Renewable Energy Opportunities and Solutions

Agenda

- RCI Projects with Renewable Energy Components
- Importance of Renewable Energy
- Energy Mandates
- Points to Consider
- How the Army Acquires RECs
- RCI Renewable Energy Reporting Templates
- Balfour Beatty
- Lend Lease

RCI Projects with Renewable Energy

- **Hawaii Legacy Photovoltaic Film – 5.5 MW**
- **Hawaii Solar Panels (PPA) – 12.8 MW**
  - **Current Rate = $0.28 kWh**
  - **New Rate = $0.085 kWh**
- **Hawaii Solar Thermal – Projected to save 3.2 Million kWh/year**
- **Fort Bliss Solar Panels – 13.2 MW**
  - **Current Rate = $0.07 kWh**
  - **New Rate = $0.07 kWh**
- **Monterey Solar Panels – 5.2 MW (Pending Execution)**
  - **Current Rate = $0.21 kWh**
  - **New Rate = $0.12 kWh**
- **Fort Carson Solar Panels – 13.4 MW (Under Review)**
- **Aberdeen Proving Grounds Solar Array – 3.5 MW (Under Review)**

Importance of Renewable Energy

- **Reduces Utility Expenses**
- **Meets Army Energy Mandates/Army obtains RECs**
- **Environmentally Friendly – Contributes to Net Zero Goals**
- **Potentially Enables Energy Security**

Energy Mandates

Mandate Topic	Energy Performance Target [Source]
Energy use in Federal buildings	• Reduce 3% per year to total by 30% by 2015 (2003 baseline) [EO 13423, EISA 2007]
GHG emission reduction	• Identify GHG emission reduction targets to be met by 2020 from 2008 baseline [EO 13514] • Army target – 34% [SA Memo to OSD]
Energy metering for improved energy management	• Meter electricity by Oct 2012 [EPACT 2005] • Meter natural gas and steam by Oct 2016 [EISA 2007]
Electricity use for federal government from renewable sources	• At least 3% of total electricity consumption (FY07-09), 5% (Fy10-12), 7.5% (FY13 +) [EPACT 2005, NDAA 2007]
Total consumption from renewable sources	• At least 50% of required annual renewable energy consumed from “new” renewable sources [EO 13423] • 25% by 2025 -”Sense of Congress” [EISA 2007]
Hot water in new / renovated federal buildings from solar power	• 30% by 2015 if life cycle cost-effective [EISA 2007]
Fossil fuel use in new / renovated Federal buildings	• Reduce 55% by 2010; 100% by 2030 [EISA 2007]
Net zero buildings	• All new buildings entering design in 2020 and after achieve net zero energy by 2030 [EO 13514] • New federal buildings achieve net zero by 2030 [EISA 2007]
Fleet vehicle petroleum consumption	• Reduce 20% by 2015 (Base 2005) [EISA 2007] • Reduce by 2% per year thru FY2020 (Base 2005) [EO 13423, EO 13514]
Fleet vehicle alternative fuel use	• Increase 10% by 2015 (Base 2005) [EISA 2007] • Increase by 10% annually to reach 100% (Base 2005) [EO 13423]
Water consumption	• Reduce consumption intensity by 2% annually FY 08-FY 15 (2007 baseline) [EO 13423] • Reduce consumption by 2% annually for 26% total by FY 2020 (2007 baseline) [EO 13514]

Energy Mandates

Federal Mandate	Energy Topic	Energy Performance Target
Executive Order 13423	Energy use in Federal buildings	• Reduce 3% per year to total by 30% by 2015 (2003 baseline)
	Total consumption from renewable sources	• At least 50% of required annual renewable energy consumed from “new” renewable sources
	Fleet vehicle alternative fuel use	• Increase by 10% annually to reach 100% (Base 2005)
Energy Independence and Security Act of 2007	Total consumption from renewable sources	• 25% by 2025 -”Sense of Congress”
	Hot water in new / renovated federal buildings from solar power	• 30% by 2015 if life cycle cost-effective
	Fossil fuel use in new / renovated Federal buildings	• Reduce 55% by 2010; 100% by 2030
Executive Order 13514	GHG emission reduction	• Identify GHG emission reduction targets to be met by 2020 from 2008 baseline • Army target – 34% [SA Memo to OSD]
	Net zero buildings	• All new buildings that enter design in 2020 and after achieve net zero energy by 2030 [EO 13514]
	Water consumption	• Reduce consumption by 2% annually for 26% total by FY 2020 (2007 baseline) [EO 13514]
National Defense Authorization Act, 2010	Renewable Fuels Use	• Directs the Secretary of Defense to consider renewable fuels in aviation, maritime, and ground transportation fleets.
	Facility Renewable Energy Use	• Produce or procure renewable 25 percent of the total quantity of facility energy needs, including thermal energy, from renewable sources starting in fiscal year 2025

Energy Mandates

Directive Topic	Energy Performance Target [Source]	Potential Army Metric
Federal buildings energy use	Reduce by 30% by 2015 from 2003 baseline [EO 13423, EISA 2007]	% Installation energy savings relative to 2003 baseline
Non-tactical vehicle (NTV) fuel consumption	Reduce 2% annually through 2015, 20% total by 2015 - 2005 baseline [EO 13423]	% NTV fuel savings relative to 2005 baseline
Electricity from renewable sources	A voluntary “sense of Congress” goal - 25% by 2025 [EISA 2007, NDAA 2007]	% of Army energy use provided by renewable / alternative sources
Fossil fuel use in new / renovated buildings	Reduce 55% by 2010; 100% by 2030 relative to 2003 level [EISA 2007]	% Fossil fuel use reduction in new / renovated buildings relative to 2003 level
Hot water in new/ renovated buildings from solar power	30% by 2015 if life cycle cost-effective [EISA 2007]	% of new / renovated buildings with hot water from solar
Non-petroleum fueled vehicles use (ethanol, natural gas)	Increase by 10% annually [EO 13423]	% annual increase in non-petroleum fueled vehicle use
Energy metering for improved energy management	Meter electricity by Oct 2012 [EPAct 2005] Meter natural gas and steam by Oct 2016 [EISA 2007]	% completion of metering planned for electricity, natural gas and steam

Points to Consider

- **Renewable Energy Projects are submitted via the Major Decisions process**
  - **CVD has lead and will coordinate with EITF as necessary**
- **Current Utility Rates vs. Future Rates**
- **Infrastructure Impacts/Capacity**
- **State Laws**
- **Execution Vehicle – PPA vs. Lease**
- **Buy America Act**

How Army Obtains RECs

Provider → Project Company → Army (via Ground Lease)

- **Ground Lease Amendment is required to obtain the Renewable Energy Credits (RECs)**

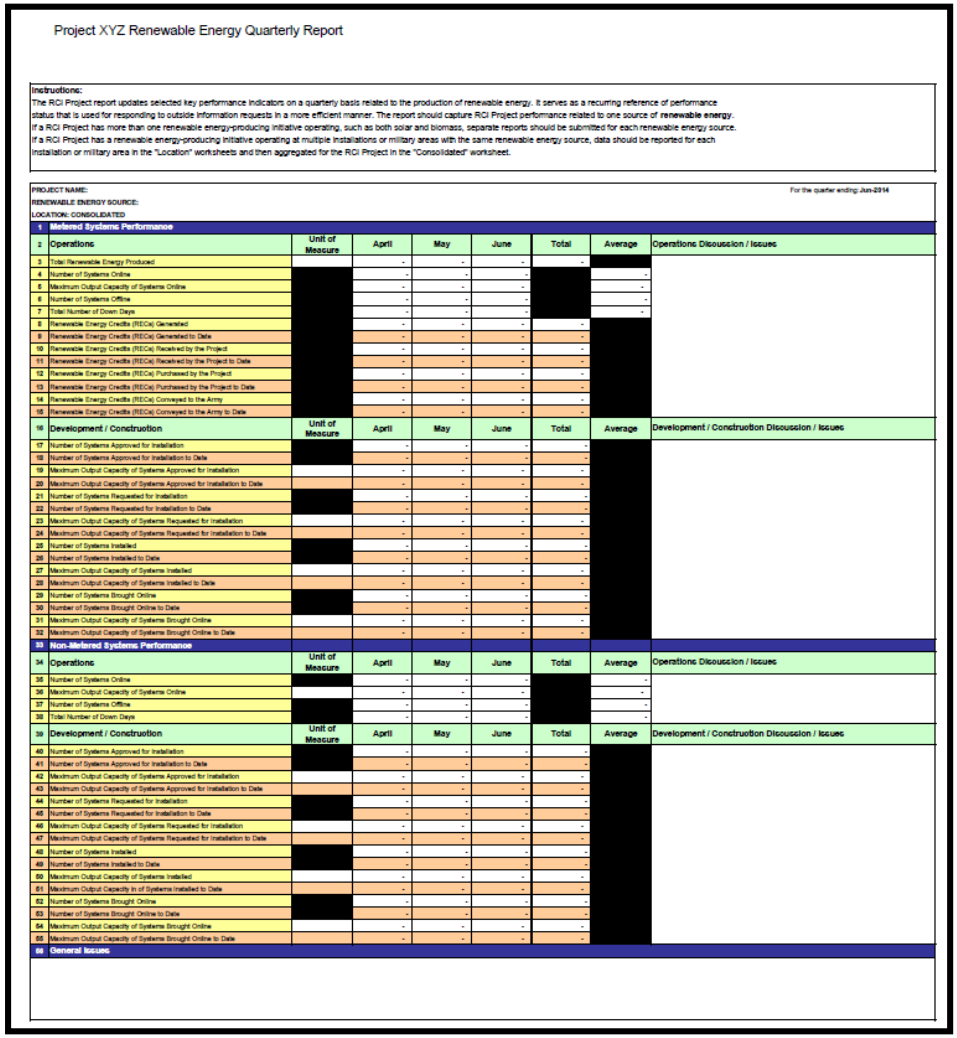
The Lessee, only with the prior written approval of the Lessor and consistent with the terms of this Ground Lease, may use those Sites and Improvements specifically identified for such purpose by the Lessor, for the generation of Renewable Energy by executing appropriate agreements with a third party (the "Renewable Energy Agreements").

The Lessee shall: (1) submit the material proposed transaction plan and draft agreements to the Lessor for written approval prior to substantial development of a deal that would result in project company resources spent or assurances given related to the renewable energy project with any third party, (2) ensure Renewable Energy Agreements (a) include provisions that protect the Lessor against a default by any of the parties to the Renewable Energy Agreements; (b) do not allow for or convey a sub-lease, or otherwise create a real estate interest of any type in the Project; and (c) in no way place a mortgage, encumbrance and/or lien upon the Project without an additional expressed written approval of and consent by the Lessor, and (3) submit final draft Renewable Energy Agreements for written approval of the Lessor prior to execution by the Lessee and the third parties.

The Lessee shall transfer all available Renewable Energy Credits (RECs) that may be generated as a result of the Renewable Energy transaction to the Lessor as compensation under this Lease, unless the Lessor provides its express written approval otherwise. Once delivered, the RECs shall become the property of the Government, and the Government shall own all Renewable Energy Attributes.

RCI Renewable Energy Reporting Templates

- **Operations and Development Reporting Template provides performance data on energy generation, production capacity, REC transfer process and installation progress of systems**
- **Data requested for both metered and non-metered renewable energy systems**
- **Requested data will be provided to EITF to address their reporting requirements**
- **Templates are to be submitted on a quarterly basis 15 days after the end of the quarter**
- **Separate reports should be submitted each quarter for different renewable energy sources (ex. solar, biomass, etc)**



Project XYZ Renewable Energy Quarterly Report

Instructions:
The RCI Project report updates selected key performance indicators on a quarterly basis related to the production of renewable energy. It serves as a recurring reference of performance status that is used for responding to outside information requests in a more efficient manner. The report should capture RCI Project performance related to one source of **renewable energy.**
If a RCI Project has more than one renewable energy-producing initiative operating, such as both solar and biomass, separate reports should be submitted for each renewable energy source.
If a RCI Project has a renewable energy-producing initiative operating at multiple installations or military areas with the same renewable energy source, data should be reported for each installation or military area in the "Location" worksheets and then aggregated for the RCI Project in the "Consolidated" worksheet.

PROJECT NAME:
RENEWABLE ENERGY SOURCE:
LOCATION: CONSOLIDATED
For the quarter ending: Jun-2014

1	**Metered Systems Performance**							
2	**Operations**	**Unit of Measure**	**April**	**May**	**June**	**Total**	**Average**	**Operations Discussion / Issues**
3	Total Renewable Energy Produced		-	-	-	-		
4	Number of Systems Online		-	-	-		-	
5	Maximum Output Capacity of Systems Online		-	-	-		-	
6	Number of Systems Offline		-	-	-		-	
7	Total Number of Down Days		-	-	-		-	
8	Renewable Energy Credits (RECs) Generated		-	-	-	-		
9	Renewable Energy Credits (RECs) Generated to Date		-	-	-	-		
10	Renewable Energy Credits (RECs) Received by the Project		-	-	-	-		
11	Renewable Energy Credits (RECs) Received by the Project to Date		-	-	-	-		
12	Renewable Energy Credits (RECs) Purchased by the Project		-	-	-	-		
13	Renewable Energy Credits (RECs) Purchased by the Project to Date		-	-	-	-		
14	Renewable Energy Credits (RECs) Conveyed to the Army		-	-	-	-		
15	Renewable Energy Credits (RECs) Conveyed to the Army to Date		-	-	-	-		
16	**Development / Construction**	**Unit of Measure**	**April**	**May**	**June**	**Total**	**Average**	**Development / Construction Discussion / Issues**
17	Number of Systems Approved for Installation		-	-	-	-		
18	Number of Systems Approved for Installation to Date		-	-	-	-		
19	Maximum Output Capacity of Systems Approved for Installation		-	-	-	-		
20	Maximum Output Capacity of Systems Approved for Installation to Date		-	-	-	-		
21	Number of Systems Requested for Installation		-	-	-	-		
22	Number of Systems Requested for Installation to Date		-	-	-	-		
23	Maximum Output Capacity of Systems Requested for Installation		-	-	-	-		
24	Maximum Output Capacity of Systems Requested for Installation to Date		-	-	-	-		
25	Number of Systems Installed		-	-	-	-		
26	Number of Systems Installed to Date		-	-	-	-		
27	Maximum Output Capacity of Systems Installed		-	-	-	-		
28	Maximum Output Capacity of Systems Installed to Date		-	-	-	-		
29	Number of Systems Brought Online		-	-	-	-		
30	Number of Systems Brought Online to Date		-	-	-	-		
31	Maximum Output Capacity of Systems Brought Online		-	-	-	-		
32	Maximum Output Capacity of Systems Brought Online to Date		-	-	-	-		
33	**Non-Metered Systems Performance**							
34	**Operations**	**Unit of Measure**	**April**	**May**	**June**	**Total**	**Average**	**Operations Discussion / Issues**
35	Number of Systems Online		-	-	-		-	
36	Maximum Output Capacity of Systems Online		-	-	-		-	
37	Number of Systems Offline		-	-	-		-	
38	Total Number of Down Days		-	-	-		-	
39	**Development / Construction**	**Unit of Measure**	**April**	**May**	**June**	**Total**	**Average**	**Development / Construction Discussion / Issues**
40	Number of Systems Approved for Installation		-	-	-	-		
41	Number of Systems Approved for Installation to Date		-	-	-	-		
42	Maximum Output Capacity of Systems Approved for Installation		-	-	-	-		
43	Maximum Output Capacity of Systems Approved for Installation to Date		-	-	-	-		
44	Number of Systems Requested for Installation		-	-	-	-		
45	Number of Systems Requested for Installation to Date		-	-	-	-		
46	Maximum Output Capacity of Systems Requested for Installation		-	-	-	-		
47	Maximum Output Capacity of Systems Requested for Installation to Date		-	-	-	-		
48	Number of Systems Installed		-	-	-	-		
49	Number of Systems Installed to Date		-	-	-	-		
50	Maximum Output Capacity of Systems Installed		-	-	-	-		
51	Maximum Output Capacity in of Systems Installed to Date		-	-	-	-		
52	Number of Systems Brought Online		-	-	-	-		
53	Number of Systems Brought Online to Date		-	-	-	-		
54	Maximum Output Capacity of Systems Brought Online		-	-	-	-		
55	Maximum Output Capacity of Systems Brought Online to Date		-	-	-	-		
56	**General Issues**							

RCI Renewable Energy Reporting Templates

- **Finance Reporting Template provides performance data on dollar value of energy cost savings and rates charged**
- **Templates are to be submitted on a quarterly basis 45 days after the end of the quarter**
- **Separate reports should be submitted each quarter for different renewable energy sources (ex. solar, biomass, etc)**

Project XYZ Renewable Energy Quarterly Report

Instructions:
The RCI Project report updates selected key performance indicators on a quarterly basis related to the production of renewable energy. It serves as a recurring reference of performance status that is used for responding to outside information requests in a more efficient manner. The report should capture RCI Project performance related to one source of **renewable energy**. If a RCI Project has more than one renewable energy-producing initiative operating, such as both solar and biomass, separate reports should be submitted for each renewable energy source. If a RCI Project has a renewable energy-producing initiative operating at multiple installations or military areas with the same renewable energy source, data should be reported for each installation or military area in the "Location" worksheets and then aggregated for the RCI Project in the "Consolidated" worksheet.

PROJECT NAME: For the quarter ending: Jun-2014
RENEWABLE ENERGY SOURCE:
LOCATION: CONSOLIDATED

1	**Metered Systems Performance**							
2	**Finance**	**Unit of Measure**	**April**	**May**	**June**	**Total**	**Average**	**Finance Discussion / Issues**
3	Cost Savings Realized from Total Renewable Energy Produced		$ -	$ -	$ -	$ -		
4	Rate per Unit Non-Renewable Energy		$ -	$ -	$ -		$ -	
5	Rate per Unit Renewable Energy		$ -	$ -	$ -		$ -	
6	Rate per Unit Other Charges		$ -	$ -	$ -		$ -	
7	**General Issues**							

Balfour Beatty Awards

- **2014 Awards**
  - **Association of Energy Engineers (AEE) Region IV Renewable Energy Project of the Year – Fort Bliss Family Housing**
  - **AEE Region IV Renewable Energy Innovator of the Year – Jeff Downing**
  - **International Green Apple Environment Award – Fort Bliss Family Housing Emerald Homes**
  - **International Green Apple Environment Award – Renovation & Construction Team**
  - **National Green Building Standard Partner of Excellence Award – Exemplary Advocate Hayley King**
- **2013 Awards**
  - **Hermes Creative Award**
  - **National Green Building Standard Partner of Excellence Award (World's Largest Emerald Rated Community)**
  - **NAHBGreen 2013 'Low-rise Multifamily of the Year' Award**

Balfour Beatty Energy Initiatives

- **MHPI initiated or in approval rooftop PV:**
  - **13.3 MW Fort Bliss, TX**
  - **13.4 MW Fort Carson, CO**
  - **9.3 MW Navy NE**
- **Participate in Better Buildings Challenge's 20% energy reduction by 2020**

Balfour Beatty Sustainability Initiatives

- **In 2013, BBC Renovation & Construction Team surpassed its goal of 50% waste reduction**
  - **72% portfolio-wide waste reduction of commercial and demolition waste**
  - **Diverted 97% of construction and demolition waste from the landfill at Fort Leonard Wood**
- **In 2013, Switch4Good Resident Program produced 15% energy reduction with no home retrofits & was funded by Dept of Energy grants**
- **Fort Bliss Family Housing began installing the world's largest NGBS Emerald and solar-powered community**
- **Pursuing NGBS Gold for 85 homes and 4-star Land Development Certification in the Marseilles Village community**

Sustainability Spotlight: Fort Bliss Emerald Community

- **250 Multifamily units certified National Green Building Standard Emerald – the highest achievable**
- **13.3 MW of PV rooftop solar integrated to be shared by all housing footprint, offsetting 26 – 39% of housing energy needs**

Green Features	Annual kWh Savings	Annual $ Savings*
R-15 in exterior walls	371	$27.05
R-38 blown & batt fiberglass combination	124	$9.08
Low-E double pane windows with argon gas and window tinting	330	$24.12
16 SEER HVAC	771	$56.31
GE hybrid electric water heater	3,435	$250.73
Energy efficient refrigerator	215	$15.72
Total	5,247 kWh/unit	$383/unit

**Based on 2013 energy rate of $0.07/kWh*

Balfour Beatty Community Initiatives

- **Regeneration program has delivered 3,308 man-hours of volunteerism in local communities in 2013**
- **All employees can take 2 days' paid volunteer leave**
- **In 2013, BBC awarded 32 academic scholarships to children of active duty service members living in our communities**
- **Travis AFB donated over $2,200 to local schools with money raised from recycling efforts**

Lend Lease DoD Energy Strategy

Building Energy Management System

- Leverage technologies to provide demand management
- Resident education to support sustained energy conservation
- Accurate measurement and verification

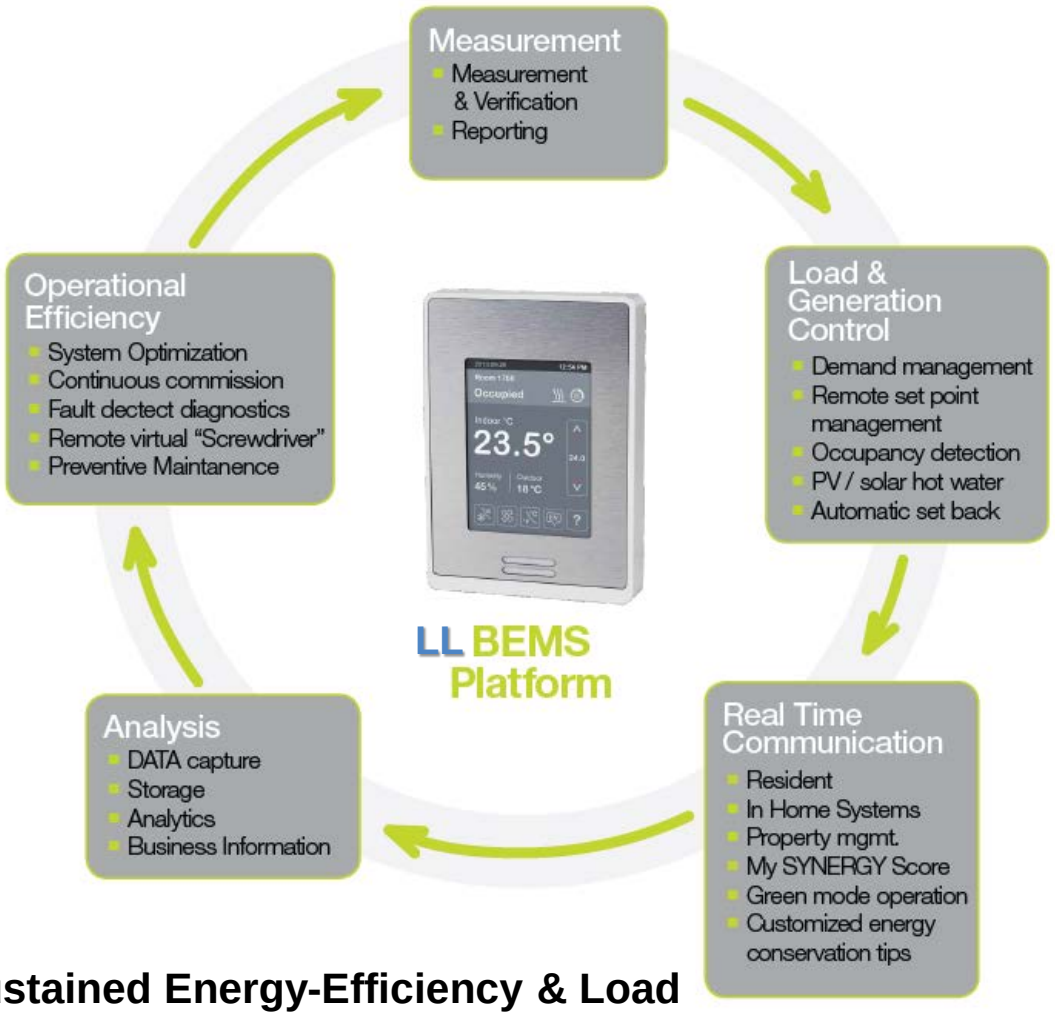
Green Retrofit

- Assessment of current state of built environment
- Implement customized whole building energy conservation measures to reduce consumption

Energy Production

- Incorporate renewable energy systems such as solar PV, solar hot water, geothermal, etc., to reduce grid consumption
- Onsite distributed solutions

Building Energy Management Systems (BEMS)



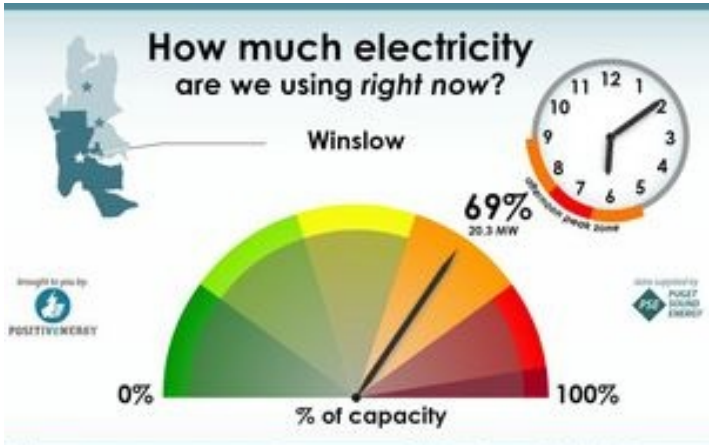
Energy Savings Results at Pilot Projects over last 10 months:

- **Ft Campbell, KY 8%**
- **IPC, Hawaii 11%**
- **Ft Hood, TX 16%**

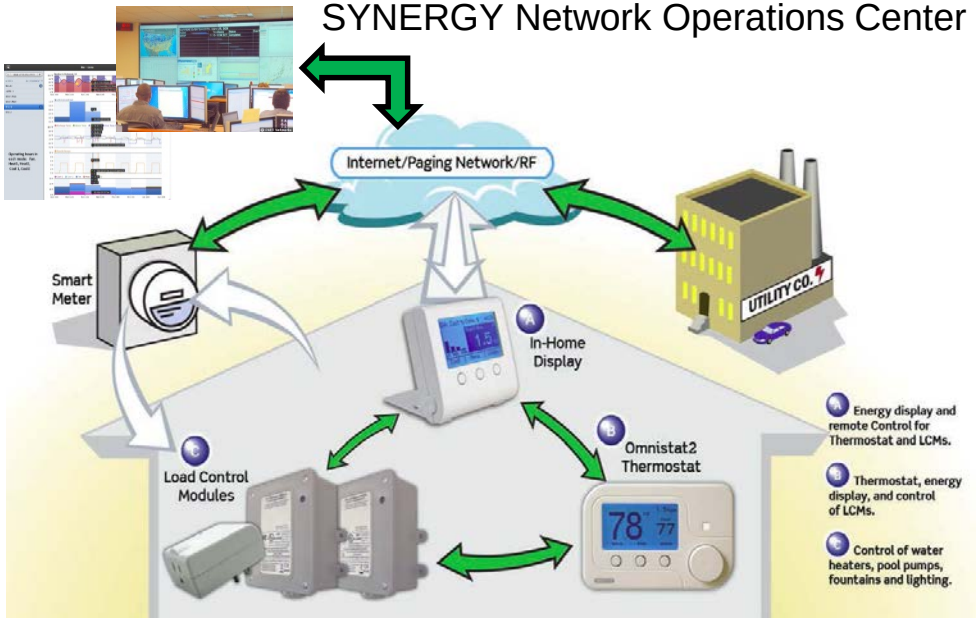
Sustained Energy-Efficiency & Load Reduction with Smart Technology & in-home SYNERGY Dashboard

BEMS Feedback Loop

- **Provide real time feedback to residents via “Energy Speedometers”**
  - **In home display**
  - **Simple gauge of progress**
  - **Could be tied to RECP Goals**



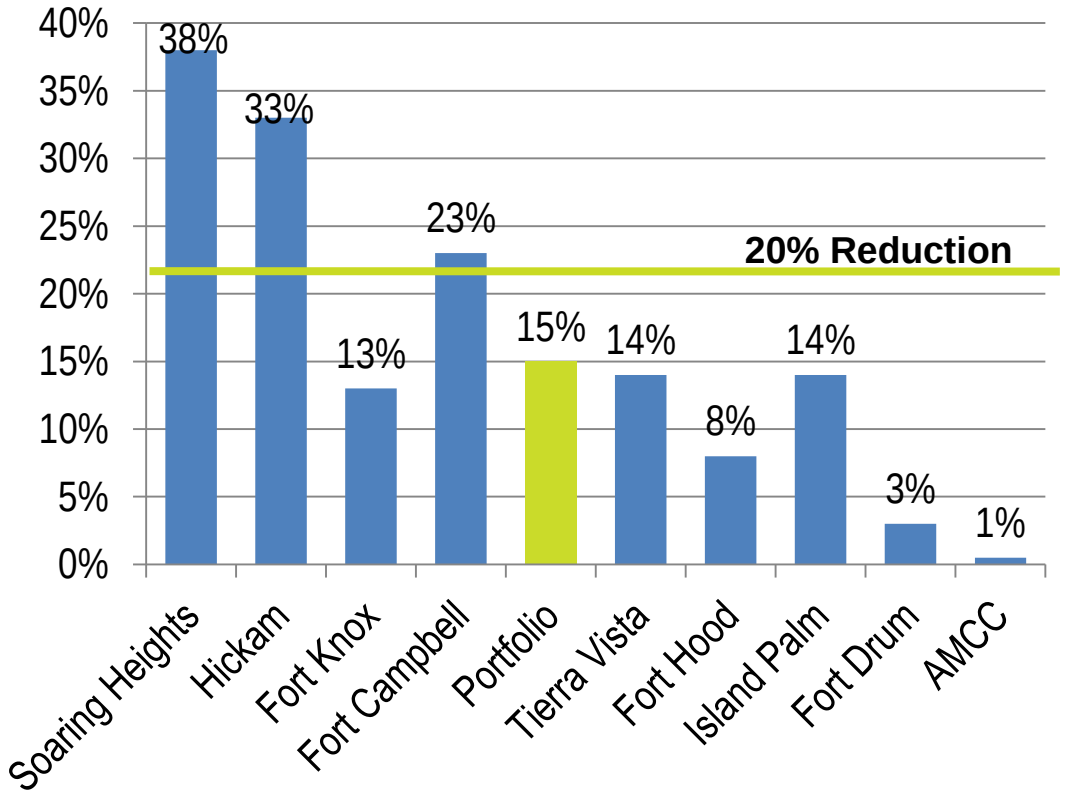
SYNERGY Network Operations Center (NOC)



- **Real time Feedback to Projects**
  - **Operational Performance**
  - **Mechanical issues**
  - **Tracking energy project results (M&V tool)**

Current Energy Consumption vs. Better Buildings Challenge Commitment

Lend Lease accepted President Obama's challenge and is committed to achieving at least a 20% energy-reduction for our entire MHPI portfolio.



Across our Army portfolio, we are launching a series of green retrofit and building energy management programs that encourage conservation and resident engagement in addition to our generation targets.

* North Haven (Fort Wainwright and Fort Greely) is excluded due to project start date.

Solar Pipeline – Future Opportunities

Project	Location	Role	Type	MW
Island Palm Communities	Oahu, HI	Owner / Developer / Builder	PV – Rooftop – Additional Capacity to existing PPA, working with SolarCity	16.00
Hickam Communities	Oahu, HI	Owner / Developer / Builder	PV – Rooftop – Additional Capacity to existing PPA, working with SolarCity	4.00
AMCC at Camp Lejeune	Jacksonville, NC	Owner / Developer / Builder	PV – Rooftop	8.00
Fort Hood Family Housing	Killeen, TX	Owner / Developer / Builder	PV – Rooftop	8.00
Knox Hills	Fort Knox, KY	Owner / Developer / Builder	PV – Rooftop	6.00
AMCC at Tri-Command	Beaufort, SC	Owner / Developer / Builder	PV – Rooftop	6.00
Unsolicited Proposals	Multiple	Developer/Builder	Under Development	20.00
ARMY MATOC	Multiple	Developer/Builder	Lend Lease PP awarded Solar MATOC on 8/27/13.	50.00
Total				100+

Zero Energy Homes – Fort Campbell, KY

Zero Energy Homes

- **Designed by modifying large-scale production house plans and constructed using state-of-the-art technology in building materials and techniques.**
- **Features include: HVAC ground source heat pump, solar water heating system, automatic window awnings, and photovoltaic arrays (solar panels).**
- **The design concepts and expected resident behavior are modeled to achieve a 54% reduction in energy consumption. The remaining 46% is off-set through a roof-mounted PV solar panel system.**
- **The combination of technology and resident education will achieve a true zero energy home.**

Ground Source Heat Pumps – Fort Knox, KY

KnoxHILLS
A Lend Lease Community

Ground Source Heat Pumps

- **The Knox Hills project team is currently installing Ground Source Heat Pumps (GSHP) on all new homes. To date they have completed:**
  - **676 homes**
  - **1 community center**
  - **1 welcome center**
- **The project is one of the largest GSHP communities on a military installation.**

North Haven – Forts Wainwright & Greely, AK

Resource Management: White Goods Initiative

- During its inception in 2009, North Haven created a White Goods Reuse Program that continues to achieve excellent sustainable successes.
- North Haven partnered with local organizations and philanthropic businesses to reroute over 400 appliances from the waste stream, finding them homes with low income individuals in the surrounding communities.
- Three of the major recipients of the donated appliances were Interior Regional Housing Authority (IRHA), the Salvation Army and the Fairbanks Chapter of the National Association for the Advancement of Colored People (NAACP)

Circulation Pump Conservation Program

- NHC has nearly 6,000 circulation pumps in operation throughout FWA and FGA
- Current pumps consume significant electricity and continue to fail at excessive rates.
- NHC has identified a recirculation pump that will replace the pumps that are currently in use; the new pump is energy efficient and can reduce electrical consumption by 20% or greater and will provide a more reliable/long-term operation which will help to reduce maintenance related costs. We will be able to realize the electrical savings in Siku Basin where we currently have electrical metering in place, but we will not be able to realize the energy reduction on the remainder of Fort Wainwright due to the fact that there is no electrical metering data available.
- NHC is currently working with the Director of Maintenance and the Design Builder to develop a design, costs, scope of work, and a schedule to supply and install the pumps.

North HAVEN
A Lend Lease Community

Fort Drum Mountain Community Homes – Fort Drum, NY

Fort Drum Mountain COMMUNITY Homes
A Lend Lease Community

SYNERGY Rewards

- **Web-based program that actually rewards families with conservation credits for conserving energy. Credits can be saved and redeemed for popular merchandise. The SYNERGY Rewards program is designed to educate residents and encourage a whole-family approach to achieving conservation.**

ENERGY STAR®

- **Since 2007, all newly constructed homes are certified as "New York ENERGY STAR® Labeled Homes" under guidelines from the New York Energy Research and Development Authority (NYSERDA) Partnership Agreement.**
- **Homes built prior to 2007 are retro-fitted to meet NYSERDA standards, which are significantly more stringent than typical EPA ENERGY STAR® labeled homes and use approximately 30% less energy than conventional homes.**