

CASE STUDY



ENTERPRISE APPROACH TO COOLING WATER MANAGEMENT

Summary

NorthShore University HealthSystem (NorthShore) implemented an enterprise approach to cooling water management. This increased operational efficiency by 5.5 percent and resulted in ~1.2 MM gallons of water saved and \$8,175 dollars in annual savings. In addition, energy efficiency and organizational communication were improved. The program has a simple payback of 22 months.

The Problem

Water and sewer rates nationwide have risen by 33 percent and calls for corporations to become water stewards have increased. As a result, NorthShore’s leadership issued its Green Team a challenge to reduce water usage by 2,000,000 gallons across its enterprise.

NorthShore Annual Savings		
Hospital	Water (gal)	Cost
Highland Park Hospital	284,170	\$1,768
Skokie Hospital	476,339	\$2,753
Glenbrook Hospital	109,236	\$800
Evanston Hospital	317,132	\$2,854
NorthShore	1,186,877	\$8,175

NorthShore University HealthSystem

NorthShore University HealthSystem (NorthShore) is an integrated healthcare delivery system that serves patients throughout the Chicago metropolitan area and encompasses Evanston, Glenbrook, Highland Park and Skokie hospitals. In addition, the NorthShore Medical Group has more than 70 offices, 800 primary and specialty care physicians, the Research Institute, and the NorthShore University Foundation. In total, the health system employs more than 8,000 people.

- Evanston Hospital is a Level I Adult and Pediatric General Acute Care facility offering 354 licensed and 306 staffed beds.
- Highland Park Hospital is a Level II Adult and Pediatric General Acute Care facility offering 139 licensed and 123 staffed beds.
- Skokie Hospital is a Level II Adult and Pediatric General Acute Care facility offering 123 licensed and 112 staffed beds.
- Glenbrook Hospital is a Level II Adult and Pediatric General Acute Care facility offering 173 licensed and 149 staffed beds

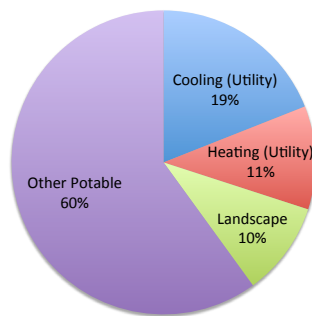


The Strategy Selected

The Green Team used EPA's Water Sense ACT framework:

- Assess water use and savings opportunities
- Change products or processes to incorporate best management practices
- Track results

NorthShore Water Use



From this, the team identified an opportunity to develop an enterprise approach to reduce water usage in the cooling tower systems. It partnered with Phigenics, an independent, third-party water management company, to validate and verify the results.

Implementation Process

Once the project was identified, the team utilized best practices referenced in the Health Facility Management article "Measuring up: Strategies for benchmarking cooling water systems". The Enterprise Approach to Cooling Water Management employed a 7-step framework.

Water Management Framework



Source: Phigenics LLC.

Using NorthShore Evanston Hospital's historical best practices of seven cooling tower cycles, Glenbrook, Highland Park

Glenbrook, Highland Park and Skokie Hospitals increased cycles of concentration from averages of three cycles towards the target of eight cycles during the 2015 cooling season.



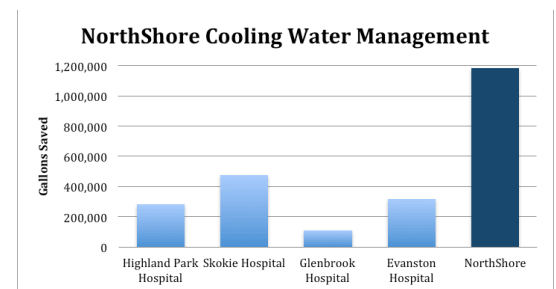
and Skokie Hospitals increased cycles of concentration from averages of three cycles towards the target of eight cycles during the 2015 cooling season. The increased cycle target was achieved through the adjustment of the cooling tower's conductivity set point in conjunction with implementation of a modified scale control strategy.

The following Key Performance Indicators (KPIs) were identified and monitored during the course of the FY 2015 cooling season. (March 2015)

- Cycles of concentration
- Biocide residual level
- Viable THAB dipslides (CFU/ml)
- Viable *Legionella* cultures (CFU/ml)
- Corrosion coupons (mild steel and copper)
- Calcium hardness mineral balance
- Makeup water usage (measured via water meter)
- Blowdown water usage (measured via water meter)

Benefits

NorthShore University HealthSystem reduced water consumption on average, 5.5 percent per cooling tower, which equates to 1,186,877 gallons of water and approximately \$8,175 annual savings in total water and sewer savings portfolio. In addition, this approach increased energy efficiency, useful life of NorthShore's assets and cross department communication. The program has simple payback of 22 months.



Challenges and Lessons Learned

To reduce water usage, increasing the cycles of concentration was key. This required implementing a commodity acid for scale, pH and alkalinity control. Concerns from operating plant personnel were expressed regarding safety and risks involved with handling acid (exposure due to leaks and chemical transfer) and having the acid in bulk storage on the work-site. To alleviate the heightened concern of the operating plant personnel, the following measures were implemented:

- Chemical distributor provided hands-free delivery service of the appropriate amount acid.
- Safety training and emergency eyewash was provided to operating plant personnel.
- Controllers and chemical feed equipment designed to feed and control corrosives were installed.

The Team

Program Champion:

Michael Fiore,
*Corporate Director of
Environmental Health &
Safety, NorthShore*

Cedric Everett, *Energy
Manager, NorthShore*

John Franke, *Industrial
Hygiene, NorthShore*

Marguerite O'Connell,
*Senior Account
Manager, Phigenics*