

A thick, solid blue horizontal bar with a white arrow pointing to the right, partially overlapping the bar from the right side.

NOW THAT WE'VE DIPPED OUR TOE IN ... WATER PILOT LESSONS LEARNED

Better Buildings Summit
May 28, 2015

Water Savings Pilot

Last year, DOE launched a Water Savings Pilot with 23 BBC Partners

- Partners reported water savings between 10% and 20%, against their baseline years
- In 2014, total water savings are equal to about 570 Olympic-sized pools
- Partners are sharing solutions!
 - Best practice guides for water efficiency
 - Strengthening the business case for water saving projects



Water Pilot Partners

- Aeon
- Atlanta, GA
- Campus Crest Communities
- Cummins
- Eden Housing
- **Ford**
- Fort Worth, TX
- General Motors
- Harbec, Inc.
- Kohl's Department Stores
- **NHT Enterprise**
- Nissan North America
- Poudre School District, CO
- Saint-Gobain Corporation
- Staples
- **State of North Carolina**
- The Tower Companies
- TIAA-CREF
- Tonti Properties
- **Transwestern**
- Trinity Management
- USAA Real Estate Company
- West Palm Beach, FL

Water Savings Expansion

- Based on the success working with this group, DOE is expanding its water-saving efforts
- Organizations partnering with DOE on water savings will set water efficiency goals, report progress and share solutions with the market
- Participation is open to all partners with a complete energy data display and one energy-focused showcase project or implementation model
- DOE will coordinate with other federal agencies, as well as leading NGOs, to deliver greater water-related expertise to partners

Speakers

- Len Hoey, Engineering Architect Manager, North Carolina Division of Environmental Assistance
- Jared Lang, Sustainable Development Manager, NHT
- Heidi McKenzie, Manager, Environmental Strategies and New Business Services, Ford Motor Company
- Anne White, Program Coordinator—Sustainability Services, Transwestern
- Steve Goldman, Marketing and Communications Coordinator—Corporate Partnerships, Environmental Defense Fund



Better Buildings Summit

Water Panel

Len Hoey, PEM

N.C. DIVISION OF
ENVIRONMENTAL ASSISTANCE
AND CUSTOMER SERVICE



Data Challenges

- Units purchased:
 - Some bills just state “units” purchased
 - Does “unit” = cubic feet or gallons
- What is multiplier:
 - Base unit
 - Hundreds
 - Thousands
- Everything must come back to a common value



Implementation Challenges

- Old piping and china:
 - Even if china is replaced if piping has scale buildup it may not carry waste to sewer lines with low flow fixtures
- ADA compliance:
 - Will renovations be extensive enough to trigger ADA update
 - Rest room may not be large enough to accommodate larger stall sizes and maintain fixture count



Implementation Challenges

- Hot water availability:
 - If you use on demand water heating is flow great enough to activate system



NC Water use at a glance

Metric	Baseline 2002-2003	Current 2013-2014	% change
Total water use in kgal	3,954,200	4,520,043	13%
Gross square feet	71,562,179	134,962,064	89%
Water gallons per gsf	55.26	33.49	-39%
Water cost per kgal	\$3.25	\$10.17	212%
Avoided Water costs		\$158,316,830	



Minor Investments with Major Returns

Jared Lang



About NHT / Enterprise...

- + Owns & Operates 3,000 affordable rental units along the East Coast and Illinois; encouraging for-profit or non-profit partnerships.*
- + Achieved green certification (Enterprise, Earthcraft, etc.) on 8 properties in its portfolio.*
- + First Enterprise Green Certified property in Washington, D.C.*
- + Typical > 20% energy reduction in new projects.*

R STREET APARTMENTS



DEVELOPER:

NHT/Enterprise

LOCATION:

14th and R Street, NW, Washington, DC

NUMBER OF UNITS:

130

WATER UPGRADE:

January 2012

CERTIFICATIONS:

Enterprise Green Communities

R STREET WATER UPGRADE

- ❖ *Water upgrade in January 2012*
- ❖ *Cost: \$10,000*
- ❖ *Savings / year : \$27,500*
- ❖ *Payback: 6 month*
- ❖ *NPV @ 6%: \$100,000*

NHT/ENTERPRISE WATER UPGRADE KIT

- 1. 0.8 GPF Toilets*
- 2. 1.0 GPM Bathroom faucets*
- 3. 1.5 GPM Kitchen faucets*
- 4. 1.5 GPM Showerheads*



ShowerStart™
Let your shower wait on you



ANNUAL SAVINGS: R STREET

	Before Water Upgrades			After Water Upgrades	
	2009	2010	2011	2012	2013
Water Cost	\$73,100	\$65,400	\$73,600	\$42,800	\$43,400
Average Water Cost	\$70,700			\$43,100	

Delta	% Change
(\$27,600)	39%

PROJECT COSTS: R STREET

# of Units	130
Soft Costs	
Installation (2 hours @ \$20/hour)	\$ 5,200
Hard Costs	
Showerheads	\$ 25
Bathroom Aerators	\$ 5
Kitchen Aerators	\$ 5
Total Project Cost	\$ 9,750

NET PRESENT VALUE: R STREET

5-Year Financials

	2012	2013	2014	2015	2016	2017
Project Cost	\$ (9,750)					
Average Savings		\$ 27,600	\$ 27,600	\$ 27,600	\$ 27,600	\$ 27,600
NPV @ 6%	\$100,482					

FRIENDSHIP COURT APARTMENTS



DEVELOPER: NHT/Enterprise

LOCATION: Charlottesville, VA

NUMBER OF UNITS: 150

WATER UPGRADE: September 2014

ANNUAL SAVINGS: FRIENDSHIP

	Before Water Upgrades			After Water Upgrades
	2012	2013	2014	2015
Water Cost	\$100,350	\$112,963	\$96,435	\$36,137
Average Water Cost	\$103,249			\$36,137

Delta	% Change
(\$67,112)	65%

PROJECT COSTS: FRIENDSHIP

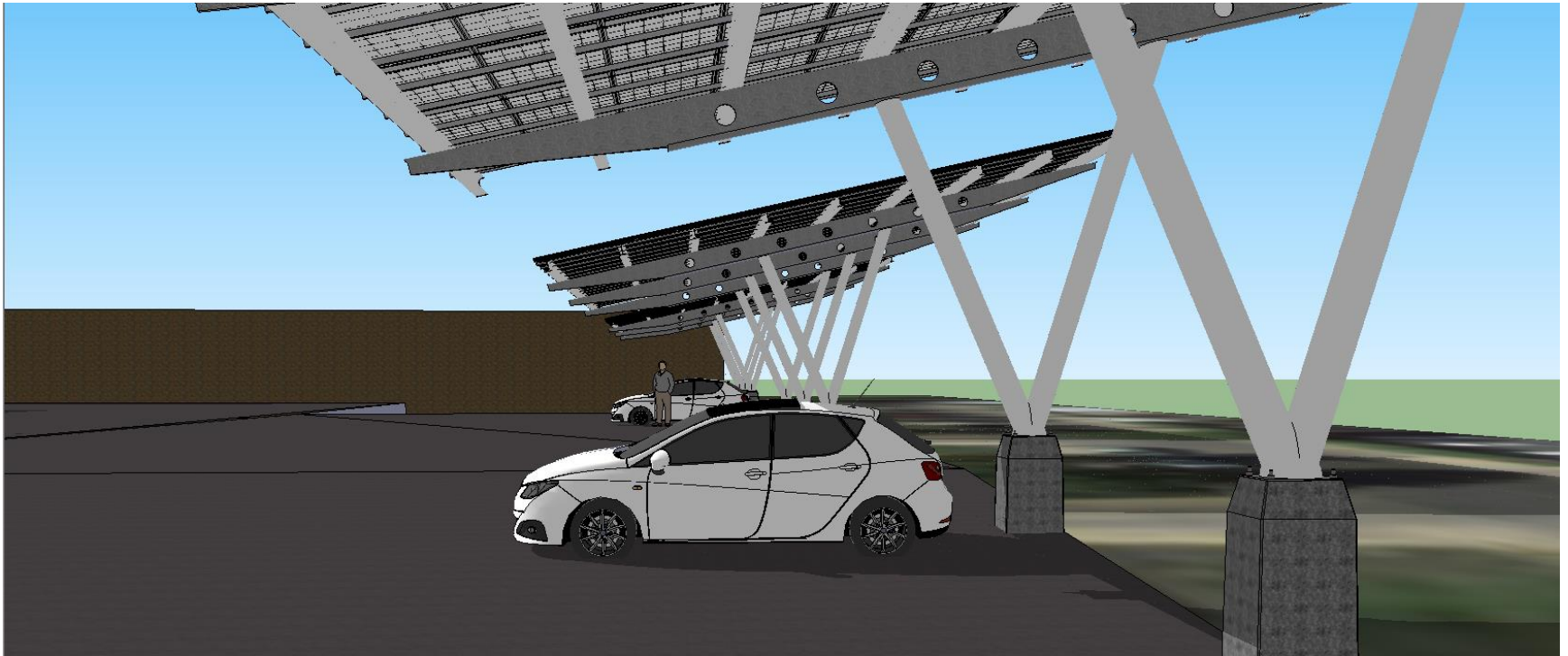
# of Units	150
# of Bathrooms	220
<u>Soft Costs</u>	
Installation (2 hours @ \$20/hour)	\$6,000
<u>Hard Costs</u>	
Toilets & Parts	\$220
Showerheads	\$25
Bathroom Aerators	\$2
Kitchen Aerators	\$2
Total Project Cost	\$60,780

NET PRESENT VALUE: FRIENDSHIP

	2012	2013	2014	2015	2016	2017
Project Cost	(\$60,780)					
Average Savings	(\$60,780)	\$67,112	\$67,112	\$67,112	\$67,112	\$67,112

NPV @ 6%	\$209,358
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WHAT'S NEXT?



- ❖ Meeting our Better Buildings Challenge Goals:
 - 20% Reduction in Energy and Water Use by 2020
- ❖ Green Operation & Maintenance
- ❖ Rooftop and Carport Solar Projects

NHT / ENTERPRISE PRESERVATION CORPORATION

For additional information, contact:

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Go Further

**MANUFACTURING WATER
STRATEGY – LESSONS LEARNED**

SOME OF OUR PRODUCTS...



OUR PLAN IS ONE FORD

Ford remains focused on accelerating the development of new products our customers want and value, continually, improving our balance sheet and perhaps most importantly working together as ONE team.



ONE FORD

ONE TEAM • ONE PLAN • ONE GOAL

ONE TEAM

People working together as a lean, global enterprise for automotive leadership, as measured by:

Customer, Employee, Dealer, Investor, Supplier, Union/Council, and Community Satisfaction

ONE PLAN

- Aggressively restructure to operate profitably at the current demand and changing model mix
- Accelerate development of new products our customers want and value
- Finance our plan and improve our balance sheet
- Work together effectively as one team

ONE GOAL

An exciting viable Ford delivering profitable growth for all

Expected Behaviors

Foster Functional and Technical Excellence

- Know and have a passion for our business and our customers
- Demonstrate and build functional and technical excellence
- Ensure process discipline
- Have a continuous improvement philosophy and practice

Own Working Together

- Believe in skilled and motivated people working together
- Include everyone; respect, listen to, help and appreciate others
- Build strong relationships; be a team player; develop ourselves and others
- Communicate clearly, concisely and candidly

Role Model Ford Values

- Show initiative, courage, integrity and good corporate citizenship
- Improve quality, safety and sustainability
- Have a can do, find a way attitude and emotional resilience
- Enjoy the journey and each other; have fun - never at others' expense

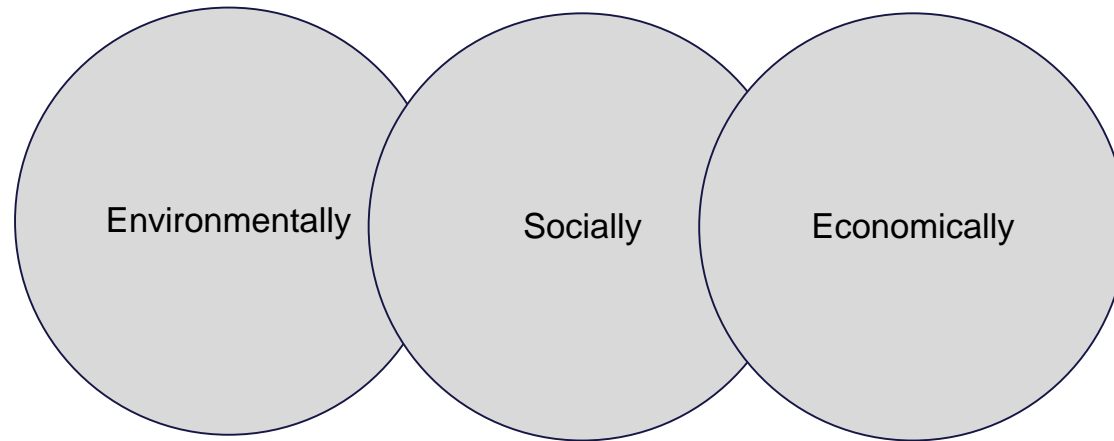
Deliver Results

- Deal positively with our business realities; develop compelling and comprehensive plans, while keeping an enterprise view
- Set high expectations and inspire others
- Make sound decisions using facts and data
- Hold ourselves and others responsible and accountable for delivering results and satisfying our customers



Ford's Sustainability Vision

Our vision for the 21st century is to provide sustainable transportation that is affordable in every sense of the word:



“Improved sustainable performance is not just a requirement, but a tremendous business opportunity.”

- *Bill Ford*

MANUFACTURING ENVIRONMENTAL STRATEGIC DIRECTION

Provides the foundation for all environmental actions

Strategic

Tactical



Environmental Strategic Direction

- Adopt holistic approach to reducing overall environmental impact of manufacturing operations:
 - Pursue integrated air emissions control approach that also reduces greenhouse gas emissions and improves energy efficiency.
 - Take resource conservation actions specifically toward eliminating land disposal and reducing water usage.
 - Evaluate and reduce toxicity of manufacturing byproducts (e.g., air emissions, wastewater, waste) in addition to quantity.

SLIDE 4

Env. Operating System

SAMPLE: 201X ENVIRONMENTAL PLAN

Note: Sample Data Only - Do Not Use

Metric	2011 Target / Comments	FNA	FSAO	FOE	FAPA
Environmental Compliance	• Environmental Compliance Index = 100	G	R	G	Y
Water Usage (m ³ /vehicle)	• X% YOY reduction	G	Y	G	G
CO ₂ Emissions (tons/vehicle)	• X tons/vehicle	G	G	G	G
Landfill Waste (kg/vehicle)	• X% YOY reduction	G	G	G	G
VOC Emissions (g/sq m)	• 2011 targets: FNA = X g/sq m; FSAO = X g / m ² ; FOE = X g / m ² ; FAPA: X g / sq m	G	G	G	G

■ Satisfactory
 ■ Marginal-Plan to Recover
 ■ Unsatisfactory
 ■ Change From / To



MANUFACTURING ENVIRONMENTAL STRATEGIC DIRECTION

Adopt holistic approach to reducing overall environmental impact of manufacturing operations:

- Pursue integrated air emissions control approach that also reduces greenhouse gas emissions and improves energy efficiency.
- Take resource conservation actions specifically toward eliminating land disposal and reducing water usage.
- Evaluate and reduce toxicity of manufacturing byproducts (e.g., air emissions, wastewater, waste) in addition to quantity.

Provides consistent foundation for environmental improvement and allows for detailed strategies by topic (CO₂, water, waste, etc.)

THE BEGINNING OF FORD'S WATER JOURNEY

In June 2000, Bill Ford attended the opening of the *Viva el Agua* exhibit at the Papalote Children's Museum in Mexico City, where he announced a Global Water Management Initiative focused on water conservation, reuse and water quality management.



DEVELOPING A MANUFACTURING WATER STRATEGY

Ford achieved its global water target two years early, in 2013.

1 Ford committed to a 3% year-over-year reduction in water use per vehicle produced at its manufacturing facilities globally.

2 This commitment resulted in a 42% reduction in water use per vehicle, from 2000 to 2009.

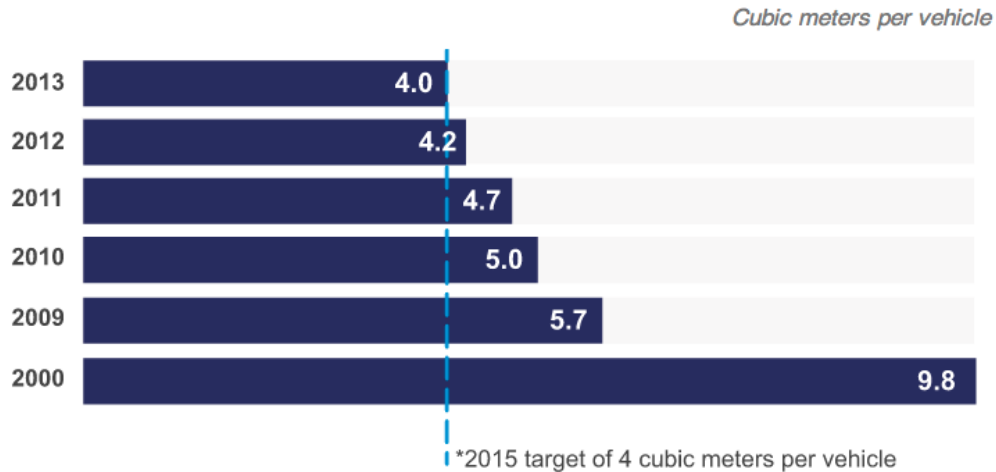
3 In 2010, a formal global manufacturing water strategy was developed, setting a target of 30% reduction in water use per vehicle from 2009 to 2015.

4 This target was achieved two years early, in 2013. 2014 maintained achievement with unprecedented number of NA launches.

EXTENDING THE STRATEGY TO THE CORPORATION

The success of the manufacturing water strategy led to receptivity to the development of a corporate water strategy.

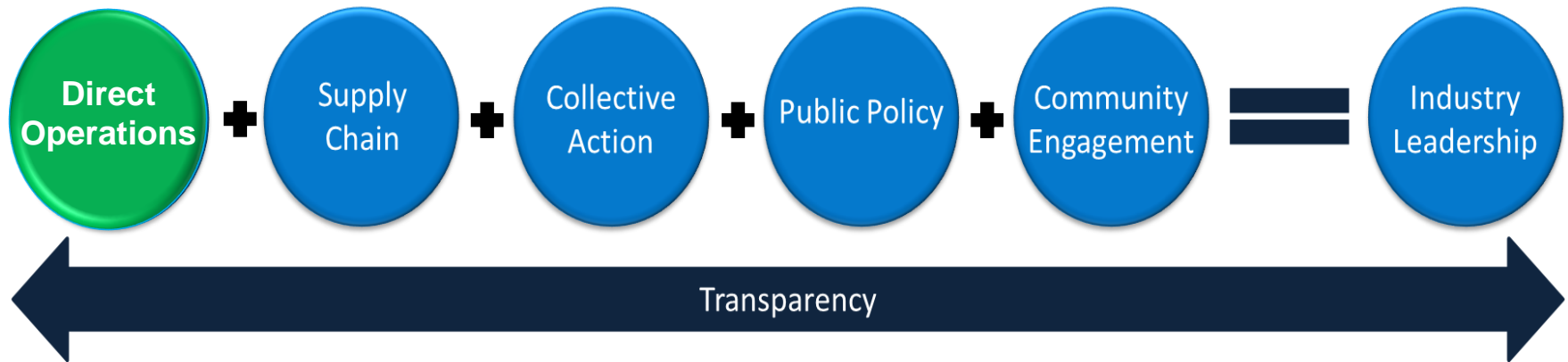
Global Water Use per Vehicle Produced



- Our corporate water strategy aligns with the core elements of the UN CEO Water Mandate.
- Companies that support the CEO Water Mandate commit to implementing the framework's six core elements for water management and pledge to publicly report their progress annually.
- Ford endorsed the Water Mandate in 2014.

FORD'S CORPORATE WATER STRATEGY

Ford's corporate water strategy aligns with the elements of the UN CEO Water Mandate.



Ford has reduced global manufacturing water use by over 10 billion gallons since 2000.

THE JOURNEY SO FAR



Since Bill Ford's 2000 announcement, Ford has:

- Reduced global manufacturing water use by over 38 million cubic meters (over 10 billion gallons).
- Reduced water use per vehicle by 60% , from 9.8 to 4.0 cubic meters per vehicle.
- Been an inaugural responder to CDP Water and participated in the pilot scoring.
- Acknowledged the Human Right to Water.
- Joined the US Water Partnership and the Global Water Challenge.
- Signed the UN CEO Water Mandate.
- Joined the U.S. DOE Better Buildings Challenge – Water Pilot

10.6 billion gallons of water is:



the amount of water that flows over Niagara Falls in

3.9 hours¹



equal to the amount of annual water use for about

99,000

U.S. residences¹



16,000

Olympic-size pools¹



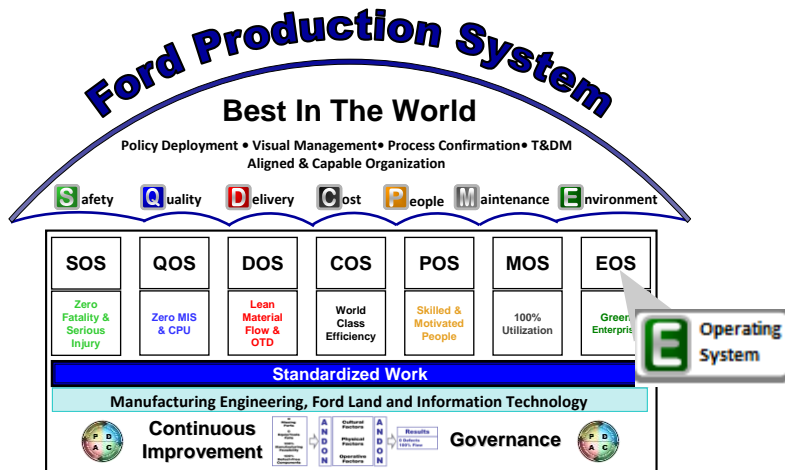
265 million

loads of laundry²



SUCCESSFUL SOLUTIONS

From 2000-2014, Ford has successfully implemented the “low cost” water projects in addition to advanced technologies with new programs



SPLS

WW Cost Savings Single Point Lesson EQD5940L_070.doc
 WBO | Process | AVO & PTO Plans
 Revised Date February 11, 2009

Subject: Cooling Tower Optimal Operation - Reduce Water Usage

WBLAT | Definition: Reduce water usage in cooling towers to improve efficiency and reduce costs.

HOW | Steps for Implementation:

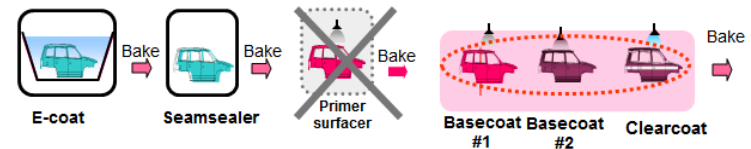
1. The water efficiency of cooling towers is measured by the ratio of water usage to the amount of heat being removed. The goal is to reduce water usage while maintaining the same amount of heat removal.
2. The most common cause of high water usage is a high wet-bulb temperature. This is caused by a high wet-bulb temperature in the ambient air, a high wet-bulb temperature in the cooling water, or a high wet-bulb temperature in the cooling tower.
3. The wet-bulb temperature of the cooling water can be reduced by increasing the flow rate of the cooling water, increasing the surface area of the cooling tower, or increasing the height of the cooling tower.
4. The wet-bulb temperature of the ambient air can be reduced by increasing the flow rate of the ambient air, increasing the surface area of the cooling tower, or increasing the height of the cooling tower.

Additional Information or Comments:

Other Comments:

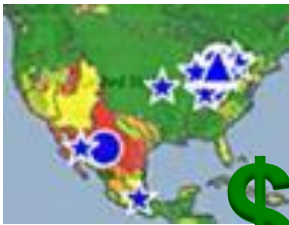


Leaks



MAJOR CHALLENGES

Update water strategy to acknowledge new challenges and identify new opportunities



Risk



Cost



Aging
Infrastructure

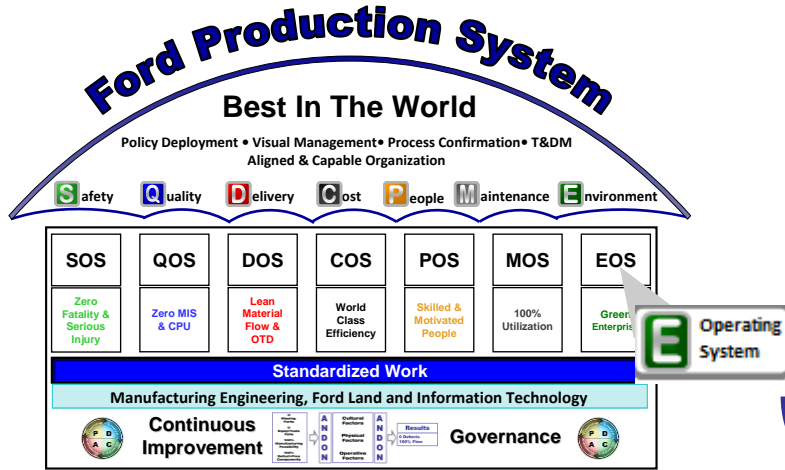


Collaboration

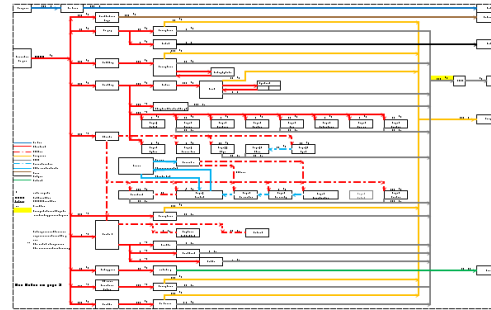


MOVING FORWARD

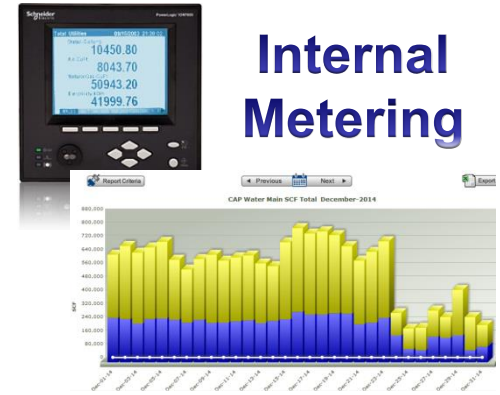
Ford has developed, and is in the process of implementing, strategic actions used to lay the foundation for implementing higher cost water reduction actions.



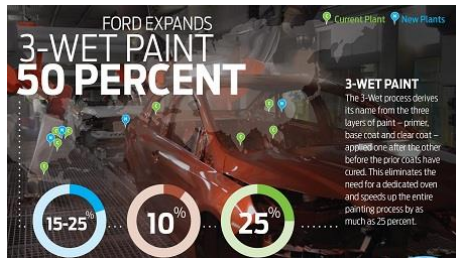
Water Balance



Internal Metering



Operating System



Technology Expansion



- 100 Point Sustainability Program
- Incorporates environmental best practices into new/modified plants receiving new programs
 - Established rating system for key environmental areas including water
 - Allows for prioritization of sustainability actions





Go Further


Thank You!

EDF-GEMI Water Management Application Toolkit (WaterMAPP)

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



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
- 

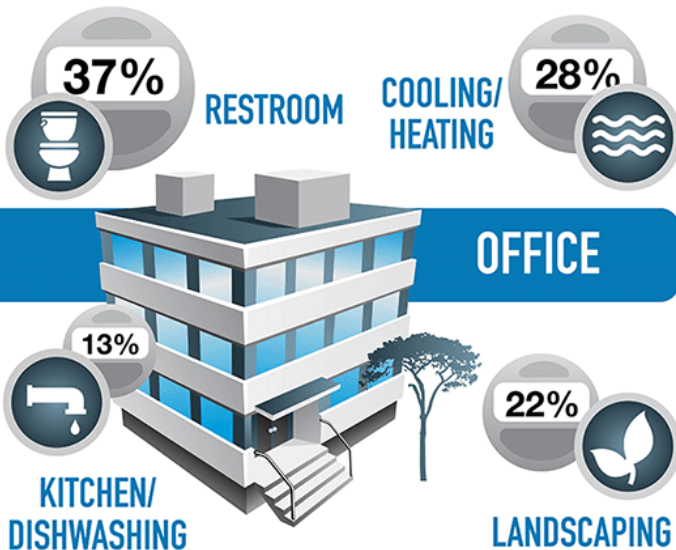


The Company We Keep



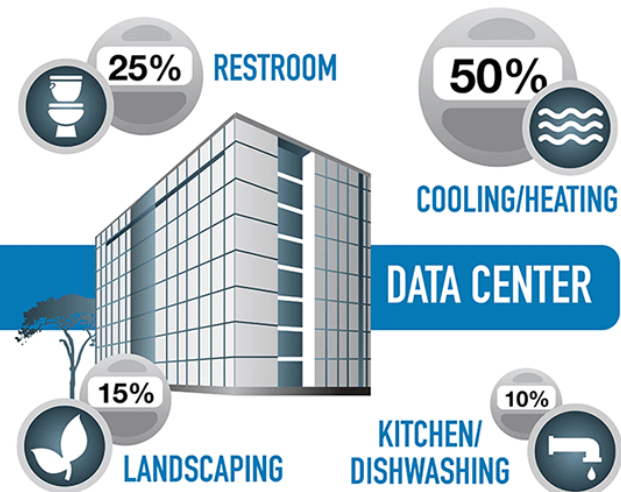
WHERE DO BUILDINGS use water?

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.

AT&T's Water Footprint

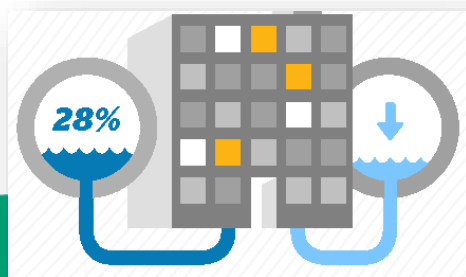


- AT&T water footprint: 3.3B gallons of water annually
- 2012 budget: Water expenditures <2% of energy expenditures
- AT&T internal water activities: Scorecard, training, pilots

- < 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**

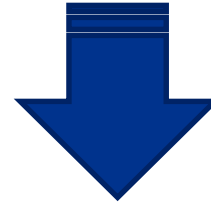


28%

*Amount of total water
in an office building
devoted to cooling*

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



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

WaterMAPP – Integrated Scoring/Savings

Water Scorecard Inputs

Version 0.9 - May 2013

Score Card Data – Building Info

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

Inputs:

Score Card Data – Water Consumption

Enter the last 24 months of water use (gallons):	
Month 1 - Newest Month	2,864,500
Month 2	2,106,430
Month 3	2,000,000
Month 4	1,900,000
Month 5	1,800,000

Inputs:

Water Scorecard Grading

Version 0.9 - May 2013

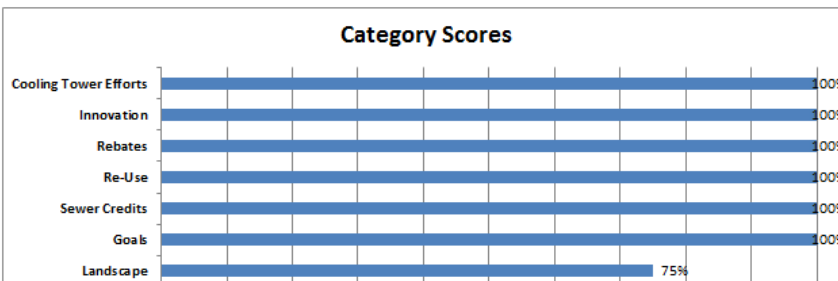
Check your Grade!

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

Category Scores



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

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

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



Building Water Efficiency Webinar

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