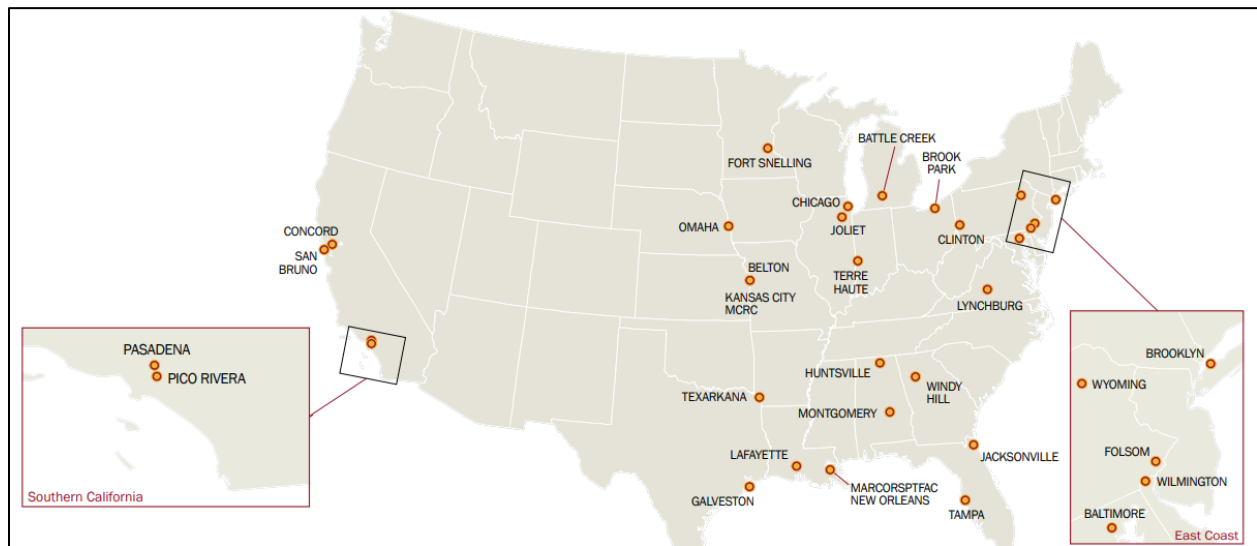


Introduction

Commander, Marine Forces Reserve (COMMARFORRES) commands and controls assigned forces for the purpose of augmenting and reinforcing the Active Component with trained units and individual Marines as a sustainable and ready operational reserve in order to augment and reinforce active forces for employment across the full spectrum of crisis and global engagement. COMMARFORRES is the principal advisor to the Commandant of the Marine Corps on matters pertaining to Marine Forces Reserve.

Marine Forces Reserve is the headquarters command for approximately 100,000 Reserve Marines and 159 Reserve Training Centers located throughout the United States, Washington D.C., and Puerto Rico.

28 of these facilities are owned by Marine Forces Reserve.



U.S. Marine Corps Forces Reserve (MARFORRES) G-F Facilities are tasked to maintain and modernize the Reserve installation's infrastructure to meet the evolving operational and base support requirements of the Force.

Background

The U.S. Marine Corps Forces Reserve sustainability program has developed this strategy to position MARFORRES to be ready, relevant, and capable to execute current and future mission requirements while effectively employing our energy, land, and water resources.

The MARFORRES Sustainability Strategy presents sustainable action plans (SAPs) focused on prioritizing readiness by capturing the Marine Force Reserve's current position and establishing future organizational approaches in compliance with high-priority federal mandates. The primary goal is to highlight opportunities to measure progress in achieving and exceeding compliance with federal public acts, the Energy Independence and Security Act of 2007 and Energy Policy Act of 2005, Executive Orders, the Unified Facilities Criteria, and other policies and mandates.

From a facilities management standpoint, given the scope and spectrum of facilities across the country, the administration of the sustainability program requires a flexible and highly adaptable strategy to ensure success. Through the application of this Sustainability Strategy, the MARFORRES sustainability program continues to take significant leaps in several critical program areas. These advances are due to the integration of sustainability through these established action plans.

Summary of Accomplishments

The MARFORRES sustainability program management has developed into an integral part of the underlying support mechanisms which ensure the effectiveness and efficiency of the MARFORRES mission. Published in 2022, the MARFORRES Sustainability Strategy has identified capabilities, coordinated efforts, and driven innovation. The measure of the strategy's impact is best served through the analysis of the underlying elements of the sustainability program. During this achievement period, MARFORRES has seen significant improvement in several critical areas of the sustainability program:

- Audits/Inspections
- Information Management
- Program Investment/Implementation

Audits/Inspections

Information collection is the critical recurring process that powers the innovation of the sustainability program. From validating baselines to supporting the essential analysis of performance, to guiding the team's innovation, MARFORRES has placed a significant focus on an effective and sustainable approach to information gathering. The deployment of advanced metering infrastructure (AMI) and the application of programmatic audits serve as essential components of the MARFORRES Sustainability Strategy.

MARFORRES has installed AMI, Direct Digital Controls (DDC), and occupancy sensors to monitor consumption associated with Heating, Ventilation, and Air Conditioning (HVAC) and lighting. Approximately 22 of 28 sites have DDC systems (78%). Under this strategy, AMI systems at 20 sites received necessary security upgrades to ensure continuity of operations and compliance.

MARFORRES performed a baseline analysis of Greenhouse Gas (GHG) emissions in June 2021 that assessed best available data for compliance with mandated requirements. Average annual emissions from natural gas combustion and electricity purchased were assessed for compliance with a 52% reduction (the higher figure was chosen to ensure compliance) from a baseline of 2005 to 2030. Electricity and natural gas utility data from FY19 indicates 17 of the MARFORRES-owned sites are on pace to achieve the goal of 52% GHG emissions reduction (Biden 2021 policy goal, FY05 baseline) by FY30, assuming further reductions continue to be permanently achieved.

Data consistency and collection methodology have driven the MARFORRES sustainability program to place significant emphasis on the data collection efforts through their audit program.

Normalization has progressed significantly through this performance period. Data analytics were a critical component to the strategy development and serve to guide the implementation of a systematic process for conducting site evaluations and energy audits to support the MARFORRES sustainability program. Through these efforts, MARFORRES leadership will have the necessary relevant information to guide the ongoing deployment and refinement of the sustainability program strategy and action plan development.

Information Management

The successes of information collection through applied technologies in the field coupled with robust site evaluations and audits identified a second vulnerability to the MARFORRES sustainability program: information management.

The MARFORRES strategy identified currently deployed information management tools and has expertly conducted gap analysis to identify room for integration, automation, and programmatic growth, which will ultimately serve to carry MARFORRES well into the future. While information management is a focal point subject to continual growth and improvement, MARFORRES has initiated critical design and development concepts to enhance data stewardship and provide a sustainable process for data accretion and disposition. The systems included in this portfolio are as follows:

- The Defense Utility Energy Reporting System (DUERS) program collects data on electrical, natural gas, steam, and water usage across sites. Data pulled from several online sources provide energy data collection, management, and dispersal services for MARFORRES.
- The Enterprise Geographic Information System (eGIS) portal centralizes sustainability data and management tools.
- The Environmental Management portal (EM Portal) provides tools and reporting measures in addition to sustainability data and progress. It empowers MARFORRES to transition from a system of record to a system of engagement. Implementation of SAPs focused on energy personnel, development of energy plans, and the integration of centralizing tools and reporting measures will increase data fidelity and improve MARFORRES engagement in sustainability at Headquarters (HQ) and Marine Corps Reserve Centers (MCRC).

During this reporting period, MARFORRES has completed an assessment of the existing EM Portal and Environmental Compliance tracker for integration of the energy requirements developed under the MARFORRES sustainability program. While the functional needs may be different, the system architecture and a variety of the established business processes are well suited for integration. This approach uses readily available applications as subscribed by U.S. Marine Corps and/or MARFORRES. Applications include, but are not limited to, Microsoft SharePoint Online (SPO), Power Applications (PowerApps), Power Business Intelligence (PowerBI), and Power Automate to enhance user interface / user experience (UI/UX). PowerApps provides customized views and forms that may have less detail than

SharePoint List view. PowerBI is used for reporting features. A less-visible feature is Microsoft Power Automate for notifications and reminders.

Program Investment/Implementation

MARFORRES Sustainability Strategy

Published in 2022, the MARFORRES Sustainability Strategy is the keystone of the sustainability program. Serving as a framework and guide, this strategy incorporates the lessons of the past with the vision towards the future. The strategy has established seven Lines of Operation that are vital to the holistic achievement of energy and sustainability mission requirements. In each of the seven Lines of Operation, the strategy describes the baseline conditions, regulatory drivers influencing the desired end state, and current and future actionable measures through the identification and implementation of SAPs.

The MARFORRES Sustainability Strategy Lines of Operations are:

1. Energy Consumption
2. Water Consumption
3. Greenhouse Gas and Petroleum Consumption
4. Energy Security
5. Solid Waste
6. Sustainable Design and Construction
7. Culture of Sustainability

This has culminated with the establishment of several SAPs. These plans expertly implement the sustainability programs initiatives and drive focus through the application of process management fundamentals. This common approach allows the sustainability program to resonate and integrate well with other established management strategies.

Outreach and Training

Outreach initiatives across MARFORRES sites are key to implementing the MARFORRES Sustainability Strategy. Marine Corps Installation Command (MCICOM) and the U.S. Marine Corps Expeditionary Energy Office have developed materials to increase organizational awareness of sustainability initiatives:

- Training and awareness materials produced and distributed by MCICOM, with slogans such as “Marine Energy” and “You Have the Power,” promote energy conservation goals.
- Tip sheets provide information about increasing operational energy efficiency through fuel conservation.
- October is Energy Awareness Month, with a focus on celebrating how federal government is "Leading by Example" by providing leadership in energy management and building optimization.

- Expeditionary energy, water, and waste initiatives are socialized throughout the active-duty and MARFORRES community.

In addition to the established outreach functions, the 2022 Strategy, under the Culture of Sustainability Line of Operation, has resulted in the development of a training syllabus to support the education and continuity of operations for energy managers and site energy non-commissioned officers.

High-Performance and Sustainable Buildings Checklist for Construction Projects

The six Guiding Principles for sustainable federal buildings are based on fundamental sustainable design practices and reflect progress in building design, construction, and operation best practices, as well as ensuring efficient operations; protecting occupant health, wellness and productivity; and promoting resilient buildings. The Guiding Principles ensure that federal buildings:

- Employ Integrated Design Principles
- Optimize Energy Performance
- Protect and Conserve Water
- Enhance the Indoor Environment
- Reduce the Environmental Impact of Materials
- Assess and Consider Building Resilience Integrated Design Principles

MARFORRES has developed a High-Performance and Sustainable Building Checklist to ensure these principles are integrated into the operation of both new and existing buildings. Sustainable siting is ensured through site assessments that consider environmental, economic, and mission impacts, as well as potential significant impacts to historic properties and other cultural resources. Where feasible, stormwater management considerations for new construction and modernization projects employ strategies that include low-impact development (LID) strategies and reduce stormwater runoff and discharges of polluted water off-site to protect the natural water flow and watershed health.

Project Development

Through the implementation of this strategy, MARFORRES continues to refine their sustainability portfolio by driving the focus of several key initiatives.

Significant investments in solar power generation with 24 of the 28 MARFORRES sites incorporating operational photovoltaic arrays with a total system size of more than 2,250 kW. An additional two planned projects adding more than 200 kW in capacity will ultimately assist MARFORRES in achieving the 25% renewable-energy target established in Energy Independence and Security Act (EISA) of 2007.

Conservation and efficiency are key elements of a successful sustainability program. In this frame, MARFORRES continues to lead innovation. MARFORRES exceeds the requirements of Executive Orders (EO) 13834, 13514, and 13693 by effective implementation of several water conservation projects outlined in the Guiding Principles of Sustainable Federal Buildings,

December 2020, to support the military mission. These water efficiency improvement projects include maximizing the use of alternative water systems, installing high-efficiency water fixtures, and improving leak detection at MCRCs. Maximizing the use of alternative water systems through the use of recycled water systems (closed-loop wash racks) have the greatest impact on reducing



Closed-Looped, recycled water systems

MARFORRES' total water consumption. Closed-looped, recycled water systems were installed at vehicle wash racks at 49 MARFORRES-owned reserve center and tenant sites and resulted in a significant reduction in water consumption. The installation of the wash racks has saved MARFORRES an estimated 34 million gallons of water to date, positioning MARFORRES to surpass the EO 13834 goal to reduce potable and non-potable water consumption by 20% relative to the FY07 baseline.

Advancements in energy security flourish under this strategy. With a strong focus on mission, and the application of the identified Lines of Operations, MARFORRES HQ highlights the monumental success that can be achieved through the integration of sustainability concepts into facility management. Analysis of the existing MARFORRES energy security posture for the MARFORRES-owned sites involved assessment of various factors impacting one or more of the following three well-established “pillars of energy security” articulated in the Headquarters Marine Corps (HQMC) and Department of the Navy (DoN) Installation Energy Resilience Strategy, issued in February 2020:

1. Reliability – The capability to prevent and resist utility disruptions.
2. Resiliency – The capability to adapt and recover from utility disruptions.
3. Efficiency – The capability to reduce demand and cost of utilities.

The analysis examined the capacity of command to maintain power to mission-critical facilities during a utilities outage, the availability of diverse power (to include renewables), and a preliminary review of the current MARFORRES cybersecurity infrastructure.

MARFORRES HQ (Building 1), located in New Orleans, is the primary site with energy security vulnerabilities due to its robust energy demands. Infrastructure enhancements have been implemented to ensure the Facility Related Control Systems (FRCS)



Marine Forces Reserve Headquarters

remain reliable, resilient, and efficient. This facility houses a data center with five dedicated computer room air-conditioning units, and all critical servers are equipped with uninterruptible power supplies. Two backup diesel generators are configured to support critical loads. If necessary, the existing Building Control System (BCS) can be used to further reduce electrical loads in selected non-essential areas (e.g., demand response) to extend the duration of this period to 21 days. The two solar arrays installed on the facility and the nearby warehouse supply a total of 88 kilowatts (kW) to these two facilities, and each supports its respective building load.

Currently, a project is underway to redesign the existing HVAC system with a built-up chilled water system. This design should further increase the sites energy resilience through the reduction in energy demand, thereby extending the functionality and effectiveness possible through the BCS.



Building 1 and Supporting Solar Array 1

Sustainable Results

- MARFORRES achieved a 30% energy consumption reduction at owned sites in FY20.
- Closed loop recycled water industrial wash systems, resulting in a more than 20% reduction in potable and non-potable water consumption.
- 17 sites have achieved at least a 30% reduction in GHG emissions related to energy and natural gas usage.
- 4 Facilities, representing 39% of the eligible square footage, qualify as Sustainable Facilities.

MARFORRES A Sustainable Way Forward

The MARFORRES sustainability program serves the United States Marine Corps as a scalable and universal solution to driving facility management and sustainment into the future. The strategy employed by MARFORRES can readily be adapted to any organizational level and the framework it establishes readily addresses the fluidity of the military mission(s) it supports.