NASA Procedural Requirements

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Responsible Office: Environmental Management Division

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CHAPTER 2. Reporting Metrics

2.1 Energy-Consuming Facilities Definitions

2.1.1 The following standard NASA terms apply to energy-consuming facilities for the purpose of reporting and measuring progress toward energy-efficiency goals.

2.1.1.1 Nonmission Variable Buildings/Facilities: Standard buildings or facilities that are subject to the energy-efficiency improvement goals for Federal buildings set forth in EO 13123, Section 202. This category includes office buildings, storage buildings, laboratories, and other research and development buildings that are not energy-intensive. It does not necessarily include industrial and laboratory facilities housing energy-intensive activities, or mission variable facilities for which NASA claims exemption from Federal energy-efficiency improvement goals. However, Centers and Component Facilities may designate energy-intensive facilities as nonmission variable at their discretion.

2.1.1.2 Energy-Intensive Buildings/Facilities: Buildings or facilities that are subject to the energy-efficiency improvement goals for industrial and laboratory facilities set forth in EO 13123, Section 203. This definition includes laboratories, research facilities, electronics-intensive facilities, and facilities housing 24-hour-a-day operations that consume energy far in excess of the normal heating, cooling, lighting, ventilation, and water-heating energy load requirements of a standard building or facility of comparable size. This category includes the following:

a. Industrial Facilities: Any fixed equipment, building, or complex for production, manufacturing, or other processes that uses large amounts of capital equipment in connection with, or as part of, any process or system, and within which the majority of energy use is not devoted to the heating, cooling, lighting, ventilation, or water-heating energy load requirements of the facility. Examples of industrial facilities are as follows:

(1) Manufacturing Facilities: Manufacturing facilities use large amounts of industrial equipment in a well-defined process to produce multiple units of individual finished products from raw materials and prepurchased subassemblies as required to support the missions of the individual NASA Strategic Enterprises.

(2) Refurbishment and Coating Facilities: Refurbishment and coating facilities repair or restore the original condition of multiple units of individual products as required to support the missions of the individual NASA mission. This includes the replacement of worn/damaged components and the preparation required for the application of a coating system such as sandblasting and cleaning.

b. Operational, Test, and Support Facilities: Facilities that provide direct technical support to the design, development, test and evaluation, and regular mission operation activities for one or more of NASA program. These are facilities that may have special temperature, humidity, critical air control, data collection, or power requirements. Such facilities include, but are not limited to the following:

(1) Engine research and test stands.

(2) Space communication buildings and tracking stations.

(3) Data processing and interpretation facilities.

(4) Laboratories.

(5) Centrifuges.

(6) Environmental simulation and test facilities.

(7) Launch preparation, launch, and landing facilities.

(8) Flight/motion and mission simulation facilities.

c. Clean rooms: Facilities utilized in a manner as to provide critical temperature, humidity, and air quality control in a dust-free environment. A clean room facility should, as a minimum, occupy 50 percent or greater of the facility's volume and shall be Class 100,000 or less. The facility provides the environment required for research, testing, integration, or assembly of flight hardware or experimentation in support of NASA mission.

d. Utility Distribution Facilities: Facilities that provide and distribute chilled water, hot water, steam, electricity, or any other form of utility service for the purpose of sustaining the mission activities of multiple facilities.

2.1.1.3 Mission Variable Buildings/Facilities: Energy-intensive buildings or facilities for which NASA claims exemption from the energy-efficiency improvement goals for standard buildings and industrial and laboratory facilities set forth in EO 13123, Sections 202 and 203. Exemptions must be justified on the basis of technical or economic infeasibility of making significant energy efficiency improvements due to the facility's physical nature or where conventional performance measures are rendered meaningless by an overwhelming proportion of process-dedicated energy. This category includes the following:

a. Wind Tunnel/Model Development Facility: Aerodynamic and aero propulsion research and development facilities that provide low and/or high speed conditioned gas flow for performance, controls, and other aerospace testing of components and models.

b. Goldstone Deep Space Communications Complex: One of the three Deep Space Network communication complexes worldwide which support NASA's planetary and interplanetary missions. This category includes all energy-consuming facilities at the Goldstone complex.

c. Operational, Test, and Support Facilities, Cleanrooms, and other energy-intensive facilities that meet the following criteria:

(1) Contain equipment, processes, or systems used in scientific research, development,

test, and evaluation in direct support of one or more of NASA program.

(2) Energy costs are funded by benefiting program(s) (except where all facility energy costs are paid by the institution from a single appropriation).

(3) Annual energy usage equals or exceeds the minimum British Thermal Units (BTU) per gross square foot per year (BTU/GSF/Year) values shown in Table 2-1 for facilities classified as "Buildings"; or 5 billion BTU's for facilities classified as "Other Structures".

Center/Component Facility/Location	Minimum BTU/GSF/Year
Glenn Research Center	375,000
Plum Brook Station	375,000
Goddard Space Flight Center	350,000
Langley Research Center	325,000
Wallops Flight Facility	325,000
Dryden Flight Research Center	300,000
Marshall Space Flight Center	300,000
Tracking Stations	300,000
White Sands Test Facility	300,000
Ames Research Center	275,000
Johnson Space Center	275,000
Michoud Assembly Facility	275,000
Stennis Space Center	275,000
KSC Vandenberg Launch Site	275,000
Jet Propulsion Laboratory	250,000
Kennedy Space Center	250,000
NASA Industrial Plants at Downey & Palmdale	250,000
Santa Susana Field Laboratory	250,000

Note: (1) Minimum BTU/GSF/Year values for mission variable buildings/facilities are based on a minimum energy intensity of 150,000 BTU/SF/Year for process energy and 100,000 BTU/GSF/Year for building energy. Of the building energy portion, 55 percent is considered weather dependent (e.g., energy used for heating, cooling, and ventilating), and 45 percent is considered fixed (e.g., energy used for lighting, hot water heating, and miscellaneous loads). The weather-dependent portion of the minimum energy intensity was adjusted to account for differences in weather conditions (average heating and cooling degree days) at NASA Centers and Component Facilities.

Table 2-1. Minimum BTU/GSF/Year for Mission Variable Buildings/Facilities

2.2 Reporting Requirements

2.2.1 Each Center and Component Facility is required to submit the following energy-efficiency and conservation management information to Headquarters for production of Energy Management budget exhibits for DOE and the Office of Management and Budget (OMB), the annual Agency energy report to the President and Congress, and to evaluate progress toward the Agency energy-efficiency goals:

a. Annual budget projections for energy, purchased utilities, and energy efficiency and water conservation activities.

b. Quarterly energy consumption data within 60 days of the close of the fiscal quarter.

c. Annual updates to energy-consuming facility classifications, exempt facility justifications, metrics data, water usage, and related information on energy efficiency and water conservation accomplishments.

2.2.2 Center and Component Facility energy managers will report this information through the Agencywide automated NASA Environmental Tracking System (NETS).

2.3 Metrics

2.3.1 An energy metric is a mathematical equation used to track energy use against productive output, facility utilization, or physical characteristics to measure progress toward the Agency energy-efficiency goals. The following metrics shall be used to evaluate progress for each facility energy goal category and for individual facility types.

2.3.1.1 Nonmission Variable Buildings/Facilities: Agencywide, Center, and Component facility progress toward the energy-efficiency goal for nonmission variable buildings/facilities will be calculated using BTU's per Gross Square Foot per Year (BTU/GSF/Year) as the metric.

2.3.1.2 Energy-Intensive Buildings/Facilities: Agencywide progress toward the energy-efficiency goal for energy-intensive buildings/facilities will be calculated using BTU/GSF/Year as the metric. Center and Component Facility progress will be calculated using the following metrics for specific facility types:

a. Industrial Facilities (includes Manufacturing and Refurbishment and Coating Facilities): BTU Input/Number of Units Produced or Processed/Degree Day measures the amount of energy used per product/goods produced or processed. The number of degree days compensates for extreme hot/cold weather operation and may be assumed as "1" if not desired to be utilized.

b. Operational, Test, and Support Facilities: BTU/GSF/Year including all significant energy sources.

c. Clean room Facilities: BTU/Gross Cubic Feet/Year. The metric should include all significant energy sources. Research-specific loads are not considered significant compared to support loads (building, heating, ventilating, air-conditioning, and personnel).

d. Utility Distribution Facilities: BTU Output/BTU Input measures the efficiency of energy conversion for the production of hot/chilled water, steam, electricity, and high pressure air. BTU input will be for natural gas, kilowatts, and fuel oil. BTU output will be in chilled/hot water, steam, and kilowatts. The metric should use source data from utility system O&M logs.

2.3.1.3 Mission Variable Buildings/Facilities: Agencywide, Center and Component Facility progress toward the energy-efficiency goal for mission variable buildings/facilities will be calculated using the following metrics for specific facility types:

a. Goldstone Deep Space Communications Complex: Million of BTU's (MBTU) per Tracking Hour measures the amount of energy consumed by space communication systems and support equipment per mission tracking hour. The metric should include all significant energy sources and use source data from facility operations logs.

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