

*“Leading the Way in Delivering Air Force Installation Energy Assurance”*

# ENERGY | express

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Fall 2022

## AFCEC bolsters DAF energy assurance with merger

By Courtney Combs

AFIMSC Public Affairs

**JOINT BASE SAN ANTONIO-LACKLAND, Texas** — The Air Force Civil Engineer Center recently merged two energy organizations under one directorate, forming a single, cohesive team focused on achieving Department of the Air Force energy objectives.

AFCEC, a primary subordinate unit of the Air Force Installation and Mission Support Center, recently combined the Air Force Office of Energy Assurance and the organization’s energy directorate in to one, retaining the AF OEA name. Kirk Phillips directs the combined organization, which will remain based at two locations -- Tyndall Air Force Base, Florida, and Arlington, Virginia.

“We’ve combined the strengths of both organizations, creating a unified team with the people and skills needed to achieve the Department of the Air Force’s goal of mission assurance through energy assurance,” said Maj. Gen. John Allen, AFIMSC commander.

AFCEC’s energy directorate stood up in 2012 to provide energy and utilities expertise and solutions to Air Force installations. The DAF established the flagship AF OEA, administratively under AFCEC, four years later to take an enterprise-wide approach to identifying and facilitating energy projects that provide resilient, cost-effective, cleaner power to installations.

Today, the new AF OEA is comprised of

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*Maj. Gen. John Allen, AFIMSC commander*




eight divisions: business operations, measurements and analysis, program development, program execution, advanced meter reading system, advanced technologies, rates and resilience, and special programs.

“As individual directorates, we’ve implemented many successful technologies to enhance resilience in energy and water utilities and meet federal energy goals,” Phillips said. “I’m looking forward to seeing how much more we achieve as an integrated team.”

The merger is another step forward in AFIMSC’s long-standing priority to enhance installation and mission support capabilities, and increase lethality and readiness, Allen said.

“We validated the decision to merge through our energy assurance unity of effort process mapping effort,” Allen said. “Organizational maturity delivers better service and support to our customers across the Air and Space Forces.”

For more information on the Air Force Office of Energy Assurance visit: <https://www.afcec.af.mil/Home/Energy/>. 

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  - Meet Robbie Marcucci
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# Dissecting the 5R's of robustness

## AFCEC Energy Resilience Team

Energy availability and resiliency are vital for all Air Force missions, from installation infrastructure to aviation operations and everything in between. In order to maintain the critical airpower contributions to national security, significant amounts of energy are required. The Air Force's comprehensive energy management approach enhances mission capability and readiness by improving the ability to manage supply and demand. Three main goals have been established to guide this effort and achieve mission assurance through energy assurance: Identify Enabling System Vulnerabilities, Improve Resilience Planning and Ensure Resilience Results.

**Energy resilience** is the ability to prepare for and recover from energy disruptions that impact mission assurance on military installations. The National Defense Authorization Act of 2019 further expanded the definition to include "...anticipation, preparation for, and adaptation to utility disruptions and changing environmental conditions and the ability to withstand, respond to, and recover rapidly from utility disruptions while ensuring the sustainment of mission-critical operations."

To break down the attributes of energy resilience, "5Rs" are used to describe infrastructure needs to ensure the mission continues: robustness, redundancy, resourcefulness, response and recovery.

## Resilience in Terms of Robustness

Robustness is the ability of a system, infrastructure or mission to actively adapt and maintain essential power requirements for mission-critical functions across multiple potential energy disruption scenarios.

Attempting to make a system robust across all imaginable failure scenarios would involve exorbitant costs. However, the more robust a base is the greater its resilience. An energy system's



### Attributes

What does the infrastructure need to achieve?

### Qualities

How does infrastructure make critical mission more resilient?

### Elements

How does the infrastructure deliver resilient qualities?

robustness is determined through performance evaluation metrics across multiple disruption scenarios. Systems that are not robust will be evaluated to determine whether to mitigate the associated risk through investment, changes in operations or to accept the risk. Necessary improvement capabilities can be implemented that are not

vulnerable to the same failure modes or conditions (e.g., two types of backup power).

### Qualities and Examples of Robustness

Security measures designed to deny unauthorized access to facilities,

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## Meet Robbie Marcucci, Dept. of the Air Force Energy Resilience and Conservation Investment program manager

### Please tell us about your experience/background.

I received my bachelor's degree in electrical engineering from Embry-Riddle Aeronautical University and a Master of Military Operational Art and Science from Air University. I served active duty for 10 years in locations around the world including Thule Air Base, Greenland, where I was base civil engineer; Taji Military Training Base, Iraq, as the senior base engineer advisor; and to Barksdale Air Force Base, Louisiana, where I spent time in several roles with Air Force Global Strike Command. For the past four-and-a-half years, I've been with the Air Force Civil Engineer Center serving as the DAF ERCIP program manager at Tyndall Air Force Base, Florida.

### Describe your role at AFCEC.

As the DAF ERCIP manager, I manage Air Force-sponsored projects in a subset of the Defense-Wide Military Construction program with an annual budget over \$500 million to improve energy resilience, energy security and energy conservation of fixed installations.

I support the air staff in development of strategy, doctrine, policy and directive guidance for the Air and Space Forces' Facility Energy Program, as it pertains to the ERCIP program, and also responsible for providing non-directive guidance, oversight, execution and engagement for the program across the enterprise.

### What is the best thing about your job?

The best part about my job is having the opportunity to train younger engineers and programmers. Teaching them all the 'whys' of our career field including all the third, fourth and fifth order effects that their daily efforts have on the Air Force as a whole. These are things they wouldn't ever think are impacted by the little details of what they do every day, making everything they do in their roles that much more significant.

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# Air Force demonstrates defense-wide leadership through Energy Resilience Readiness Exercises

**By Secretary of the Air Force**  
Public Affairs

This month, the Department of the Air Force conducted its first regional energy resilience readiness exercise across three geographically proximate installations - Schriever, Buckley and Peterson Space Force Bases in Colorado - to simulate the potential complexities of a widespread electricity outage. Thanks to this accomplishment, the Department of Defense has now conducted 10 ERREs since fiscal year 2020.

ERREs are helping the DAF address challenges brought about by asymmetric threats to enabling systems like energy and water, changes to the global climate, and increasing complexity and interdependency of missions and infrastructure. The exercises help installations ensure mission continuity by testing the impacts of a disruption in commercial electricity to the installation, such as would occur in a natural disaster. Under this controlled environment, complications can be more easily mitigated before an actual

unplanned disruption occurs.

"ERREs simulate the impact of an event that cuts electrical power to an installation so that we can better prepare for, fight through and recover from an energy disruption," explained Nancy Balkus, Deputy Assistant Secretary of the Air Force for Environment, Safety and Infrastructure. "These exercises not only uncover resilience gaps and hidden infrastructure interdependencies, but also help us prioritize future investment decisions to be

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## MARCUCCI

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**Tell us about the hobbies you enjoy in your down time.**

I enjoy woodworking, creating artistic and unique craft projects with my kids and volunteering my time at my Veterans of Foreign Wars post.

**What do you see as the biggest energy challenge?**

I think the biggest energy challenge is career field expertise in regards to the

shift towards resilience and away from conservation, especially with so many new and emerging technologies.

**What motivates you about working with Air Force Energy?**

Being able to provide others with an increased understanding and meaning to their jobs to improve work satisfaction makes the work incredibly meaningful to me.

**What is your favorite energy-saving tip for Airmen?**

Effectiveness first, efficiency always.

# Water resiliency and best practices

By Ken Gray and Steve Lange

AFCEC/CNR

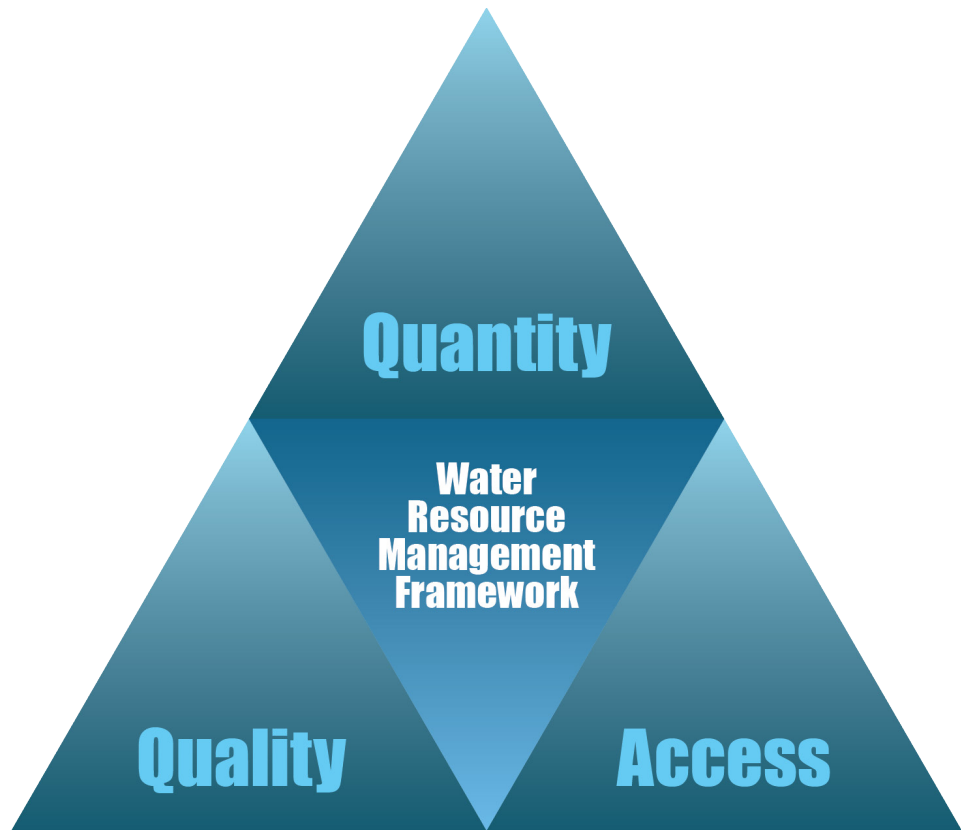
Water resilience is the reliable ability to access an adequate quantity and quality of water to meet mission requirements while also mitigating water-related risks to mission success. The Air Force water resource management framework fully incorporates water into energy resilience efforts.

“Natural hazards, water scarcity and adversarial threats pose growing risks to water availability and prolonged power outages for installations and their surrounding communities,” said Ed Oshiba, Assistant Secretary of the Air Force for Energy, Installations, and the Environment.

Reducing vulnerability and risk increases resilience and resilient water systems are prepared to manage hazards with minimal loss of functionality with the ability to rapidly deploy an effective response. However, many installations already have resilience measures in place, such as emergency response plans and other mitigation strategies, yet don’t have adequate resilience during a disruptive event. While resilience focuses heavily on preparedness, it also requires effective implementation of response and recovery actions with flexibility, agility and rapidity.

Water vulnerability assessment is a process to identify, mitigate and minimize vulnerabilities that can lead to water degradation and/or supply disruptions. Risk assessments detect hazards and their causes and systematically assess the probability and severity of loss or adverse impact. Resilience assessments are conducted using Installation Energy Plans, a decision-making framework to assist installations in achieving energy goals and ensures energy and water resilience meet critical mission requirements. In addition to IEPs, the Installation Water Dashboard, located on CE-DASH, contains a wealth of information about Air Force water systems.

Knowing an installation’s water usage is the first step to understanding water resilience. This is best determined by using water meter readings to gather accurate readings. Although meters do



## Did You Know

Installation bioenvironmental engineers have been leading cross-functional teams performing Water Vulnerability Assessments.

In 2021, the Air Force implemented Risk and Resilience Assessments to meet requirements in the American Water Infrastructure Act.

Energy managers should review these documents for critical system information.

not save water directly, they provide data to help determine infrastructure performance improvements including storage requirements and cost reductions, water leaks in distribution system

or equipment, operational issues (open valves or malfunctioning equipment) and identify water-intensive buildings in need of water efficiency upgrades. Using advanced metering devices that provide daily updates and measure hourly water consumption allows for rapid identification of anomalies.

Once an installation knows its water use, it can transition to preparing for disaster mitigation and recovery. Knowing mission-critical facilities is vital for mission owners and installation leadership to develop a restoration priority list if water loss occurs. Once established, water system maintenance personnel can identify and isolate critical facilities by shutting off water to non-critical facilities. A best practice is to exercise valves to make sure they operate properly and to ensure water only flows to prioritized facilities so there are no unexpected water distribution pathways.

It’s essential for energy and water system maintenance personnel to understand the requirements for critical water and wastewater distribution

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# ROBUSTNESS

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equipment and resources to protect personnel and property from damage or harm. Physical security is crucial as the mission cannot afford down time for preventable reasons. Examples include underground powerlines to protect power supply, natural terrain barriers and secure gate facility checkpoints.

## Cybersecurity

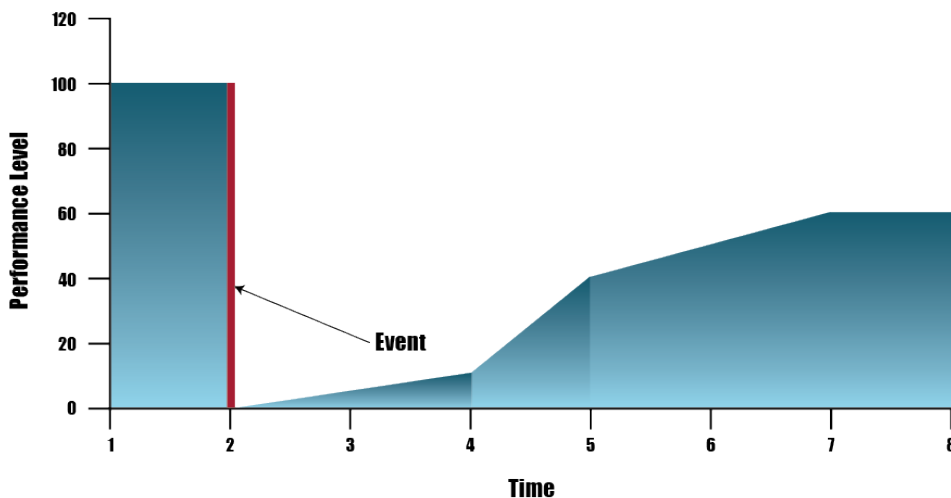
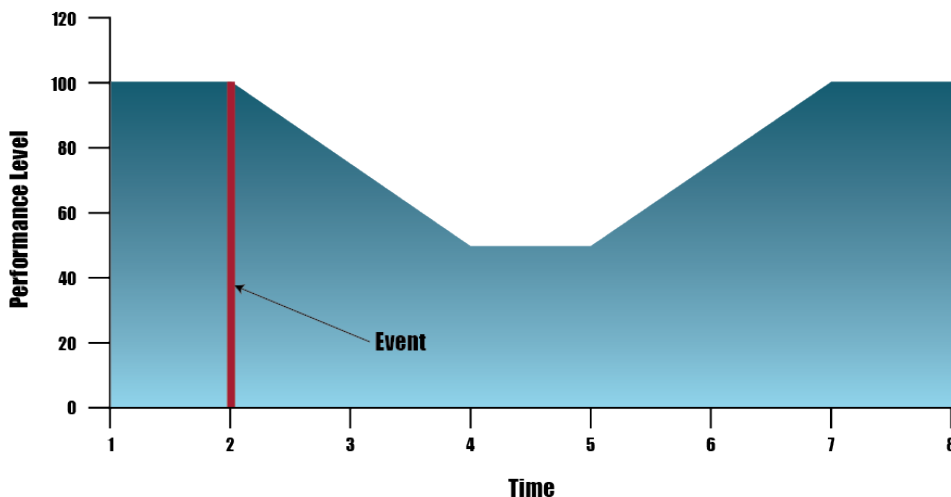
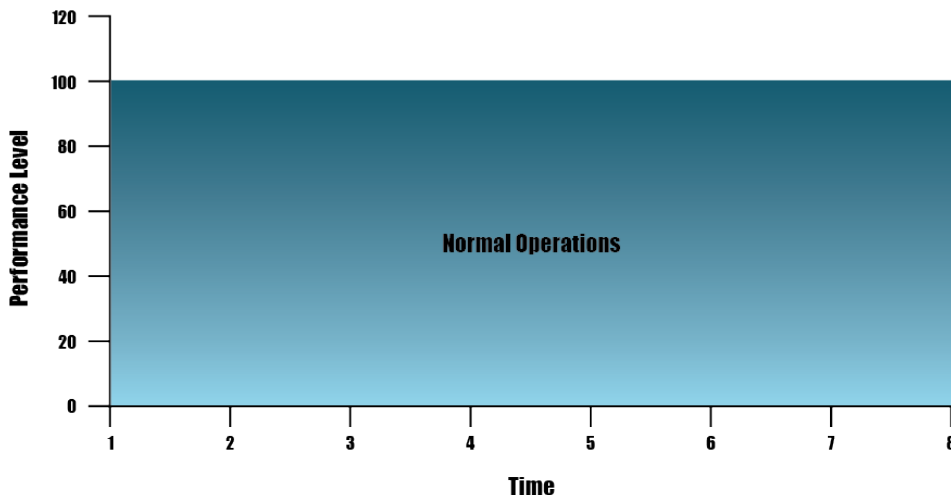
Cybersecurity refers to technologies, processes and practices to protect networks, devices, programs and data from cyberattacks. It's critical for mission owners to be involved in protecting facilities and assets given the vulnerabilities of computer based systems and controls. Most utility resources are embedded with controls, sensors, alarms and alerts to assist with resource management, but these technologies open doors for hackers to access, plant viruses, malware and malicious software which could potentially bring down a system or steal sensitive information. Managers must stay vigilant and continually monitor networks to proactively mitigate potential threats.

For more details on cybersecurity and the status of COINE v2.0 implementation, refer to UFC 4-010-06, Cybersecurity of Facility-Related Control Systems.

## Performance monitoring

A good foundation of system performance and robustness is ensuring installation utilities are in good operating condition. One method of monitoring and assessing system quality is to ensure its reliability. Many utilities are equipped with smart meters and sensors to collect data through a centralized location and command center to manage resources effectively to warn about potential problems (electrical, gas, water, wastewater, etc.).


The Installation Resilience Operations Center, or IROC, a pilot project at Tyndall Air Force Base, Florida, as part of the "Installation of the Future" rebuild, will serve as a centralized location to monitor system performance, cybersecurity status, utility line breaks and conditions



and connect to the Wing Command Post. The Utility System Operation Reporting Tool examines system performance, the occurrence of outages and the rating of the Utility Condition Index, or UCI. USORT is located on CE DASH.

Other examples of robustness include standardized designs for installation facilities and utilities, keeping O&M schedules, completing routine inspections

and following operating practices for critical utility elements and equipment.

In conclusion, maintaining the Air Force's critical airpower contributions to national security requires significant amounts of energy. To account for potential energy source disruption due to natural or manmade disasters, these resiliency measures ensure quick recovery to resume its missions. 

2022 ENERGY  
ACTION MONTH



POWERING  
POSSIBILITY

#PowerDAFPossibility

## *It's Energy Action Month!*

Each October, the Department of the Air Force recognizes Energy Action Month to highlight energy's critical role in operations and mission continuity and to encourage smart energy use and management for our installations, ground vehicles and aircraft.

"Powering Possibility" is a three-year theme to reflect the Department's forward-looking approach to energy innovation and powering the future force. Under this theme, DAF will showcase energy's essential role in assuring combat readiness, underscore the importance of developing high return-on-investment energy solutions that bolster resilience in the face of climate change, and encourage Airmen and Guardians to prioritize efficient energy and water management.

### WATER RESILIENCY


*continued from pg. 5*

equipment, including attributes like horsepower, voltage and phase requirements. An assessment of the power necessary to operate water pumps and lift stations must be accounted for in order to remain operational during an outage. If relying on generators, fixed generation is recommended if the system receives required routine maintenance, while mobile generators require additional planning. It is highly recommended to have an emergency response inventory and contingency plan for a failing generator.

Most importantly, pumps and lift stations need to be

powered. If generators are used, the emergency response plan should include run-times underload to plan fuel requirements and resupply tanks. Alternately, installations can explore renewal energy solutions dedicated to water resiliency such as solar photovoltaic and/or deployable wind turbines paired with energy storage.

Other long-term resilience actions include floodproofing by raising elevations, fireproofing key water system assets and adding additional storage based on critical mission requirements.

All communities need safe drinking water and properly treated wastewater. In order to provide these services reliably, adopting these best practices will help ensure water resiliency. 

# EERE

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better prepared to deliver power when and where needed to protect our Nation, our values and our interests," she added.

SAF/IEE has worked tirelessly to establish ERREs as a cornerstone of both mission and energy assurance efforts across the enterprise and to solidify the DAF as a resilience leader within the Department of Defense. The DAF holds the distinguished honor of conducting the DoD's first joint base ERRE at Joint Base McGuire-Dix-Lakehurst, the DoD's first simultaneous multi-installation ERRE at Wright-Patterson AFB and Springfield-Beckley Air National Guard Base, and the DoD's first Control Systems Resilience Readiness Exercise at Wright-Patterson.


The DAF has developed a set of guiding criteria to ensure exercises provide an accurate test of mission capabilities. Outage exercises are base-wide, conducted during periods of peak electrical demand, and disconnect the installation from its primary power source for 12 hours. Prior notification of the exercise, including details such as the date and time, are kept on a "need to know" basis to preserve the authenticity of the outage event.

ERREs are already producing valuable information as to where the DAF can improve installation energy assurance. ERREs have revealed key insights and findings around

communications plans and protocols, backup generation and safety system preparedness for power outage.

Using these insights, the DAF began organizing monthly collaboration meetings with the Department of the Army and Navy to discuss ERREs across the services in FY22. These discussions provide a venue for the services to share lessons learned and best practices, develop policy and guidance and collaborate around program structure.

SAF/IEE continues to build upon the momentum from the past two years to solidify ERREs as part of DAF's broader readiness posture. In June, Joint Base Charleston successfully completed an approximately 12-hour ERRE across its multiple geographically separate facilities, which included more than 43 mission partners. By the end of the fiscal year, the DAF will also help lead the first ERRE at an Air Force Reserve base. Looking ahead, the DAF will continue to execute five ERREs per year through at least FY27 in accordance with the requirement in 10 USC §2920 and with a focus on mission priority installations. And, by FY 2024, execution of the ERRE program will fully transition from SAF/IEE to Air Force Civil Engineers Directorate.

For more information on how the Air Force is improving energy resilience, visit the SAF/IEE website at: [www.safie.hq.af.mil/InstallationEnergy](http://www.safie.hq.af.mil/InstallationEnergy). 



**POWER UP ENERGY EXPO**  
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**If you would like to nominate someone to be profiled in an upcoming issue, please contact us at [AFIMSC.PA.Workflow@us.af.mil](mailto:AFIMSC.PA.Workflow@us.af.mil).**

**CE DASH**

<https://cs2.eis.af.mil/sites/10159/>

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