CALIFORNIA DEPARTMENT OF WATER RESOURCES

American Water Works Association California-Nevada Section

WTA

CALIFORNIA Water Boards

CALIFORNIA WATER EFFICIENCY PARTNERSHIP

MEASURING PERFORMANCE IN THE CII WATER SECTOR

RYAN BAILEY, DEPARTMENT OF WATER RESOURCES:
CHARLOTTE ELY, STATE WATER BOARD
MICHELLE MADDAUS, MADDAUS WATER MANAGEMENT
KEN JENKINS, CALIFORNIA WATER SERVICE
MICHAEL SKOVGAARD, GRUNDFOS

Making Conservation a California Way of Life

Overview of the CII Performance Measures

Charlotte Ely

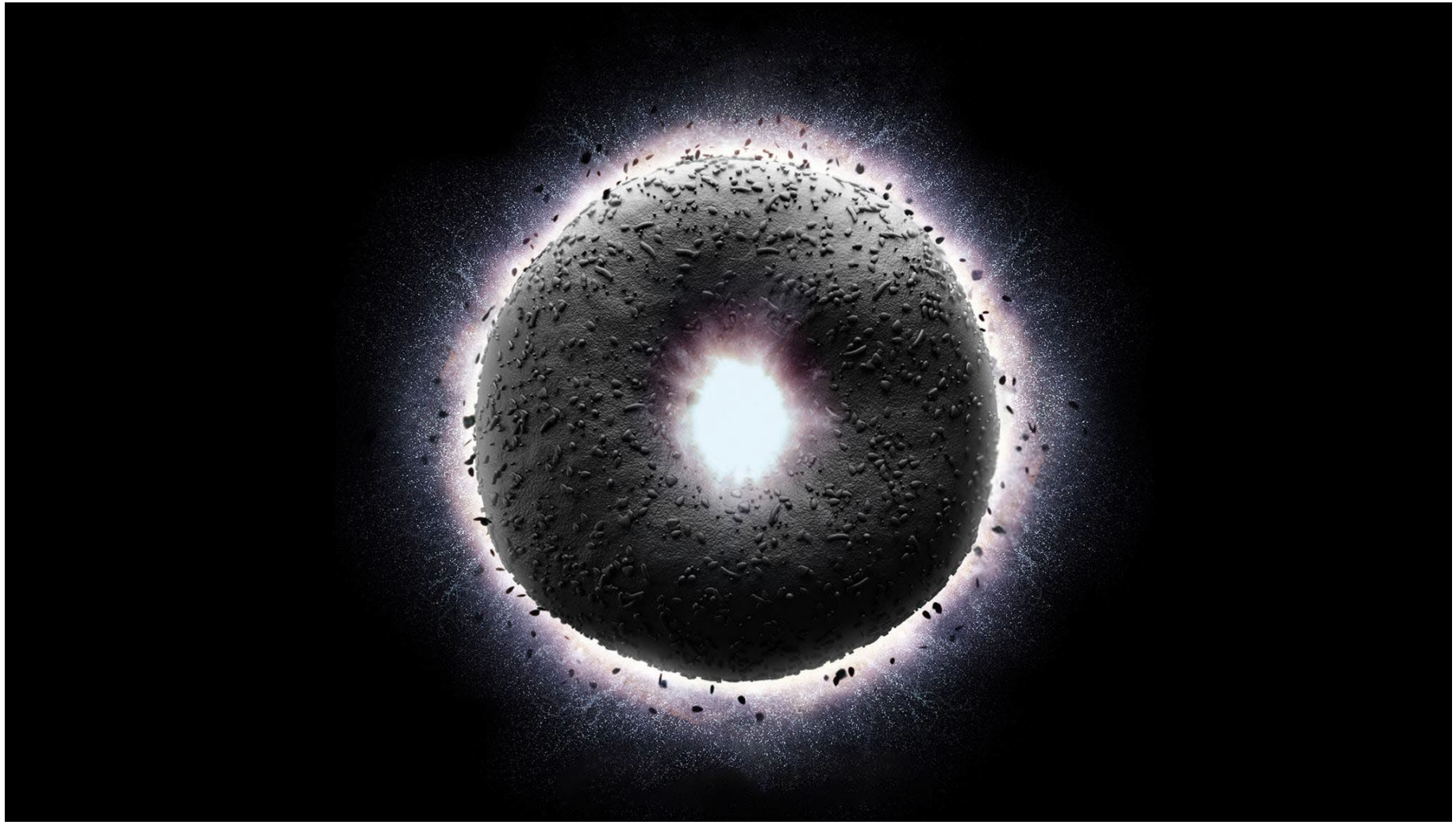
Climate and Strategy Advisor

CALIFORNIA Water Boards

Office of Research, Planning, and Performance

Objective ≠ everything bagel

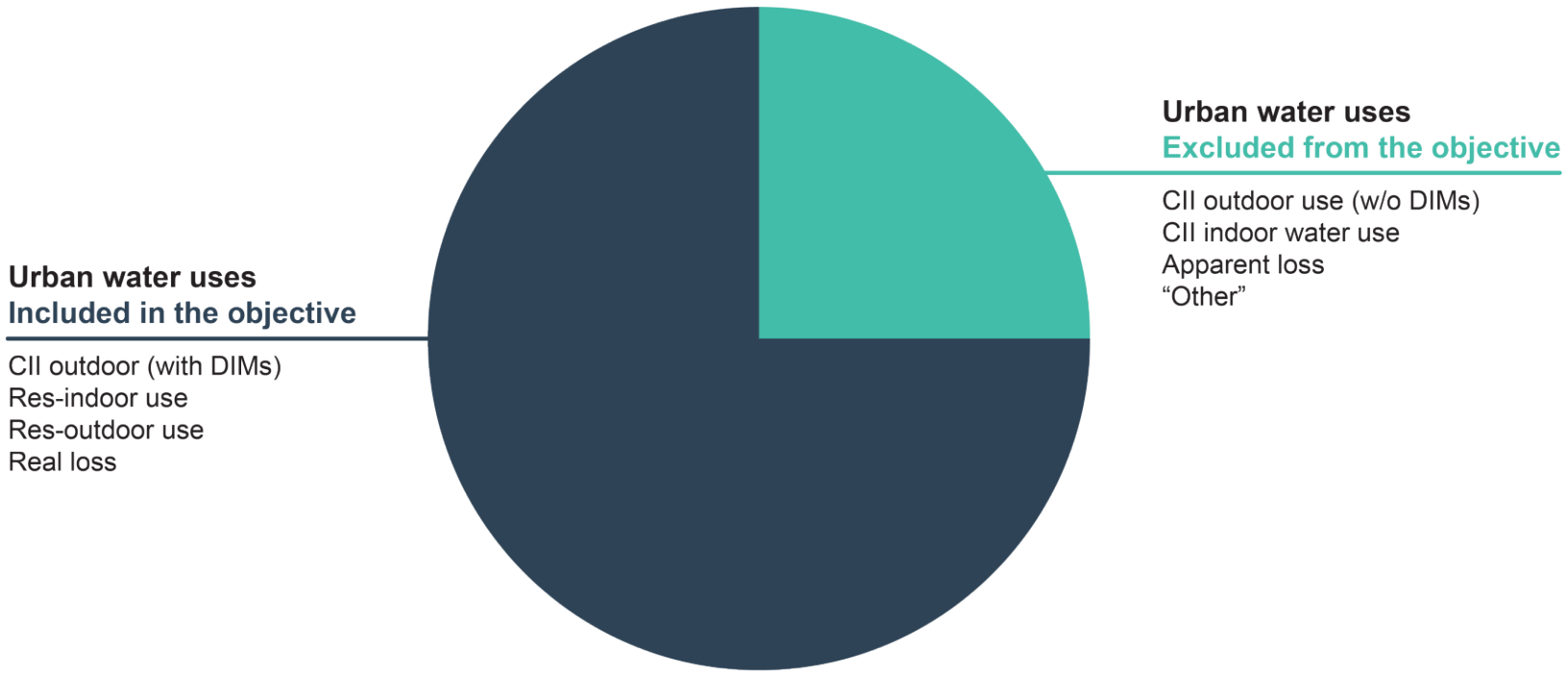
*Some water uses excluded from the **objective** are subject to **performance measures...***



*...and some urban water uses are **not** regulated under the new framework at all.*

Objective ≠ everything

*Some water uses excluded from the **objective** are subject to **performance measures**...*

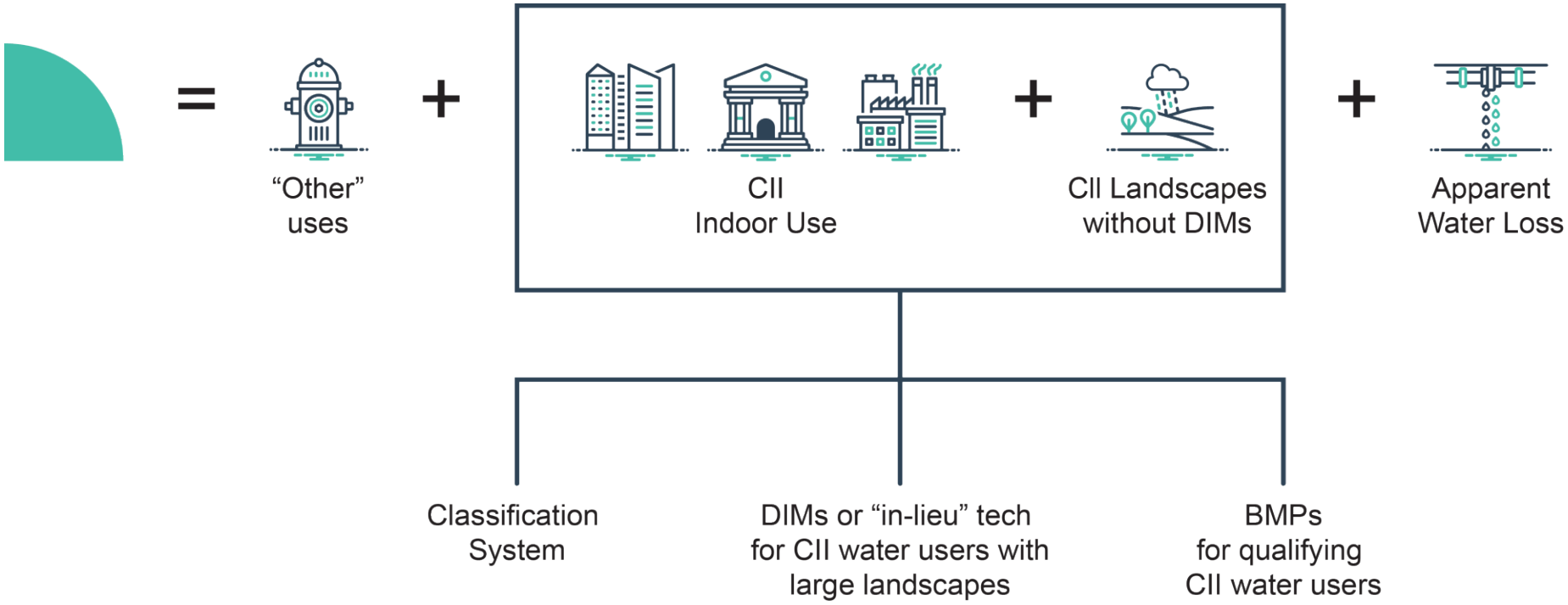


CII = Commercial, Industrial, and Institutional | **DIM =** Dedicated Irrigation Meter

*...and some urban water uses are **not** regulated under the new framework at all.*

Demands excluded from the Objective

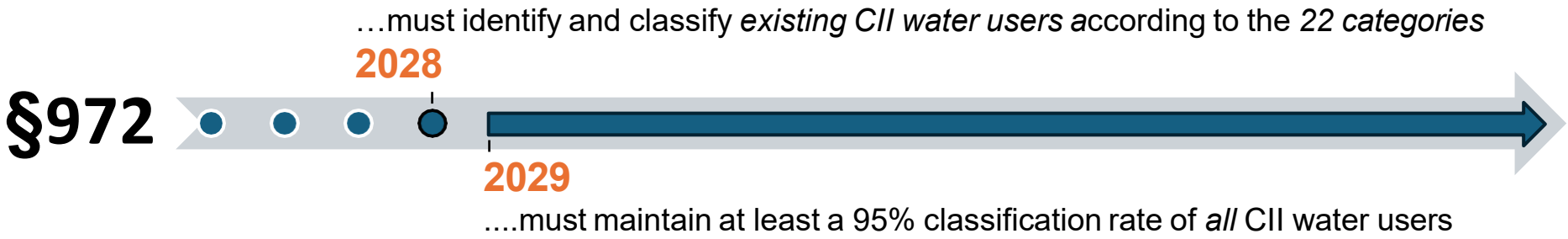
Some of which will be subject to CII Performance Measures



*"Process water" is **not** subject to CII Performance Measures*

§972
Regulatory timeline

For the report submitted by January 1, ___, a supplier….



- ***Existing*** *CII water users* = those served by the supplier on or before January 1, 2025 (may be based on connection, account, or other).
- ***All*** *CII water users* = Also those served by the supplier after January 1, 2025.
- ***22 categories*** = the 18 broad ENERGYSTAR Portfolio Manager (ESPM) categories; CII laundries; Landscapes with Dedicated Irrigation Meters; Water Recreation; and Car Washes.

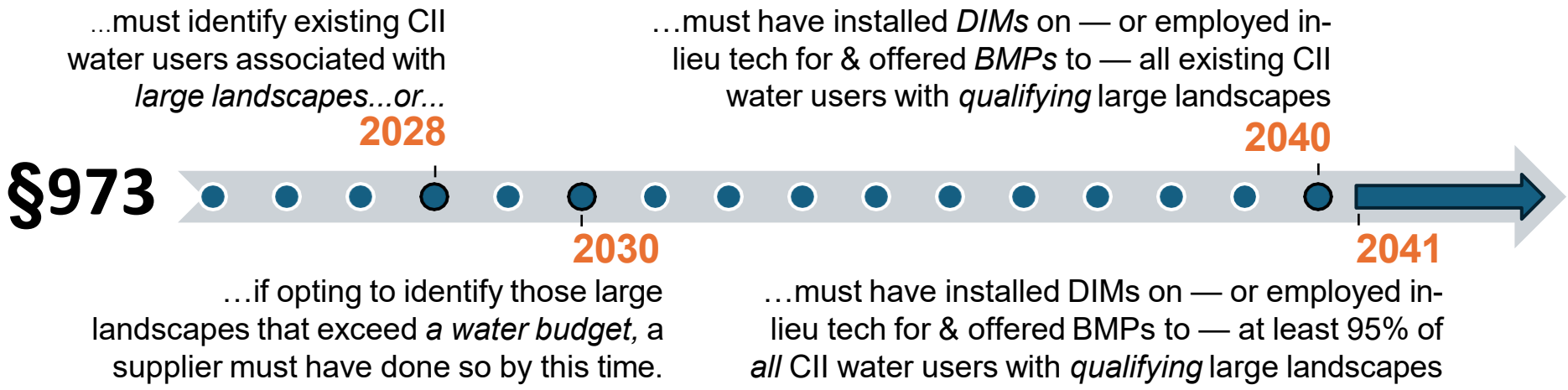
§972
Classification Requirements

What do the data from the 2025 reports show?

Of the **342** suppliers that submitted reports:
 	
• **214** suppliers did not provide any information about classification.
 	
• **128** suppliers provided some information about classification.
	• Of the **128** suppliers that reported some information about classification...
	
	  • Majority of suppliers classified CII water users in terms of *accounts.*
	
	  • **63** suppliers appear more than halfway though classifying existing CII water users.

§973
Regulatory timeline

For the report submitted by January 1, ___, a supplier….



- ***Large landscapes*** = CII landscapes that are 1/2 acre in size or larger with mixed-use meters; ***qualifying*** large landscapes may be limited to those that exceed a water budget.
- ***A water budget*** = For Special Landscapes Areas (SLAs) ➔ $CII_{MUM} = L_{ALL}$ x Net ET0 x 1.0 x 0.62; for non-SLAs ➔ $CII_{MUM} = L_{ALL}$ x Net ET0 x 0.63 x 0.62
- ***DIMs*** = Dedicated Irrigation Meters; ***BMPs*** = Best Management Practices; ***In-lieu tech*** = technologies that support landscape water use efficiency improvements by means other than the direct measure of water use.

§973
DIMs or in-lieu tech for large ‘scapes

What do the data from the 2025 reports show?

Of the **342** suppliers that submitted reports:

- **235** suppliers indicated how they will be identifying large landscapes.
- **36** suppliers have started reporting the number of large landscapes in their service area.

Of the **235** suppliers that reported some information about large landscapes:

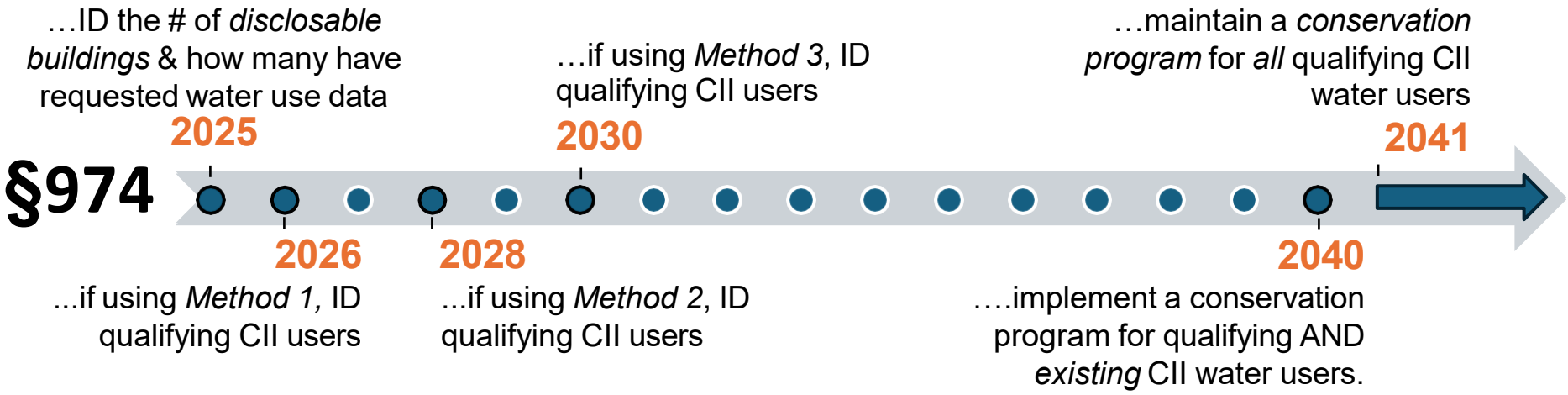
- A majority have indicated they will install DIMs or employ in-lieu tech for all large landscapes (i.e., not just those exceeding a budget).

Of the **36** suppliers that reported on the number of large landscapes:

- **14** reported installing DIMs.

§974
Regulatory timeline

For the report submitted by January 1, ___, a supplier must….



- ***Disclosable building*** = a commercial or multifamily building with more than 50,000 sq. Ft. of gross floor area.
- ***Methods 1, 2, and 3*** = methods use to identify qualifying CII water users (e.g., the top 2.5% of all CII water users).
- ***Qualifying CII water users*** = the subset of high water-using or inefficient CII water users that a supplier must offer BMPs to.
- ***Conservation program*** = *designed and implemented to carry out some combination of the BMPs listed in §974(f).*

§974
BMPs for qualifying CII water users

What do the data from the 2025 reports show?

Of the **342** suppliers that submitted reports:

- **306** suppliers identified the "covered buildings" in their service area.
- **253** suppliers indicated the method they will use to identify qualifying CII water users.
- **9** suppliers indicated that CII water deliveries are likely to be 10% or less of total deliveries

Of the **253** suppliers that indicated the method they will use to identify qualifying CII water users:

- **238** selected *method 1*
- **6** selected *method 2*
- **8** selected *method 3*

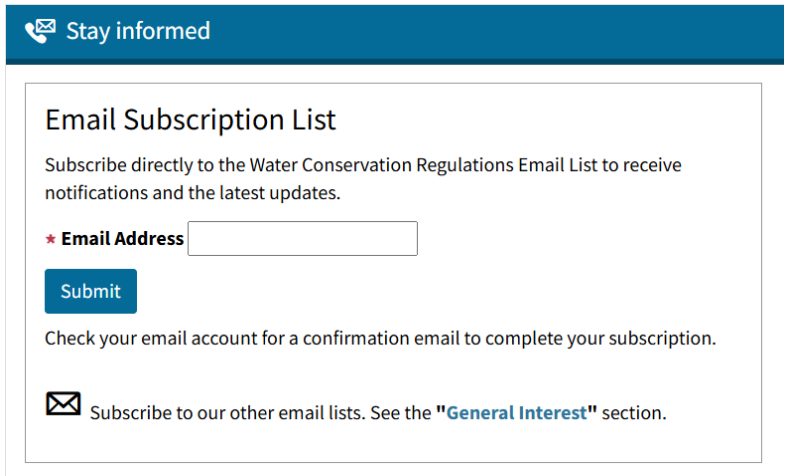
More than half of these suppliers have started identifying which BMPs they will offer to qualifying CII water users.

§974
BMPs for qualifying CII Water Users
What do the data from the 2025 reports show?

BMP Category	BMP in category most frequently offered to qualifying CII water users
Outreach, TA, and Education BMPs	Webpage portals to access information, tools, and rebates ***(188 suppliers)***
Incentive BMPs	Rebates and cost-sharing for replacing inefficient fixtures, equipment, irrigation systems or landscapes with water efficient ones ***(223 suppliers)***
Landscape BMPs	Programs to remove turf and replace it with climate-ready vegetation ***(131 suppliers)***
Collaboration and Coordination BMPs	Collaboration with non-governmental organizations on outreach and education ***(105 suppliers)***
Operational BMPs	Infrastructure changes, for example, smart meter replacement programs ***(151 suppliers)***

Thank you!

- Questions: Waterconservation@Waterboards.ca.gov



SCAN ME

Think Globally, Act Locally
April 10, 2025

Presented By :
Michelle Maddaus
President & Principal Engineer

MADDAUS
WATER
MANAGEMENT INC.
Making a Difference in the World of Water

Agenda

1. Introduction: Thinking globally, acting locally
2. High level overview of CII water use efficiency for Urban Water Suppliers
3. Road map on where to start with CII

Global Business Leaders Advancing Water Stewardship and Resilience

The CEO Water Mandate is a special initiative established in 2007 by the UN Secretary General and the UN Global Compact (UNGC) in partnership with the Pacific Institute to advance corporate water stewardship around the world.

The Mandate offers a powerful forum for companies to share good practices and forge partnerships to address urgent water challenges related to scarcity, quality, governance and access to water and sanitation.

478
ENDORSING COMPANIES
A list of all endorsing companies >

2103
PROJECTS
on the Water Action Hub >

577
RESOURCES
in the Water Stewardship Toolbox >

https://ceowatermandate.org/

- California Water Action Collaborative
  - Formed in May 2014 at a CEO Water Mandate in Los Angeles
  - 25 members - major food & beverage companies and leading environmental organizations
  - Collaborate to make measurable positive impacts on water security in the state.

SOUTHERN CALIFORNIA SUSTAINABLE LANDSCAPES INITIATIVE

This project is a collaboration with the Southern California business community to motivate the installation of sustainable landscapes on their properties that provide multiple ecosystem, economic, human health, and community benefits.

Read More →

YUBA II FOREST RESILIENCE PROJECT

Wildfires are now the biggest natural disaster facing the Western US. 65% of California's water supply originates in watersheds at high risk of wildfire. Restoring healthy function to forests includes interventions such as thinning, prescribed fire, meadow restoration, invasive plant removal, native plant regeneration, and road decommissioning. By implementing a Conservation Finance model, Blue Forest & the World Resources Institute seek to scale forest restoration across the West, starting in California.

Read More →

WATER EFFICIENCY UPGRADES FOR LOW-INCOME MULTIFAMILY HOUSING IN LOS ANGELES

Leaky toilets are the #1 source of water waste in multi-family housing. Leaky toilets are usually easy to fix, but very hard to detect - especially in large multi-family buildings. This project will deploy leak detection technology in low-income, multi-family housing in Los Angeles, California.

Read More →

Think Globally – Act Locally

- 3 virtual trainings for utility staff
- Field training
- Important to know the corporate structure

Coca Cola bottling facility

Recommended action plans

- Improve toilet efficiency
- Improve faucet efficiency
- Fix leaks
- **Savings estimated:** 179,450 gal/yr.
- Add product lines submeters
- Complete water balance
- **Savings estimated:** currently assessing

Case Study:
Making changes to save water!

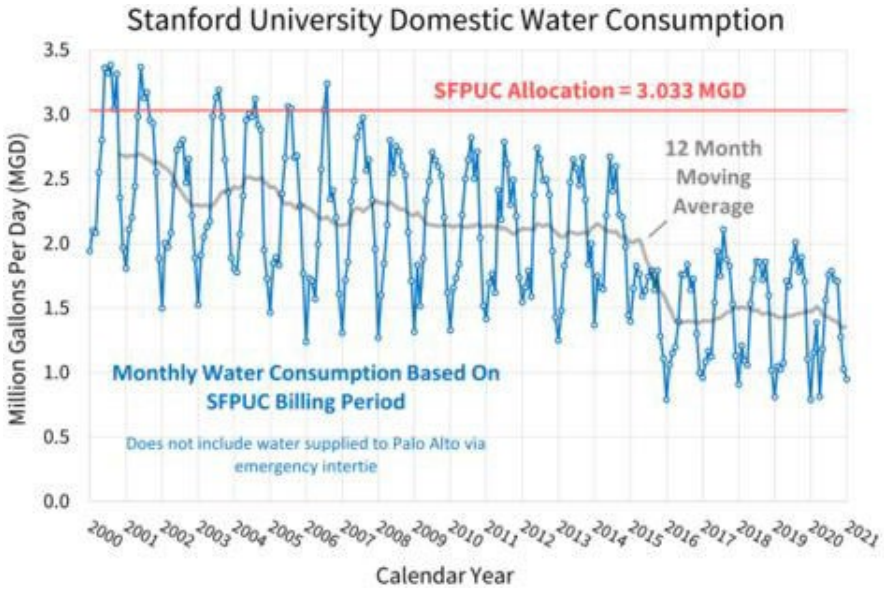
Coca Cola bottling facility

- Cooling tower submeter
  - Identified 7,000 gal/day waste event on Feb 15, 2023, due to miscalibration of the conductivity sensor.
  - Prevented scale event in April 2023, identified and corrected controller failure and pump issue on glycol tower.
- Cooling tower performance check
  - April 2024 - JVWCD trained new maintenance team on cooling tower operation & performance checks.
- Complete a Water Balance
  - Determine how much water is being used by different processes.
  - Goal: identify largest water uses, system inefficiencies, and leaks then determine the most beneficial water management priorities.

Case Study:
Stanford University CII Improvements

- 22 years of water conservation on campus
- Cut water use 44% despite campus growth
- Saved 1.1 MGD
- Replaced 16,000+ fixtures
- Transferred landscaping to non potable water
- Replaced Central Energy Facility
- Collaboration across 5 campus management groups
  - Housing, Dining, Athletics, Academics, School of Medicine
  - High end laboratory research

Stanford University



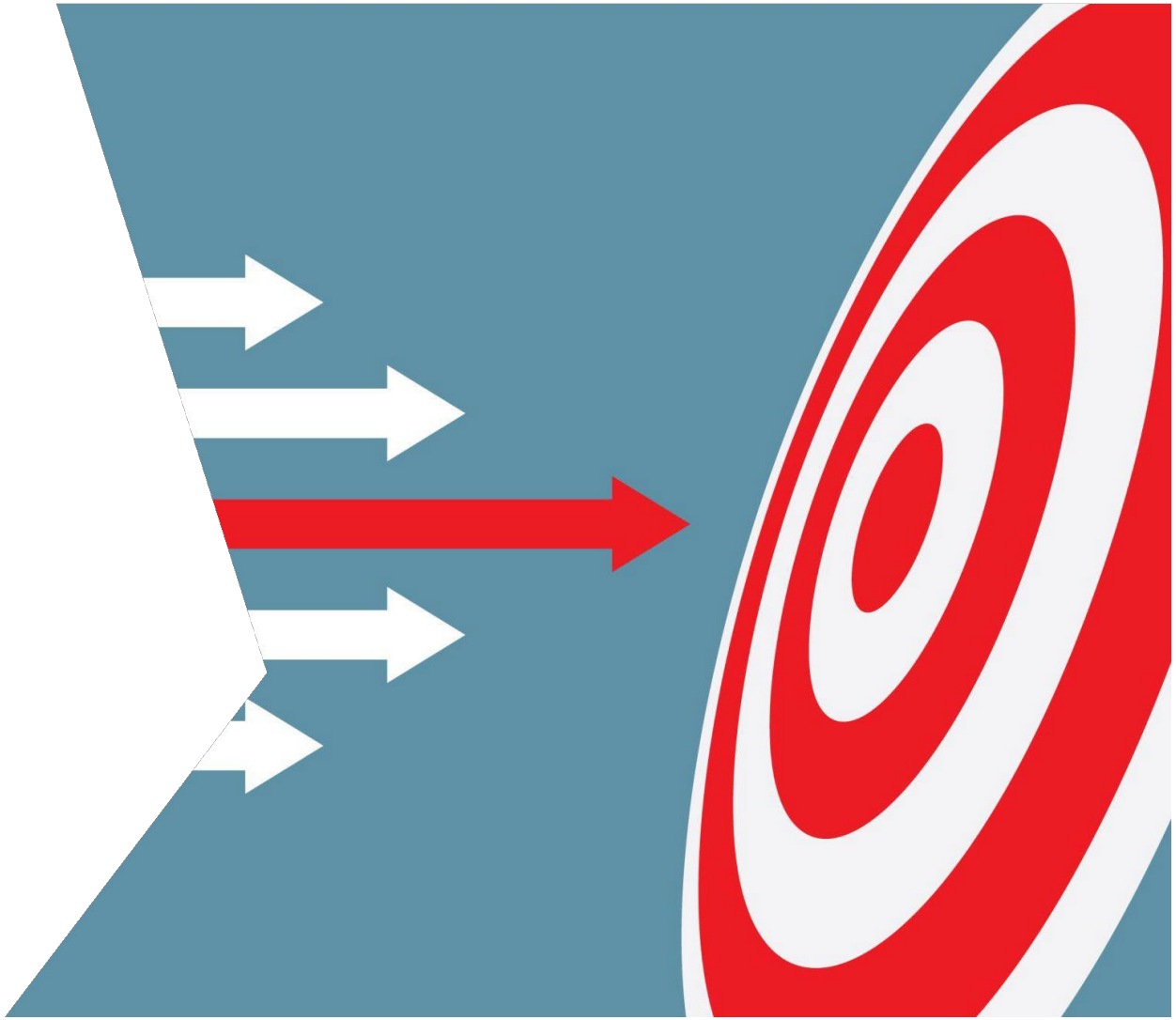
Three Key Components of *"Making Water Conservation a CA Way of Life"*

1. Urban Water Use Objective
2. Commercial, Industrial, Institutional (CII) Performance Measures
3. Annual Reporting

Roadmap:

How do you start?

Targeting / Identifying Businesses



Finding Potential Businesses

- Think Big (broad demographics of business)
- CEO Water Mandate Companies
- Chamber of Commerce
- Rotary
- County/City Economic Development Departments
- Online search + maps

Getting from a No to a YES!

- You have to sell it!
- Water Assessments have VALUE
- We can TEACH your staff
- You can qualify for a rebate
- California regulations are HERE! Businesses need to become efficient
- You can save on operation costs: Water, Sewer, Energy

NATIONAL CII WATER AUDIT TRAINING CERTIFICATION PROGRAM

NEXT CLASS: SEPT 2025

Sacramento, CA

Learn from industry experts and build confidence in conducting commercial, industrial, and institutional (CII) water audits!

Brought to you by:

IAPMO International Association of Plumbing and Mechanical Officials

MADDAUS WATER MANAGEMENT INC. Making a Difference in the World of Water

KUEL water

HW (Bill) Hoffman & Associates, LLC

Program Overview

- Three-day training course
- Hands-on practice at an audit site
- Teaches technical knowledge and techniques in performing CII water audits
- Expert trainers & course material
- Personalized guidance
- Following the course, participants will be prepared to take an IAPMO-certified test and earn their certificate

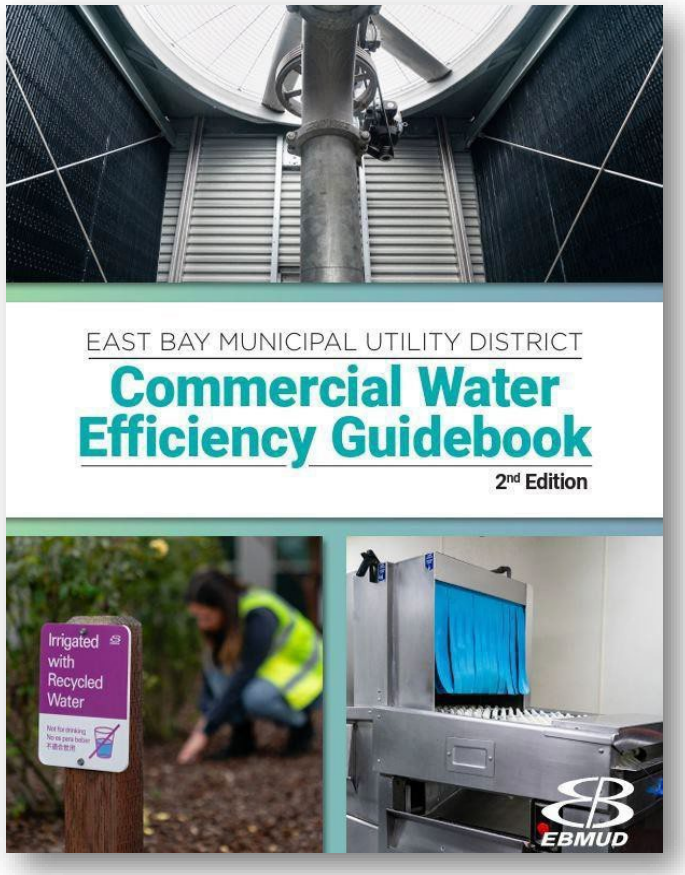
Interest List:

https://bit.ly/CIICertTraining

www.iapmo.org/training-education/

NEW Resource Released February 2025!

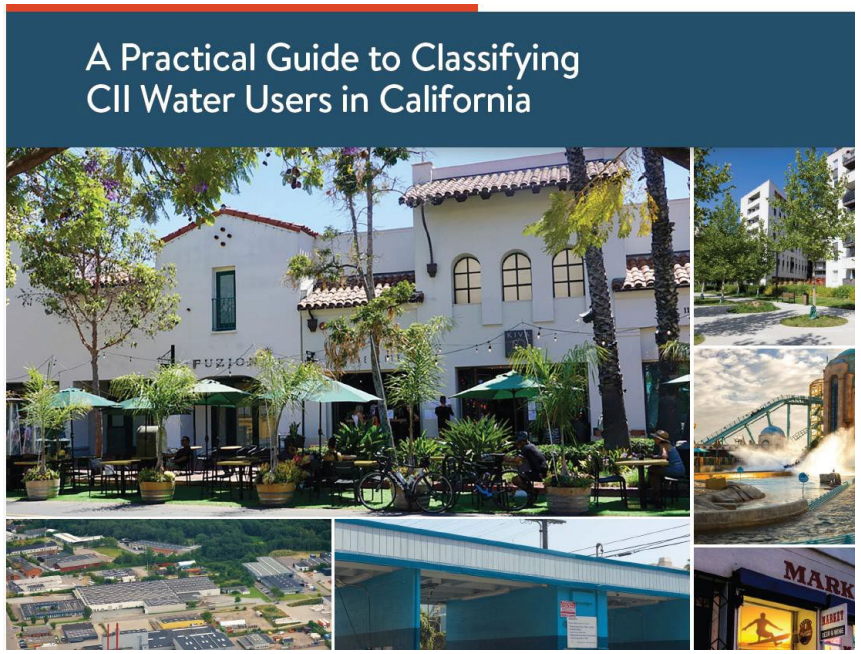
- 164 pages
- FREE to download
- Helps meet CA Regulations
- Promote CII best management practices with CII customers
- Orient water utility staff
- Learn from case studies
- Developed in CA, but applicable anywhere!



CalWEP CII Classification Guidebook

The primary objectives of this guidebook are to:

1. Help water suppliers meet Section 972 requirements mandating annual classification of CII water users.
2. Provide clear instructions for classifying CII water.
3. Support accurate benchmarking to identify high water users
4. Establish a clear timeline and methodology



Thank you!

Questions? Contact Us!

michelle@maddauswater.com

925-831-0194

maddauswater.com

MADDAUS WATER MANAGEMENT INC.

Making a Difference in the World of Water

Presented By : Michelle Maddaus

California Water Service

Quality. Service. Value.®

Measuring Performance in the CII Water Sector

Ken Jenkins
Vice President, Water Resources Planning & Sustainability

April 10, 2025

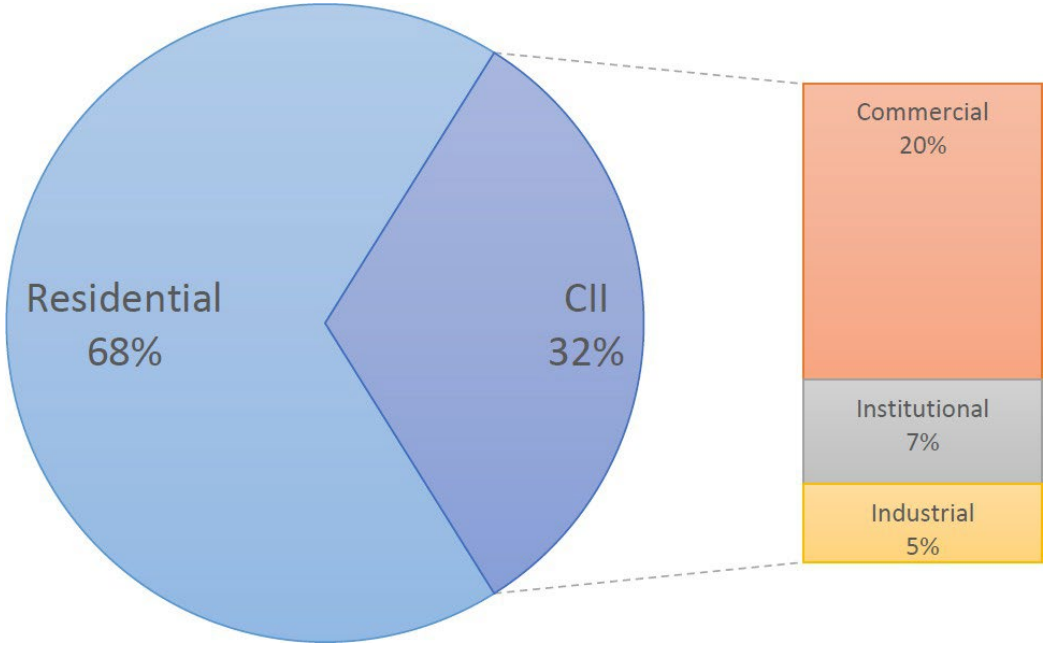
Overview

- California Water Service Group
- CII Water Use Distribution
- CII Water Use Diversity
- CII Rebate Programs
- Customized Incentive Program
- Case Studies
- Takeaways

California Water Service Group

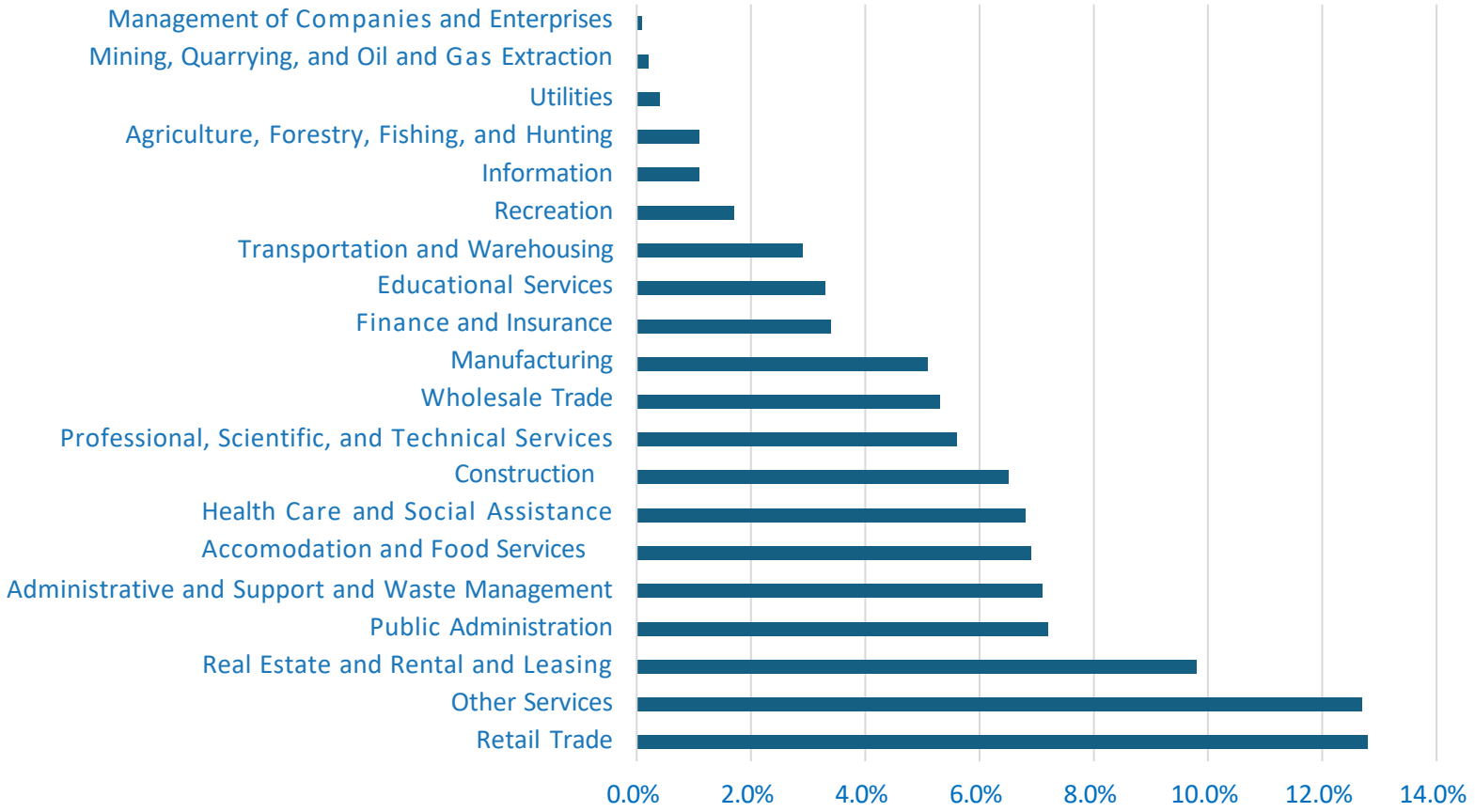
- Largest water IOU in the West, 3rd largest in the U.S.
  - 7,900 miles of main
  - 1,135 wells
  - 681 storage tanks
  - 155,000+ valves
  - 50,000+ hydrants
  - 2,010+ sampling stations
  - 6 surface water treatment plants
  - 12 wastewater treatment plants

CII Water Use Distribution

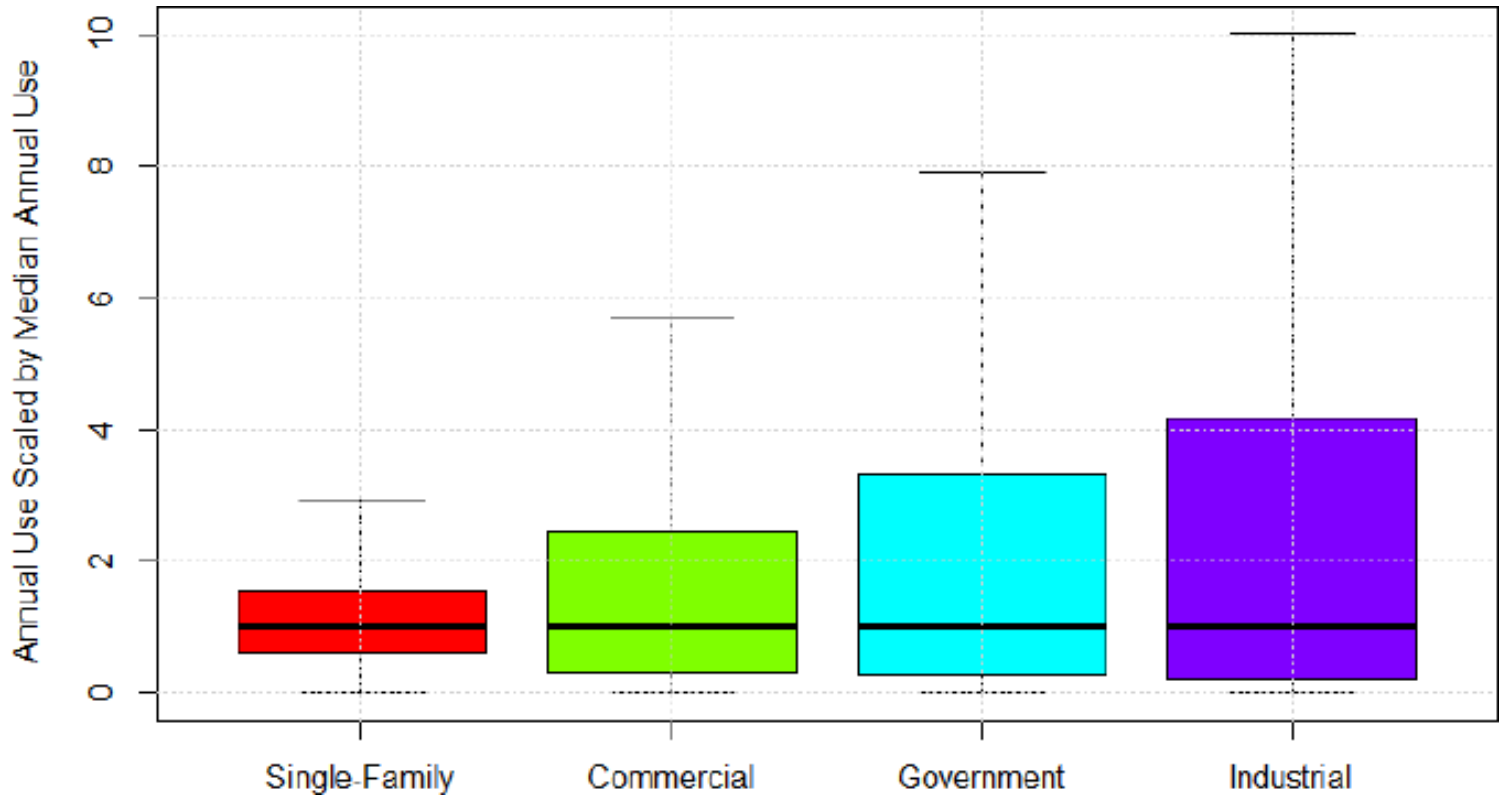


CII Water Use Distribution

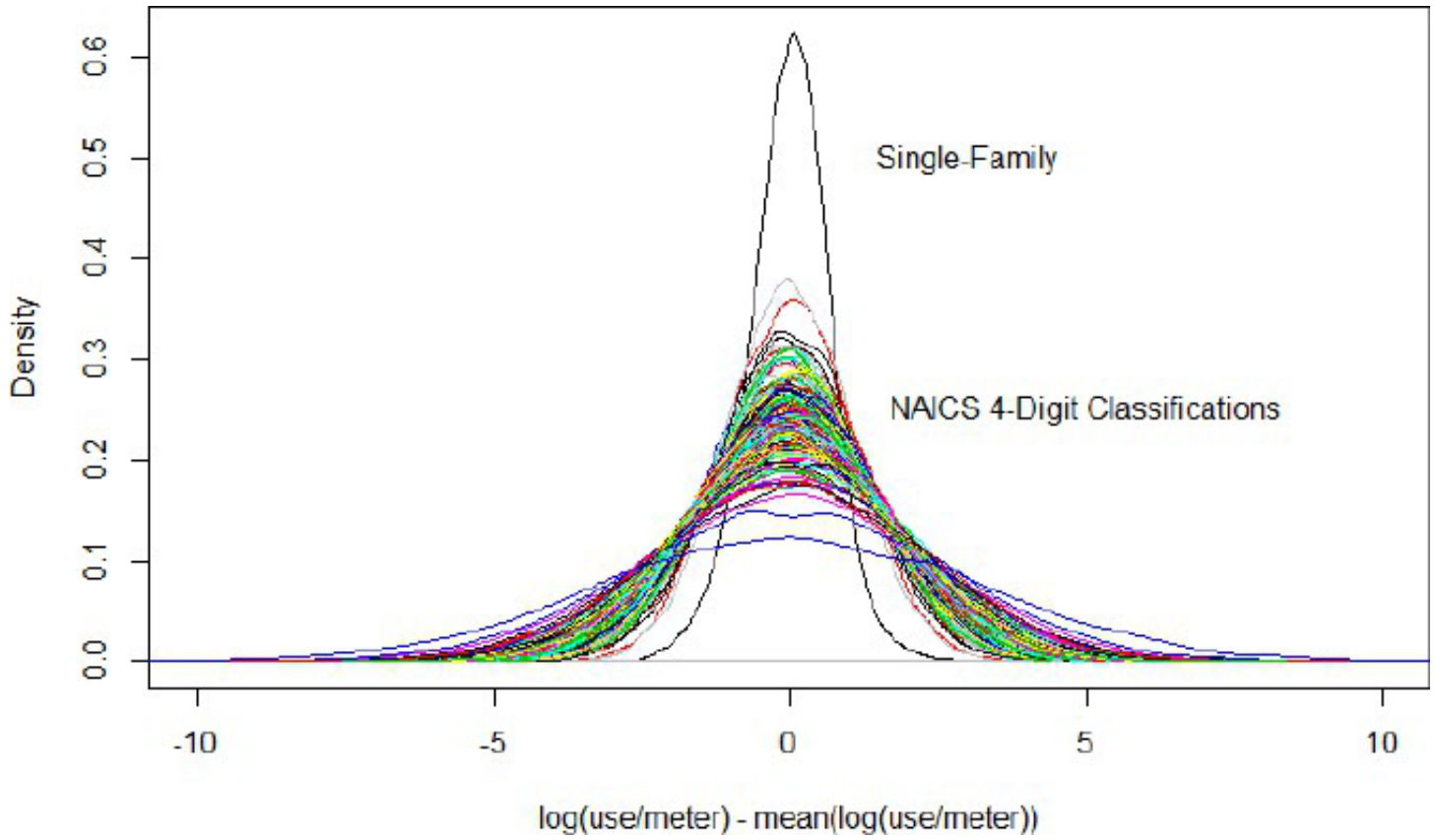
NAICS 2-Digit Group



Significant Diversity in CII Water Use



Significant Diversity in CII Water Use



CII Rebate Programs

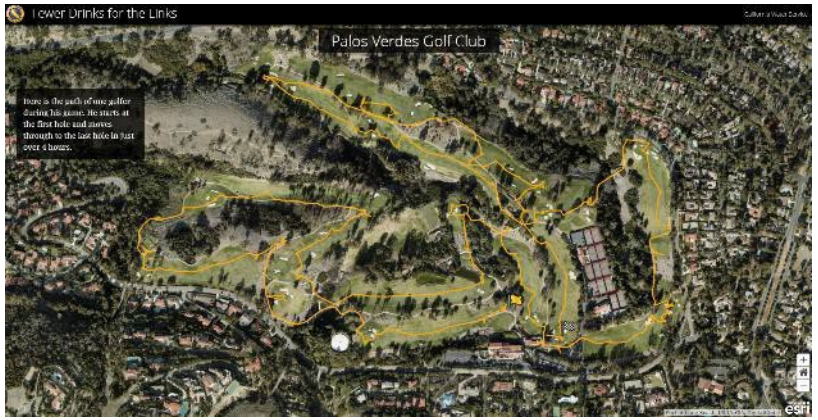
- High-efficiency valve-type toilet
- High-efficiency tank-type toilet
- High-efficiency urinal
- High-efficiency sprinkler nozzle
- Spray body with integrated pressure regulation and check valve
- Large rotary nozzle
- Smart irrigation controller
- Lawn-to-garden

Customized Incentive Program

- Non-standard projects
- Minimum savings of 74,800 gallons over lifetime
- Payback period of two years or greater
- O&M and new construction not eligible
- Maximum of 50% of project cost
- Rebate calculated based on 1,000 gallons saved over the project life (maximum of 10 years)
- Pre-qualification required

Case Study

Less Drinks for the Links



Case Study

Salinas Fire Department DRAFTS Unit

Case Study

Pacific Laundry Services

Takeaways

- Significant distribution and diversity in CII water-use
- One size does not fit all
- Meet customers where they are
- Mix of standard and customized programs

CALIFORNIA DEPARTMENT OF WATER RESOURCES

American Water Works Association California-Nevada Section

WTA

CALIFORNIA Water Boards

CALIFORNIA WATER EFFICIENCY PARTNERSHIP

MEASURING PERFORMANCE IN THE CII WATER SECTOR

MICHAEL SKOVGAARD

GRUNDFOS

Agenda.

CONTENT

1. Who is Michael
2. Grundfos – Why are we concerned about resource efficiency
3. Danish Food and Beverage Successes Provide Blueprint for Sustainability
4. Optimizing Data Center Cooling Efficiency

Michael Skovgaard Business Development Regional Director, Grundfos

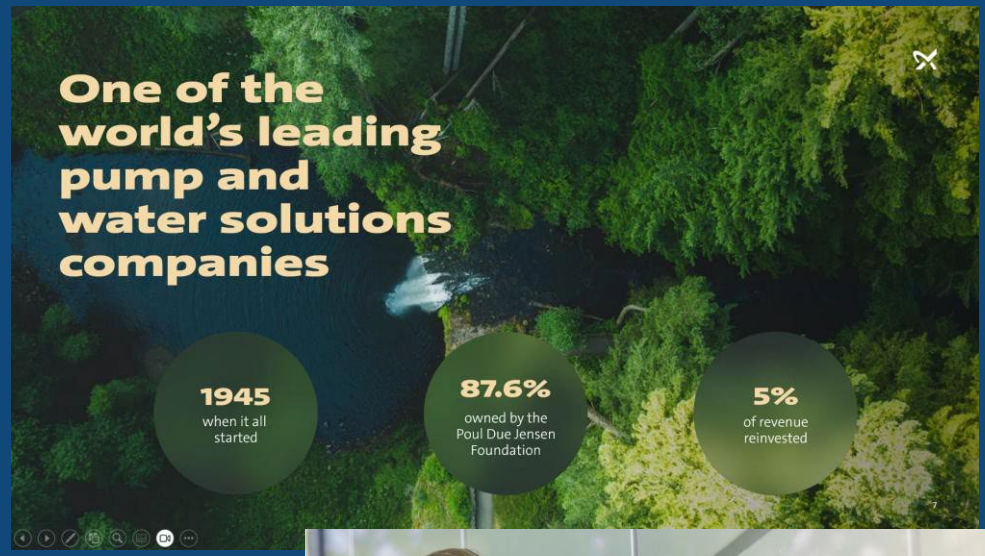
Dr. Michael Skovgaard, from Århus, Denmark, is the Director of Business Development at Grundfos – Industry division. With a Ph.D. in Physics specializing in chaos mathematics in fluid dynamics, he has been a pivotal figure in organizations like Vestas, Danfoss, Continental, Guldmann, and Grundfos. Michael's expertise spans technical management, product strategy, and supply chain management. His tenure at Grundfos spans from 1996-2023. Prior to leading Business Development in Industrial Water Treatment, focusing on the Americas, he has held significant roles such as CTO at Grundfos NoNOX A/S.

His dedication to excellence and innovation continues to drive Grundfos as the world's leading water solutions company.

Jan. 2022

Grundfos' Commitment to Sustainability and Water

- Grundfos was founded in 1945.
- A Foundation owns the majority of Grundfos.
- The sole purpose of the Foundation is to develop Grundfos by reinvesting in innovation and activities aligned with the purpose.
- Grundfos is an Ecovadis platinum – top 1% company.
- Grundfos is committed to develop solutions within the water community that addresses the world's climate challenges.
- Grundfos is the water solutions company with a validated Science Based Net-Zero target Scope 1,2, and 3).



6 CLEAN WATER AND SANITATION

13 CLIMATE ACTION

Validated by: SCIENCE BASED TARGETS

PLATINUM Top 1% ecovadis Sustainability Rating JUN 2024

Industry uses a lot of water and energy – with significant environmental and business impact

Pump systems may account for up to

40%

15%

of all pumps are currently optimised to their systems[2]

35%

of total global energy consumption is by the industrial sector[1]

39%

of total water withdrawals in high-income countries used for industrial purposes[3]

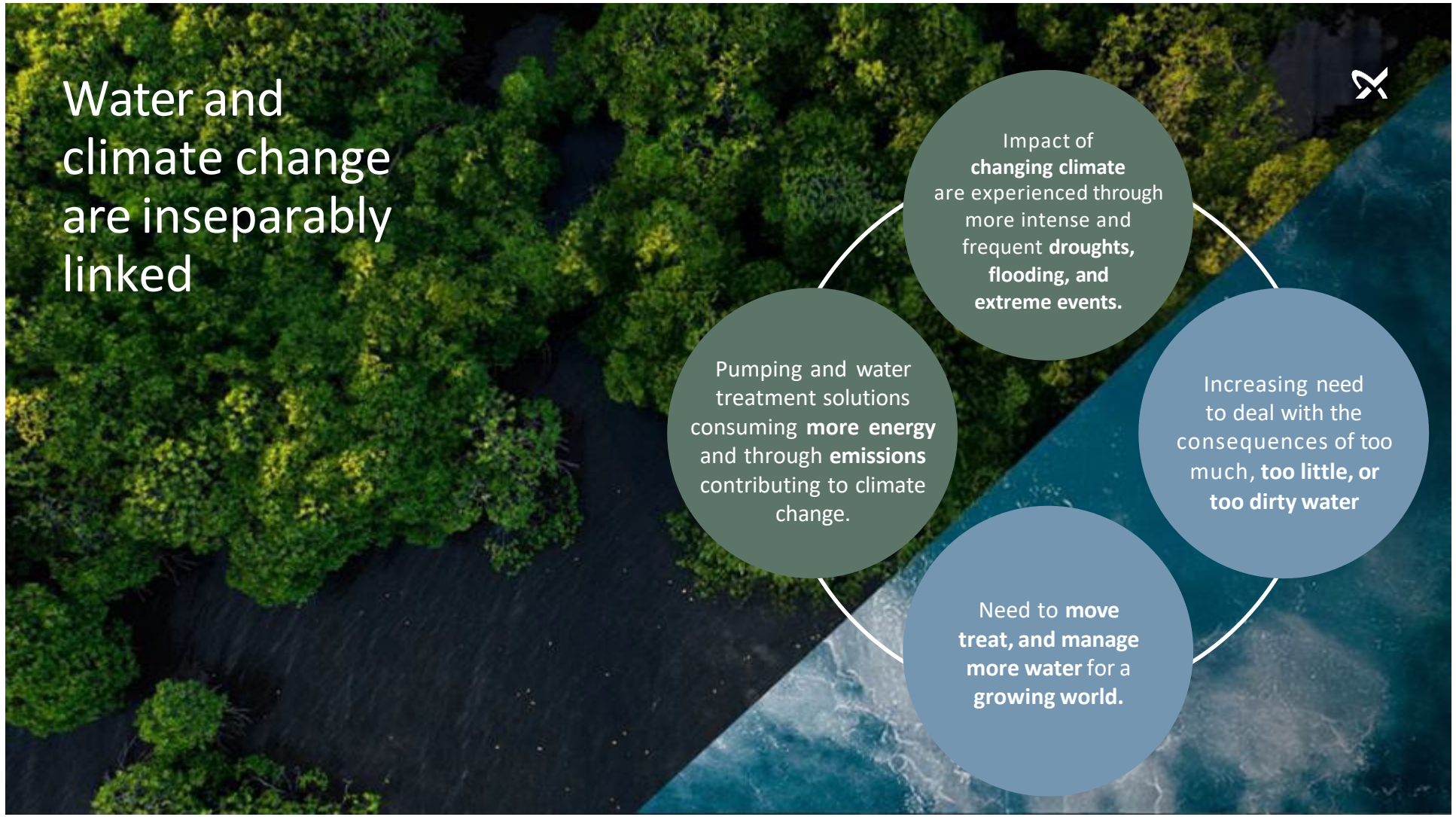
By 2030 energy consumption in industry is expected to grow by[1]

35%

<15%

of total industrial water consumption is reused[4]

[1] EnerData, 2024, European Union Energy information
[2] Hydraulic Institute, 2023, Energy efficiency
[3] *UNESCO, 2024, UN World Water Development Report*
[4] 2020 World Business Council for Sustainable Development (WBCSD) report

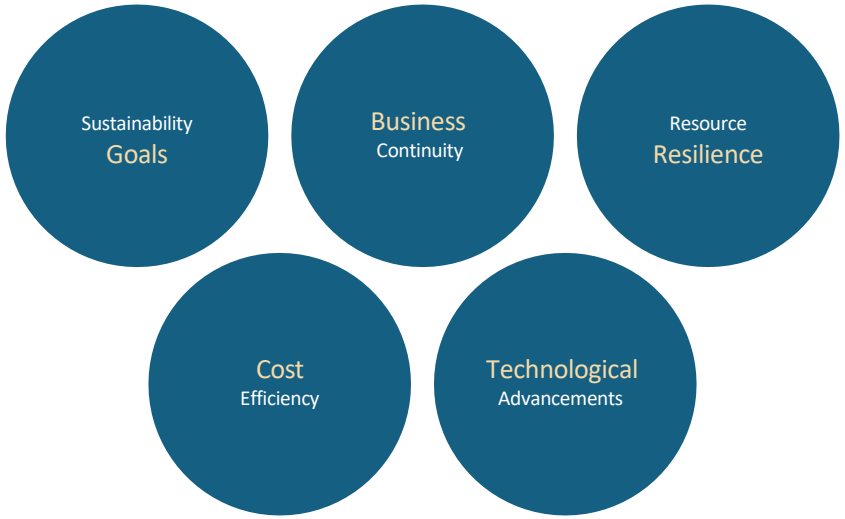

Water and climate change are inseparably linked
Impact of **changing climate** are experienced through more intense and frequent **droughts, flooding, and extreme events.**
Increasing need to deal with the consequences of too much, **too little, or too dirty water**
Need to **move treat, and manage more water** for a **growing world.**
Pumping and water treatment solutions consuming **more energy** and through **emissions** contributing to climate change.

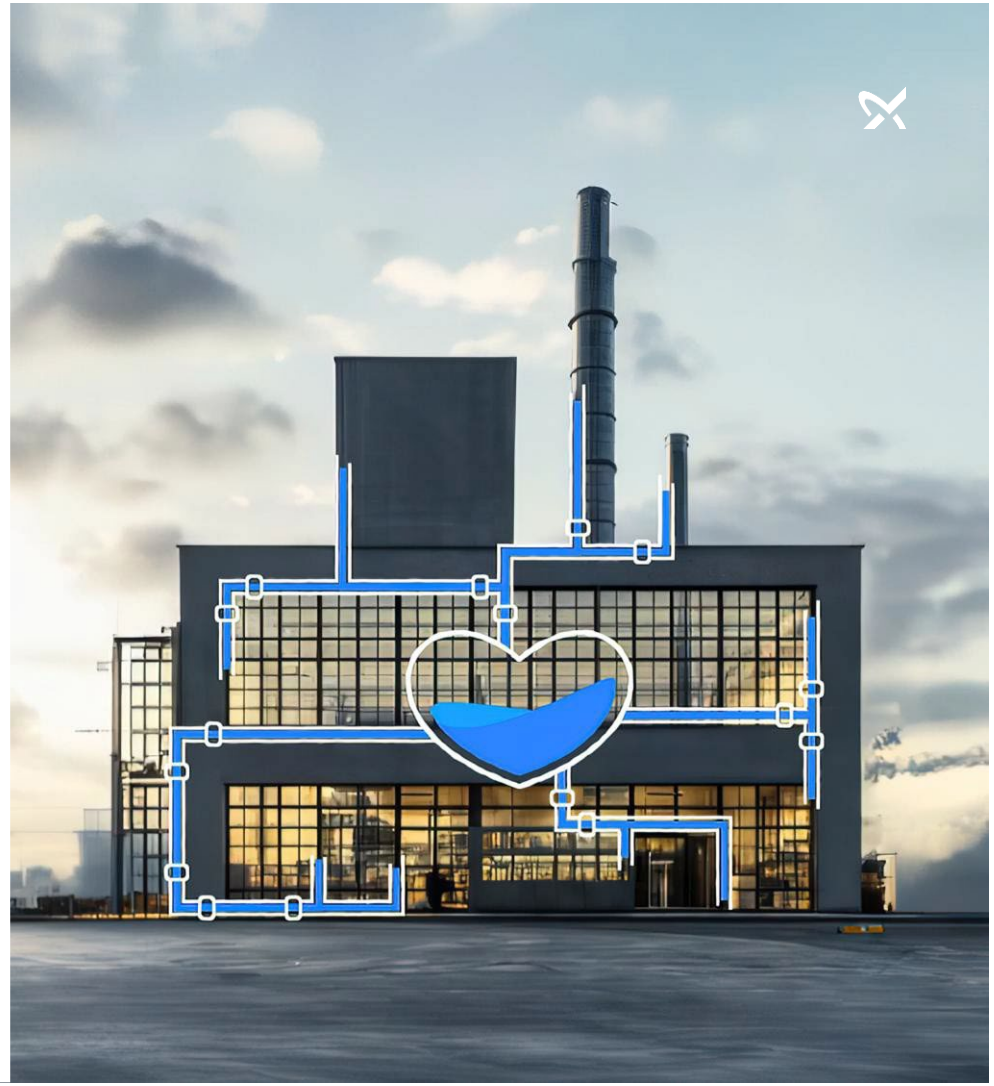
Doing more with less

With our intelligent pumping and water treatment solutions, we can manage water and energy more efficiently, without compromising on performance.

As Grundfos, we can help industry do more, using less.

We enable:





DRIP - **D**anish Partnership on **R**esource Efficient **I**ndustrial Food **P**roduction

DRIP – Purpose and background

DRIP – Content

DRIP – Results

DRIP
Water efficient industrial food production

"Water as a clean resource is something we have borrowed. We owe it to our future generations to pass it on so they can pass it on - nothing else makes sense."

DRIP Completion Report - Welcome to DTU Research Database

DRIP - Partnership developing innovative efficient technologies in the food industry

DRIP - **D**anish Partnership on **R**esource Efficient **I**ndustrial Food **P**roduction

DRIP – Purpose and background

Purpose	The aim of the partnership was to create effective solutions to improve water efficiency in the food industry without compromising food safety. The partnership aimed at a paradigm shift in **industrial water efficiency** by demonstrating and implementing of **water-fit-for-purpose concepts** to use significantly less water of drinking water quality and increasingly use **reused/reclaimed water.**
Triple Helix Partnership	End –users: Arla Foods (dairy), Carlsberg (brewery), Danish Crown (food processing), HK Scan (food and meals), triple-Nine (functional food for marine) Technology providers: Aqua Porin (membranes), Alfa Laval (process technology), Grundfos (pumps and water treatment), IN-Water (water consultancy), Liq-Tech (membranes), Siemens (process automation), Tetra-Pak (packaging), Ultra-Aqua (UV) Research institutes: Danish Agriculture and Food Council, DTU Food, DTU Environment, Danish Technological Institute, UCPH-FOOD.
Budget	USD: $14 million (2015-2021). (Final report in 2022)

DRIP - **D**anish Partnership on **R**esource Efficient **I**ndustrial Food **P**roduction	DRIP – Content – 4 work packages

Risk and Regulatory	Risk assessments is the base of all decisions for **using water fit for purpose** at end users' facilities. The association of the national authorities on food and environment ensured focus and **transparency** if a full-scale implementation in DRIP was nominated.
Industry analysis (potential and priority)	The **business potential of the solutions demonstrated in DRIP is large**, and more technology providers have used DRIP as **a platform for new business areas.** Dissemination of the solutions is a longer process, as water saving focus develops at various speeds in the international food industry.
Execution	28 projects were developed. 8 resulted in full scale implementation. 7 pilot projects offer opportunities to move into full scale implementation. 3 pre-studies are attractive to bring into pilot phase. In total, **water savings of 1.44 Mio. m3/year or 32 % of the total water consumption at the five end-users** has been achieved or demonstrated.
Project Foundation	Research on technology and industry-based topics showed that **further optimizations are possible.** It also pointed out a need of **strategies for implementing new technology** for saving water.

DRIP - **D**anish Partnership on **R**esource Efficient **I**ndustrial Food **P**roduction

DRIP – Results – There is plenty of potential for more effective water usage

Significant water savings were identified. The highest saving potential was found at Arla (Dairy) and Carlsberg (Brewery). Both companies already did a significant amount of reuse.

Water reuse:

1. Carlsberg is evaluating opportunities for the water recycling plant concept in other locations.
2. Danish Crown is considering how the three full-scale DRIP solutions could be implemented in other locations.

New technology

1. Ultra-aqua actively promotes their UV-based product for polishing of treated process water and their filtration unit for reclamation of process water.
2. IN-Water actively promotes their sensor based “CIP-by-measure.”

END-USER	**Arla**	**Carlsberg**	**Danish Crown**	**HK Scan**	**TripleNine**	**Total**
Total annual water consumption, m3	**1.600.000**	**750.000**	**1.635.000**	**416.000**	**131.350**	**4.532.350**
DRIP total annual water savings, m3	**673.600**	**475.000**	**240.300**	**39.500**	**12.315**	**1.440.715**
DRIP implemented annual water savings 2015-2021, m3	242.600	435.000	176.300	39.500	12.000	905.400
- Low hanging fruits	*190.000*		*82.500*	*17.000*		*289.500*
- Implemented projects	*22.600*	*435.000*	*15.800*	*22.500*		*495.900*
- Projects under implementation	*30.000*		*78.000*		*12.000*	*120.000*
DRIP demonstrated annual water savings beyond 2021, m3	431.000	40.000	64.000		315	535.315
- Pre-studies	*125.000*	*40.000*	*35.000*			*200.000*
- Pilot projects	*306.000*		*29.000*		*315*	*335.315*

DRIP - **D**anish Partnership on **R**esource Efficient **I**ndustrial Food **P**roduction

DRIP – Results 2/2 – Reduce and reuse.

A quick scan of other DRIP partners was conducted and confirmed significant savings potential.

Reduce

1. Installation of water meters for benchmarking of individual processes. Priority 1 – up **to 20% water savings.**
2. Increased focus on water efficiency and company management systems. Up **to 5% water savings**

Reuse:

Optimization of CIP plants and introduction of CIP-by-measure approach. **10-20% water savings**

1. Introducing more water efficient equipment and operations (flushing nozzles, constant flow valves, and water efficient flushing heads for tank cleaning).
   20% water savings
2. Other: **5-30%** water saving

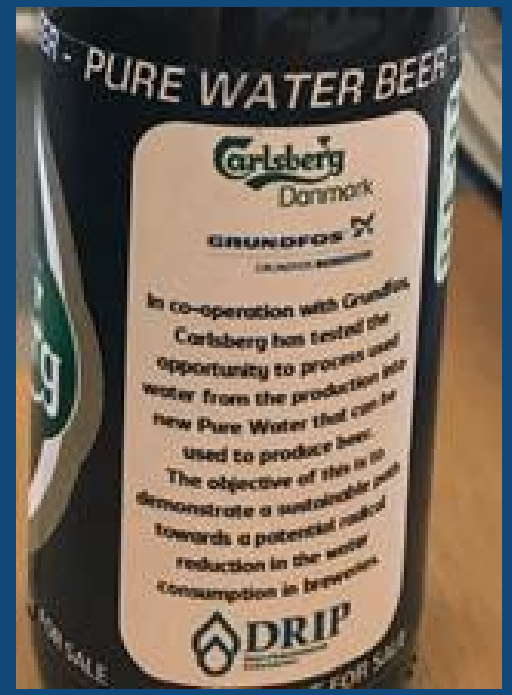
=> **20-40% water savings** in all cases

Company	Trade	Conducted (month/year)	Water consumption (m^3/year)	Potential water savings in prioritized activities (%)	Potential water savings in prioritized activities (m^3/year)
Conducted:					
Prime Ocean A/S (Skagen)	Fish processing	9/2018	41,000	30-40%	12-16,000
Jeka Group A/S	Fish processing	6/2020	99,000	20-30%	20-30,000
Ingstrup Mejeri A/S	Dairy	9/2018 og 6/2019	10,000	15-20%	1-2,000
Thise Mejeri Amba (Thise)	Dairy	2/2020	174,000	20-30%	35-50,000
Them Andelsmejeri	Dairy	11/2021	100,000	20-30%	20-30,000
Globus Wine A/S (Køge)	Bottlery	6/2019	45,000	20-30%	9-13,000
Ardo A/S (Orehoved)	Frozen fruits, vegetables,	8/2021	57,000	30-40%	17-23,000
ZPD A/S (Esbjerg)	Nutrition	10/2021	67,000	30-40%	20-25,000
Potential:					
DanRoots A/S (Bjerringbro)	Horticulture				
Dan Cake A/S (Give)	Bakery				
DSM (Esbjerg)	Nutrition				
Total			**634,000**	**20-30%**	**135-189,000**

DRIP - **D**anish Partnership on **R**esource Efficient **I**ndustrial Food **P**roduction

Key Takeaways.

1. In F&B, water is a key component BUT the needed quality varies: **“Water fit-for-purpose”**
2. Water savings in the F&B segment is possible. **“Many a mickle makes a muckle”** – there is possibility in every drop.
3. Take **intentions into the management process**.
4. **Monitor the water usage.**
5. Point of use is a good place to start: **Reduce water in the “cleaning” and “wash-down”** applications.
6. **End of pipe:** Reclamation requires an area for designated usage. In F&B most likely involves approvals and quality planning/testing.

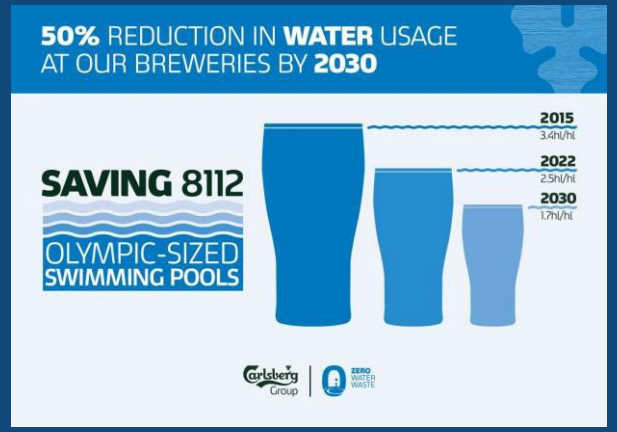


DRIP - **D**anish Partnership on **R**esource Efficient **I**ndustrial Food **P**roduction

Carlsberg TWM (Total Water Management) facts

Carlsberg Water Reuse Facts

- **3.4** Liters of water used per 1L of beer produced globally in 2015, on average.
- **<1.7** – 2030 global goal in L of water used per L of beer produced, or a **reduction of 50%**, part of Carlsberg's Together Towards Zero ambition.
- **65%** - Amount of total water that is used as process water.
- **366 gpm** – Amount of process wastewater the Total Water Management (TWM) plant can treat at a time.
- **330 gpm** – Amount of PURE water sent back to the factory for reuse, or 90% of the total. The remaining 10% is excess sludge and wastewater concentrate, sent to public wastewater treatment.
- **148,000 m3** – Amount of water saved by TWM per year (or **560 million l/y).**
- **9.6%** - Reduction of energy from TWM plant's biogas production and hot water recirculation.
- **17** – number of Carlsberg breweries in high water risk areas globally. Carlsberg plans to use learnings from the TWM plant to reduce water waste at these sites.
- **Uses of process water** – Cleaning vessels, tanks, pipes, machinery, surfaces, bottles and cans; also used in pasteurizer, boiler, cooling towers and more.



Optimizing Data Center Cooling

The power required to run a data center is already significant. Data centers in the United States account for about 3%6 of the total power use and that's rapidly increasing. Driven by AI and cryptocurrency, the resulting energy consumption increase is between 20-40%7 per year

Finding the balance between Energy and water usage.
Energy efficiency is a critical factor in the operation of data centers, as they consume approximately 2% of the world’s energy.
A data center can require as much as 5 million gallons of drinking water per day either directly for cooling or indirectly for power generation12.

Depending on the location, data centers are in competition with municipalities, farmers, and other industrial users for affordable and reliable water sources. The perfect balance between PUE and WUE

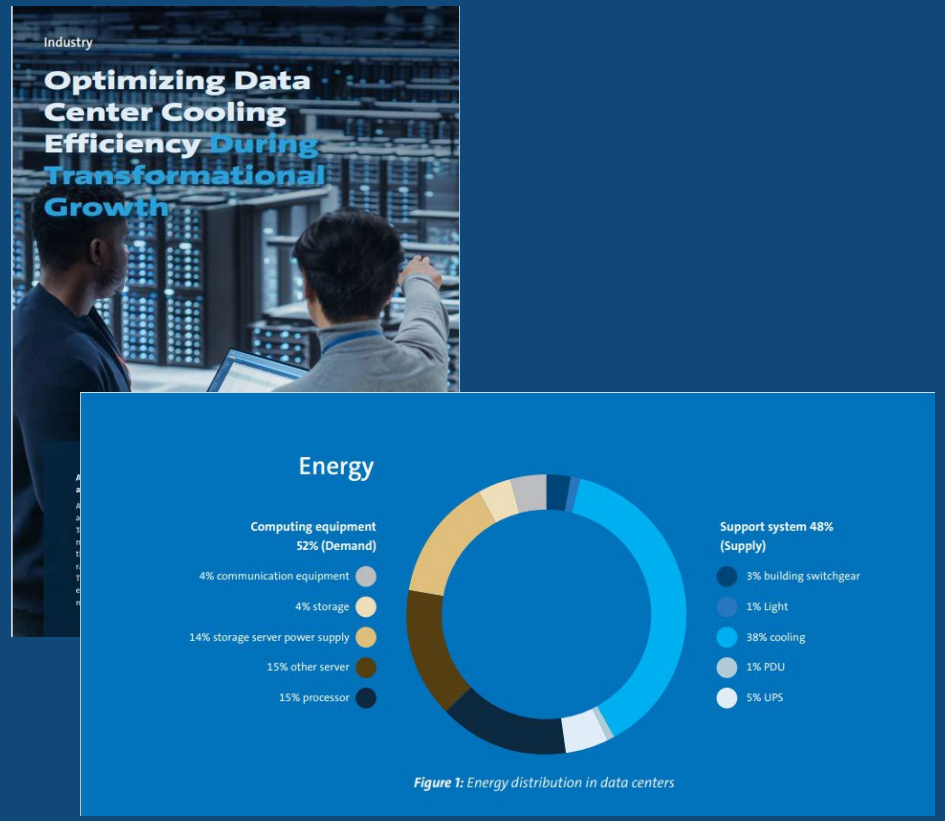


Figure 1: Energy distribution in data centers

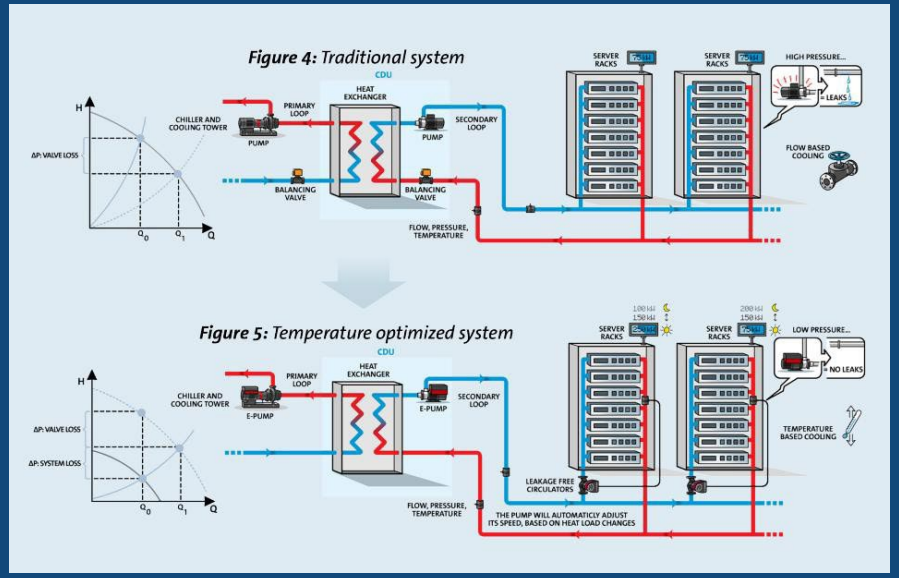
Using modern smart technology can save as much as 70% compared to traditional technology

Pumps are an essential part of modern data centers and are found in a variety of applications: temperature control, water treatment, wastewater handling and boosting.

Electronically controlled pumps – known as E-pumps – offer a unique potential for data centers to control their cooling system in a better and more efficient way.

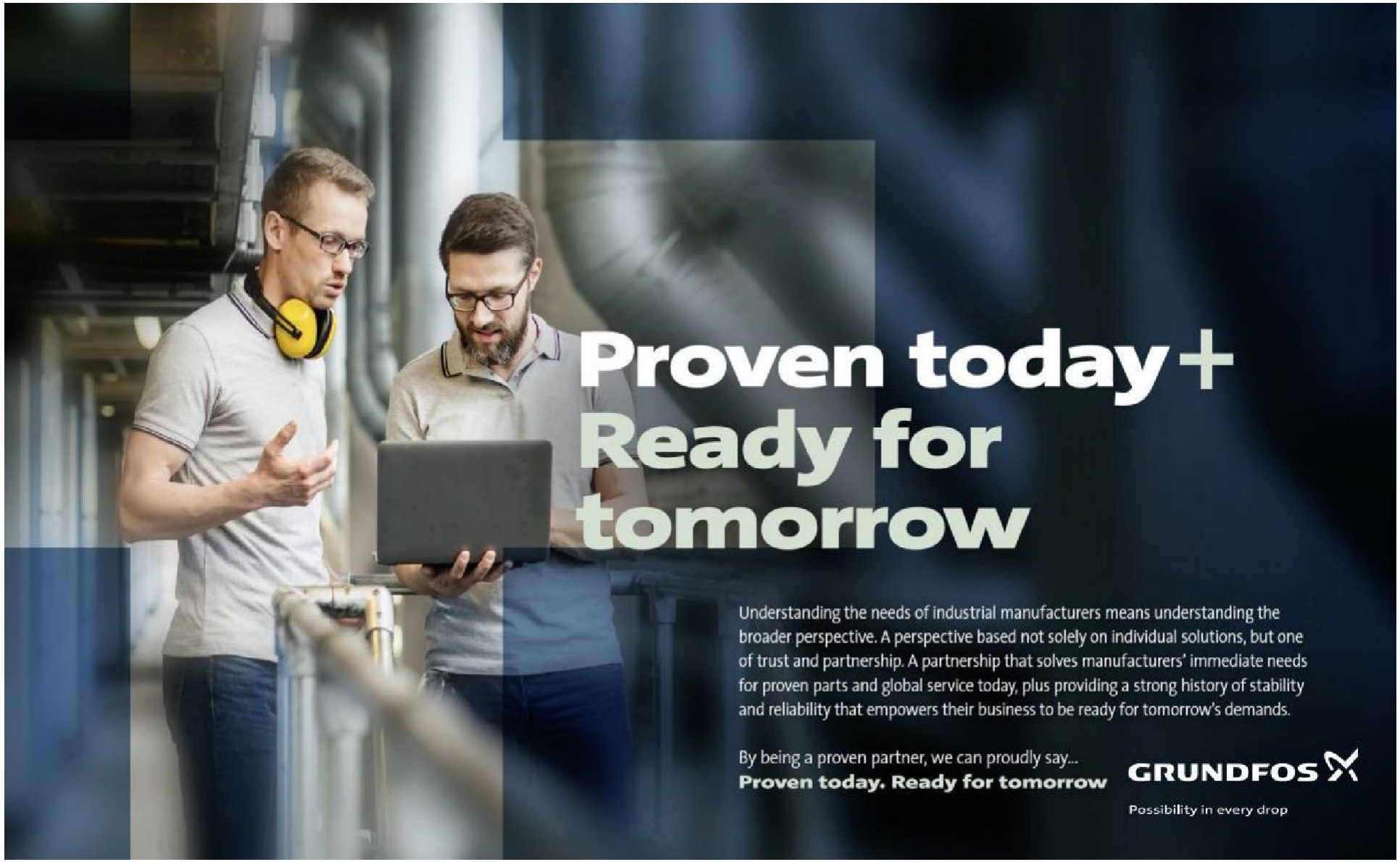
In traditional cooling systems, balancing valves are used to throttle the flow, leading to back pressure in the system, energy loss and heat generation, all negatively impacting PUE.

Technology with demand control, sensors and on-line algorithms is available today. Linked to SCADA systems the offer solution that is using much less energy for water distribution in data centers.



"We need to move away from traditional flow-based control to temperature control where we can vary the flow for each rack based on the demanded cooling load, thereby ensuring that only the flow needed is supplied resulting in energy efficient coolant distribution. "

Jens Mielke – Chief Key Account Manager, Grundfos


Proven today +
Ready for
tomorrow
Understanding the needs of industrial manufacturers means understanding the broader perspective. A perspective based not solely on individual solutions, but one of trust and partnership. A partnership that solves manufacturers' immediate needs for proven parts and global service today, plus providing a strong history of stability and reliability that empowers their business to be ready for tomorrow's demands.
By being a proven partner, we can proudly say...
Proven today. Ready for tomorrow
GRUNDFOS
Possibility in every drop


GRUNDFOS
Possibility in every drop