

FY2016 // UNITED STATES COAST GUARD

# ANNUAL GREENHOUSE GAS INVENTORY AND ENERGY MANAGEMENT REPORT



DECEMBER 2016





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## SECTION 1 – Management and Administration Summary

### Agency Information

<b>Agency</b>	United States Coast Guard
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### A. Energy Management Infrastructure

1.	<b>Senior Agency Official</b>	Rear Admiral Bruce D. Baffer
	<p>Rear Admiral Bruce D. Baffer, Assistant Commandant for Engineering and Logistics, is the United States Coast Guard's Senior Energy Official. RADM Baffer oversees the design and implementation of energy policies and practices for the Coast Guard.</p>	
2.	<b>Agency Energy Team</b>	Mr. Sam Alvord, Ms. Anika Wilkins, Mr. Son Nguyen, and Ms. Jessika Hunt
	<p>Mr. Sam Alvord serves as the Chief for the United States Coast Guard Office of Energy Management, COMDT (CG-46). Mr. Alvord is responsible for comprehensive oversight of energy management initiatives. Management activities include technical, financial, and sustainable perspectives throughout the agency. He serves as the Coast Guard representative on the Department of Homeland Security (DHS) Energy Council and is the head of the Coast Guard Service Control Point (SCP) at Defense Logistics Agency-Energy (DLA-Energy).</p> <p>The Coast Guard Office of Energy Management, COMDT (CG-46), is responsible for:</p> <ul style="list-style-type: none"> <li>• providing the policy direction and oversight necessary to ensure compliance with statutory requirements and Executive Order (EO) directives;</li> <li>• conducting technical evaluations, life cycle costs and financial analyses for capital energy projects;</li> <li>• recommending, developing, and issuing policy and procedures for procurement and management of fuel credit card and the electronic fuel purchasing programs;</li> <li>• overseeing development of a facility energy reporting system;</li> <li>• liaising with DLA-Energy Program Chiefs on operational fuel issues;</li> <li>• tracking performance/results of energy conservation, reduction and generation initiatives; designing and implementing training plans for field Commanding Officers, shore, shipboard and aeronautical energy managers, engineers, budget and contracting officers;</li> <li>• directing Research and Development (R&amp;D) energy initiatives by performing economic, market, and technical assessments;</li> <li>• responding to Congressional and budget inquiries on energy issues; highlighting and championing energy efficiencies as an integral part of engineering and logistics;</li> <li>• showcasing technology and publicizing Coast Guard energy successes; piloting most appropriate state-of-the-art energy technologies and retrofits;</li> </ul>	



- and evaluating potential alternatively financed contracts including Energy Savings Performance Contracts (ESPC), Utility Energy Savings Contracts (UESC) and making financial and technical recommendations.

The Coast Guard has two energy-related working groups: the Sustainability Working Group, and the Fuel Management and Logistics Working Group. The former addresses utility-related projects and services, while the latter addresses liquid petroleum and alternative fuel matters. The two groups meet periodically, and are comprised of representatives from operations, engineering, environmental, procurement, legal and financial disciplines. Historically, both groups have provided as-needed technical guidance in their respective functional areas, support program development and implementation, and review program effectiveness. The teams are led by the Chief of the Coast Guard Office of Energy Management, COMDT (CG-46).

## B. Management Tools

### 1. Awards

As an incentive for implementation of proactive energy efficiency and conservation measures, the Coast Guard participates in Department of Energy (DOE) and DHS-level award programs including annual Federal Energy Management Program (FEMP) Energy and Water Management Awards and DHS Sustainable Practices Awards. In addition, the Coast Guard participates in acquisition award opportunities that highlight the unique procurement strategies the agency employs that include ESPCs, Power Purchase Agreements (PPAs), and UESCs.

Moreover, the Coast Guard sponsors an annual environmental and energy awards solicitation to promote and recognize achievements related to EO 13693 and the Commandant's Sustainability, Environmental, and Energy Policy Statement. Contributions are recognized by individual, team, small and large unit categories in both an energy and environmental compliance track. Winners are recognized by the Assistant Commandant for Engineering and Logistics.

The Coast Guard Office of Energy Management, COMDT (CG-46), has promulgated policy concerning protocol for internal recognition of energy champions, and ranges from recognition through meritorious team commendation, flag letter, monetary, hardware, or other compensatory offering dependent on level of contribution.

### 2. Performance Evaluations

Performance evaluation criteria for the Chief of the Office of Energy Management, COMDT (CG-46), include effective identification, implementation and oversight of enterprise energy efficiency projects, energy fund stewardship and data-driven energy conservation advocacy. These criteria evaluate the Chief's contribution to the fiscal necessity to minimize Coast Guard operational and mission support costs and reflect progress towards meeting the requirements of the Energy Policy Act of 2005 (EPACT 2005), the Energy





Independence and Security Act of 2007 (EISA 2007), and EO 13693. Coast Guard Working Group members and energy management stakeholders include their energy achievements as part of the Excellence, Achievement and Recognition System (EARS) and Officer Evaluation Report (OER) processes.

### 3. **Training and Education**

Information on effective energy management practices is distributed through the Coast Guard Energy Portal intranet site, via email, and through a semi-annual electronic newsletter. A master energy stakeholder email list provides a mechanism for outreach that includes disseminating information from FEMP and other energy awareness notices. This list is updated annually, and includes personnel from multiple technical and support disciplines.

The Coast Guard continues to provide training on energy efficiency, water conservation, renewable energy, and alternatively financed contracts to comply with Federal requirements. Training is determined on a case-by-case basis in accordance with the Coast Guard's guidance on travel, conference, training, and community outreach. Targeted individuals for training are engineering leadership, engineers, specification writers, facility managers, contracting officers, lawyers, shop foreman, maintenance leaders, certified energy managers, etc. Although funding and timing remain a challenge, in FY 2016, the Coast Guard sent personnel to the following energy training events: 2015 Fall DOE FEMP ESPC Workshop, Greenbuild 2015, 2015 Fall Federal Utility Partnership Working Group (FUPWG) Seminar, 2016 Spring DOE FEMP ESPC Workshop, and 2016 DOE FEMP Energy Exchange.

The Coast Guard is leveraging its military logistic partnerships with the DLA and DLA-Energy to fulfill current and future fuel and energy requirements. The Coast Guard provided energy and fuel logistics training to District 7 in FY 2016. The event trained personnel for DLA-Energy's Enterprise External Business Portal (EEBP) & Invoicing, Receipting, Acceptance, and Property Transfers (iRAPT) systems to start utilizing DLA shore fuel tank contracts and better support operational units. This event overviewed the DLA-Energy procurement programs and covered fuel into aircraft, cutters, boats, and shore units, whether direct delivery from the vendor, or provided directly from a DLA Defense Fuel Supply Point (DFSP). The event also highlighted the latest energy and fuel policy, procedural information, environmental and energy awards program, Inter-Agency Agreements (IAAs) for fuel reimbursement, and the development and validation of Energy Logistics Support Plans (ELSPs).

The Coast Guard provides the acquisition community opportunities to participate in green procurement webinar training sessions (held throughout the year) sponsored by EPA, DOE, U.S. Department of Agriculture (USDA), GSA, and the Coast Guard Learning Management System (LMS).

*Agency outreach programs that include education, training, and promotion of ENERGY STAR® and other energy efficient and low standby power products for Federal purchase card users.*

The Coast Guard disseminates ENERGY STAR® and FEMP-rated product information to



field units and encourages use of these products. The Government Services Administration (GSA) and the ENERGY STAR® program also serve as sources for energy consumables.

**4. Use of Energy and Water Efficiency measures in Facilities Covered under EISA Section 432**

In compliance with EISA (2007) Section 432, the Coast Guard developed a covered facility list consisting of facilities which, in aggregate, consume more than 75% of Coast Guard shore energy. In June 2016, the Coast Guard completed its second round of audits on 100% of the covered facilities (as required by EISA (2007) Section 432) and has since begun, or is in the process of completing, audits on all facilities that were audited approximately four years ago. Currently, the Coast Guard is scheduled to meet the requirements for June 2017, having already developed an audit plan and secured contract support.

The Coast Guard has populated the Compliance Tracking System (CTS) with all ESPC and UESC projects for the required CTS project benchmarking.

The Coast Guard has entered facility water use data per the FY 2014 requirement.

The Coast Guard is also developing a facility benchmarking program that encompasses the covered facility list. The program will utilize the Environmental Protection Agency's (EPA) online ENERGY STAR® Portfolio Manager tool, that will be populated through a collaborative effort with the EPA. Upon completion, this will allow the Coast Guard to benchmark all covered facilities as required by EISA (2007) Section 432.

## SECTION 2 – Energy Efficiency Performance Summary

### A. Energy Intensity Reduction Performance Summary

**1. Goal Subject Buildings**

The Coast Guard compiles energy consumption and cost data from the Coast Guard Financial Center (FINCEN) utility database and field unit records. For the fourth consecutive year, the Coast Guard has also employed data using Energy Management Metrics (EM<sup>2</sup>). EM<sup>2</sup> is a data warehouse based on FINCEN data, DLA-Energy, and DHS Fleet Fuel credit card data streams. When direct-metered consumption is not available, the Coast Guard uses other internal financial performance data and statistical algorithms to generate consumption figures. This data is then used to populate the FEMP Greenhouse Gas (GHG) and Sustainability Data Report workbook.

In FY 2016, Coast Guard energy use intensity (BTU per square foot) decreased 2.45% compared to the 2015 baseline of 81,147 BTU per square foot.

The Coast Guard achieved this decrease in energy intensity based on several initiatives, including:

- Leveraged an Alternately-Financed Projects Green Book to execute comprehensive alternatively-financed projects including ESPCs, UESCs, and PPAs;
- Incorporated energy efficiency into new designs and renovations;
- Increased outreach and awareness program to help change the culture to incorporate and sustain energy efficiency throughout the Coast Guard;
- Expanded energy team to include strategic consultants for facility and tactical vehicle energy, as well as ad hoc team members throughout the organization;
- Deployed EM<sup>2</sup> and other energy management tools that enabled data validation and certification, thereby establishing robust internal controls over energy accounting, tracking, and consumption.

In FY 2016, the Coast Guard leveraged established, documented algorithms to account for and assign energy usage to real property. This process allowed the Coast Guard to compile energy data quicker, more often, and more consistently than before. In late FY 2016, this process was utilized to provide monthly data reports on most sites.

## 2. **Non-Fleet Vehicle and Equipment Fuel Use**

Coast Guard mobile energy consumption includes fuel consumed by cutters, boats, and aircraft and is referred to as 'tactical' fuel. The Coast Guard used data obtained from EM<sup>2</sup>, which is based on data feeds from the DLA-Energy and open market fuel credit card purchases.

Coast Guard cutters will interchange between military specification (MILSPEC) and commercial specification jet fuel, marine diesel, or diesel based on required mission and available supply. Overall, FY 2016 tactical fuel gallons were higher than FY 2015. Shore tie power consumption also increased. However, the shore tie increase is negligible. Additionally, overall fuel costs were lower in FY 2016 due to reductions in unit costs.

In late FY 2016, the Coast Guard promulgated a holistic Fuel Management Guide (FMG). The FMG directs end-users, based on asset-type, on introductory fuel management, fuel requirements planning, proper fuel obligation, fuel quality, and mandated Coast Guard fuel purchasing hierarchy. The FMG provides enumerated guidance on DLA-Energy and DHS fuel purchasing programs, along with step-by-step procedures. The Coast Guard developed the FMG as a singular solution to alleviate knowledge gaps that derived from multiple, legacy sources concerning fuel procurement and management.



## B. Renewable Energy

### 1. On-Site generated renewable energy

The Coast Guard evaluates viable and economically-sound renewable energy projects continually as part of planning new design and major retrofits. In FY 2016, the following major renewable energy projects were in operation:

#### Solar Water Heating

- Housing units in Honolulu, Hawaii
- Indoor swimming pool in Alameda, California
- Swimming pool in Petaluma, California
- Gymnasium in Portsmouth, Virginia

#### Photovoltaics (PV)

- 875 kW ground-mounted array in Petaluma, California
- 125 kW roof-mounted panels in Petaluma, California
- Roof panels in Southwest Harbor, Maine
- Lighted aids to navigation (ATON): 4,463 solar panel/battery powered light-buoys; 10,791 solar panel/battery powered lighted-fixed ATON totaling approximately 245 kW
- 2.89 MW roof-mounted panels in Puerto Rico
- 30.6 kW roof-mounted panels at Base Honolulu and Station Kauai, Hawaii
- Approximately 200kW of PV in small installations across the Coast Guard

#### Other

- Ground source heat pumps in Cape Cod, Massachusetts
- Landfill gas combined heat and power generation at the Coast Guard Yard, Baltimore, Maryland
- Biomass heat in Southwest Harbor, Maine
- 5kW vertical wind turbine at Air Station Barbers Point, Hawaii

#### Major Renewable Energy Projects in Process

- Recapitalization and improvement of the Renewable Energy Center at the Coast Guard Yard to increase electric and steam output
- Planning for a potential increase to the array in Petaluma, California
- Development of a project at the Coast Guard Academy that includes PV
- Discussions about PV at an existing project at Air Station Barbers Point, Hawaii

### 2. Purchased renewable energy





The Coast Guard uses PPAs as the primary purchase mechanism for renewable energy generated on Coast Guard property. The Coast Guard's largest operational PPA resides at Training Center (TRACEN) Petaluma, California. The Coast Guard also includes renewable energy as part of electricity contracts where cost-effective. An example includes Base Kodiak, Alaska. The Coast Guard receives Renewable Energy Credits (RECs) as part of electricity purchased from the local utility at no cost to the Coast Guard.

In FY 2016, the Coast Guard did not purchase RECs.

### C. Water Conservation

The Coast Guard compiles water consumption and cost data from the FINCEN utility database and field unit records. In FY 2007, the Coast Guard established a water intensity baseline of 38.4 Gal/GSF. In FY 2016, The Coast Guard achieved a 20.7% decrease as compared to the FY 2007 baseline.

This reduction is attributed to:

- the completion of water conservations projects included as part of ESPCs and UESCs,
- the identification and mitigation of water leaks,
- proactive water management programs at major facilities,
- and the inclusion of water conservation in energy projects.

Aided by enhanced data transparency and validity, the Coast Guard has removed a large amount of waste removal data from water purchases, leading to an additional reduction in water use when compared to the baseline.

### D. Metering of Electricity Use

The Coast Guard completed an enterprise-wide advanced meter installation (AMI) in FY 2012 and achieved compliance with EPACK 2005. The Coast Guard has standard meters at all its campuses, that account for 100% of the agency's electricity use.

Advanced electricity meters are installed at appropriate assets, which are defined as follows: buildings over 25,000 square feet, smaller facilities necessary for optimization of building operations, selected family housing communities, and electrical connections for tactical assets.

Upon completion of this metering project, the Coast Guard now has advanced electricity meters at 1,345 facilities and 252 tactical asset connection points.



Housing units included in the project were selected to maximize data collection efficacy. While the total quantity of appropriate buildings is less than previously estimated, it is expected that advanced meters will still monitor nearly 60% of the Coast Guard shore facility electricity consumption.

In line with EISA 2007, Coast Guard is beginning to add advanced natural gas and water meters to its infrastructure. At present, all campuses using natural gas and water are metered by the utility. As a result, 100% of Coast Guard gas consumption is recognized. Financial analyses show that an appropriate building must be over 75,000 square feet to require an advanced gas or water meter. At the end of FY 2016, the Coast Guard has 24 advanced natural gas meters and 73 advanced water meters installed.

Coast Guard facilities do not operate on purchased steam. Steam meter requirements do not apply.

In FY 2014, the Coast Guard began development of an enterprise-wide Energy Data Management System to compile, warehouse, and report all AMI data currently being collected. This system will centralize all AMI data and facilitate better analysis.

## E. Federal Building Energy Efficiency Standards

Since FY 2007, data has been provided for new building designs that have or possess a strong likelihood to receive construction funding, and where confirmed by representatives of the Coast Guard Office of Civil Engineering, COMDT (CG-43).

The Coast Guard is assessing the utilization of LEED® design and certification principles as a methodology to ensure a 30% energy efficient improvement over the applicable standard when life cycle cost effective.



## SECTION 3 – Implementation Highlights during FY 2016

### A. HIGHLIGHTS OF FY 2016

1.

#### a) Life-Cycle Cost Analysis

The Coast Guard Shore Facility Capital Asset Management (SFCAM) principles consider total ownership costs through the full life cycle of a facility, including energy costs.

#### b) Retrofits and Capital Improvement Projects

The Coast Guard uses several methods to accomplish energy-efficient retrofits and capital improvements. Methodologies include ESPCs as delineated below, cost-benefit assessment and specific energy efficiency projects funding, and traditional capital improvement projects where ENERGY STAR® or other energy efficient equipment is used.

In FY 2013, the Coast Guard commissioned a 1,400 square-foot Net Zero building at the Corona Del Mar mooring for the Coast Guard Cutter NARWHAL. This single-story building utilizes solar photovoltaic panels on the roof, yet maintains architectural integration with the surrounding neighborhood of beachfront homes. This building serves as an institutional template and highlights how energy security can be integrated effectively within mission support facilities. In November 2014, it was certified as a Net Zero building with one full year of Net Zero operation.

#### c) Use of Performance Contracts

##### i) Use of Energy-Savings Performance Contracts (ESPCs)

In FY 2016, the Coast Guard developed an Alternately-Financed Projects Green Book, which provides energy managers, civil engineers, acquisition and legal professionals standards for internal controls and effective management procedures related to Performance Contracts. This Green Book will facilitate the efficient execution of more impactful and affect Alternately-Financed Projects moving forward.

Additionally, the Coast Guard began construction on a modification to an ESPC at the Coast Guard Yard in Baltimore, Maryland. The modification includes six Energy Conservation Measures (ECMs), including optimizing Combined Heat and Power (CHP) operations, lighting upgrades, HVAC retrofits, and mechanical improvements, among others. This project will reconcile the shortfalls from below-expected landfill gas productions and ensure the Coast Guard payments are less than annual savings. The construction is scheduled for completion in February 2017. The new total contract value is \$48.3M with a 17-year performance period (ten years remaining), and is expected to save approximately 49 Billion BTUs.



### **ii) Use of Utility Energy Services Contracts (UESCs).**

In FY 2016, the Coast Guard awarded an UESC at Base Portsmouth, Virginia. The UESC will convert base heat from fuel oil to natural gas (while bringing a gas line onto the property), install a peak shaving generator, and include lighting and water improvements. Construction is currently underway and is nearing acceptance.

In FY 2016, the Coast Guard awarded an Investment Grade Audit (IGA) for an UESC at the Coast Guard Academy in New London, Connecticut. Project objectives are to convert the central heating plant from fuel oil #6 to natural gas, expand the central chiller plant, retrofit lighting and HVAC equipment, and install PV. This project has a target award of Q4 FY 2017.

### **iii) Use of Other Types of Contracts.**

In addition to direct obligations, the Coast Guard has embraced alternative financing as an approach to quickly implement projects to address the goals of EO 13693, EPACT 2005, and EISA 2007. The Coast Guard is in working on prioritizing the expansion of a PPA PV array at TRACEN Petaluma, California.

### **d) Use of ENERGY STAR® and Other Energy-Efficient Products**

The Coast Guard disseminates ENERGY STAR® and FEMP rated product information to its field units and encourages use of the products. GSA and their associated Energy Star program, also serves as a source for energy consumables.

### **e) Sustainable Building Design and High-Performance Buildings**

The Coast Guard applied the Green Building Council's LEED® principles to the design and construction of the Coast Guard Shore Operations Center in Seattle, Washington. To continue the leadership in sustainable building design, the Coast Guard submitted the Shore Operations Center for LEED® Existing Building certification. The Coast Guard submitted the Cutter NARWHAL support building, mentioned previously.

### **f) Energy Efficiency/Sustainable Design in Lease Provisions**



The majority of Coast Guard existing facility and vehicle leases follow GSA policies. The Coast Guard considers the projected lease rate structure along with energy costs when evaluating structures prior to entering into direct leases. The projected energy cost is a major consideration during the lease evaluation.

**g) Distributed Generation, including use on on-site renewable energy resources and combined cooling, heating, and power systems**

In FY 2016, 36 Billion BTUs of renewable energy were generated at Coast Guard locations nationwide. Key projects include:

- Solar PPA at TRACEN Petaluma, California
- Renewable energy center at Coast Guard Yard, Maryland
- Solar PV project in Puerto Rico





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