Customer Profile
One of the world’s largest airlines carries over 25 million passengers and has operations in over 75 countries. The company is committed to addressing its energy efficiency issues and environmental responsibilities.

A core part of its business strategy is to improve the energy and carbon efficiency of its ground operations – data centers and facilities.

Locations
Global Operations

Industry
Transportation

Challenges
- Drive 20% reduction in greenhouse gas emissions and improve energy efficiency in its data centers and facilities
- Replace manual processes and fragmented energy and environmental reporting capabilities which limit its ability to develop a sustainable global energy efficiency program

Panduit Solutions
Panduit Intelligent Data Center and SmartZone™ Solutions included software, appliances, and services that deliver comprehensive energy and physical infrastructure efficiency in data centers and enterprise facilities.

Benefits
- Achieved five year target to reduce energy consumption by 20% in its facilities and data centers
- Developed a sustainable and actionable global energy efficiency program
- Created an auto-populated “Energy and Environmental Evidence Kit” to support regulatory compliance

Transportation Energy Management
SmartZone™ Solutions Enable Energy Efficiencies and Greenhouse Gas Reductions for Global Airline

Challenges
Aviation is unlikely to ever be considered particularly environmentally-friendly, yet this global airline insists on becoming carbon neutral by 2020, in-line with voluntary international aviation targets, using a combination of operational efficiencies and new technology. A portion of the European-based aviation leader’s strategy is focused on improvements of energy and environmental performance of its ground operations – data centers and facilities.

IT and data centers are on the front line for the airline – whether it is supporting the 75% of passengers who choose to check in online, or in supporting contingency plans of those delayed by a volcanic ash cloud. The airline’s power-hungry data centers are under more pressure than ever to increase operational and energy efficiencies.

A strong demand for data was driving the airline’s consumption of power upwards, increasing operational costs, and putting serious strains on budgets of data center managers and facilities. Energy experts estimate that data center space accounts for as much as twenty times more energy consumption per square foot than a typical office building. However, to truly curb the airline’s energy costs and balance them with rising demand, efficiencies need to be identified and acted upon throughout the entire ground operation; specifically, data centers and facilities.

To address these challenges, the airline set specific energy and environmental performance objectives. The aviation leader targeted a 50% reduction in net carbon emissions by 2050 and reduction of its energy consumption from ground operations by 20% over a five year period.

Challenges for the development of a sustainable efficiency program included a lack of standardized power, environmental, and reporting solutions, and limited energy and thermal data collection within facilities and data centers. The airline had fragmented global reporting, few metrics were captured, and they struggled with labor intensive manual processes to meet regulatory compliance.

Solution
Development steps toward a sustainable energy management solution program

To facilitate the development of a corporate energy management solution program and help the airline take advantage of any governmental financial incentives, Panduit Advisory Services conducted site audits to evaluate the current energy footprint and provide an accurate assessment of data centers and facilities including design details and typical operations.

Inventories were carried out on current systems, power usage and locations, taking into consideration any previously established goals for reducing its carbon footprint. Collection and analysis of data on energy use, environmental conditions, and ambient temperatures via Panduit ‘non-invasive’ data collection systems assisted in providing recommendations, savings calculations, risk assessments, and deployment initiatives on power and cooling efficiency improvement programs.
Panduit worked closely with the airline to develop best practice energy management policies and strategies for its data centers and identified both current and future legislative requirements, and their subsequent impact on the organization. Factors such as room and rack layout, hot and cold aisle configuration and containment, recirculation of hot air into IT equipment and prevention of hotspots that challenge cooling, were taken into consideration.

**Pioneering 6 Zone™ Methodology bridged the facilities and data center information gap**

Leveraging the 6 Zone™ Methodology (see illustration below), Panduit guided the organization in identifying and understanding the interdependencies between the facility and IT infrastructures. By integrating the methodology with data center infrastructure management (DCIM) solutions in each zone of a facility and data center, IT and facilities managers could broadly look at all areas, removing traditionally “siloed” areas labeled as either an IT or facilities domain.

**Enhanced infrastructure and environment visibility enabled informed decision making**

The airline’s phased deployments integrated SmartZone™ Solutions including software, appliances, gateways, and services within data centers, and further expanded throughout global facilities. The fully modular and integrated range of solutions primarily focused on power delivery, monitoring and outlet control, environmental management, alarming and reporting, cabinet and room security, local and remote access, and the provision of management information.

Previously, there had not been an easy exchange of information across the airline’s data centers and facilities. With the installation of SmartZone™ Software, an enterprise-level power and environmental monitoring and management solution, the airline is able to harness information from all zones within the data centers and facilities infrastructure areas. The software provides visibility to real-time and historic data along with enhanced reporting of key operational metrics — power, cooling, and space — which was critical to making effective decisions.

**Panduit® 6 Zone™ Methodology**

Panduit® 6 Zone™ Methodology separates a data center building or enterprise facility into distinct “zones” that contain different building systems or operational functions. SmartZone™ Solutions monitor, capture, and process real-time operational and performance data in each zone to provide a holistic view of connectivity, energy, and environmental parameters in the data centers, facilities, and extended enterprise.

- **Zone 1: Building Point-of-Entry**
  - Monitors the building utility metering “Point-of-Entry”, providing power, oil, water, and gas consumption information, and carbon emissions.

- **Zone 2: Switchboard Distribution Board**
  - Monitors sub-meters at the main distribution board for data center related equipment.

- **Zone 3: Plant Equipment**
  - Distributed monitoring of supporting facility services, including individual chillers, AHU, CRAC, UPS and lighting circuits.

- **Zone 4: Branch Circuit Monitoring of Data Center**
  - Focuses on monitoring of total rack or cabinet IT loads and environmental conditions.

- **Zone 5: Rack and Cabinet Level Monitoring**
  - Intelligent monitoring and control of power, environmental conditions, and cabinet-level security with asset tracking and capacity planning for the data center and enterprise.

- **Zone 6: Device Level Monitoring**
  - Automated connectivity patch field management, as well as monitoring and control of per outlet or device power, within a data center or enterprise.
Environmental monitoring and alerts help airline manage risk

Temperature and humidity are two key factors within the airline’s data center infrastructure, which can potentially affect system resilience, availability, and security of business systems and ultimately, business continuity. As part of the deployed environmental management solution, SmartZone™ Solutions measure both temperature and humidity over the network to monitor the environmental conditions of each data center. By defining and setting pre-determined thresholds, management is provided with early alerting in the event where thresholds are exceeded, to ensure optimized cooling, uptime and system reliability, thereby helping to minimize and manage risk.

Unique zero-downtime ‘non-invasive’ power monitoring benefits legacy data centers

The airline’s legacy data centers leveraged SmartZone™ Non-Invasive Power Monitoring Devices that can be installed without the need for scheduled power downtime required with traditional monitoring technologies. The open fork in the non-invasive device enables it to be placed directly over a power cable with a choice of locking-ring collars that allow it to be installed at any convenient location on the cable.

The non-invasive devices efficiently and cost effectively increased visibility of power demand, and improved control to allow the airline to make informed decisions, calculate ‘what-if’ scenarios, risk analysis and drive down costs.

Intelligent solutions enhance efficiency and security

SmartZone™ Gateways were fitted in each cabinet to collect energy and environmental data from SmartZone™ Appliances including in-line devices and intelligent power distribution units (PDUs). Gateways are monitored on a Simple Network Management Protocol (SNMP) network to the software, which provides the data center management team with real-time temperature and power alarms, as well as historical power and environmental reports. The software also controls remote operation of the rack door access system. Racks were fitted with electronic locks and the door sensors were fitted with smart card readers.

Optimized capacity planning

Rigorous data center capacity planning and management is critical for the airline. By providing integrated threshold monitoring and early alerting on power, humidity, temperature and other variables at both cabinet and room level, SmartZone™ Solutions helped management understand the interdependencies between power, rack space and cooling within the data center environment, including past trends. In order to predict compute resource to handle various workloads, Panduit provides assistance in measuring current loads, testing for anticipated loads, and gathering usage trends over time to determine the possible need for expansion.

The software’s ability to integrate into the various Network Management System (NMS) platforms, allows it to show the same interdependencies that exist for space. In optimizing physical layer capacity management, the capability of ‘real-time’ monitoring to capture detailed data and both document and graphically represent the current state of the airline’s infrastructure, gives a complete picture and baseline of the type, location and connection of equipment.

By providing highly accurate ongoing data collection, the company is able to perform data center trend analysis by tracking historical trends of power and cooling utilization over a period of time. The management information can then be modeled against business initiatives and events to produce short, medium, and long term forecasts for future planning.
Results

Achieved facilities and data centers energy reduction target

The airline achieved the 20% energy reduction across its ground operations within the five year target. The Panduit® 6 Zone™ Methodology helped bridge the information gap between IT and facilities by partitioning the physical infrastructure of the airline’s ground operations into distinct zones. SmartZone™ Solutions provided management access to real-time monitoring of power, environmental, and security system hardware from each building point-of-entry, through each zone, and down to data center racks and individual device.

Combining SmartZone™ Software with gateways and power monitoring devices delivered the benefits of intelligence to all groups within data centers and enterprise facilities, from data center managers monitoring IT hardware performance to facility managers monitoring power distribution and the CRACs, chillers, and pumps.

Developed an actionable global energy efficiency program

Panduit was able to assist the airline to investigate and prioritize its main challenges – from its energy hungry data center operations, which spreads across six locations – and extending energy efficiency programs into its global facilities. The enhanced visibility of data centers and facilities infrastructure and environment enabled the airline to make informed decisions based on real-time and historical data. In addition, this provided the ability to perform trend analysis and risk management, while assisting with energy and carbon reduction initiatives.

The transportation leader is able to instantly access holistic and granular-level cooling, power, and capacity data. Access to this information allowed the airline to virtualize its servers and instead of running servers on 20% to 30% capacity, they now operate at 50% to 60% capacity.

“Panduit continues to help with many energy efficiency initiatives that have impacted our day-to-day operations across our global ground operation. We have achieved our initial five-year targets and developed a sustainable and actionable global energy efficiency program.”

— Data Center Operations Director, global airline

Created auto-populated Evidence Kits to support regulatory compliance

A key feature of SmartZone™ Software is the ability to provide real-time and historical power and environmental data from multiple sources across a single reporting portal. The software is able to convert the airline’s data into sophisticated management reports that are concise, simple to understand, and easy to share.

To eliminate a labor intensive manual process, Panduit worked with the airline to create an Energy and Carbon Reduction Evidence Kit that utilizes SmartZone™ Software to automate Carbon Footprint and Annual European Government Energy Reporting. A built-in carbon emissions calculator helps the airline determine an overall carbon footprint for the data centers and ground facilities, which simplifies energy efficiency and carbon footprint reporting for regulatory compliance.

“The airline’s vision was to develop a best-in-class energy efficiency program across its enterprise facilities in a cost effective manner. The global energy efficiency programs implemented to date helped the airline meet its five year target to reduce ground energy consumption by 20%, lower its carbon emissions, and simplify its mandatory government reporting.”

— Colin Dean, Panduit EMEA Sales Director