TriEco-Tetra Tech Sustainable Resources Joint Venture of San Diego and Hunt Electrical of Salt Lake City workers at Dugway Proving Ground, Utah, place the grid studs and crossbeams that will hold the solar panels of the $7.7 million solar power array project. Photo by Bonnie A. Robinson.

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Planning for energy, water, waste at Reserve Forces Training Area
by Cyndi Skinner, Barry Gordon and Gabe Cross

In early 2010 Parks Reserve Forces Training Area, in Dublin, California, was identified as one of the Army’s Net Zero pilot installations for Net Zero energy capability by 2020. A lot has happened in the last five years that has helped Parks RFTA move toward its Net Zero energy goals, as well as complementary goals for water, waste, and stormwater. The current Unified Facilities Criteria 2-100-01 Installation Master Planning, released in 2012, was the first major update of the UFC in over 25 years; for the first time ever it is focused on sustainable strategies for planning. The UFC is more than a regulation; it marks a fundamental change in the way the Department of Defense approaches master planning. It establishes a worldwide planning program that includes guiding policy, education, training, and metrics. This wholesale change in installation master planning is not only a return to plan-based programming, it also embeds sustainability into its core tenets.

The release of the UFC was followed closely by new public law that supported Parks RFTAs energy, waste, water, and stormwater goals. The 2013 National Defense Authorization Act requires that installations update their master plans at least every 10 years and address environmental and sustainability planning as part of the update. The 2014 NDAA gave more specific direction that calls for:

a. compact and infill development;
b. horizontal and vertical mixed-use development;
c. full lifecycle costs of planning decisions; and
d. capacity planning through the establishment of growth boundaries…while focusing development toward the core.

The 2014 NDAA also states that “[a] master plan for a major military installation shall be designed to (use) multi-story, mixed-use facility solutions that are sited in walkable complexes so as to avoid, when reasonable, single-purpose, inflexible facilities that are sited in a sprawling manner.”

Acronyms and Abbreviations

<table>
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<tr>
<td>ADP</td>
<td>Area Development Plan</td>
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<tr>
<td>ERDC-CERL</td>
<td>Engineer Research and Development Center-Construction Engineering Research Laboratory</td>
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<td>EUI</td>
<td>Energy Use Intensity</td>
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<td>EO</td>
<td>Executive Order</td>
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<td>NDAA</td>
<td>National Defense Authorization Act</td>
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<td>NZP</td>
<td>Net Zero Planner</td>
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<td>RFTA</td>
<td>Reserve Forces Training Area</td>
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<tr>
<td>SCP</td>
<td>Sustainability Component Plan</td>
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<tr>
<td>UFC</td>
<td>Unified Facilities Criteria</td>
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<td>USAC</td>
<td>U.S. Army Corps of Engineers</td>
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All of this momentum has helped support Parks RFTA in meeting the goals of creating a UFC compliant Master Plan four years ahead of the Oct. 1, 2018, deadline outlined in the Office of the Under Secretary of Defense – Acquisitions, Technology and Logistics’ Policy Memorandum (2 Dec 2013). The Parks RFTA Master Plan also

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partnership efforts should aim to emulate.

Lean, Clean and Green: Detroit District’s deputy commander and Logistics staff strived to find the best and brightest team members to develop a program to encourage the district’s workforce to use flex fuel in its flex fuel Government Services Administration vehicle fleet. The missions included reducing gasoline consumption by 30 percent, while also increasing GSA fleet use to save on temporary duty costs. The team members sought to educate operators on fuel use by providing fuel maps and logbooks to help them closely monitor their flex fuel usage. Their hard work paid off. The Detroit District went from using 2 percent of E-85 in its flex fuel fleet to a usage of more than 71 percent within the first eight months of implementing the education efforts. In addition, the demand for gasoline decreased from 40,000 gallons in fiscal year 2013 to a little more than 32,000 gallons in 2014, a 20 percent reduction while still executing the same mission. The Detroit District team continues to remind workers that a cleaner and safer environment is needed, especially when it comes to reducing carbon in our atmosphere.

Building the Future: Sacramento District was commissioned to do a job that involved love for sustainability practices as well as a love for the natural environment. The Defense Language Institute at the Presidio of Monterey, California, asked the district for a modern instruction building to not only improve its campus but also be environmentally friendly. Sacramento District’s list of improvements to make the campus more environmentally practical included using natural light, recycled rainwater for toilets, and modern sustainable practices. The team created a safe, sustainable, and simple new building for students, which serves as an “optimum learning environment” for creativity. The building was constructed to meet LEED Silver certification. The collaboration and tireless efforts of the Sacramento District created a top-notch, environmentally friendly building that can help enhance the learning of the students at the Defense Language Institute and will help the Presidio meet its goal of being Net Zero energy by 2030.

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conforms to the latest executive order on the subject. In March 2015, the White House published EO 13693, “Planning for Federal Sustainability in the next Decade,” stating, “…agencies shall increase efficiency and improve their environmental performance. Improved environmental performance will help us protect our planet for future generations and save taxpayer dollars through avoided energy costs and increased efficiency, while also making Federal facilities more resilient. To improve environmental performance and Federal sustainability, priority should first be placed on reducing energy use and cost, then on finding renewable or alternative energy solutions.”

EO 13693 supersedes previous EOs and has set the bar higher by creating stringent guidelines and goals, to include:

- Reduce Green House Gas emissions 40 percent by 2025 (’08 baseline)
- Reduce Energy Use Intensity 2.5 percent annually by 2025 (’15 baseline)
- At least 10 percent of building energy use is “clean” by 2025 (renewable and alternative)
- Reduce Water Use Intensity 36 percent by 2025, 2 percent annually (’07 baseline)
- By 2020, new construction of federal buildings over 5,000 square feet are to be designed to be Net Zero energy and strive for Net Zero water and waste by 2030
- In 2016, identify 15 percent (by sf) of agency building inventory that will comply with Federal High Performance Sustainable Buildings guiding principles by 2025
- Each agency will prepare for impacts of climate change on mission critical water, energy, communication, transportation, and operations

Parks RFTA is well on its way to meeting these requirements through the development of an installation Sustainability Component Plan. Based on the Installation’s completed master plan, the SCP is a detailed analysis of each district’s path to meeting or exceeding federal sustainability goals and mandates, and includes a comprehensive plan for addressing each district’s energy use, water use, waste management, and stormwater management. SCPs include a comprehensive Energy Plan, Water Plan, Waste Plan, and Stormwater Plan, as well as a comprehensive list of strategies and policies, and an explanation of the metrics and calculations used to arrive at the final plan. The SCP covers two districts at Parks and it unfolded in three phases – preparation, analysis, and strategy application.

SCP Preparation. Leading up to the workshop, interdisciplinary teams that included installation personnel collected data for all buildings on the installation, including envelope assemblies, environmental control systems, lighting, and equipment with significant effects on the building’s energy load. This data, along with the completed ADPs and GIS shapefiles, was sent to the Engineer Research and Development Center-Construction Engineering Research Laboratory, developers of the Net Zero Planner tool and trained staff from the Fort Worth District, U.S. Army Corps of Engineers, for input into the NZP tool to generate a baseline energy-use

Participants worked in an applied instructional environment and learned how to model Energy Use Intensity by using the completed Area Development Plans as a starting point to apply sustainability strategies. Courtesy photo.
model for the entire area, optimize energy efficiency measures, and set targets for future development.

SCP Analysis. In early 2014, roughly 30 people, including senior leadership, Directorate of Public Works staff and other installation stakeholders gathered to start the SCP. The workshop was led by USACE and supported by ERDC-CERL. Participants received a theoretical overview of mandates, strategies and their applications, and instruction on how to integrate sustainability into the Master Plan. Participants worked in an applied instructional environment and learned how to analyze the completed ADPs. Additionally, the participants collected information on the existing condition to include the district’s climate and context, current consumption patterns, and sustainability efforts to date including successes and lessons learned. This analysis was then used to support the determined baseline for energy and water consumption, waste generation, and stormwater runoff. Ancillary goals were set and all progress was then measured in reference to this baseline.

SCP Strategy Application. Meeting sustainability goals required design efforts to be integrated with cultural change and individual efforts to reduce the environmental impacts at Parks RFTA. Informed by the analysis, sustainability vision statements with specific measureable goals and target strategies were developed for each of the four major categories. This holistic approach employs a planning-level assessment of buildings; performs energy, water, and solid waste calculations; and establishes base, better, and best models for energy, water, waste and stormwater using the Army’s goal of Net Zero as the framework.

Energy Plan. The Energy Plan graphically displays buildings based on their Energy Use Intensity and shows how strategies to reduce consumption improve building EUIs by meeting the Parks RFTA Vision for Energy Use: Achieve Net Zero energy and self-sufficiency through passive load reduction, optimized energy efficiency and recovery, and meet reduced loads with on-site generation and storage. The vision and embedded goals are supported by implementable and site specific sustainability strategies. As an example, Goal 1: Passive load reduction is supported by the following strategies: narrow wings, thermal mass, reduced infiltration, increased insulation, direct solar gain, high performance windows, natural ventilation and night flushing, and daylighting. It is by embedding the strategies within the goals that the Net Zero vision can be achieved comprehensively on the district and installation scale for the short-term, long-term and capacity plan on a base case, better case and best case. Parks RFTA’s total reduction for the short-term, long-term and capacity plan are 25 percent, 62 percent, and 100 percent reduction in energy use from the base to best case models, meeting the Army’s Net Zero Energy Installation goal. This equates to a savings of 6.2 million kwh of energy per year; 100 percent of remaining demand met with on-site photovoltaic panels.

Water Plan. The Water Plan displays which buildings are appropriate for specific water reduction strategies and is used to identify district scale water strategies, infrastructure projects, or opportunities for large water savings that are not connected to individual buildings. By implementing the identified strategies, Parks RFTA is able to forecast a 51 percent reduction of water use even with full build out of the Master Plan. This results in a savings of 29 million gallons of water per year.

Waste Plan. The Waste Plan displays buildings based on the application of waste strategies and identifies projects that relate to waste generation or diversion. Buildings slated for demolition, existing or proposed waste management facilities (including reuse centers or composting facilities), or other waste management projects are displayed as appropriate. Parks RFTA is able to forecast a 57 percent reduction of solid waste generation. This is a reduction of 2.8 million pounds per year.

Stormwater Plan. The Stormwater Plan displays all impervious surfaces that will generate runoff in excess of natural site hydrology and the location of all strategies used to mitigate that runoff. Building level strategies such as rainwater harvesting or green roofs as well as district scale strategies such as engineered biofiltration features are displayed as appropriate. Parks RFTA is able to mitigate 100 percent of its stormwater runoff on-site by implementing the identified stormwater strategies.

Marching toward Net Zero requires a holistic approach to addressing energy, water, waste, and stormwater on multiple levels. Key strategies must be implemented at every level: installation-wide planning, district and neighborhood scales, individual facilities, policies, and personnel behavior. The SCP at Parks RFTA has been used to synchronize energy, water, waste, and stormwater strategies with the Master Plan. The SCP process has allowed Parks RFTA to be stewards of the environment, reduce resource use, and provide a sustainable future for Soldiers, families, and civilians.

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