

Sun Eco Assessment Service - Basic

Korea

1. Scope

This Sun Eco Assessment Service for Data Center – Basic ("Service") is a fixed price service, and provides Customer with an assessment of the power and energy consumption, rack design and space utilization, and cooling and air distribution at Customer's data center by evaluating computing technology, facility infrastructure and space planning in relation to a defined set of target hardware, as well as an assessment of how strategically refreshing computer hardware or modifying the infrastructure and space planning of the data center may decrease power and energy consumption and improve cooling and air distribution. Sun will make commercially reasonable efforts to provide the Service.

2. Tasks and Deliverables

2.1. Site visit

2.1.1 Sun will conduct a visit at Customer's site to collect the information necessary in order to provide the Service assessments. The site visit will take place on a single day during normal business hours and will typically require less than one (1) engineer day (approximately 6-8 hours) at the Subject Area (as defined in Section V, below), depending on specific site conditions and availability of information required from Customer. Activities will include test measurements, field observations and interviews with Customer personnel.

2.2.2 The site visit will be scheduled for a mutually convenient time and date. Scheduling will be coordinated by and at the discretion of Sun with appropriate Customer approval. Site visits must be scheduled and confirmed with a minimum of sixteen (16) calendar days advance notice before the proposed date. Any requests for modification of the schedule by Customer must be approved by Sun.

2.2 Assessments

2.2.1 Power & Energy Consumption Assessment. Sun will provide the following assessments:

- Inventory of Target Equipment (as defined in Section V, below).
- Collection of manufacturer power specifications (nameplate data) for Target Equipment.
- Critical load of room housing Target Equipment. Limited to PDU or UPS load dedicated to Subject Area.
- Baseline measurement of power consumption of Target Equipment. Amperage draw measured at individual hardware units with multi-core AC clamp-on meter.
- Evaluation of cabinet-level power distribution practices for Target Equipment.

2.2.2 Rack Design & Space Utilization Assessment. Sun will provide the following assessments:

- Evaluate general rack design and placement in relation to preferred practices (as described in Section V, below).
- Evaluate specific rack design and placement of racks housing Target Equipment.
- Evaluate rack utilization of racks housing Target Equipment.
- Evaluate general room utilization practices.
- Determine heatload per cabinet for Target Equipment. If Target Equipment is spread over more than 10 cabinets, a subset of the cabinets housing the Target Equipment will be used, at Sun's discretion.

2.2.3 Cooling & Air Distribution Assessment. Sun will provide the following assessments:

- Evaluate cooling capacity serving the room housing the Target Equipment (based on the specifications of the primary A/C system).
- Evaluate design of air distribution scheme for room housing the Target Equipment in relation to preferred practices.
- Evaluate specific air distribution implementation in vicinity of Target Equipment.
- Conduct detailed measurements (temperature, relative humidity & air distribution) in the vicinity of Target Equipment.
- Conduct spot measurements (temperature, relative humidity & air distribution) in strategic areas in the room housing the Target Equipment.
- Conduct interviews with Customer personnel regarding current and future planning related to cooling capacity serving the room housing the Target Equipment.
- Both actual conditions at the time of the site visit and future planning considerations based on discussions with Customer personnel will be taken into account during the assessments.

2.2.4 Assessment Report. Sun will provide the following to Customer:

- **Data Analysis and Report Preparation:** Following the site visit, the data collected will be analyzed and an overview report will be prepared. The data will be analyzed both in relation to energy usage and availability requirements. The overview report will typically be available for presentation between two and three weeks following the site visit.
- **Overview Report:** The target delivery date for the overview report is twenty-one (21) business days from the final day of any site visit. Reports completed before the target date will be provided as available. The overview report will include a description of the assessments provided, documentation and analysis of the data and observations, graphical presentation and photo documentation (where available), specific recommendations regarding the Target Equipment and general observations and recommendations regarding other potential issues observed in the screening of the rest of the room. The report will be provided in electronic format. A single shipment of up to four (4) printed copies will be provided upon request.
- **Presentation:** Upon request by Customer, a remote presentation of findings in the report will be provided.

3. Customer Responsibilities. Customer shall provide Sun with the following:

3.1 A project manager ("Project Manager") to:

- Provide direction and guidance to Customer as required by Sun to maintain project momentum;
- Provide information and resources in a timely manner as needed by Sun to enable Sun to provide the Service described in this Statement of Work;
- Be readily available and on-site as and when required by Sun for the duration of the Service; and
- Receive any deliverables created as a result of this Service.

3.2 Adequate workspace Sun's personnel, as well as access to telephones, copiers, faxes, conference rooms, and printing facilities as reasonably necessary.

3.3 Customer's relevant business requirements and Service-level agreements.

- 3.4 Access to Customer personnel, including business, IT and operational staff.
- 3.5 Parking and access passes as required by Sun for Service delivery.
- 3.6 A timely response (i.e., in a time period that does not adversely affect Sun's scheduled delivery of the Service) to all of Sun's requests for information.
- 3.7 Timely delivery of information and support (i.e., in a time period that does not adversely affect Sun's scheduled delivery of the Service) from suppliers of non-Sun equipment and Services as requested.
- 3.8 Any relevant operational performance standards in use by Customer related to Service delivery.
- 3.9 An escalation procedure in the event that Customer does not provide timely responses to Sun to enable the Service to be provided within the established time frames.
- 3.10 A timely response (i.e., in a time period that does not adversely affect Sun's scheduled delivery of the Service) to the review of all Service-related documentation.
- 3.11 Copies of Customer's relevant business, organizational, configuration and process documentation.
- 3.12 Facilities access and access to relevant internal and external systems as required by Sun.
- 3.13 Access to Customer's existing IT infrastructure.
- 3.14 Customer will notify Sun of any system, application, or equipment modifications known to be potential problems, or deviations from industry standard practices.
- 3.15 Access to all Subject Areas.
- 3.16 Access to subject equipment cabinet interiors.
- 3.17 Personnel familiar with the history and projected plans for the Subject Areas.
- 3.18 A full-time escort is only necessary if it is company policy, but someone should be available to facilitate access and answer questions at all times during the site visit.
- 3.19 Customer personnel knowledgeable about the mechanical systems and electrical infrastructure serving the Subject Areas. This includes any air introductions from outside the controlled environment (make-up air, fresh air, building air, shared primary air, etc.), as well as the electrical infrastructure from the utility supply to the facility to the data center (generators, UPS, PDUs, etc).
- 3.20 Typically, 30 to 60 minutes will be needed for discussion of such mechanical systems and electrical infrastructure. Customer personnel should be available throughout the duration of the site visit to answer any questions that might arise.
- 3.21 The most recent floor plans available for the Subject Area. These should include any floor grid and hardware layout, including air conditioners and other support equipment. These will be used to identify test locations, problem areas and other points of reference. Due to inclusion in the report documentation, 11X17 prints are preferred. Sun requests that these plans be emailed if reasonably possible, as it would greatly facilitate Sun's preparation of its reports. Most CAD formats are acceptable.
- 3.22 Cabinet elevations of the Target Equipment, if necessary and reasonably possible.
- 3.23 Access to any historical monitoring data. Sun requests all temperature, relative humidity, power quality and environmental support equipment monitoring data. This could be from a building monitoring system, from a system specific to the data center or from chart recorders within the room space or attached to specific hardware. With permission, the onsite engineer will examine the data and may request electronic or paper copies of certain data, when available. Customer will make copies available for off-site examination.

- 3.24 Permission to take photographs. Permission to take photographs is deemed granted, unless explicitly denied by Customer. These photographs greatly enhance the descriptive quality of the report. No client names, monitor screens or other proprietary information will be photographed. All photographs are strictly confidential and will be used solely for illustration purposes.
- 3.25 Permission to use clamp-on meters on power cables to Target Equipment while operating with normal load. Sun will utilize a handheld multi-core AC digital clamp meter that is designed to measure current in a non-intrusive manner. This meter clamps onto the server power cords and utilizes digital signal processing to determine the circuit amp loading. The meter has a limitation of 0.51" maximum cord diameter and a maximum range of 100 amps when used in this application. There is no impact to operations, power quality, or power flow to the system under investigation.
- 3.26 Additional Expenses. Customer will pay for reasonable travel, accommodations, meals, and incidental expenses in the event that an on-site visit by Sun is required.

4. Additional Provisions

4.1 Subject Area:

- For purposes of this Service Listing, the "Subject Area" means a single computer room not to exceed 25,000 square feet. Support Rooms will only be examined in so far as they influence the Subject Area. Definition of the Subject Area for the Service will be determined by Sun in its sole discretion.
- Areas housing the support infrastructure for the Subject Area ("Support Rooms") are not included in the maximum limits defined above, and will be examined, in Sun's sole discretion, as necessary to support the Service.
- The Target Equipment must all be located within the Subject Area, and must be within the limitations defined above.

4.2 Target Equipment:

- Sun will utilize a selection of equipment (the "Target Equipment") to illustrate Customer's current energy and cooling usage and practices, and how such usage and practices can be impacted by strategically refreshing computer hardware technology ("Technology Refresh"). This Target Equipment will also be utilized to illustrate space utilization and cooling distribution practices.
- The Target Equipment may be comprised of between 10 and 20 systems within the same Subject Area that have been identified by the Sun team as candidates for Technology Refresh based on both technical criteria and the availability of suitable replacements from the new generation of energy efficient servers currently available. Target Equipment must be located in a maximum of ten (10) cabinets or only a subset of the Target Equipment will be examined.

4.3 General Preferred Practices:

- While this Service focuses on the Target Equipment, it also includes screening of elements related to the Subject Area in general (e.g. general infrastructure) to help identify other issues that could impact operations or areas where energy savings can be made. Recommendations for improvement or additional investigation may be made.

4.4 Reference Standards used in the Service will be as follows:

- The data and observed conditions compiled during the site visit will be evaluated in relation to applicable industry and manufacturer practices, including a variety of compliance and consensus standards.
- Hardware Manufacturer Recommendations: Specifications used will be influenced by the

specific hardware in place at the facility, as well as future planned equipment. Additional manufacturer information from Sun regarding potential energy savings from Technology Refresh will also be included.

- Environmental Support Equipment Manufacturer Recommendations: Specifications used will be influenced by the environmental support equipment in place at the facility (e.g. air conditioners). Additional information available from manufacturers of equipment not in place at the facility will be used as necessary.
- Industry Standards: The following standards are used (ASHRAE, ASTM, BSI, IEC, IEE, IEEE, ISO, NEC, NFPA, Telcordia).
- Government Standards: Relevant government codes and standards will be referenced as appropriate for the location where the Services are being provided.

This Service is subject to your existing services agreement with Sun that governs the delivery of Services. If you do not have a services agreement with Sun that would govern the delivery of Services, then Sun's delivery of Services shall be subject to the terms located at www.sun.com/sales/salesterms. This Service Listing or SOW does not constitute an offer by Sun. The Services described above are subject to availability and unless otherwise stated, are only available within the above-referenced country. Any reference to "Customer" in this Service Listing entitled to receive the Services.

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