We’ll be starting in just a few minutes….

Tell us…please send your response to the webinar organizers via the chat window:

What topics are you interested in for future webinars?
Downstream Savings:
From Water Efficiency to Energy Savings

February 2, 2016
3:00-4:00 PM ET
Overview and Agenda

- Welcome & Introductions
- Case Studies
  - United Technologies Corporation
  - The City of Atlanta
  - InterContinental Hotels Group
- Additional Resources
- Question & Answer Session
## Today’s Presenters

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sean West</td>
<td>United Technologies Corporation</td>
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<tr>
<td>Juliette Apicella</td>
<td>Southface Energy Institute</td>
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<tr>
<td>Jean Pullen</td>
<td>Southface Energy Institute</td>
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<tr>
<td>Maury Wolfe</td>
<td>InterContinental Hotels Group</td>
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</tbody>
</table>
UTC Water Reduction Goals

February 2, 2016

COMPANY PRIVATE
UNITED TECHNOLOGIES

2015 REVENUE $56.1B

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

No technical data subject to the EAR or the ITAR
UNITED TECHNOLOGIES
Manufacturing Sites Worldwide

- Key manufacturing sites
- Other manufacturing sites

No technical data subject to the EAR or the ITAR
2020 WATER REDUCTION GOAL

Water Use
-25%

Annual Target: annual increment 5% reduction from baseline

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

Baseline: 2015 water use amount

No technical data subject to the EAR or the ITAR
2020 WATER BEST PRACTICE GOAL

Annual Target: Starting Q4-2016, 20% of WMBP completed; additional 20% each year 2017-2020

Reporting Sites: All subject to 2020 water use goal

Baseline: 2015 site performance against water scarcity, WMBP matrix used to inform BU’s where they stand vs 20% annual increase in target

No technical data subject to the EAR or the ITAR
## WATER MANAGEMENT BEST PRACTICE IMPLEMENTATION MATRIX

### No technical data subject to the EAR or the ITAR

### Goal Attainment: Credit given when BMP implemented across > 50% opportunities at site

### 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 resistors
- Rinse tank overflow
- Xeriscaping
- Recycle Process wastewater
- Rain water harvesting

### Implementation Matrix

<table>
<thead>
<tr>
<th>Region Type</th>
<th>Large Sites &gt; 1 Million Gal/year</th>
<th>Small Sites &lt; 1 Million Gal/year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stressed Regions</strong></td>
<td>71 sites (20%)</td>
<td>76 sites (22%)</td>
</tr>
<tr>
<td></td>
<td>563.9 million gallons (29%)</td>
<td>28.45 million gallons (1.5%)</td>
</tr>
<tr>
<td><strong>Scarcce Regions</strong></td>
<td>71 sites (20%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,339 million gallons (68%)</td>
<td></td>
</tr>
<tr>
<td><strong>Extreme Scarce Regions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Abundant Regions</strong></td>
<td></td>
<td>79 sites (23%)</td>
</tr>
<tr>
<td><strong>Sufficient Regions</strong></td>
<td></td>
<td>27.5 million gallons (1.5%)</td>
</tr>
</tbody>
</table>

**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 EH&S DATA COLLECTION

Project Tracking

![Water Best Practice Status](image)

No technical data subject to the EAR or the ITAR
WBCSD WATER TOOL
Data input screenshot (WBCSD)

No technical data subject to the EAR or the ITAR
WATER SCARCITY

Water use by scarcity level – Water tool output

No technical data subject to the EAR or the ITAR
UTC WATER GUIDANCE DOCUMENT

List of ten water management best practices

No technical data subject to the EAR or the ITAR
WATER CONSUMPTION WORLDWIDE

(gallons x 10^6) (sales, $ billions)
Juliette Apicella and Jean Pullen

Southface Energy Institute
(Representing the City of Atlanta)
TOTAL IMPACT: THE ENERGY & WATER NEXUS OF UTILITY AND COMMUNITY SCALE EFFORTS IN THE CITY OF ATLANTA

Jean Pullen, PE, CEM, BEAP, LEED AP
Principal Engineer for Resource Efficiency

Juliette Apicella, LEED AP
Program Manager, Southface, Atlanta Better Building Challenge
2014 SAVINGS compared to baseline year
Energy 11% savings - 1.97 Trillion Btu
Water 20% savings - 163M Gallons of Water
100,788 metric tons CO₂ Emissions

Over 100 million square feet
400+ Properties
PARTICIPANT PROGRESS - WATER

Water Performance - Average Annual Percent Improvement

- Annual Water Savings
- Average Annual Percent Improvement
- Minimum Annual Percent Improvement
PARTICIPANT PROGRESS - WATER

2014 Water Savings by Property Type

Number of Properties

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Number of Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 0%</td>
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<tr>
<td>0% to 5%</td>
<td></td>
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<tr>
<td>5% to 10%</td>
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<td>10% to 15%</td>
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<td>20% to 25%</td>
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<tr>
<td>25% to 30%</td>
<td></td>
</tr>
<tr>
<td>30% to 35%</td>
<td></td>
</tr>
<tr>
<td>more than 35%</td>
<td></td>
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</tbody>
</table>

- Retail
- Healthcare
- Education - Other
- Residential/Hotel
- Entertainment
- Parking/Other
- College/University
- Recreation Center
- Public Services
- Office
- K-12 School

Southface
WATER EFFICIENCY MEASURES

- AC condensate capture for cooling tower makeup
- Rainwater harvesting
- High-performance toilets, urinals, and faucets
- Cooling tower upgrades
- Domestic hot water equipment and fixture upgrades
- Irrigation optimization
- Leak repair & detection

Condensate Capture System
PARTICIPANT SUCCESS STORY

Bank of America Plaza

Southface
CITY OF ATLANTA
PER-CAPITA WATER USE

Gallons per Person per Day

2000 2010 2020 Goal

250
200
150
100
50
0

2000
2010
2020 Goal
36% of municipal energy is used in water treatment operations (excludes fleet fuels).
HIGH-PERFORMANCE PUMPS & LIGHTING
HEMPHILL WATER TREATMENT PLANT VARIABLE-SPEED PUMPS

- 36% source energy savings.
- Over $1 million in annual energy cost savings.

Photo: Steve Swieter, 2013
SENSOR-CONTROLLED TUNNEL LIGHTING

Video: Steve Swieter, 2013

• Original fixtures – 144 Watts 24/7
• New high/low 98/25 Watts = 78% savings
LED OUTDOOR LIGHTING: EFFICIENCY, QUALITY, SAFETY, & SECURITY IMPACTS

Existing HPS

New LEDs

Savings range from 82-86%

Photos: Steve Swieter, 2013
INDOOR LED PILOTS

Office, control room, and lab area lighting reduced by 69%

Photo: Steve Swieter, 2013
4 million kWh savings = annual electricity use by 33 city fire stations or 270 single-family homes.
IMPACTS

• Significant contributor to the success of the Atlanta Better Buildings Challenge
• 5th place in EPA’s 2012 National Building Competition
OPPORTUNITY: COMBINED HEAT & POWER FROM RENEWABLE BIOGAS

- 1.6 MW capacity is equivalent to 9 MW solar (PV) in annual output
- Uses digester gas that was previously flared
- $1 million in net annual savings potential
- $7 million capital cost
- Potential to meet entire city renewable energy goal of 5% by 2015
- Engine & exhaust heat returned to the process
- Equals energy use of over 1,000 homes

Combined heat & power system
1.6-MW engine
RM CLAYTON COMBINED & POWER

Design Schematic

Project of the Year award (2012) from the American Society of Civil Engineers – Georgia Chapter.
• 16% drinking water system source energy savings
• 17% department-wide site energy savings
• 22% reduction in greenhouse gas emissions from energy
  (16.8% emissions factor impact & 5.5% energy impact)
WATER RECLAMATION ENERGY

Wastewater Collected & Treated
Site Energy
Source Energy

2009-2012
• 163 million gallons saved each year
• 78 million source Btu per million gallons treated & conveyed
• **ABBC impact of water savings estimated to be up to 13 billion source Btu per year**
Maury Wolfe

InterContinental Hotels Group
Water Stewardship at InterContinental Hotels Group (IHG)
InterContinental Hotels Group

- **IHG is a global hotel company whose goal is to create Great Hotels Guests Love.**
- **726,876 rooms** in more than **5,000 hotels** in nearly **100 countries** around the world.
- **We treat responsible business as a strategic business issue** -- We believe that incorporating societal and environmental factors in our business strategy and operations will play a vital role in the long-term viability of our business and the travel and tourism sector.

- **Our Brands:**

*IHG® Rewards Club not applicable to Kimpton® Hotels & Restaurants; to be included at a future date.*
IHG’s Corporate Responsibility initiatives keep us ahead of the competition

Corporate Responsibility at IHG

Key Public Facing Targets

Key CR targets 2013-2017

- Reduce carbon footprint per occupied room by 12% across our entire estate
- Reduce water use per occupied room in water-stressed areas by 12%
- Provide skills and improved employability to 20,000 people via the IHG Academy
- Contribute a total of $10m to communities through monetary donations and in-kind support, including funds deployed through the IHG Shelter in a Storm Programme
- Track and report supply chain diversity
- Integrate CR criteria into the selection and evaluation process for all preferred suppliers.

Learn more and read our policies at: www.ihgplc.com/corporateresponsibility

At IHG, the notion of acting responsibly is at the heart of everything we do. It means doing the right things in the right way and thinking longer term so that we conduct our business in ways that are mutually beneficial for our business, our stakeholders and society, and which champion and protect the trusted reputation of IHG and our brands. For that reason we treat CR as a strategic business issue, believing it only makes sense if it aligns to our purpose of creating Great Hotels Guests Love.
**IHG Green Engage™ system**

**What is IHG Green Engage?**

- Online sustainability platform designed by IHG to identify the most appropriate “green” solutions for our hotels.
- Helps hotels measure, manage, and report their energy, water and waste.
- Automatically feeds data into IHG RFP to help answer sustainability questions – carbon footprint, for example - and help our customers meet their sustainability goals.

**Recent Initiatives and Results**

- **As of January 1st 2015 the IHG Green Engage system is a foundational standard for all IHG hotels. All over 5,000 IHG hotels are now enrolled in the system and required to complete Level 1 Certification.**
- Since 2012, avoided over $185 million in utility costs in our company managed estate from their IHG Green Engage efforts.
- Over 100,000 Green solutions have been completed in IHG hotels globally, 17,000 of these relate specifically to water.
- Reduced our carbon footprint per occupied room by 3% from a 2012 baseline.
- Reduced water use by 4.2% per occupied room in water-stressed areas from a 2012 base line.
California Drought: The Facts

- 2014 was the worst drought on record in California, and has not eased up through 2015 and into 2016.
- Californians view the drought as the single most critical issue facing the state right now, above jobs, the economy, the cost of health care, the quality of schools, etc.
California is facing a severe drought.
IHG took a leadership position, leveraging IHG Green Engage, Public Affairs relationships and our Operations teams.
Water saving toolkits were sent to every hotel. Over 90% of the hotels installed aerators for over 7MM gallons of potential water savings annually.
Completed a pilot project, partnering with vendors and the California Conservation Corps to retrofit the Holiday Inn Diamond Bar with new water saving toilets. This installation is expected to reduce hotel water utility costs by $2400 a year.
Exploring several additional locations, the first began a full bathroom refresh on April 27th, and supporting larger rollout across the state.
In response to the Governor’s recent water conservation measures, which includes mandatory towel and linen reuse programs in California hotels, IHG is sending all California hotels the materials they need to comply.

“Local accounts and travelers are excited we are doing something proactive about this … it lets community know that we are engaged and creates a great image for our hotel.” _ Michael Tsai, General Manager, Holiday Inn Diamond Bar
IHG Takes a Proactive Role

- IHG took a leadership position, leveraging IHG Green Engage, Public Affairs relationships and our Operations teams.
- Water saving toolkits were sent to every hotel in 2014. Over 90% of the hotels installed aerators for over 7MM gallons of potential water savings annually.
- First pilot complete – Holiday Inn Diamond Bar.
- Launching 2nd and 3rd pilots in Los Angeles and supporting larger roll out across the state.
- Towel/Linen reuse cards were sent to all California IHG properties to help them comply with new regulations.
IHG Green Engage™ Case Study: Water Conservation in California

In 2014 IHG sent all California hotels a water conservation kit that saved IHG properties 7M gallons of water annually….since then, 6 properties have completed a broader bathroom refresh, replacing toilets and showerheads, and collectively will save 2.4M gallons of water and $13,000 on water costs per year!

Look what some of these hotels have done...

The Holiday Inn Diamond Bar completed Green Solution ‘Dual Flush/Low Flush Toilets’ and replaced outdated 3.5 gallon per flush toilets with water efficient 1.6 gallon per flush toilets. This will help them save $2,400 annually on their water utility bill.

The Holiday Inn Express Downtown LA installed water efficient toilets and showerheads in all guests rooms and is expected to save over $2,600 and 475,000 gallons of water annually.

In April of this year, the Crowne Plaza Los Angeles Airport completed Green Solution ‘Low Flow Showerheads’ by replacing 48 2.5 gallon per minute showerheads with water efficient 1.75 gallon per minute fixtures. In May and June, their water consumption was down an average of 10%.

The Situation in California...

• 2014 was the worst drought on record in California, and continues into 2015…earlier this year, Governor Brown declared the drought a state of emergency, followed by an Executive Order announcing the first ever 25% mandatory water reductions and a series of action to help save water.

• Californians view the drought as the single most critical issue facing the state right now, above jobs, the economy, the cost of health care, the quality of schools, etc.

• IHG took a leadership position, leveraging IHG Green Engage, Public Affairs relationships and our Operations teams.

• Water saving toolkits were sent to every hotel in 2014. Over 90% of the hotels installed aerators for over 7MM gallons of potential water savings annually.

• Towel/Linen reuse cards were sent to all California IHG properties to help them comply with new regulations.

• In 2015, 6 properties have completed a broader bathroom refresh, replacing toilets and showerheads, and collectively will save 2.4M gallons of water, and $13,000 on water costs per year.
Case Study: Holiday Inn Diamond Bar

- Replaced toilets for all 176 guest rooms with water efficient Penguin 1.28gpf toilets.
- Cost of the toilets was almost completely covered by local rebates. HD Supply applied for the rebates on behalf of the hotel so they didn’t have to pay the rebate amount upfront.
- Labor costs were covered through installation by the California Conservation Core, and the hotel recycled all toilets that were replaced.
- The hotel expects to see a reduction in water use of around 20%, and a savings of approximately $2,400 annually.
- Received positive feedback from guests on their proactive water saving efforts, and on the attractiveness of the toilets themselves.

“We were interested in participating in this project in order to support IHG and the California water conservation project, and want to do our part to help with the drought. Our toilets were really old and used a lot of water that was not needed. This was a great opportunity to make sure we help the environment and the local drought, as well as save on costs. It is a win-win situation.”

– Michael Tsai, General Manager, Holiday Inn Diamond Bar
What we know now – competitor activity

IHG target = reduce water consumption per occupied room in water scarce regions by 12% between 2013 and 2017

- **Target**: reduce water consumption by 20% per occupied room by 2020 on 2007 baseline
- **Current Consumption**: 0.76m³ per occupied room (IHG is 0.6m³)
- **Progress**: Achieved 11.6% reduction to date

- **Target**: 10% reduction in water consumption
- **Current Consumption**: 0.74 m³ per occupied room (IHG is 0.6m³)
- **Progress**: Achieved 1.3% reduction in water use between 2011 and 2012 (normalised for weather and occupancy)

- **Target**: 15% reduction in water use by 2015
- **Progress**: Achieved 1.3% reduction in water use between 2011 and 2012 (owned/leased and managed hotels).

- **Target**: 20% reduction in water use per square foot by 2020
- **Progress**: Achieved 1.7% reduction in water use in 2012.
Driving Leadership: Water Stewardship

Water Overview

- Average water use per night is 158 gallons
- 71% of water consumption is in areas of moderate to severe water scarcity.
- Full service/Limited service split is 73%/27%
- Franchised/Company Managed split is 59%/41%
Questions
Additional Resources
For More Information

United Technologies Corporation
  • [Partner Profile](#)
  • Implementation Model: Global Water Conservation Guidance Document

City of Atlanta
  • [Partner Profile](#)
  • Implementation Model: Public-Private Partnership

InterContinental Hotels Group
  • [Partner Profile](#)
  • Implementation Model: Green Engage
Join us for the next Better Buildings Webinar

Registration is now open!

Valuing Energy Efficiency: Considering Energy Performance in Real Estate Appraisals and Valuation

March 1, 3:00 – 4:00 PM ET

Presenters:
Colliers International
Inspyrod
Sustainable Values

Register here.
Join Us at the Better Buildings Summit

2016
REGISTER TODAY
BETTER BUILDINGS SUMMIT
WASHINGTON, DC • MAY 9-11
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### DOE Program Leads

<table>
<thead>
<tr>
<th>Name</th>
<th>DOE, Office of Energy Efficiency and Renewable Energy</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrew Mitchell</td>
<td></td>
<td><a href="mailto:andrew.mitchell@EE.Doe.Gov">andrew.mitchell@EE.Doe.Gov</a></td>
</tr>
</tbody>
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### Program Support

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<tr>
<th>Name</th>
<th>DOE</th>
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</thead>
<tbody>
<tr>
<td>Kendall Sanderson</td>
<td>JDM Associates</td>
</tr>
<tr>
<td>Holt Mountcastle</td>
<td>JDM Associates</td>
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<td><a href="mailto:ksanderson@jdmgmt.com">ksanderson@jdmgmt.com</a></td>
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