28-29 Advice from Fort Lee: When it’s time to replace water heaters, consider tankless units by Curt Savoy
29-30 Confidence builds in structure removal projects by Debra Valine
31 Fort Lewis to exceed Army mandate for handling demolition, construction debris by Brendalyn Carpenter

36 Creating sustainable installations requires comprehensive planning by Jerry Zekert
37 Grigg named Installation Support Professional of the Year by Huntsville Engineering and Support Center Public Affairs Office

38 CP-18 provides opportunity to develop your career by Lt. Gen. Carl A. Strock
39 Huntsville offers installation management courses in FY 2007 by Betty J. Batts
39 Army energy managers earn national certification by David Purcell
40 Register for Energy Efficient Technologies Workshop by Dahtzen Chu
40 Federal planning awards will acknowledge planning excellence by Jerry Zekert
41 OSHA publication helps designers create ‘better workplaces’ for firefighters by Charlie Butler
41 The MPTM: a master planner’s handbook by Jerry Zekert

V oltman: in charge of energy, utilities by Ralph Totorica and Steve Sain
42-43 Volkman: in charge of energy, utilities by Mary Beth Thompson

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During the last few years, rising energy costs and shrinking budgets have made energy management a critical issue for the federal government. Some of the challenges facing federal managers include increased energy consumption and costs, reductions in staff, reductions in operations and maintenance (O&M) budgets, and energy disruptions that affect national security. To address these energy management concerns, the Installation Management Agency, Southwest Region (IMA SWR) has initiated a program to provide garrisons with the services of a resource efficiency manager (REM).

The REM is an on-site, full-time energy consultant who investigates and recommends energy saving projects and O&M best practices. The REM’s goal is to initiate actions that significantly save energy/utility costs relative to the cost of the REM contract.

The IMA SWR awarded a five-year regional REM contract in September 2004. The contract includes line items for all 17 IMA SWR installations. The intent is to provide “seed” funding to garrisons to cover the first year of the contract. Subsequent years are then funded by the garrison through the energy/utility cost savings generated.

The REM concept is fairly new but is gaining increased popularity due to successful implementation within the federal sector and the Army. IMA SWR currently has two REM contracts in place, one at Fort Sill, Okla., and one at Fort Polk, La. In addition, REMs are planned in the near future for Forts Sam Houston and Bliss in Texas.

Fort Polk

The REM contract at Fort Polk has been in place for four years. The contract has proven to be perhaps the most successful REM program in the federal government. Nancy Varner and David Hopper, both certified energy managers, were combined as a tag-team to serve Fort Polk’s REM needs. Among other initiatives, Varner attained over $2 million in savings utility and ESPC (Energy Savings Performance Contracts) overpayments. Her results were so noteworthy that, in fiscal year 2004, the Assistant Chief of Staff for Installation Management (ACSIM) named her its Army “Energy Champion.”

When Varner transferred to Lackland Air Force Base, Texas, last year, she was succeeded by David Hopper. In his first year, Hopper surpassed Varner’s award-winning savings achievements. Within a few weeks of his arrival, Hurricane Rita left the post isolated from the local electrical grid. With his extensive background in electrical power transmission and distribution, Hopper led the power restoration team in bringing Fort Polk back online about 12 hours earlier than expected. This action alone resulted in over $1.2 million in productivity savings.

Hopper also implemented numerous low- or no-cost projects, including locking-in natural gas purchase rates immediately following Hurricanes Rita and Katrina, which saved about $70,000. He also renegotiated a discount for electricity to one of Polk’s two major electric service points, resulting in annual savings of more than $36,000 for three years, and revamped the water billing rates to tenants, increasing reimbursements to the local Directorate of Public Works by $800,000.

Combining the efforts of Varner and Hopper, Fort Polk’s REM service provider, Sain Engineering Associates, has been able to save Fort Polk about $5.2 million. This, in turn, has achieved a benefit-to-cost ratio of more than 8-to-1, sustained over four years. This means that for every dollar Fort Polk has invested in its REM contract, Varner and Hopper have returned it with over $8 in savings.

Fort Sill

The Fort Sill contract, with Michael Baird serving as the post’s REM, has been in place for two years. Coming from an O&M background, Baird has focused on low- or no-cost operational improve-
German district heating systems assessed for CONUS application

by Alexander Zhivov

The Assistant Chief of Staff for Installation Management asked the Engineer Research and Development Center’s Construction Engineering Research Laboratory (ERDC-CERL) to investigate novel district heating (DH) and co-generation systems in Germany, both at Army installations and German cities. The purpose was to identify and study DH methods and systems, and offer recommendations for the Army’s DH systems in the continental United States with an overall goal to improve heat and power reliability at U.S. installations at a reduced life-cycle-cost.

District heating has been used successfully in Europe, mainly due to its low costs to consumers, and is the “standard” for providing energy to millions of Europeans. Plant efficiencies are in the range of 70 percent to 80 percent, well above that of a modern electrical generation plant. To help evaluate the performance of DH, the ERDC-CERL team visited six sites in Germany and found the following common themes:

- Almost all German DH use variable temperature (low-medium hot water, below 130 degrees Centigrade); variable-flow systems using proven-technologies. This type of operation reduces heat and water losses, improves overall thermal efficiencies and eliminates the high cost of steam or high-temperature piping.
- These heating systems were used in conjunction with co-generation to optimize system efficiencies.
- Most of the piping has built-in leak detection, which, in the alarm mode, identifies the exact location of the leak, ultimately reducing repair costs.
- The use of improved monitoring and control equipment has allowed some plants to continue to operate efficiently even with a limited plant labor force. Other than for maintenance, staff only needed to visit the remote sites every one to three days to observe the equipment performance. It was not uncommon to have a shift crew of four to five workers operate a large (300–to 600-megawatts) power plant that normally required a crew of 20 or more workers.

The U.S. Army has a number of installations that use central energy plants to heat and in some cases cool buildings; most are centrally located. The installations’ buildings are located in close proximity and are large enough to justify a central heating and cooling system. A major concern is that many of these central energy systems are aging. The systems have: 1) exceeded their expected useful lives, 2) high operation and maintenance costs, 3) large capital replacement costs and 4) significant energy and water losses. Without adequate maintenance and repair, these systems could experience a catastrophic failure, ultimately threatening mission performance and readiness.


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(continued from previous page)

mills for Fort Sill such as reducing waste in boiler water treatment, finding and repairing leaks in water distribution systems and optimizing the chilled water supply temperature setting for relatively-large central cooling plants. These initiatives have saved more than $56,000 annually, and there are several others projected to save much more upon completion.

Another way that REMs can add value is to attain funding from external sources. Baird led the effort to apply for over $13 million in ECIP (Energy Conservation Investment Program) funding from the ACSIM. Baird’s submittal resulted in a $1 million grant which will cover the design and installation of geothermal heat pumps.

Baird spent a few years in the wind power industry and is using this expertise to develop a wind power generation project. Like the geothermal heat pumps, the wind power project can help Fort Sill achieve its renewable energy goals. Finally, Baird is assisting Fort Sill to qualify for an energy security study and possibly an ESPC (Energy Savings Performance Contracting) project that has the potential to save several thousand dollars with no capital investment.

Overall, Fort Sill’s benefit-to-cost ratio has been approximately 3.5 to 1, sustained over two years. Even though these economics are extremely fruitful for Fort Sill, there is significant potential for them to get better over the next few years once all of Baird’s initiatives come to fruition.

Due to the remarkable successes achieved by the REMs at Forts Polk and Sill, it is no wonder the REM concept is rapidly gaining popularity within the Army and other federal agencies.

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