

# MDM & ENERGY MANAGEMENT

# THE ULTIMATE ALL-IN-ONE EMS

Expertpower is a SaaS cloud-based software solution, providing comprehensive energy management capabilities for a wide variety of purposes such as: sub-metering, billing, meter data management, energy efficiency, demand monitoring, power quality analysis, and business intelligence.

Today's markets have increased awareness for conservation, aiming for reduction of carbon

footprint and global warming. Expertpower's tools enable users to do so by setting goals and monitoring performance in the most accurate and comprehensive way possible.

Expertpower's platform offers information and analytics to improve the efficiency, reliability, security and profitability of our customers' energy system.

## Data Collection

- Automatic data collection from meters (electricity, water, gas etc.), connected by electrical pulse, serial, Ethernet or cellular communication
- Third-party system API (AMI, AMR, SCADA, CRM, ERP, OMS, Billing)
- Virtual Device: output of complex calculations of several devices
- Easy configuration of new devices, communication server and register mapping
- Import from data files

## Visualization

- View all data in your browser—no software installation or employee training needed
- User-friendly dashboards and reporting tools
- Role & permissions based user access
- Geo-location

## Data History

- Years of consumption available as live data or archive
- Charts most measured parameters
- Monitors trends to identify potential problems
- Endless data stored on the cloud-based MS Azure platform

## Cyber Security

- ISO 27001 & GDPR compliant
- Annual penetration testing by independent experts



## Energy Efficiency, BI & Analytics

- Data / Event Monitoring
- Business intelligence
- Power Quality



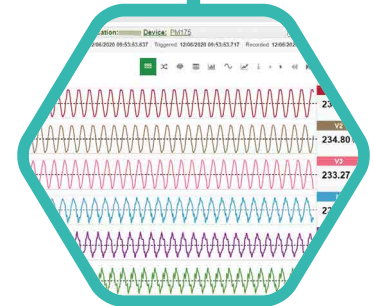
## Billing & Submetering

- Cost Calculation & Monitoring
- Invoice Management
- Tenant Management



## Meter Data Management

- VEE
- Meter readings
- Event & tampering reporting



# ENERGY MANAGEMENT & EFFICIENCY

Expertpower enables the monitoring and analysis of power and energy consumption in complex sites.

**Visualizing** the collected data in user friendly dashboards and providing the techno-commercial analytics layers

**Virtual devices:** provides the ability to apply complex calculations and formulas to create virtual metering

**Historical data,** trends and detection for identifying energy consumption demands, anomalies, meter tampering, ROI calculations

**Advanced comparison wizard:** select multiple devices, parameters and time periods to achieve deep insights related to energy consumption and energy consumers' behavior

**Water, gas & steam monitoring:** all on one platform



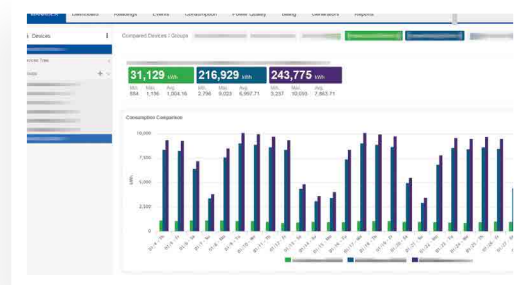
## EXECUTIVE DASHBOARD



## HEAT MAP



## COMPARISON



# 1

Rich report suite and dashboards, providing actionable consumptions insights and Business Intelligence:

- Compares cumulative monthly consumption with previous years
- Highlights excessive weekend consumption
- Highlights consumption outliers outside working hours
- Tracks losses reflected in energy balance distribution

# 2

CO<sub>2</sub> emission reporting

# 3

HVAC efficiency monitoring

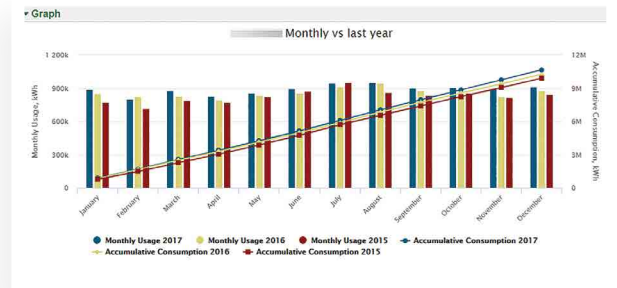
# 4

Visual energy balance

## WEEKEND RATIO



## CUMULATIVE - LAST YEAR



## HOURLY OUTLIERS

Configurable consumption alerts via email, SMS

Report View

Report Type: Consumption outliers per day      Report Name: Consumption Outliers2  
 Report Dates: 9/1/2016 - 10/1/2016      Report generation date: 2/13/2018  
 Devices: Floor 1 Meter #3, 195MO Floor 1 Meter #1, 195MO Floor 1 Meter #2, 195MO Floor 1 Meter #4, 195MO Floor 1 Meter #5, 195MO Floor 1 Meter #6  
 Start Hour: 01:00      End Hour: 04:00  
 Threshold: 10

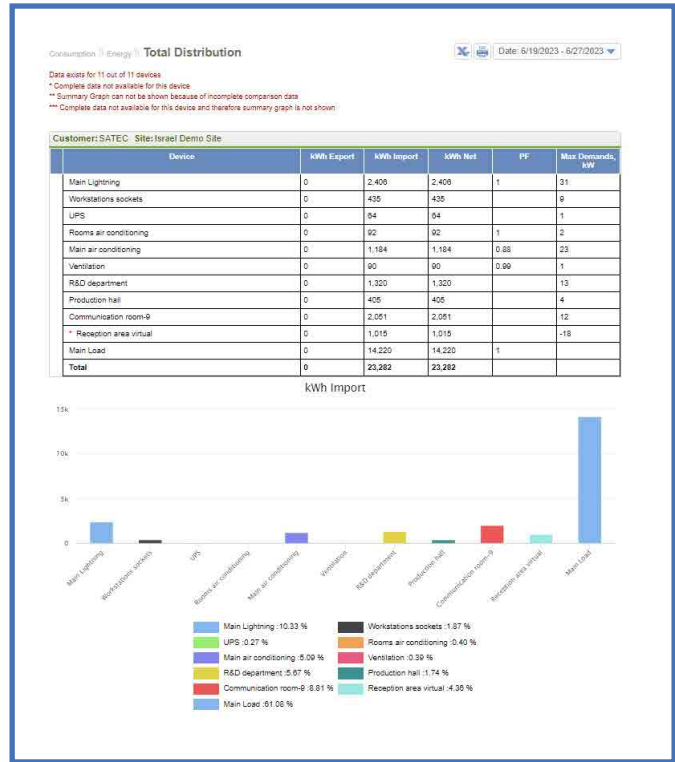
Device	Branch No.	Department	2016-09-01	2016-09-02	2016-09-03	2016-09-04	2016-09-05	2016-09-06	2016-09-07	2016-09-08	2016-09-09	2016-09-10	2016-09-11	2016-09-12	2016-09-13	2016-09-14
Floor 1 Meter #1			0	1	1	0	0	1	1	0	1	1	0	0	1	0
Floor 1 Meter #2			13	13	13	13	13	13	13	13	13	13	13	13	13	13
Floor 1 Meter #3			2	2	2	2	2	2	2	1	1	1	1	1	1	2
Floor 1 Meter #4			1	1	0	0	0	0	0	0	0	0	0	0	0	0
Floor 1 Meter #5			0	1	0	0	0	0	1	0	0	0	0	1	0	0
Floor 1 Meter #6			2	2	3	3	3	3	3	2	2	2	2	3	3	3

# BILLING & SUBMETERING

Enables the monitoring of tenant consumption and managing the billing process for electricity, water, sewage, gas and steam, all under the same billing module

- Dynamic tariff settings, including prices, usage and seasons
- Accurate cost calculation
- Complete submetering solution
- Tenant management portal
- Flexible invoicing options
- Invoice comparison
- Billing based on virtual meters
- Supports complex formulas and calculations
- Billing data available by reports and API

## ENERGY BALANCE - TOTAL DISTRIBUTION



## DETAILED CONSUMPTION REPORT

Can be invoiced: ✗ Device Name: 11334-PM175-13  
 Meter No.: 823519 Number of days in period: 43  
 Billing period: December 2011 Method of Charge No: IEC V2 TOU energy import tariff Low Voltage  
 Dates of meter readings: 10/31/2011 - 12/13/2011

Description	Usage code	Season	Tariff	Energy Measurements				Billing		
				Previous		Present		Usage	Cost per kWh	Total Cost
				Previous Date	Previous Reading	Present Date	Present Reading			
TOU energy	077	Summer	Peak	12/7/2011	60,330	12/13/2011	61,502	1,166	1.01	1,176.38
TOU energy	078	Summer	High	12/7/2011	49,317	12/13/2011	52,246	3,120	0.43	1,346.59
TOU energy	079	Summer	Low	12/7/2011	45,003	12/13/2011	47,552	2,549	0.28	710.92
TOU energy	177	Winter	Peak	12/1/2011	59,352	12/7/2011	60,330	978	0.91	892.43
TOU energy	178	Winter	High	12/1/2011	47,516	12/7/2011	49,317	1,801	0.53	962.99
TOU energy	179	Winter	Low	12/1/2011	43,963	12/7/2011	45,003	1,040	0.31	317.30
TOU energy	777	Fall/Spring	Peak	10/31/2011	48,144	12/1/2011	59,352	11,119	0.42	4,663.31
TOU energy	778	Fall/Spring	High	10/31/2011	41,241	12/1/2011	47,516	6,275	0.34	2,137.89
TOU energy	779	Fall/Spring	Low	10/31/2011	36,498	12/1/2011	43,963	7,465	0.27	2,014.06
Subtotal								35,513		14,221.87
PF								0		
Total Charge										14,221.87

Additional Text For Invoice:



# ELECTRICITY BILL



Computation No. \_\_\_\_\_

## Electricity usage bill

To \_\_\_\_\_

Meter No. \_\_\_\_\_  
 Billing month \_\_\_\_\_  
 Number of days in period \_\_\_\_\_  
 Metering period \_\_\_\_\_  
 Invoice date \_\_\_\_\_  
 Method of Charge \_\_\_\_\_

החשבונית נכנסה לתוקף ב-01/08/2023

Description	Energy Measurements								Billing	
	Usage code	Season	Tariff	Previous		Present		Usage (kWh)	Cost per kWh (agorot)	Total cost (NIS)
				Previous Date	Previous Reading	Present Date	Present Reading			
TOU Energy 077	Summer	Peak		7/1/2023	1,543,886	8/1/2023	1,851,476	7,789.00	141.31	11,006.64
TOU Energy 078	Summer	High		7/1/2023	585,484	8/1/2023	585,484	0.00	0.00	0.00
TOU Energy 079	Summer	Low		7/1/2023	1,755,446	8/1/2023	1,788,720	33,272.00	41.15	13,691.43
Subtotal				7/1/2023		8/1/2023		41,061.00		24,698.06
PF		General	General	7/1/2023		8/1/2023		0.987		
0.82 שריד go										
VAT				7/1/2023		8/1/2023			17.00%	4,198.87
החוק ארנון ח-KVA				7/1/2023		8/1/2023		0.00	29.13	0.00
<b>Total Charge</b>				7/1/2023		8/1/2023				<b>28,896.73</b>



Demo

TOU Usage



Produced with Expertpower™

# POWER QUALITY

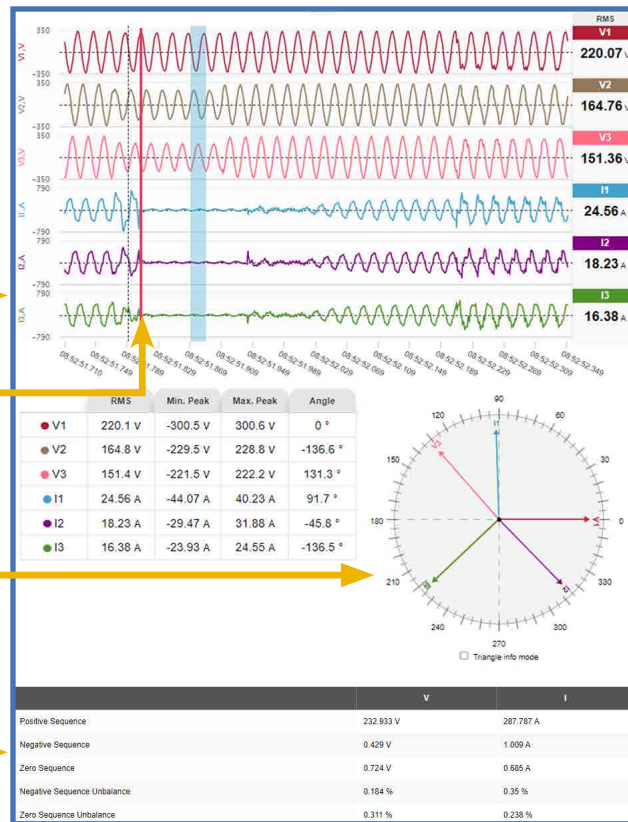
## DETAILED EVENT ANALYSIS

Continuous waveform display

Trigger indicator

Phasor diagram

Symmetrical components for fault direction analysis



pertpower MANAGER > POWER QUALITY > EN50160:2007 STANDARD > CATEGORY OVERVIEW

ANAGER Dashboard Readings Events Consumption Power Quality Billing Generators Reports

Power Quality | EN50160:2007 Standard | Categories Overview | Date: 12/31/2017 - 2/10/2018

Time Range: Start Date: 12/31/2017, End Date: 2/10/2018

Customer: EN50160:2007 Standard, Site: EN50160:2007 Standard, Location: EN50160:2007 Standard, Device: PM175

Category	Week 1 Dec 31 - Jan 06	Week 2 Jan 07 - Jan 12	Week 3 Jan 13 - Jan 19	Week 4 Jan 20 - Jan 26	Week 5 Jan 27 - Feb 02	Week 6 Feb 03 - Feb 09
Power Frequency	✓	✓	✓	✓	✓	✓
Voltage Variations	✓	✓	✓	✓	✓	✓
Rapid Voltage Changes	✓	✗	✓	✓	✓	✓
Flicker Severity	✓	✓	✓	✗	✗	✗
Voltage Unbalance	✓	✓	✓	✓	✓	✓
Harmonic Voltage	✓	✓	✓	✓	✓	✓

xpertpower MANAGER > POWER QUALITY > EN50160:2007 STANDARD > COMPLIANCE REPORT

ANAGER Dashboard Readings Events Consumption Power Quality Billing Generators Reports

Power Quality | EN50160:2007 Standard | Compliance Report | Date: 12/31/2017 - 2/10/2018

Customer: EN50160:2007 Standard, Site: EN50160:2007 Standard, Location: EN50160:2007 Standard, Device: PM175

Power Frequency

Voltage Variations

Rapid Voltage Changes

From Date	To Date	Polychase Incidents	V1 Incidents	Max V1 Variation, % of time	V2 Incidents	Max V2 Variation, % of time	V3 Incidents	Max V3 Variation, % of time
12/31/2017	1/6/2018	0	0	0	0	0	0	0
1/7/2018	1/13/2018	1	1	6.83	0	0	1	6.2
1/14/2018	1/20/2018	0	0	0	0	0	0	0
1/21/2018	1/27/2018	0	0	0	0	0	0	0
1/28/2018	2/03/2018	0	0	0	0	0	0	0
2/4/2018	2/10/2018	0	0	0	0	0	0	0

Flicker Severity

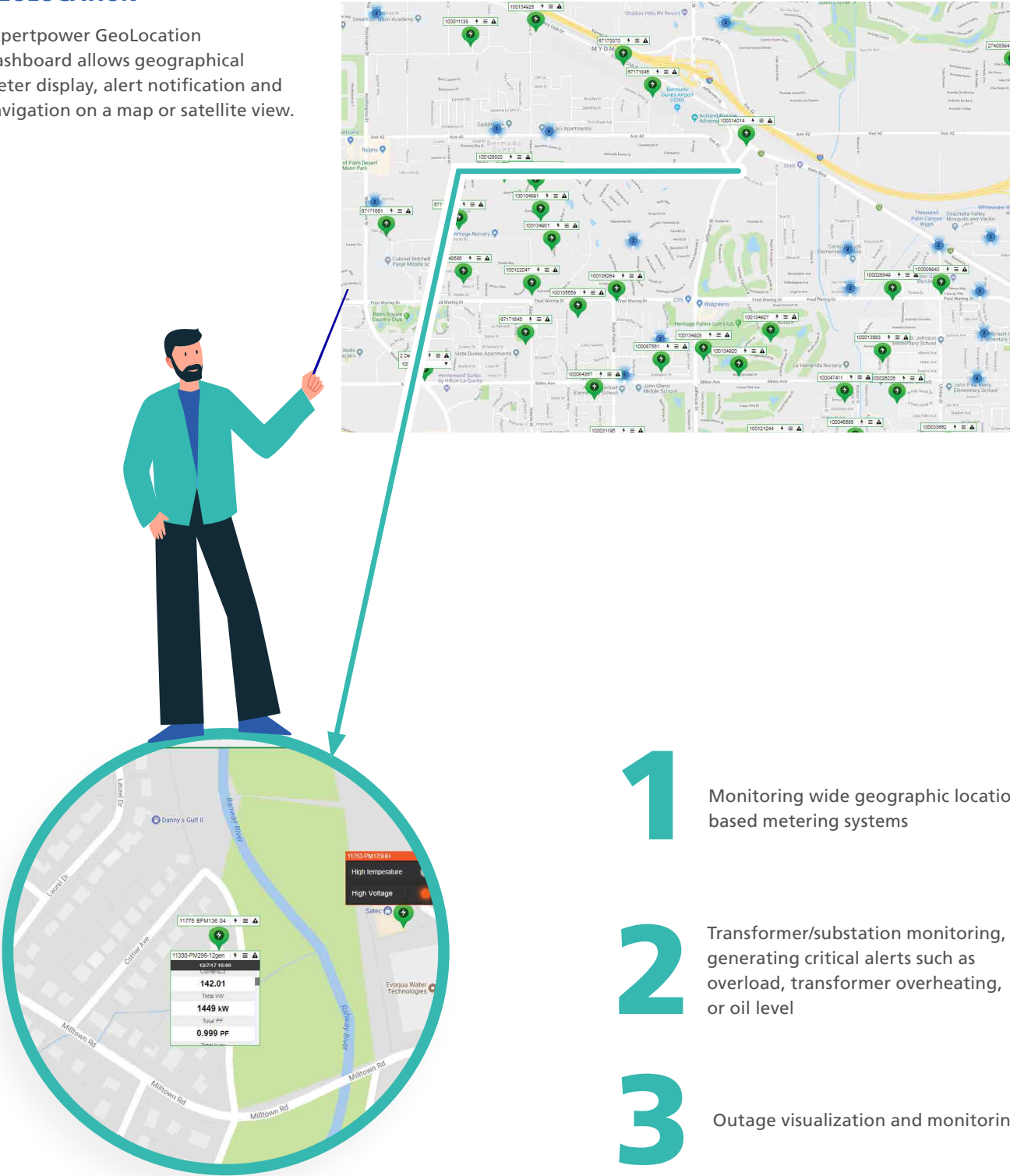
From Date	To Date	In-service time, % of time	Compliance PSt<=T, % of time	Max V1 PSt	Max V2 PSt	Max V3 PSt
12/31/2017	1/6/2018	98.81	97.47	2.69	2.75	2.59
1/7/2018	1/13/2018	100	98.81	0.87	0.75	1.31
1/14/2018	1/20/2018	100	95.18	2.77	2.45	2.17
1/21/2018	1/27/2018	96.81	96.78	1.16	0.43	0.88
1/28/2018	2/5/2018	100	92.85	1.42	0.46	0.94



# GEOLOCATION

## GEOLOCATION

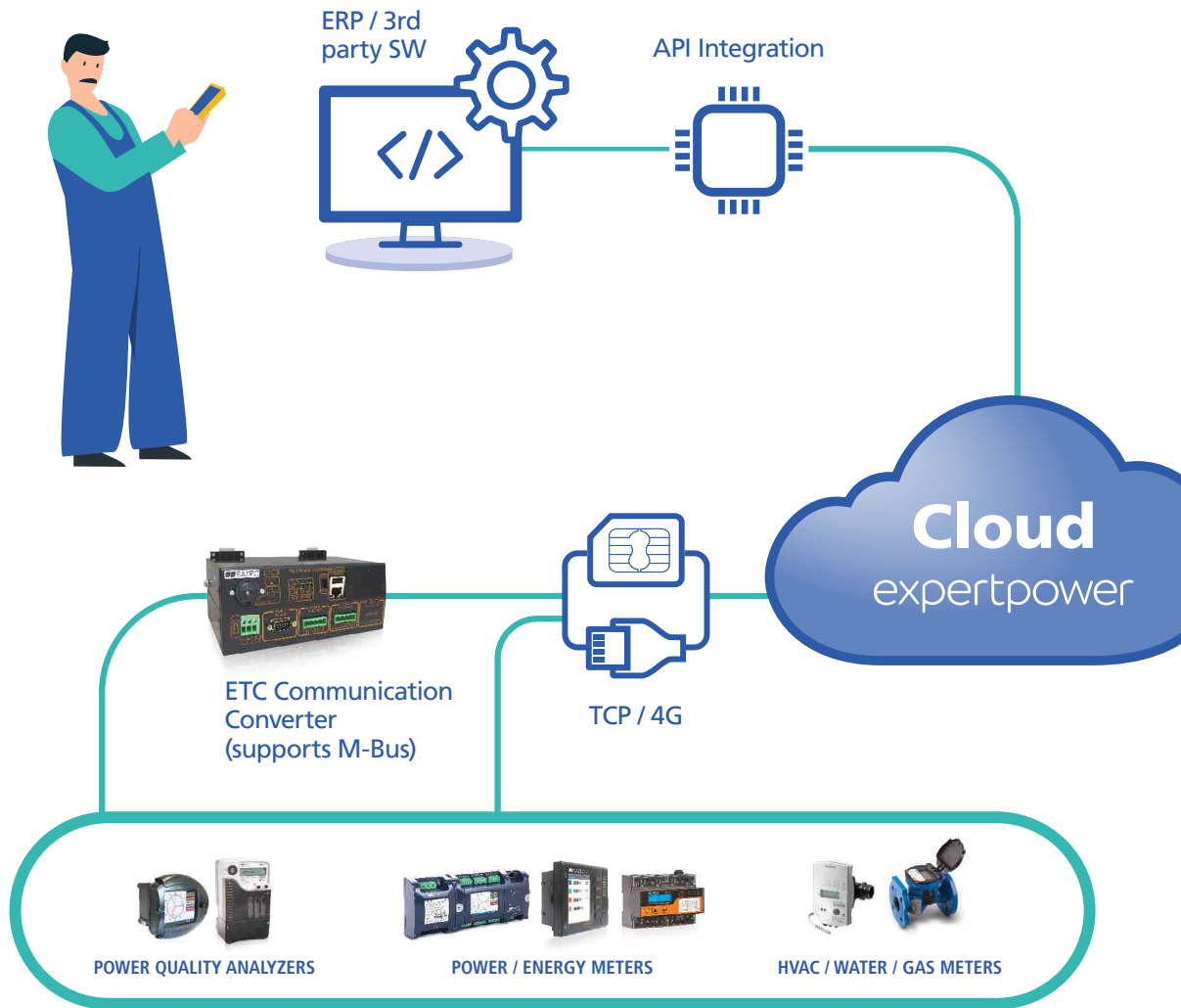
Expertpower GeoLocation Dashboard allows geographical meter display, alert notification and navigation on a map or satellite view.



- 1 Monitoring wide geographic location based metering systems
- 2 Transformer/substation monitoring, generating critical alerts such as overload, transformer overheating, or oil level
- 3 Outage visualization and monitoring

# SYSTEM ARCHITECTURE

## Expertpower Energy Management





Energy Management & Efficiency



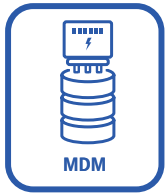
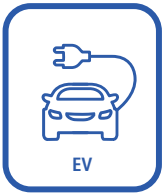
Billing & Submetering



Power Quality



BI / Data Analytics

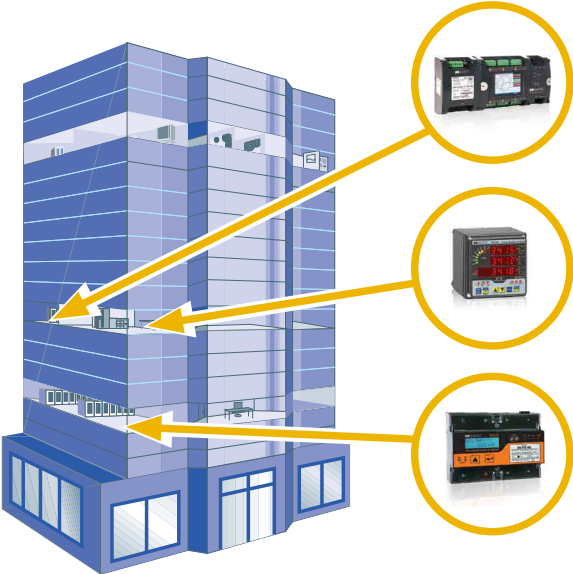


# APPLICATIONS



## Commercial

COMMERCIAL BUILDINGS | SHOPPING CENTERS | UNIVERSITIES | HOSPITALS | RESIDENTIAL



### ENERGY EFFICIENCY & COSTS

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

### 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
- EV consumption monitoring





# Utilities - Smart Grid - Renewable

GENERATION | TRANSMISSION | DISTRIBUTION  
ELECTRICITY / WATER / GAS UTILITIES

## SMART GRID

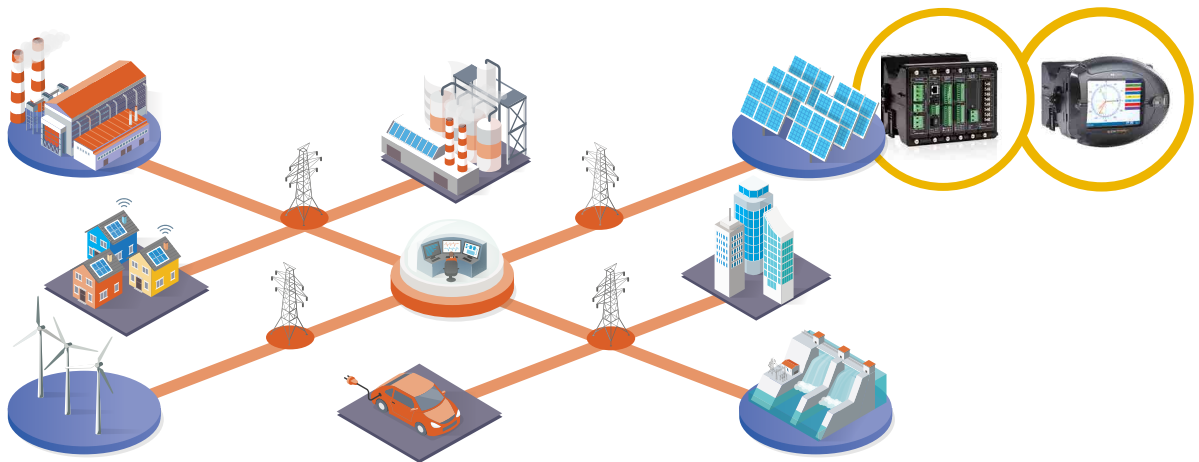
- MDM complete solution including billing
- Monitor and reduce energy losses

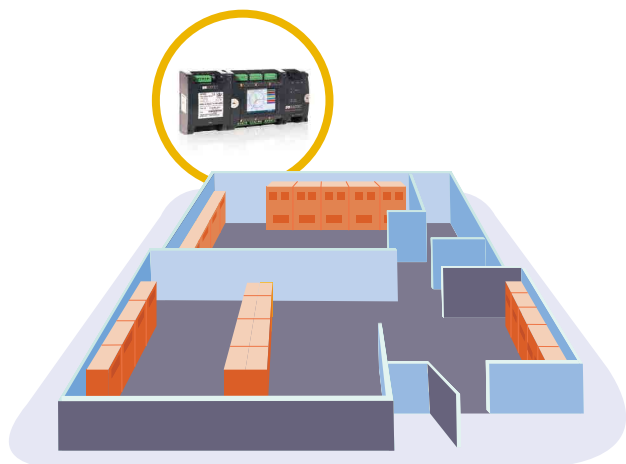
## POWER QUALITY

- Analyze source of power quality issues to enable quick resolution
- Manage customers' power quality analysis

## NETWORK SECURITY

- Proactive maintenance for maximum system availability
- Analyze demands to help utilize existing infrastructure and transformers monitoring





## Data Centers

### ENERGY EFFICIENCY & COSTS

Optimize Power Usage Effectiveness (PUE) via:

- Monitoring and enhancing HVAC performance
- Minimizing downtime by flagging and preventing overload
- Proactive maintenance for maximum system availability
- Analyze demands to optimize existing infrastructure and prevent over-design

### SUBMETERING & 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

## Industrial

### SEMICONDUCTORS | PETROCHEMICAL MINING | AUTOMOTIVE | FOOD & BEVERAGE ENERGY EFFICIENCY & COSTS

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

### POWER RELIABILITY

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

### POWER QUALITY

- Monitor power quality to prevent failure
- Generate compliance reports in accordance with local regulations



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