5.0 Energy and Environment

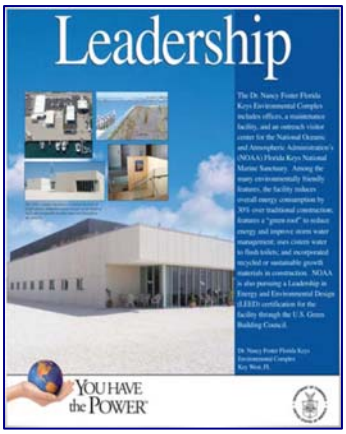
As a leader in understanding and predicting changes in the Earth's environment and managing coastal and marine resources, NOAA has the opportunity to be a leader in promoting the sustainable use of the Earth's resources. NOAA's facility program has a strategic, long-term goal to integrate environmentally-sound business practices in its planning, operations and management of NOAA's facilities. NOAA is committed to reducing consumption of energy and other natural resources, as well as reducing its contribution to greenhouse gas emissions. The following section summarizes NOAA's progress and challenges in becoming a "Green" organization.

NWS Weather Forecast Office at Miramar, CA 10 KW photovoltaic system shown on lower right

5.1 Summary of NOAA's Greening Successes

According to the 2007 IFIP data, 95 NOAA buildings reported implementing some type of energy improvement initiative, including the following: upgrading existing lighting with high efficiency lighting, water conservation improvements, installing programmable thermostats, in stalling lighting occupancy sensors, and HVAC energy improvements such as installation of geothermal heat pumps.

FY07 was also the year NOAA launched the "NOAA Green Team"—an internal working group with representatives across NOAA whose focus is to encourage and promote green practices at all NOAA locations. The NOAA Green Team uses many techniques to accomplish this goal, such as: analyzing NOAA's current business practices and comparing them to best practices; identifying opportunities for change that will achieve the desired reductions; educating staff on green and energy efficient business practices; developing and implementing NOAA-wide green business guidance; incorporating best practices into any plans for future construction, renovation, leases, structures and equipment; and monitoring NOAA's greening progress. To address specific greening programs, the NOAA Green Team launched five sub teams (bike commuting, carbon footprint reduction, electronic stewardship, sustainable design, and water conservation). As of May 2008, there are over 80 NOAA employees from all Line Offices participating on these greening teams.



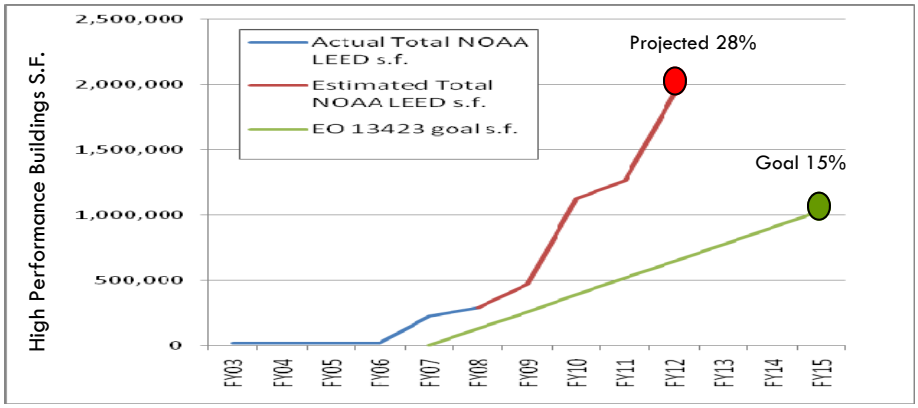
NOS's National Marine Sanctuary's Dr. Nancy Foster Complex (Key West, Florida) is featured in the Department of Energy "You Have the Power" poster series. The environmental friendly facility features a "green roof" to reduce energy consumption and improve storm water management, uses cistern water to flush toilets, and incorporated recycled or sustainable growth materials in construction. Overall energy consumption is reduced by 30 percent over a traditional facility.

5.2 Designing and Building High-Performance Facilities.

Executive Order (EO) 13423 mandate agencies achieve 15% total building square footage being high performance by FY 2012. NOAA has adopted the US Green Buildings Council's Leadership in Energy and Environmental Design (LEED) Silver level as its standard for new facility construction. As capital funding for construction or recapitalization of facilities is available, NOAA's adoption of the LEED Silver standard has enabled substantial progress in meeting the EO goal. As of May 2008, five NOAA facilities have received a LEED certification (for a total of 260,398 s.f.). Based on planned new facility construction, NOAA projects that it will exceed the 2012 EO target, with 28% of NOAA's facility square footage projected to meet the high performance

requirement by FY 2012; see Figure 7a showing NOAA's projected compliance with EO 13423. See Table 5 for a complete list of NOAA's certified and projected LEED-certified buildings.

Figure 7a: NOAA's Compliance with E.O. 13423



NOS's National Marine Sanctuary's Great Lakes Maritime Heritage Center (GLMHC), Alpena, Michigan, dedicated on September 17, 2005, received a LEED Gold rating on February 22, 2008. Energy conservation measures include a geothermal heat pump system with estimated energy savings of 41% as compared with a natural gas heating system.

E. Stewardship of NOAA Portfolio (continued)

Table 5: NOAA LEED© Registered and Certified buildings

Project Name	City	State	Ownership	Occupancy Year	LEED Certification & year
West Coast Alaska Tsunami Warning Center	Palmer	AK	DOC/NOAA	2003	"Certified" 2003
Caribou Weather Forecast Office	Caribou	ME	DOC/NOAA	2002	Silver, 2003
NOAA Satellite Operations Facility	Suitland	MD	GSA	2007	Gold 10/31/2007
Key West Weather Forecast Office	Key West	FL	DOC/NOAA	2005	Silver 2/13/2008
Great Lakes Maritime Heritage Center (GLMHC) - Thunder Bay NMS	Alpena	MI	DOC/NOAA Lease	2005	Gold 2/22/2008
Dr. Nancy Foster Florida Keys Environmental Complex	Key West	FL	DOC/NOAA	2006	*Silver Estimated FY08*
Ted Stevens Marine Research Institute	Juno	AK	DOC/NOAA	2007	*Estimated FY09*
David Skaggs Research Center	Boulder	CO	GSA	1999	*Estimated FY10*
Annette Island Weather Service Office and Upper Air Facility	Metlakatla	AK	DOC/NOAA	*Estimated 2008*	*Silver Estimated FY09*
Center for Weather and Climate Prediction	College Park	MD	GSA	*Estimated FY2009*	*Estimated FY2010*
Pascagoula Laboratory	Pascagoula	MS	DOC/NOAA	*Estimated FY2008*	*Silver Estimated FY09*
Cooperative Oxford Laboratory	Oxford	MD	DOC/NOAA	*Estimated FY2008*	*Silver Estimated FY09*
UCSB – Ocean Science Education Building	Santa Barbara	CA	Permit	*Estimated FY10*	*Gold Estimated FY11*
Monterey Bay NMS Visitor Center	Santa Cruz	CA	Permit	*Estimated FY11*	*Silver Estimated FY12*
Farallones – NMS Crissy Field Campus Renovation	Crissy Fields	CA	NOAA & National Park Service	*Estimated FY09*	*Silver Estimated FY10*
Sterling WFO - NOAA Relocation	Sterling	VA	DOC/NOAA	*Estimated FY2009*	*Estimated FY2009*
National Logistics Support Center & National Reconditioning Center	Kansas City	MO	GSA	*Estimated FY2012*	*Silver Estimated FY13*
WSO Upper Air Facility	Barrow	AK	DOC/NOAA	*Estimated FY2009*	*Silver Estimated FY10*
NOAA Pacific Regional Center, Ford Island	Honolulu	HI	DOC/NOAA	*Estimated FY 2014*	*Silver Estimated FY14*
SW Fisheries Science Center,	La Jolla	CA	DOC/NOAA	FY11	*Silver Estimated FY12*

Completed - Certified building with USGBC	In Construction - Building to LEED standards
Completed/awaiting Certification with USGBC - Built to LEED standards	Future - Planning/budgeting/design - to LEED standards

OAR's Great Lakes Environmental Research Laboratory (GRERL) research vessel (R/V) **SHENEHON** is one of six NOAA vessels operating on 100% biodiesel (B-100) (four OAR and two NMFS). OAR has three additional vessels operating on 85% ethanol and one operating on 100% pure ethanol.

5.3 Recycling Program.

Equally important to NOAA's greening success has been the recycling program across the nation at each facility. Through programs initiated local as NOAA facilities, it is estimated that NOAA's recycling rate is at 37%, surpassing the Environmental Protection Agency's (EPA's) 35% minimum rate.

5.4 Other Successes.

Converting NOAA vessels to biodiesel, installing green roofs to reduce storm water runoff and improve water quality, are other examples of NOAA "Greening" success stories.

350 s.f. Green Roof installed at OMAO's **Marine Operation Center – Atlantic** significantly reducing storm water runoff quantity and improving runoff quality.

5.5 NOAA's Carbon Footprint

NOAA has recently begun to measure its impact on carbon dioxide emissions—NOAA's carbon footprint. By using data from NOAA's FY07 Energy Report to Department of Energy, it is estimated that approximately 155,550 Metric Tons of carbon dioxide gas are released as a result of NOAA's operations. Figure 7b, shows the breakout of NOAA's major emission source. Further analysis of these data revealed that approximately 51% of NOAA's emissions are from facility operations. Establishing baseline data on NOAA's contribution to carbon emissions is an important first step to being able to measure the progress in reducing these emissions as a result of NOAA's "greening" efforts.

Figure 7b: Estimated Metric Tons of Carbon Dioxide

Facility operation's contribution to NOAA's overall carbon footprint is approximately 51% .

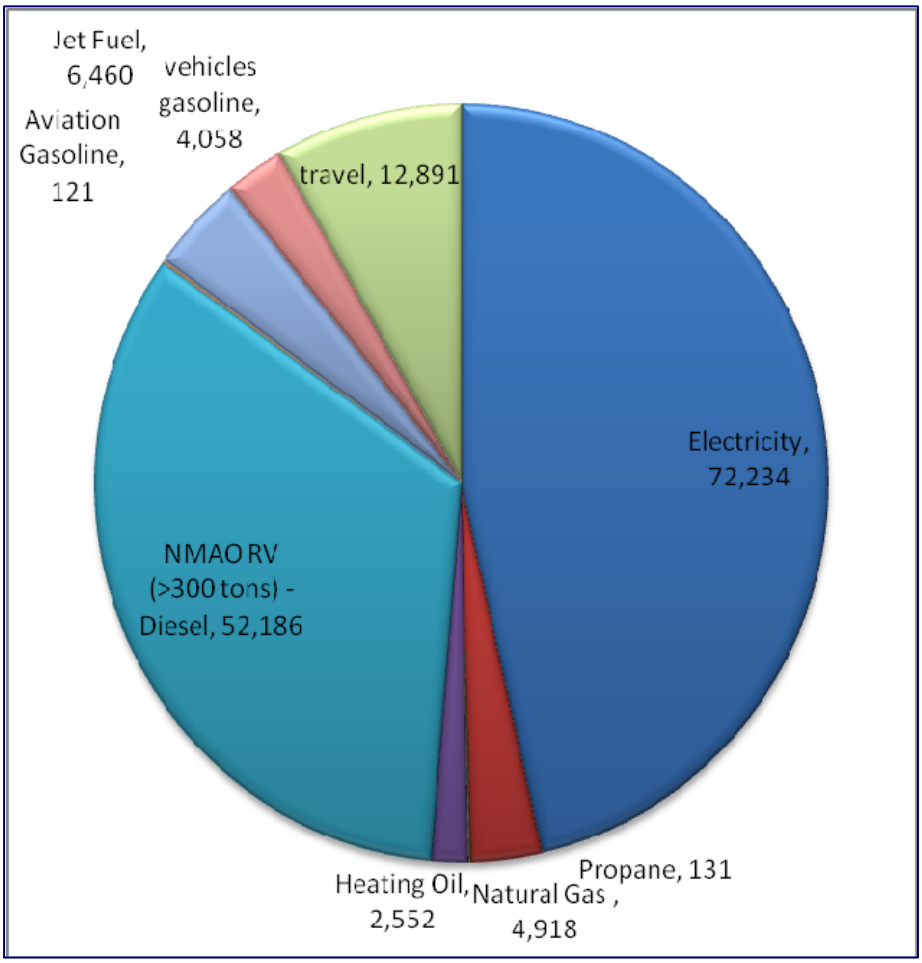
NOAA's Carbon Breakout *(estimated):*

Facility operations: 51%

Ships: 34%

Aircraft: 4%

Employee Travel: 11%



5.5 Challenges

NOAA faces two primary challenges in further advancing its efforts in energy and environmental stewardship:

- Aging facility portfolio and adequate levels of investment funding to modernize facilities; and,
- Data and performance measures.

The aging of NOAA's facilities (with more than 100 facilities being over 40 years old) and historical under-capitalization of investments to modernize and recapitalize these facilities has resulted in increasingly energy-inefficient building systems—such as electrical, HVAC, etc. Inadequate capital funding to modernize aged and inefficient building systems to become more energy and cost efficient continues to pose a significant challenge to greater progress. Similarly, NOAA faces challenges in its progress in increasing its reliance on Renewable Energy (RE) sources. In FY 2007, NOAA made only marginal progress towards EO 13423's 3% RE goal (based on NOAA's estimated energy consumption of 109,177 MWh). Figure 7c shows NOAA's FY 2007 RE progress.

Another challenge is NOAA's ability to capture, in an efficient and easy to use system, energy and water consumption at all NOAA facilities. Due to the geographic dispersion of NOAA's facilities, and current limitations in NOAA's data systems, accurate and easily obtainable energy data has been available only for NOAA's larger facilities; with data for NOAA's smaller facilities having to be estimated in most cases. Capturing NOAA's energy and water data is key to benchmarking NOAA's progress with the many energy reduction mandates and making sound investment decisions.

Figure 7c: NOAA's Renewable Energy (RE) Generation and Purchases at NOAA Sites