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# Phigenics

Our Core Purpose:

*To help facility managers optimize the total cost of their water systems by improving safety and efficiency.*



## WALMART SAVES ONE BILLION GALLONS REDUCING WATER USE AND UTILITY EXPENSE AT THE WORLD'S BIGGEST RETAILER

### SUMMARY

Famed economist Adam Smith once said, "Nothing is more useful than water; but it will purchase scarce anything; scarce anything can be had in exchange for it."

With California facing its worst drought conditions in its history, toxic algae blooms in Lake Erie, and [water costs rising 33 percent since 2010](#), water's value — both its actual costs and our perception of it — has been transformed since Smith's time.

Companies today have a vested business interest in managing their water consumption. Since 2011, [businesses globally have invested \\$84 billion in water management projects](#).

Given that water for cooling makes up a significant portion of a building's water use, adopting a portfolio approach to cooling water management is one way companies can make meaningful strides in reducing water consumption and improving energy efficiency.

In the example described here, Walmart — with a portfolio of stores spread across the U.S. — made significant reductions in its water use and utility expense by adopting such an approach.

*This case study is a modified version of an article that originally appeared in the October 2015 blog of the [Environmental Defense Fund](#).*



## FRAGMENTED APPROACH DRIVING HIGHER COSTS AND WATER USE

In 2008, Walmart's approach to utility water management was fragmented. Its 180 water-cooled U.S. stores had no engineering support on-site and it had no remote monitoring of cooling system performance. In addition, it had 15 water treatment service suppliers, each with their own vendor report forms, chemical strategies and proprietary equipment.

Assessing its portfolio of stores, Walmart found a lack of both vendor oversight and a standardized approach to cooling water management. These weaknesses resulted in excessive water consumption due to low reuse of water and slow response time to leaks, decreased energy efficiency and decreased useful life of assets. Furthermore, because of the lack of a reporting system and access to real-time data, labor costs were being funneled toward maintenance issues instead of optimization.

In 2008, Walmart partnered with Phigenics to develop a new approach to cooling water management. Recognizing that developing a strategy to reach water reduction, safety and cost goals at each individual site would be both time- and resource-intensive, Walmart took a portfolio-based approach.

For companies seeking to optimize the performance of their cooling tower operations, the below framework has been a winning approach for designing and implementing a portfolio cooling water management program.

### GAIN LEADERSHIP BUY-IN

The operation of cooling towers involves many departments; without buy-in from a company's leadership, getting support for a water management program may prove difficult.

The operation of cooling towers involves many departments; without buy-in from a company's leadership, garnering support for a water management program may prove difficult. Corporate facility and sustainability managers frequently cite two reasons to help build support for the design, investment and implementation of a portfolio-based water management program:

1. **The attractive return on investment through reduced operational and capital expenditures over the portfolio's cooling tower operation.**
2. **The program's alignment with existing corporate sustainability goals, such as combating water scarcity, being proactive stewards of water resources and promoting a healthy environment for consumers and employees.**

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***"We understand water is intrinsic to our mission of helping our customers save money and live better."***

- Walmart Global  
Responsibility Report

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## DEVELOP A CROSS-FUNCTIONAL COOLING WATER MANAGEMENT TEAM

Once management buy-in has been achieved, the program champion assembles a cross-functional cooling water management team. The team should include oversight by an independent water management expert and coordination with the local water treatment service representatives and water testing laboratories.



Initially, the team develops an implementation plan based on the following steps and should meet quarterly to review progress. The program champion coordinates quarterly team meetings, monitors overall program progress and serves as the point of contact with internal and external stakeholders.

## DEVELOP A BENCHMARKING PROGRAM

The program team's first task is to develop program objectives and key results (OKRs). Some examples of OKRs used in Walmart's program and those of other leading companies are:

- **Optimizing the useful life of capital assets** — key results are conducting an audit, developing a remediation protocol or developing a maintenance plan for each cooling tower.
- **Reducing cooling water consumption by 20 percent overall and by 30 percent in water scarce areas** — key results are increasing the portfolio's cycles of concentration (how many cycles a tower can operate before flushing the system, aka blow-down); installing make-up and blow-down meters and wireless communication exchanges; and plotting facilities on a water scarcity map to assess which face the greatest risk of water stress.
- **Reducing operation and cooling tower expense by 20 percent** — key results are reducing the amount spent on water treatment by 1,000 gallons; reducing water, sewer and energy costs; and negotiating with water utilities for evaporation credits.
- **Improve consumer and worker health and safety** — key results include complying with water risk management guidelines (ASHRAE 188); reducing and benchmarking quarterly positive tests for *Legionella*; and documenting achievements in hazard control.

## CREATE A PERFORMANCE SPECIFICATION

Once the program's OKRs have been set, the team creates a corporate cooling water system performance specification, which entails setting engineering and operational requirements for facilities personnel and contractors.

Developing the specification enables the team to standardize operating practices and water treatment services. Key sections of a performance specification include:

- **Product and equipment specifications**
- **Water quality standards – source and quality**
- **Key performance indicators (KPIs) – cycles of concentration or water treatment cost per use**
- **Test methodology requirements**
- **Water treatment supplier requirements**
- **A summary of roles and responsibilities**
- **A corrective action policy for noncompliance**

## DEVELOP PROGRAM VERIFICATION AND VALIDATION STRATEGIES

A key step in launching a successful water management program is the development of verification and validation strategies.

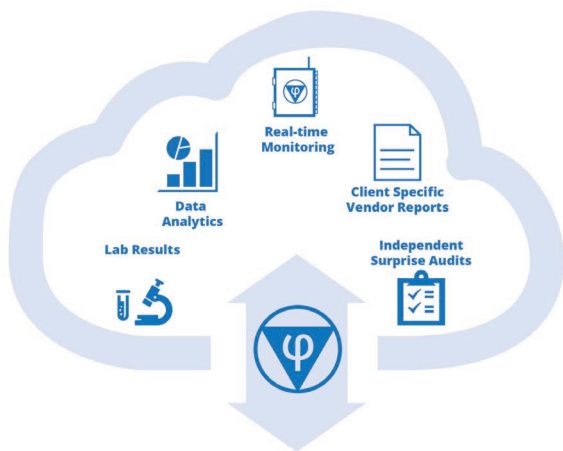
Verification is evidence that the plan is implemented accurately. For instance, if an organization wants to free up staff from some routine tasks so they can focus on higher-value activities, it can install water meters on its cooling water make-up and blow-down lines to enable automatic monitoring of water consumption, which will inform the team if the plan is being implemented accurately.

Validation provides quantitative evidence about the effectiveness of the program. For example, take an organization seeking a quarterly snapshot of its cooling water treatment plan. A team wanting highly accurate data and a minimum impact on labor would hire a credible third-party laboratory to benchmark its KPIs by conducting tests for typical cooling system efficiency metrics, such as cycles of concentration.

## MAKE IT SMART

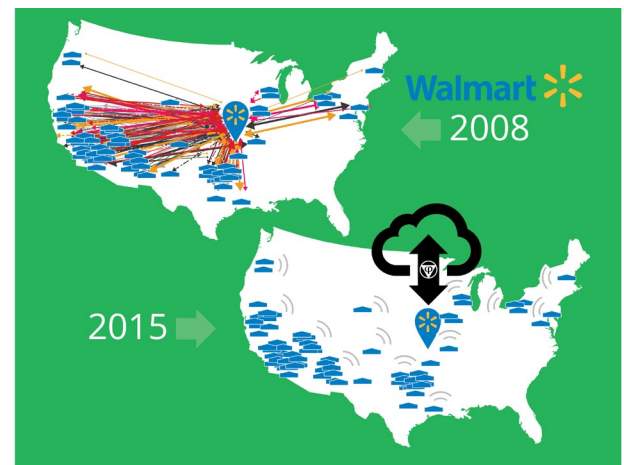
At this point, companies need to evaluate whether to make the program "smart" (providing remotely accessible, real-time data). A smart program may include investment in:

- **A cloud-based software platform specialized for cooling water management**
- **A standardized system for automatic sensor monitoring**
- **Make-up and blow-down meters**
- **Secure wireless data communications**
- **A standardized online service report for contractors**





By making a system smart, critical system sensor data is accessible and available to the team and other approved stakeholders through any Internet-connected device. The real-time data empowers the team to respond quickly to leaks and changes in water quality, while allowing it to use data analytics to enhance decision-making. It also assists in helping the team track progress toward operational OKRs. For these reasons, Walmart made one of the largest investments in real-time monitoring equipment and software for its cooling water systems.



## COMMUNICATE AND CELEBRATE SUCCESS

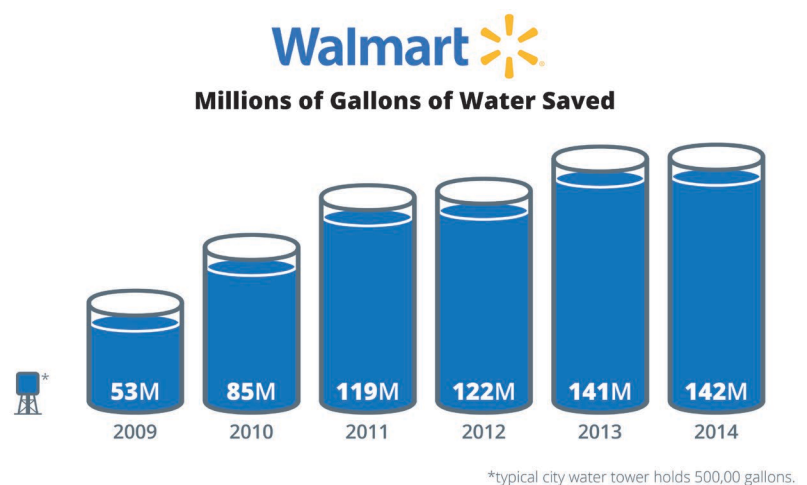
With the rise in awareness of water scarcity and the impact water has in people's lives, an equally important step in this process is taking the time to engage with key internal and external stakeholders about the importance of managing water use.

Quarterly milestone meetings, your company's blog and social media channels are great opportunities to let others know about successes from your cooling water management program as well as to highlight other opportunities for them to conserve water.

## 110 MILLION GALLONS AND \$733,000 SAVED PER YEAR

Going back to our key example — Walmart — this portfolio approach represented a clear shift forward for cooling water management. Walmart is using data analytics to enhance its decision-making and drive accountability across its water-cooled facilities.

Through the development and implementation of the approach outlined above, Walmart reduced water consumption by 25 percent per cooling tower, which equates to 660 million gallons of water and \$4.4 million in total water and sewer savings portfolio-wide over the six years of the program. Over ten years, that equates to over one billion gallons saved. In addition, this approach increased the energy efficiency and useful life of Walmart's assets.



Other companies can apply this proven approach to more responsibly manage facility water use across their portfolio of properties. This approach will help your company cut costs, reduce risk from shortages in water-stressed areas and further your company's role as a water steward through communicating water and energy efficiency gains and best practices in smart cooling water management.