UNITED TECHNOLOGIES CORPORATION: GLOBAL WATER CONSERVATION GUIDANCE DOCUMENT

SOLUTION OVERVIEW

Water use has long been an important part of UTC's sustainability goals. The company is currently working toward a global target to reduce water use by 40% by end of 2015 and is in the process of setting a new water reduction goal out to 2020. To help meet its ambitious goals, UTC developed a comprehensive internal guidance document that details the company's global water scarcity assessment, best practices in managing water at individual sites, and water saving case studies.

ORGANIZATION TYPE

Diversified manufacturer providing a range of high-technology products and services to the global aerospace and building systems industries

BARRIER

Lack of meaningful guidance for industrial operations in pursuing ambitious company-wide water conservation goals

SOLUTION

Development of a comprehensive internal guidance document that details UTC's global water scarcity assessment, best practices in managing water at individual sites, and water saving case studies

OUTCOME

The guidance document has helped UTC achieve a 33% absolute reduction in global water use against a 2006 baseline, going from about 3.8 billion gallons to 1.72 billion gallons

POLICIES

The key feature of UTC's Global Water Conservation Guidance Document is a set of 10 best practices that UTC sites must either consider or implement to comply with UTC corporate water conservation policies. The number and type of specific practices that sites must implement is determined based on size and a water scarcity assessment informed by a publically available tool. Sites in extremely water scarce areas (defined as per capita consumption in 2025 expected to be

less than 500 m3/person/year) are required to implement the most practices, sites with abundant water supplies (per capita water consumption in 2025 is expected to be greater than 4,000 m3/person/year) face fewer requirements.

UTC utilizes a tool developed by the World Business Council for Sustainable Development (WBCSD) to gauge and categorize the availability of water supplies at specific locations. WBCSD identifies five categories of water supply: Abundant, Sufficient, Stressed, Scarce or Extremely Scarce. According to UTC, 60% of its facilities are in regions with Sufficient or Abundant water supplies while 40% are in regions that are Stressed, Scarce or Extremely Scarce. UTC best practices associated with each scarcity level are listed below:

All scarcity levels are required to implement:

- **Water balance** – A water balance illustrates the volumetric flow rate of all water used including sources that are both significant and non-significant (such as cafeteria use and mop water). A water balance also indicates where wastewater is treated and/or recycled.
- **Leak management** – Leak management includes periodic visual or auditory checking of locations where leaks are commonly found such as in piping joints, restroom fixtures, pump seals, hose nozzles/shut off valves, drinking fountains, and processing equipment. This also includes quantifying the volume of water lost through leaks in order to determine the potential water and cost savings of leak repair.
- **Eliminating once-through cooling** – UTC recommends that all single-pass cooling systems at its sites be replaced with air-cooled or recirculating systems
- **Cooling tower management** – Cooling towers can consume a significant portion of a site's total water consumption, and can also offer the best opportunities for water savings. General objectives in cooling tower management include eliminating excess water losses, ensuring that the cooling tower water is not over-treated with chemicals, and investigating alternate sources of make-up water. Specific areas of focus to meet these objectives include evaporation rates, drift, blow down, basin leaks, water chemistry, and cycles of concentration.

All stressed and above are required to:

- **Install flow meters** – The water flow to rinse tanks should be turned off when process lines are not in use. This can be done manually or automatically. Conductivity sensors are also recommended to cycle the rinse water according to the concentration of contaminants.
- **Install low flow fixtures and flow resistors** – Modern plumbing fixtures use significantly less water than conventional designs. As a result, UTC asks its sites to consider replacing old plumbing fixtures with new ones.
- Reduce or eliminate rinse tank overflow – The water flow to rinse tanks should be turned off when process lines are not in use. This can be done manually or automatically. Conductivity sensors are also recommended to cycle the rinse water according to the concentration of contaminants.
- **Reduce or eliminate landscape irrigation (Xeriscaping)** – Use local plants or natural landscaping that does not require irrigation. Consider the use of captured rainwater or recycled wastewater for irrigation. Also, use control systems that irrigate based on soil

moisture content and rainfall amounts rather than a timed schedule.

All scarce and above are required to:

- **Recycle process wastewater** – Identify water quality requirements for each process and evaluate water recycling opportunities. Examples of opportunities include cooling tower blow down that can be used in scrubber applications, and process water that can be reused several times for the same application.
- **Rainwater harvesting** – Consider establishing systems that capture and reuse rainwater runoff to displace water from municipally-supplied and other sources. Rainwater can be useful in flushing toilets, washing cars, landscape watering, and washing parts.

In the United States, UTC's Guidance Document was utilized in 2010 by all the 128 sites it owned at the time, 101 of which were located in areas with Sufficient or Abundant water supply while another 27 were in regions that are Stressed, Scarce or Extremely Scarce.

PROCESS

The UTC Global Water Conservation Guidance Document was developed and released in late 2010. Initially, it was provided to sites as voluntary guidance, but in 2014, UTC began mandating compliance with the processes outlined in the document. The guidance document is incorporated into UTC's sustainability goals, and in the future, the data collection process will be automated so the company will be able to monitor site-by-site if best practices are being implemented, and also understand the rate at which savings are being achieved. The guidance document was developed and reviewed in-house by UTC's Environmental Health and Safety council and internal subject matter experts. UTC then reached out to the World Resources Institute and other non-governmental organizations and consultants for external review. As sites implement best practices, they report their success stories, which are then shared across the organization.

TOOLS AND RESOURCES

UTC's Guidance Document utilizes the World Business Council for Sustainable Development (WBCSD) Global Water Tool to map water supply and assess risks relative to UTC's global operations. Regional water resources for each UTC facility are classified by the Tool into one of five water supply categories: Abundant, Sufficient, Stressed, Scarce, or Extremely Scarce.

Tools:

- UTC Global Water Conservation Guidance Document
- World Business Council for Sustainable Development (WBCSD) Global Water Tool

MEASURING SUCCESS

UTC measures the success of its water conservation strategy, including the effectiveness of its guidance document, by tracking total water consumption at each site and across the corporation. UTC has set an absolute water reduction goal. In the 1990s, when UTC was first developing its environmental sustainability programs, it set water intensity goals, with water consumption

normalized to revenue. The company, however, changed this practice in 2006, and switched to absolute targets. This change was driven by the belief that more rapid environmental progress can be made when the consumption of finite resources is reduced as opposed to just growing more slowly over time.

OUTCOMES

UTC has already reduced its global water consumption by 33% against a 2006 baseline, which equates to about 2 billion gallons, or the amount of water consumed by nearly 55,000 U.S. residents in a year. While it is difficult to quantify the exact impact the water guidebook has had on the company's total savings numbers, UTC believes that many of the practices sites have implemented would not have been undertaken without the clear guidance contained in the manual. UTC's shift in policy to mandate compliance with the guidance document will likely lead to more best practices being implemented and even more progress made.

One specific example of impressive water savings comes from a UTC facility, which implemented best practices from the guidebook and reduced water consumption by 3.6 million gallons. The facility also realized a 90% reduction in wastewater discharge. These numbers were achieved through multiple upgrades to the facility, such as right sizing new rinse tanks to fit the production lines, improving rinse efficiency through rinse tank design, and addition of a dedicated spray rinse tank. Through these efforts, the facility was able to reduce its water tank footprint by 4,606 square feet or 58%, down from 22 to only 11 tanks total. Similar success stories have also been experienced at UTC facilities in the Netherlands and Mexico and are also included in the guidebook.