Transfer Tasks: Applying Successful Energy Strategies to Water Reduction Goals

Better Buildings Summit

May 11, 2016

Agenda

02:00	Welcome & Introductions
02:05	Speaker Presentations
02:45	Discussion
03:15	Adjourn

Today's Presenters

Cindy Zhu

Fellow,
U.S. Department of Energy

Travis Blomberg

Sustainability Advisor,
Transwestern

Brandon Chase

Director of Customer Success,
Aquicore

Sharon Nolen

Manager,
Eastman Chemical

Importance of Water Savings

- Energy required for treating and transporting water
  - Water saving actions lead to energy savings
- In 2015, BBC and Better Plants set water goals alongside energy efficiency targets
- 30+ partners have joined

Brandon Chase,
Aquicore

U.S. DEPARTMENT OF
ENERGY

Water on earth:

97%

In oceans and seas

2%

Frozen and unusable

1%

Potable

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Buildings consume 14%
of all potable water

(which is)

FIFTEEN
TRILLION

gallons per year

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Source: USGBC Green Building Facts 2015

The Rising Cost of Water

The price of water has increased by 400% since 1983, 2x more than electricity

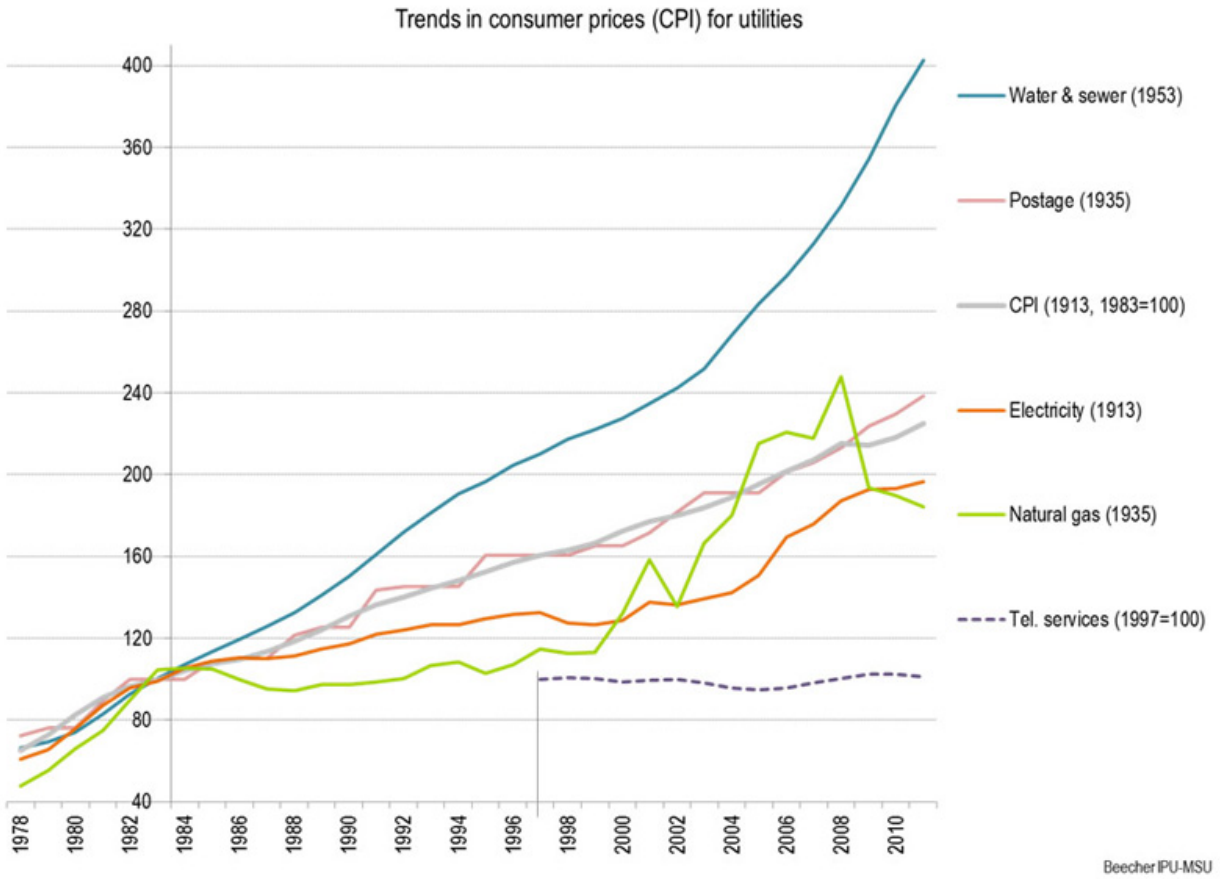

Exhibit 2. Trends in the Consumer Price Index for utilities (general, 1979-2011).
The index is set to 100 for 1982-1984 except for telephone services, where the index is set to 100 for 1997.

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Regulations & Certifications Support Efficiency

CA TITLE 24 - 2013

- Water submetering required for buildings >50K SF
- Water efficiency standards for indoor appliances
- New irrigation standards

ASHRAE 189.1 – 2014

- More stringent water efficiency standards
- WE section rewards appliance efficiency, irrigation, & water metering

LEED V.4 – 2013

- Up to 2 LEED points for water metering
- Tiered/Volumetric pricing more prevalent

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The Business Case For Water Management

- Water costs are lower than energy costs, but rising
  - Cities across the US have steadily rising water rates
- Sewer billing often inaccurate
  - Client overcharged for 9 years

BILLING ERROR IDENTIFICATION

✖ Billed an extra $81,000 for 9 years: Charged for water PLUS irrigation

✔ Utility fixed the problem, saving $9,000/ year & $81,000 reimbursed

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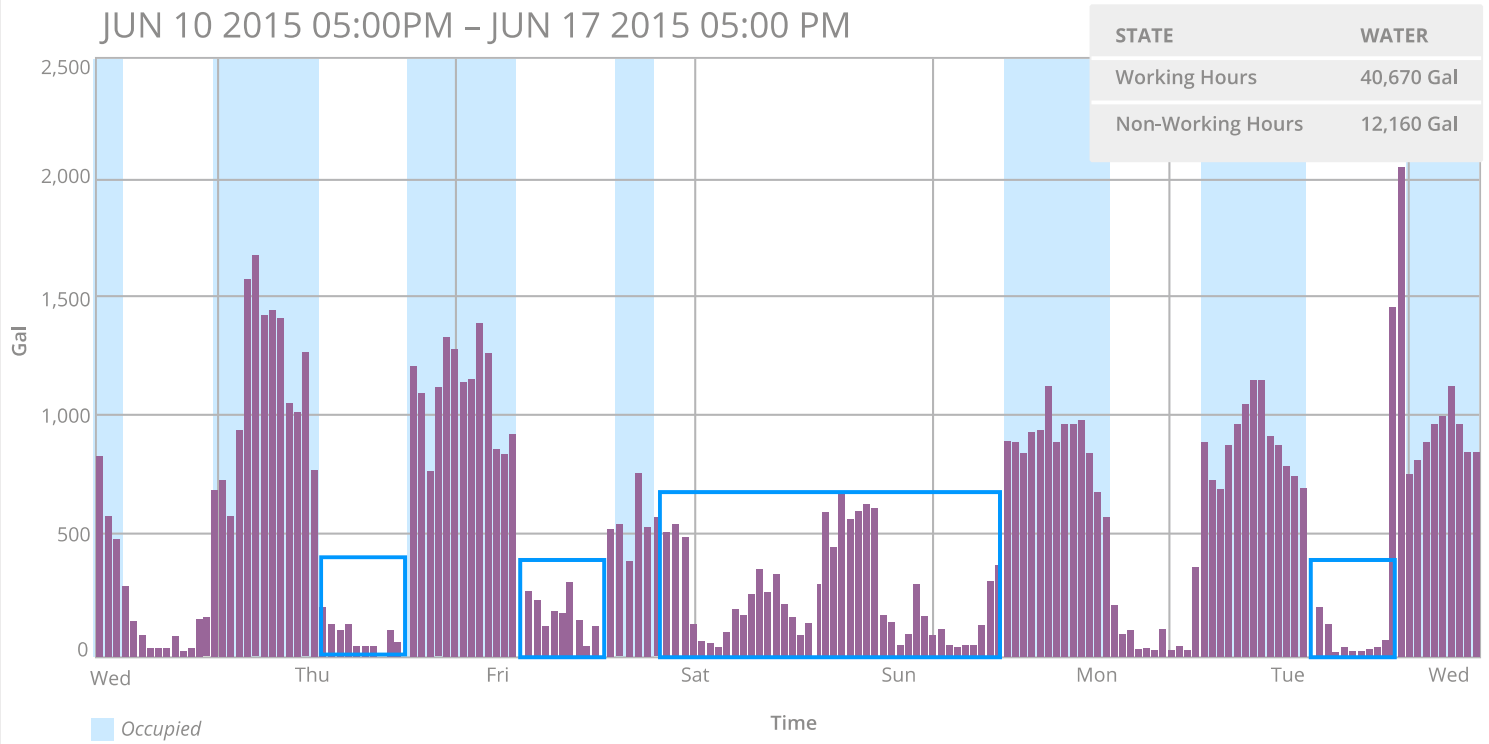
What Is Real-Time Water Monitoring?

Trend
29% of consumption is during non-working hours

Opportunity
Eliminate weekend and off-hours consumption

Estimated Savings
$10,915



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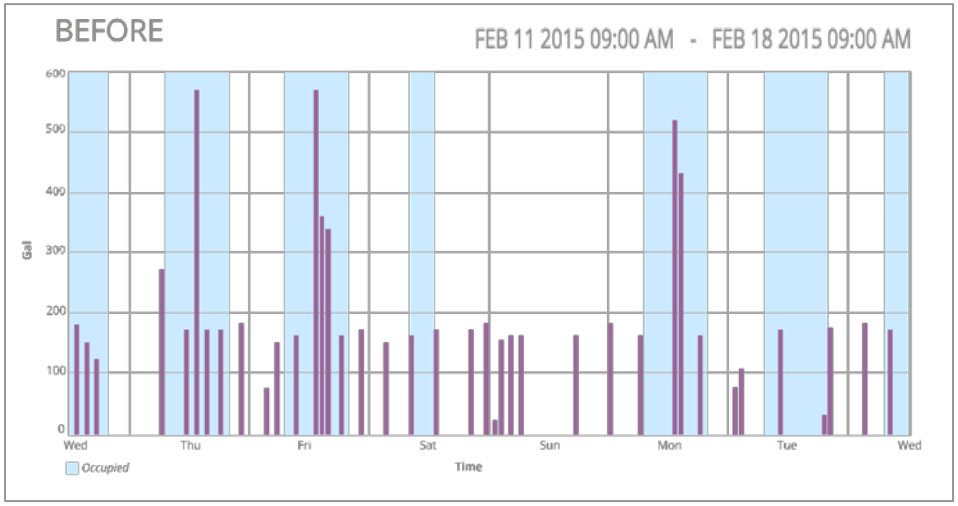
Case Study Example:
The Tower Companies

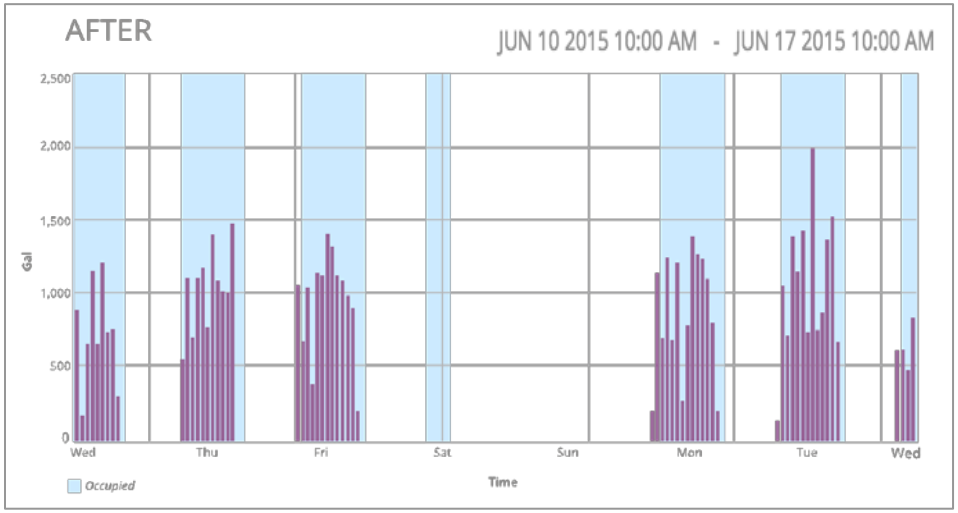
4,000,000 gal / year

$45,000 / year

100,000 showers

Cooling Tower Water Optimization





- Changed Float Assembly
- Lowered High Water Level in CT
- Relocated Water Sensors in CT sump

45% Water Reduction

Cooling Tower Real-Time Monitoring Results

2015 Savings from Optimization of Operations …….$14,000

Total Gallons Saved……1.5M

What's Next?

Travis Blomberg,
Transwestern

U.S. DEPARTMENT OF
ENERGY

Transwestern's Internal Water Rating Program

MAY 11, 2015 | WASHINGTON D.C.

TRANSWESTERN®

OVERVIEW of TRANSWESTERN

*Experience **Extraordinary***

TRANSWESTERN®

Breadth and depth

AGENCY LEASING

3,403 transactions

approximately 34.1 MSF

valued at 2.53 billion

TENANT ADVISORY SERVICES

1,562 transactions

approximately 23.2 MSF

valued at 1.56 billion

MANAGEMENT SERVICES

897 projects

approximately 221.3 MSF

66% office
30% industrial
2% retail
2% healthcare

CAPITAL MARKETS

Investment Services & Structured Finance

491 transactions

approximately 4.5 billion

*Statistics are year-end 2015

TRANSWESTERN®

Sustainability Service

ENERGY STAR AWARD 2015
PARTNER OF THE YEAR
Sustained Excellence

Operational and energy efficiency experts blend passion with an ownership mentality to deliver greater results and return on investment.

- SINCE 2008

LEED

certified 112 properties LEED

37.71 MSF

total waste recycled 4,809 tons

59.79 million gallons of water saved

ENERGY STAR

398 buildings benchmarked

75 average portfolio rating

14.67 billion kBtu saved

- WORLDWIDE SERVICE

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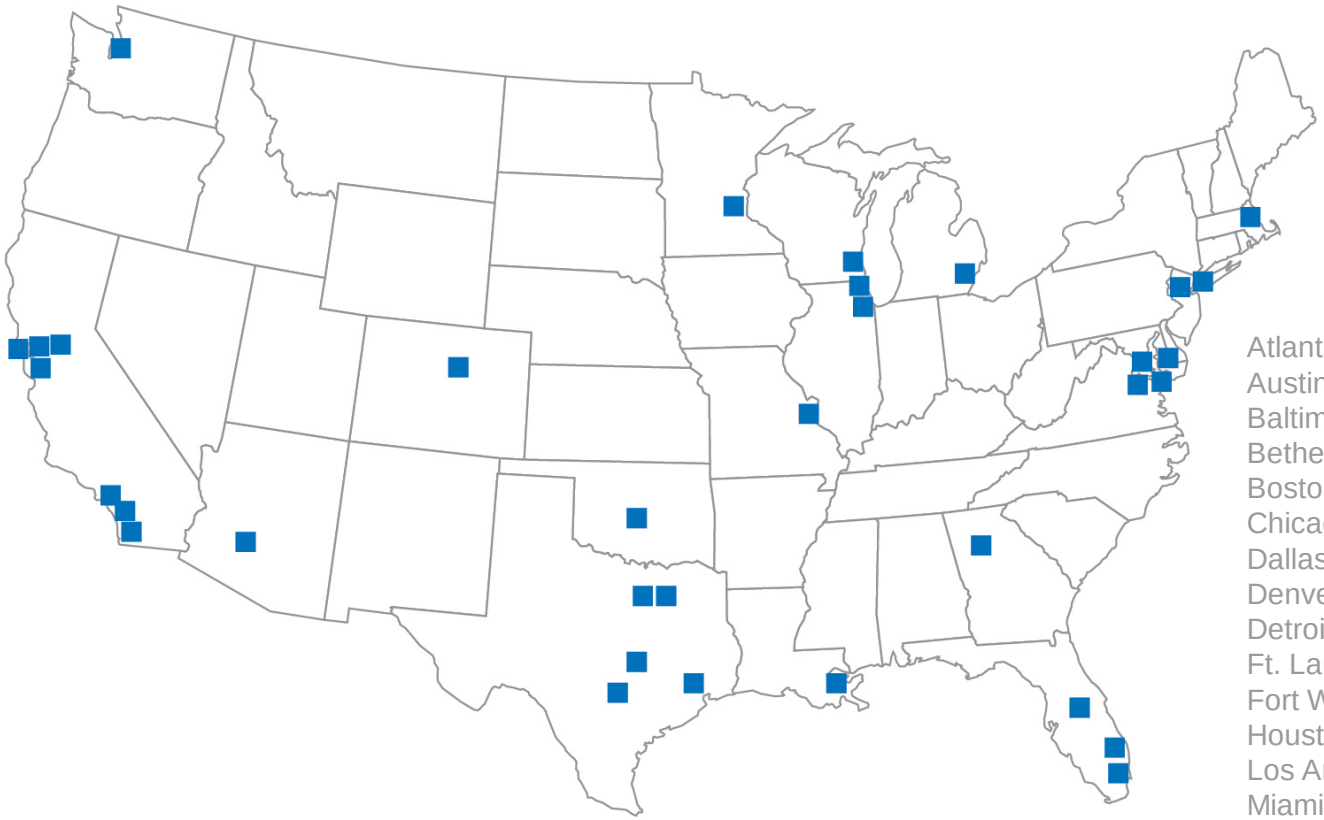
WHERE WE ARE

- U.S. Commercial Office Locations



Atlanta, GA
Austin, TX
Baltimore, MD
Bethesda, MD
Boston, MA
Chicago, IL
Dallas, TX
Denver, CO
Detroit, MI
Ft. Lauderdale, FL
Fort Worth, TX
Houston, TX
Los Angeles, CA
Miami, FL
Milwaukee, WI
Minneapolis, MN
New Orleans, LA
New York, NY
Oakland, CA
Oklahoma City, OK
Orange County, CA
Orlando, FL
Parsippany, NJ
Phoenix, AZ
Rosemont, IL
San Antonio, TX
San Diego, CA
San Francisco, CA
Seattle, WA
Silicon Valley, CA
St. Louis, MO
Vienna, VA
Walnut Creek, CA
Washington, DC

Transwestern's Internal Water Rating Program

TRANSWESTERN®

GOALS & ACTIONS

- Prepare clients for water-centric, operational challenges
- Participation in Programs
  - U.S. Department of Energy Better Buildings Challenge
  - ENERGY STAR® Partner of the Year
- Participate in Transwestern Programs
  - DROP
  - Enhance
- Tune year-over-year goals

BETTER BUILDINGS CHALLENGE

Goal

- 20% energy and water reduction by the year 2020

How We Reach Our Goal

- Benchmark 400 commercial office properties (2012)
- Implement energy and water conservation measures
- Keep Energy Star Portfolio Manager up to date
- Engage building occupants

Better Buildings CHALLENGE
U.S. DEPARTMENT OF ENERGY

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TRANSWESTERN SUSTAINABILITY SERVICES

Transwestern's DROP Team

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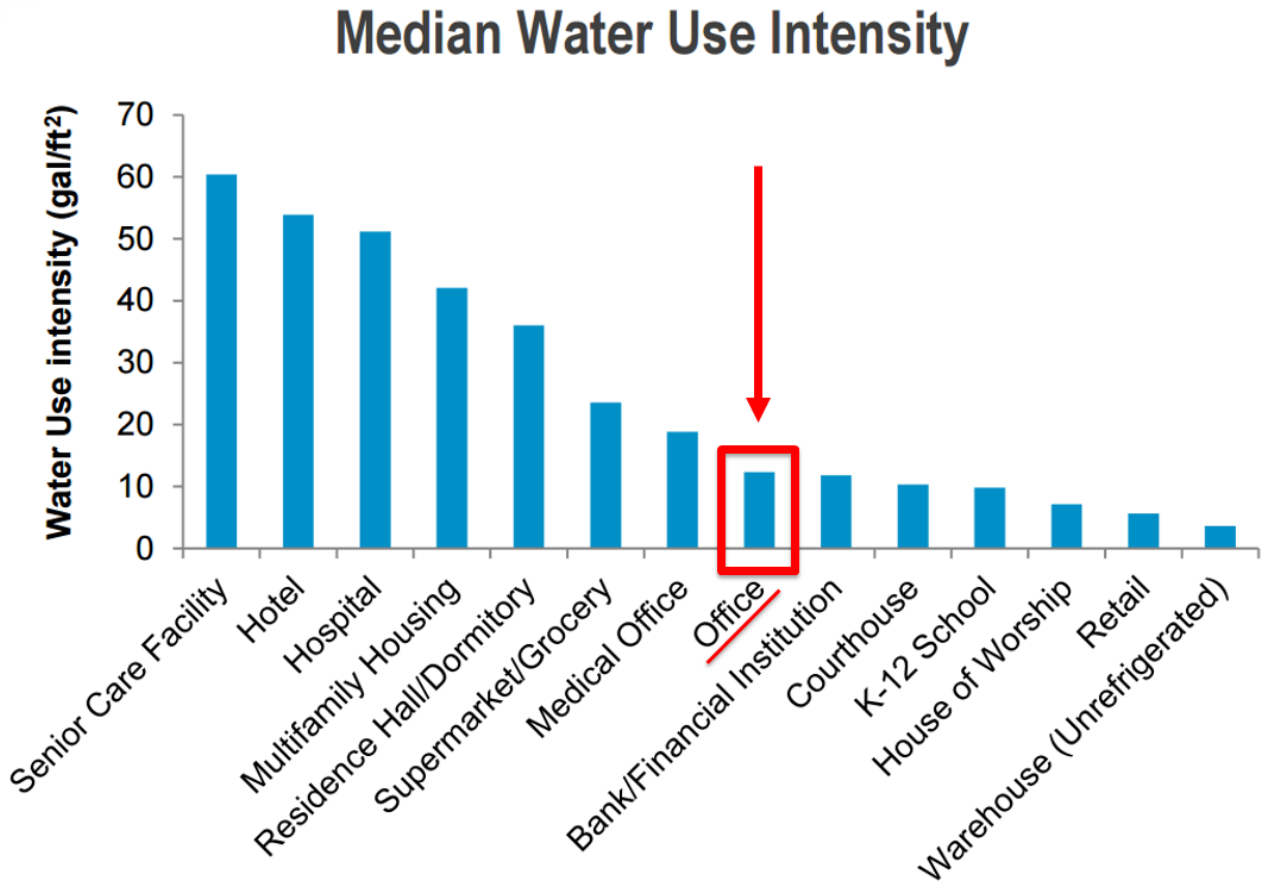
HOW IS MY BUILDING PERFORMING?

BUILDING TYPES - OFFICES



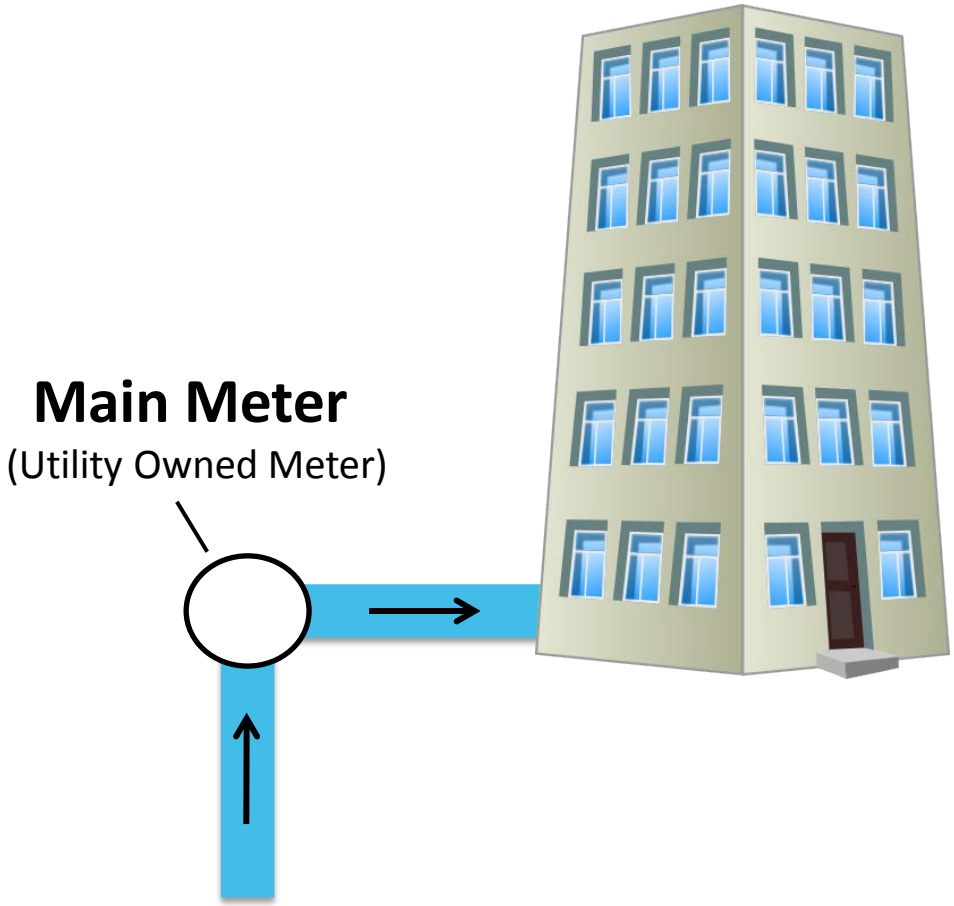
WATER USE TRACKING – DATA TRENDS – OCT 2012

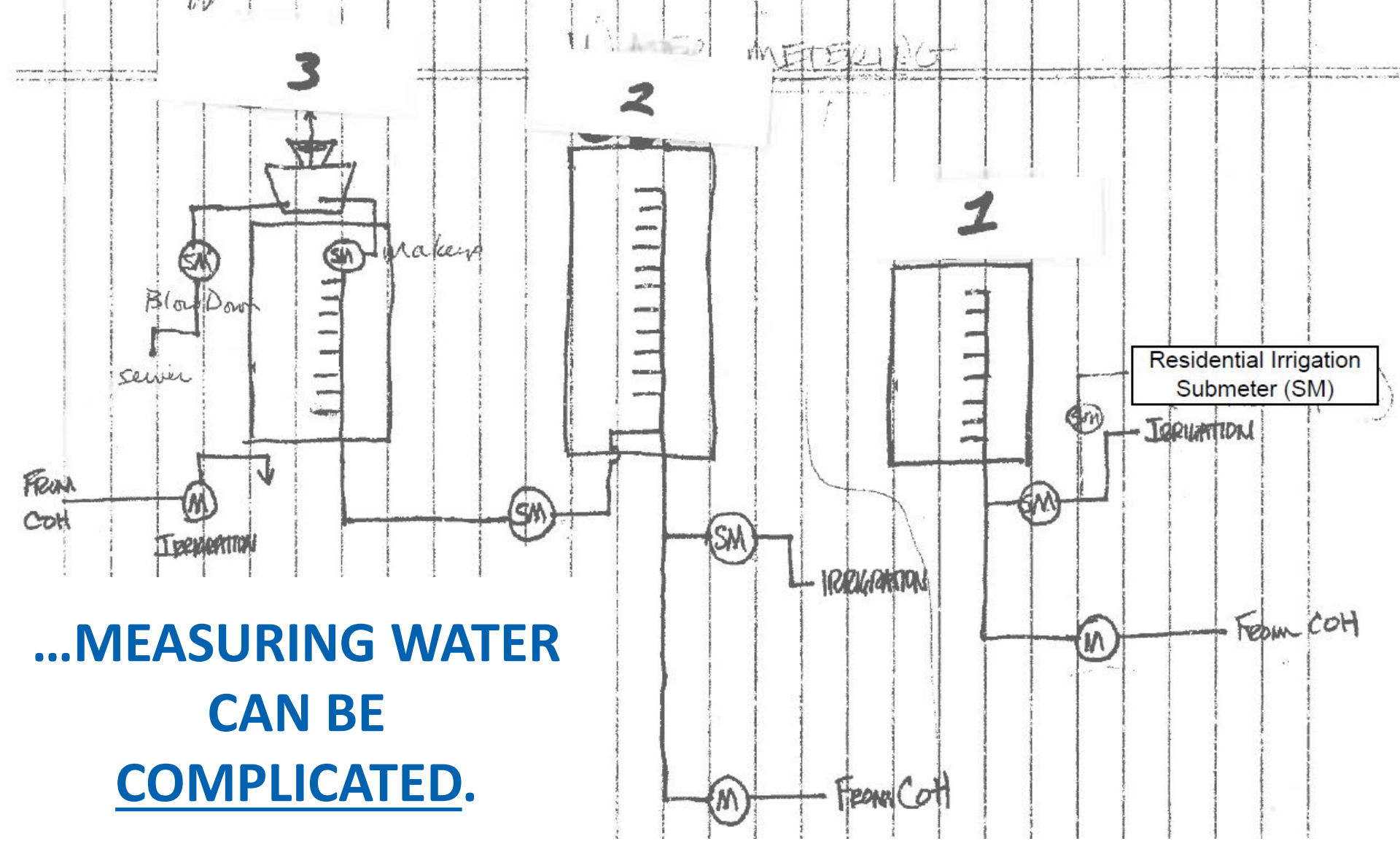
HTTPS://WWW.ENERGYSTAR.GOV/IA/BUSINESS/DOWNLOADS/DATATRENDS/DATATRENDS_WATER_20121002.PDF?2003-40FB

TRANSWESTERN®

MEASURING WATER CAN BE EASY.

OR…



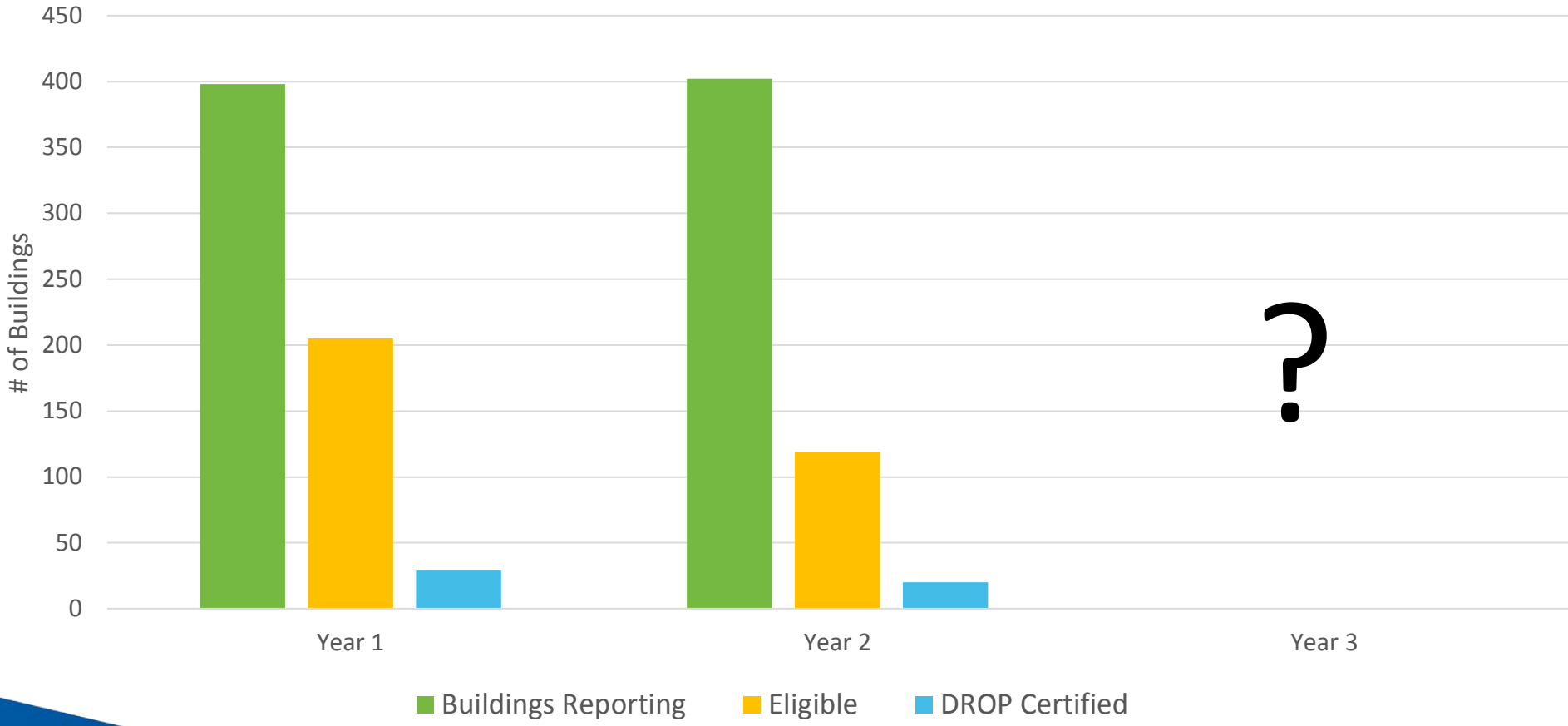


…MEASURING WATER CAN BE COMPLICATED.

Example: Water Flow Diagram Sketch

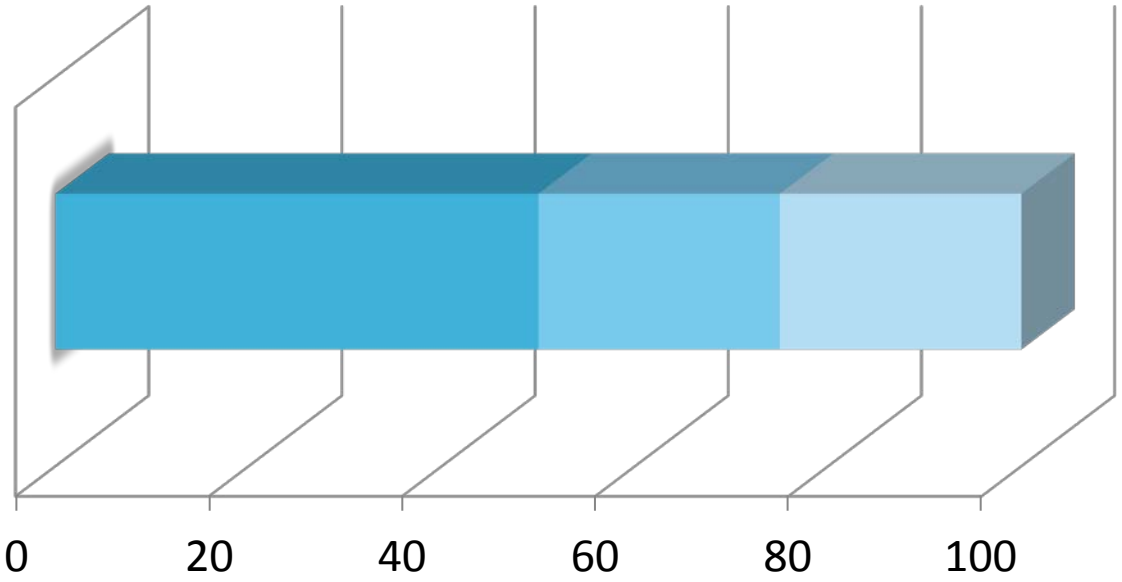
DROP PARTICIPATION

WATER DATA REPORTING



DROP

DROP Score



- 1 = Excessive water consumption
- 50 = Average water consumption
- 75+ = Reduced water consumption

DROP

Improve your DROP Score

Indoor Water Usage

- Low-flow plumbing fixtures
- Interval faucets
- Efficient equipment
- Submeter readings
- Vacancy Checks

Outdoor Water Usage

- No irrigation
- Drip irrigation
- Rainwater capture
  - Sewer savings

RECAP

- Internal Tool for Benchmarking Water Usage
- Track water use data
  - ENERGY STAR® Portfolio Manager
- Utilize water use data from
  - Indoor Use
  - Irrigation
  - Cooling Tower
- Provide Recognition

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DROP

Sharon Nolen,
Eastman Chemical

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ENERGY STAR AWARD 2016
PARTNER OF THE YEAR
Sustained Excellence

Better Plants CHALLENGE
U.S. DEPARTMENT OF ENERGY

Leveraging Energy Management to Address Water Conservation

Sharon L. Nolen, PE, CEM
Eastman Chemical Company
Manager, Worldwide Energy Program

Who we are

- A global specialty chemical company headquartered in Kingsport, Tennessee
- Approximately 15,000 employees and 50 manufacturing sites around the globe
- Serving customers in approximately 100 countries
- A company dedicated to environmental stewardship, social responsibility and economic growth
- 2016 ENERGY STAR® Partner of the Year Sustained Excellence
- 2016 Ethisphere's World's Most Ethical® Companies
- 2016 Glassdoor Employees' Choice Best Places to Work (# 11)
- 2015 revenue of $9.6 billion

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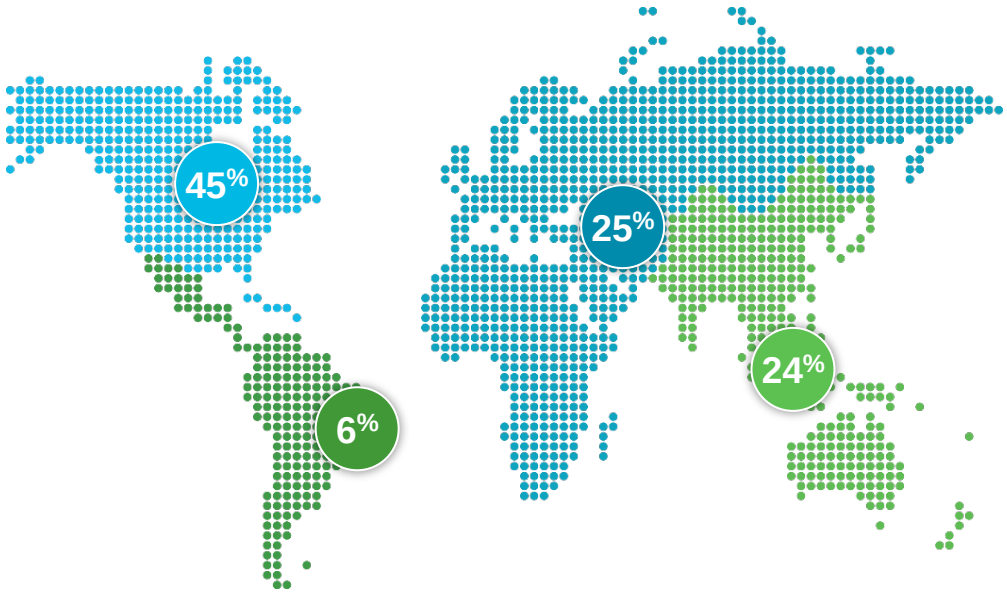
End-market and geographic diversity contribute to growth

2015 sales revenue by end market and geography

19%	Transportation
14%	Building & Construction
14%	Consumables
12%	Tobacco
8%	Durable Goods
8%	Industrial Chemicals & Processing
7%	Personal Care/Health & Wellness
6%	Food, Feed & Agriculture
6%	Other
3%	Energy, Fuels & Water
3%	Electronics



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Eastman's energy management program

- Eastman Chemical Company started in Kingsport, TN in 1920
- This plant (now one of the largest chemical manufacturing sites in North America) began operating its first CHP system in the 1920's
- Eastman has a long history of incorporating energy efficiency in operations including site initiatives, sub-metering, training, and energy projects
- In 2010, the company set an ambitious public goal through the DOE Better Building, Better Plants program that caused a complete revamp of the worldwide energy program
- An Executive Level Steering Team was formed under the Sustainability Council and became the Design and Natural Resources Sub-council.

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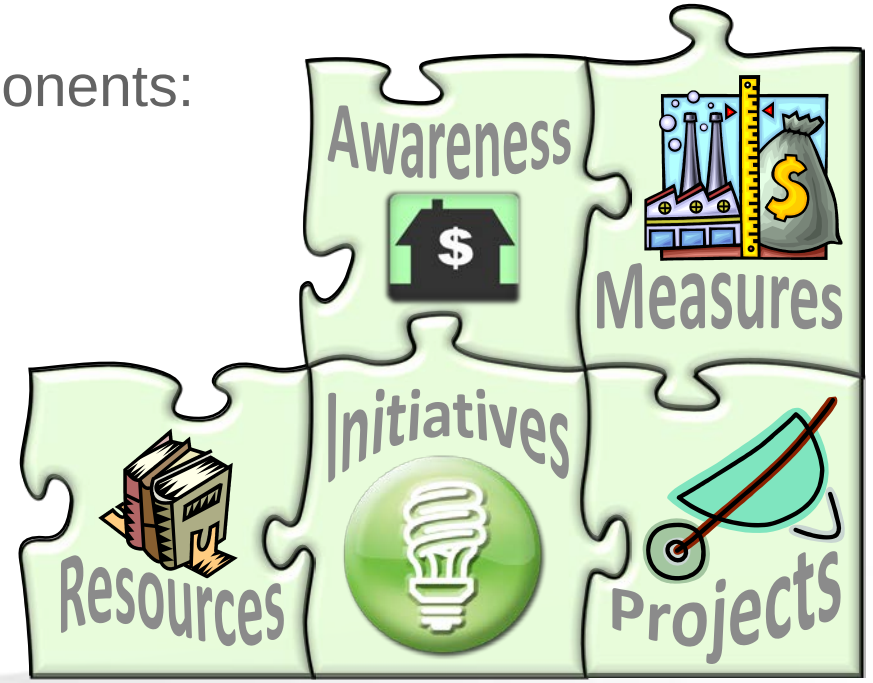
Principles and strategy

- Three guiding principles were developed as a reference to ensure that decisions made related to the energy program are consistent with the intended direction
- Strategy utilizes five key components:
  - Measures
  - External resources
  - Awareness
  - Initiatives
  - Projects



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Guiding principles

Ensure the Accuracy of Utility Information

- Creates a basis for sound business decisions
- Required for accurate reporting and life cycle assessments

Maximize Operating Efficiency

- Reduces energy usage economically
- Typically improves the reliability of equipment

Incorporate Energy Efficiency in Capital Investments

- Improves lifetime equipment costs
- Positively impacts carbon emissions

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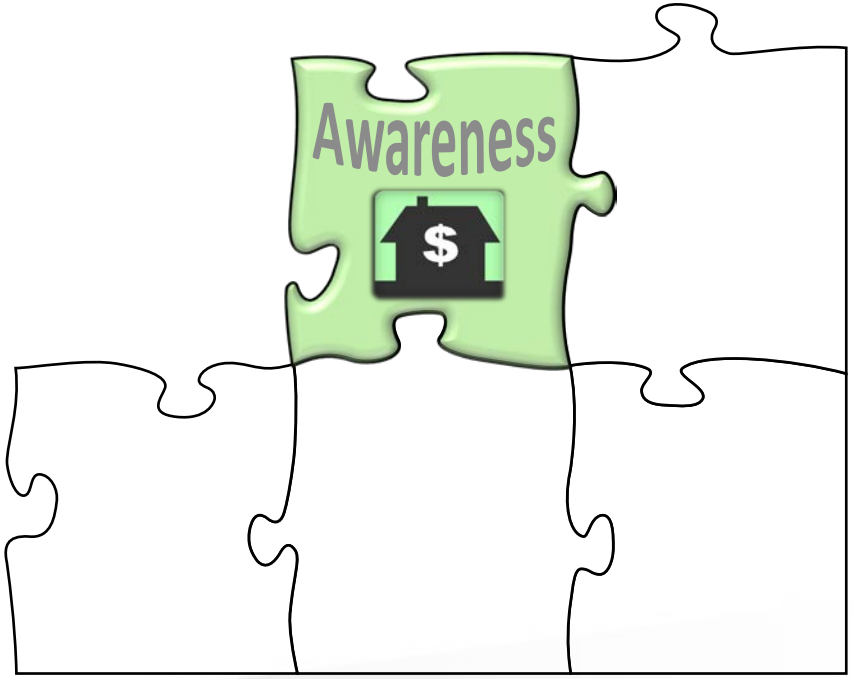
Strategy

Employee awareness

- Energy program was originally only project-focused
- Program expanded to include employee engagement and awareness
- Energy fairs
  - Local utilities and retail stores manned booths showcasing energy efficiency products
- Green Teams
  - Geared toward sharing information with employees that have personal interests in preserving the environment



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Strategy - Water

- Some may have to be convinced that it really is an issue
  - Water is plentiful and cheap in some parts of the world
- Some of the same methods of communication can be used, i.e. Green Team Newsletters
- Employees can be asked to relate issues at home to issues at work
- The same employees who are interested in conserving energy will likely be interested in saving water

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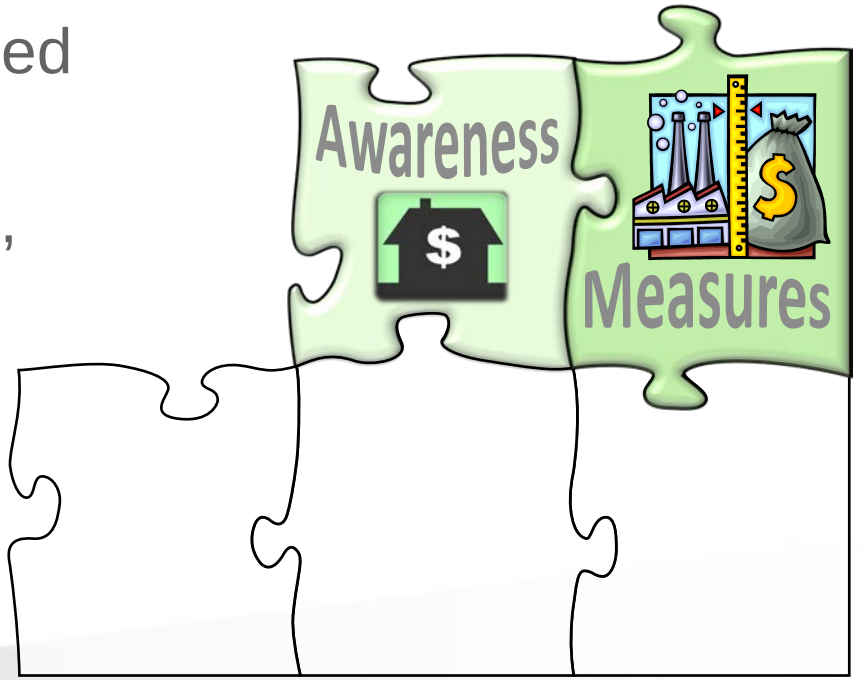
Strategy

Measures

- Critical to have a well-defined, auditable measure with meaningful goals
- Energy intensity is widely used
- **Water** measures could be based on amount withdrawn, consumed, or intensity or limited to specific sites
- **Water** goals may be quantitative or qualitative



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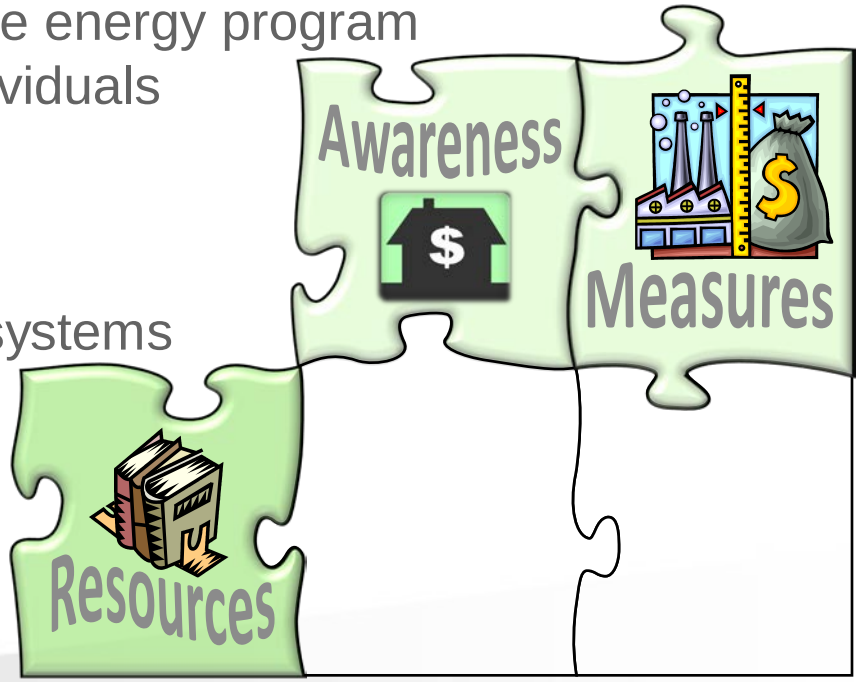
Strategy

External resources

- ENERGY STAR®
  - ENERGY STAR Guidelines for Energy Management used to identify gaps in the existing program
  - Review of the existing corporate energy program by knowledgeable, outside individuals
- DOE
  - On-site training
  - On-site assessments of utility systems

Both ENERGY STAR and the DOE hold meetings where partner companies share information both through formal presentations and networking opportunities



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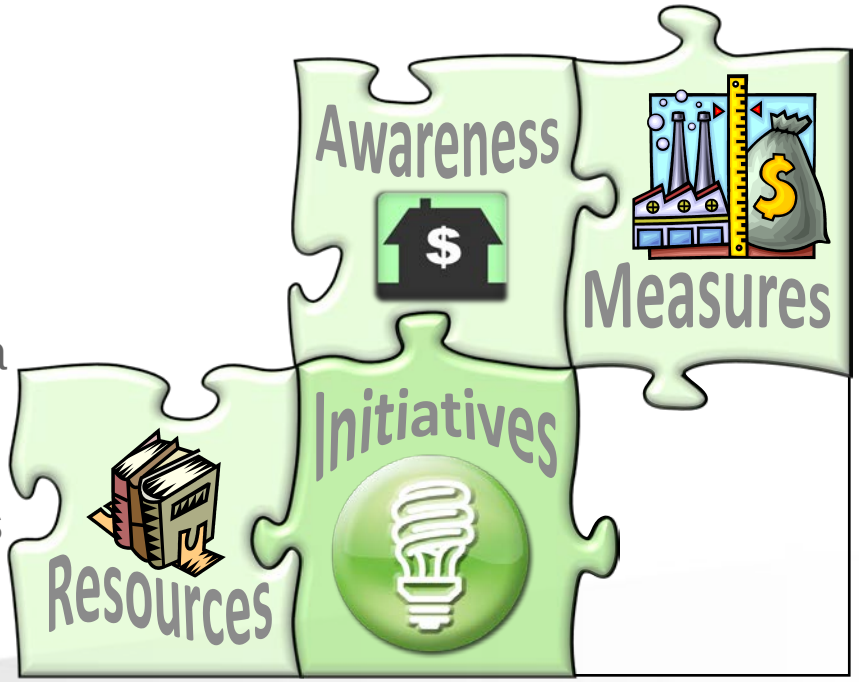
Strategy

Energy initiatives

- Potential identified for a centralized, standardized approach for other initiatives
  - Steam traps
  - Motors
  - HVAC
  - Condensate Return
- Evaluation
  - Questionnaire to assess the progress of each site in each area
  - Results serve to identify common areas of concern, needs for improvements, and best practices at individual sites for sharing



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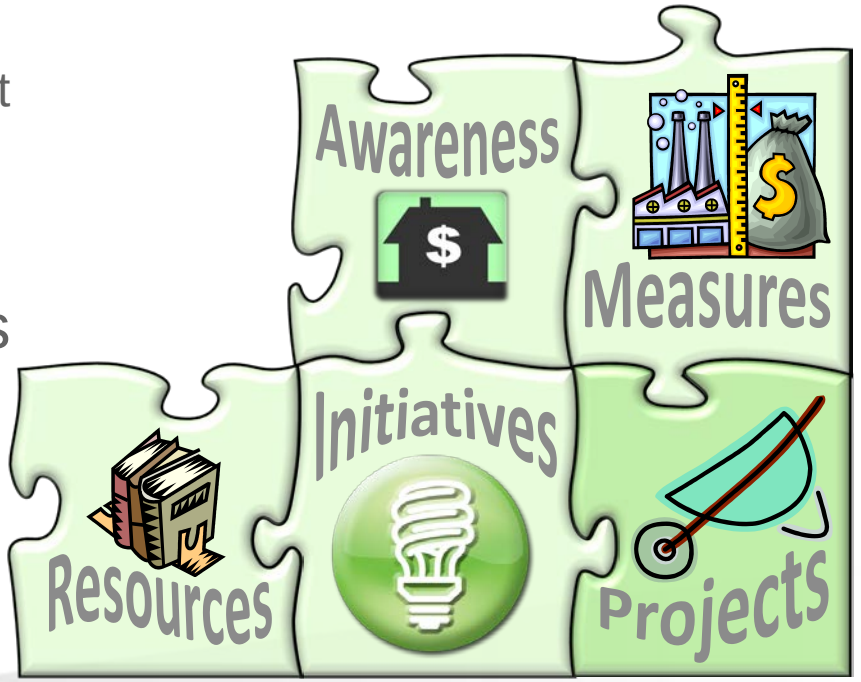
Strategy

Energy efficiency projects

- Database of potential projects is continually updated
- Best projects are identified
- Typical projects
  - Upgrades to more energy-efficient equipment
  - Heat recovery opportunities
- Project ideas are usually process-specific, but there is some potential to find common opportunity across the company



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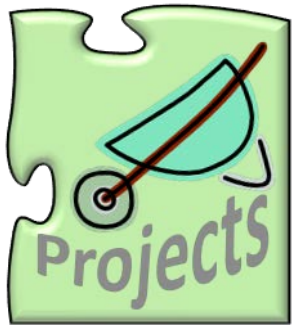
Strategy - Water



- Add water conservation to the energy surveys
  - Check meter accuracy and location
  - Capture project ideas in the energy project database for future consideration
- Consider water conservation in design
- Look for opportunities for water reuse (much like heat integration)

Challenge: Energy projects often have good returns, water projects almost never do

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American Chemistry Council Energy Efficiency Awards

- Hot Water Recycle Project – Cooling water which was previously being sent to the sewer is now being recycled for use as feed to the washing process.
- RB Condensate Coil Heat Recovery – A reduction in dryer steam consumption was achieved by installing a new heat recovery system designed to re-use waste condensate which was previously being sent to the sewer.
- Installation of a flash system that utilized 600 psig condensate from columns eliminated sending 600 psig steam through valves to produce 300 psig steam.

Summary

- Many elements of an energy management program can be applied to natural resources other than energy
- Eastman is leveraging its energy management program to address water conservation
- Several internal and external drivers are escalating the importance of water
- Eastman is currently focused on:
  - Identifying water conservation projects
  - Identifying water risks
  - Increasing employee awareness
  - Establishing water-related goals and strategies
  - Identifying best practices

EASTMAN

More information available in the April issue of
Chemical Engineering Progress

EASTMAN

Discussion

U.S. DEPARTMENT OF ENERGY

Thank you!

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