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## Energy Management Services

Data centers & IT environments are often critical to today's businesses, directly affecting operations and profitability. General & Mechanical Services has the unique ability to address all kinds of challenges through comprehensive services and solutions that improve efficiency, reliability, and total cost of ownership. Our team of seasoned professionals is dedicated to assisting our clients understand where they are today and help determine where they need to be tomorrow.



The Benchmark for Mission-Critical Services



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## **GMS Assessment Portfolio**

### **FirstStep Assessment**

This introductory assessment service evaluates floor layout and air distribution, rack configuration, computer room air conditioner (CRAC) unit(s), uninterruptible power supply (UPS), batteries, and utility usage (when provided). It is a great first step in identifying deficiencies that can limit capacity, availability, and energy efficiency. Recommendations offered by senior applications engineers often identify quick payback items, critical needs, and deviations from best practices to help ensure the data center operates at a high level.

### **Power and Cooling Assessment**

This service provides an onsite review, analysis, report, and recommendations of the critical physical infrastructure components – including power systems, cooling systems, and rack configurations. This is a detailed assessment that will investigate known issues, identify capacity constraints, and uncover other potential problems that may compromise availability and efficiency. General & Mechanical Services will make recommendations on how to reduce energy consumption, optimize space, increase utilization, extend the life of hardware, and create the highest level of network availability.

### **Energy Efficiency Assessment (w/ PUE)**

This service provides an onsite assessment, analysis, report, and recommendations to improve the critical power and cooling infrastructure within the IT environment. This detailed assessment will investigate known issues, identify capacity constraints, and uncover other potential problems that compromise availability and efficiency. General & Mechanical Services will determine the power usage effectiveness (PUE) of the data center and will make recommendations to optimize space, system configurations, and operations to extend the life of hardware, increase efficiency, reduce energy costs, and create the highest level of network availability. Since cost and savings is often identified, General & Mechanical Services can also provide the financial and rebate analysis necessary to make an informed business decision.

### **Computational Fluid Dynamics Assessment (CFD)**

This service models and analyzes the airflow and temperature patterns of your existing data center. The CFD software creates a 3D model of the physical attributes within the space, as well as the location and performance characteristics of the cooling infrastructure components, IT equipment, power systems, and any other significant equipment within the data center. From this, models and simulations are created to identify optimization

strategies that will reduce equipment temperatures, increase efficiency, and reduce operating costs. The CFD service can also provide cooling equipment failure scenario analysis for contingency planning, simulation models for planned upgrades or expansions, or theoretical models for planned new construction.

### **IT (Server) Readiness Assessment**

When a major change is going to take place like virtualization, cloud computing, blade servers, etc.; it's best to understand and prepare the infrastructure to compliment the upgrade. Often, significant energy savings can be obtained as well as problems averted by improving specific pieces of equipment and daily operation. Even small changes can have an important impact on eliminating hot spots, balancing power, extending equipment life, and reducing energy usage. The Energy Management Service team can provide a report with detailed recommendations on ways to avoid problems and enhance the overall effectiveness of your IT upgrades.

### **Data Center Circuit Tracing Assessment**

This service provides verification and circuit identification of power distribution systems located in the data center. General & Mechanical Services will identify and document the 208/120 volt power pathways from individual circuit breakers, in the distribution panels or power distribution units (PDUs) to the IT equipment and associated rack. This can be offered as a standalone service or as part of any data center audit.

### **Network Closet Assessment**

This service provides an assessment and analysis of the critical infrastructure components including: power systems, cooling systems, rack configurations, electrical distribution, and room environment. General & Mechanical Services will supply the information necessary to manage network closets for optimum performance, extend hardware life, and provide the highest level of system availability. With a large group of highly trained field engineers, General & Mechanical Services can perform this service across North America while maintaining a consistent, high quality deliverable.

### **Custom Assessment (Grey Space, Power, Renewable Energy, etc)**

In addition to the core audit offerings, various other assessments can be built to fit each client's individual need. Working closely with other lines of business in GMS, as well as with third party partners, the Energy Management Services team can provide services for the white space, grey space (office space), power, generation, automation, security, and various other areas. Once the client has an understanding of their goals and budget, a service can be designed to meet those specific needs.

## Commissioning

Commissioning can be offered for new construction, retrofits, or even on a “retro” or “continuous” basis to ensure peak performance throughout the lifecycle of the data center. This service is often overlooked, which can result in continuous deficiencies, inefficiencies, and critical failures that may compromise availability. Commissioning can be included as part of a turnkey and new construction project, or as a standalone service.

## Power Security

General & Mechanical Services offers end to end power security solutions from pre-commissioning and installation services to arc flash and on-site maintenance. Our engineers have identified the key service requirements necessary to ensure continuity and integrity of the critical power infrastructure inherent in every data center. Additional offerings include the creation of an electrical one-line diagram, circuit breaker maintenance and testing, time-current coordination, power factor analysis, as well as various other services. General & Mechanical Services has the expertise to provide a customized solution tailored to your specific data center service requirements.

## Design/Build (Turnkey Projects)

For brownfield projects, General & Mechanical Services offers full turnkey project services, managing all aspects of the upgrade. This includes final design, permitting, equipment and subcontractor selection, project management, construction, and commissioning. This is a great fit for complex projects that are critical in nature, often involving “hot-site” work.

For greenfield projects, General & Mechanical Services offers full design and construction services. Significant client involvement is encouraged throughout the process to ensure all expectations are met. This allows the client to hold General & Mechanical Services fully accountable to the budget, timeline, and final outcome, eliminating the “finger-pointing” that is common on large projects.

## Additional activities included in some assessments

### Infrared Thermography Analysis

This analysis uses digital infrared thermography cameras to evaluate the condition of facility infrastructure. It may be purchased as a standalone service or integrated into one of our standard audit offerings. General & Mechanical Services will supply a detailed assessment of the existing temperature conditions and electrical infrastructure to help improve reliability and prevent unplanned downtime. The primary subsystems targeted for review are the main switch gear, transformers, disconnects, UPS(s),

distribution panels, power distribution units (PDU), rack air inlet temperatures, and air conditioning components in the IT space.

### **Rack and Air Distribution Analysis**

Included in most assessments, this comprehensive data center analysis identifies the air distribution effectiveness and optimum hot aisle / cold aisle configuration. Engineers will record airflow and temperatures as well as evaluate potential leaks, obstructions (above and below a raised floor), and sources of air mixing that may lead to limited effectiveness and capacity. Given the current and future load, a plan will then be created optimize temperature, airflow, and containment which often leads to improved efficiency, capacity and/or the ability to handle higher densities.

### **Financial Analysis**

In addition to providing a thorough report, energy management consultants can include a financial analysis of the recommendations. This can include calculations of the net present value (NPV), return on investment (ROI), simple payback, or other financial metrics that are important to our client's decision making process.

### **Rebate Analysis**

This service is designed to identify local, state, and federal energy efficiency incentive opportunities. Often times there are programs designed to support data center upgrades where the incentives will pay upwards of 50% of the cost. This "free money" is typically used to offset the implementation costs and lower the overall project payback. While General & Mechanical Services cannot guarantee the amount of incentives that will be paid, our engineers can help facilitate the process of savings identification, documentation, and pre & post onsite validation.

### **Utility Analysis**

Effective energy management of the data center includes understanding how energy is consumed as well as how it is supplied. General & Mechanical Services can help customers analyze utility data and/or sub-meter data to identify usage trends and establish a baseline. Furthermore, this service includes benchmarking our client's carbon footprint and providing accurate energy savings calculations. This support also extends to understanding and negotiating utility contracts in de-regulated markets as well as demand response programs when available.