Better Buildings
U.S. DEPARTMENT OF ENERGY

Water World: Success Stories and Tools for Water Use Reduction in Your Building Portfolio

January 6, 2015
3:00-4:00 PM EST

U.S. DEPARTMENT OF ENERGY

Overview and Agenda

- Welcome and Overview
- Cummins
- National Church Residences
- Environmental Defense Fund
- Additional Resources
- Question & Answer Session

Today's Presenters

Name		Organization
Todd Swingle		Cummins
Alan Mileti		National Church Residences
Steven Goldman		Environmental Defense Fund

Todd Swingle

Cummins

U.S. DEPARTMENT OF ENERGY

DOE Webinar
Cummins Water Program Review

Todd Swingle

January 2015

WHO WE ARE

Cummins Inc., a global power leader, is a corporation of complementary business units that design, manufacture, distribute and service engines and related technologies, including fuel systems, controls, air handling, filtration, emission solutions and electrical power generation systems.

WORLD HEADQUARTERS
500 Jackson Street
Columbus, IN, 47201

STOCK SYMBOL (traded on NYSE)
CMI

FOUNDED IN 1919

WEB SITE
www.cummins.com

FORTUNE 500 RANKING
(2014)
168

SALES / EARNINGS

In 2013, Cummins earned **$1.48 billion** on revenues of

$17.3 billion.

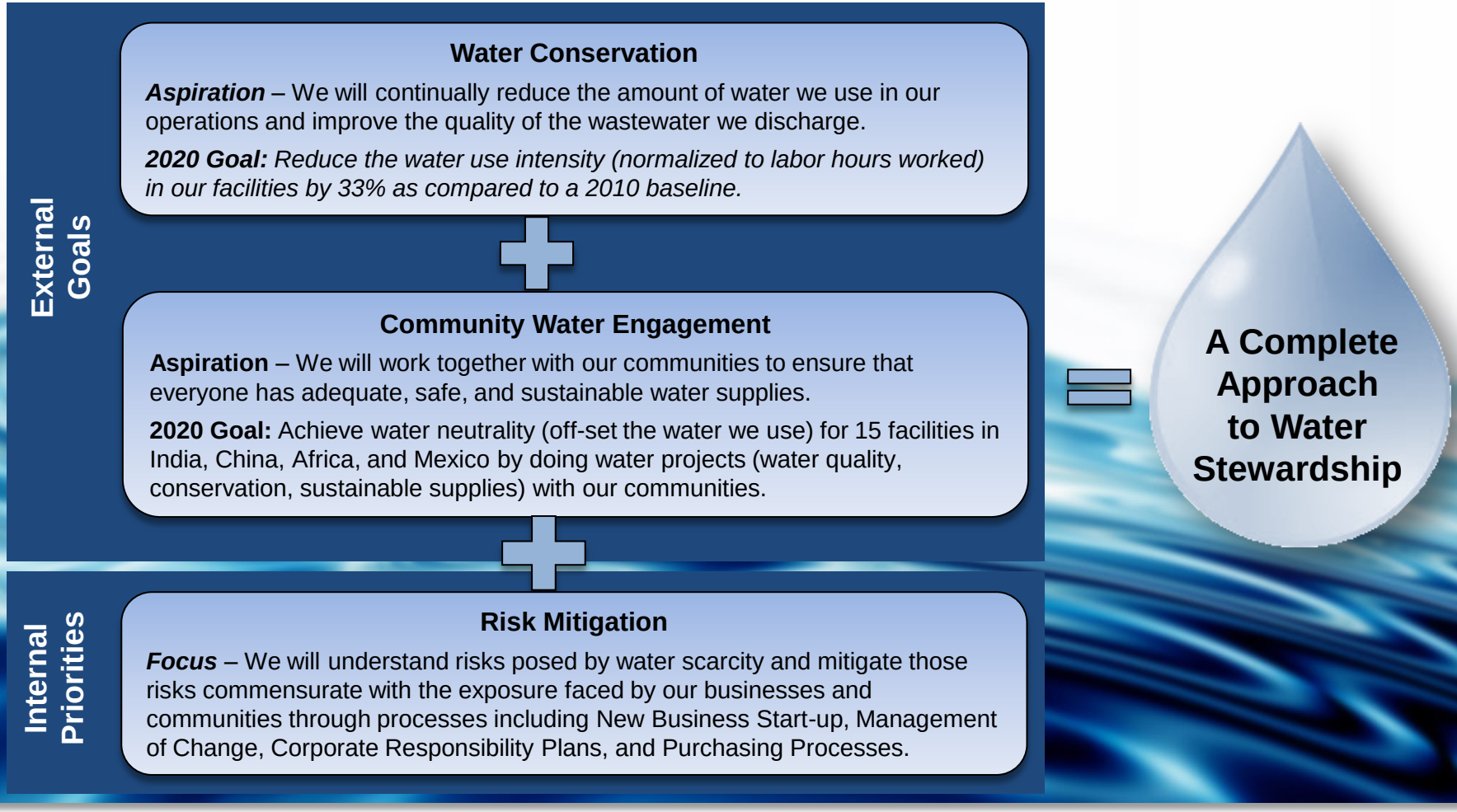
EMPLOYEES

Worldwide, approximately
48,000 people.
More than 60 percent of the Company's employees are located outside the United States.

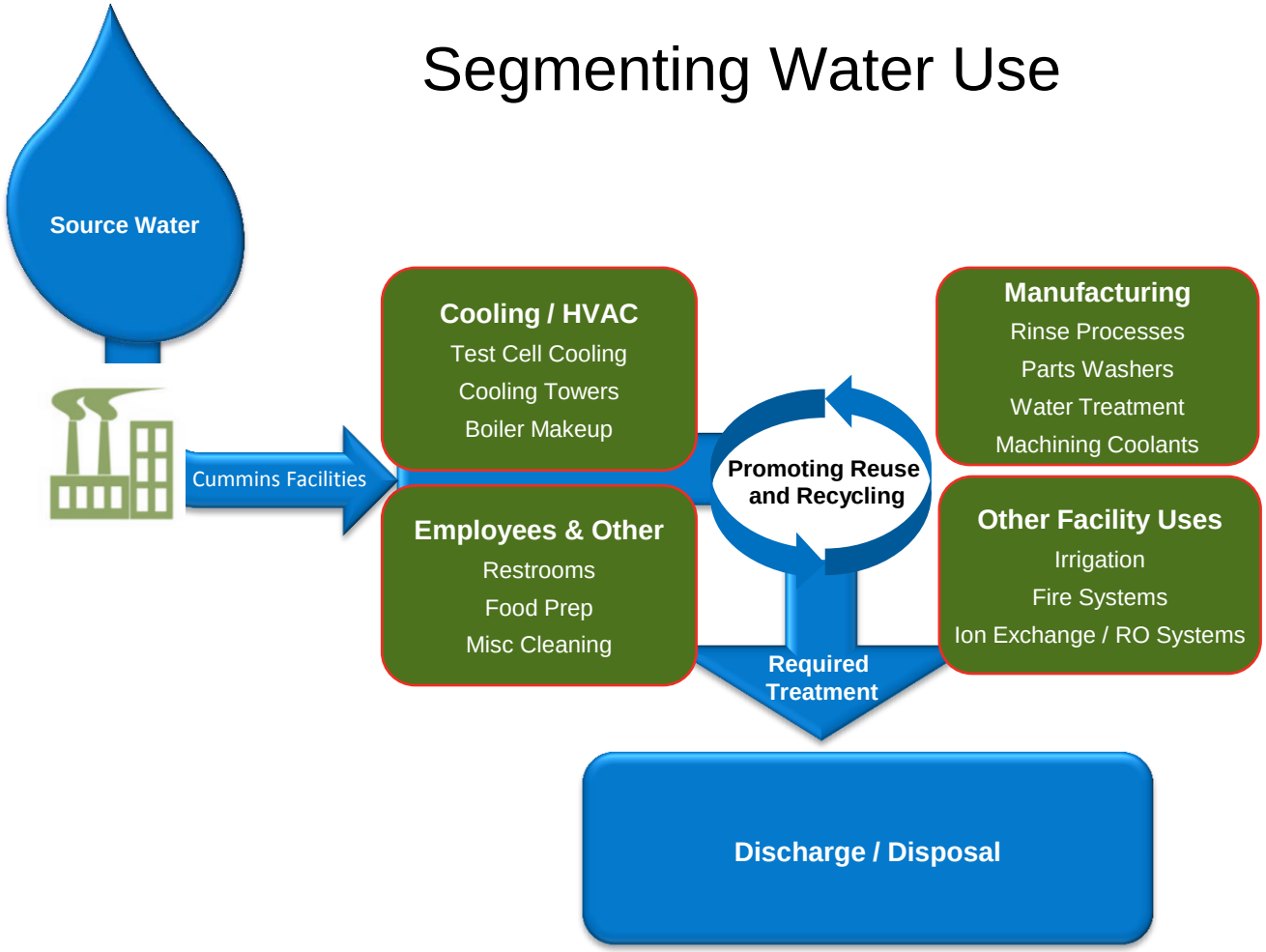
CUSTOMERS

The Company's customers are located in approximately **190 countries** and territories that Cummins reaches through a network of more than **600** Company-owned and independent distributor locations and approximately **6,500 dealer locations.**

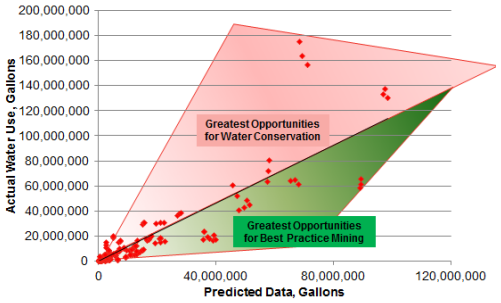
Water Stewardship at Cummins



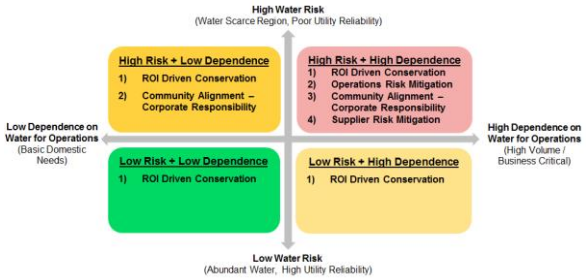
Segmenting Water Use

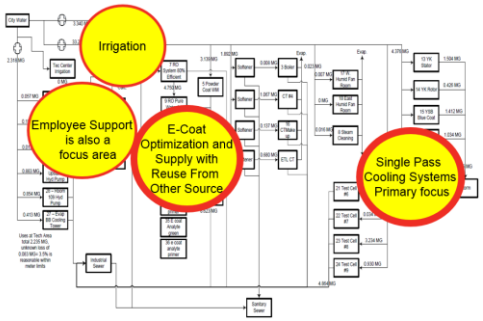


Make the Complex Simple

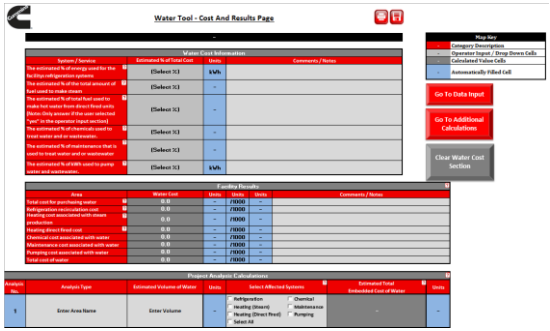


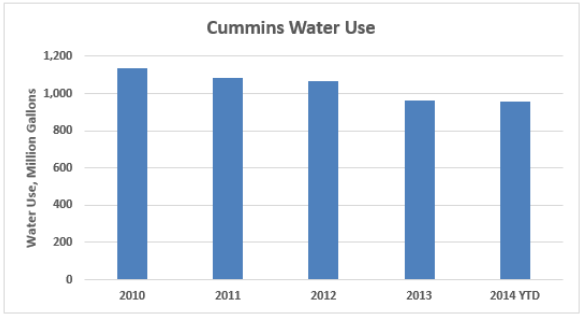
Prioritize



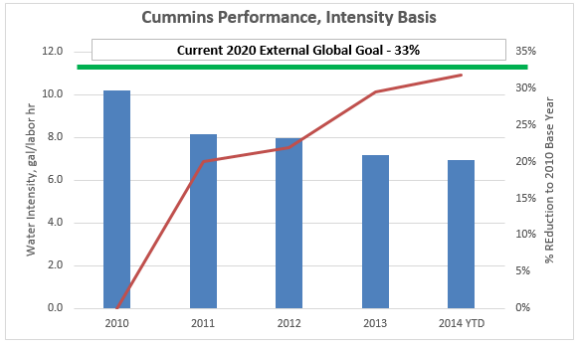


Consult





Achieve



Alan Mileti

National Church Residences

U.S. DEPARTMENT OF ENERGY

National Church Residences

EXCELLENCE THAT TRANSFORMS LIVES

Water World: Success Stories and Tools for Water Use Reduction in Your Building Portfolio

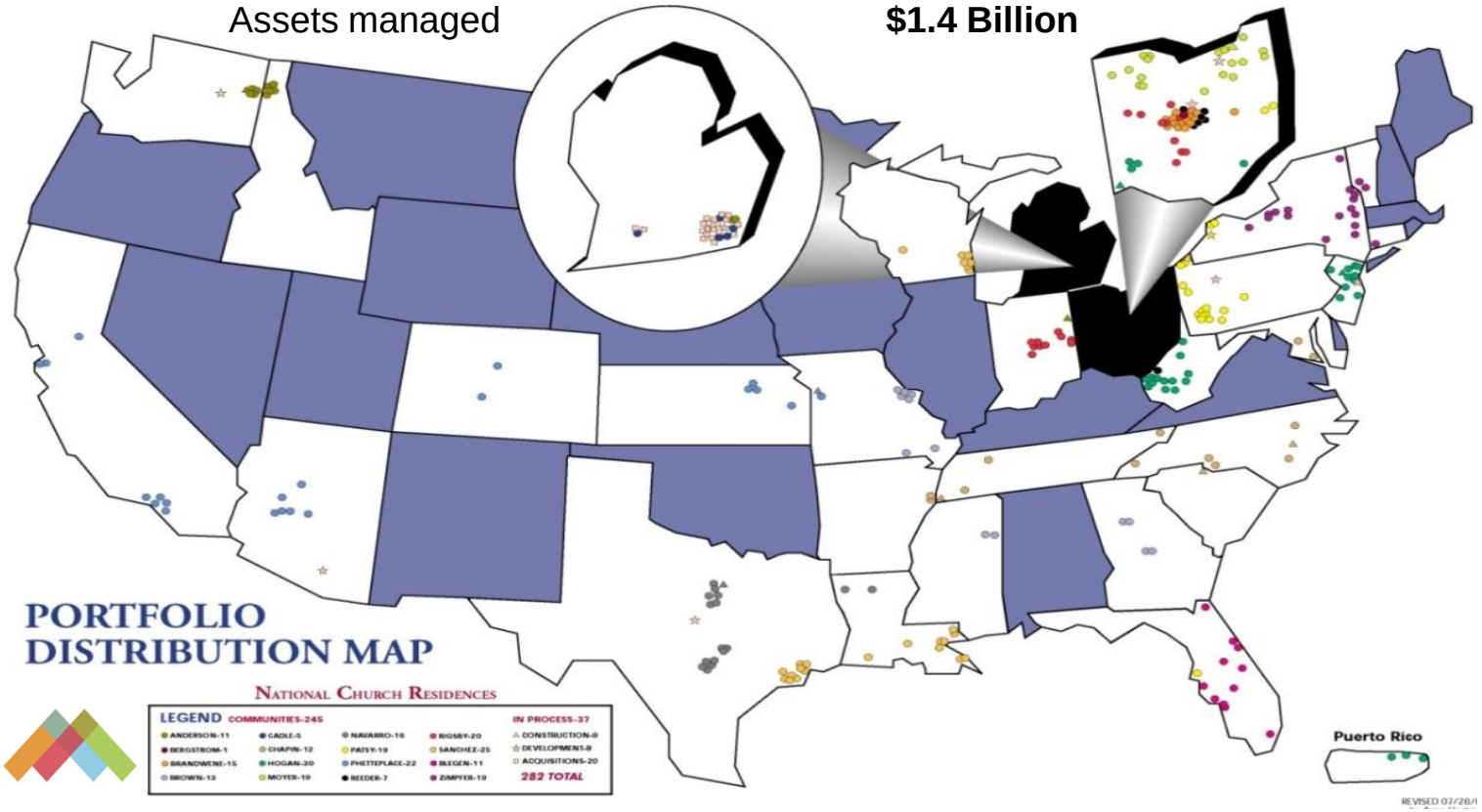
Alan Mileti

Utility & Procurement Specialist

National Church Residences – Columbus, Ohio

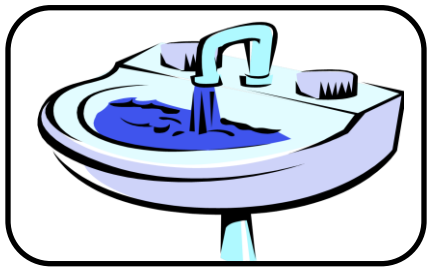
National Church Residences Portfolio Statistics

# of properties in US and Puerto Rico	**340**
# of states with properties	**28**
# of residents served	**24,000**
Assets managed	**$1.4 Billion**



Common Reasons for High Resident Water Consumption

- Resident habits
- Residents often aren't aware of leaks or don't report them when discovered
- Water conservation tips aren't provided to residents. *(Many residents see no relationship between the amount of water they use and their cost to live in the property.)*
- Older fixtures
- Poor or aging plumbing



Water Consumption Statistics

- 45% of water use in the average American home occurs in the bathroom with 27% being used by toilets.
- Showering accounts for almost 17% of residential water use indoors. Replacing an older showerhead can save 50% in shower water usage.
- Bathroom and kitchen sinks account for 16% of the water used in the average American home. Replacing older faucet aerators can save up to 40% of faucet water use.

Water Consumption Statistics

How much water does a leaking faucet waste?

- If leaking four drips per minute:

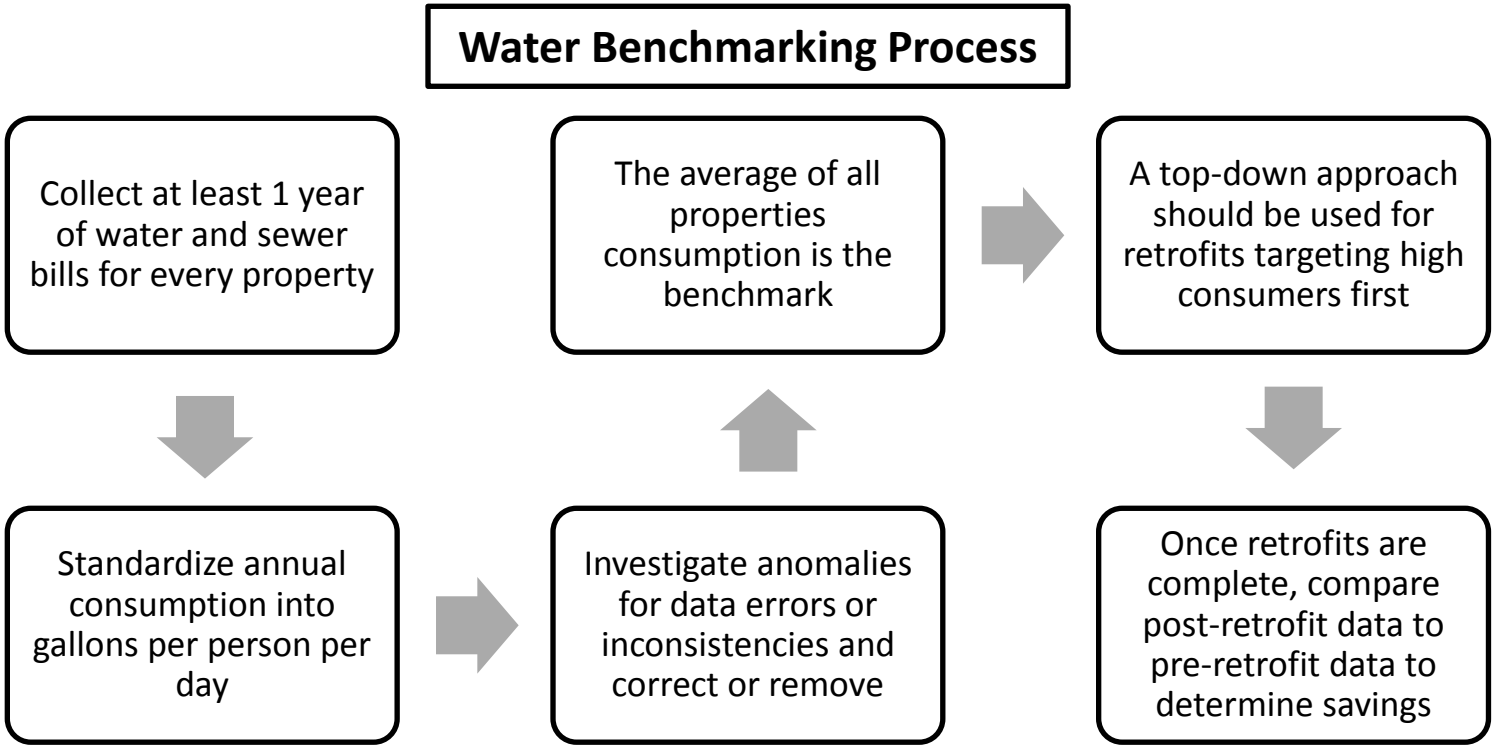
  -Over a **half gallon** per day
  -Over **17 gallons** per month
  -Over **211 gallons** per year

- If leaking a steady stream (5 drips/second):

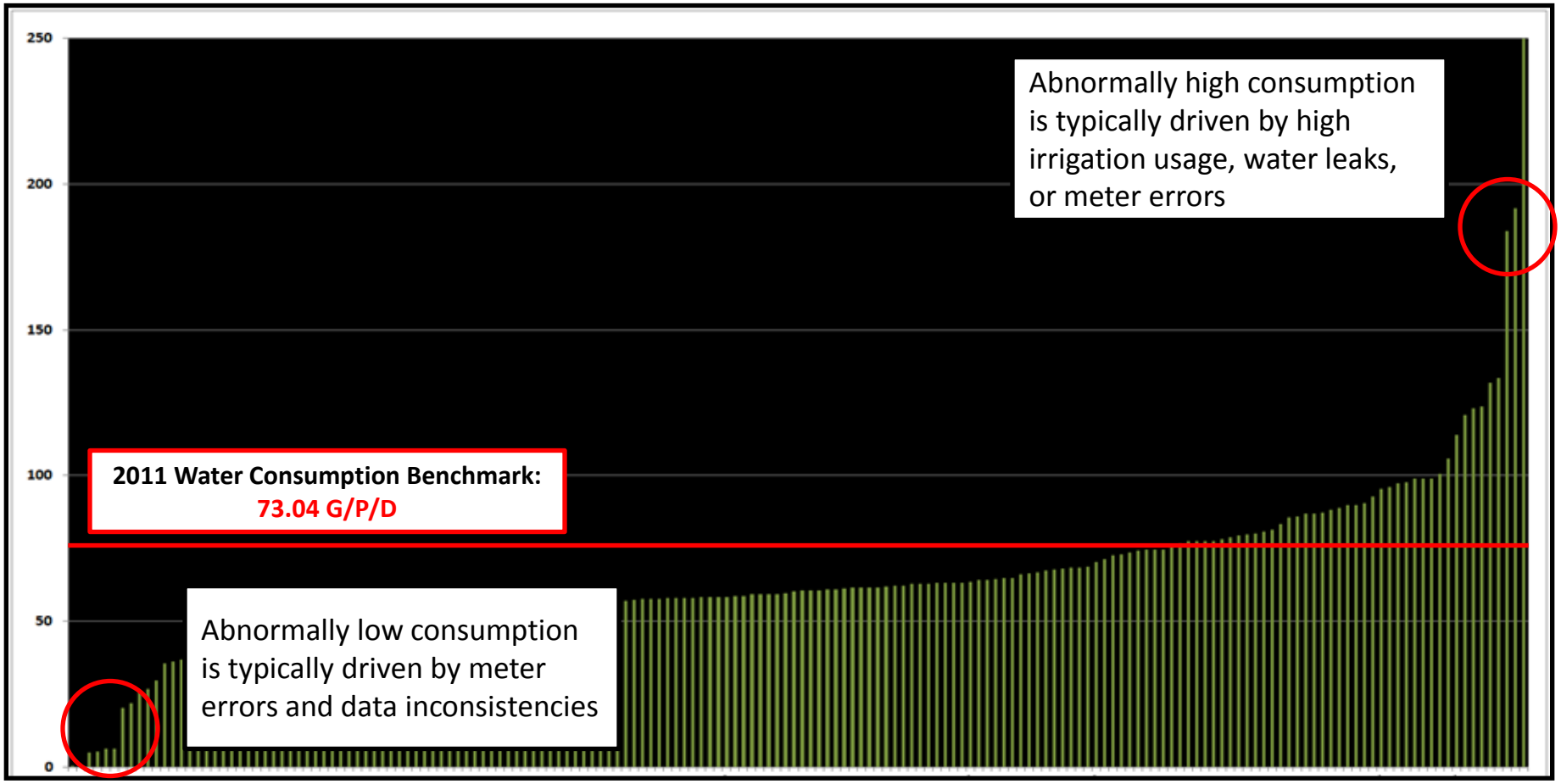
  -Over a **43 gallons** per day
  -Over **1,250 gallons** per month
  -Over **15,768** per year

National Church Residences Water Conservation Initiative

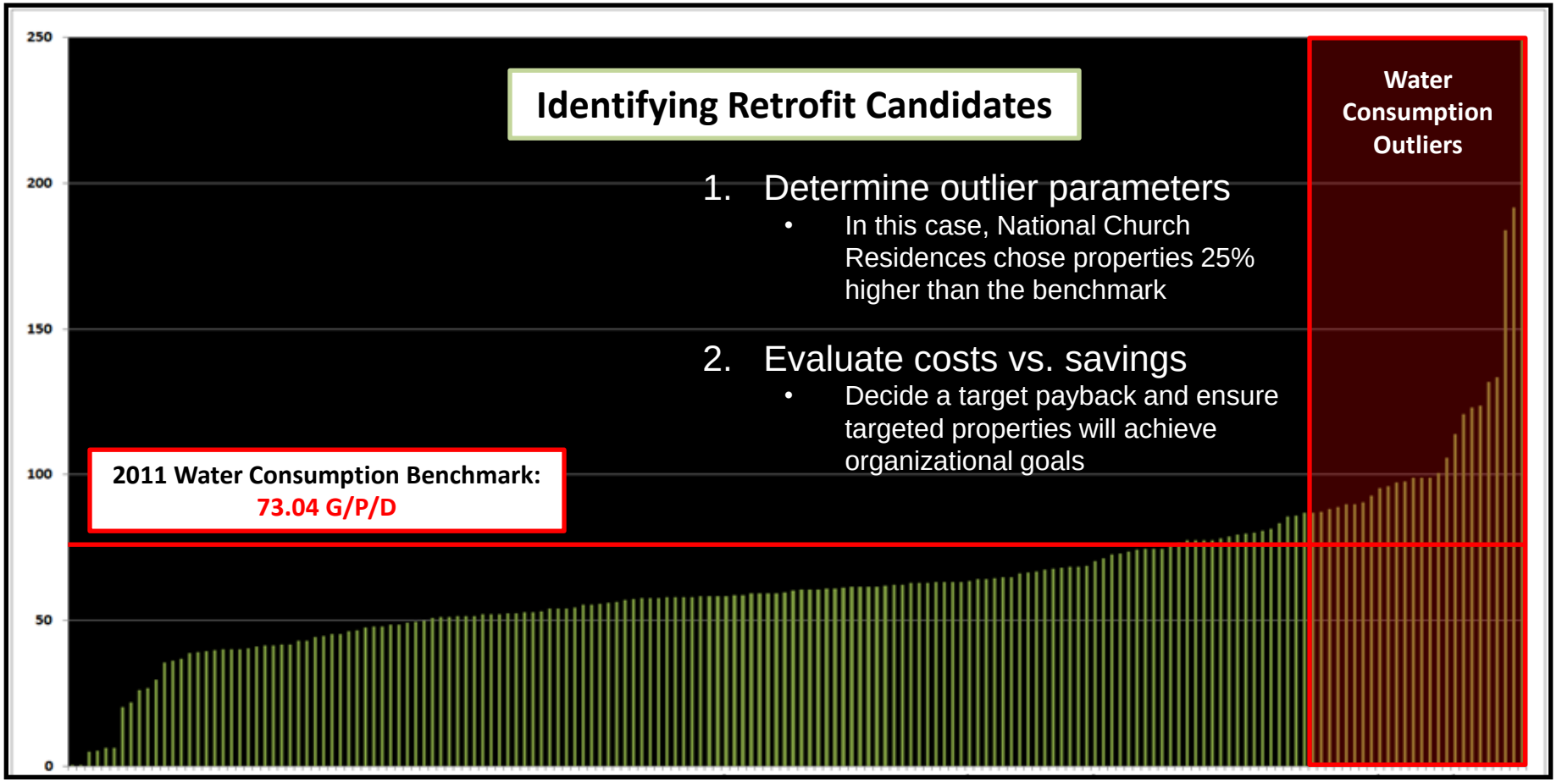
In order to most effectively tackle water efficiency initiatives, it is best to target high consumers within a portfolio. Benchmarking is critical in identifying these properties and ensuring that both savings and water reduction are being maximized.



National Church Residences Water Conservation Initiative



National Church Residences Water Conservation Initiative



National Church Residences Water Conservation Initiative

Phase 1 – Pilot

Surveyed select properties and evaluated 12-month water history

Evaluated
- 13 properties
- 1,401 units

Implemented
- 1 property
- 167 units

Financials
- Cost: $24,000
- Savings: $26,000
- Payback: 11 months

Phase 2 – Beta

Surveyed select properties based on location (high water rates) and age

Evaluated
- GA, LA, and MI
- 40 properties
- 5,265 units

Implemented
- 4 properties
- 692 units

Financials
- Cost: $54,213
- Savings: $81,834
- Payback: 8 months

Phase 3 – Roll-Out

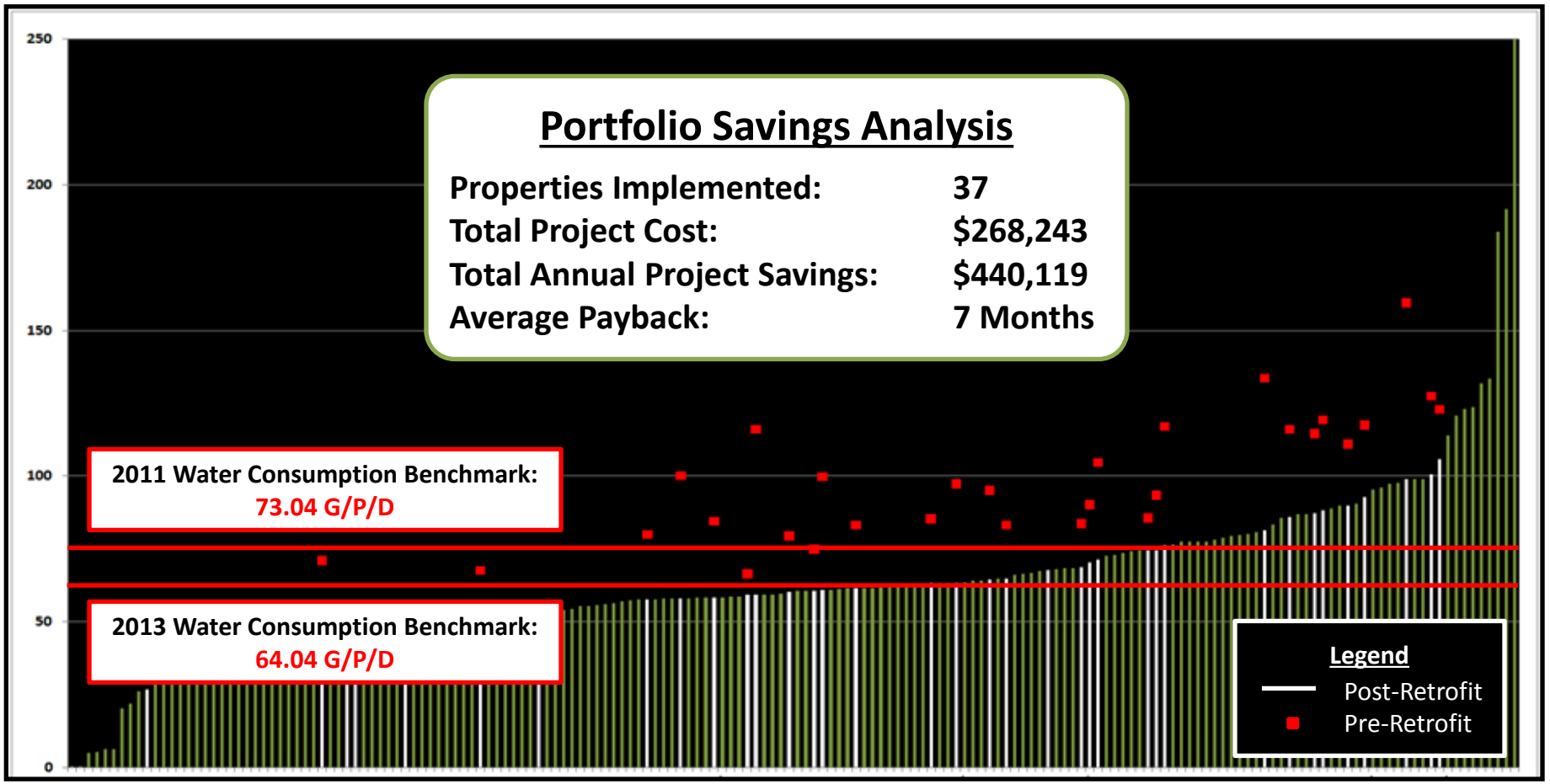
Benchmarked portfolio for outliers; targeted sites w/ < 12 mo. payback

Evaluated
- All properties
- 170 properties
- 13,770 units

Implemented
- 32 properties
- 2,822 units

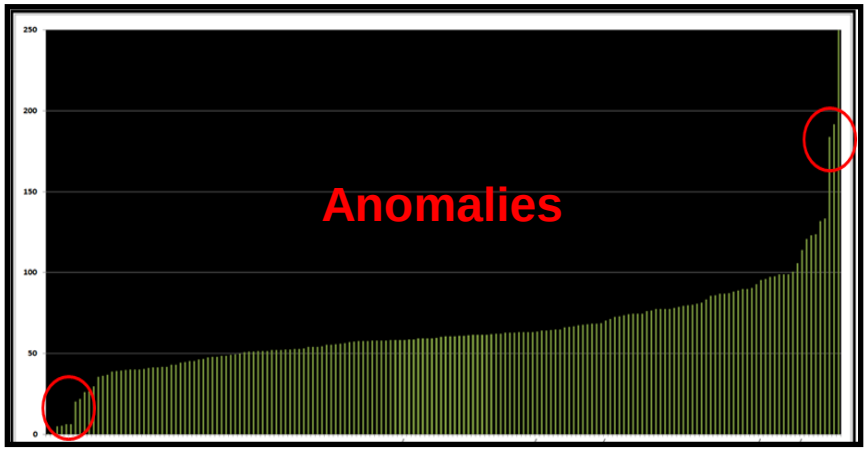
Financials
- Cost: $201,700
- Savings: $332,285
- Payback: 7 months

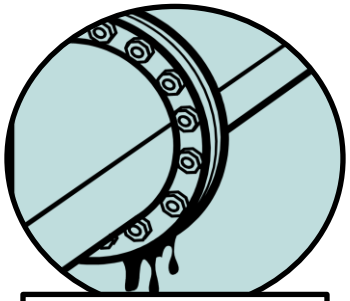
National Church Residences Water Conservation Initiative



Other Factors Impacting Water Consumption

While retrofitting aerators, showerheads, and toilets is the easiest and most cost-effective solution to water management, there are other factors that can drive high consumption.





Water Leaks

Faulty Equipment

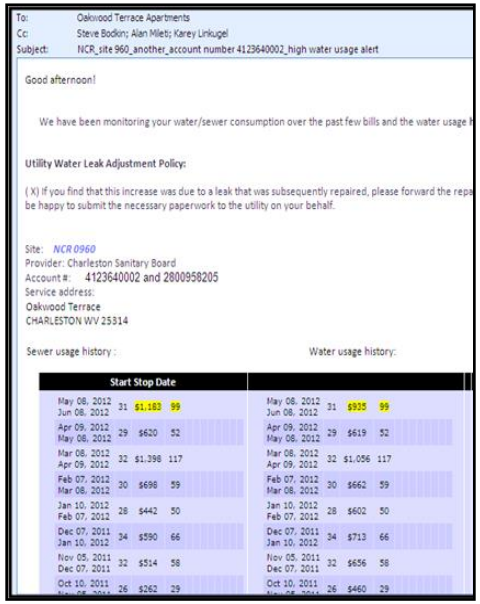
Meter Errors

Irrigation

Other Factors Impacting Water Consumption

National Church Residences has developed the following strategies to better deal with water leaks, faulty equipment, meter errors, irrigation management, and other factors that contribute to high water consumption

Data Management Services



To: Oakwood Terrace Apartments
Cc: Steve Bodkin; Alan Mileti; Karey Linkugel
Subject: NCR_site 960_another_account number 4123640002_high water usage alert

Good afternoon!

We have been monitoring your water/sewer consumption over the past few bills and the water usage h

Utility Water Leak Adjustment Policy:

(X) If you find that this increase was due to a leak that was subsequently repaired, please forward the repa
be happy to submit the necessary paperwork to the utility on your behalf.

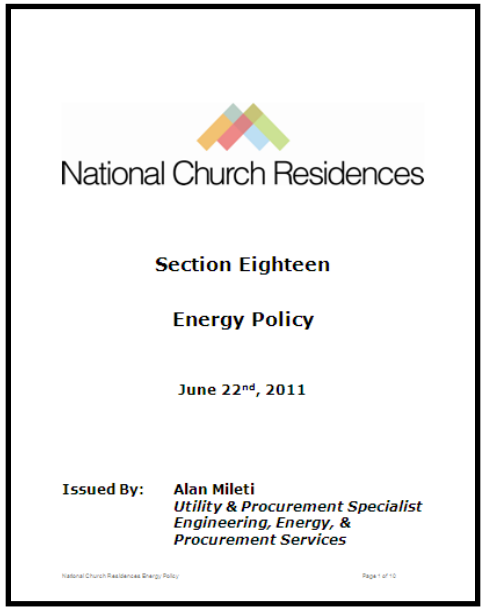
Site: *NCR 0960*
Provider: Charleston Sanitary Board
Account #: 4123640002 and 2800958205
Service address:
Oakwood Terrace
CHARLESTON WV 25314

Sewer usage history: Water usage history:

Start Stop Date				Start Stop Date			
May 08, 2012 Jun 08, 2012	31	$1,183	99	May 08, 2012 Jun 08, 2012	31	$935	99
Apr 09, 2012 May 08, 2012	29	$620	52	Apr 09, 2012 May 08, 2012	29	$619	52
Mar 08, 2012 Apr 09, 2012	32	$1,398	117	Mar 08, 2012 Apr 09, 2012	32	$1,056	117
Feb 07, 2012 Mar 08, 2012	30	$698	59	Feb 07, 2012 Mar 08, 2012	30	$662	59
Jan 10, 2012 Feb 07, 2012	28	$442	50	Jan 10, 2012 Feb 07, 2012	28	$602	50
Dec 07, 2011 Jan 10, 2012	34	$590	66	Dec 07, 2011 Jan 10, 2012	34	$713	66
Nov 05, 2011 Dec 07, 2011	32	$514	58	Nov 05, 2011 Dec 07, 2011	32	$656	58
Oct 10, 2011	26	$262	29	Oct 10, 2011	26	$460	29

- Utilizes third-party data management company for utility data analysis
- Auditing services monitor consumption and costs for anomalies and work with property to determine and resolve issue
- Quickly identifies water leaks, faulty equipment, meter and billing errors, etc.

Organizational Energy Policy



National Church Residences

Section Eighteen

Energy Policy

June 22nd, 2011

Issued By: **Alan Mileti**
Utility & Procurement Specialist
Engineering, Energy, & Procurement Services

National Church Residences Energy Policy Page 1 of 10

- Addresses all aspects of energy that would impact a property
- Specifically addresses water management and provides guidelines for checking for leaks, installing low-flow equipment, and sets irrigation standards

Thank You

Alan Mileti
Utility & Procurement Specialist
National Church Residences

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Columbus, OH 43220

Phone 614.273.3776
Fax 614.451.0351
amileti@nationalchurchresidences.org

Steven Goldman

Environmental Defense Fund

U.S. DEPARTMENT OF ENERGY

EDF-GEMI Water Management Application Toolkit (WaterMAPP)

Steven Goldman, Marketing and Communications Coordinator, Corporate Partnerships, EDF

EDF
ENVIRONMENTAL DEFENSE FUND®
Finding the ways that work

Agenda

- Overview of cooling tower operations—and the potential for water, energy, chemical, and dollar savings
- Review the key tools and resources—and how these can help your company

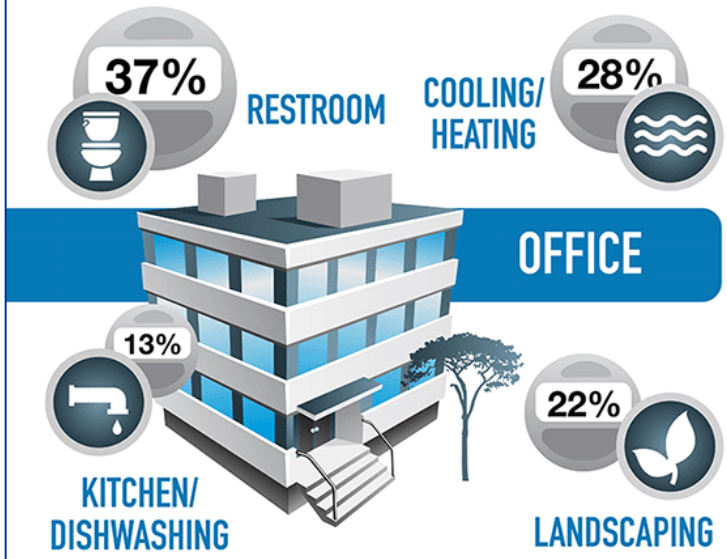

McDonald's

The Company We Keep

FedEx Express
ALCOA
at&t
Walmart
ABBOTT
Wegmans
helping you make great meals easy
Duke Energy
McDonald's
citi
COMPASS GROUP
Nordstrom
escape from the ordinary
ups
STARBUCKS COFFEE
KKR
CATERPILLAR
DUPONT

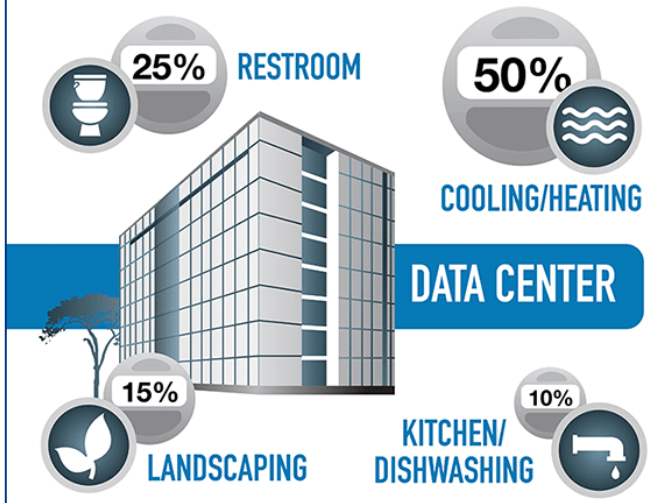
WHERE DO BUILDINGS use water?

Cooling is among the top consumers of water for large office buildings.



Source: http://www.epa.gov/watersense/commercial/types.html#tabs-office

...and because of the heat generated by computer equipment, data centers consume even more water for cooling.



The actual percentages will vary by data center, with some consuming a significantly higher percentage of water for cooling.

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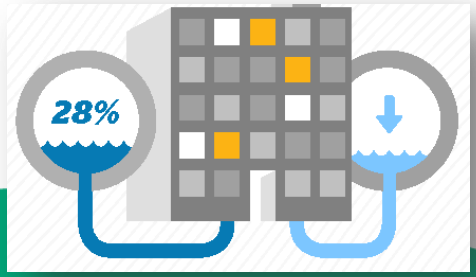
AT&T's Water Footprint

- AT&T water footprint: 3.3B gallons of water annually
- 2012 budget: Water expenditures <2% of energy expenditures
- AT&T internal water activities: Scorecard, training, pilots

- < 2 percent of portfolio (125 facilities) = 50 percent of total water use
  31 in high or very high water stress regions

  – **All had one thing in common: high evaporative cooling demands**



28%
Amount of total water in an office building devoted to cooling

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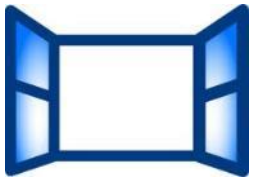
Finding the ways that work

The Project

Technical, Operational, and Free Air Cooling

Technical and Free Air Cooling

- **Technical**: One cooling tower filtration system upgrade costs less than $100,000 to install but promises more than $60,000 in annual water and sewer savings—paying for itself in less than two years.



- **Free Air Cooling**: A minor $4,000 equipment upgrade to expand free air cooling promises nearly $40,000 in annual savings.

Water Savings

- AT&T's pilot projects achieved water reduction savings ranging between 14-40%

- **Potential scalability in the U.S:**
  - 28 billion gallons of water could be saved by U.S. companies per year.

Wide Applicability

Free Tools to Jumpstart a Water Management Program

WaterMAPP

www.edf.org/attwater

The **Water Management Application (WaterMAPP)** is an Excel-based, multi-tabbed spreadsheet with two primary components:

- The **Water Scorecard** helps you assess your company's water efficiency and can be used to create visibility for water performance at facilities. The Water Scorecard Guide offers an overview of the score card concept, calculations used by AT&T in developing their first scorecard, and provides detailed information about how you could develop your own scorecard.

- The **Water Efficiency Calculator** estimates water and financial savings from cooling tower or free-air cooling improvements — key data for making the water-efficiency investment business case.

Download the WaterMAPP tool

Cooling System Efficiency Guide & Videos

The Cooling System Efficiency Guide [PDF] and 12-video series on YouTube can be used by anyone in your organization to learn more about the fundamentals of how a cooling system works, and how it can be managed to minimize an organization's use of water, energy and chemicals.

Sample Water Audit Forms

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Finding the ways that work

WaterMAPP – Integrated Scoring/Savings

Water Scorecard Inputs

Version 0.9 - May 2013

Score Card Data – Building Info	Inputs:
Facility Manager Name:	Joe Manager
Building ID/Name:	Headquarters Tower
Street Address:	123 Main St.
City:	Detroit
State:	MI
Zip Code:	48206
Closest City:	Minnesota - Saint Cloud
Building Type:	Admin
Water Stress Region	High
# of Tenants:	2,500
Square Footage:	20,000

Score Card Data – Water Consumption	Inputs:
Enter the last 24 months of water use (gallons):	
Month 1 - Newest Month	2,864,500
Month 2	
Month 3	
Month 4	
Month 5	

Water Scorecard Grading

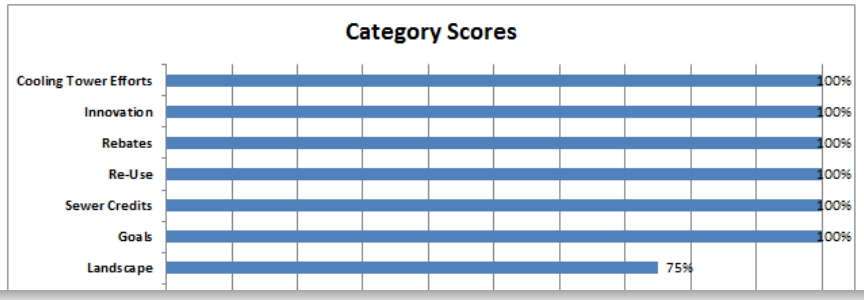
Version 0.9 - May 2013

Check your Grade!

Total Score:	80
Your Overall Grade Is:	B-

Building Information

Facility Manager Name:	Joe Manager
Building ID/Name:	Headquarters Tower
Street Address:	123 Main St.
City:	Detroit
State:	MI
Zip Code:	48206



WaterMAPP

Annual Savings Potential

Version 0.9 - May 2013

Current Cycles of Concentration:		3
Target Cycles of Concentration:		10
Electricity Used By Chiller (kWh/yr)		-
Blowdown Water (Gals/Yr)		6,738,980
Make Up Water (Gals/Yr)		6,738,980
Chemicals (lbs/yr)		33,695
Electricity ($/Yr)		-
Make Up Water ($/Yr)	$	15,365
Sewer Charges ($/yr)	$	46,297
Water Treatment ($/yr)	$	33,695
Total ($/yr)	$	95,357

Savings Potential from Free Air Cooling

Current Economizer Mode:		No Air Economizer
Target Economizer Mode:		Full Air Economizer
Electricity Used By Chiller (kWh/yr)		5,281,640
Blowdown Water (Gals/Yr)		-
Make Up Water (Gals/Yr)		10,393,436
Chemicals (lbs/yr)		-
Electricity ($/Yr)	$	96,126
Make Up Water ($/Yr)	$	23,697
Sewer Charges ($/yr)	$	71,403
Water Treatment ($/yr)	$	51,967

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Making the Business Case

- Key to scaling up potential savings is understanding all the areas you can save:
  - Water
  - Sewer
  - Chemicals
  - Energy

→ All included in the Water Efficiency Calculator

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Training Webinar

Water Efficiency Webinar with EDF and AT&T

AT&T and Environmental Defense Fund (EDF) developed a free suite of tools that U.S. commercial and industrial sector buildings can use to collectively save up to 28 billion gallons of water annually. Buildings with cooling towers typically use 28% of their daily water use for cooling, and they have the opportunity to reduce that water demand by 14-40% with the Building Water Efficiency toolkit.

Watch the webinar and learn how to:

- Measure and manage water use
- Optimize building cooling
- Build the business case to realize an ROI on water management

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Finding the ways that work

Help Your Organization Save Water

- Raise awareness
- Use the Water Score Card tool to identify savings opportunities at facilities
- Share training materials, including the Cooling Efficiency Guide, Training videos, and webinar
- Use the WaterMAPP's Water Efficiency Calculator to build the business case for identified efficiency opportunities

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Additional Resources

U.S. DEPARTMENT OF ENERGY

For More Information

- Environmental Defense Fund
  - www.edf.org/attwater

Q & A

U.S. DEPARTMENT OF ENERGY

Join Us for the Next Better Buildings Webinar

ESPC 2.0: How a New Generation of Energy Savings Performance Contracting is Improving Energy Efficiency in U.S. Buildings

Date: Tuesday, February 3
Time: 3:00 – 4:00 PM EST

Overview: Join Better Buildings Challenge Partners and Allies to learn how Energy Savings Performance Contracting (ESPC) is moving beyond the traditional education and hospital sector markets. Learn how you can take advantage of ESPCs to improve long-term energy performance in your buildings with little or no upfront cost. A representative from the Department of Energy will also introduce DOE's ESPC Accelerator – a high impact program designed to support expansion of ESPCs among state and local governments.

Register here.

Additional Questions? Feel Free to Contact Us

betterbuildingswebinars@ee.doe.gov

Today's Presenters	Todd Swingle Cummins todd.swingle@cummins.com Alan Mileti National Church Residences amileti@nationalchurchresidences.org	Steven Goldman Environmental Defense Fund sgoldman@edf.org
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