

**Mike Monroney Aeronautical Center
(MMAC)**

**Modified Preliminary
Energy and Water Conservation
Implementation Plan**

for

FY-2002

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Preliminary FY-2002 MMAC Energy and Water Conservation Implementation Plan

I. Management and Administration

The MMAC, a large campus-like setting on Oklahoma City Airport Trust property, is made up of over 100 facilities comprising approximately 3 million square feet, and whose annual energy costs were \$3.8 million in FY-95, and \$4.2 million in FY-2001. The MMAC employees approximately 4,250 people, and hosts an average of 850 students per year. The facilities are a complex mix of office spaces, laboratories, classrooms, equipment repair and distribution centers, energy-intensive radar equipment centers, recently renovated buildings and old, inefficient facilities.

A comprehensive network of Organizational Energy Coordinators is in place, along with a strong program for promoting energy awareness in all quarters. These, along with similar measures, have been vital to changing a deeply ingrained culture so the *direct users* of energy are more responsible for and conscious of energy conservation as a corporate and an individual issue of urgent priority.

A. Energy Management Infrastructure

1. MMAC Senior Agency Official

The senior officials of The Mike Monroney Aeronautical Center are: Ms. Lindy Ritz, AMC-1, Director, and Mr. Richard Rodine, AMC-2, Deputy Director

2. Agency Energy Team

Ms. Ritz and Mr. Rodine appointed Mr. Richard Hanks, PE, as MMAC Energy Manager in 1996 to develop the new MMAC Energy and Water Management and Conservation Program. They have established a network of 38 Energy Coordinators and Points of Contact headed up by the MMAC Energy Manager.

The Energy Program will expand into three major areas center wide for increased functionality.

- I. Design – Energy Audits will become a primary design tool. Energy performance tools have been requested by AMP-1 to demonstrate AMP's expertise in facility conservation.

II. Operation & Maintenance – METASYS Energy Management System will be more fully utilized. Lighting Optimum Run Time (ORT) Scheduling has started and needs to increase in order to support the continued savings as previous years.

III. End-User – Increase training on the efficient use and coordination of energy consuming activities associated with lighting, HVAC, and user equipment such as Radar, Paint Booths, Computers, Solder Guns, Drills, Wood Working, Metal Working, Crash testing, Laboratory, Photography, Instrument Landing Systems, etc.

B. Management Tools

The METASYS automatic energy management and control system, a Johnson Controls, Inc., product, automatically regulates HVAC equipment operations and schedules, and continually gathers usage data from the energy meters. The MMAC-wide energy awareness program encourages the Energy Coordinators and Points of Contact to manage their organizations' ORT programs with AMP providing the Operations and Maintenance services. The Energy Manger uses METASYS to monitor all requests for actions that may effect energy efficiency, thereby observing energy considerations in mission accomplishment, peoples' health, safety, comfort and work efficiency.

An ACCESS database was designed and installed for capturing and managing hot/cold complaints and trouble calls. This has been very effective for getting complaints managed by organizational energy coordinators, resulting in a 90 percent reduction in complaint calls to the AMP organization.

A Zero Gas Day program was initiated and managed by AMP-300 with regular feedback from the Energy Manger. The "Zero Gas Day" program has been instrumental in maintaining a high percentage of HVAC zones on Optimum Run Time schedules. It has also been vital to shutting down the large HVAC boilers in the summer and the chillers in winter (as permissible without adversely effecting acceptable comfort and health conditions).

A new lighting database was initiated in FY-2001 and placed on hold until FY-2002 and beyond. The database would provide progress and performance on lighting efficiency by monitoring new, replacements, change outs, and lighting control.

The new security system is a JCI system and will benefit from the existing JCI energy management system.

1. Awards (Employee Incentive Awards)

Awards are anticipated for AMP-400 A/E design accomplishments, and AMP-300 Zero Gas Day accomplishments.

2. Performance Evaluations

The PE's of approximately 40 Managers and Supervisors now include specific responsibilities for energy and water conservation. Continued verification will require management support.

3. Training and Education

Pending availability of funds, training is planned for appropriate people O&M, and for continuing center-wide training & awareness.

4. Showcase Facilities

The support to construct or renovate an exceptional "Showcase " facility is not unusual and has become routine for the MMAC Facility Support Division, AMP. A Showcase Facility could easily be accomplished through the A/E Services contract. The benefit resulting from Showcase Facility endeavors may be limited in a closed environment such as the MMAC. Should AMP choose to pursue a Showcase Facility project Energy Management would support the effort.

II. Energy Efficiency Performance

A. Energy Reduction Performance

The FY-2002 goal is a total overall energy reduction (since the FY-1995 inception of the MMAC energy conservation program) of 35 percent. It should be noted that increased security requirements and security training might have an impact on energy consumption in the future.

1. Standard Buildings

The FY-2002 goal is to achieve a 40 percent energy consumption reduction in standard facilities relative to FY-1995.

2. Industrial and Laboratory Facilities

N/A

3. Exempt Facilities

The FY-2002 goal is to reach a 25 percent reduction in energy consumption in exempt facilities relative to FY-1995.

4. Tactical Vehicle and Equipment Fuel

N/A

B. Renewable Energy

1. Self-generated Renewable Energy

Work with AMA and AMP to identify and develop potentials from an FAA mission/ training standpoint and a facility life-cycle cost investment. Utility cost may be prohibitive for FY-2002 and future years, nevertheless the calculations need to become standard for construction.

2. Purchased Renewable Energy

N/A

3. Million Solar Roofs (MSR)

Work with AMP to identify and develop potentials.

C. Petroleum

N/A

D. Water Conservation (Data is not available at this time.)

Water conservation is a major concern and effort for FY-2002. The water usage baseline was established, and this will underpin a concerted center-wide conservation effort. Water Conservation Measures (WCM) will be identified in FY-2002 and beyond.

III. Implementation Strategies

A. Life-Cycle Cost Analysis

Life-cycle cost analyses are performed in the normal course of major project evaluation, selection, and development. Renewable energy sources will be included in FY-2002.

B. Facility Energy Audits

It is now standard procedure to perform energy audits as an integral part of all applicable major facilities projects.

C. Financing Mechanisms

Look for opportunities and be prepared to utilize an area-wide utility contract, lease agreement modifications, or other funding resources.

D. Energy Star and Other Energy-Efficient Products

Work with AMP and AMQ to identify and develop potential applications.

E. Energy Star Buildings

Work with AMP to identify and develop potentials.

F. Sustainable Building Design

Establish Sustainable Design Principles and Goals within AMP.

HVAC/ORT

Lighting/Lighting Control/ORT

Electrical Motors

G. Energy Efficiency in Lease Provisions

The Energy Manager reviews all AMQ lease provisions to verify inclusion of appropriate clauses for energy compliance.

H. Industrial Facility Efficiency Improvements

N/A

I. Highly Efficient Systems

Continue installing plate and frame heat exchangers where appropriate, and report the feedback on the chilled water piping loop system that interconnects the HVAC systems of five buildings.

J. Off-Grid Generation

Research the applicability and availability of off-grid utilities, include meeting with and collaborating with utility companies. While off-grid generation per se is not a currently available resource, demand and load profile management is a conservation area into which we are moving aggressively.

One of MMAC Energy Management's most important and promising goals for FY-2002 is to identify and institute strategies to optimize energy efficiency while minimizing costs. We are evaluating electrical consumption demand to develop energy profiles by day, week, month and year. The goal is the ability to manage loads for reducing or eliminating load profile excursions and perturbations, and to get the load factor as high as possible and as flat as possible. With better-engineered and managed load profiles, the utilities can offer incentives and lower rates. As the Center achieves consistently higher load factors and more predictable power load requirements, we are more attractive to the utility companies, and are in a stronger position in rate negotiations.

K. Electrical Load Reduction Measures

The MMAC has a relatively flat load factor of approximately 0.7 and a high demand charge. Electrical Load Reduction Measures (ELRM) were not needed in FY-2001, however the METASYS Energy

Management Control System was tested for a short period. The impact on MMAC employees was not considered routine and the ELRM was moved to the Energy Emergency actions if needed in an emergency.

Training was placed on hold until FY-2002 and beyond for ELRM in the areas of Lighting, HVAC, and user Equipment.

L. Water Conservation

New water and sewage metering and the center-wide survey completed in FY-2001 provide the usage baseline. Specific conservation measures implemented based on this baseline will be provided in future reports.