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

SATEC
at a Glance

ExpertPower™ software solution provides comprehensive energy management and micro SCADA capabilities for a wide variety of purposes such as: sub-metering, billing, meter data management, energy efficiency, demand response, power quality analysis, independent power producer core processes and generator control. ExpertPower™ is available either as an on-line cloud service (Service Edition) or as a stand-alone on premise package (Pro Edition).

SATEC’s complete versatile solution includes our wide range of analyzers combined with ExpertPower™ software, offering 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.

With installations of over 40,000 managed devices at one site, ExpertPower™ is the most powerful energy management solution on the market. Its scalability allows you to start with small installations and to expand as your business grows.

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**Energy Management**
- Data Monitoring
- Data Modeling
- Navigation
- Reports
- Events & Alarms

**Billing & Submetering**
- Cost Calculation & Monitoring
- Invoice Management
- Tenant Management
- Tariff Management

**Power Quality**
- Power Quality Events
- Waveform Analysis
- EN50160, IEEE1159 GOST Reports

**Demand Response**
- Automatic / Manual Generator Control
- Interface to Utility Load Profiles

**IPPs & Utilities**
- Meter Data Management (MDM)
- Core Processes
- Billing

**Energy Efficiency**
- Efficiency Targeted Report Suite
- Alerts & Notifications
- COP Trend

**Applications**
- Tools: Dashboards, Charts, 1-line Diagrams, Web Access

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**Infrastructure**
- Database
- Virtual Device
- Data Fetching
- Web Services API
- Alarms
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 register 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 levels
- GeoLocation—positions your metering points on the map, providing geographic navigation and grouped alert monitoring
- Lobby Application—customizable full screen kiosk mode showing consumption over time, energy saving competition, weather forecast and more

Historical information
- All data is logged in the database
- Chart any measured parameters
- Monitors 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
- Logs all alarms
- Requests 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, CSV etc.)
- Standard RESTful Web service API and IEC 60870-5-104 interfaces allow for easy integration with third party enterprise applications such as BMS, SCADA, ERP, CRM and Accounting

Architecture
- Complete web based design with multi-browser support
- Grow as you go architecture—from single device to tens of 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 you to monitor your power and energy consumption in complex sites.

- Collects data from SATEC and other products over Modbus, BacNet, DLMS and SNMP protocols
- Graphic or geographic maps, icons and color status indicators
- Virtual devices—real time calculations such as summation, subtraction and more
- Historical data, trends and detection for identifying unnecessary load operation
- Advanced comparison wizard—select multiple devices, parameters and time periods

**SINGLE LINE DIAGRAM**

With real time date updates

**EXECUTIVE DASHBOARD**

Fully user-editable customized dashboards for each user
Billing & Subtenants

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

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

ENERGY BALANCE - TOTAL DISTRIBUTION

DETAILED CONSUMPTION REPORT
**ENERGY BILL**

**SATEC Powerful Solutions**

**Computation No.:** 197570  
**Meter No.:** C-111377  
**Billing month:** July 2017  
**Metering period:** 6/16/2017 - 7/16/2017  
**Invoice date:** 7/25/2017  
**Number of days in period:** 32  
**Method of Charge**

<table>
<thead>
<tr>
<th>Description</th>
<th>Usage (kWh / kvrd / kW)</th>
<th>Price (cents)</th>
<th>Total Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Customer Charge</td>
<td></td>
<td></td>
<td>56.29</td>
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<tr>
<td>CIEP Standby Fee KWH</td>
<td>4,678.00</td>
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<td>0.748</td>
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<tr>
<td>Demand Charges KVAR</td>
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<td>Delivery Charges KWH (Off Peak Summer)</td>
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<td>Delivery Charges KW Demand Summer</td>
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<td>Monthly Billing Fee</td>
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<tr>
<td>Sub-Metering Monitoring Charge</td>
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<td><strong>Total Charge</strong></td>
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<td><strong>625.92</strong></td>
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</tbody>
</table>

**TOU Usage**

**Month:**
- 7/16
- 6/16
- 5/16
- 4/16
- 3/16
- 2/16
- 1/16
- 12/16
- 11/16
- 10/16
- 9/16
- 8/16
- 7/16

**Usage:**
- Off peak
- On Peak

Produced by ExpertPower™
Power Quality

DETAILED EVENT ANALYSIS

Display RMS Chart

Moveable selection

Trigger indicator

Symmetrical components for fault direction analysis

Harmonics spectrum

Continuous waveform display

Analysis of selected time period
Demand Response & Smart Grid

- Automatic and manual operation of generators to reduce peak demand according to schedule, incentives and availability
- Power station load management, production tracking and consumption monitoring, allowing detection of consumption irregularities and anomalies
- Control of substation automation bay controllers

GEOLOCATION
ExpertPower™ GeoLocation Dashboard allows for geographical meter display, alert notification and navigation on a map or satellite view.
IPP Power Plant Management

- Generates daily production plans based on different algorithms, send/get daily production data from a CDC (Central Dispatch Center)
- Predicts customer consumption
- Manages power plant statuses such as: availability, startup duration and interruptions
- Issues gas orders
- Generates energy and cost balance calculations based on import & export energy, operational parameters, plant statuses and different tariffs
- Complete billing solution for electric power and related thermal products, including invoicing and a large set of configurable reports and tariffs

IPP GENERATION PLAN

IPP CUMULATIVE GRAPH
Energy Efficiency

- Rich report suite provides actionable insights
  - Compares cumulative monthly consumption with previous years
  - Highlights excessive weekend consumption
  - Highlights consumption outliers outside working hours
  - Tracks losses reflected in energy balance distribution
- Monitors HVAC coefficient of performance (COP) trends for proactive maintenance

WEEKEND RATIO

CUMULATIVE—LAST YEAR

HOURLY OUTLIERS
Configurable consumption alerts via email, SMS and mobile application
Tenant Mobile Application

- Supported on both iPhones and Androids
- Monitor monthly/daily/hourly cost
- Notifications about excessive usage and a high predicted monthly bill
- Look around to compare my normalized consumption with other tenants
- View past invoices
Applications & Case Studies

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
- Comprehensive billing solution for energy retailing (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 utilize existing infrastructure and prevent overdesign

Commercial
Commercial Buildings | Shopping Centers
Universities | Hospitals | Hotels
Chain Stores | Residential Buildings
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

NETWORK SECURITY
- Proactive maintenance for maximum system availability
- Analyze demands to help utilize existing infrastructure and prevent overdesign

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

SUBMETERING AND BILLING
- Comprehensive, high-resolution billing solution for retailing energy to customers, down to an individual electric cabinet or even individual computer
- Web access for customers to view their bills and online data
- Power reliability
- Proactive maintenance for maximum system availability
- Analyze demands to help utilize existing infrastructure and prevent over design

Data Centers

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 monitor power quality to prevent failures
- Verify the quality of the supplied voltage
- Generates compliance reports in accordance with international and local regulation