Captain Ramé (Hugh) Hemstreet

I am here to tell you how we are going to use the IT abracadabra that Mr. Jeffrey Johnson just described to improve the energy efficiency at installations throughout Naval District Washington.

Captain Ramé (Hugh) Hemstreet graduated from Tulane University in 1982 with a B.S. in civil engineering. He was commissioned an ensign upon graduation, and his first assignment was as an assistant Resident Officer in Charge of Construction (ROICC) in Newport, Rhode Island. His following tour was as the ROICC, Palau and Yap, reporting to OICC Marianas. In 1986, Captain Hemstreet reported to Commander, Fleet Air Mediterranean, as the NATO Infrastructure Officer. He is a veteran of Naval Mobile Construction Battalion Forty; he deployed to Operation Desert Shield/Storm, Naval Air Station Sigonella, and Operation Restore Hope. In 1993, Captain Hemstreet reported to the Public Works Center Yokosuka, Japan, where he served as the Japanese Facilities Improvement Program/Planning Officer and as the Production Officer. From 1996 to 1998, Captain Hemstreet was on the Office of the Chief of Naval Operations staff in the Shore Installation Management Division. From 1999 to 2001, he was the Public Works Officer/ROICC/OICC at Marine Corps Base Camp Pendleton. In 2001, he returned to Japan; first as the Executive Officer, Public Works Center Yokosuka, Japan, and then as the Deputy Regional Engineer for Commander, Naval Forces Japan. From 2004 to 2006, he commanded Naval Facilities Engineering Command (NAVFAC) Midwest at Great Lakes, Illinois. He then served as Deputy Commander for Operations, NAVFAC, from 2006 to 2009. Currently, he is the Commanding Officer of NAVFAC Washington and the Regional Engineer for Naval District Washington. Captain Hemstreet has an M.S. degree in construction management from the University of California, Berkeley, and an M.S. degree in national security studies from the National War College. His personal decorations include the Legion of Merit (Gold Star in Lieu of Third Award), the Meritorious Service Medal (Gold Star in Lieu of Fifth Award), and the National War College Commandant's Award for Writing Excellence.

First, however, I would like to describe how we are organized because I think that is another foundational element in our effort to reduce energy consumption. A 2010 energy efficiency assessment done by the Pew Center on Global Climate Change pointed out that one of the stumbling blocks to achieving energy efficiency is what is known to economists as the "principal–agent problem." [1] That problem arises when the organizational entities that are responsible for purchasing things like equipment and buildings are not the same as those who are responsible for paying the electrical bills associated with using that equipment or those buildings. The problem is often further complicated by assigning responsibility for equipment or facilities maintenance and improvement to yet other organizational entities.

That is how things worked in the Navy for a long time, although we have made some progress in that regard during the past decade. In fact, working to resolve that dilemma is part of my job at Naval District Washington. We have brought our facilities-related entities together and created an organization that is responsible for facilities life cycle management. We start with construction at the front end and then manage the utility program for the region. We are also responsible for the operation, maintenance, and restoration and eventually demolition of those facilities. So, in concert with the IT efforts that Mr. Johnson described, we think we have the right platform for success.

Within the Facility Engineering Command, we have created what we call the Smart Energy Concept of Operations (CONOPS) at Naval District Washington to try to pull together all those disparate elements. The objectives for that CONOPS are shown below:

- Objectives
  - Reduce energy costs without impacting mission (also reduces energy consumption)
  - Reduce operations and maintenance costs without impacting mission
  - Change operational behavior regarding energy to allow transparent decisions regarding energy-saving opportunities

- Action Areas
  1. Manage facilities to as-designed condition
  2. Identify energy efficiency upgrades
  3. Generate stakeholder metrics that change behavior
  4. Enhanced demand response
  5. Networked SCADA (supervisory control and data acquisition)

You will notice that the word "cost" appears a couple of times both with regard to energy itself and with regard to operations and maintenance. That is the key driver for us at the deck-plate level. Our utility bill for the region and all the tenant commands on the installations within Naval District Washington is about $200 million a year; our primary goal is to reduce that cost and return that money for other purposes.

You will also notice the word "mission" appears frequently. In order to gain buy-in from the stakeholders—the folks who execute missions on our installations—we need to assure them that we are not going to have the energy tail wagging the mission dog, that we are going to safeguard their mission operations. At Indian Head, we produce chemical propellants that are not manufactured anywhere else in the free world. At Patuxent River, we are doing research, development, test, and evaluation (RDT&E) on unmanned vehicles. We need to assure the personnel at those locations that the energy CONOPS is going to remember that the mission is primary. To help change operational behavior and get at that second aspect of the triad Rear Admiral David Boone talked about, we need to ensure that we provide the information to all the energy users in the region so that they can make smart energy decisions. Then, the industrial control system that Mr. Johnson is creating will allow us to take action in the five primary areas listed in bottom half of the list above.

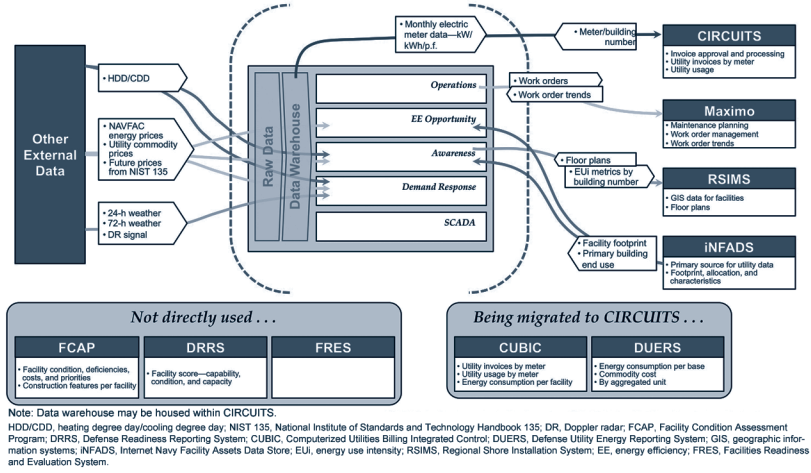
The first of these is to manage our facilities to as-designed condition, or in facilities speak, to employ "continuous commissioning" so as to maintain our facilities in their peak performance

mode. That will also help us identify energy-efficient upgrades, the second of our five action areas. We know that a lot of our facilities are underperforming, and the data that we are going to gather from the Industrial Controls System (ICS) will help us identify where we can make investments that will reduce energy usage and energy cost.

Our third action area is to generate stakeholder metrics. While about half of the tenants on our installations actually pay their own energy bills, the employees at those sites typically do not see the bill and thus are not necessarily impacted. Thus, there are really two aspects to this. One is providing everyone that pays a utility bill with real-time meter data that shows how they are performing. The second is to provide that data to the folks at the deck plates who are utilizing the energy. As that data percolates its way down, we can take advantage of the fact that people are naturally competitive to further reduce energy consumption. That same Pew study I talked about earlier described a number of success stories where people had been given just the information they needed in order to change their behavior. [1]

Our fourth action area is enhanced demand response. We already have a pretty aggressive demand response program in the region, but it is now focused on our generating capability. We have many backup generators that we can use in response to peak loading from the utility companies. The ICS system will allow us to use the consumption side of the equation to further enhance the demand response program that we have. Our final action area is to network our SCADA systems together to improve the overall reliability of our systems.

The industrial control approach that Mr. Johnson described essentially happens within the dotted lines shown in Figure 1. Our next goal is to export a lot of that data into our current Naval Facilities Engineering Command (NAVFAC) CIRCUITS (Centralized and Integrated Reporting for the Comprehensive Utilities Information Tracking System) billing information system. Then, as the meters are installed and come online, we can provide actual metered billing data by facility on the installations, which will help the tenant commands who pay those bills identify where they can conserve.



Note: Data warehouse may be housed within CIRCUITS.

HDD/CDD, heating degree day/cooling degree day; NIST 135, National Institute of Standards and Technology Handbook 135; DR, Doppler radar; FCAP, Facility Condition Assessment Program; DRRS, Defense Readiness Reporting System; CUBIC, Computerized Utilities Billing Integrated Control; DUERS, Defense Utility Energy Reporting System; GIS, geographic information systems; iNFADS, Internet Navy Facility Assets Data Store; EUi, energy use intensity; RSIMS, Regional Shore Installation System; EE, energy efficiency; FRES, Facilities Readiness and Evaluation System.

Figure 1. Integration with SmartEnergy System with NAVFAC Databases

A huge component of this is to tie together energy and facility operations with energy and facilities management and facilities maintenance. In the short term, we will have to rely on a human interface to use ICS data service tickets to identify the projects that we need to create in our Maximo maintenance management system. Over the next several years, our goal is to make that an automated process whereby the ICS pushes a service ticket directly into Maximo whenever ICS identifies a system that is operating outside of parameters. We also want to be able to use our Regional Shore Installation Management System geospatial information system as a graphic platform to show trends over time.

Figure 2 provides a notional example of some of the metrics that we want to provide. Some of these are internal metrics that will help our public works folks identify the real energy hogs. Once they have done that and discovered the underlying reasons, they can identify appropriate energy conservation measures that we might want to undertake to drive down those energy hogs. Once we have dealt with the low-hanging fruit, we can turn to the temporal aspect of facility operations to see if there might be opportunities during nighttime or weekends to further reduce energy

loads. We can provide this type of output to our energy users and in the process help them identify where their high expenses are and what projects they might want to fund in order to reduce their energy bills over the long term.

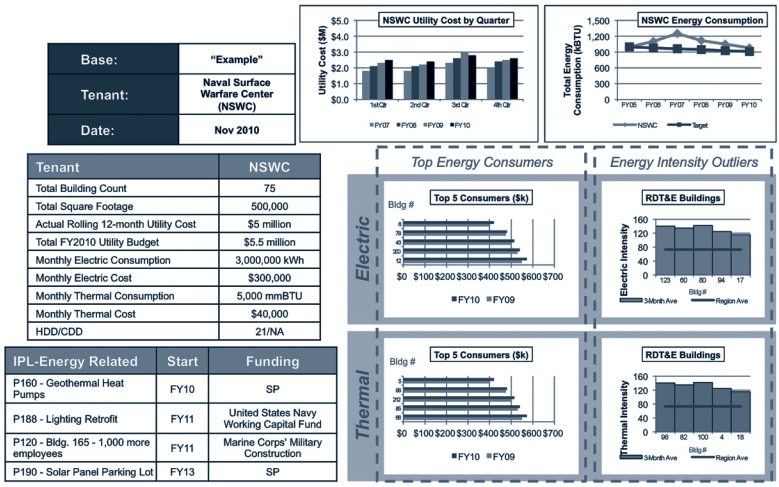


Figure 2. SmartEnergy Metrics Scorecard

We now have capability at three of our installations, and this spring we will bring online a facilities operations center at the Washington Navy Yard that will enable us to actually implement the CONOPS and operate our facilities within identified parameters. That will enable us to identify the facilities shortcomings that we need to fix. Then, over the course of the next couple of years, we will be setting up facilities operations centers at our other installations. We have decentralized the approach for the facility operations centers to ensure that each of them remains focused on the specific mission at that installation. At the same time, we want to ensure that we do not adversely impact that mission by turning off a piece of equipment that is essential to the folks who work on our installations.

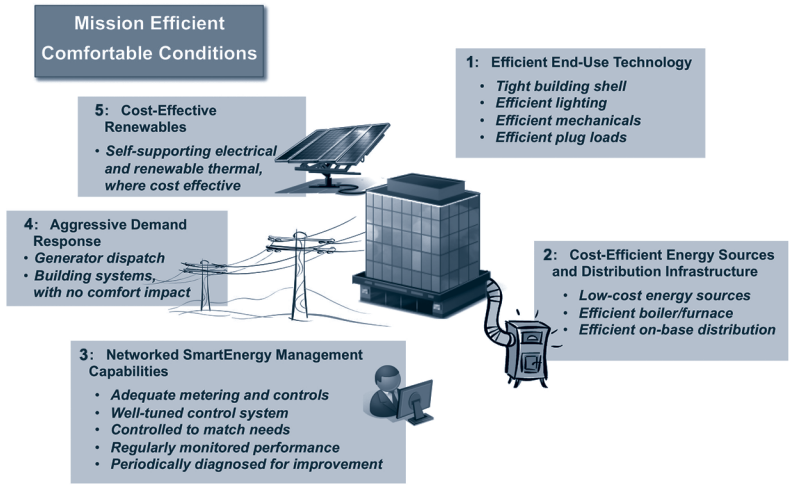


Figure 3. Five Elements of Naval District Washington Energy Vision 2035

As indicated in Figure 3, we hope to achieve results in five areas:

1. Efficient end-use technology
2. Cost-efficient energy sources and distribution infrastructure
3. Networked SmartEnergy management capabilities
4. Aggressive demand response
5. Cost-effective renewables

Achieving results in these areas will help ensure that NAVFAC is operating the utility systems on our installations in an efficient manner. By networking our energy management capabilities together, we will be able to produce the metrics that provide real-time feedback to those who use our utilities. The aggressive demand response program is intended to go beyond generating capability to the actual buildings themselves while minimizing any impact to the tenant commands. Finally, where it makes sense, we are looking at cost-effective renewables. Toward that end, we have

a demonstration project for a NetZero building on the Washington Navy Yard. That building, which we should finish this summer, will demonstrate technologies that can get us to NetZero. While these technologies may not be applicable in every circumstance, I think the demonstration project will provide lessons that will get us closer to NetZero. We also have other renewable projects, many of them as a result of the American Reinvestment and Recovery Act.

REFERENCE

1. William R. Prindle, *From Shop Floor to Top Floor: Best Business Practices in Energy Efficiency*, 2010, **http://www.pewclimate.org/docUploads/PEW_EnergyEfficiency_FullReport.pdf**.