

**United  
Technologies**

## UTC Water Reduction Goals

May 11, 2016

Sean West

# UNITED TECHNOLOGIES

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## Agenda

UTC at a glance

2015 Sustainability Goals

2020 Sustainability Goals

Absolute Water Reduction

Water Management Best Practice Implementation

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# UNITED TECHNOLOGIES

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2015 REVENUE \$56.2B

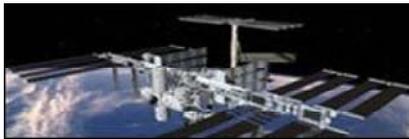


Heating, ventilating, cooling & refrigeration systems

Security & fire protection services



Elevators, escalators, moving walkways, people movers & horizontal transportation systems



Industrial & aerospace systems



Aircraft engines, gas turbines & space propulsion systems

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# SUSTAINABILITY AT UTC

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Driving sustainable performance



Our strategy is straightforward and effective:

Innovate to meet growing demand for sustainable products

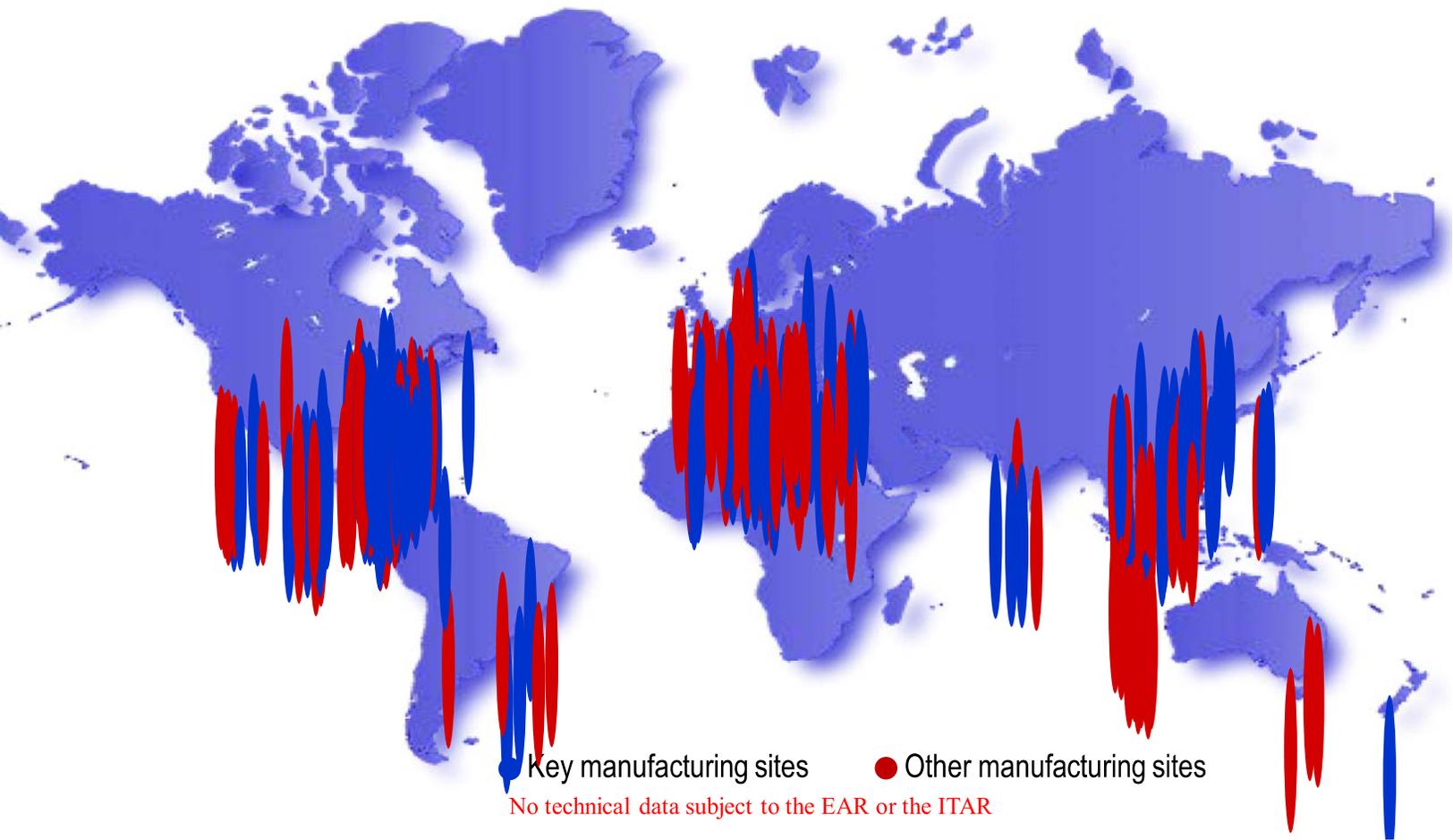
Implement sustainable solutions in our operations

Encourage suppliers, customers and employees to achieve sustainable outcomes

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## Manufacturing Sites Worldwide

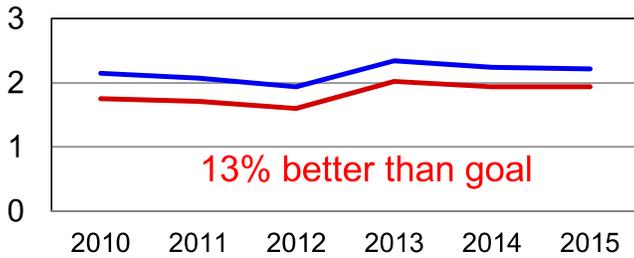


# ENVIRONMENTAL PROGRESS

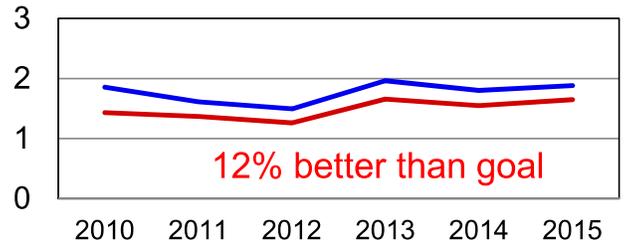
## Achieved 2015 goals

— Actual  
— Goal

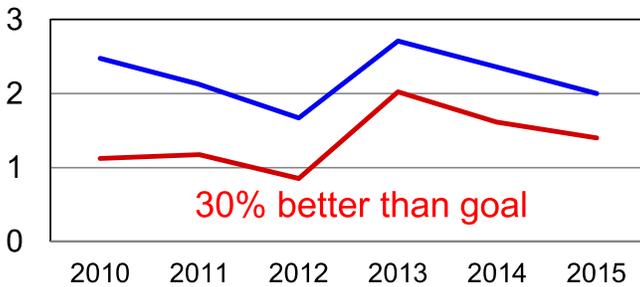
Greenhouse Gas Emissions  
(million tons)



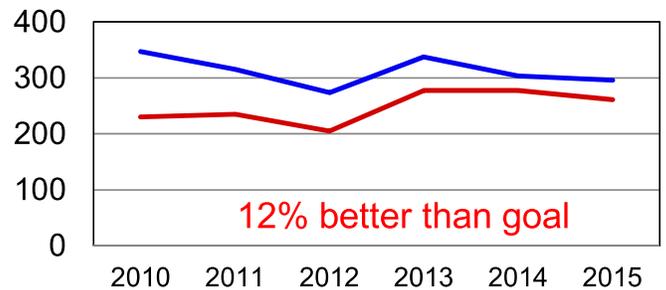
Water Consumption  
(billion gallons)



Air Emissions  
(million pounds)



Industrial Process Waste  
(million pounds)



Goodrich data included as of 2013

This document does not contain any export controlled technical data.

# UTC 2020 SUSTAINABILITY GOALS



## 2020 SUSTAINABILITY GOALS

MOVING THE WORLD FORWARD



SINCE 1997, UNITED TECHNOLOGIES HAS **TRIPLED** THE SIZE OF OUR BUSINESS

WHILE REDUCING OUR GREENHOUSE GAS EMISSIONS BY **34%**

AND WATER CONSUMPTION BY **57%**

### ENGINEERING GOALS

Implement Design for Sustainability during the development cycle of new products

Implement Life-Cycle Analysis during the development cycle of new products

### SUPPLY CHAIN GOALS

INCENTIVIZING KEY SUPPLIERS TO IMPLEMENT **11 SPECIFIC** SUSTAINABILITY MEASURES

### ENVIRONMENT, HEALTH & SAFETY COMPLIANCE GOALS

- 0** Enforcement actions, non-compliance
- 100%** Inspections without enforcement actions
- 100%** Annual permit & program evaluations
- 100%** Passing compliance/assurance scores

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# 2020 WATER REDUCTION GOAL

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Absolute water reduction goal



**Annual Target:** annual increment 5% absolute reduction from baseline

**Reporting Sites:** Manufacturing, and non-manufacturing with annual energy/water spend > \$100,000

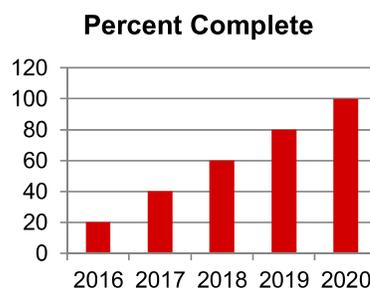
**Baseline:** 2015 water use amount

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# 2020 WATER BEST PRACTICE GOAL

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## Implementation of Best Practices



**Annual Target:** Starting Q4-2016, 20% of business unit WMBP projects must be complete; Additional 20% each year 2017-2020

**Reporting Sites:** All subject to 2020 water use goal

**Baseline:** 2015 site water scarcity level, total water use

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# WATER MANAGEMENT BEST PRACTICE

## Implementation matrix

	Large Sites > 1 Million Gal/year	Small Sites < 1 Million Gal/year
Stressed Regions Scarce Regions Extreme Scarce Regions	71 sites (20%) 563.9 million gallons (29%)	76 sites (22%) 28.45 million gallons (1.5%)
Abundant Regions Sufficient Regions	71 sites (20%) 1,339 million gallons (68%)	79 sites (23%) 27.5 million gallons (1.5%)

*Yellow* = All ten best practices required

*Blue* = Must have current water balance and leak management PLUS five additional best practices

*Green* = Must have current water balance and leak management

### UTC MINIMUM BEST PRACTICES

Current water balance  
Leak management

### UTC ADDITIONAL BEST PRACTICES

Eliminate once-through cooling  
Cooling tower management  
Flow meters  
Low flow fixtures and flow restrictors  
Rinse tank overflow  
Xeriscaping  
Recycle Process wastewater  
Rain water harvesting

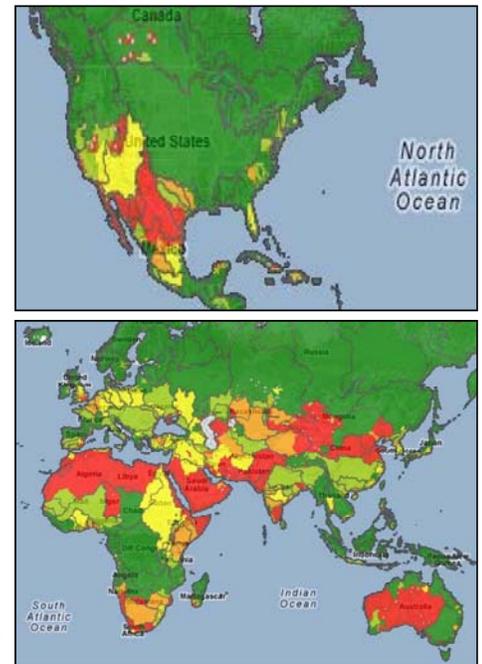
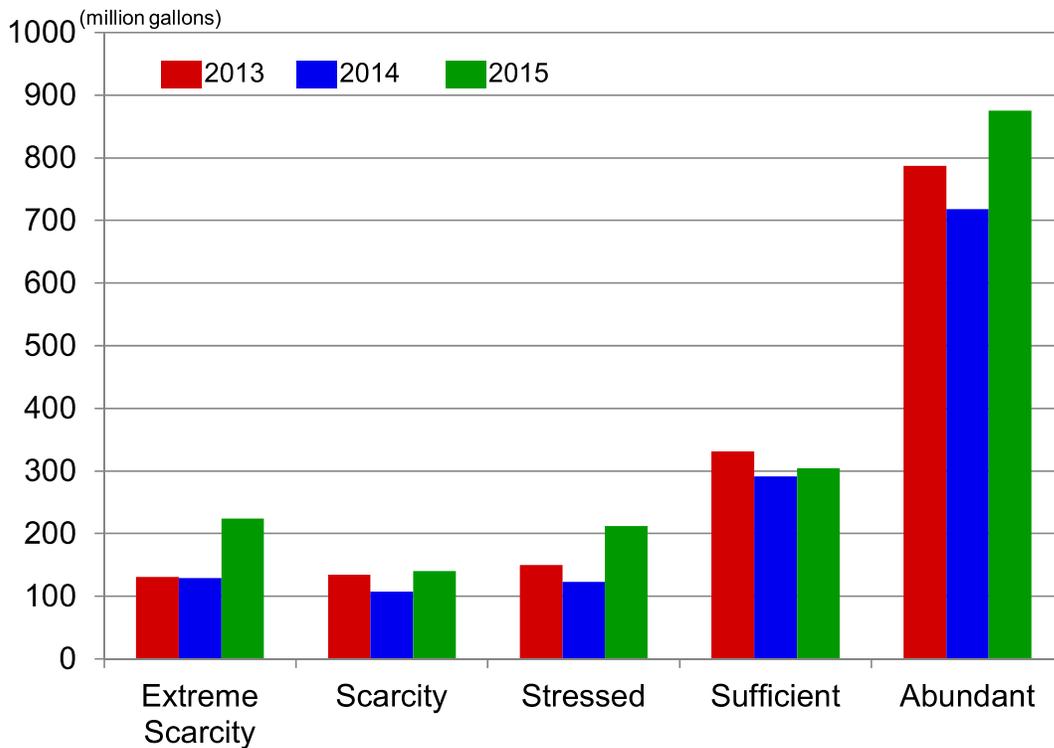
### Goal Attainment:

**Credit given when BMP implemented  
across > 50% opportunities at site**

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# WATER SCARCITY ANALYSIS

## Water use by scarcity level – Water tool output



Extreme Scarcity	Scarcity	Stressed	Sufficient	Abundant
<500 (m3/person/year)	500-1000 (m3/person/year)	1001-1700 (m3/person/year)	1701-4000 (m3/person/year)	>4000 (m3/person/year)

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# UTC EH&S DATA COLLECTION

## Documenting WMBP Implementation Status

Water Best Practice Status		
Edit a Record		
UniqueKey	53527115	
Water Scarcity Classification	No Data	
2015 Water Usage - Gals	15	
Required Water Best Practices	0	
Water Best Practice	Implementation Status	Comments
Cooling Tower Management	Not Started	2018 project
Current Water Balance (Mandatory)	Complete	URS Consulting completed report Jan 2016
Elimination of Once-Through Cooling	Greater Than 50% Complete	Water cooled Air Compressor added to tower
Flow Meters	Not Started	Reviewing meter specs
Leak Management (Mandatory)	Not Started	Spring 2016 target date
Low Flow Fixtures and Flow Resistors	Complete	42 fixtures complete
Rain Water Harvesting	Reviewed, Exemption Granted	Landlord rejected project
Recycle Process Wastewater	Reviewed, Not Applicable	no process wastewater
Rinse Tank Overflow	Reviewed, Not Applicable	no rinse tanks on site
Xeriscaping	Not Started	working with landscape contractor

Save Cancel

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# UTC WATER GUIDANCE DOCUMENT

## List of ten water management best practices


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**GLOBAL WATER CONSERVATION GUIDANCE DOCUMENT**

Water use has always been an important part of conservation goals. From a global perspective, water supply necessitates that sustainability be added to being intricately linked to energy as potential to significantly impact how and where successful history of implementing water conservation programs. Since 1987 UTC has reduced water consumption 87% from 3.8 billion gallons billion gallons in 2010.

In addition to local water supply classification should be aware of other risk factors such as water quality conditions. Water quality statistics typically published by water supplier or municipal. Other risk factors include rising cost and increasing regulatory requirements on water quality.

This guidance document provides details of UTC global water scarcity assessment and best practices managing water risks for the corporation and its clients. You will also find case studies and examples of sites that have been successfully implemented UTC sites.

**TABLE OF CONTENTS**

- Current state assessment
- Baseline consumption and water balance
- Continuous Improvement (key areas to focus)
- Required Actions
- Minimum expectations for best practices
- Case studies

**BEST PRACTICES**

- Water balance
- Leak management
- Eliminate once-through cooling
- Cooling tower management
- Flow meters
- Low flow fixtures and flow restrictors
- Rinse tank overflow
- Xeniscaping
- Recycle process wastewater
- Rain water harvesting


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**CURRENT STATE ASSESSMENT**

Unlike greenhouse gas emissions, water issues need to be managed accordingly. Utilizing the WBCSD Water Tool, UTC was able to compare UTC sites with validated water watershed basis. It provided a baseline of UTC such as projected water availability (or scarcity) population growth patterns and industrial trends.

Regional water resources are classified by the categories: **Abundant, Sufficient, Stressed, Scarce** used to compare UTC sites with validated water watershed basis. It provided a baseline of UTC such as projected water availability (or scarcity) population growth patterns and industrial trends.

According to WBCSD projections of future water use) are in regions with **Sufficient** or **Abundant** water use) are in regions that are **Stressed**. Refer to Figure 1 below.

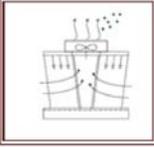
**Fig. #1 (2010 data)**

	Large Volume > 10 Million Gal. # of Sites	Small < 1 Million Gal. # of Sites
Scarce	0	102,330,666
Stressed	4	114,558,951
Sufficient	3	72,503,618
Abundant	0	209,129,201
No Data	15	655,295,741
Total	18	1,177,808,186

Since 2005, UTC's water consumption has decreased in "Extremely Scarce" regions. If this trend continues, we may experience water shortages, increased regulatory requirements, and increased costs.


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**Cooling tower management program**



In many cases, water consumption for chemical evaporation and cycle operations, alternate equipment, tower make-up.

**Install flow meters**

Installing flow meters on large process water consumers help track and manage water use. Flow meters alone do not save water, they do monitor usage and can identify water leaks and system failures.

**Install low flow fixtures and flow restrictors**

Modern plumbing fixtures use significant water. Replacing old plumbing fixtures with new dual flush water closets, 0.125 gallon per flush kitchen fixtures and 1.5 gallons per minute kitchen fixtures at the use of flow restrictors in the feed line excessive water is not fed to the process provide sufficient water for quality rinsing.

**Reduce or eliminate rinse tank**

It is a common practice to use rinse tanks. The water flow to rinse tanks should be done manually or automatically. Another option is to control water flow to Conductivity sensors can measure the conductivity of the water and cycle the water accordingly.


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**MINIMUM EXPECTATIONS FOR BEST PRACTICES**

**Water Balance per Standard Practice 005**

A Water Balance shall be prepared that illustrates the volumetric flow rate of all water used including sources that are not defined as a Significant Water Source (e.g. sanitary, cafeteria, blow down from cooling towers and boilers and mop water), and all Significant Water Sources. The Water Balance shall also indicate where wastewater is treated and/or recycled. The volume of water discharge from all water sources at the facility shall be measured using influent and/or discharge water meters. The volume of water consumed (from all sources public water supplies or on-site diversions) and discharged shall be evaluated annually to ensure that the sources of all significant changes are identified.

**Water leak management program**

All facilities will experience some water leaks. Leaks may range from a fraction of a percent up to several percent of total water use. Common locations to find leaks are in piping joints, restroom fixtures, pump seals, hose nozzles, shut off valves, drinking fountains, processing equipment, and other locations. Eliminating leaks typically includes tightening or replacing fittings. Leaks can be identified via visual or auditory observation. Water fixtures and process equipment should be observed during both use and down time. All employees should be responsible for notifying maintenance personnel of leaks. Underground and under-the-floor leaks can be detected through a leak detection survey. If an underground leak is suspected, but not identified, facilities should consider having a leak detection survey conducted by a consulting or service firm.

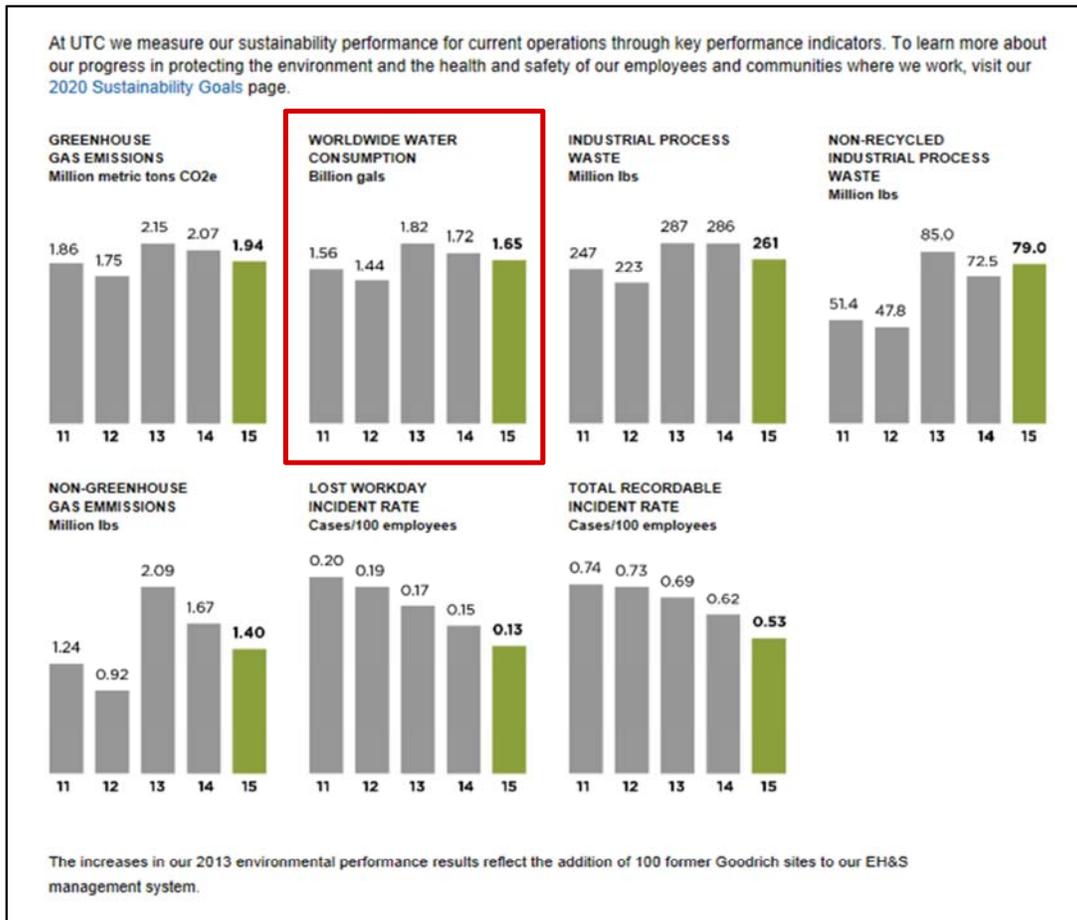
Quantifying the volume of water lost through leaks is important for determining the potential water and cost savings of a leak repair. One of the simplest methods to determine leak loss is the bucket and stopwatch method. A small drip also can be measured by the bucket and stopwatch method. Mathematical estimates of leaks also can be used.

**Eliminate once-through cooling**

For many years it was a common practice to use municipal water in once-through or single-pass cooling systems for various HVAC and process cooling applications. Single-pass cooling systems are ineffective and waste water. All single-pass cooling systems should be replaced with air-cooled or recirculating systems.

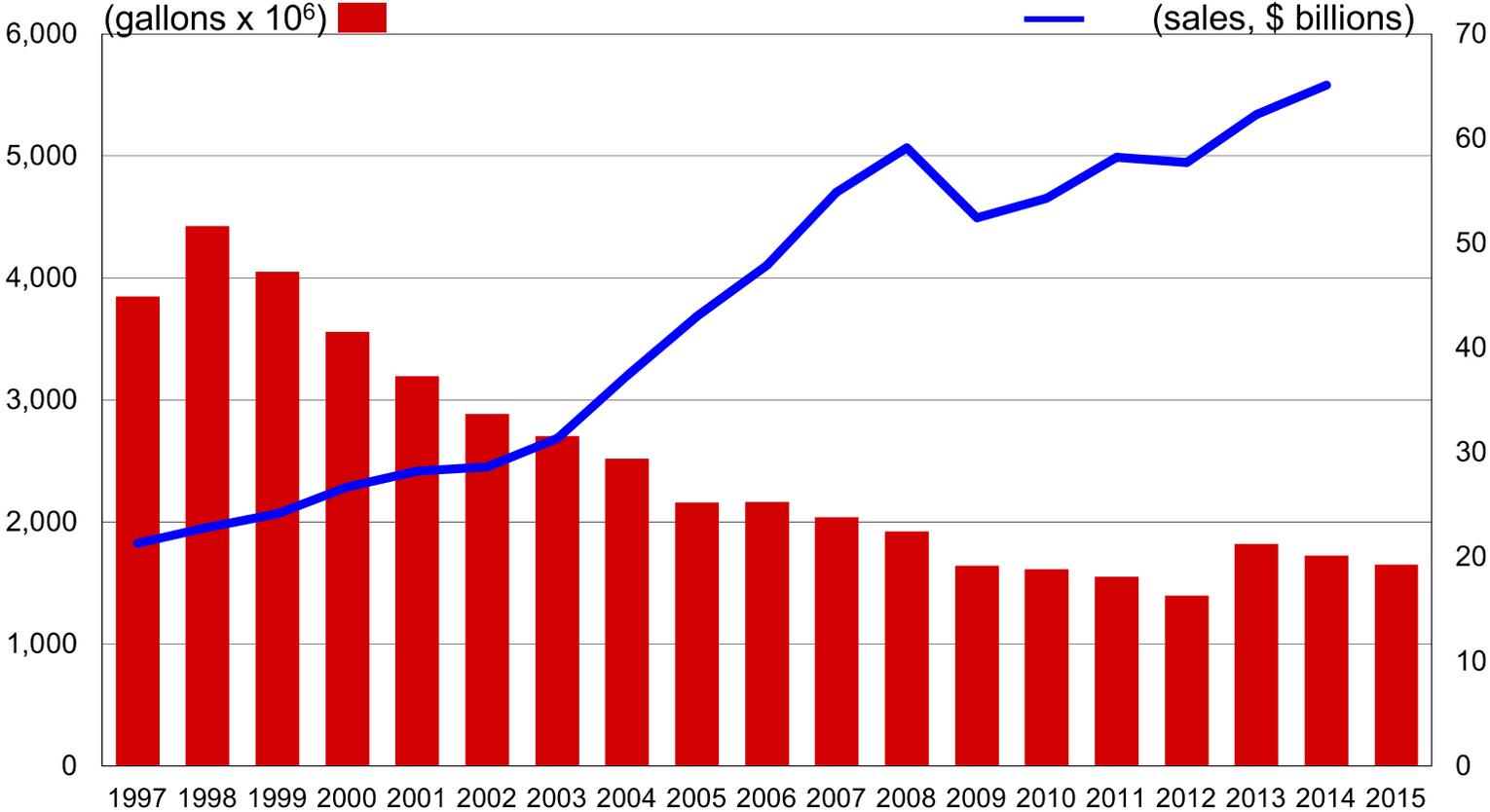
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# UTC 2015 ANNUAL REPORT



This document contains no data that is subject to the EAR or ITAR

# WATER CONSUMPTION WORLDWIDE



# Q&A

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