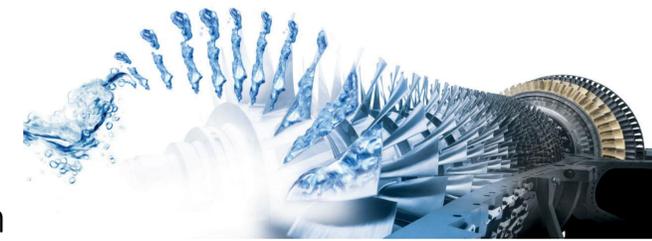


# NEXT GENERATION WATER

## Developing a Next Generation Water Action Plan for General Electric

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### BACKGROUND

Industrial corporations in the United States use over **22 trillion gallons** of freshwater annually to manufacture the everyday products we all know and use. Freshwater is integral to the creation of these products, and thus the success of the private sector. But freshwater is also a shared resource, needed and used by humans and ecosystems alike. In the last decade, corporations have recognized their large water footprint, and have begun to develop and implement water management strategies.

Our client, General Electric (GE) is one such corporation. As a digital industrial, conglomerate corporation with locations in over 170 countries and more than 300,000 employees worldwide, as of April 2017, their business segments included

- Power
- Renewable Energy
- Aviation
- Healthcare
- Healthcare
- Transportation
- Energy Connections & Lighting
- Capital

GE has recognized and worked to address their large water impact. Since the launch of their Ecomagination sustainability program in 2006, they have been tracking their water usage while setting and surpassing a series of water reduction goals.



GE is now working to identify new and high-impact water reduction goals and strategies to implement in 2020 and beyond to continue their role as corporate water stewards. Using a three-tiered approach, our project sought to create a framework for GE to discover meaningful next steps in corporate water sustainability.



### THREE-TIERED APPROACH

#### Watershed



**Objective:**  
Identify priority sites for GE to engage with based on the water risk and water use impact of the watershed.

**Data for analysis:**  
Annual freshwater use and specific locations of GE's 72 criteria sites from 2016. Criteria sites are sites that use 15+ million gallons of freshwater annually and encompasses 90% of GE's freshwater use.

#### Facility



**Objective:**  
Prioritize the implementation of water-saving strategies in GE's facilities through cost-effectiveness evaluations.

**Data for analysis:**  
Results and recommendations from 9 water audits completed by GE between 2009 to 2012. These audits were workshops designed to identify water-saving opportunities at individual sites.

#### Employee



**Objective:**  
Identify optimal employee engagement practices to fuse with GE's water initiatives.

**Data for analysis:**  
Information on environmental employee engagement programs at 54 peer and competitor companies, collected from their most recent corporate sustainability reports.

### KEY FINDINGS

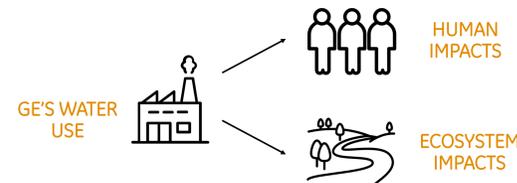
#### Watershed

We used two separate tools to assess **water risk** and **water impact** for all 72 criteria sites, and then combined the results to see which sites should be prioritized for GE.

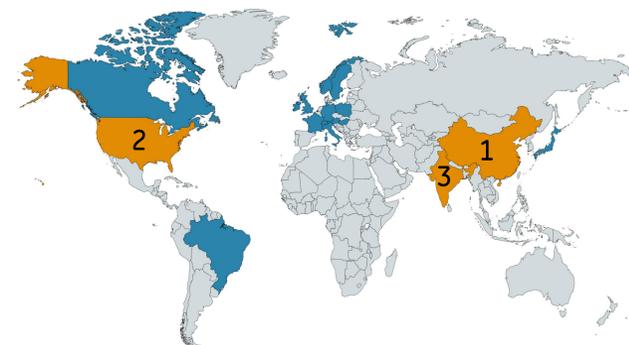
**Water risk** includes *quality* such as pollutants in the freshwater, *quantity* such as droughts and floods, and *regulatory* such as funding for infrastructure upgrades and risks to water movement within the watershed



**Water impact** looks at how GE's water use is affecting the amount of water available for humans and ecosystems.



We determined a final list of **six priority sites located in the United States, India, and China**, based on criteria sites with high relative water risk and water impact in their local watersheds.



Map of countries in which General Electric criteria sites are located. Countries in blue have General Electric criteria sites; countries in orange have General Electric sites in high priority watersheds. The numbers represent the number of sites in high priority watersheds

#### Facility

Out of 75 specific recommendations included in the previous nine water audits, we identified five general categories of water-saving strategies:

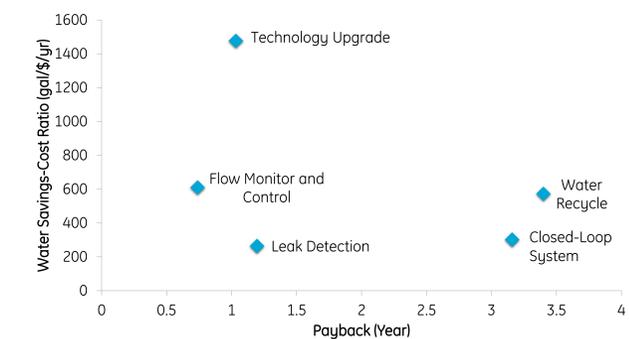
1. Installation of closed-loop systems
2. Flow monitoring and control
3. Water recycling
4. Technology upgrades
5. Leak detection

$$\text{Water Savings | Cost Ratio} = \frac{\text{Water Savings (gal/yr)}}{\text{Cost of Implementation (\$)}}$$

$$\text{Payback Period} = \frac{\text{Cost of Implementation (\$)}}{\text{Monetary Value of Water Saving (\$/yr)}}$$

By looking for projects with a **low payback period** and a **high water-savings to cost ratio**, we found that technology upgrades and flow monitoring and control were the most cost effective measures to implement.

#### COST-EFFECTIVENESS OF WATER-SAVING STRATEGIES



The payback period and water-saving cost ratios for the five categories of water saving recommendations

#### Employee

Based on our research on the environmental employee engagement (EEE) activities, we identified eight types of related programs:

- Volunteer activities
- Health engagement
- Green workshops
- Green teams
- Treasure hunts
- Green lifestyle
- Green rewards
- Social media



We found that **Volunteering** is the most common form of EEE, while **Green Lifestyle** had the highest emphasis.

EEE TYPE	PREVALENCE	EMPHASIS SCORE
Volunteer Activities	68%	.34
Health Engagement	53%	.71
Green Workshop	40%	.26
Green Teams	38%	.68
Treasure Hunt	35%	.54
Green Lifestyle	35%	.93
Green Rewards	27%	.75
Social Media	24%	.60

We also discovered a positive correlation between company financial performance and all types of EEE.



### RECOMMENDATIONS

#### Watershed



GE can employ our water risk and impact analysis to identify priority sites and engage in local watershed management. GE should continue to collect and monitor data related to the local water context of their operating sites.

#### Facility



Next, GE can zoom in on specific facilities within the priority sites and apply our cost-effectiveness analysis to evaluate operational efficiency strategies. We recommend creating a database to track the implementation of water-saving projects.

#### Employee



Finally, GE should design EEE programs to implement at individual facilities to encourage water-saving behaviors. In particular, Volunteering initiatives may offer the most financial and environmental benefits.

The interconnectedness of the three tiers in our framework enables a more holistic perspective on the tools and metrics that GE can leverage in keeping themselves at the forefront of corporate water sustainability. Nevertheless, the flexibility built into our framework allows GE to easily pursue water management programs on just one or two of the scales or to re-evaluate optimal strategies under changing business or environmental settings.

### ACKNOWLEDGEMENTS

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For further information, please visit <https://nextgenwater.dudaone.com>

Top right graphic and "Employee" photo are courtesy of General Electric.

