Thanks For Joining

This is the US DOE TAP Webcast – Introduction to Benchmarking: Starting a Benchmarking Plan

We will begin shortly!

For the best audio quality, please dial in using your telephone and place your phone on mute. We will have a Q&A session at the end. If you have a question during the presentation, please type it in the questions window in the control panel to the right.

Toll: +1 (951) 266-6126

Access Code: 520-707-895

Audio PIN: Shown after joining the Webinar

Introduction to Benchmarking: Starting a Benchmarking Plan

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Technical Assistance Program
February 21st, 2013

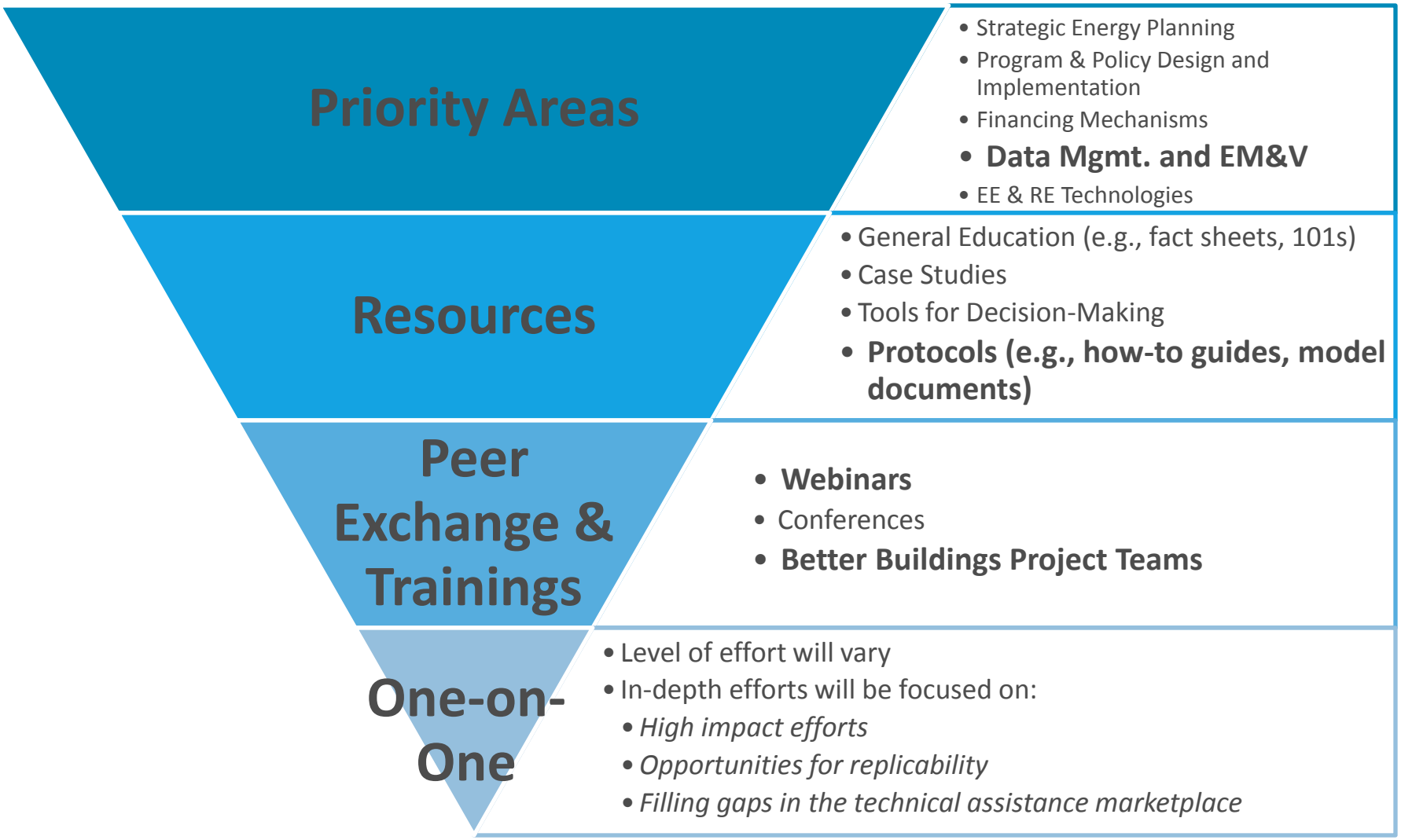
Agenda

1. Welcome & overview
2. The benefits of benchmarking and creating a benchmarking plan
3. Resources for creating a benchmarking plan
4. Hillsboro, Oregon’s benchmarking program
5. New opportunities available for technical assistance
6. Question & answers

What is the Technical Assistance Program?

- DOE's Technical Assistance Program (TAP) provides state, local, and tribal officials with resources to advance successful, high-impact, and long-lasting clean energy policies, programs, and projects
- TAP supports one of EERE's key missions – taking clean energy to scale through high impact efforts
- TAP has been around for over a decade and handled thousands of inquiries – most recently TAP had been focused on supporting Recovery Act grantees
  - One-on-one assistance
  - Online resource library & webinars
  - Facilitation of peer exchange

New TAP Approach



Data Management and EM&V as a Priority Area

- Resources:
  - ***Designing a Benchmarking Plan*** live now on the Solution Center!
  - Also rolling out a Data Management and Evaluation portal on the Solution Center in May

- Peer Exchange & Trainings:
  - One-time national peer exchange – join us for follow up session, ***Planning for Energy Benchmarking***, next Wednesday
  - Long-term small group peer exchange – join the ***Better Buildings Alliance Project Team for Data Management Approaches***, kicking off on Wednesday, March 20th
  - National webinar trainings, including – ***Benchmarking Outreach and Data Collection Techniques (Internal), Benchmarking Outreach and Data Collection Techniques (External***, March and April

- One-on-one Assistance

How to Tap into These and Other TAP Offerings

- Visit the ***Solution Center***
  http://www1.eere.energy.gov/wip/solutioncenter/

- Contact Local or State ***Regional Coordinator***
  http://www1.eere.energy.gov/wip/solutioncenter/pdfs/rcmapsep2012.pdf

- Submit an ***application*** for assistance
  http://www1.eere.energy.gov/wip/solutioncenter/technical_assistance.html

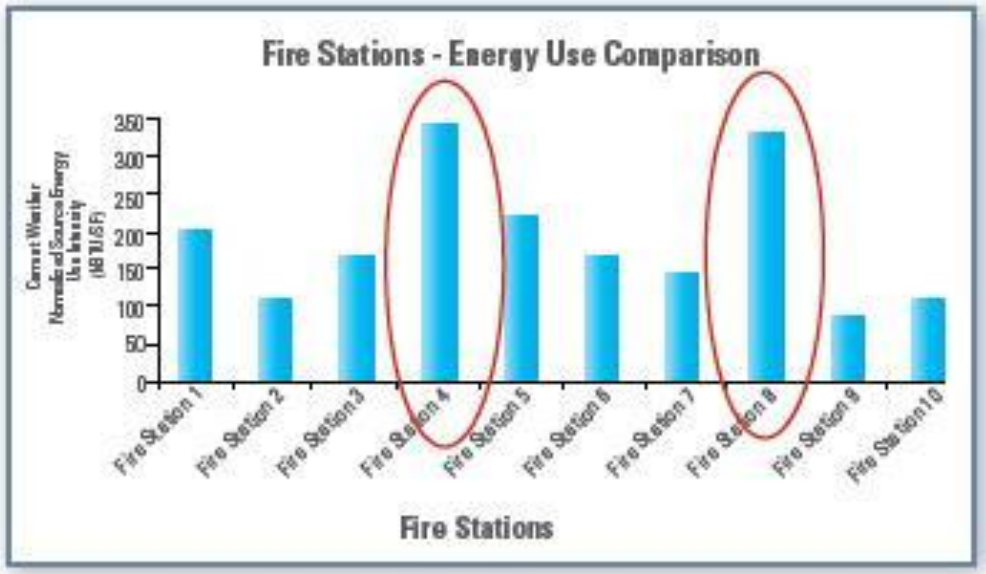
- Sign up for ***TAP Alerts***, the TAP mailing list, for updates on our latest and greatest
  TechnicalAssistanceProgram@ee.doe.gov

What is Benchmarking?

Benchmarking is the process of accounting for and comparing

- a building's current energy performance with its energy baseline,
- a building's energy performance with the energy performance of similar types of buildings

Benchmarking can be used to compare performance over time, within and between peer groups, or to document top performers.



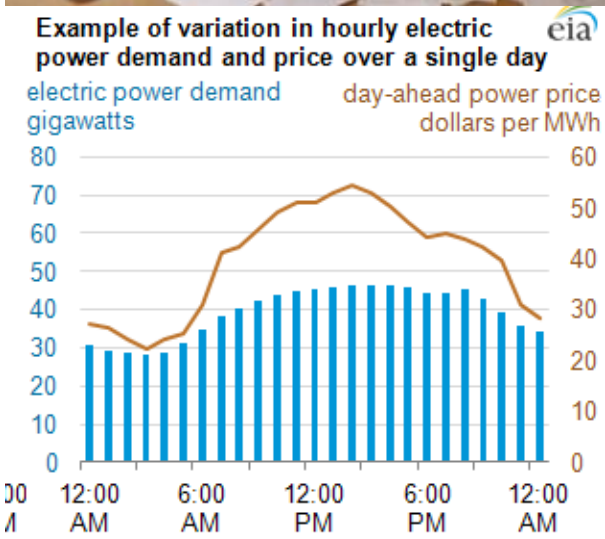
Prioritize efforts by identifying under-performing buildings.

The Benefits of Benchmarking

- Proactive approach to managing energy use
- Continuous improvement as a part of a strategic energy management plan
- Identify billing errors
- Verify pre- and post-project energy use, GHG emissions, and energy costs
- Communicating results in meaningful terms
- Assess effectiveness of current operations, policies and practices
- Assist in planning: set goals, targets, and timelines
- Participation in energy challenges or benchmarking programs

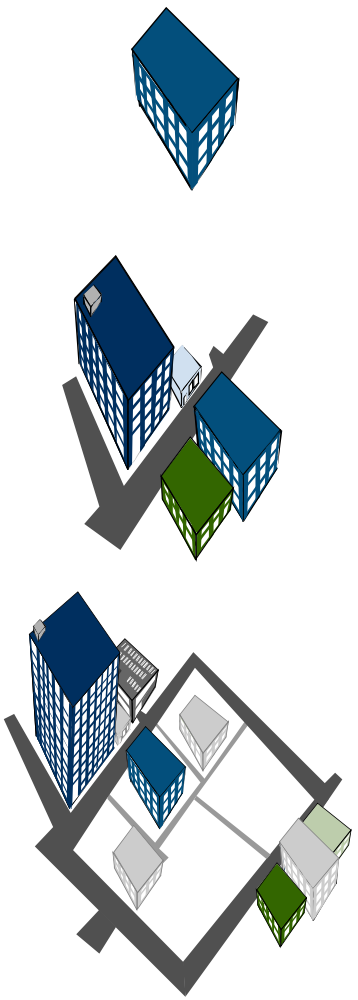
Benchmarking can seem complicated

- Compiling data from multiple sources
- Associating meters with the correct facilities
- Interpreting results
- Using a Benchmarking Tool
- Reviewing the data for completeness
- Cooperation from other staff



Being thoughtful about Benchmarking

- Creating a benchmarking plan allows for a strategic approach to the benchmarking process
- Avoid pitfalls of the piecemeal process (lack of data needed for the tool or for the results), stalled out cooperation, inability to benchmark against others
- Speak the language of those interested
- Allow for room to grow capabilities



Resource Guide Layout

- Establish the Goal for Benchmarking
- Secure Buy-in from Leadership
- Build a Benchmarking Team
- Identify the Output Metrics Needed to Support the Benchmarking Goal
- Identifying the Data Input Requirements
- Select a Benchmarking Tool
- Determine a Collection Method
- Consider the Data Verification Process
- Evaluate Analysis Techniques
- Communicate the Plan and Formalize the Process
- Planning for Change

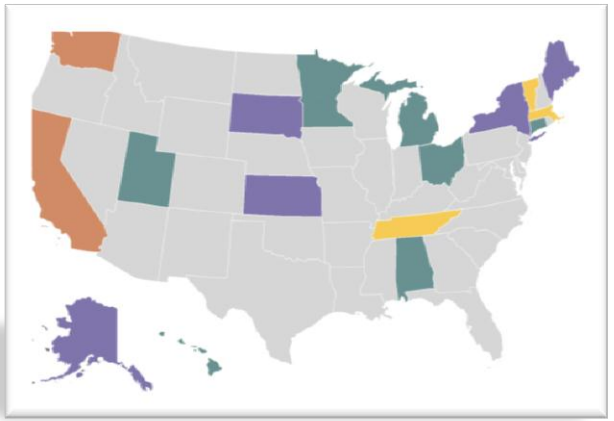
Using the Resource Guide

- Framework for planning a benchmarking program
- Follows a progression of steps to set up a benchmarking program
- Organizations can work through chronologically or select the appropriate sections
- Embedded with tips and resources appropriate to each section
- Particularly useful for organizations using Portfolio Manager,

Establish the Goal

- Energy Management Strategy
- Demonstrating the results from energy efficiency projects and programs
- Participation in a benchmarking program

Better Buildings CHALLENGE
U.S. DEPARTMENT OF ENERGY



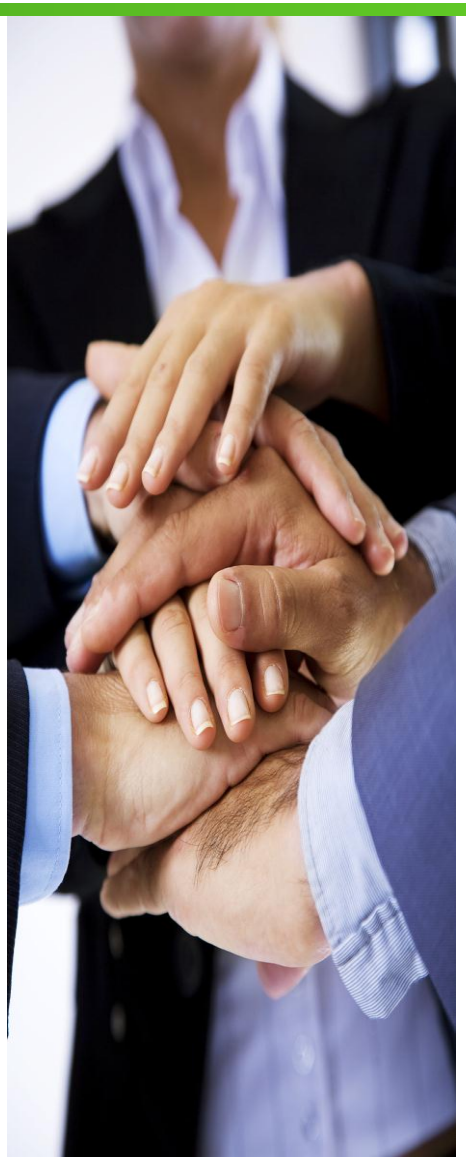
ISO 50001
energy management

energy
ENERGY STAR

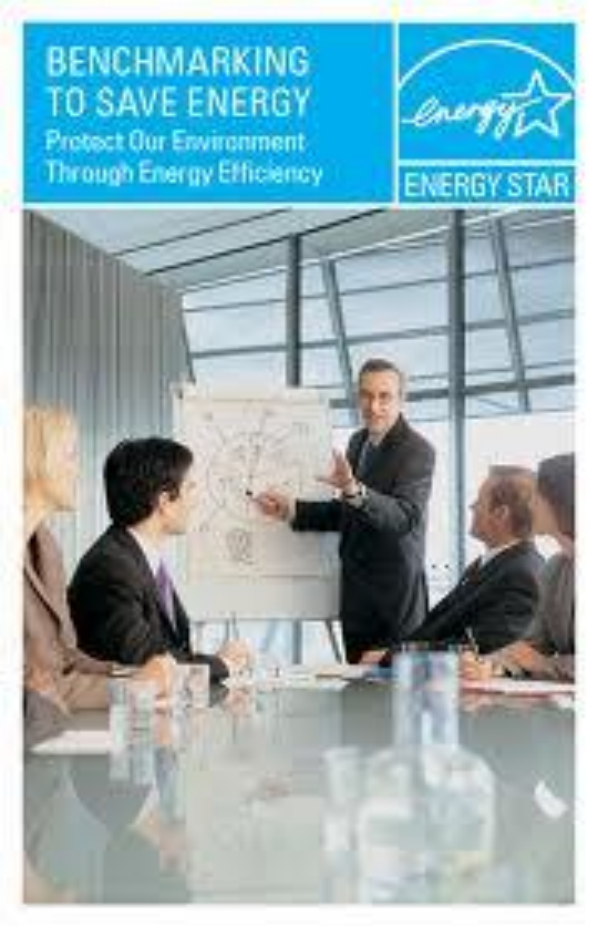
Secure Buy-in from Leadership

- A critical element of success is the involvement of top management.
  - Secure buy in from top management for initial endorsement
  - Ensure top management is a part of regular review and communication
- Present the case for benchmarking to demonstrate the value
  - Provide list of benefits that benchmarking offers
  - Present significance of energy costs to demonstrate need for energy data management

Energy expenditures average more than $2 per square foot in commercial and government buildings, making energy a cost worth managing. By making energy performance measurable and visible, building owners can improve the efficiency of their buildings, which can drive new investment and create an estimated 5 to 15 green jobs per $1 million invested.



Making the Case for Benchmarking



Benchmark with EPA's ENERGY STAR® Portfolio Manager

Save Energy, Save Money and Fight Global Warming
Start by Measuring Energy Performance

What is Portfolio Manager?

Portfolio Manager is an interactive energy management tool that allows you to track and assess energy and water consumption across your entire portfolio of buildings in a secure online environment. Whether you own, manage, or hold properties for investment, Portfolio Manager can help you set investment priorities, identify under-performing buildings, verify efficiency improvements, and receive EPA recognition for superior energy performance. It is available at no-cost to all users.

Why Benchmark with Portfolio Manager?

Leading organizations take a strategic approach to energy management. By understanding current and past energy use through benchmarking, organizations can identify opportunities to improve energy performance and gain financial benefits. By looking at performance at the whole building level, building managers can identify opportunities for savings through operational improvements and system optimization as well as capital upgrades.

Portfolio Manager can be used by all organizations to:

- **Establish a baseline energy performance for each property using Portfolio Manager.**
- **Set goals for energy performance.**
- **Prioritize investments.**
- **Conduct ongoing measurement and verification of improvements- both financial and environmental.**
- **Earn recognition from EPA, BOMA, ASHE, and others for environmental and operational excellence.**

Certain building types can receive an EPA energy performance rating, comparing facility performance to similar buildings across the country.

What is EPA's Rating System?

The EPA energy performance rating indicates how efficiently buildings use energy on a 1-100 scale; a rating of 50 indicates average energy performance while a rating of 75 or better indicates top performance.

EPA's energy performance rating system accounts for the impact of weather variations as well as changes in key physical and operating characteristics of each building. Based on the information you enter about your building (such as its size, location, number of occupants and number of personal computers), the energy performance rating compares your building's energy use to the actual energy use of similar buildings around the country.

EPA developed the energy performance rating as a screening tool to help organizations assess performance and identify those buildings that offer the best opportunities for improvement and recognition. The rating system's 1–100 scale is easily understood, and can facilitate communication between facility managers and senior executives regarding building performance.

EPA's energy performance rating is available for the following building types. See the ENERGY STAR web site for detailed eligibility requirements.

Bank/Financial Institution
Courthouse
Hospital (acute care and children's)
Hotel
House of Worship
K–12 School
Medical Office
Municipal Wastewater Treatment Plant
Office
Residence Hall/Dormitory
Retail Store
Supermarket
Warehouse (refrigerated and non-refrigerated)

Buildings that are not eligible to receive a rating also benefit by benchmarking. Performance improvements for all buildings can be tracked over time by comparing current performance to the baseline established in Portfolio Manager.

LEARN MORE AT energystar.gov

ENERGY STAR®, a U.S. Environmental Protection Agency program, helps us all save money and protect our environment through energy efficient products and practices. For more information, visit www.energystar.gov.

Build a Benchmarking Team

- Establish the Benchmarking Program Coordinator/Project Manager
  - One or more person may be required
  - Clearly define the role of the Program Coordinator
- Identify key personnel in the organization to implement the benchmarking plan
  - Involve personnel with familiarity to the energy data and whose work will be affected by the benchmarking program. Good candidates include:
    - Maintenance
    - Operations
    - Purchasing
    - Human Resources
    - Environmental, Health and Safety
    - IT

Tips for Building a Benchmarking Team

Collecting and tracking benchmarking data can be a substantial effort. When appropriate:

- Look for “pro bono” help with analysis from local stakeholders (e.g., interns or college/university expertise, non-profits, and local weatherization agencies).
- Use this part of the project as a professional development opportunity for a local government’s financial analysts or junior engineers.
- Hire consultants such as energy service companies (ESCOs) or third-party providers.
- Incorporate benchmarking into energy efficiency projects and contracts. Some ESCOs will offer free benchmarking as a way of developing business opportunities.

Identify the Output Metrics Needed

- The benchmarking goals determine the benchmarking metric.
- Determine the granularity and frequency of the output metrics required. Select a level of detail and frequency that is achievable that contains enough resolution for meaningful analysis. The output metrics should be appropriate for the audiences to whom the results are communicated.
- What is it that will demonstrate progress or success?

Some common Energy Use Intensities (EUI's) are shown below:

Metric	Application
Btu per square foot	Any building
Btu per employee	Office building
Btu per unit of product	Assembly plant
Btu per pound of product	Manufacturer
Btu per pound of product processed	Refinery
Btu per number of beds occupied	Hotel or hospital
Kilowatt-hours per square foot	Lighting
Kilowatts per ton	Chilled water efficiency
Watts per cubic foot of airflow per minute	HVAC systems
Courtesy: E Source	

Identifying the Data Input Requirements

- Identify the data inputs needed to generate the output metrics required
  - Account for data inputs required by the benchmarking tool.
    - (see the Portfolio Manager Data Collection Worksheet for data requirement examples)
  - Account for all energy sources — (kWh, mMBtu, Mcf, lbs of steam, etc.).
  - Map out data availability and data access
  - Incorporate facility characteristics

- Select data inputs that will assist in analyzing energy use for decision making, even if not required to produce the outputs deemed important. Consider including:
  - Operating characteristics – document the characteristics that can affect the energy use in a building.
  - Production units – document the production rate of facilities to compare with energy or environmental metrics.
  - Cost – financial metrics are rarely excluded from the decision making process.
  - Energy project milestones – Verifying pre and post savings from energy efficiency projects requires an understanding of project timelines.

Sample Data inputs – General Office

General Building Information

- **Facility name**
- **Year built**
- **Building address (ZIPCODE!)**

Space Use Attributes (General Office)

- **Gross floor area (SF)**
- Weekly operating hours
- # of workers on main shift
- # of personal computers
- Percent of floor area that is air conditioned(>=50%, <50%, or none)
- Percent of floor area that is heated (>=50%, <50%, or none)

http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager_benchmarking

Select a Benchmarking Tool

- Benchmarking tools range from simple spreadsheets to custom designed web-based platforms.
- Demonstrating progress towards the Benchmarking goal should dictate selection
- Compare functionality of tools:
  - Outputs generated
  - Data inputs and frequency required
  - Data entry methods
  - Data display capabilities
  - Cost
  - Usability and Support
  - Compatibility

ENERGY STAR's Portfolio Manager

- Free, online, benchmarking tool for existing buildings
- Whole-building ACTUAL Energy Performance Score and benchmarking data
- Measures and Tracks energy intensity, cost, emissions
- Normalizes for weather, operating hours, occupant density, plug load
- Provides ENERGY STAR Label for Buildings

Check it out:

Energystar.gov/benchmark

Determine a Data Collection Method

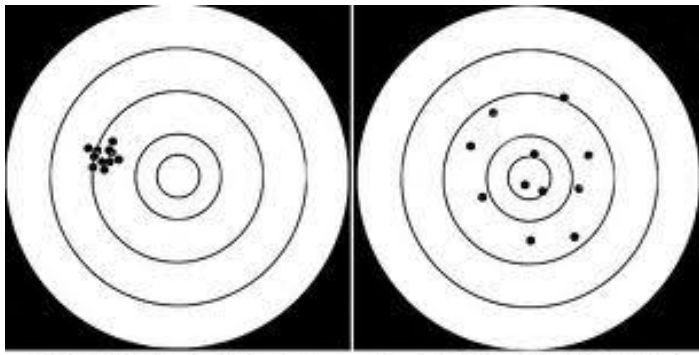
- Select a collection method that addresses how the data is currently managed.
- Data can be collected and aggregated in several ways.

Common techniques:

Portfolio Manager strategies for data collection		
Approach	Concept	Relevant tools
Centralized	Create a central account to host all organization benchmarking data. Department/facility data is shared with the benchmarking coordinator/team for input	Use the Portfolio Manager Data Collection Worksheet, Portfolio Manager Import Templates, or Portfolio Manager Multi-meter update to collect data from departments for manual upload of uploading by ENERGY STAR
Decentralized	Create a central account to host all organization benchmarking data. Create separate accounts for department or facility managers to benchmark their subset of buildings. Use the sharing function in the tool to transfer benchmarking data to the central account	Provide department benchmarking staff with Facility sharing instructions. Benchmarking staff may also find the Portfolio Manager Data Collection Worksheet, Portfolio Manager Import Templates, or Portfolio Manager Multi-meter update useful in their own data entry process

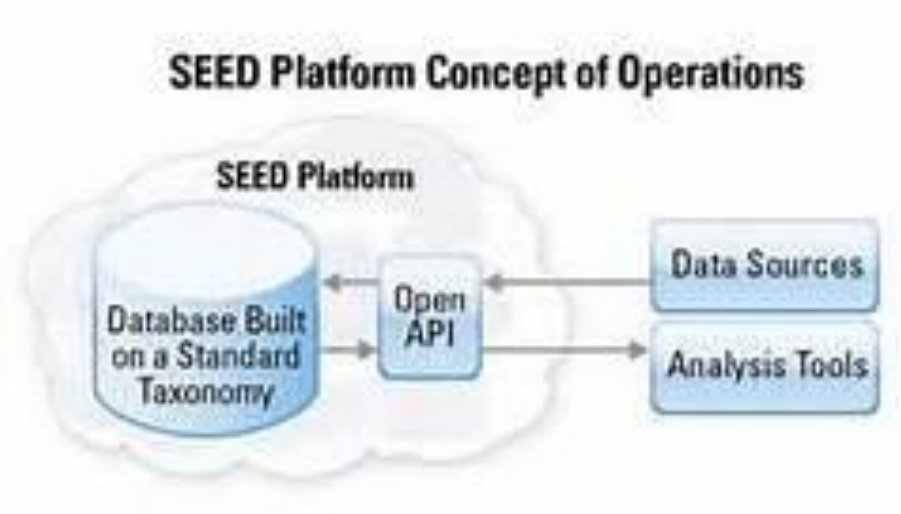
Consider the Data Verification Process

- Establish Quality Assurance/Quality Control (QA/QC) plan
- Consider :
  - Range checking for high or low EUI values
  - Comparing the reported footprint with building inventory lists or real property data
  - Checking that the appropriate facility type is selected for facilities
  - Ensure realistic footprints and names (no gross rounding or ‘sample facilities’)
  - Use ‘Alerts in Portfolio Manager’ or flag 1 and 100’s
  - Sample utility bills
  - 3rd party verification
  - Protocol of gaps in data
- Use the verification process to promote accurate and transparent reporting.
- Training staff can often be one of the best forms of ensuring quality reporting from the ground up.



Standard Energy Efficiency Database (SEED) Platform

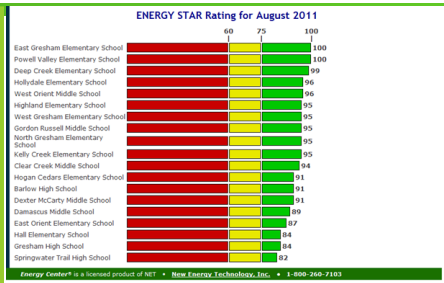
- *SEED is free.*
- *SEED is standard.* It provides a common format for storing and sharing energy data.
- *SEED is open source.* It allows flexibility to add and modify features that collect and utilize data in new ways.
- *SEED is connected.* It provides seamless links with related tools such as Portfolio Manager, DOE Buildings Performance Database, and DOE Asset Rating tool.

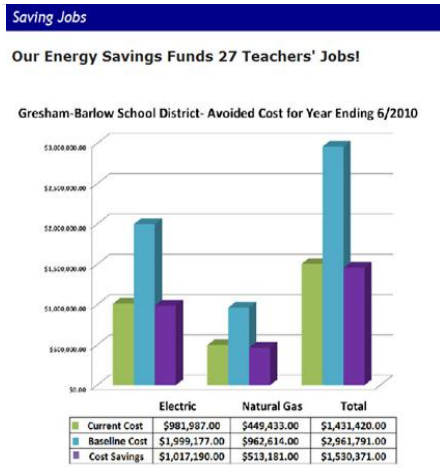


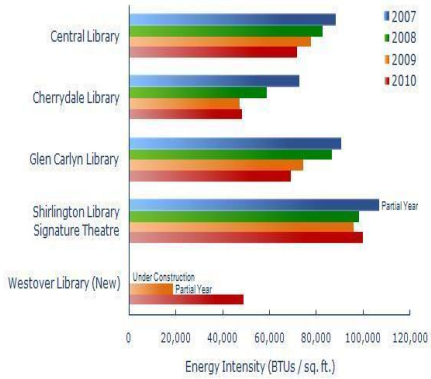
- Contact Elena Alschuler for more info - Elena.Alschuler@ee.doe.gov

Evaluate Analysis Techniques

- Tracking and analyzing energy data provides insight into the impact of operations on energy use and consumption.
- Documentation of the energy consumption and cost analysis must be in a form that is meaningful and clear to all levels of the organization.
- Establish baseline of energy performance
- Benchmark and track progress
  - Compare with energy simulation/energy modeling
  - Perform a statistical review (such as CBECS)
  - Compare across portfolio
  - Track energy consumption and energy use intensity for facilities against the baseline established.
- Start high-level and zoom in for a detailed analysis as required.
  - Review portfolio or department wide energy performance to identify low performing groups of buildings
  - Target buildings with high EUI's for further investigation

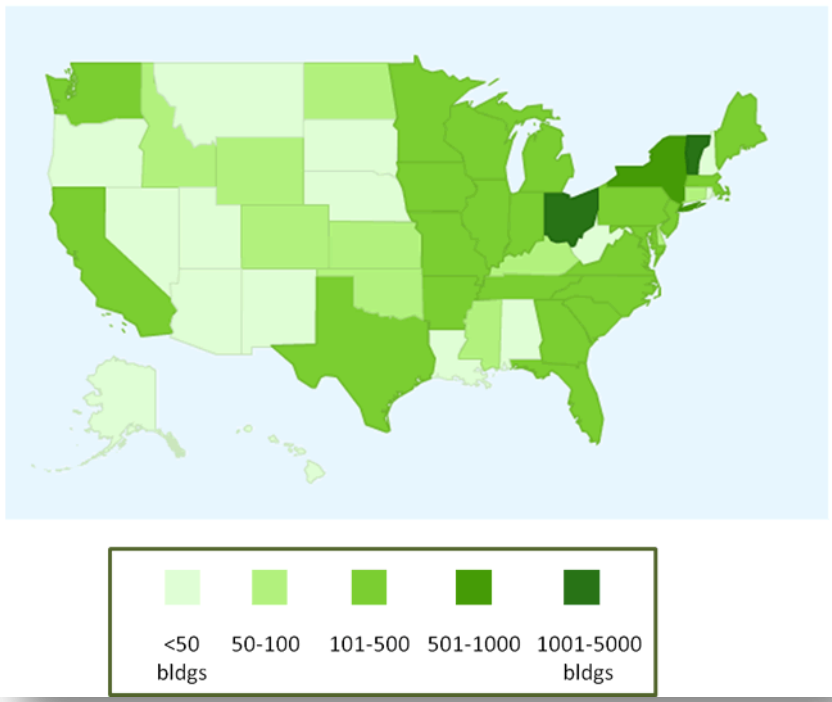






Buildings Performance Database (BPD)

- The BPD enables analysis of the benefits and risks of energy efficiency projects
- The BPD contains empirical data that can be used to evaluate the energy savings resulting from implementing various energy efficiency projects
- Compare your buildings energy use with similar buildings – but with more granularity than CBECS
  - Compare based on assets, size, location, etc



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Communicate the plan and formalize the process

- Developing a formal process and communicating the plan can be an important aspect of the benchmarking program.
- Demonstrate stability by highlighting top management support
- Present the value of benchmarking beyond just another exercise
- Clearly identify roles and goals to ensure transparency and outline expectations
- Empower participants
  - Provide training for benchmarking tool
  - Incorporate into existing operations
- Include involved 3rd party organizations
  - Utility account representatives – to assist with data access
  - Vendors – to include energy project timelines and existing data

Communicate the plan and formalize the process (cont.)

- Set timelines for deliverables
  - Nothing motivates like a deadline
  - Clear expectations with opportunity for input ensure timely completion and reduce stall outs

- Schedule check-ins and share results regularly
  - Build momentum
  - Assess status
  - Add accountability
  - Solicit feedback

Planning for Change

- Set schedule for regular re-appraisal of benchmark portfolio with respect to strategic plan objectives
- Check in with stakeholders
- Re-evaluate other tools and service providers newly on the market or revamped that may enhance your benchmarking activities.
- Revisit spending/funding needed to continue benchmarking program.
- Evaluate current capabilities and any additional training or staffing needed (could include temporary help such as interns for data entry)
- Identify what is not included in the plan and what changes/modifications could happen by the next update
- Publish revised benchmarking plan

Energy Benchmarking

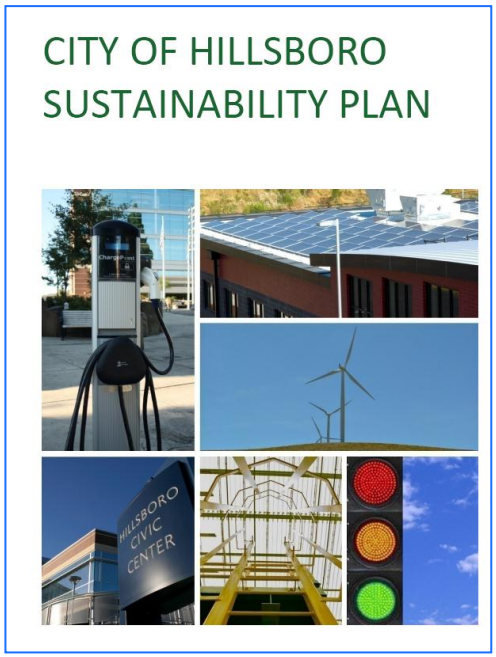
EERE Webinar February 21, 2013

Hillsboro OREGON

Sustainability & Energy Planning

"The City of Hillsboro envisions a sustainable future, in which the City responsibly satisfies the needs of its citizens, provides a healthy and satisfying work environment for its employees and minimizes its impact on the physical environment of the community"

- Leadership commitment
  - Hillsboro 2020
  - US Conference of Mayors Climate Protection Agreement
- Structure
- Goals



Hillsboro-oregon.gov/sustainability

Energy Goals

Materials management:

• Achieve a rate of construction material consumption that meets internal standards for sustainability

• 100% of all inputs purchased by the City are sourced from sustainable sources or meet internally established criteria (e.g., zero waste, zero toxins) where technologically and financially feasible

• Zero toxic emissions

• 100% recycling of waste from City operations

• Zero construction and maintenance waste (no waste from construction and maintenance activities is sent to landfill). May be accomplished via public/private partnerships

Policy:

• 100% of City development investments meet a standard set for sustainable development, and City promotes and encourages sustainable development by others

• 100% of applicable City policies incorporate the principles of sustainability

• All city facilities constructed or renovated shall meet current Leadership in Energy and Environmental Design (LEED) standards or better, unless cost prohibitive based on Return on Investment (ROI) or cost/benefit analysis

Energy and air quality:

• 60% reduced City facility energy consumption per square foot (2007 baseline)

• 100% of electricity and natural gas sourced from renewable sources for City facilities and exterior lighting infrastructure

• 80% reduction in greenhouse gas emissions; 100% of remaining emissions offset (2007 baseline)

• 80% production of energy for City facilities from renewable energy sources

• 100% fossil fuel-free staff vehicles and 40% reduction for other exempt vehicles (non-passenger emergency response, etc.) [Based on available technologies and cost effectiveness] (2007 baseline)

• All City facilities zero net energy consumption, if feasible based on Return on Investment (ROI) or cost/benefit analysis

Natural Resources:

• 25% reduction in water consumption by City facilities against established baseline (including re-use and other measures) (2007 baseline)

Hillsboro OREGON

Energy Goal +

2011 Better Buildings Challenge

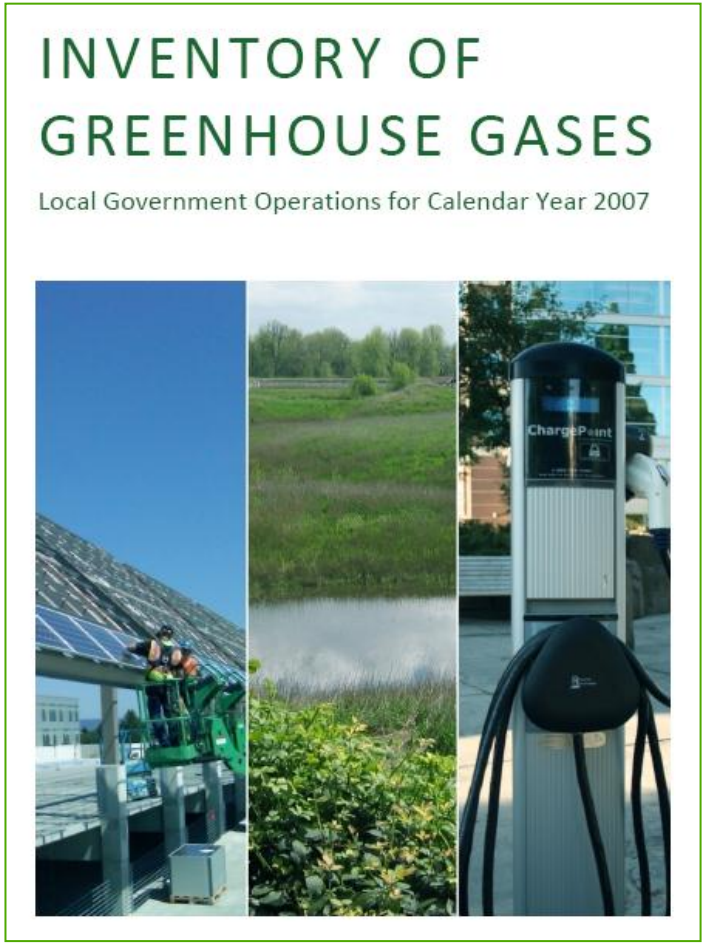
- **20% reduced energy intensity by 2020 (2009 baseline)**

Better Buildings CHALLENGE
U.S. DEPARTMENT OF ENERGY

Hillsboro OREGON

Why Benchmarking?

- Quantifying GHG emissions
- Goals
  - Sustainability goals
  - Energy Star
  - Better Buildings Challenge
  - National Buildings Challenge
- Cost savings (SRF)
- Action prioritization
- Energy consumption
- Fuels
- Water



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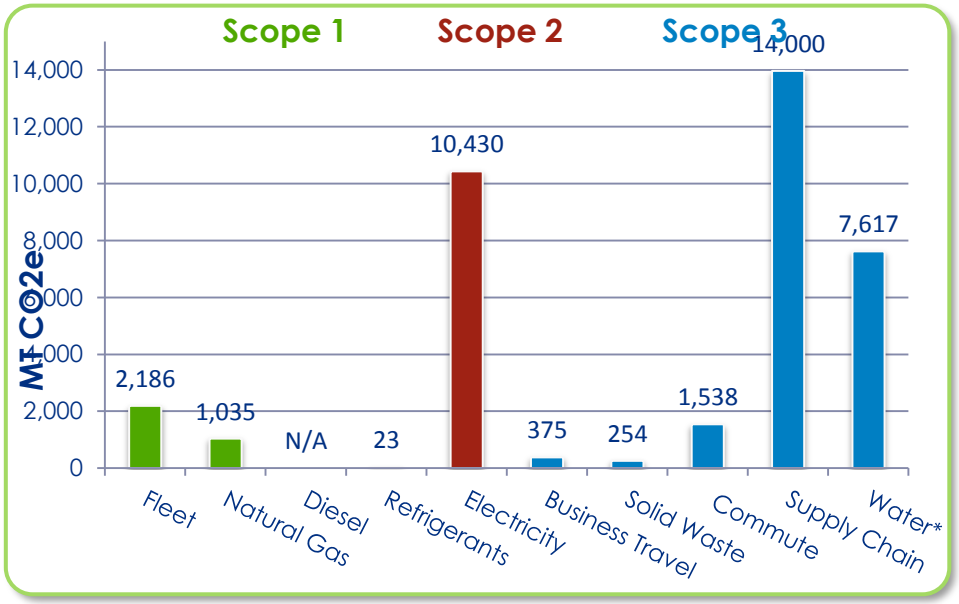
Selecting Baselines and Metrics

- Energy consumption/ Sq ft
- Energy intensity
- % renewable energy from renewables
- % of facility energy generated by renewables
- % fossil fuel free staff vehicles
- Tons GHG emissions
- % facilities meeting green building standard



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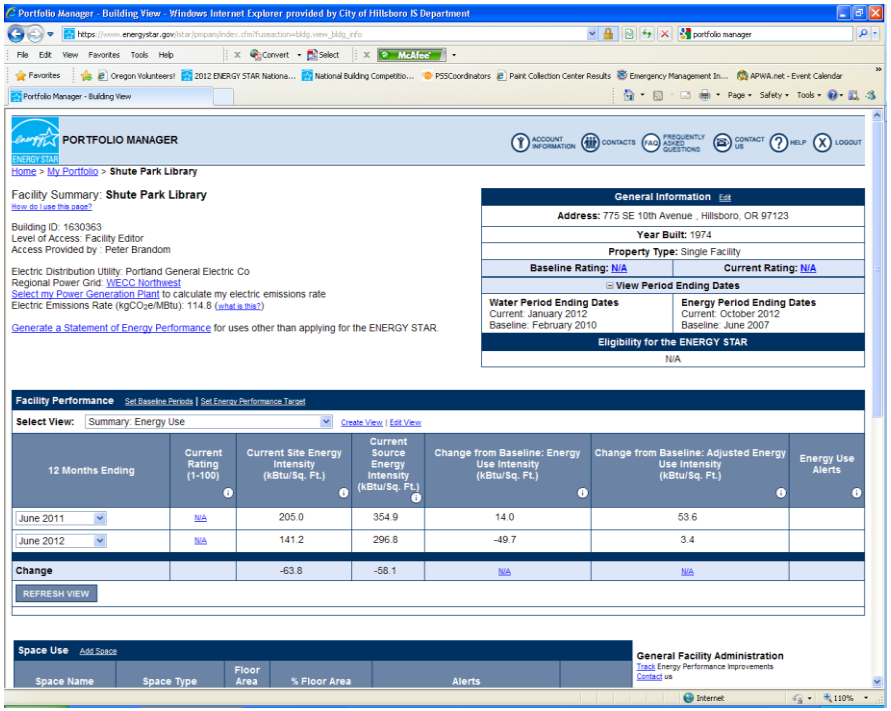
Selecting Tools & Processes

- Portfolio Manager
  - Tracking
  - Reporting (internal and external)
  - Prioritization
  - Performance measurement
- Staff Roles
- How data was/is collected
- How data is verified



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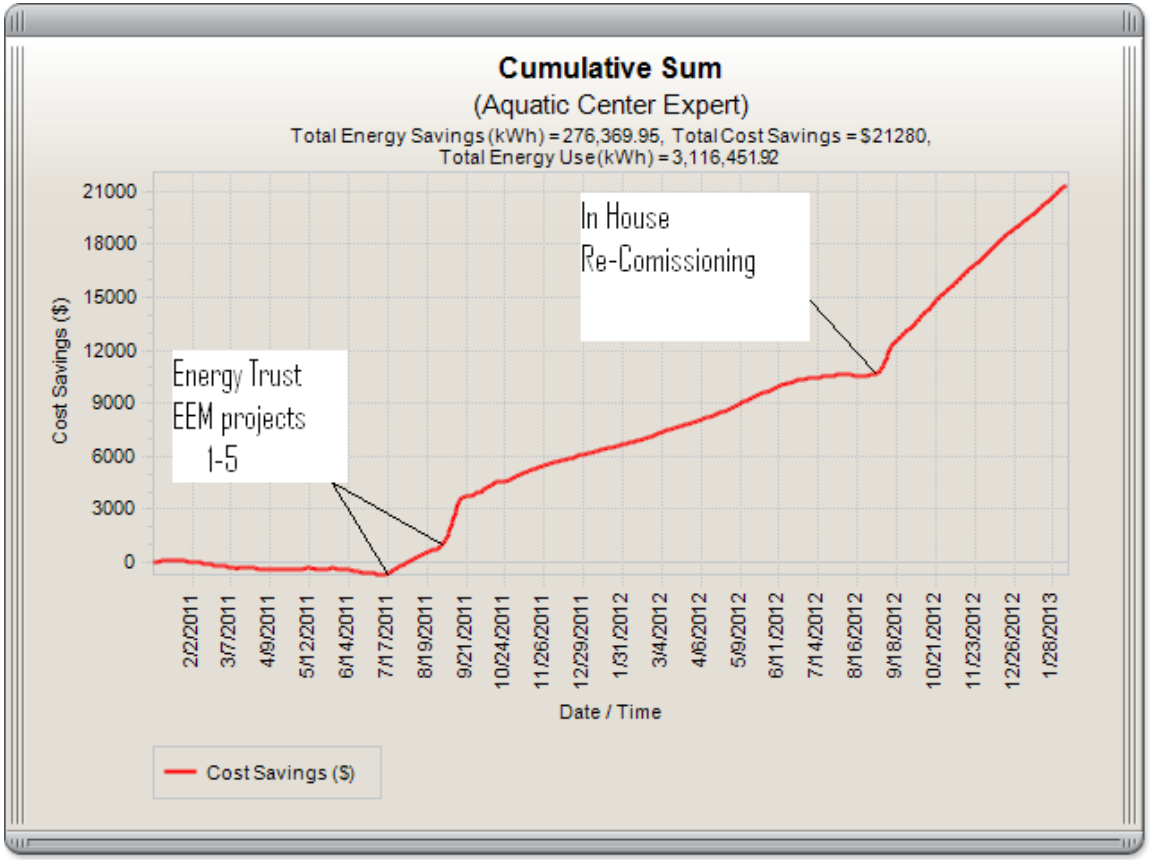
Selecting Tools & Processes

- Utility Trac Plus
- New building controls
- Energy Management Plan
  - Enhanced process
  - Regular reporting
  - Roles/responsibilities
  - Education
  - Communication



Hillsboro OREGON

Thank You

"The City of Hillsboro envisions a sustainable future, in which the City responsibly satisfies the needs of its citizens, provides a healthy and satisfying work environment for its employees and minimizes its impact on the physical environment of the community"

peter.brandom@hillsboro-oregon.gov

hillsboro-oregon.gov/sustainability

CITY OF HILLSBORO
SUSTAINABILITY PLAN

Hillsboro OREGON

Better Buildings Alliance

- Opportunity for governments to work collaboratively with DOE to advance their clean energy goals
- Helps members sustain success of ARRA funded work
- Leverages DOE expertise
- Provides forum to engage with peers around actionable steps
- Public sector Project Teams focus on strategic target areas:
  - Community Strategic Energy planning
  - Data Management Approaches
  - Finance Strategies
  - Energy Savings Performance Contracts (ESPC)
  - Technical areas (lighting, HVAC, plug loads, data centers, etc.)

Alliance Members Agree to:

- **Commit**
  - Assign a representative
  - Share energy savings goals, encouraged to be an annual goal of >2%
- **Act**
  - Work to achieve goals and monitor progress
  - Participate in at least one BBA workgroup or activity
- **Share**
  - Provide annual updates on energy savings and progress toward meeting goals
  - Share your successes and help other members replicate your results

DOE Agrees To:

- **Assist**
  - Provide information and resources to help members meet energy goals
  - Work with members to create new resources and tools
- **Connect**
  - Provide a neutral, third-party platform for peers to build solutions
  - Connect members with financial allies for financing solutions
- **Inform**
  - Keep members informed through regular BBA communications and webinar series
  - Provide access to DOE and trusted third-party resources

Data Management Approaches Project Team

- Will equip members with knowledge, tools, peer-exchange, and feedback to develop data management practices
- Leverage existing data management materials
- Sessions held via facilitated webinar
- Participants will execute data management practices in real time as they are discussed in WG sessions
- Insights participants gain through process will be shared with peers during Project Team meetings
- Sessions starting in March

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Installation of night curtains

Whole Foods Market, a BBA member, installed night curtains to cover the refrigerated produce cases when stores are closed. This strategy lowers the cooling load on the refrigeration case by about 40% during unoccupied periods.

BETTER BUILDINGS ALLIANCE SIGN-UP FORM

Building owners and operators can join the Better Buildings Alliance (BBA) by completing the sign-up form.

SIGN-UP FORM

Join the Better Buildings Alliance

Commercial buildings—our offices, schools, hospitals, restaurants, hotels and stores—consume nearly 20 percent of all energy used in the United States. We spend more than $200 billion each year to power our country's commercial buildings. Unfortunately, much of this energy and money is wasted: a typical commercial building could save 20 percent on its energy bills simply by commissioning existing systems so they operate as intended. Energy efficiency is a cost effective way to save money, support job growth, reduce pollution, and improve competitiveness.

Through the Better Buildings Alliance, members in different market sectors identify specific barriers and work with the U.S. Department of Energy's (DOE) exceptional network of research and technical experts to develop and deploy innovative, cost-effective, energy-saving solutions that lead to better technologies, more profitable businesses, and better buildings in which we work, shop, eat, stay, and learn.

http://www1.eere.energy.gov/buildings/betterbuildings/bba/bba-index.html

Questions about the Better Buildings Alliance?

For more information on the **Better Buildings Alliance**,
please send questions to
bba@ee.doe.gov

Question and Answer Time

If you have questions or comments, let us know what you think

Type questions in the Question box in the control box on the right

Thank you for participating

Slides will be posted on the Solution Center

http://www1.eere.energy.gov/wip/solutioncenter/

The “Designing a Benchmarking Plan” resource guide will be posted online:

http://www1.eere.energy.gov/wip/solutioncenter/pdfs/tap_designing_a_benchmarking_plan.pdf

More questions? Contact Joel Blaine – Joel.Blaine@ee.doe.gov