



**FY2014 COAST GUARD
ANNUAL GREENHOUSE GAS INVENTORY
AND ENERGY MANAGEMENT REPORT**

DECEMBER 2014





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SECTION 1 – Management and Administration Summary

Agency Information

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|-------------------------------|--|
| Agency | United States Coast Guard |
| Agency Contact(s) | Mr. Sam Alvord |
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A. Energy Management Infrastructure

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|----|-------------------------------|--|
| 1. | Senior Agency Official | Rear Admiral Michael Haycock |
| | | RDML Michael Haycock, Assistant Commandant for Engineering and Logistics, is the Senior Energy Official on behalf of the United States Coast Guard (USCG). He has overall responsibility for the design and implementation of energy policies, and practices within the USCG. |
| 2. | Agency Energy Team | Sam Alvord, Son Nguyen, Wayne Morris and Henry Langford |
| | | <p>Mr. Sam Alvord serves as the Chief of the Office of Energy Management for the USCG. He is responsible for planning, developing, organizing, instituting, and evaluating energy management initiatives and practices from technical, financial, and sustainable perspectives throughout the USCG. He is the USCG representative on the Department of Homeland Security (DHS) Energy Council and is the Head of the USCG Service Control Point (SCP) at Defense Logistics Agency – Energy (DLA-Energy).</p> <p>The Office of Energy Management is responsible for providing the policy direction and oversight necessary to ensure compliance with statutory requirements and Executive Order (EO) directives; conducting technical evaluations, life cycle costs and financial analyses for capital energy projects; recommending, developing, and issuing policy and procedures for procurement and management of Fuel Credit Card and the Electronic Fuel Purchasing Programs; overseeing development of a facility energy reporting system; acting as liaison with Program Chiefs at DLA-Energy on operational fuel issues; 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; directing Research and Development (R&D) energy initiatives by performing economic, market, and technical assessments; responding to Congressional and budget inquiries on energy issues; highlighting and championing energy efficiencies as an integral part of engineering and logistics; showcasing technology and publicizing USCG energy successes; piloting most appropriate state-of-the-art energy technologies and retrofits; and evaluating potential alternatively financed contracts including Energy Savings Performance Contracts (ESPC), Utility Energy Savings Contracts (UESC) and making financial and technical recommendations.</p> |

The USCG has two energy-related working groups known: the Sustainability Working Group, and the Fuel Management and Logistics Working Group. The former deals primarily with utility-related projects and services, while the latter deals with liquid petroleum and alternative fuel matters. The groups meet on a periodic basis and consist of representatives from operations, engineering, environmental, procurement, legal and finance. Both groups have been responsible for providing 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 Office of Energy Management.

B. Management Tools

1. Awards

As an incentive for implementation of proactive energy efficiency and conservation measures, the USCG participates in Department of Energy (DOE) and DHS-level award programs including annual FEMP Energy and Water Management Awards and DHS Sustainable Practices Awards. In addition, the USCG participates in acquisition award opportunities that highlight the unique procurement strategies the agency employs which include ESPCs, PPAs and UESCs. The USCG has also participated in FEMP outreach campaigns to recognize military and civilian energy stewards.

Moreover, the USCG sponsors an annual environmental and energy awards solicitation to promote and recognize achievements related to EO 13514 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 Office of Energy Management has promulgated policy concerning financial incentives for energy management, which under most circumstances directs 100% of earned utility rebates returned to the unit achieving the rebate. Additionally, protocol for internal recognition of USCG energy champions has been established 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 includes 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 USCG 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 13423. USCG Working Group members and others associated with energy management 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 are 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 non-technical disciplines.

In addition to in house information distribution, the USCG attended ESPC Comprehensive Workshops and held an internal Coast Guard Energy Efficiency Forum for Specification Writers and Engineers in August 2014. This forum provided training on energy efficient subsystems, high performance buildings, energy and sustainability assessments, retro commissioning, design vs. performance specifications, specification writing, and energy conservation measures (ECMs) ashore and afloat in order to comply with federal statutes. The training was sponsored by DHS Mission Sustainable Energy, who provided trainers from the Department of Energy's National Renewable Energy Lab (NREL). Targeted individuals were engineering leadership, engineers, specification writers, facility managers, shop foreman, maintenance leaders, certified energy managers, etc.

To supplement the facility management training, the USCG is leveraging its military logistic partnerships with DLA and DLA-Energy to fulfill current and future fuel and energy requirements. The CG provided Energy and Fuel Logistics Training to District 7 in July 2014. The event trained personnel for DLA-Energy's new 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 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 and provided detailed procedural information. This training is planned for District 5, District 9 and District 1 in FY 2015.

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 USCG disseminates Energy Star® and FEMP-rated product information to its field units and encourages use of the products. Government Services Administration (GSA) and their associated Energy Star® program, also serves as a source for energy consumables.

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

In compliance with EISA Section 432, the USCG has developed a Covered Facility list consisting of facilities which, in aggregate, consume 75% of USCG shore energy. In June 2012, the USCG had completed audits on 100% of the Covered Facilities (as required by EISA 432) and has since completed (or is in the process of completing) audits on all facilities that were audited more than four years ago. Currently, the USCG is scheduled to meet the requirements for June 2015, having already developed an audit plan and secured contract support.

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

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

Also in development is 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 which will be populated through a collaborative effort with the EPA. Upon completion, this will allow the USCG to benchmark all covered facilities as required by EISA Section 432.

SECTION 2 – Energy Efficiency Performance Summary

A. Energy Intensity Reduction Performance Summary

1. Goal Subject Buildings

The USCG compiles energy consumption and cost data from the USCG Financial Center (FINCEN) utility database, field unit records and, for the second year in a row, the USCG Total Energy Resource Reporting and Accounting (CG-TERRA) tool, which is based on DLA-Energy and the DHS FLEET Fuel credit card data streams. When directly metered consumption is not available, the USCG uses other internal financial performance data and statistical algorithms to generate consumption figures. This data is then formatted and entered into the FEMP GHG and Sustainability Data Report workbook.

In FY 2014, USCG energy use intensity (BTU per square foot) decreased 35.5% compared to 2003 baseline of 131,773 Btu per square foot.

The USCG was able to achieve this decrease in energy intensity due to the development of several initiatives including:

- Comprehensive use of alternatively financed contract vehicles including ESPCs, UESCs, and PPAs;
- Incorporation of 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 USCG;
- Expansion of the energy team to include strategic consultants for the facility and tactical vehicle energy as well as ad hoc team members throughout the organization;
- Deploying CG-TERRA and other energy management tools that enable data validation and certification, thereby establishing robust internal controls over energy accounting, tracking, and consumption.

In FY 2014, the USCG leveraged new, documented algorithms to account for and assign energy usage to real property. This new, documented process will allow the USCG to compile energy data quicker, more often, and more consistently than before.

2. Non-Fleet Vehicle and Equipment Fuel Use

USCG mobile energy consumption includes fuel consumed by cutters, boats, and aircraft.

The USCG used data obtained from CG-TERRA, which is based on data feeds from the DLA-Energy and open market fuel credit card purchases.

USCG cutters will interchange between the utilization of military specification and commercial specification jet fuel, marine diesel, or diesel based on required mission and available supply. Overall FY 2014 mobile fuel gallons were slightly higher than FY 2013

due primarily to better accounting for boat fuel consumption; additionally, overall fuel costs were greater in FY 2014.

B. Renewable Energy

1. On-site generated renewable energy

The USCG continually evaluates renewable energy projects for economic viability as part of planning of new design and major retrofits. In FY 2014, the following major renewable energy projects were in operation:

Solar Water Heating

- Housing units in Honolulu, HI
- Indoor swimming pool in Alameda, CA
- Swimming pool in Petaluma, CA
- Gymnasium in Portsmouth, VA

Photovoltaics (PV)

- 875 kW ground mount array in Petaluma, CA
- 125 kW of roof mounted panels in Petaluma, CA
- Roof Panels in Southwest Harbor
- Lighted aids to navigation – approximately 4.8 thousand solar panel/battery powered light-buoys; approximately 11.5 thousand solar panel/battery powered lighted-fixed aids to navigation
- 2.89 MW of roof mount PV in Puerto Rico
- Roof Panels at Net Zero Cutter NARWHAL facility

Other

- Ground source heat pumps in Cape Cod, MA
- Landfill gas combined heat and power generation at the USCG Yard
- Biomass heat in Southwest Harbor

Major Renewable Energy Projects in Process

- Recapitalization and improvement of the Renewable Energy Center at the USCG Yard to increase electric and steam output
- Planning for a potential increase to the array in Petaluma, CA

2. Purchased renewable energy

The primary purchase of renewable energy for the USCG is through the use of PPAs for renewable energy generated on USCG property. The largest operational PPA for the USCG is at TRACEN Petaluma. The USCG also includes renewable energy as part of electricity contracts where cost-effective, like at Base Kodiak where the USCG receives Renewable Energy Credits (RECs) as part of electricity purchased from the utility at no cost to the USCG. Additionally, the USCG purchased RECs as part of new construction where LEED® certification was being pursued.

C. Water Conservation

The USCG compiles water consumption and cost data from the FINCEN utility database and field unit records. In FY 2007, the USCG established a baseline of water intensity of 38.4 Gal/GSF. FY 2014 showed a decrease of 22.3% 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. Additionally, through better data transparency and validity, the USCG has been able to remove a large amount of non-water data from water purchases, leading to an additional reduction in water use when compared to the baseline.

D. Metering of Electricity Use

The USCG completed a major advanced meter installation (AMI) project in FY 2012 and achieved its goal in compliance with EPACT 2005. USCG has standard meters at all of its campuses, so 100% of its electricity can be accounted for. 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 USCG now has advanced electricity meters on 1,345 facilities and 252 tactical asset connection points. The housing units chosen for the project were selected to maximize the effectiveness of the collected data. Therefore, 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 USCG shore facility electricity consumption.

In line with EISA 2007, the USCG 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, so 100% of the 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 2014, the USCG has 22 advanced natural gas meters and 73 advanced water meters installed.

USCG facilities do not operate on purchased steam, so the steam meter requirement does not apply.

In FY 2014, the USCG began development of an enterprise wide Energy Data Management System to compile, warehouse, and report all AMI data currently being collected. This system, scheduled for completion in Q4 FY15, will centralize all AMI data and allow better analysis of the data.

E. Federal Building Energy Efficiency Standards

Data has been provided for new building designs, initiated since FY 2007, that have or possess a strong likelihood to receive construction funding, and where confirmed by representatives of the USCG Office of Civil Engineering. The USCG 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 2014

A. HIGHLIGHTS OF FY 2014

1.

a) Life-Cycle Cost Analysis

The USCG Shore Facility Capital Asset Management (SFCAM) principles consider total ownership costs through the full life cycle of a facility. Included in these costs are energy costs. The USCG Facilities Energy Manual, COMDINST M1000.7, outlines policy and procedures for life-cycle analysis in new construction and major renovation projects.

b) Retrofits and Capital Improvement Projects

The USCG accomplishes energy efficient retrofits and capital improvements through several methods. These include ESPCs as delineated below, through the cost-benefit assessment and funding of specific energy efficiency projects, and through traditional capital improvement projects where ENERGY STAR® or other energy efficient equipment is used.

In FY 2013, the USCG commissioned a 1,400 square-foot Net Zero building at the Corona Del Mar mooring for the USCG 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 effectively integrated within mission support facilities. As of October 2014, it is 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 2014, the USCG began formally developing a modification to an ESPC at the USCG Yard that includes adjusting Renewable Energy Center operations to assure the USCG accrues savings greater than required payments, as well as other lighting, HVAC, and mechanical improvements. The Investment Grade Audit (IGA) for the project was completed in August of 2014 and has a target award for mid FY 2015.

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

In FY 2014, the USCG awarded a UESC for comprehensive energy and water conservation projects at the Training Center in Petaluma, CA. The UESC includes 13 different ECMs including boiler upgrades, and energy monitoring and control system,

water conservation measures, and lighting upgrades, among others. The project is currently in the construction phase with completion and acceptance expected July 2015. The project had a contract value of \$4.9M, a ten-year performance period, and is expected to save 7,300 MBTU annually.

iii) Use of Other Types of Contracts.

In addition to direct obligations, the USCG has embraced alternative financing as an approach to quickly implement projects to addressing the goals of EO 13423, EPACT 2005, and EISA 2007. The USCG is in discussions with several other federal agencies to determine the viability of a multi-agency solar PV PPA for locations in Northern California.

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

The USCG 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

SFCAM principles balance sustainability design features with other operational requirements. The principles of the Green Building Council's LEED® were applied to the construction of the Shore Operations Center in Seattle, WA. To continue the leadership in sustainable building design the Shore Operations Center in Seattle is also being submitted for LEED® Existing Building certification, while the USCG Net Zero Cutter NARWHAL support building received LEED Gold in the Summer of FY 2014.

f) Energy Efficiency/Sustainable Design in Lease Provisions

The majority of the USCG facility leases follow the direction of GSA when leasing existing buildings and vehicles. When evaluating structures prior to entering into direct leases, the USCG considers the projected lease rate structure along with energy costs. 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 2014, 51.8 Billion BTUs of renewable energy were generated at USCG locations nationwide. Key projects include:

- Solar PPA at TRACEN Petaluma
- Renewable energy center at USCG Yard
- Solar PV project in Puerto Rico