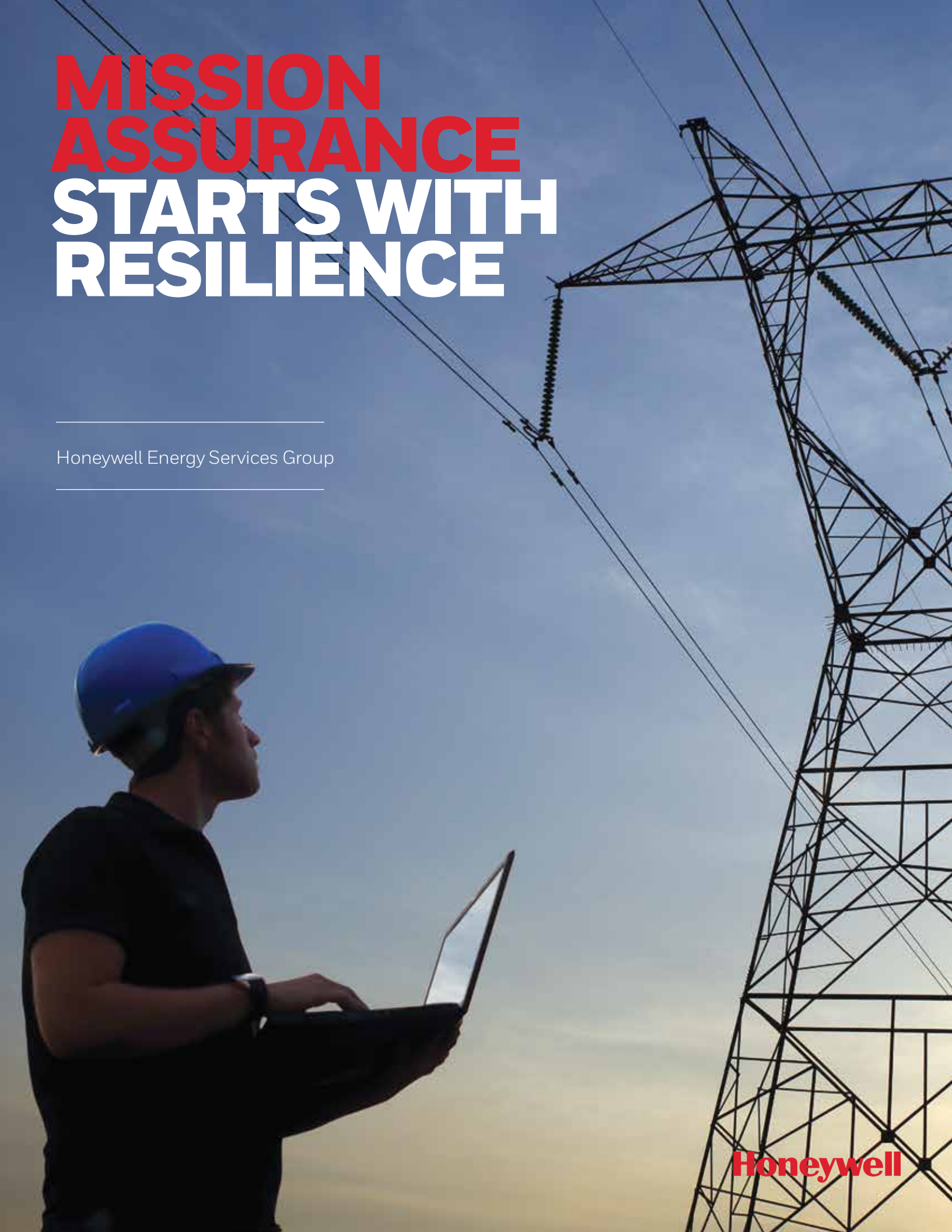
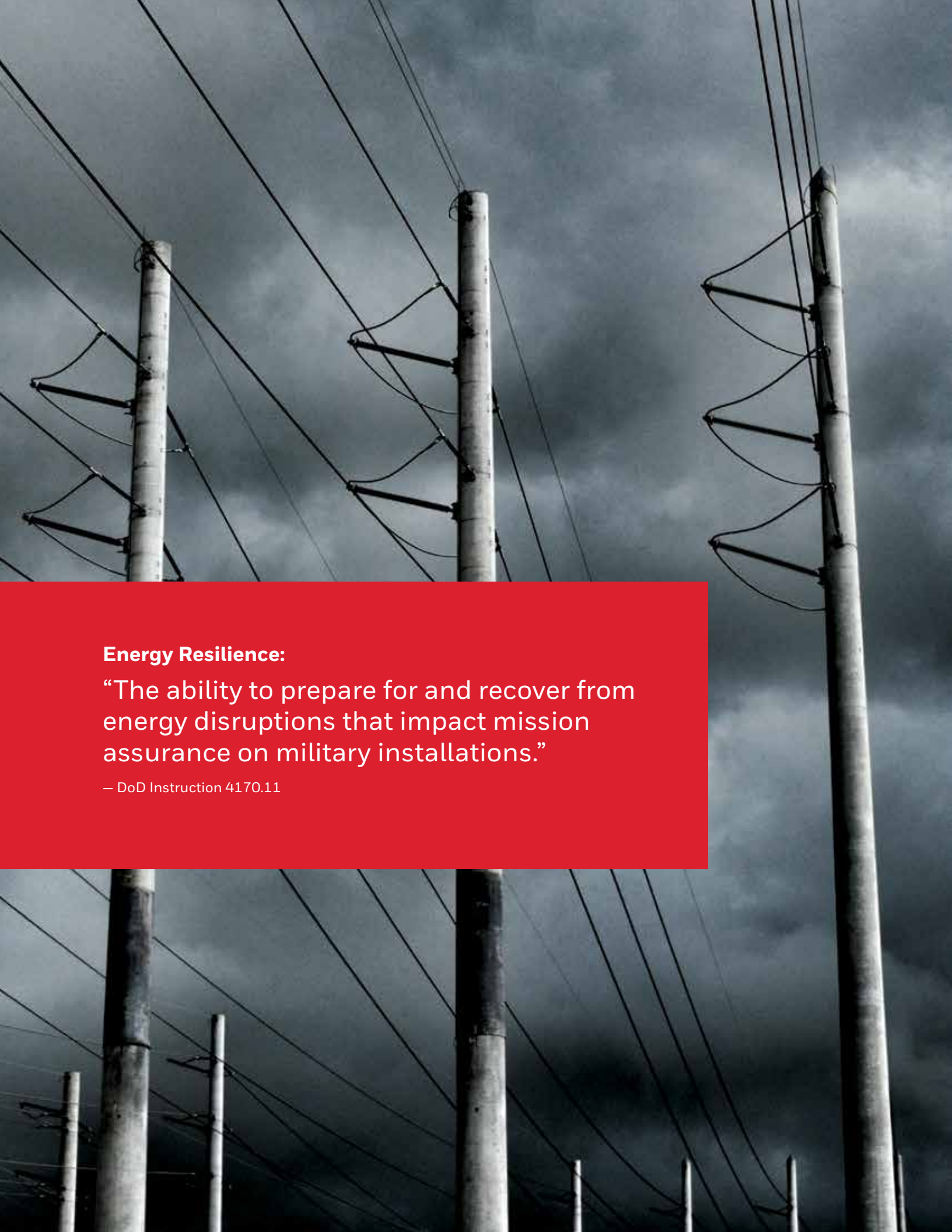


MISSION ASSURANCE STARTS WITH RESILIENCE

Honeywell Energy Services Group

Honeywell



Energy Resilience:

"The ability to prepare for and recover from energy disruptions that impact mission assurance on military installations."

— DoD Instruction 4170.11

When the Mission Depends on It

Prepare the Resources You Need

When duty calls, you'll be there – and you need to know that the resources you depend on will be as well.

That's why Honeywell is committed to helping you increase the efficiency, security, and resilience of the energy and water supplies you need to sustain critical missions.

Optimize demand.
Enhance supply.
Secure critical resources.
With guaranteed outcomes.

Whatever it takes, our goal is to help you prepare to recover from disruptions quickly – or prevent them in the first place – so that you can stay focused on the job at hand.

Disruptions to your energy supply are most likely – and least acceptable – in the midst of a disaster.

As mission readiness has grown in importance, energy and water resilience have become critical factors for establishing readiness.

And with this heightened focus, there's been a growing recognition that resilience is often more complex than hardening an asset or facility, because the needs of a mission can span multiple installations.

Resilience Is a Plan to Succeed

Resilience must be carefully planned to fit your objectives – and your budget. That's why we build on our long experience and expertise as a master systems integrator to enhance your resource resilience and your cybersecurity.

We start by working with you to understand the needs and complexities of your mission. Then together, we develop a comprehensive solution consistent with your overall mission objectives.

Efficiency: Optimize Demand

Upgrade critical infrastructure assets to help optimize facility demand, harden systems, and improve load control. Streamline energy and water operations, as well as maintenance.

Security: Enhance Supply

Enhance on-site production, storage, and distribution of energy and water.

Resilience: Secure Critical Resources

Extend run time to deliver functionality for up to 14 days, or more.

THE THREATS TO FACILITIES ARE INCREASING

Weather
In recent years, weather has been much more disruptive and damaging, a trend that is expected to continue.

Aging Infrastructure
Infrastructure investment in the U.S. has lagged growth for decades, resulting in an aging system more vulnerable to disruption – as seen in Puerto Rico's challenges from Hurricane Maria.

Cybersecurity Threats
Adversaries and strategic competitors will increasingly seek to exploit cyber vulnerabilities to gain political, economic, and military advantages.

AND DISRUPTIONS ARE MORE COSTLY*

1205
utility outages
that lasted 8+ hours in 2017, up from 701 in 2016.

In 2016, each outage cost
$500,000
per day
on average, up sharply from **$179,000 per day** in 2015.

In 2017, equipment failure caused
45%
of outages.

* Data from DoD Annual Energy Management and Resilience Report (fiscal years 2015, 2016, 2017).

Build Resilience on a Proven Foundation

The U.S. federal government has trusted and worked with Honeywell throughout many decades and many complex, vital projects. Over the course of this unique relationship, Honeywell has developed a proven three-phase approach to mission assurance: optimize demand, enhance supply, and secure critical resources.

Efficiency: Optimize Demand

"The most resilient gallon of water or kWh of electricity is the one you didn't need."

We begin with a comprehensive systems-level assessment of your energy assets, and your Operations and Maintenance or O&M practices.

Most installations have energy systems operating below optimal levels. These systems may never have been properly commissioned, or may have been modified and left "untuned." Updating them can be a significant step to improving performance, reliability, and resilience.

We work with you to learn the requirements of your installation and mission, as well as existing gaps. Then we prioritize and update your energy systems to optimize O&M, including any necessary recommissioning.

We can also incorporate intelligent monitoring and analysis to help identify inefficiencies as they occur, or even before, so you can address potential issues proactively.

After optimizing how efficiently your energy assets run, we also advise you on which are in good condition and which may need to be considered for replacement.

Most mission-critical installations suffer from a lack of capital investment to replace equipment that has not reached failure mode, yet is nonetheless nearing end of service life.

Such equipment can include boilers, chillers, cooling towers, pumps, lighting, controls, and other components that are critical to ensuring the installation remains operational. The longer these systems are kept functioning, the more inefficient they become and the greater the chances of failure at the most inopportune time.

Proactively replacing such equipment is a sound step toward optimizing demand for your installation and reducing the level of load you must plan for with standby systems.

Furthermore, these replacements can be paid for using the energy and O&M savings gained from new equipment.

Security: Enhance Supply

Once efficiency updates have been implemented, we evaluate your installation's ability to provide its own energy and water for the relevant agency-required time (typically up to 14 days).

This includes on-site generation systems comprised of standby diesel generators (SDGs) and combined heat and power systems (CHPs). If these systems are not adequate, or need upgrades and reconfiguration, we have the expertise to engineer and install cost-effective solutions.

Honeywell has deployed resilient, on-site generation systems that include both conventional technologies (typically natural-gas fueled) and renewables (such as biomass and solar photovoltaic). These are often further supported by thermal energy storage (TES) and battery energy storage systems (BESS).

Enhancements can also include hardening your systems in mission critical areas to create redundancies, so that single component failures will not cripple the system.

Additionally, adding on-site water production and storage is an often overlooked way to further assure supply.

Resilience: Secure Critical Resources

The next step in our approach is to ensure your energy systems are robust, resilient, and can work seamlessly together while grid-connected or in island mode.

When multiple energy systems work together in this fashion, it is known as an "advanced distributed energy-management control system," which is an area of particular Honeywell expertise.

Such systems have the ability to integrate with an energy-management control system (EMCS), which can enable your installation to temporarily shed load and reduce demand. This is demand response (DR), and it helps ensure that your fuel and energy supplies can last well beyond the mandated requirements when the grid is unavailable.

In short, we help review the full energy system that supports your mission readiness, seeking opportunities to further harden it and prepare it for rapid repairs.

Vigilance: Reinforce Cybersecurity

Resilience goes beyond physical places and structures to encompass your digital resources – and to protect those, you need robust cybersecurity.

To remain effective, we believe cybersecurity should be managed as a continuous process: ongoing assessments of internal processes and procedures; staff-awareness programs; integration of modern applications for monitoring and response. And to be sustainable, these efforts should be aligned to your organization's requirements.

Moreover, a complete cyber strategy may need to secure both IT and OT systems – that is, operational technologies, the systems that operate within your critical infrastructure.

Both government and industrial leaders have trusted and engaged Honeywell to help them develop cyber strategies that better secure their most vital OT systems. Today, Honeywell is helping define the future of industrial cybersecurity, in collaboration with agencies like the Industrial Control Systems Computer Emergency Response Team (ICS-CERT), a division of the U.S. Department of Homeland Security.

Mission Assurance Also Means Budget Assurance

Just as important as improvements to your energy supply: Maintaining the budget to support them.

Funding for infrastructure is often seen as a roadblock, even when it is vital to resilience and mission assurance.

However, a thoughtfully designed energy savings performance contract (ESPC) or utility energy services contract (UESC) can help align the improvements your mission needs with your budget.

We help you leverage a range of funding options, from those with quick payback, to guaranteed savings through an ESPC, to small capital-intensive energy conservation measures (ECMs) with longer payback, and larger capital benefits.

Ultimately, we help you see that your energy-resilience project has positive cash flow by blending the right mix of funding with the energy and operational savings from upgrades.

Microgrid Helps Keep the FDA Online Throughout Historic Storms

The Food and Drug Administration (FDA) headquarters in White Oak, Maryland, is a state-of-the-art General Services Administration (GSA) campus, consisting of 4 million square feet and 18 buildings – so seeing that it stays online throughout a utility outage can be a big undertaking. That's why the FDA turned to Honeywell for a solution it could depend on.

The Challenge

This huge research center is home to decades of ongoing work, including a national-security stock of vaccines, and biosafety-level 3 labs that work with potent and contagious live agents. This makes it critical that facilities maintain secure, reliable.

The Solution

Using a phased approach to reduce costs and optimize operations, Honeywell worked with the GSA to design more energy-efficient facilities across the campus, and built a 55MW combined heat and power central-plant complex that can operate as a microgrid. The FDA's investment was also guaranteed by an energy savings performance contract (ESPC).

The Benefits

- Reduced energy use by 915,000 MMBtu / year.
- Can switch from grid connection to "island mode" manually or automatically, with more than 200 seamless transitions in 2018.
- Continuous operation throughout multiple severe weather events that disrupted local power, including Superstorm Sandy.
- Reduced construction, energy, and operating costs.

Find out what your operations can achieve.

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THE FUTURE IS WHAT WE MAKE IT

Honeywell