtualization technologies such as VMWare
- Local or remote MS-SQL database
- Supports express, standard and enterprise MS SQL editions



Energy Management & Power Monitoring

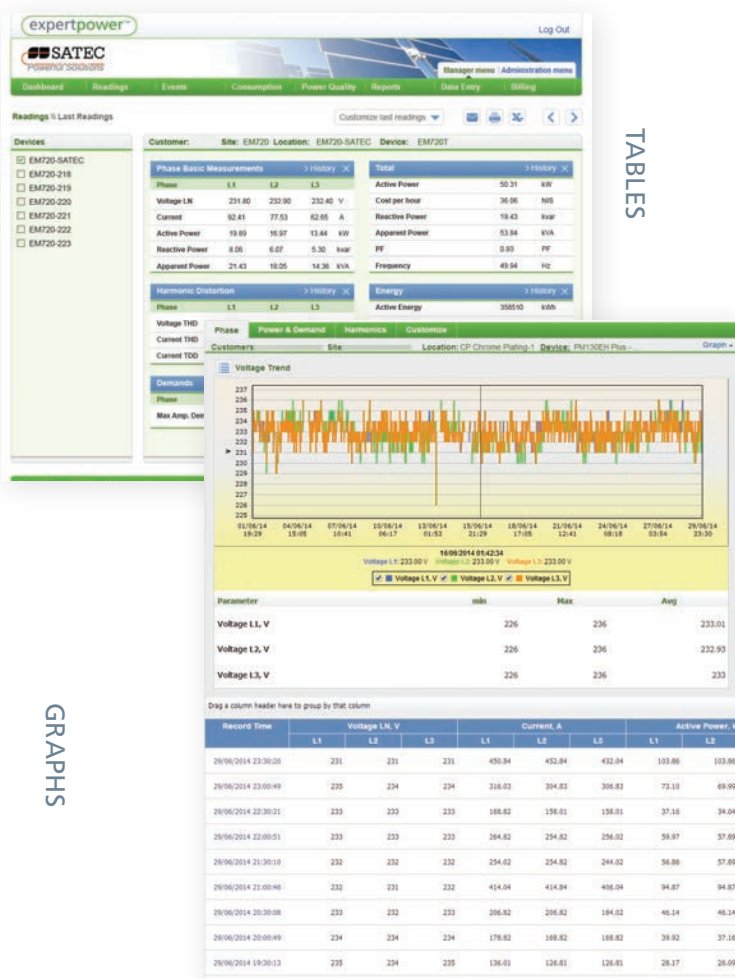
Allows monitoring your power and energy consumption in complex sites.

- Collects data from SATEC and other Modbus products
- Single-line diagrams with real time data updating
- Graphic maps, icons and color status indications
- Virtual devices—real time calculations such as summation, subtraction and more
- Historical data, trends and detection allow for identifying unnecessary load operation
- Advanced compare wizard— to select multiple devices, parameters and time periods
- Fully user-editable customized dashboards for each user

DASHBOARD



TABLES

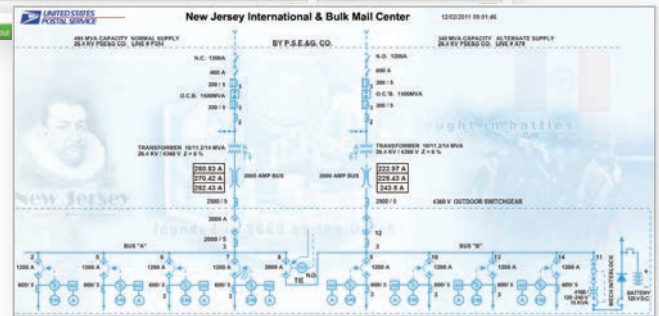


GRAPHS

DASHBOARD WITH SINGLE-LINE DIAGRAM



SINGLE LINE DIAGRAM



GEOGRAPHIC MAPS



Billing & Subtenants

Enables monitoring the consumption of sub-tenants and manage the billing process.

- Dynamic tariff definition including prices, usage and seasons
- Accurate cost calculation
- Complete submetering solution
- Tenants management
- Flexible invoicing options
- Invoice comparison

USER MANAGEMENT

Customer: Site: Device: 38 - Main 0 Electricity

User: Zo_38

Name for Bill: Main 0

Address for Bill: Customer 57

Date Added: 11/15/2006

Date Expired: 1/17/2107

External User ID: 3049521278

Language for Bill: Hebrew

Billing Data: Payment Program: IEC V2 TOU energy import tariff Medium Voltage

ENERGY BILL

Customer: Site: 38 - Main 0

Method of Charge: IEC V2 TOU energy import tariff Medium Voltage

Season	Previous Reading	Present Reading	Usage	Cost per kWh	Total Cost
Summer	40,300	1213/2011	41,982	1,066	1,076.38
Summer	49,317	1213/2011	52,346	1,120	1,346.89
Summer	45,000	1213/2011	41,852	2,949	718.82
Winter	59,352	1217/2011	66,300	878	890.43
Winter	47,516	1217/2011	48,317	1,081	553.68
Winter	43,960	1217/2011	45,083	1,046	531.27
Fall/Spring	46,546	1211/2011	58,352	1,119	6,463.31
Fall/Spring	41,241	1211/2011	47,516	6,375	3,347.89
Fall/Spring	36,498	1210/2011	43,960	7,965	3,514.06
Subtotal			35,513		14,221.87
PF			0		
Total Charge					14,221.87

DETAILED CONSUMPTION REPORT

Description	Usage code	Season	Tariff	Previous Reading	Present Reading	Usage	Cost per kWh	Billing	
TOU energy	077	Summer	Peak	12/7/2011	40,300	1213/2011	41,982	1,066	1,076.38
TOU energy	078	Summer	High	12/7/2011	49,317	1213/2011	52,346	1,120	1,346.89
TOU energy	079	Summer	Low	12/7/2011	45,000	1213/2011	41,852	2,949	718.82
TOU energy	177	Winter	Peak	12/1/2011	59,352	1217/2011	66,300	878	890.43
TOU energy	178	Winter	High	12/1/2011	47,516	1217/2011	48,317	1,081	553.68
TOU energy	179	Winter	Low	12/1/2011	43,960	1217/2011	45,083	1,046	531.27
TOU energy	777	Fall/Spring	Peak	10/7/2011	46,546	1211/2011	58,352	1,119	6,463.31
TOU energy	778	Fall/Spring	High	10/7/2011	41,241	1211/2011	47,516	6,375	3,347.89
TOU energy	779	Fall/Spring	Low	10/7/2011	36,498	1210/2011	43,960	7,965	3,514.06
Subtotal						35,513			14,221.87
PF						0			
Total Charge									14,221.87

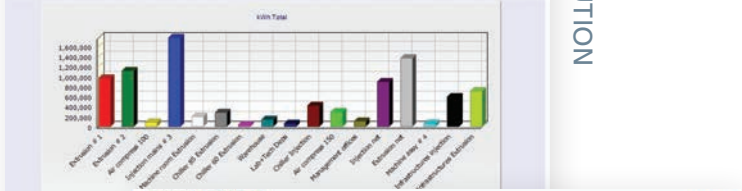
BILL DATA

Description	Usage code	Season	Tariff	Previous Reading	Present Reading	Usage	Cost per kWh	Total Cost		
TOU Energy	177	Winter	Peak	2/9/2015	36,729	210/2015	58,348	21,419.00	91.25	18,544.84
TOU Energy	178	Winter	High	2/9/2015	46,793	210/2015	61,114	14,321.00	53.47	3,257.44
TOU Energy	179	Winter	Low	2/9/2015	51,369	210/2015	9,813	-4,756.00	35.51	-12,739.76
Subtotal				2/9/2015	2/10/2015			-6,016.00		14,462.52
PF		General	General	2/9/2015	2/15/2015		1.00			
Usage for Efficiency				2/9/2015	2/10/2015			-6,016.00		
Standard price				2/9/2015	2/15/2015				43.71	
Cost for Efficiency				2/9/2015	2/10/2015					14,462.52
Average Price				2/9/2015	2/15/2015					-240.40
Efficiency factor				2/9/2015	2/15/2015					-0.18
Fixed Charge		General	General	2/9/2015	2/15/2015					58.85
Total Charge				2/9/2015	2/15/2015					14,521.37



TOTAL DISTRIBUTION

Device	kWh Export	kWh Import	kWh Total	PS	Max Demand, kW
Extrusion # 1		962,481	962,481	0.962	319
Extrusion # 2		1,116,930	1,116,930	0.936	409
Air compressa 100		76,362	76,362	0.778	82
Injection maina # 3	0	1,772,232	1,772,232	0.981	587
Machine room Extrusion		200,942	200,942	1.000	104
Chiller 65 Extrusion		283,273	283,273	1.000	108
Chiller 60 Extrusion		39,142	39,142	1.000	82
Warehouse		136,332	136,332	1.000	63
Lab+Tech Deps		55,996	55,996	1.000	40
Chiller Injection		411,473	411,473	1.000	233
Air compressa 150		290,500	290,500	1.000	100
Management offices		102,124	102,124	1.000	42
Injection net		891,783	891,783	0.932	273
Extrusion net		1,363,726	1,363,726	1.000	456
Machine room # 4	0	61,476	61,476	0.896	51
Infrastructure Injection		594,899	594,899	1.000	274
Infrastructure Extrusion		706,783	706,783	1.000	208
Total	0	9,066,444	9,066,444		



VIRTUAL DEVICE CONFIGURATION

VIRTUAL DEVICE CONFIGURATION

Device	Frequency	Special Processing	Recalculate	Special Formula
<input checked="" type="checkbox"/> Energy				fz
<input checked="" type="checkbox"/> Basic Measurements				
<input type="checkbox"/> Demands				

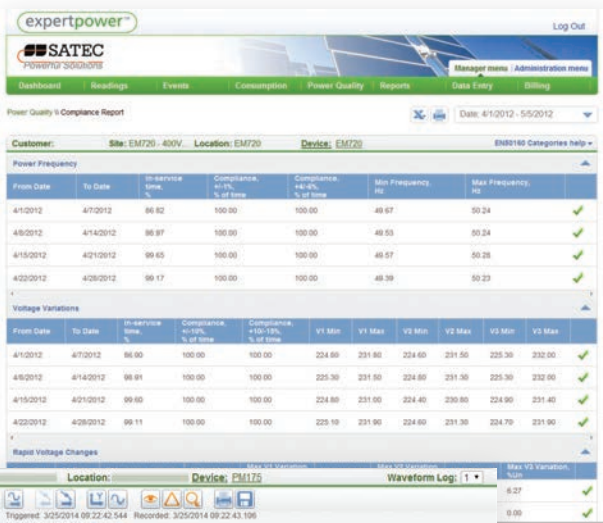
Special Formulas

Device	Factor	Usage Type	Generic Factor
37 - Main 0	1	Active Energy Import	
211 - Kibbutz	-1	Active Energy Export	
37 - Main 0	-1	Active Energy Export	
211 -	-1	Active Energy Import	

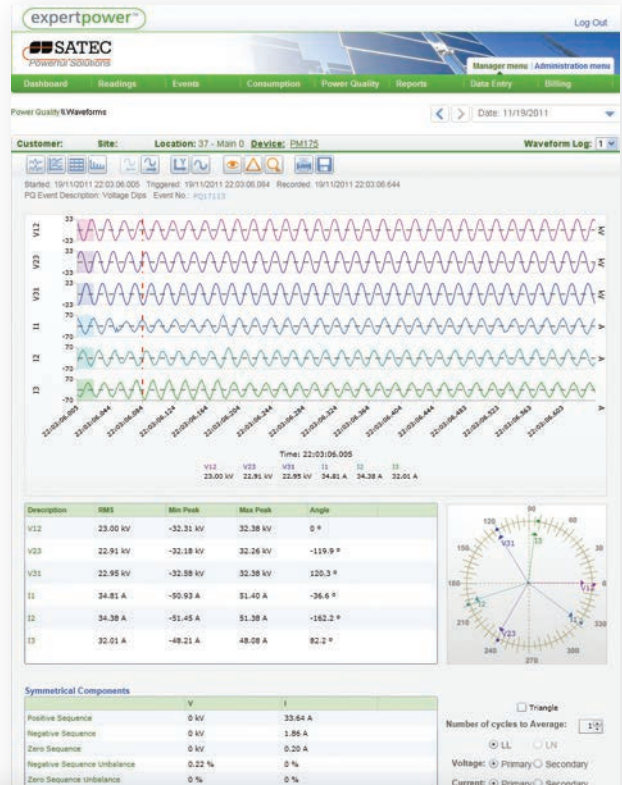
Power Quality

- Compliance reports to international standards (EN50160, IEEE1159, GOST 13109) or customer contract
- Accurate harmonics measurement, including THD, TDD, K-Factor, Crest Factor, harmonic power/direction and symmetrical components
- System-wide events, waveform and phasor plotting

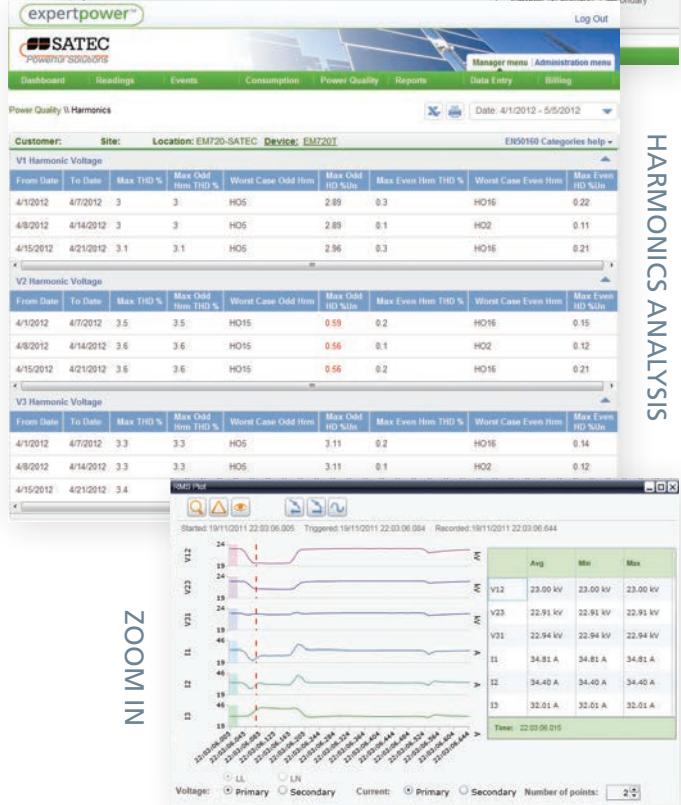
EN50160 COMPLIANCE REPORT



DETAILED EVENT ANALYSIS



HARMONICS ANALYSIS



RMS PLOT



EN50160 HARMONICS REPORT

ZOOM IN

Demand Response & Smart Grid

- Automatic and manual operation of generators to reduce peak demand according to schedule, incentives and availability
- Power stations load management, production tracking, consumption monitoring with out-of-plan usage and production
- Control of substation automation bay controllers



DEMAND RESPONSE

A screenshot of the expertpower SATEC DEMAND RESPONSE interface. It shows a table of events with columns for 'Event Number', 'Date', 'Category', 'Sub-Category', 'Description', and 'Source'. The table lists various events such as 'ETC Event Log', 'JP Event', and 'Digital Input #1' with their respective dates and descriptions.

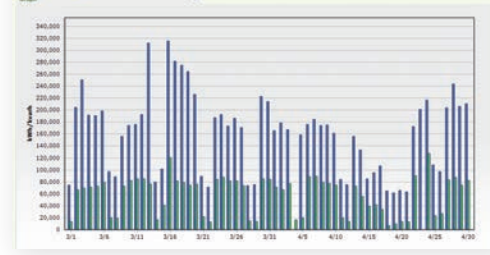
Power Plant Management

- Predict customers' consumption, generate daily production plans based on different algorithms, send/get daily production data from a CDC (Central Dispatch Center)
- Manage power plant statuses such as: availability, startup duration, interruptions, outage and more
- Data validation flows
- Energy and cost balance calculations based on import & export energy, operational parameters, plant statuses and different tariffs
- Complete billing solution, including invoices and a large set of configurable billing reports and tariffs

BILLING

A screenshot of the expertpower SATEC BILLING interface. It displays a detailed table of billing data with columns for 'Date of Bill', 'MWh Import', 'MWh Export', 'Cost (MWh)', 'Power Factor', 'MWh Max (MWh)', and 'MWh Max (MWh)'. The table shows data for various dates from 2014 to 2015, including import and export values and costs.

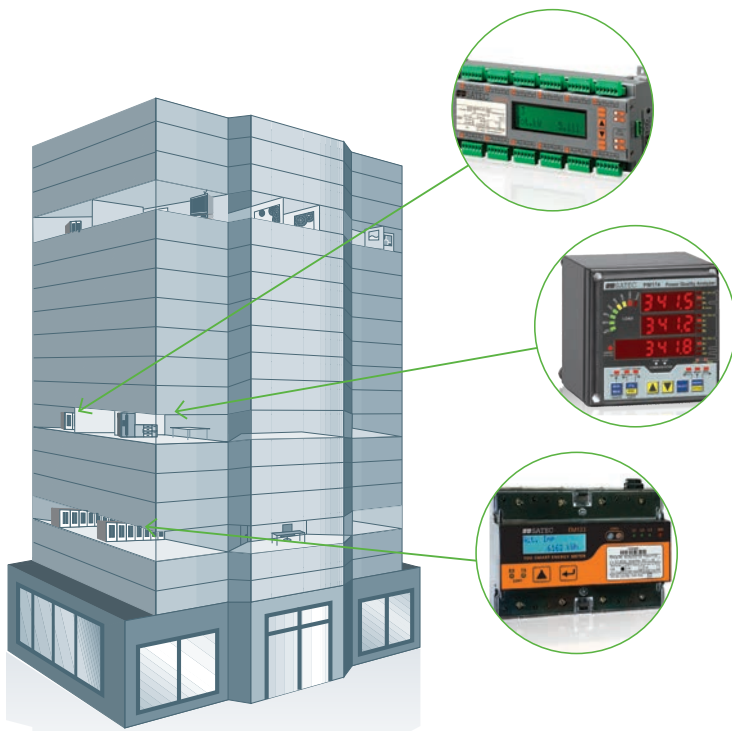
TOTAL ENERGY



A screenshot of the expertpower SATEC DATA IMPORT interface. It shows a form with four main sections: '1 Choose import type', '2 Select import source', '3 Download template', and '4 Select file to upload'. The '2 Select import source' section is expanded, showing a list of data sources such as 'Zohar Data', 'Delta Energy Import', and 'Process TOU'.

DATA IMPORT

Applications & Case Studies



Commercial

Commercial Buildings | Shopping Centers

Universities | Hospitals | Hotels

Chain Stores | Residential Buildings

ENERGY EFFICIENCY & COSTS

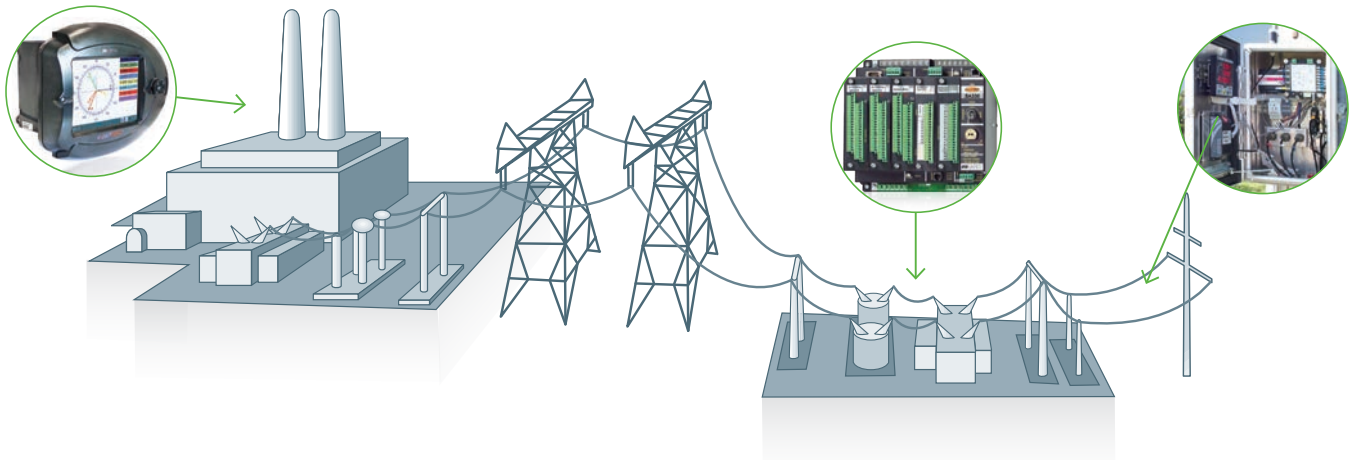
- ❑ Reduce energy consumption
- ❑ Reduce surcharges and penalties (power factor, peak demand, etc.)
- ❑ Initiate corporate level saving plans
- ❑ Increase green star rating

SUBMETERING & BILLING

- ❑ Complete billing solution for reselling energy (electrical, water, gas and air condition) to sub-tenants
- ❑ Web access for tenants, to view their bills and on-line data

POWER RELIABILITY

- ❑ Proactive maintenance for maximum system availability
- ❑ Analyze demands to help utilizing existing infrastructure and prevent over design



Utilities | Smart Grid | Renewable

Generation | Power Plants

Transmission | Distribution | Smart Grid

Renewable: Solar | Wind | Waste Water

SMART GRID

- AMR/AMI complete solution including billing
- Comprehensive substation automation
- Monitor and reduce energy losses

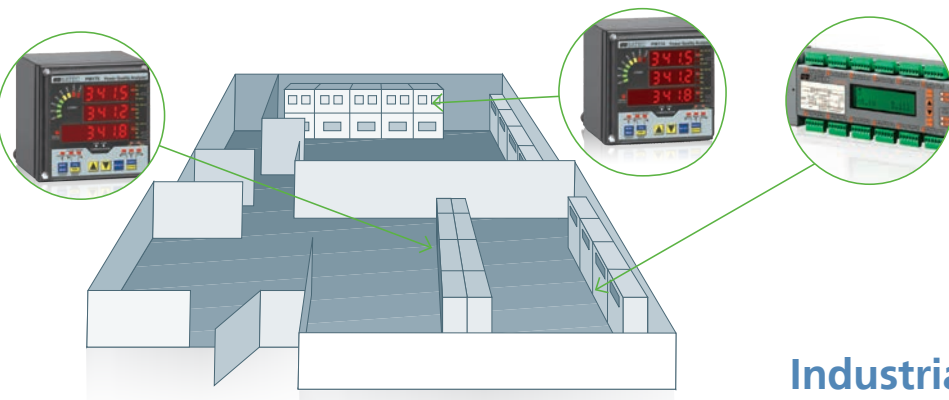
POWER QUALITY

- Analyze source of power quality issues to allow isolation

- Manage customers' power quality

NETWORK SECURITY

- Proactive maintenance for maximum system availability
- Analyze demands to help utilizing existing infrastructure and prevent over design



Data Centers

ENERGY EFFICIENCY & COSTS

- Reduce energy consumption
- Reduce surcharges and penalties (power factor, peak demand, etc.)
- Initiate corporate level saving plans

SUBMETERING AND BILLING

- Complete billing solution for reselling energy to customers at cabinet or even computer resolution

- Web access to customers to view their bills and online data
- Power reliability
- Proactive maintenance for maximum system availability
- Analyze demands to help utilizing existing infrastructure and prevent over design

Industrial

Process Industry

Semi-Conductors

Pharmaceutical

Process Industry

Mining

Automotive

ENERGY EFFICIENCY & COSTS

- Reduce energy consumption
- Reduce surcharges and penalties (power factor, peak demand etc.)
- Initiate corporate level saving plans

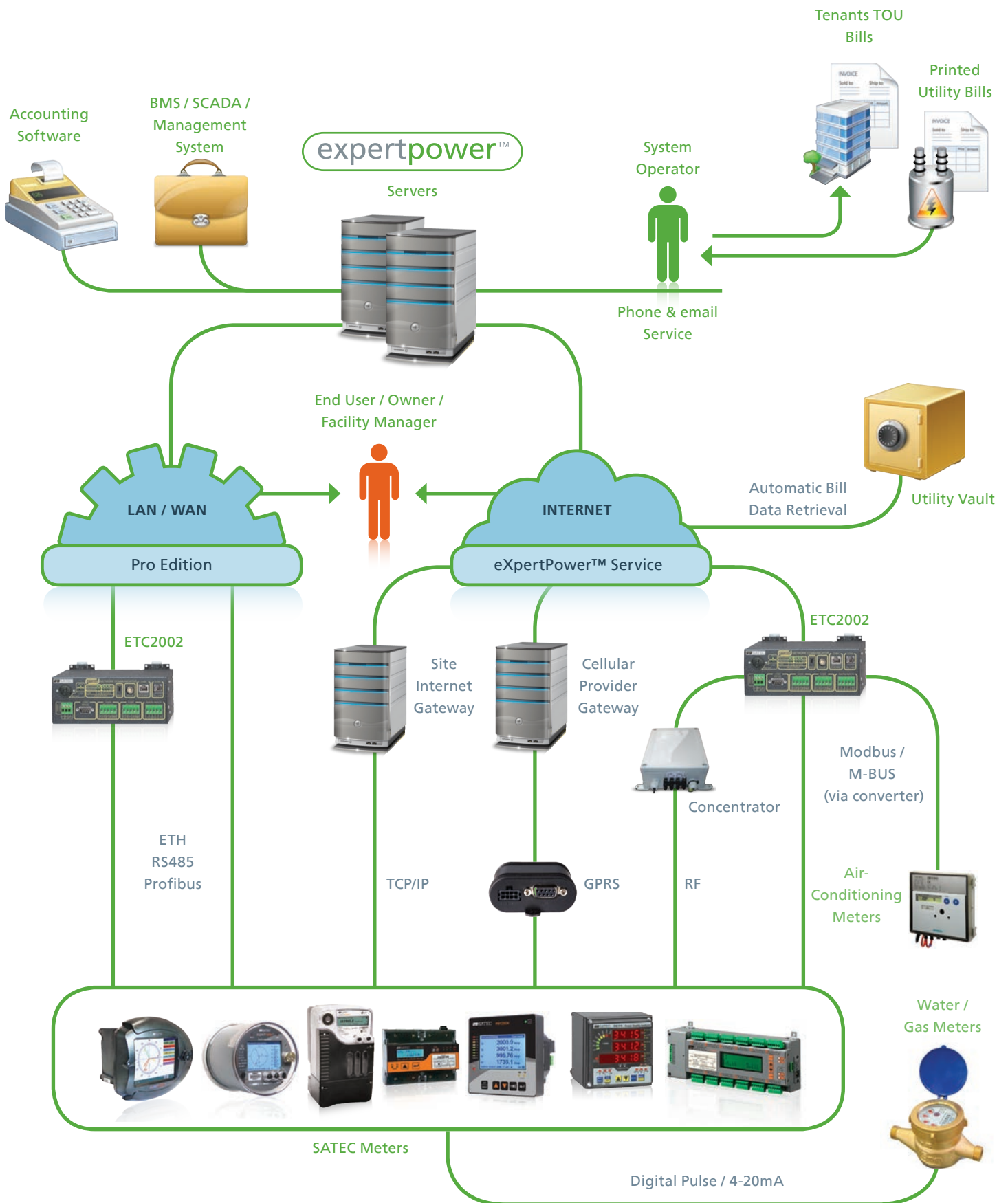
POWER RELIABILITY

- Proactive maintenance for maximum system availability
- Analyze demands to help utilize existing infrastructure and prevent over-design

POWER QUALITY

- Effectively monitoring power quality to prevent failures
- Verify the quality of the supplied voltage
- Compliance report according to international and local regulation

System Structure



Service or Pro Edition?

eXpertPower™ is offered in two versions: Service and Pro edition. In the Service model, SATEC owns and manages the servers, and is responsible for configurations, backups, etc. In the Pro edition, the customer owns the servers and all the operation of the system while SATEC provides support when required according to agreed SLA. The great advantage of the Service edition is that it saves the customer software installation, expensive computer purchases and upgrades; and the system is continuously managed by SATEC. The

benefit of the Pro edition is that the information remains inside the organization. The Pro edition may be used in a local area network or over the Internet (requires static IP addresses).

Both editions may require setup, customization and configuration, such as graphic screens and tariff building (if your utility tariff is not already among the many tariffs we already support, we will carefully analyze the tariff and configure the software accordingly).



Licensing

In the Service edition data services are rented as follows:

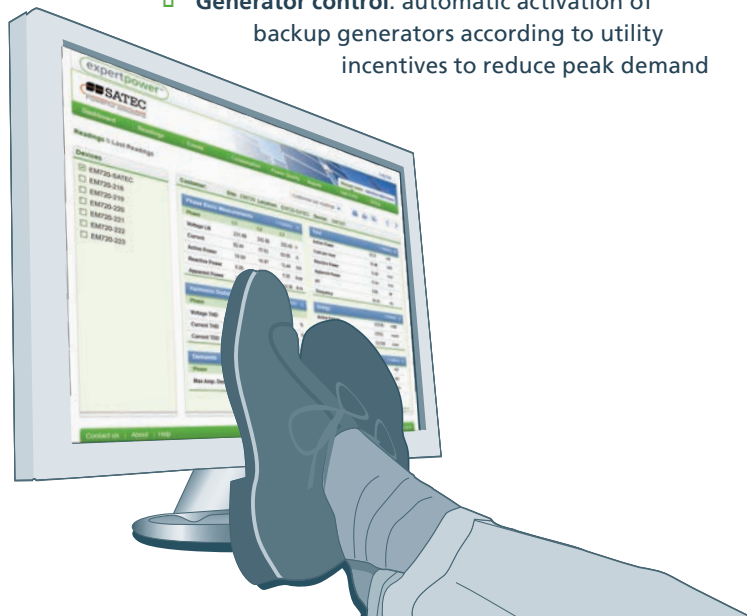
ONE TIME CHARGES

Basic setup fee for setting the account and communication plus optional configurations (graphic screens, single line diagrams etc.)

MONTHLY CHARGES

The monthly charges are per device (for BFM136 it is per load):

- ❑ **Basic data:** access all your data with update rate of 6 minutes or slower
- ❑ **Power quality:** if your device has power quality information, you may want to add this option to see it. This is an add-on—must have basic data
- ❑ **Frequent readings:** for places where the 6 minute update rate is not fast enough, we allow up to 2 minute update rate
- ❑ **Virtual device:** calculation of metering point without having physical devices, such as summing parallel transformers (basic data only—no power quality).
- ❑ **Billing service:** issue monthly bills (in PDF format) based on meter data, providing help desk for your customer questions and on-site technical assistance (not offered in some countries).
This is an add-on—must have basic data or Virtual device.
 - ❑ **Generator control:** automatic activation of backup generators according to utility incentives to reduce peak demand



Licensing

In the Pro edition the software is purchased (with optional modules); device and user licenses can be added as follows:

OPTIONAL MODULES

In addition to the basic functionality we offer billing, web services, demand response and power plant management modules.

DEVICE LICENSE

There are three device licenses. Each license allows communication to one device as follows:

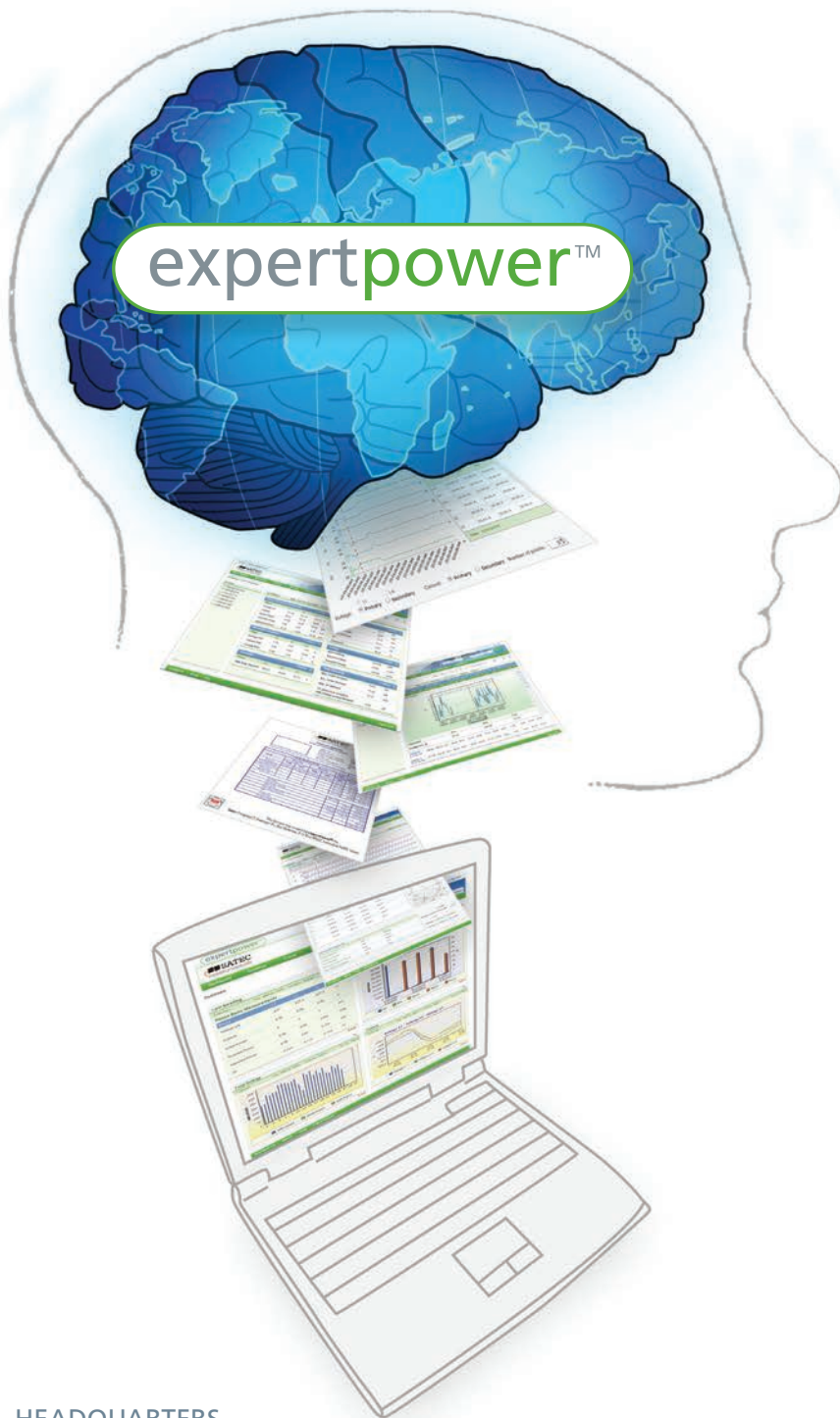
- ❑ **Basic meter license** (order code LIL): supports EM132, EM133 and PM130 PLUS Series
- ❑ **Mid level meter license** (order code LIM): supports PM172, 3rd party devices and virtual devices
- ❑ **Power quality multi-feeder license** (order code LIH): supports all power quality devices (automatically enables power quality options) and BFM136 (one license per BFM136, regardless of number of channels used)

BILLING LICENSE

Generation of a bill requires billing license per bill. Each bill requires a license (i.e., a BFM136 connected to 3-phase loads will require 12 licenses; a PM130EH PLUS that monitors a water meter with digital input would require 2 licenses).

LICENSING PER CONNECTION/USER

The basic package allows installation of the software on one computer (the server) and setting up to 10 users. For accessing the data from another computer, a user license is necessary (order code LIU). Each LIU allows additional 10 users and 1 simultaneous connection (i.e., Basic plus 2 LIUs allows 30 user names and access from two computers at a time).



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