



Power Advisor Digital Support contracts

Dave Savage, Senior Director Digital Power Services

A Transformational Shift is Happening

Services DNA is changing

We are leveraging new technologies and transforming the way we offer services to benefit our customers and deliver increased value to their business. Within the realm of Power Solutions, drivers like shifting manpower; data quality and reliability; deeper insight into electrical networks, have been the catalyst for evolution. Simultaneously, the industry is experiencing a parallel convergence of IT (information technology; used for data-centric computing) and OT (operational technology; systems used to monitor events, processes and devices) that is affecting how our customers develop and manage their maintenance strategies.

This shift towards digitized services is transforming business models across industries:

Changes in other Industries



The world's largest taxi company **owns no vehicles**



The world's most popular media owner **creates no content**



The world's most valuable retailer **has no inventory**



The world's most agile accommodation provider **owns no property**

Changes in our Industry

Your trusted advisor status is shifting from Service provider **to analytics provider**

Your Maintenance has evolved from reactive to preventive to **planned preventive maintenance to condition-based approaches**

Cloud-based solutions are becoming more mainstream and are widely used... are expected by our customers

The changing demographic workforce is adjusting to **different skill levels (e.g. computer savviness, etc.)**

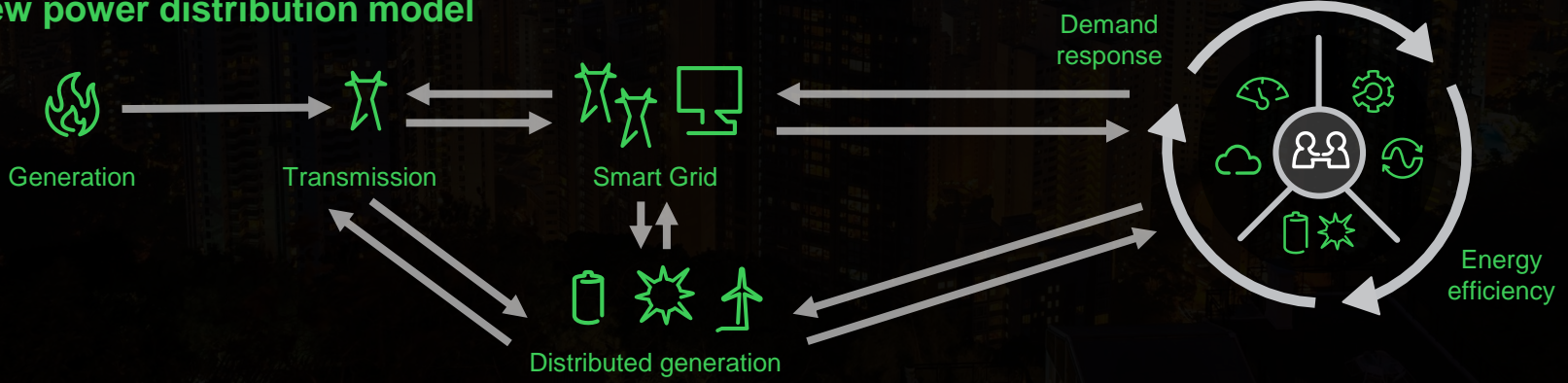
Facilities are shifting from localized to globalized; our approach therefore incorporates branches and remote facilities manned by data scientists

How power distribution has changed

Traditional power distribution model



New power distribution model



Managing modern power systems is increasingly challenging

With energy sitting at the heart of modern industry, the ability to efficiently manage and control this resource is essential for businesses to successfully operate and compete in the market.

Achieving this goal can be challenging however, due to two characteristics that define modern power systems: complexity and criticality.

Complexity



- Generation from single to multi source, PV, Wind, CoGen etc.
- Drive for cost reduction, VSD's, LED's and other Eco measures
- Increased digitized devices connected for granular information
- System visibility can be limited, and expertise to manage scarce

Criticality



- Efficient use of energy can have significant impacts on budgets
- Asset longevity is affected by power quality
- Poor power quality can increase risks to personnel and property
- Increased stakeholders requiring visibility and data quality
- Downtime has major business impact

Visibility into your power system is important:

>**70%** of facilities operate with problematic Electric conditions, which could lead to equipment damage and unplanned downtime

> **90%** of power management systems have outdated configurations that put monitoring and control of the network at risk

10-15% of devices in the typical power management system are nearing end of their supported lifecycle

Many hours of non-productive on site fault finding and maintenance activity can be avoided by condition based maintenance to investigate the system and identify issues

EcostruXure Power Architecture



SAFE

Protect
People & Assets

RELIABLE

Optimize
Business Continuity

EFFICIENT

Maximize Operational &
Deployment Efficiency

COMPLIANT

Simplify Regulatory
Compliance

Analytics & Services



EcoStruxure™
Power Advisor Services

- Get decision support from experts
- Prioritize & correct system issues and Power Quality problems
- Ensure high quality system data



Edge Control



EcoStruxure™
Power SCADA Operation
Power Monitoring Expert

- Manage & control electrical system
- Turn data into actionable insights for operations and maintenance



Connected Devices



PowerLogic™
ION9000

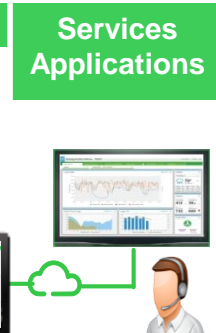
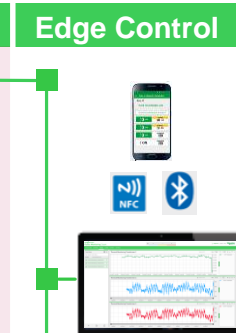
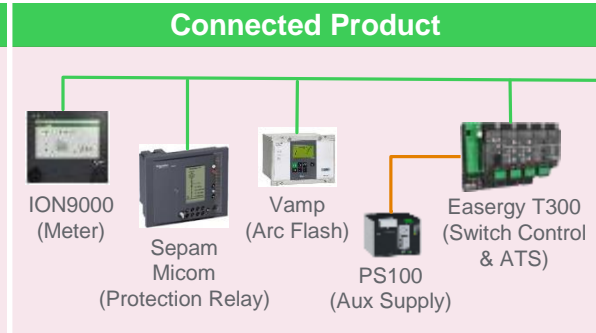
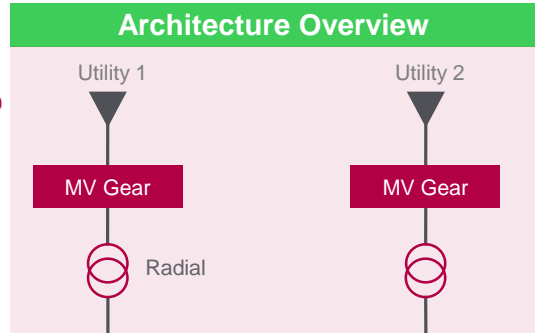
- Maintain safe and reliable power
- Monitor electrical infrastructure and equipment status
- Capture high speed power events

Life Is On

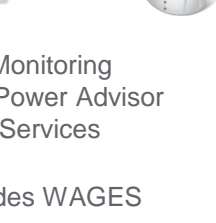
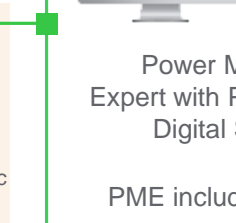
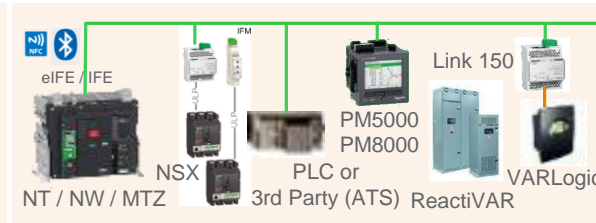
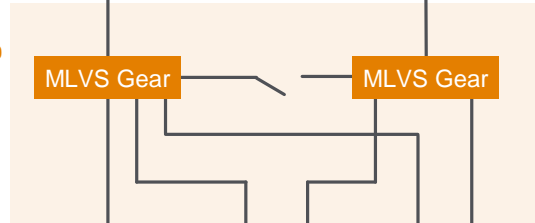
Schneider
Electric

EcoStruxure Power Architecture for a Medium-Sized Hospital

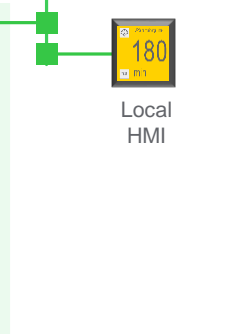
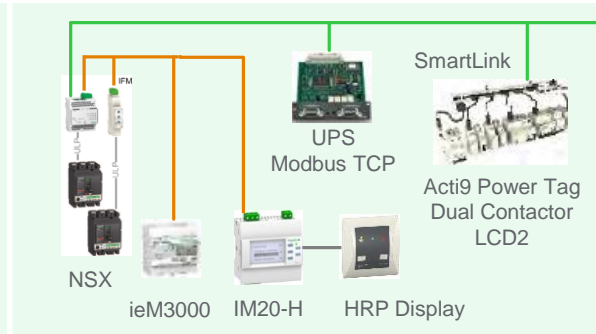
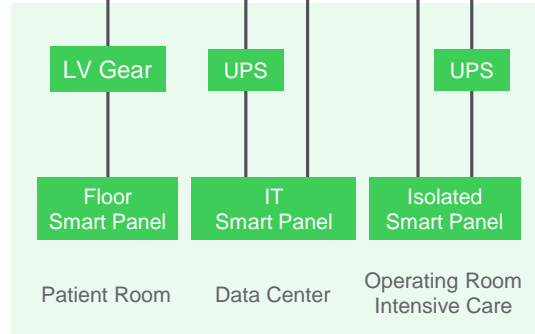
Medium Voltage



Low Voltage



Final Distribution



Data Quality is imperative, critical decisions matter.

Let Power Monitoring Expert help you make all the right moves.

Make informed decisions to maintain power reliability and a safe installation

Run power events analysis thanks to default/rich data integration for connected devices (e.g. Masterpact MTZ circuit breaker, ION9000, PM8000, AccuSine), events time-sequence, location, and power quality waveform analysis.

Track your facility's power quality performance and compliance against standards

Run an efficient and compliant facility

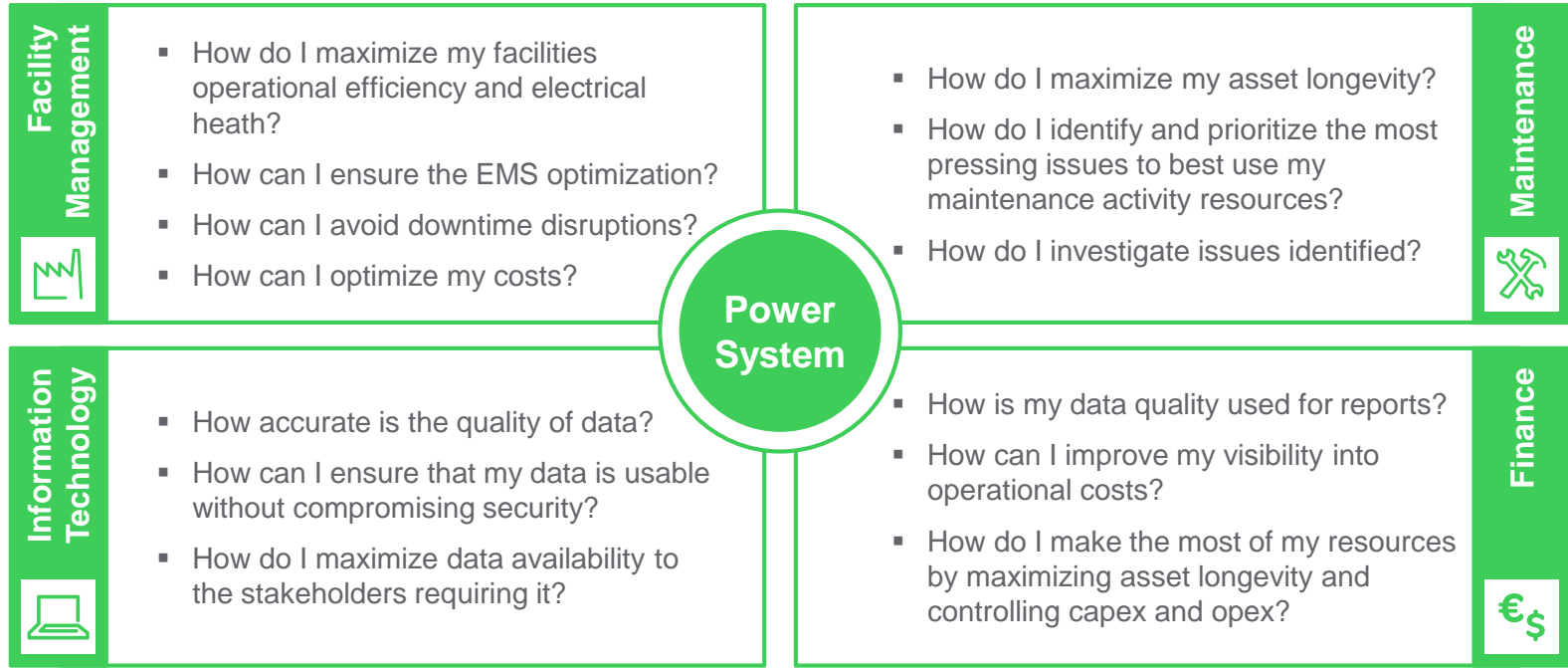
PME and all PS devices are a Certified Energy Data Management System in accordance with ISO 50001, ISO 50002 and ISO 50006

- Collect and analyze energy performance data of your facility
- Provide appropriate data for your energy audit
- Enable you to implement action plans to improve performance based on review of energy audit



There are numerous business interests and concerns to balance

In addition to the complex and critical nature of power systems, there is an **increasing number of stakeholders** who have interests related to the power system.



**As a market leader in
electrical distribution,
Schneider Electric can
help you manage this
complexity and achieve
your goals**



Does Data Quality Analytics have an ROI?

I was allocating 90K€ of energy per year to the wrong cost center. Power Advisor detected my meter was configured to be on the wrong feeder and I was able to correct the problem.

Power Advisor identified that we had significant unmetered loads. We added additional metering and finance can now track total production costs more accurately

One of our branch circuit meters had a faulty CT on one circuit. After this was corrected, we saw that the branch circuit was too close to capacity. We were then able to shift load and prevent an outage that would've cost 10-20K€

Our CTs were reversed, meaning that our maintenance teams were troubleshooting on the wrong phase for hours. After Power Advisor found the problem, maintenance immediately found the issues, saving hours of further investigation

After an upgrade, a meter was left in demo mode and we never got real readings. Power Advisor detected this. Once the meter was properly configured, we found serious power factor issues that were costing us 50K per year

As your electrical infrastructure evolves with maintenance, modernization & expansions, your Power Management System needs to keep up. If not properly maintained, your Power Management System can lose data integrity in as little as 6 months. Power Advisor finds these data quality issues and recommends fixes so you can always trust your data

What is the ROI on Electrical Network Analytics?

My senior electrical engineer retired a year ago and our power management system has not really been used since then. After running Power Advisor, we found that we had introduced serious harmonics into our critical circuits due to new Variable Speed Drives and LED lighting. An outage on the critical circuit could have risk to patients lives, not to mention the associated liability

We've had budget constraints for a long time, resulting in an unused Power Management System. Recently, we purchased a support contract that included Power Advisor. The analytics showed that the power factor was very low. I checked with accounting and saw the power factor penalty on the bill of \$3000/month - that's \$36K per year. No one from accounting was watching for this. Following the Power Advisor recommendation, we installed a capacitor bank and predict a payback in under 2 years

We have 2700 electrical assets in our site, including UPSs, meters, transformers, breakers, etc. While they are all connected to the Power Management System, it is difficult to keep track of every aspect due to information overload. We ran Power Advisor and found that we have severe over voltage conditions in the evenings. If left undetected it could have caused premature aging and outage of our 200K€ transformer.

We have 38 transformers across 3 sites. We have a Power Management System, but no one really knows how to use it. We purchased Power Advisor and when it ran, we found that 2 of the transformers were running significantly over capacity due to a recent expansion. We are now planning to upgrade them and avoid downtime on the production line, which costs 90K€/hour, not including property damage or injury that could have occurred if the transformer blew

A Power Management System provides a rich view into your electrical network. However, if your electrical network is complex or there are not enough expert resources, it may be difficult to fully leverage the system. Power Advisor looks at all the data and identifies the top issues to fix.

Our Connected Services provide a path to efficient operations...

With our team of dedicated **energy distribution experts**, we can provide you with the capability to **proactively and efficiently manage your operations** on a day-to-day basis.

Our Connected Service Plans enable you to have **direct contact** with experts who can **diagnose the cause of problems** when they appear, and **deliver actionable insights** that you can use to take corrective action in the shortest time possible.

Plans are offered at **different levels of support**, based on your needs, and can be customized with optional services.

Core



Power Advisor

Periodic assessments of your power monitoring system by applying expert analysis and patented analytics



Support Access

Providing you with direct access to advanced level support from Schneider Electric experts and certified partners

Optional



On-site Services

Scheduled, on-site preventative and condition-based predictive maintenance services



Priority Response

Rapid, prioritized access to experts who can help solve critical issues, and the option to have a dedicated support engineer available when you need them



Software Assurance

Ensuring you have the latest features and cybersecurity protection



Compliance Support

Support in validating the accuracy of your power monitoring system data to adhere to international standards

Digital Service Plans

	Standard	Prime	Ultra
Ongoing Support and Troubleshooting Enjoy peace of mind knowing superior technical support is always available			
Basic Product Support (phone and email; 8am-8pm EST)	•	•	•
Direct access to Advanced Support & priority case escalation		•	•
Remote Access Troubleshooting		•	•
Dedicated Senior Support Engineer			•
24x7 Support		Option	Option
Software Assurance ¹	Option	•	•
Robust Training Options Get the most from your system with training online, on-site or at one of our state-of-the-art training centres			
Self-Help Web Portal	•	•	•
On-Demand Online Training Classes	Option	•	•
Power Management University Training Classes	Option	Discounted	Discounted
Proactive Diagnostics and Maintenance Ensure your system is functioning at peak performance and identify issues before they become problems			
On-site preventative, condition based maintenance (Days per year) ²	Option	Option (2)	Option (4)
Power Advisor System & Network Analysis (Executions per year)	Option	2	4
Real-Time Monitoring through Mission Control			•
Software Diagnostics (Disc usage, server, communication status) Report			•
Energy Management Services Work with our experts to customize and maintain your energy management system to meet your individual needs			
Expert design and customization services (remote)	Option	Discounted	Discounted

...with Power Advisor serving as the technological backbone...

Power Advisor is the **analytical catalyst** behind Connected Services. Using data from your power monitoring software, combined with **advanced algorithms and expert analysis**, we can help you to **optimize the system performance and reliability** of your large and critical power facilities.

...delivering key actionable insights to improve your system...

The primary objective of Power Advisor reports is to **deliver actionable insights** that you can use to improve your power system. Our experts analyze your data and **highlight relevant potential issues**.

Power Advisor enables you to...



Understand your system

Improve visibility, getting a comprehensive assessment of your power system and ensuring your system is correctly configured



Identify and correct relevant issues

Quickly and accurately identify system issues, and be able to know how to proactively address them in the most efficient way

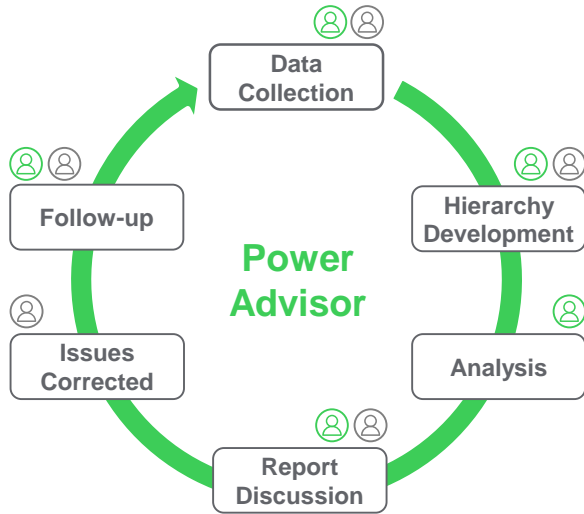


Optimize system performance

Monitor the health of your electrical network, identifying opportunities for improvement and avoiding unexpected downtime

...through a very simple and efficient process...

Power Advisor is run multiple times each year, the frequency depending on the level of service that you need. It is a **dynamic process**, that can **adjust to changes in your systems** to ensure on-going visibility.



① Data collection

Data is extracted on premise or remotely from your power monitoring system and off-premise uploaded to our secure cloud

② Hierarchy development

A digital representation of your power system hierarchy is developed. Requires an initial setup, followed by minor adjustments as needed as your system evolves

③ Analysis

Your expert runs the data through our patented algorithm to identify potential issues

④ Report discussion

Using their experience, the expert interprets and summarizes relevant issues and schedules time to review the findings


⑤ Issues corrected

Based on report findings and guidance provided by our experts, you can prioritize and address issues efficiently, keeping your operations running smoothly

⑥ Follow-up

Corrective actions are reviewed to ensure issues are properly resolved, with additional guidance provided as needed

 Schneider Expert

 Customer

Get automated insights into your electrical network...

[Sample Data Quality Executive Summary Report.pdf](#)
[Sample Data Quality Detailed Report.pdf](#)

[Sample Electrical Health Executive Summary Report \(1 of 2\).pdf](#)
[Sample Electrical Health Detailed Report \(1 of 2\).pdf](#)

PA Reports in:
English, Swedish, Spanish
Russian, Polish, Italian
French, German, Czech
Korean, Chinese Traditional
Chinese simplified

System Score:

Overall system performance score weighted by % of system affected

Executive Summary Syst Data Quality 1 of 2
Power Advisor

Report Summary
Report Run Date: 08-August-2017

Sunrise Hospital
1425 Capilano St.
San Francisco, CA

65% System Affected
This number indicates the total percentage of your system load affected by one or more chronic system issue(s).

System Health Check Date Range: 15 Aug 2016 - 15 Sep 2016

Based on Power Advisor's advanced analytics technology, we have detected issues within your Power Monitoring system that could cause inaccurate data, unreliable data or both to be presented to you and saved in the system. Making decisions based on this data is not recommended. Please refer to the detailed report for a deeper understanding of the possible causes and recommended actions for each of these issues. We recommend contacting your Schneider Electric Technical Support Engineer for more details on how to resolve your Power Monitoring system.

System Issues Checked (Issue/Total)	Issue Description
No Data In Query Period (10/168/168)	Device(s) missing data. Unable to perform calculations.
All Zero Values (5/155/168)	Device(s) logged consistently zero values.
Energy Balance Violation (13/155/168)	Sum of children devices' energy consumption does not match parent device.
Negative Values Present (16/168)	Device(s) logged a mix of negative and positive values.
Unchanged Values (1/155/168)	Logged values did not change over query period.
Underreporting or Overreporting (1/155/168)	Device(s) suspected of either under or overreporting.
Consistently Negative Values (2/155/168)	Device(s) logged exclusively negative values.
Device Not In Hierarchy (2/171/171)	Device(s) not in known hierarchy. Unaffected until placed in hierarchy.
Meter Detection Threshold Too High (2/3/168)	Device(s) unable to detect low enough load.

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Issue Summary:

At a glance status of all relevant issues checked, and number of areas impacted.

For communicating with finance & business stakeholders

Detailed Report Electrical Network Page 14 of 17
Power Advisor

Potential Issue: Voltage Imbalance Condition

Device 101
Threshold: 2% outside of nominal System Load Affected: 0.40 %

Measurement	Worst A6 %	Average	Minimum	Maximum
Voltage Imbalance	33.27 %	12.98V	0.97V	37.37V

Device 101 Voltage Imbalance

Potential Issue: Under Voltage Condition
Based on industry standard practices, voltage measurements below allowed threshold reported.
Source: External and Internal System Load Affected: 13.57 %

Potential Consequences
Decreased light output on some fixture/lighting types.
Erratic equipment or system performance.
Excessive heating and stressing of components and equipment.
Increased operating current and decreased starting torque, slip, speed, and efficiency in standard induction motors.
Reduced effectiveness of power factor correction capacitors.
Reduced life expectancy or equipment failure.
Unexpected equipment trips and motor contactor dropouts leading to unplanned interruptions of facility operations.

Device Name	Device Type	Comment
Device 101	PM850	
Device 117	PM620	
Device 118	PM850	
Device 129	PM850	
Device 19	PM650	
Device 6	PM850	
Device 55	PM850	

Cause, Impact & Recommendations:

Understand potential causes of the issue, the impact of not fixing it and recommendations on how to resolve it

For communicating with technical experts and consultants

Evidence Snapshots:

Isolate specific evidence of the issue to provide context without fishing through data

... and track your continuous improvement...

Comparison Report Electrical Network Report

Page 1 of 1

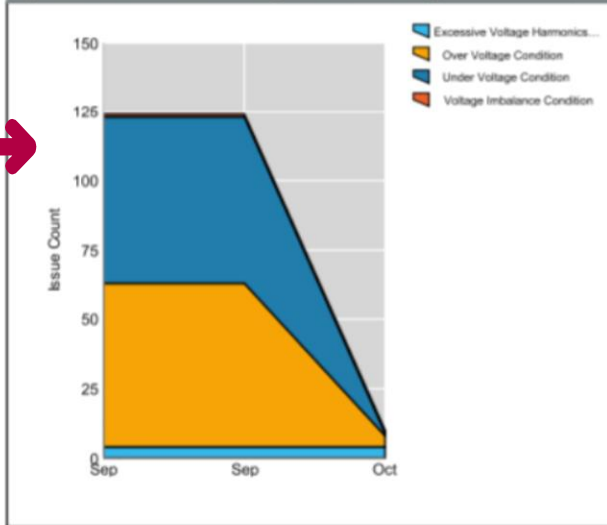


Report Details

Report Run Dates: 14-Sep-2017 03:04:18 PM Vs. 16-Oct-2017 05:14:42 PM

Complete Comparison Summary: 14-Sep-2017 03:04:18 PM - 16-Oct-2017 05:14:42 PM

System Issues Summary and Trending



Issue Trend:

Track the number of issues by type and confirm that the decline over time

Current vs Previous Comparison

Your system has improved! Based on Power Advisor's advanced analytics technology, we have detected fewer chronic power quality issues in your electrical network as compared to the last diagnostic run. This means that your system and network reliability is getting better! The graph to the left indicates the total number of devices reporting each issue and your system trend over time. Only devices with an "Active" issue status are included in the count for the graph; however, all devices with a changed issue status are in the report below. In this section, you can see the new and resolved devices per issue. Please contact your Schneider Electric Technical Support Engineer with questions or for more details.

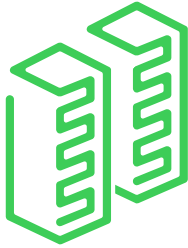


Trend Summary

Get a high level view for your stakeholders that the electrical network health is improving

...while safeguarding the security of your data...

We recognize the importance of data and system security, and take steps to **ensure that risks are minimized**. Adhering to the highest industry standards, we take care to **maintain the integrity of your IT operations**



Our experts serve as your single point of connection for data access. Scheduled data extractions ensure you know what is happening to your systems and when

Once we've collected your data, it is uploaded to our analytics platform through secure protocols

Power Advisor is built upon safe and secure cloud storage, leveraging the latest cybersecurity technology

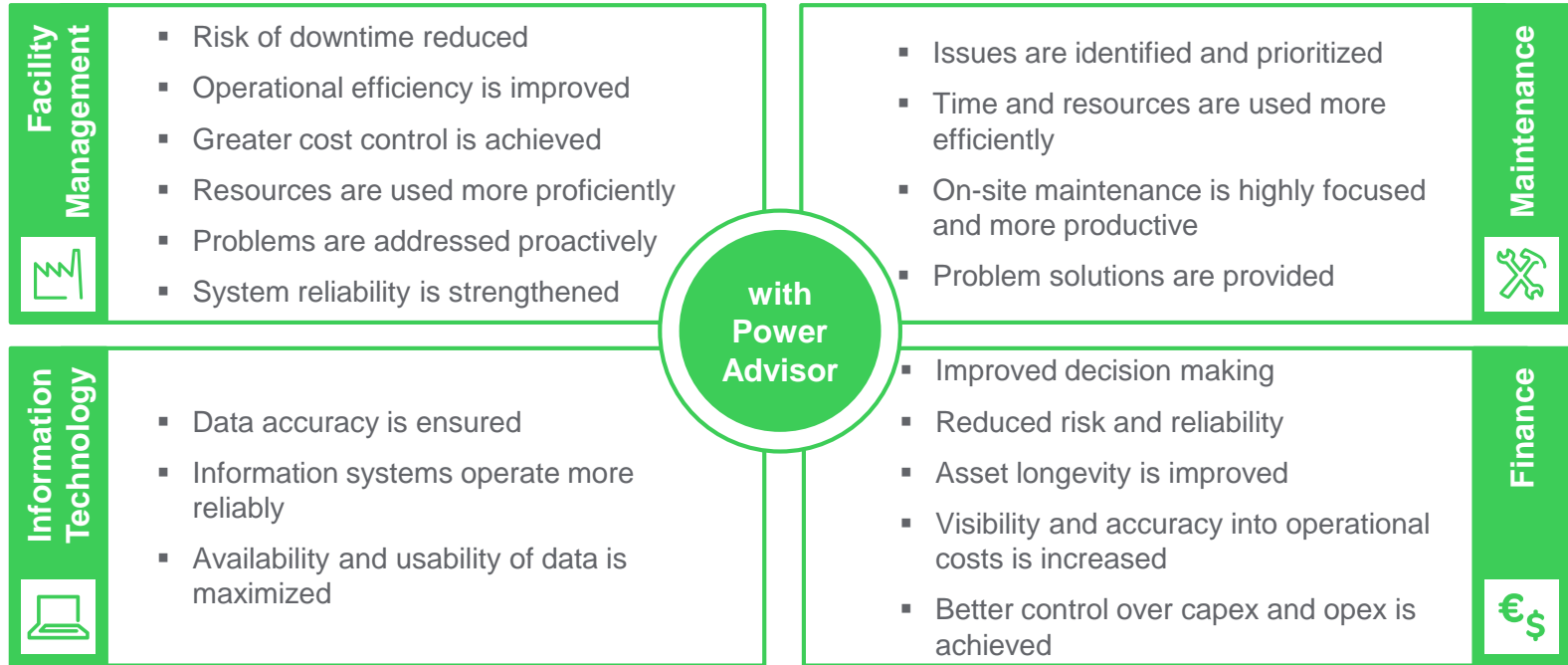
Power Advisor Wins Bronze Award Plant Engineering Magazine 2018 Product of the Year Plant Analytics and Design category



...and delivering valuable outcomes for all stakeholders

Power Advisor can help provide solutions to some of your **most pressing operational concerns**.

Improve power / data reliability with automated, expert recommendations



Life Is On



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