



Repurposing a Corporate Energy Management System for Water Efficiency

Alan Resnik

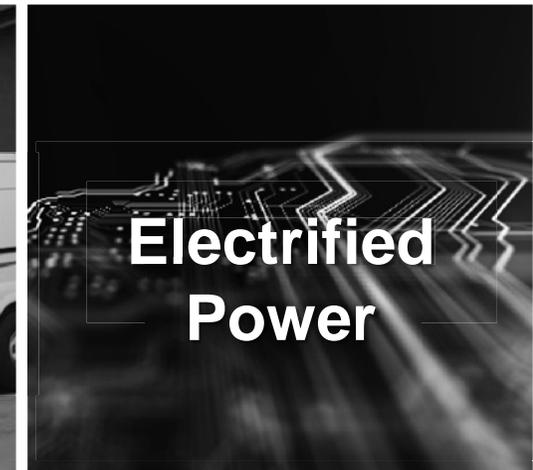
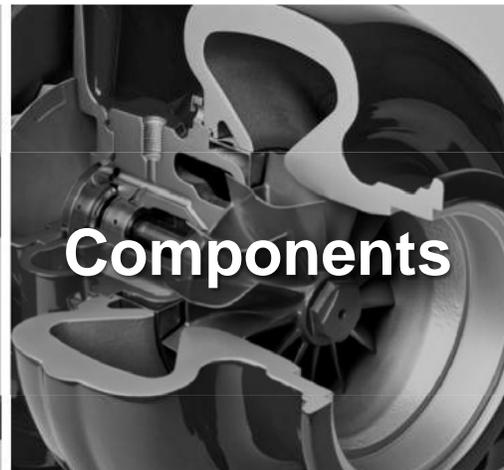
Director, Facilities & Operations
Environmental Management

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public

Five operating segments

Cummins has a nearly 100-year-long track record of delivering leading power solutions. As we look ahead, we know our industries and markets will continue to change, and we are committed to bringing our customers the right technology at the right time.



J. Irwin Miller: A visionary

- Laid foundation for future global growth
- Embraced the stakeholder model
- Integrated values into the fabric of our business





Public

WORLD HEADQUARTERS

500 Jackson St.
Columbus, IN 47201

EST. **1919**



www.cummins.com

CMI

STOCK SYMBOL

(New York Stock Exchange)

58,600 **EMPLOYEES WORLDWIDE**

More than 50 percent of the company's employees are located outside the United States.

(approximate employee total, as of December 2017)

MEMBER OF

Dow Jones Sustainability Indices

In Collaboration with RobecoSAM

SALES / EARNINGS

In 2017, Cummins earned \$999 million* on revenues of

\$20.4 billion

HSEMS: Deliver Policy Commitments

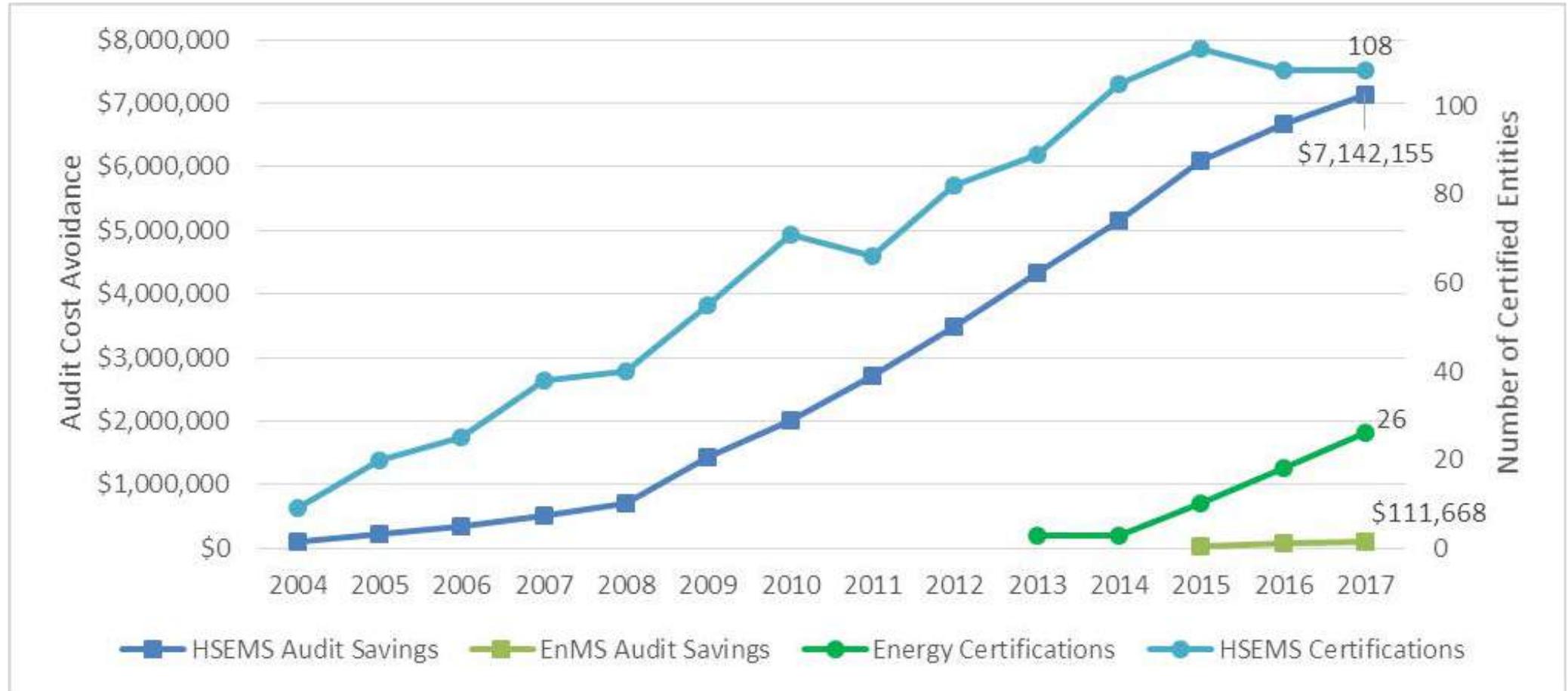
HSE Policy Commitments

Cummins' leadership will facilitate this mission by providing the necessary resources and information to meet aggressive improvement targets in the areas of:

- illness and injury prevention;
- health and wellbeing promotion;
- pollution prevention; and
- natural resources conservation.

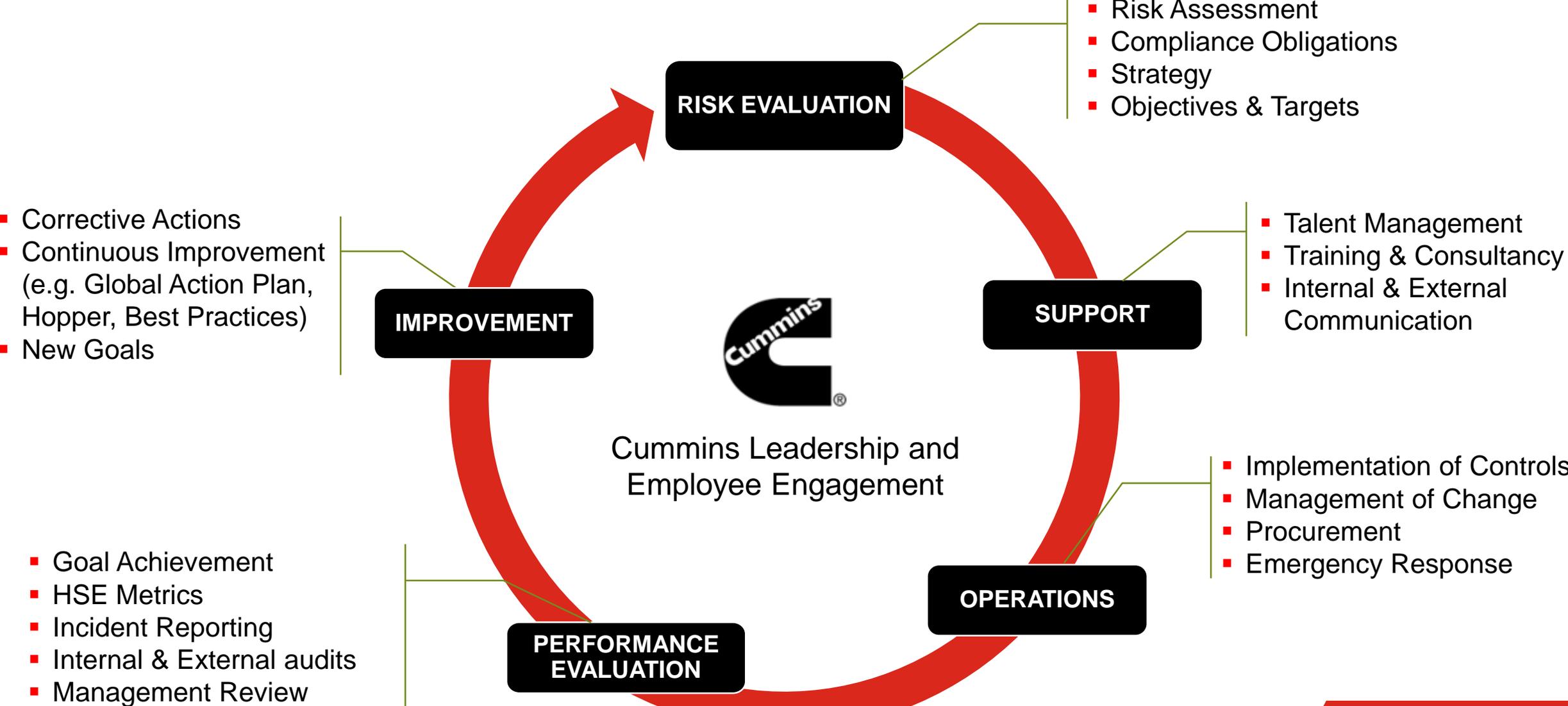


Enterprise Growth by Entity and Savings

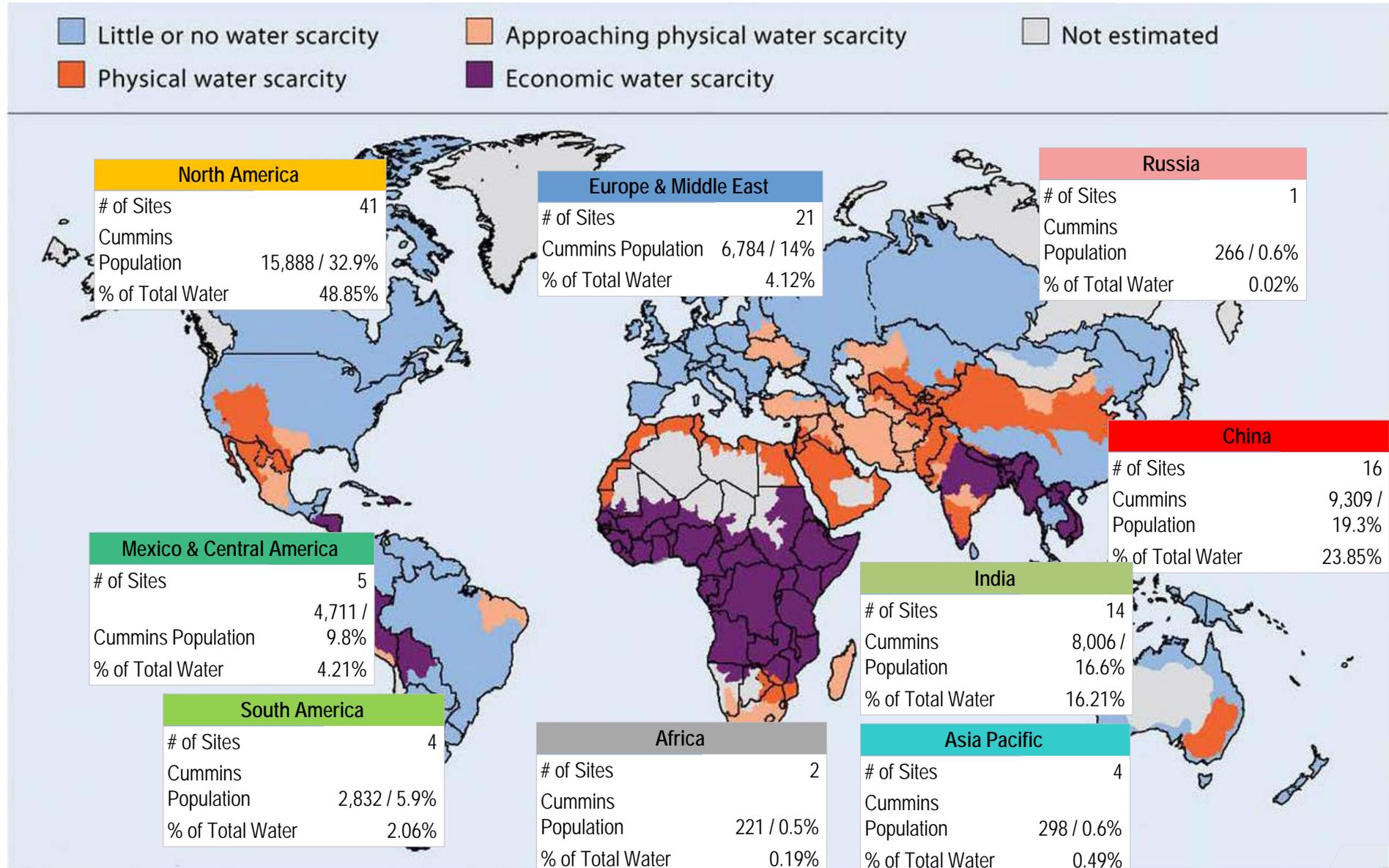


- ✓ **372 Certified Sites**
- ✓ **More than \$7.2 million avoided audit costs since 2004**

HSEEnMS: Initiative Into Standard Practice



Why Water, Why Cummins?

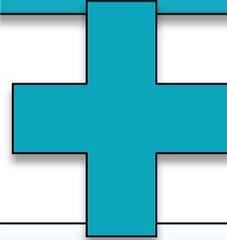


Water Stewardship at Cummins

Water Conservation

Aspiration – We will continually reduce the amount of water we use in our operations and improve the quality of the wastewater we discharge.

2020 Goal: Reduce the water use intensity (normalized to labor hours worked) in our facilities by 50% as compared to a 2010 baseline.



Community Water Engagement

Aspiration – We will work together with our communities to ensure that everyone has adequate, safe, and sustainable water supplies.

2020 Goal: Achieve water neutrality (off-set the water we use) for 15 facilities in India, China, Brazil, South Africa, and Mexico by doing water projects (water quality, conservation, sustainable supplies) with our communities.



A Complete Approach

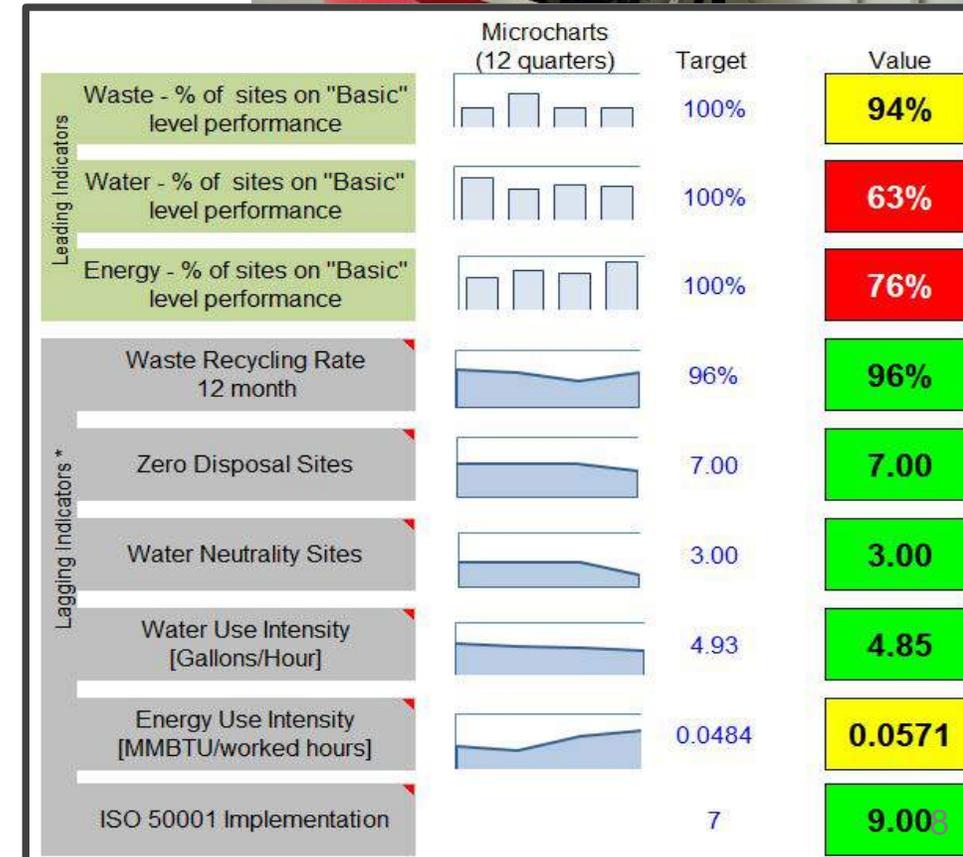


Water Performance Roadmap

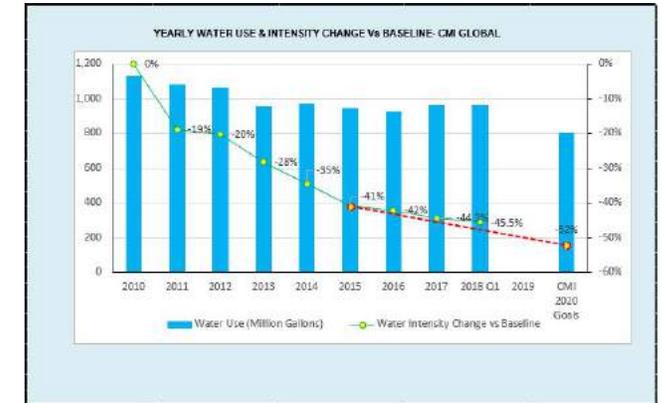
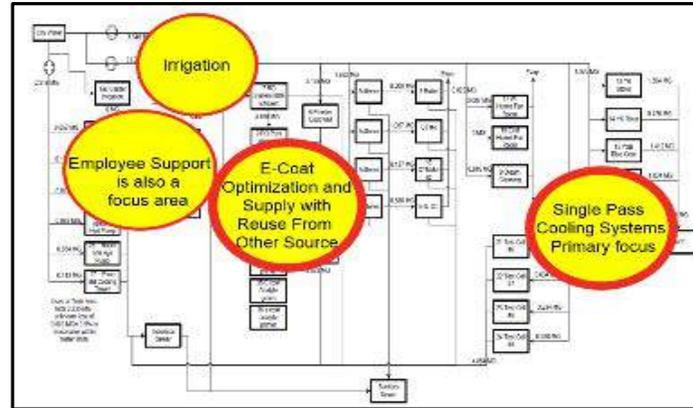
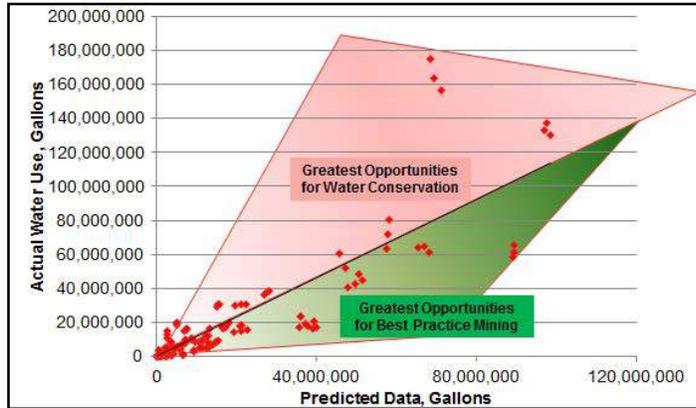
- Integrate water requirements into EEnMS (ISO 14001/50001)
 - PDCA approach
 - Energy Champion ➔ Environmental Champion Program
 - Similar tools/toolkits: Metering, Energy Review/Water Balance
 - Sustainable and auditable controls
 - Media efficiency roadmaps via annual Objectives and Targets
 - Water/Energy nexus: Holistic approach
 - SEP statistical analysis for Energy and Water normalization factors

- Capital management process
 - All Media project hopper
 - Campaigns (metering, leaks, etc.)
 - Water capital projects look at risk/stewardship/goals beyond ROI

- Leadership Scorecards



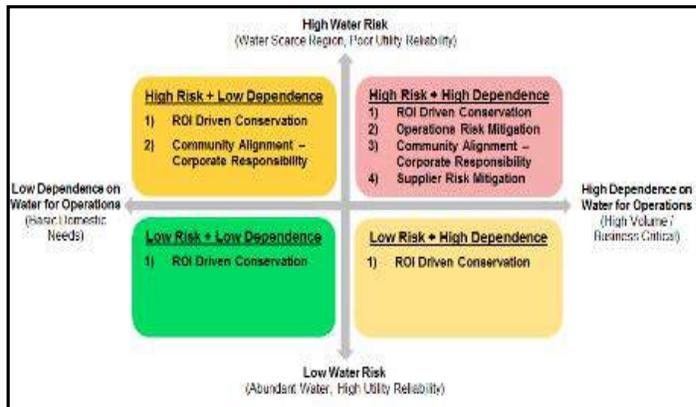
Conservation: Make the Complex Simple



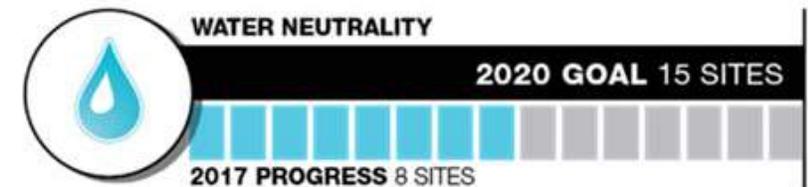
Prioritize

Consult

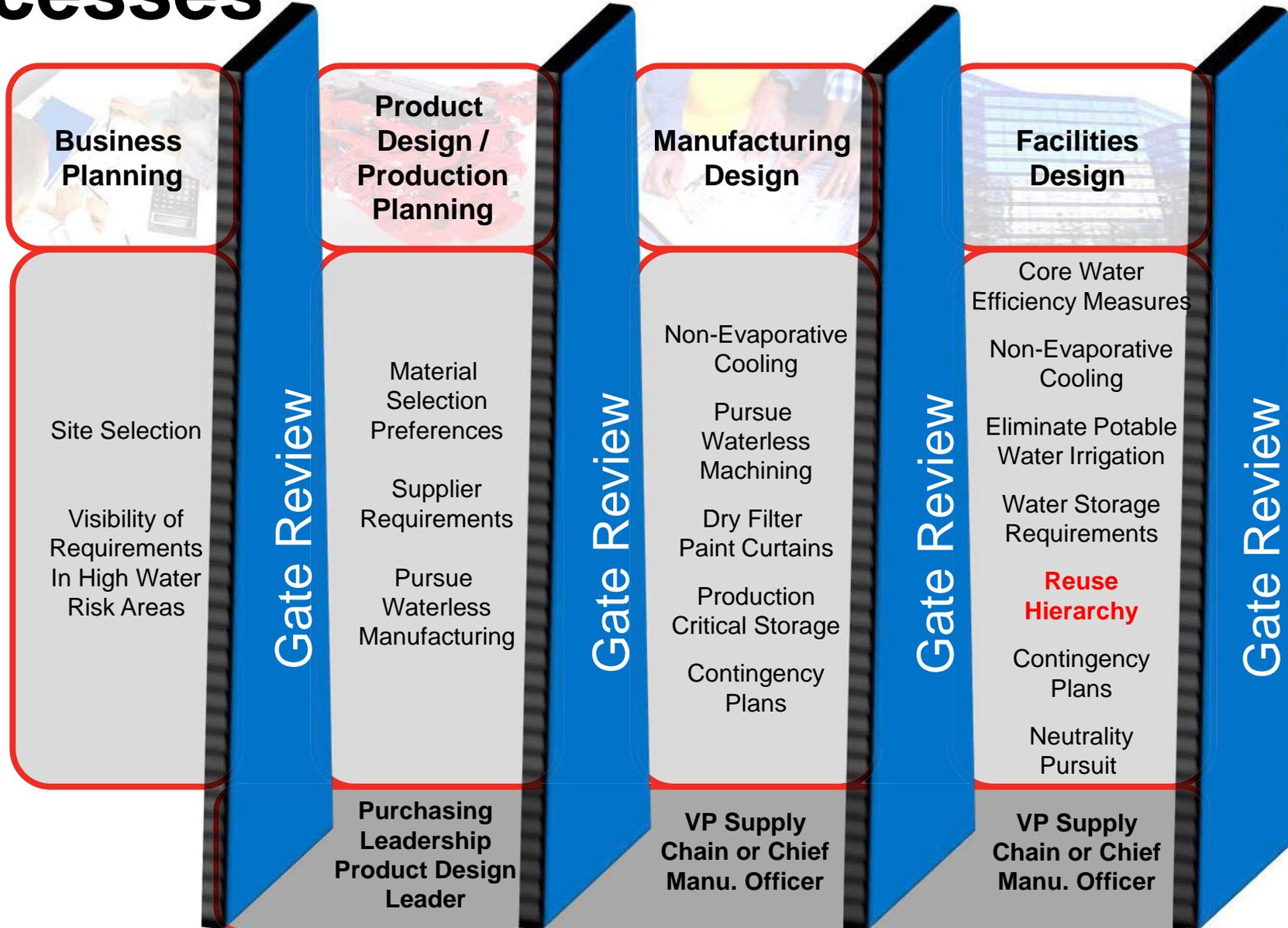
Achieve



A screenshot of a software interface titled 'Water Tool - Cost And Results Page'. It features a table with columns for 'Water Cost', 'Units', 'Costs', and 'Sustainability Score'. Below it is a 'Project Financial Calculations' table with columns for 'Project', 'Budget Type', 'Forecasted Volume', 'Actual Volume', 'Forecasted Cost', 'Actual Cost', 'Forecasted Savings', and 'Actual Savings'.



Embedding Water Risk in Business Processes



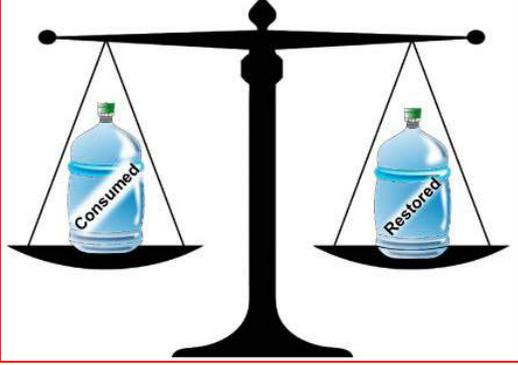
Assessing Supplier Water Risk

264 Critical suppliers evaluated using Maplecroft tool to determine water stress risk

- 17 at extreme or very high risk
 - Driving risk mitigation plans
 - Next steps; sharing CMI water tools and training

The screenshot shows the Verisk Maplecroft website interface. The 'Environmental Risk' category is selected in the left-hand navigation menu. The main content area displays 'Water Stress (subnational)' with a descriptive text and a world map. Below this, there are sections for 'Water Quality Index' and 'Air Quality (subnational)'. A table is overlaid on the bottom right of the screenshot, listing supplier data.

SIM Supplier Number	WATER STRESS INDEX	WATER STRESS RISK
483678	8.14	LOW (7.5 - 10.0)
405397	3.22	HIGH (2.5 - 5.0)
431863	10.00	LOW (7.5 - 10.0)
428348	5.03	MEDIUM (5.0 - 7.5)
470923	8.14	LOW (7.5 - 10.0)
432520	7.97	LOW (7.5 - 10.0)
433103	8.01	LOW (7.5 - 10.0)
432687	0.00	EXTREME (0.0 - 2.5)
422429	2.75	HIGH (2.5 - 5.0)



Water Neutrality



**Ecosystem Recovery
Shanghai Houtan Park
(2017)**

Total benefit
is 60 MG/yr.



Tankers Not
Needed First
Time in 40
Years.
10,000,000 L
Storage Added

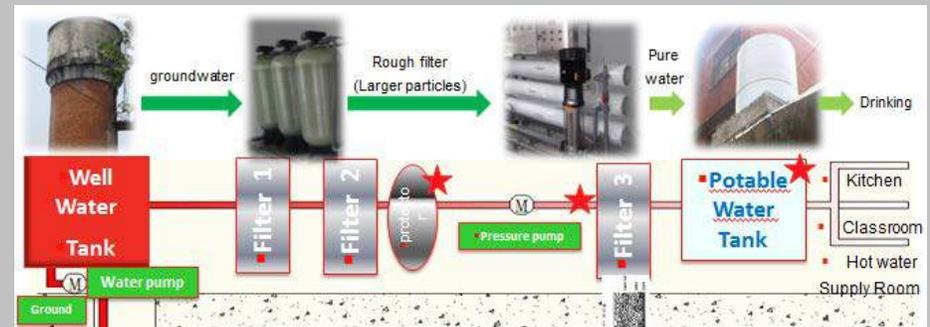
**Manjarsumbha, India Village Water
Management Project (2012)**



**Car & General
/Cummins/Lions Club
Water Pan Project (2012)**

Kenya – East Africa

5,000,000 L Reservoir



China Recon – Zhuji Middle School (2013)

Water purification systems to supply water to a middle school
serving 2,982 students, an estimated 7.8 million liters.

Moving Forward

- **Priority Opportunities**

- Single-pass operations
- Irrigation (India)
- Process optimization
- Capture of clean water streams
- Leak detection and mitigation
- Wastewater treatment for reuse
- Management of change

- **Sustainability 3.0**

- No potable water for manufacturing
- Water neutrality: all mfg. sites in stressed areas
- Wastewater treatment for reuse
- True cost of water and factor in risk

Water - Basic Level			Prev. Value	Value
Basic Level - Engineering Controls				
QEMC-WAT-BA-MAE.1 : Measure all sources supplying water to the facility		Full Conformance	Full Conformance	Full Conformance
QEMC-WAT-BA-MAE.2 : Low flow faucets or aerator flow controls in 100% of laboratories (Please click 'i' for more details)		Full Conformance	Full Conformance	Full Conformance
QEMC-WAT-BA-MAE.4 : Kitchen facilities include low- flow, manually actuated (foot or hand) pre-rinse sprays 1.6 gpm or less and no continuous wash streams are present		Not Applicable	Not Applicable	Not Applicable
QEMC-WAT-BA-MAE.5 : Automated Irrigation system includes rain sensor shutoff. Manually controlled systems are equipped with self-closing nozzles or timer shut-off		Not Applicable	Not Applicable	Not Applicable
QEMC-WAT-ST-MAE.2 : Meter any single user that equals 20% or more of the site total consumption		Full Conformance	Full Conformance	Full Conformance
QEMC-WAT-BA-MAE.6 : Sites using 100,000 gallons or more annually in single pass cooling processes eliminate single pass processes		Partial Conformance	Partial Conformance	Partial Conformance
Basic Level - Organizational Controls				
QEMC-WAT-BA-MAO.8 : Site has a water management / conservation program that conforms to CMI's Water Conservation Procedure		Non Conformance	Non Conformance	Non Conformance
QEMC-WAT-BA-MAO.1 : Site-wide water balance and flow diagram completed and updated at least annually		Partial Conformance	Full Conformance	Full Conformance
QEMC-WAT-BA-MAO.3 : Water use trends and performance metrics reviewed with site leadership on a quarterly basis		Partial Conformance	Partial Conformance	Partial Conformance
QEMC-WAT-BA-MAO.5 : Site has developed a Water conservation plan		Non Conformance	Non Conformance	Non Conformance
QEMC-WAT-BA-MAO.6 : General site water conservation information incorporated into the training program for all new hires and annual refresher for all employees		Non Conformance	Non Conformance	Non Conformance
QEMC-WAT-BA-MAO.9 : Appoint technically qualified person to oversee the site water conservation program		Full Conformance	Partial Conformance	Partial Conformance

