Blue Pillar™

SOLUTION BRIEF

Measuring the ROI of a Digital Energy Network

How to Achieve New Levels of Operational Efficiency and Capitalize on Today's Demand Response and Ancillary Energy Markets

Managing disparate energy assets scattered across enterprise infrastructures has proven to be a complicated, inefficient and laborious undertaking for most organizations. The lack of centralized management for critical energy generating and consuming assets is costing organizations significant money, both from an operational inefficiency and lost opportunity standpoint.

That's because the vast majority of organizations are still managing a wide range of key energy assets – such as generators, automatic transfer switches, switchgear, chillers, building automation systems, fuel systems and cogeneration equipment – manually in an unconnected and siloed manner.

So what's the impact of this lack of centralized command and control?

- High operations and maintenance expenses leading to an unnecessarily high total cost of asset ownership
- Unrealized financial benefits from new demand response and ancillary energy markets
- Corporate oversight and regulatory compliance issues and exposures
- Security risks caused by physical energy asset vulnerabilities
- Lack of asset readiness and real-time insight from manual management processes
- Frequent service interruptions that disrupt business operations

Blue Pillar's Digital Energy Network at-a-Glance

Blue Pillar's Digital Energy Network provides a cyber-secure layer of intelligence to an organization's energy assets, making them "digital" with full remote command and control capabilities. It then networks disparate energy assets into a system of subsystems that can be monitored and managed centrally. The Digital Energy Network can also interface with other energy management systems, including those for buildings, campuses and/or microgrids, thereby providing a holistic view with real-time situational awareness down to the circuit level.

Unlike enterprise energy management systems that require expensive and highly complex custom integration projects using SCADA or SCADA-like industrial toolkits, or custom programmed building automation systems, the Blue Pillar Digital Energy Network offers:

- A packaged, turnkey "system of systems" that deploys rapidly
- Automated integration with critical energy assets
- A "future-proof" scalable and extensible architecture capable of integrating additional assets, such as building energy management systems and sources of renewable energy (Smart Grid Ready facilities?)
- Flexible implementation, financing and support options to accommodate different cost-justification scenarios
- Professional Services to ensure a successful implementation, and provide a set of best practices for ongoing operation and management of the Digital Energy Network

Evaluating the ROI Blue Pillar's Digital Energy Network

The ROI from a Blue Pillar Digital Energy Network can be evaluated across five key variables:

1. Labor Efficiencies for Emergency Power Supply System Testing and Compliance Reporting

Reduced man-hours to perform EPSS testing	Automated and remote EPSS compliance testing and monitoring can reduce headcount required to perform tests in half.
Reduced man-hours to create & manage Regulatory reports	Automated EPSS testing, data collection and required reports eliminate manual data collection/entry and report creation.
Reduced man-hours to prepare for Regulatory Audit	All testing and emergency event history, data and compliance reports are stored digitally and indefinitely. Compliance reports can be created for user-defined timeframes and produced on-demand for audits or other investigation. Strategic and expensive resource allocation for Regulatory audits can be reduced by up to 50 man-hours annually.
Reduced man-hours to run multiple/simultaneous tests	Blue Pillar's automated and remote monitoring capabilities allow multiple EPSSs to be tested simultaneously, resulting in a reduction of 3 man-hours per month.
Using unplanned event/emergency to replace a required monthly load test	The Blue Pillar system constantly monitors and collects energy asset data that allows organizations to review an unplanned event. If test results meet NFPA 99 and 110 requirements, that event can be tagged as the required monthly load test verified by automatically generated compliance reports.
Reduced Training Costs & increased Knowledge Transfer	NFPA 110 requires a qualified person perform EPSS testing. Blue Pillar automates and standardizes all NFPA testing requirements that reduces the training time needed for testing procedures. This automation reduces EPSS testing man-hours affording a reduction or strategic repurposing of headcount.

2. Lower Project Costs

Eliminate load studies for planned equipment & facilities expansion	The Blue Pillar system includes sub-metering capabilities that monitor emergency circuits for the collection of meter data used in generating ad-hoc historical and load profile reports. Additional meters can be integrated into the Blue Pillar system if the customer desires to meter circuits that are not supported by an ATS.
Rightsizing future equipment purchases	Over-engineering generator capacity is a common practice, resulting in unnecessary capital expense. Often times, true connected load for generators can be lower than 30% of the rated load which adds an annual expense for a required load bank test. ATSs can also be mis-sized in the design phase adding to increased project cost. Blue Pillar provides insight into true connected load requirements to help customers right-size equipment purchases.
Extended Life of Generators & ATSs	Blue Pillar's real-time monitoring capabilities provide a continuous view into multiple variables affecting the status and health of all emergency power supply equipment. By utilizing alarms to identify issues in advance of serious issues, facilities managers can extend the life of equipment significantly.

3. Reduced Energy Costs

Reduction of energy demand charges	Blue Pillar provides a full sub-metering solution for emergency circuits. Additional electric meters can be integrated into the system for full facility load profiling and energy analysis. The Blue Pillar system can be used to "peak shave", allowing customers to reduce monthly peak demand charges.
Fuel consumption reductions by having better functioning, maintained equipment	Blue Pillar's monitoring and alarming functionality supports a predictive maintenance program resulting in lower fuel consumption.
Identify power quality issue (under voltage, overvoltage and power factor)	Blue Pillar's metering infrastructure can identify under-voltage, over-voltage and power factor issues. Blue Pillar identifies power quality issues at a circuit level allowing a facility to pinpoint the cause of an issue and expedite resolution.
Utility reliability	The US electric grid continues to age, and stability challenges are escalating. Leveraging a best practices emergency power management system and Digital Energy Network is essential to ensuring the highest level of patient safety.

4. Reduced Risks

Avoidance of lost revenue due to power outage	While generator manufacturers claim that a single generator EPSS has a reliability of 98% and multi-generator EPSSs maintain a 99.999% reliability rating, the single biggest cause of failures is due to battery and battery-charging systems. A key capability of the Blue Pillar system is persistent monitoring and alarm notifications on the health, state and readiness of the battery system.
Natural Disaster/Utility Power Outage Management	Blue Pillar provides real time information on the overall condition of all EPSSs from one central location. During an emergency event the Blue Pillar system records granular data that can be used for post-disaster analysis. In addition, the Blue Pillar system enables facility managers to actively control the EPSS through the end of a power interruption event.
Avoid low fuel situations	The Blue Pillar system constantly monitors EPSS fuel levels and issues alarms via email or text message if levels fall below minimum thresholds. Customers can choose to have the Blue Pillar system directly notify their fuel suppliers when fuel delivery is needed.
Reduced Litigation Exposure	The Blue Pillar system provides 24x7 monitoring of the health, state and readiness of generators, ATS, switchgear and fuel system components of an EPSS. This provides a permanent record of the performance of the EPSS during emergency events. The ability to audit and provide electronic records of how the EPSS performed is invaluable in the event of litigation.

5. Demand Response

Reliable, real-time demand response (DR) participation	DR is seen as a stop-gap resource whose role will continue to expand in markets characterized by volatility, high demand peaks and lack of new transmission-level generation capacity. Since islanding takes load off the utility grid, programs offering short notification DR alerts (minutes vs hours) will continue to offer lucrative economic participation incentives. Blue Pillar is Open Automated Demand Response (OpenADR) compliant and can actionably participate assets in real time. Blue Pillar sitting in an actionable supervisory control capacity at the node of participating generation assets assures reliable participation – with secure and automated reporting of events.

Real World Benefits Experienced by Blue Pillar Customers

Here are just some of the ways Blue Pillar's customers have achieved both qualitative and quantitative benefits by implementing a Digital Energy Network.

Blue Pillar Preventing Facility-wide Power Outages

Emergency power failure averted
A hospital was alerted by the Blue Pillar system to a failed generator battery charger averting an emergency generator failure. Battery and battery charger failure is the leading cause of emergency power system failures and had the hospital not had the Blue Pillar system this issue would have gone undetected until the next scheduled emergency power test or in the worst case during an actual power outage when the generator would have failed to start. Real-time monitoring and alarming on generator battery voltage and charger current provides Blue Pillar customers piece-of-mind and the ability to apply predictive maintenance strategies to generator battery replacement.

Patient safety, hospital data center and electronic medical records protected during severe weather
A customer leveraged the fuel management information provided by the Blue Pillar system to proactively notify and schedule diesel fuel delivery during a severe storm. By prioritizing the fuel deliveries they were able to avert an out of fuel situation protecting patient safety and the hospital's data center and electronic medical records. Several other facilities in the area without the foresight and information provided by the Blue Pillar system were unable to receive fuel deliveries during the storm and eventually lost emergency power. The optional Blue Pillar fuel management functionality allows hospitals to manage their fuel on hand to meet regulatory requirements, alarm on low fuel situations and automate fuel ordering.

Blue Pillar Enabling Preventative Critical Energy Asset Maintenance

Utility power quality issue causes hospital emergency power system issues
Hospital staff was alerted by the Blue Pillar system to a generator starting at a remote facility. Nursing staff at the facility provided conflicting reports of the power situation. The facility management team, utilizing real-time information from the Blue Pillar system, was able to determine that the generator had indeed started but one of the automatic transfer switches (ATSs) had failed to transfer to emergency causing a portion of the building to go dark. Upon further investigation, using the power metering data provided by the Blue Pillar system, the facility management team quickly determined that the root cause of the issue was a loss of one phase of power being delivered by their electric power provider. The team quickly deployed resources to address the ATS failure and altered the power provider of the power quality issue.

Blue Pillar data proactively alerts hospital to a degrading equipment component
The Blue Pillar system accurately records the time it takes the emergency power supply system to restore power to emergency circuits (referred to as time-to-bus). By trending this information over several months of testing, a Blue Pillar customer saw that the transfer time for one of their emergency power supply systems was slowly increasing. This caused the facility team to investigate further and a faulty voltage regulator was discovered on the generator. The failing component was immediately replaced and the responsiveness of the emergency power system was restored. More importantly a serious emergency power system failure was averted, protecting patient safety and equipment health.

Automatic transfer switch failure at unstaffed facility repaired before business hours
A hospital with a remote research facility that is unstaffed after normal business hours was altered in the middle of the night that the generator at the research facility had started. The facility team, utilizing Blue Pillar's system, remotely determined that an ATS was switching between normal and emergency power in an uncontrolled manner. The hospital notified their ATS service provider, who arrived onsite at 4:30 am and repaired the ATS prior to the research

staff arriving in the morning. Not only were normal business operations not effected but more severe damage to the generator and ATS was avoided.

Blue Pillar Preventing Joint Commission Compliance Failures

Hospital uncovers emergency power equipment failures and Joint Commission compliance issues before harm is done

A hospital thought that they were testing their emergency power supply systems in accordance with Joint Commission requirements. It was not until the Blue Pillar system was deployed at their hospital that they learned that this was not the case. The facility management team was initiating the tests from each automatic transfer switch (ATS) as required, however they were not monitoring the ATSs after the generator started to confirm that each ATS successfully transferred to emergency power. With the automated testing capabilities and Joint Commission compliance reporting provided by the Blue Pillar system the hospital was immediately notified that these ATSs were not functioning and quickly worked with their ATS maintenance provider to repair the failed equipment. It is unknown how long these ATSs had not been functioning.

Joint Commission compliance issue uncovered by providing management visibility

Unbeknownst to hospital management, their facility staff had been purposefully excluding several ATSs from their monthly testing regime due to concerns with the equipment's reliability. After deploying the Blue Pillar system this fact was immediately evident to the management team. The hospital's failure to test their entire emergency power supply system put not only patient safety at risk but had this been uncovered by the Joint Commission or Centers for Medicare & Medicaid Services the hospital's Medicare & Medicaid reimbursement would have been placed in immediate jeopardy. The Blue Pillar system provides hospital management with Joint Commission compliance reports ensuring that testing is done in accordance with all regulations including tracking the 20-40 day window requirement. The system also provides management a site compliance scorecard to quickly identify where each site stands.

Blue Pillar Protecting Patient Safety

Hospital facility team saves hours of troubleshooting effort and decreases the time which patient safety is at risk

Hospital facility staff initiated a routine monthly load test and found that the generator started as expected but none of the ATSs transferred to emergency power. By utilizing the information available in the Blue Pillar system they were able to determine that none of the ATSs were seeing emergency power delivered from the generator however they could also see the generator was producing emergency power. With this information they were quickly able to determine that the generator breaker had been tripped. A technician was dispatched to reset the breaker and the emergency power system was returned to a functioning state. Had the Blue Pillar system not been in place this situation would have required hours to troubleshoot and correct putting patient safety at risk in the meantime.

Blue Pillar Lowering Energy Spend

Maximized demand response revenue and direct impact on stability of regional power grid

A hospital utilizing their Blue Pillar enabled Digital Energy Network to participate in their utilities demand response program was able to increase their participation in the program by 7 times due to the circuit level control enabled by the Blue Pillar system. In addition to the increased revenue for this level of participation, the hospital automated their load shedding, requiring no human interaction therefore eliminating the internal resource costs associated with participating. This automated demand response also guaranteed the hospital's full participation when a demand response event was called maximizing the positive financial impact to the hospital. Automated demand response is a direct way for hospitals to positively impact the stability of their regional power grid.