FIVE MEGATRENDS IN THE DEFENSE ENERGY AND WATER SECTOR

2017 REPORT

ASSOCIATION OF DEFENSE COMMUNITIES

EXECUTIVE SUMMARY

Executive Summary: Even as the incoming Trump administration takes steps to back away from the previous administration's efforts to address climate change, the Pentagon's initiative to rely on renewable energy sources to achieve its goals of enhancing energy resiliency and mission assurance at its installations will continue, according to panelists gathered for the DOD/Federal Energy & Water Forum sponsored by the Association of Defense Communities and the National Council for Public-Private Partnerships on Dec. 2, 2016. Now that the effort has matured, the military services are beginning to focus on projects aimed at enhancing their energy resiliency. Panelists believe the next major shift in defense energy will usher in the procurement of "energy as a service," under which a single entity will meet all of an installation's energy needs by combining the establishment of distributed power generation, DOD's multiple procurement authorities, the privatization of utilities and energy controls. The services' approach of relying on third-party financing for new energy capacity, energy efficiency and resiliency projects, and other energy management services also will continue, according to experts.

On the water front, DOD will be forced to urgently focus on determining whether its installations have access to sufficient water supplies to function into the future.

Trend 1: Military's Focus on Renewables to Continue

The services' effort to use renewable energy to power their installations will continue, with an increasing emphasis on pursuing energy resilience. These initiatives will continue to rely on third-party financing.

The services already have made dramatic progress in adopting renewables — the Navy met the goal of bringing one gigawatt of renewable energy into procurement by the end of 2015, and the Army and Air Force have concerted efforts under way to meet that same goal. All three services have learned a lot over the past decade about how choices regarding the type of renewable energy and acquisition method can best support installations. If there is a concern about the Trump administration's willingness

to fund renewable energy as a singular objective, the services should audit their past investment in renewables and highlight the potential for savings and gains in energy security and resiliency.

With funding for installation support under tight constraints, third-party financing will remain the services' development model of choice. The military's shift toward renewables has been achieved mostly without appropriated funds, with projects being led by the local utility or a private developer. That approach will continue, even as the services begin to focus on resiliency projects.

And while utilities privatization has not always been a high priority for the services, they are taking a closer look at the authority. The Army, in fact, is pursuing utilities privatization for energy and water systems at a more rapid pace than the other services.

Army Sets Utilities Privatization Initiative on Fast Track

The Army is continuing an aggressive schedule to consider privatizing electricity, natural gas, water and wastewater utilities at each of its installations, putting it on pace to finish evaluating the feasibility of privatization across the service in about 10 years. The effort now is more than halfway complete, said Jack Surash, acting deputy assistant secretary for energy and sustainability. Officials plan to assess between 10 and 15 utility systems per year.

"We're going to be doing this day in day out for a number of years to come," said Surash, who is the Army's senior energy executive.

As of 2016, the Army had privatized 153 individual utility systems; officials plan to evaluate 104 additional utility systems over the next seven years. At that point, the Army likely will take a second look at installations where it had decided not to privatize utilities. The service began privatizing its utilities in the 1990s. In the interim, market conditions could have changed, making an equitable deal easier to reach.

Utilities privatization offers the Army several benefits. It allows the service to leverage private sector experience in supporting the service's primary mission; for instance, a local utility would be in a better position to adopt the industry's latest standards. "We've found that utilities privatization is how we provide the best mission support to the Army," Surash said.

He added that privatization allows the Army to shed a function that is not a core mission. The authority also provides an avenue for the service to take advantage of private sector financing.

"I think the Army is seeing just lots of positives from this," Surash said. "At the end of the day … it's an easier thing for the Army to do." Privatizing a utility system takes about three years, from the service's initial evaluation at an installation to the execution of a contract with the partner it selects through a competition.

The Army's effort to pursue utilities privatization comes even as many potential partners remain on the sidelines due to DOD's cumbersome and protracted acquisition process. Procurement cycles of two-plus years have hampered the participation of the private sector. Industry members have said a more streamlined process, allowing them more flexibility in securing financing for example, would greatly enhance their ability to pursue privatization opportunities.

At installations where the utilities have been privatized, the Army has enjoyed "enormous savings" from lower electricity, natural gas and water consumption. A private sector partner will increase the efficiency of the Army's utilities by bringing them up to modern standards through equipment upgrades and by installing control systems, he explained.

Utilities privatization also benefits energy resilience. Once the Army transfers the real property to its partner — including pipes, poles, wires and substation — the company will follow a regular schedule of replacing worn-out equipment. "That's a very critical thing that we were unable to do successfully before privatization," Surash said. Ensuring a utility complies with current standards also will make it easier to obtain replacement parts.

Trend 2: It's All about Energy Resilience

In the services' next phase, energy projects will focus on sustaining operations in the event of interruptions in the electrical grid through the use of distributed energy components.

As the military's effort to acquire renewables has matured, all three services are beginning to focus on projects aimed at enhancing their energy resiliency — the ability to prepare for and recover from energy disruptions that impact mission assurance. The Navy appears to have gotten a head start toward its focus on resiliency after meeting its one gigawatt goal with its REPO (Renewable Energy Program Office) 2.0 initiative. These projects can involve one of more distributed energy components, including battery storage, microgrids and fuel cells, along with renewable energy resources or other backup power sources.

One of the primary hurdles to the services' widespread pursuit of resiliency projects is the difficulty in justifying the investment in such efforts, as they are not intended to conserve energy. Use of DOD's utilities privatization authority or energy savings performance contracts (ESPCs), however, could provide a mechanism to carry out these projects.

Navy Steams Ahead to Achieve Energy Resilience

Starting in March 2016, the Navy has focused its installation energy initiatives on projects that will increase energy resiliency of Navy and Marine Corps installations. The emphasis is intended to rely on third-party financing while taking advantage of industry expertise. "Now we're massing the effects of the different authorities to achieve the outcome of resiliency," said John Kliem, executive director of the Navy's Resilient Energy Program Office.

In January 2017, the Navy merged its Renewable Energy Program Office with the Naval Facilities Engineering Command's energy office, and renamed it the Resilient Energy Program Office.

Overall, the Navy is carrying out the effort aimed at achieving "continuity of mission" through partnerships with public utility commissions, state energy offices and industry, Kliem said. The specific solution the office is pursuing is entirely dependent on a base's individual circumstances, and may use fossil fuels.

"We're technology agnostic," Kliem said, and are employing an "all-of-the-above" approach. "We're choosing the technology that makes the best business sense," he added.

At Naval Station Guantánamo Bay, for example, officials are negotiating an estimated $200 million energy savings performance contract to achieve both energy efficiency and resilience. The contract will allow the Navy to reduce its reliance on fossil fuels, while saving money, by installing distributed energy resources including renewable energy,
diesel generators, energy storage and either energy management systems or a microgrid.

The service expects to apply lessons learned from the approach at Guantánamo at other installations, particularly those also located on islands, Kliem said.

At Marine Corps Air Station Yuma, Ariz., APS recently completed a 25-megawatt microgrid that is connected to the base's facilities and powered by diesel generators, according to the electric utility. During normal times, the plant serves the commercial grid but in the event of an outage to the grid, it will provide 100 percent backup power to the base.

The Navy is pursuing the development of a 15-megawatt solar array, combined with energy storage, at Pacific Missile Range Facility, Barking Sands in Hawaii with an energy developer, which also will install new transmission lines to the facility. The project will significantly enhance the reliability and quality of the facility's energy; it also will allow the Navy to shut down its existing backup diesel generators and rely on onsite energy generation during missile tests.

A common theme among the three examples is the use of energy storage in a cost-effective

manner, along with the deployment of diesel generator sets when it makes sense, Kliem said. "We're fully leveraging other peoples' money," he said. "One authority we're not using is appropriated funds."

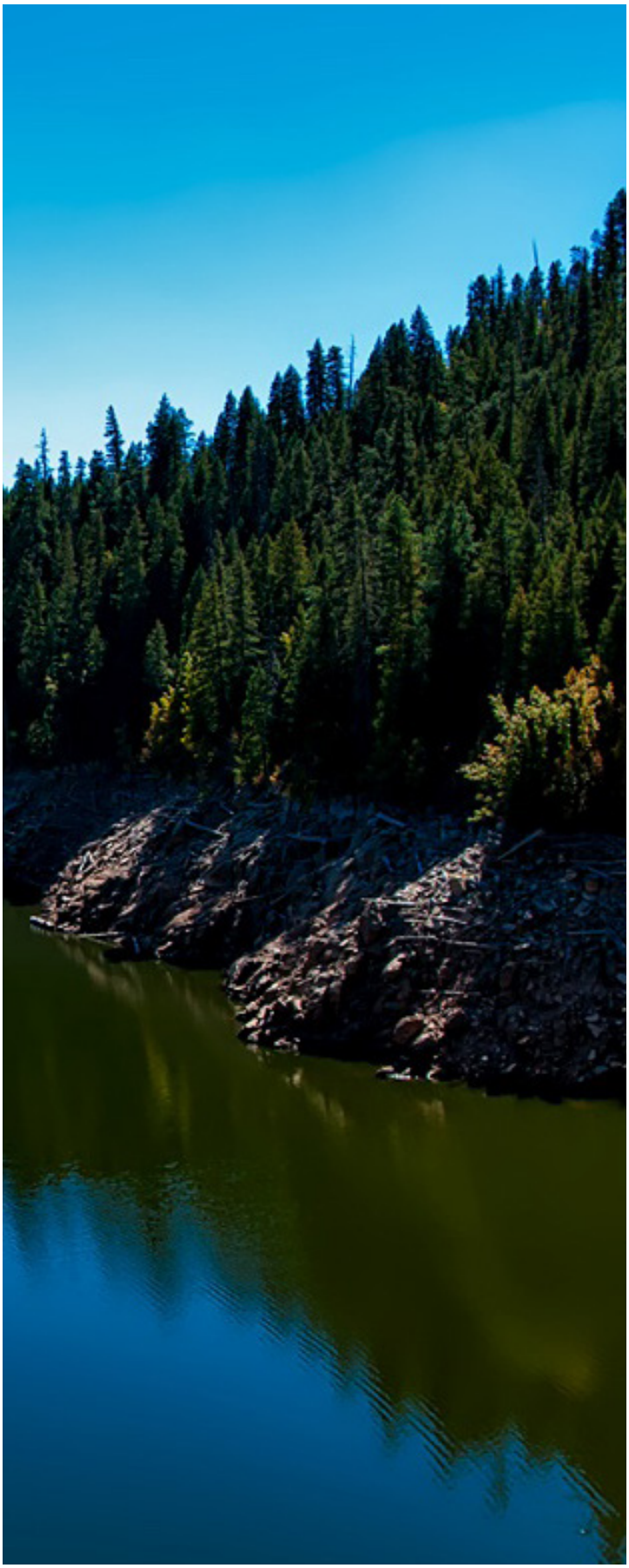
The Army and Air Force have resiliency projects underway as well.

Trend 3: The Rise of 'Energy as a Service'

Under a new approach to supporting installations, a single provider would meet all of an installation's fence-to-fence electricity needs.

The shift toward an "energy as a service" model — under which a utility or other private sector partner will provide energy management services instead of simply supplying electricity — will usher in a wholistic approach to supplying installations' energy needs. One partner will combine on and offsite power generation, procurement authorities — including ESPCs, utilities privatization and power purchase agreements — and energy controls to power installations more efficiently and enhance their resilience.

The Air Force will be the first of the services to test this new model. As a first step in a multi-year process, it plans to issue a request for information to industry in early 2017.



Air Force Looks to Change the Installation Energy Paradigm

The Air Force is embarking on an ambitious pilot project to implement an "energy as a service" model for supplying the fence-to-fence electric power needs at one installation. The goal is to establish a long-term partnership with a single entity integrating multiple activities the Air Force now manages separately — including purchasing electricity from the grid, developing new onsite generation capability, managing the distribution network, implementing conservation measures and enhancing resiliency.

The current approach is "a hodgepodge" with no one entity overseeing the big picture, said Shawn Bennett, an advisor with the service's Office of Energy Assurance. Under energy as a service, the Air Force would adopt a more holistic model with a single integrator ensuring "all of the pieces of the puzzle are working together," said Bennett, who is on detail to the Air Force from the Federal Energy Regulatory Commission.

The pilot project comes as the military faces funding and staffing constraints that industry could alleviate. DOD also could benefit from industry expertise in energy management. "Private industry is better placed to acquire that technology and operate it," he explained.

The Air Force is advancing along several tracks with the goal of issuing a request for information (RFI) from industry by early spring of 2017. Officials have reached out to industry and internal Air Force stakeholders to identify requirements and other concerns in an attempt to refine the energy as a service concept, Bennett said.

The energy office also is in the process of selecting a suitable installation for the pilot, with several bases currently under consideration. Officials have been weighing a variety of factors, including the level of interest at the installation and command level, the local cost of electricity and a base's existing energy projects. Bases which have privatized their utilities have been screened out as that would obviate the need for an energy services provider to manage its distribution network, he added.

Once the Air Force has settled on a single installation, officials will develop a detailed profile of the base and craft questions for the RFI.

One of the key questions the energy office is grappling with is what type of business model it should rely on to partner with an energy management firm, Bennett said. The decision primarily comes down to whether the Air Force should employ a contractual approach — as is used with ESPCs, for example — or a partnership model, such as the way the military's successful housing privatization initiative operates.

Bennett emphasized that while the energy as a service concept would clearly help Air Force installations achieve energy resiliency, the new approach has a more comprehensive objective. "This is a day-to-day energy management model" intended to ensure an installation's energy infrastructure receives adequate investment and is meeting the Air Force's needs as efficiently as possible, he said.

Bennett cautioned the Air Force may find out that because of its legal authorities or existing business models, it is unable to achieve all of the elements it envisions for this pilot project. In that case, the energy office will strive to include as many services as possible in the demonstration and identify what barriers exist to a more comprehensive package.

Of course, the hope is that the test establishes a new paradigm that can be applied across the Air Force.

"[But] we have a long way to go," he acknowledged. "[It will be] a multi-year effort to make this happen."

Trend 4: Water Security is Becoming Increasingly Urgent

DOD will be forced to pay increased attention to securing long-term water supplies as existing sources dry up. Look for the private sector to step in to help installations tap new water sources.

The need for the military services to evaluate whether each of their installations have access to sufficient water sources to function into the future — and whether they have the capacity to accept new missions — is becoming increasingly urgent. The potential for shortages means installations will need to manage their water use strategically and identify alternative sources. Reverse osmosis, while energy intensive, likely will be a solution at many water-stressed installations.

Projects to address water scarcity likely will rely on third-party financing. The services also will look to the private sector to help them conserve water and modernize their water infrastructure as they take a closer look at utilities privatization

Trend 5: The Federal Government Needs to Revisit Its Scoring Rules

Changing how OMB determines the budgetary impact of federal infrastructure investments could encourage the private sector to participate in public-private partnerships.

The Office of Management and Budget's (OMB) existing scoring rules in many cases restrict the federal government from entering into alternative financing arrangements, especially public-private partnerships (P3s) for developing infrastructure projects. Updated guidelines reflecting state-of-the-art business models used for P3s can be expected to attract private sector investment to such projects.

One Approach to Updating OMB's Scoring Rules

Real estate professionals within the federal government and the private sector over the past 25 years have highlighted the need for federal scoring rules to be revised to better account for long-term infrastructure investments. With a new administration and Congress, multiple organizations are offering recommendations for transforming the government's budgetary treatment of capital investments.

An advisory group formed by the National Council for Public-Private Partnerships (NCPPP) and the Urban Land Institute (ULI) has called for OMB initially to test an alternative approach to scoring real property transactions that eliminates exceptions allowing the cost of some investments to be spread over multiple fiscal years. "More creative approaches that leverage private capital, allow for federal long-term ownership and encourage consolidation should be evaluated equally, with similar scoring treatment across all alternatives," states a November 2016 report by NCPPP and ULI, Enabling Infrastructure Investment: Leveling the Playing Field for Federal Real Property.

In place of the current method, federal real estate investments should be evaluated on a life-cycle cost basis with upfront funding provided for the net present value of the long-term costs for all investments, the advisory group recommended.

Finally, the group called for the administration and Congress to convene a Commission on Budget Concepts to review the performance of the current scoring model and develop new models for assessing the cost and value of capital investments.

About ADC

The Association of Defense Communities (ADC) builds strong communities that support America's military. We are the connection point for leaders from communities, states, the military and industry on community-military issues and installation management to enhance knowledge, information sharing and best practices. With nearly 300 communities, states, regions, and affiliated industry organizations, ADC represents every major defense community/state in the nation.

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