US Department of Agriculture
Green Buildings
Office of Operations
Agricultural Research Service
The Forest Service
Animal Plant Health Inspection Service
Farm and Foreign Agriculture Services

ISWG Meeting
September 19, 2013
Today’s Talk …

- USDA, a composite of –
  - multiple agencies
  - seven mission areas, functionally diverse,
  - geographically remote facilities

- Sustainable building measurement and progress

- USDA Facilities and Sustainable Buildings work groups
Today’s Talk …

- USDA agencies put ideas into action at Office of Operations, Agricultural Research Service, Forest Service, and Animal Plant Health Inspection Service
- Approaches, opportunities, challenges, results, rewards, & recognition in achieving sustainability
- Specific new construction and O & M strategies
- Sustainable 3rd party certified buildings under the LEED and Green Globes systems
• USDA has 103,000 employees and steward of 58 million GSF in 21,328 public/private buildings in 31,836 domestic locations;
• USDA manages 30.8 million square feet within 2,292 buildings over 5,000 GSF.
USDA land-holding agency practices
Measuring Sustainability

The *five Guiding Principles*

Certified under GBI’s Green Globes and USGBC’s Leadership in Energy and Environmental Design (LEED®) systems

- The USFS Bessey Ranger District Office, Nebraska National Forest, Rocky Mountain Region, California R-2; and Eastern Sierra Interagency Visitor Center, R-5
- The USFS Sylamore Ranger District Office, Ozark – St. Francis National Forest Mountain View, AR – First FS certified LEED green building - wood framed, wood and stone veneer siding
- The USDA APHIS Detector Dog Training Center in Newnan, Georgia – APHIS achieved a LEED Gold rating
USDA agency policy

• Departmental Regulation 5600-001
• Office of Operations Sustainability policies
• Forest Service Handbook 7309.11 and “An Engineers Guide to Climate Change;”
• ARS “Research, Education and Economics Energy, Water and Sustainability Policy and Procedures 134.2;”
• APHIS policy: the Guiding Principles, owned and leased facilities
• FFAS policy: Green leasing principles and practices.
Assessing USDA buildings

• USDA criteria for existing buildings meeting the *Guiding Principles*
  – points system similar to LEED
  – 92 possible points
  – if score is 45 percent, the building is sustainable
  – point-earning is flexible – no mandatory points --
  – all points earned in all categories -- no emphasis --
Assessing APHIS buildings

• APHIS Engineering and Construction office evaluates buildings on 4-year cycle to –
  - assess current condition, funding requirements, and target potential green improvement points

• Asset Detail Report, with “Green Requirements Report” to identify greening cost estimate by category

• Guiding Principles points scorecard with dashboard summary, and spending proposal to achieve points
USDA Headquarters Implements the Guiding Principles

Ed Murtagh
Sustainable Operations Manager, Office of Operations
Peoples Garden Initiative
USDA South Building Modernization

Photo credits: USDA Office of Operations
USDA South Building Modernization and the HQ Cafeterias
Senior Management Support
Measuring & Metering

![Graph showing electric usage over time]

**USDA Headquarters Electric Usage**

FY 2006 to FY 2012

- **0**
- **5,000,000**
- **10,000,000**
- **15,000,000**
- **20,000,000**
- **25,000,000**
- **30,000,000**
- **35,000,000**
- **40,000,000**
- **45,000,000**

**Fiscal Year**

- FY 06
- FY 07
- FY 08
- FY 09
- FY 10
- FY 11
- FY 12

**Time (Hours)**

- 0:00
- 4:00
- 8:00
- 12:00
- 16:00
- 20:00
- 24:00
Green Teams

Trash & Recycle Trends FY 2005 to FY 2012
Achieving Sustainability at Agricultural Research Service
Sandy Morgan - Facilities Division
The Challenge at ARS

- ARS spends $45 Million on utilities annually
- ARS has 3,200 buildings
- ARS has Energy Intensive Buildings
  - Lab/Office Buildings
  - Greenhouses
  - Animal Facilities
- Single pass air
  - 8 to 15 air changes per hour
- Modernization increases energy costs in the interest of employee health and safety
Labs are Energy Hogs

ONE HOOD CONSUMES AS MUCH ENERGY AS THREE HOUSES
Our Approach

• Facilities Design Standards Manual
• Energy, Water and Sustainability Policy
• Commissioning
• Re-/Retro-commissioning
• Sustainability Survey
• Outreach
• Positive Motivation
• ESPCs, UESCs
Our Results

And...ARS reduced utility costs $7 Million since FY 2008
Sustainability Goals

• New construction follows LEED but is not submitted to USGBC
• Meet minimum score in the survey
• Replace T-12 lamps and incandescents
• Re-/Retro-commission
• Meter utilities
• Renewables
• Biobased
Agency-wide Actions

Use green cleaning products exclusively
Except where they do not meet mission requirements.
Entrance mats to remove dirt from shoes at each entry
Keep outside walkways clean
Cleaning equipment with a low environmental impact should also be used.
Store chemicals in isolated closets
Case Studies & Recognition

Biobased Success Story

USDA Agricultural Research Service

Biobased Laboratory Countertops

Back Sibohlo of the U.S. Agricultural Research Station, Crop Improvement and Protection Research Unit in Salinas, CA installed Delta 12 bio-based laboratory countertops during a laboratory renovation. He said they were easy to install and even easier to install penetrations for services and splash units unlike the conventional epoxy sink tops. They seem to be durable and easy to maintain. Back said, "This is a good alternative to the epoxy sink tops we are used to using."


Sandy Morgan
Facilities Energy Manager
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High Cotton

Fermin Alarcon, Electronics Technician at the Southwestern Cotton Ginning Research Laboratory in Marfa, Texas, replaced old T-12 fluorescent light fixtures containing magnetic ballasts with new high bay T-5 fluorescent light fixtures that will save energy and utility costs plus improve the lighting in the 3 story tall industrial space. The 12 new 6-lamp 54 watt fixtures cost $152 each and replaced 18 old 2-lamp 400 watt fixtures. ARS employees installed the fixtures. The new light fixtures will save over $2,000 annually and pay for themselves in a little less than 1 year.

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What Makes a Sustainable Building

Incorporate the 5 Guiding Principles

15% of Existing Buildings Must Be Sustainable by 2015

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Strengthen viability and livability of communities in which federal facilities are located.

Reduce Light Pollution
Reduce Hazardous Chemicals
Reduce Indoor Water Use
Biobased Products
Moisture Control
Reduce Heat Island Effect
Recycling
Daylighting and Lighting Controls
Ventilation and Thermal Comfort
Reduce Ozone Depleting Substances
Purchase Recycled Products
Low Emitting Materials
Use Renewable Energy

Alternative Transportation
On-site Storm Water Management
Restore Pre-development Hydrology
Site Selection and Building Orientation
Abate Asbestos and PCBs
Environmental Tobacco Smoke Control
Green Cleaning

Community

Energy Efficiency and reduced use of fossil fuels
Integrative Pest Management

Energy Audits, Water Surveys and Re-commissioning Every 4 yrs

Use a Green Building Rating System

Good Building O&M
Are You Prepared for These Common Light Bulbs to Disappear?

- Incandescent & Halogen Lamps:
  - 40-200 Watt
  - BR > 2.25° 40-205 Watt
  - Old Halogen PAR
  - USE

- Compact Fluorescent
- LED
- Halogen IR (Infrared Reflective)

T-12 Fluorescent Lamps and Magnetic Ballasts Gone

- Discontinued 7/14/12
- 10/1/2010

T-8 or T-5 High Efficiency Fluorescent Lamps and Electronic Ballasts USE

Also Going Away:
- Mercury HID & Probe Start Metal Halide
- USE Pulse Start Metal Halide or HE T-8 or T-5

Bulb Shapes

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<th>Rated Lumen Ranges</th>
<th>New Max Rated Wattage</th>
<th>Effective Date Phased Out</th>
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USDA ARS

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Facilities Division
Sandy Morgan
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Thank you!
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USFS Agency Structure

- USDA Forest Service
  - 5 Deputy Areas
  - 4 Levels within NFS
    - National Level
    - 9 Regions
    - 175 National Forests and Grasslands
    - 600 Ranger Districts
  - ~35,000 employees
  - ~45,000 buildings
  - 193,000,000 acres of land

Slide credit: Sarah H. Baker, sbaker02@fs.fed.us
Early Sustainability Topics

Anna Jones Crabtree & Steve Oravetz publications:

• Sustainable Buildings: “Recycling Construction Materials” in 1998: 
  http://www.fs.fed.us/t-d/pubs/htmlpubs/htm98712305/

• Sustainable Building: “What Are Green Products…?” in 1999:
Challenges to our Agency

• More buildings than employees: 45,000
• We have remote compounds, with – no meters, or – only one meter on site
• Energy hogs and energy efficient buildings on same compound
Challenges to our Agency

• Management issues with -
  – Mixed energy uses in same building
  – Heated storage and cold storage
  – Used only part of year
  – Oversized buildings for current needs
  – Millions of $ of deferred maintenance…compete for energy projects…
  – Old water systems with leaks and using wells.
Example of USFS Working Compound

Scheduled to Convey property:
- Over ~ $1 million in deferred maintenance
- ~13 buildings
- 80,000 SF
- 14.2 acres
USDA Forest Service
Typical 8,100 SF warehouse

Photo credit: USDA Forest Service
USDA Forest Service
Typical 22,000 SF warehouse

Recently updated with ESPC contract newer lights, controls.

Photo credit: USDA Forest Service
- Bunkhouse not used in wintertime saves energy, but when subject to elements hard on building maintenance
- ESPC projects update appliances in many locations like these, too small to count in the over 5,000 sf
This LEED-Gold certified office uses small diameter round wood themes inside and out.
- ground source heat pump system
- use of small diameter round logs, inside and out
- clerestory windows
Forest Service Enoree Ranger District Office

• Renovation and addition planned for 2013

• Expected to be first FS Green Globes building
Changing Forests...Enduring Values

Forest Service
Wood Construction
Agency Emphasis areas: Utility Bill Cleanup

- Baseline energy use
- Reliable energy use information
  - Bills to Buildings
  - Correct rates, taxes, etc.
Energy Reduction Plan

• Provide access to accurate, accessible consumption data,
• Increase energy cost and consumption awareness,
• Provide organizational capacity, and
• Implement reduction measures.
Intranet Site

• Learn about Sustainable Operations
• Locate resources and tools to help you on your Unit

• Connect with other Green Teams
• Share success stories and/or identify the “experts”

Slide credit: Sarah H. Baker, sbaker02@fs.fed.us
Reasons for Success

• Tapped into imbedded energy and enthusiasm
• Focused on those with passion and interest (didn’t drag anyone along)
• Supportive governance structure that trusted us to innovate
• Produced visible results

• Transparency and reporting

Slide credit: Sarah H. Baker, sbaker02@fs.fed.us
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