

# expertpower™



 **SATEC**  
*Powerful Solutions*

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



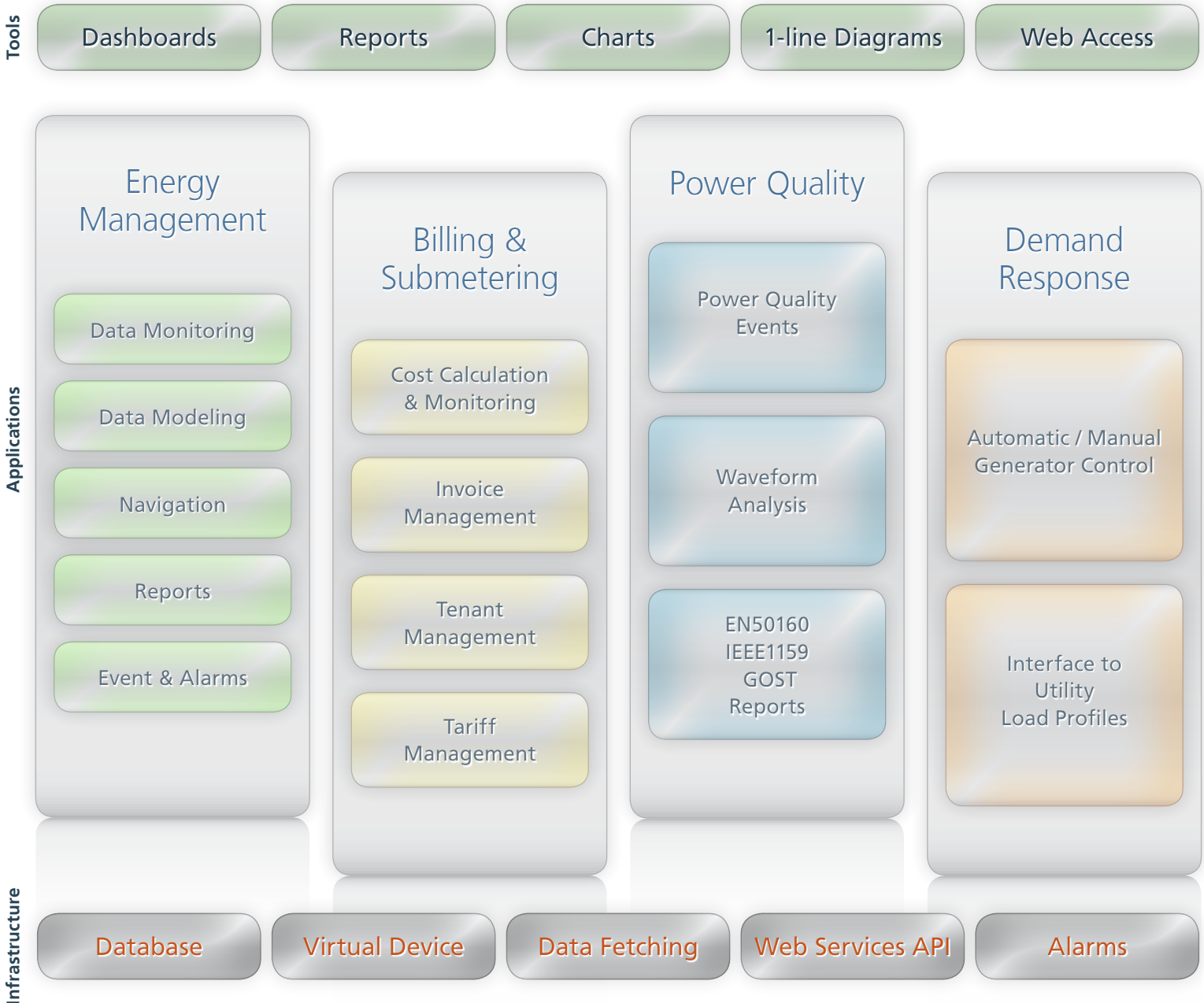
Innovative Electronics For You

# 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 installation and Internet remote installation. 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 10,000 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

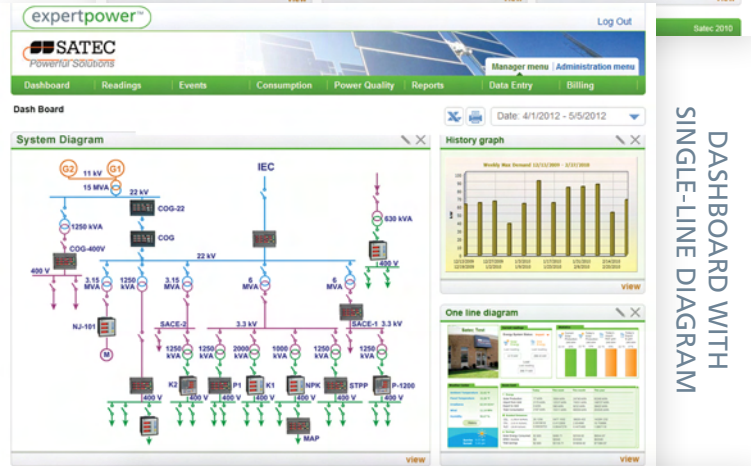
Allows monitoring your power and energy consumption in complex sites.

- 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

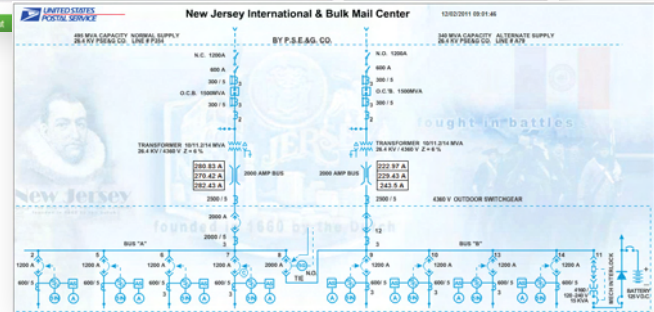
DASHBOARD



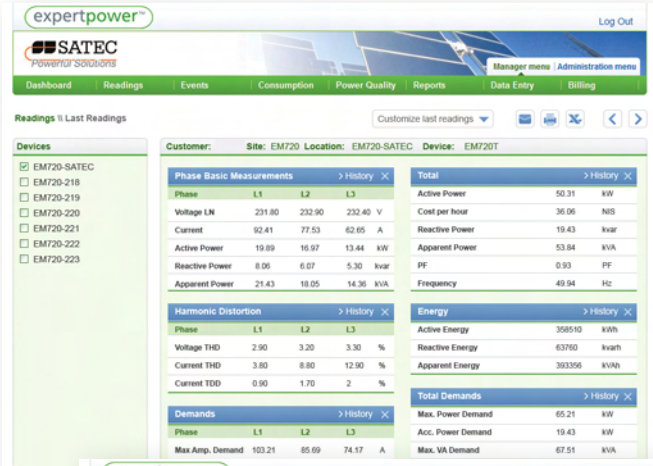
DASHBOARD WITH SINGLE-LINE DIAGRAM



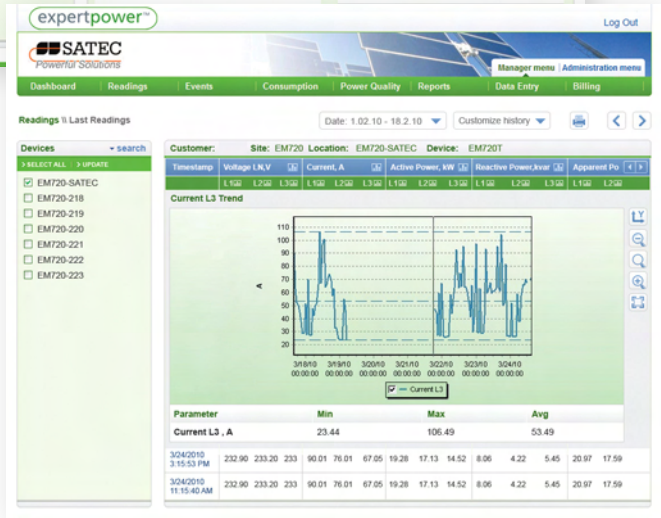
SINGLE LINE DIAGRAM



TABLES



GRAPHS



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

DASHBOARD

The dashboard displays various charts for Total Cost, Usage, Cost per kWh, and Efficiency Factor. It includes a navigation menu with options like Dashboard, Readings, Events, Consumption, Power Quality, Reports, Data Entry, and Billing. The main content area shows 'Energy Electricity Billing % TOU Import' with a date range of 1.02.10 - 18.2.10.

USER MANAGEMENT

The user management interface shows fields for User, Name for Bill, Address for Bill, Date Added, Date Expired, External User ID, and Language for Bill. It also includes a 'Billing Data' section with 'Payment Program' and 'EC V2 TOU energy import tariff Medium Voltage'.

ENERGY BALANCE SHEET

The energy balance sheet displays a pie chart showing the distribution of energy usage across different devices. A table below lists devices such as '450 - Main high voltage', '452', '453 - Building services 2', '454', '455 - Reserved 2', '456', '457', '458', '459 - Floor 3 High voltage', and 'Other', along with their respective kWh Export, kWh Import, kWh Total, PF, and Max Demand.

ENERGY BILL

The electricity usage bill includes a header with 'SATEC Powerful Solutions' and 'Electricity usage bill'. It provides details such as 'Meter No.: 770823', 'Billing period: February 2012', and 'Number of days in period: 29'. A table titled 'Energy Measurements' shows data for 'General', 'Fuel Adjustment', 'FOREX Adjustment', 'ERB Levy', and 'Inflation Adj'. A 'Billing' section lists 'Substrate', 'Generative charge', 'REP Levy', 'Max Demand KVA', 'PF', 'Fixed Fee', and 'Total Charge'.

DETAILED CONSUMPTION REPORT

The detailed consumption report shows a table with columns for 'Description', 'Change Units', 'Season', 'Peak', 'Previous Billing', 'Present Billing', 'Present Date', 'Previous Billing', 'Usage', 'Cost per kWh', and 'Total Cost'. It lists various TOU energy readings for different devices and time periods, including a 'Subtotal' and 'Total Charge'.

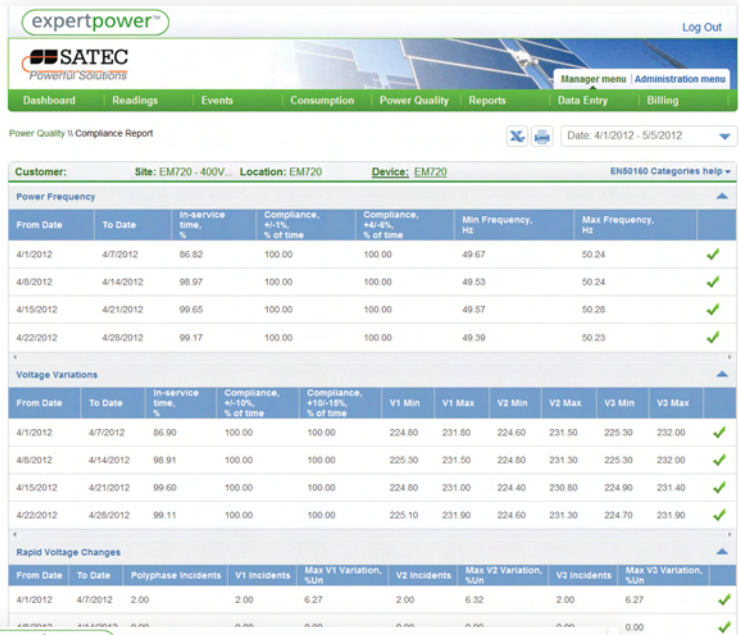
VIRTUAL DEVICE CONFIGURATION

The virtual device configuration interface shows a table for 'Device Details' with columns for 'Device', 'Comm Device', 'Device', and 'Current Version'. Below this, there are sections for 'Requested Processing' and 'Special Formulas', including options for 'Active Energy Import' and 'Reactive Energy Export'.

# 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

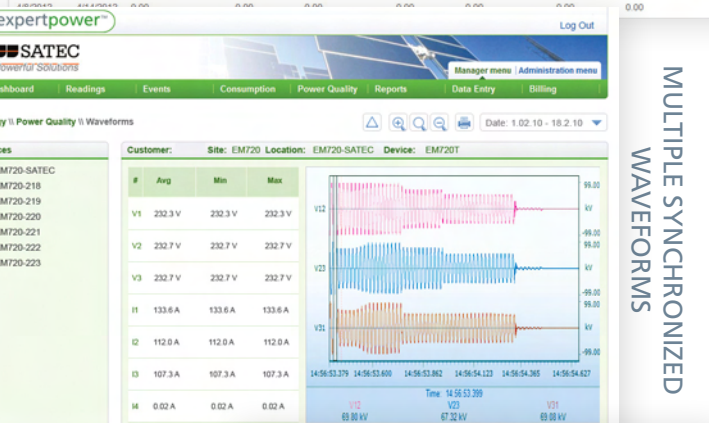
EN50160 COMPLIANCE REPORT



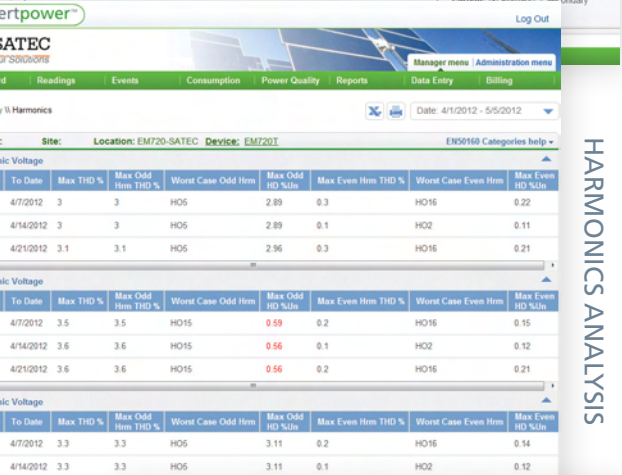
DETAILED EVENT ANALYSIS



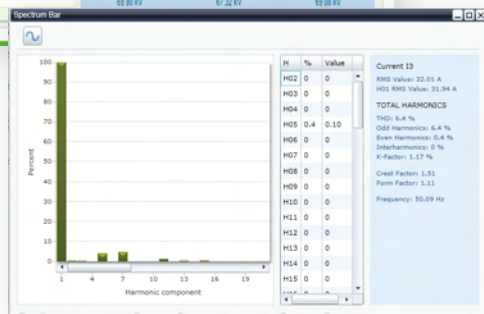
MULTIPLE SYNCHRONIZED WAVEFORMS



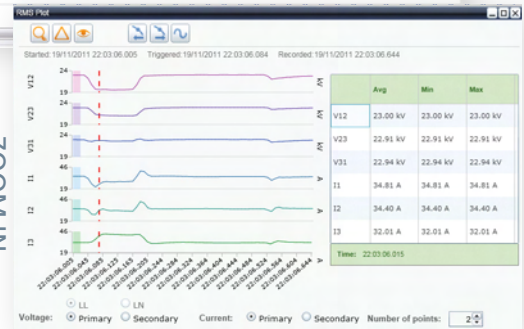
HARMONICS ANALYSIS



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



GRID MAP

Event Number	Date	Category	Sub-Category	Description	Status
7182367	31/10/2012	ETC Event Log	IP Event	IP Session Failed	ETC-216 (SATEC-Engineering)
7182365	31/10/2012	ETC Event Log	DI Event	Digital Input #1	ETC-216 (SATEC-Engineering)
7182369	31/10/2012	ETC Event Log	DI Event	Digital Input #1	ETC-216 (SATEC-Engineering)
7182364	31/10/2012	ETC Event Log	IP Event	IP Session Failed	ETC-216 (SATEC-Engineering)
7182362	31/10/2012	ETC Event Log	DI Event	Digital Input #1	ETC-216 (SATEC-Engineering)
7182361	31/10/2012	ETC Event Log	DI Event	Digital Input #1	ETC-216 (SATEC-Engineering)
7182360	31/10/2012	ETC Event Log	DI Event	Digital Input #1	ETC-216 (SATEC-Engineering)
7182359	31/10/2012	ETC Event Log	IP Event	IP Session Failed	ETC-216 (SATEC-Engineering)
7182357	31/10/2012	ETC Event Log	DI Event	Digital Input #1	ETC-216 (SATEC-Engineering)
7182356	31/10/2012	ETC Event Log	DI Event	Digital Input #1	ETC-216 (SATEC-Engineering)
7182358	31/10/2012	ETC Event Log	DI Event	Digital Input #1	ETC-216 (SATEC-Engineering)
7182355	31/10/2012	ETC Event Log	DI Event	Digital Input #1	ETC-216 (SATEC-Engineering)
7182356	31/10/2012	ETC Event Log	DI Event	Digital Input #1	ETC-216 (SATEC-Engineering)
7182353	31/10/2012	ETC Event Log	DI Event	Digital Input #1	ETC-216 (SATEC-Engineering)
7182354	31/10/2012	ETC Event Log	DI Event	Digital Input #1	ETC-216 (SATEC-Engineering)

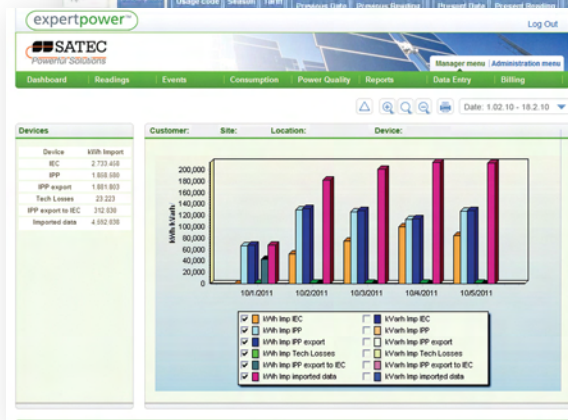
DEMAND RESPONSE

# 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

DATA IMPORT



DATA COMPARISON

# 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

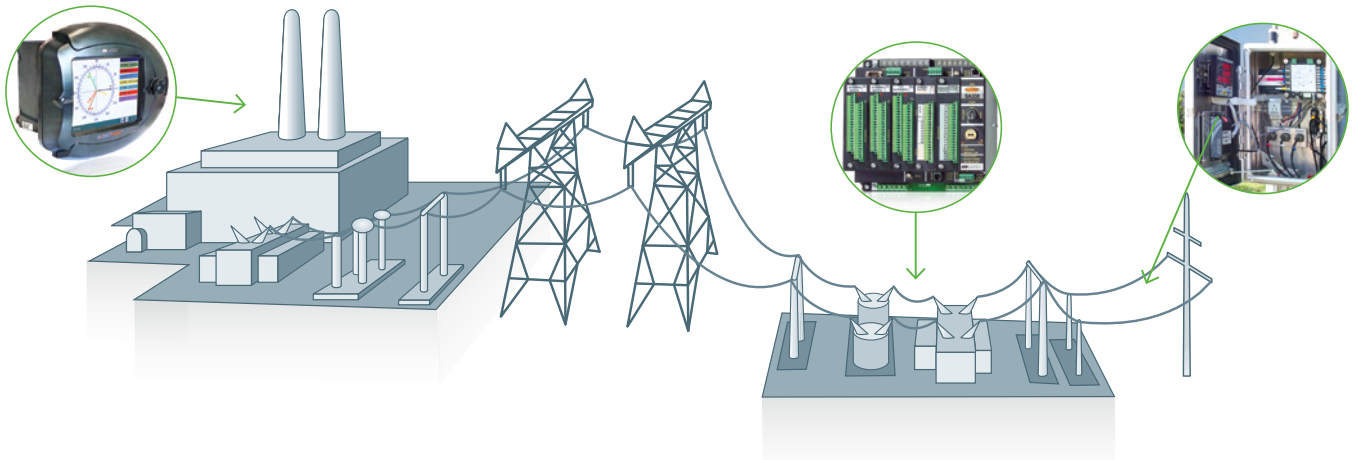
### SUBMETERING & BILLING

- ❑ 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

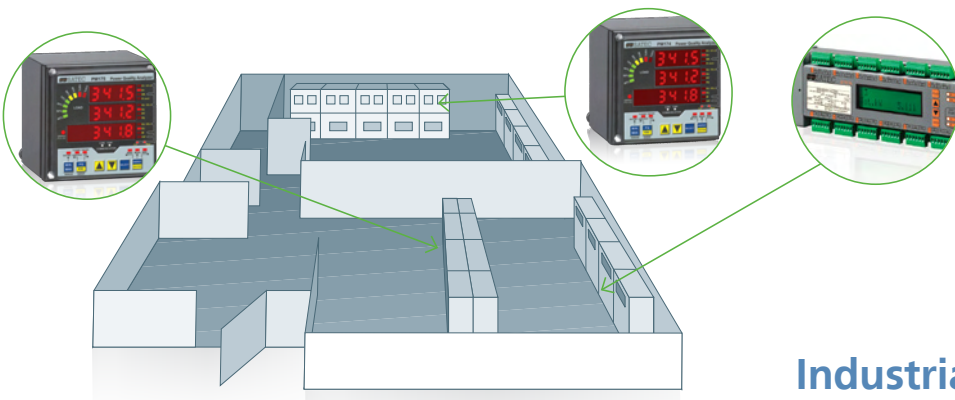
### POWER QUALITY

- ▣ 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

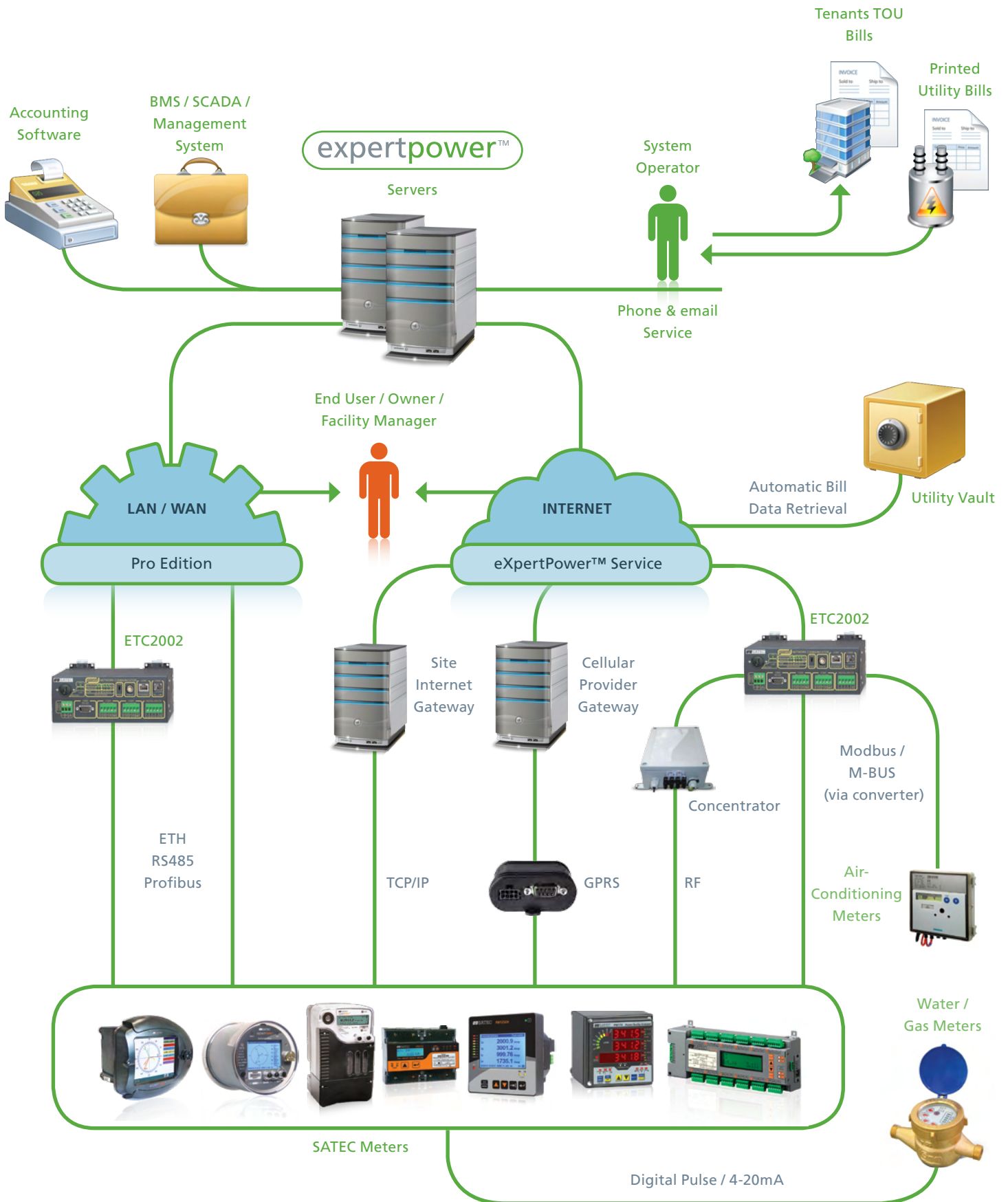
### POWER RELIABILITY

- ▣ 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, 3<sup>rd</sup> 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)

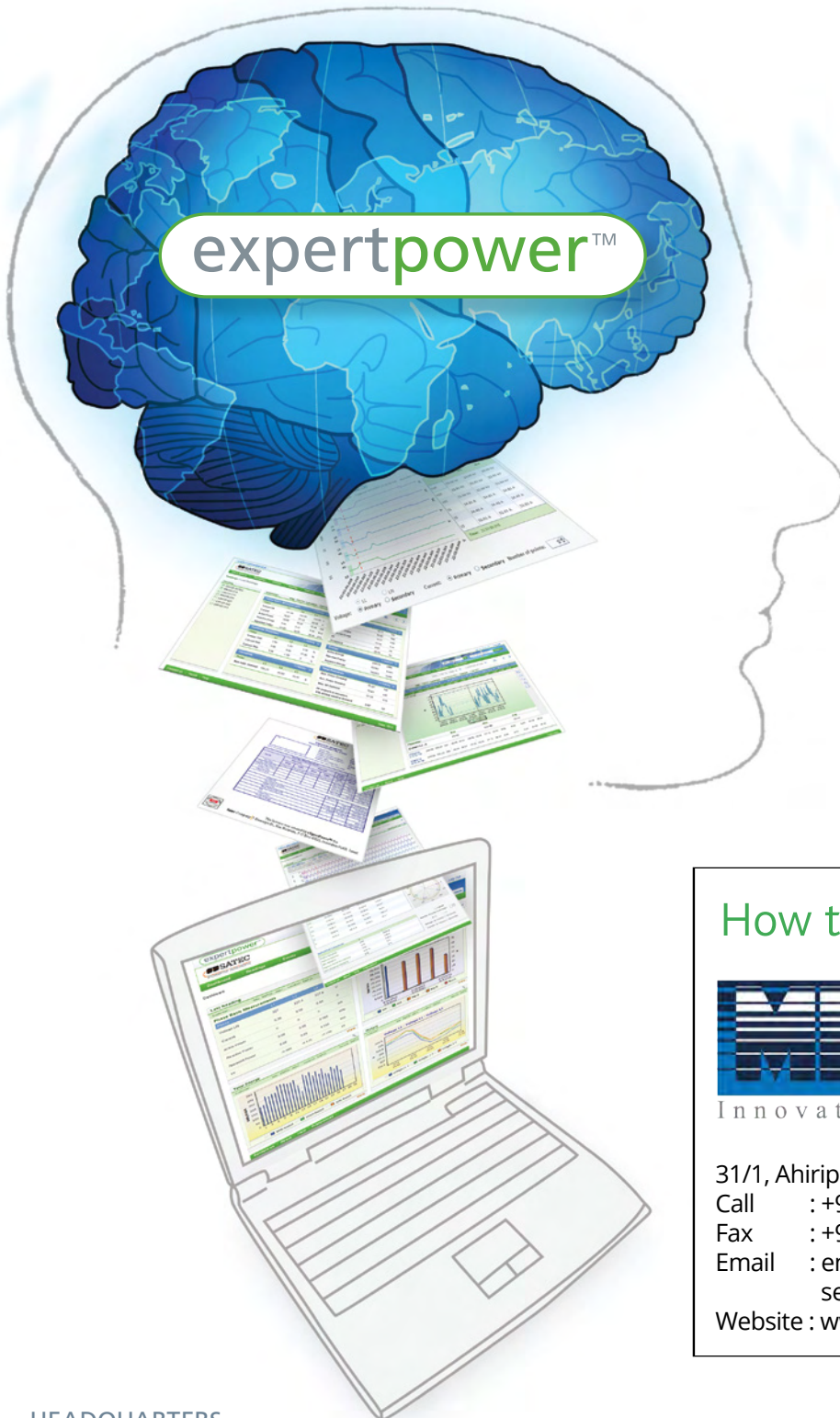
### BILLING LICENSE

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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