

Envisioning a sustainable future for water *for all*

Oct 23, 2023

Lian Bin Zhong

VP, Taiwan Frontend MFG Operations





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25+ years of exploring and learning in Semiconductor

2021 –

Micron Taiwan
- VP, TW FE MFG Operations

2018 – 2021

Micron Japan Hiroshima, Senior Director
- New Technology Deployment
- High Volume Manufacturing

1997 – 2017

IMFS Singapore / Micron Singapore
- PIE Director (NAND)
TECH Semiconductor, Singapore
- Process, PI, YE, Defect Analysis (DRAM)

1993 – 1997

National University of Singapore
- B. Eng in Electrical Engineering



Our Vision

Transforming how the world uses
information to enrich life *for all*



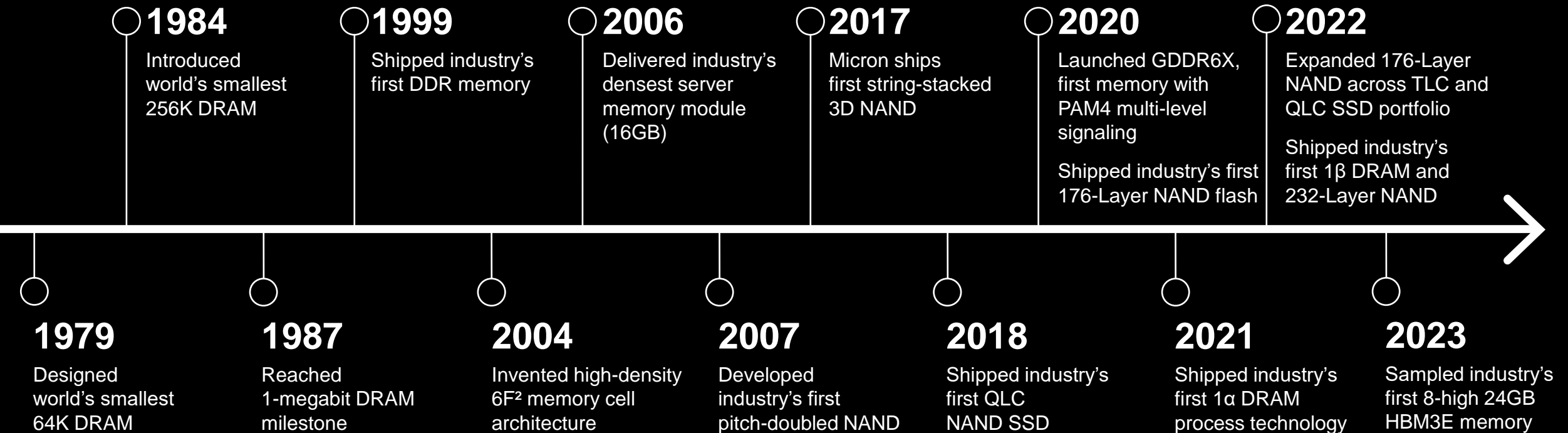
Celebrating 45 years of innovation

Our journey has been marked by groundbreaking advancements in memory and storage solutions, and we are proud to play a foundational role in the transformative technology that shapes our world.

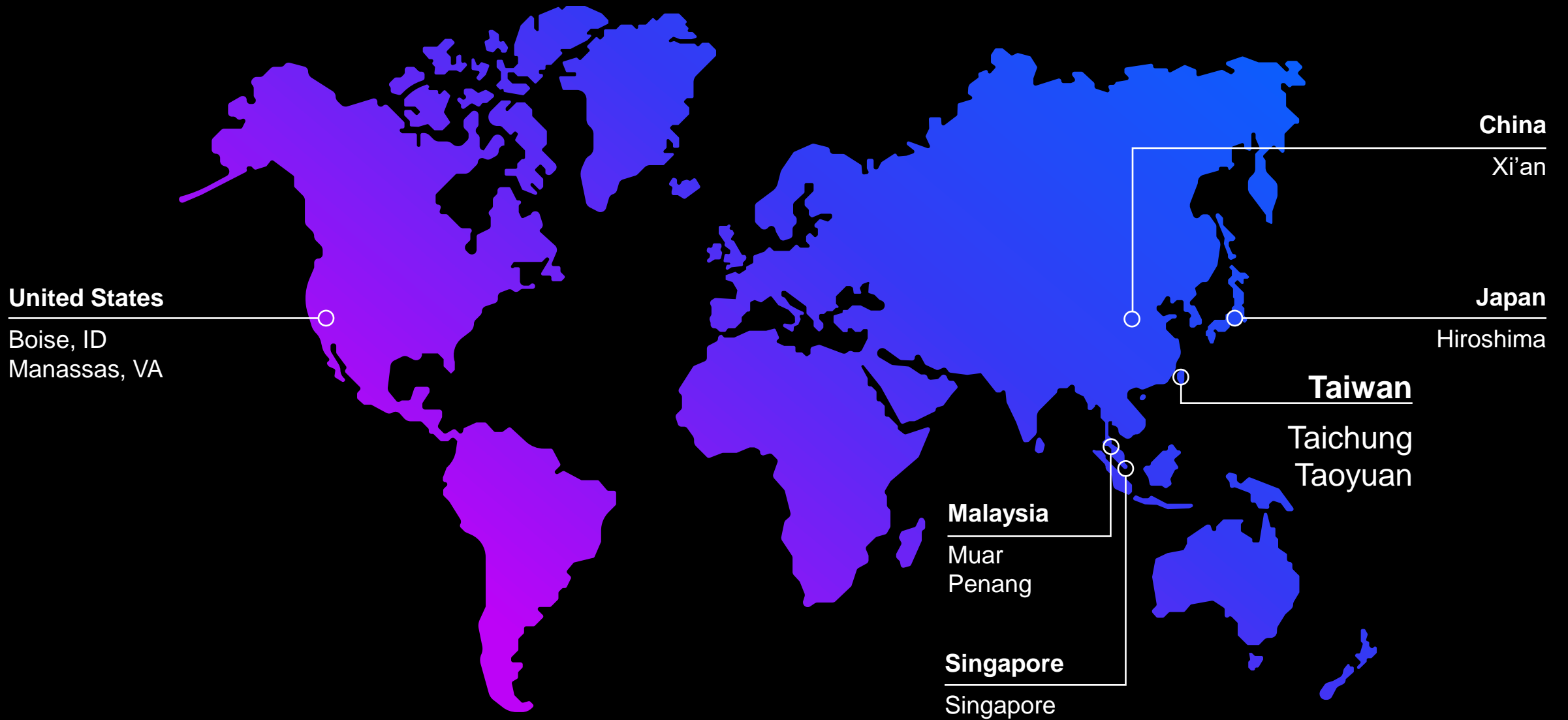


Micron innovation: industry-leading memory and storage

45+ years | 54,000+ patents



Our manufacturing sites





Delivering Leading-Edge Products *Responsibly*

Joint efforts for a sustainable future with all the stakeholders

Micron takes a proactive approach to environmental stewardship, investing in technologies to mitigate our manufacturing footprint.

Micron's sustainability priorities

Enhancing our environmental and social performance in operations, sourcing and products

- ***Responsible operations and sourcing***
- ***Engaged people and communities***
- ***Leadership products***



Micron has
invested
approximately

**\$200
Million**

in sustainability
since the
beginning of FY21

Micron's approach to operations

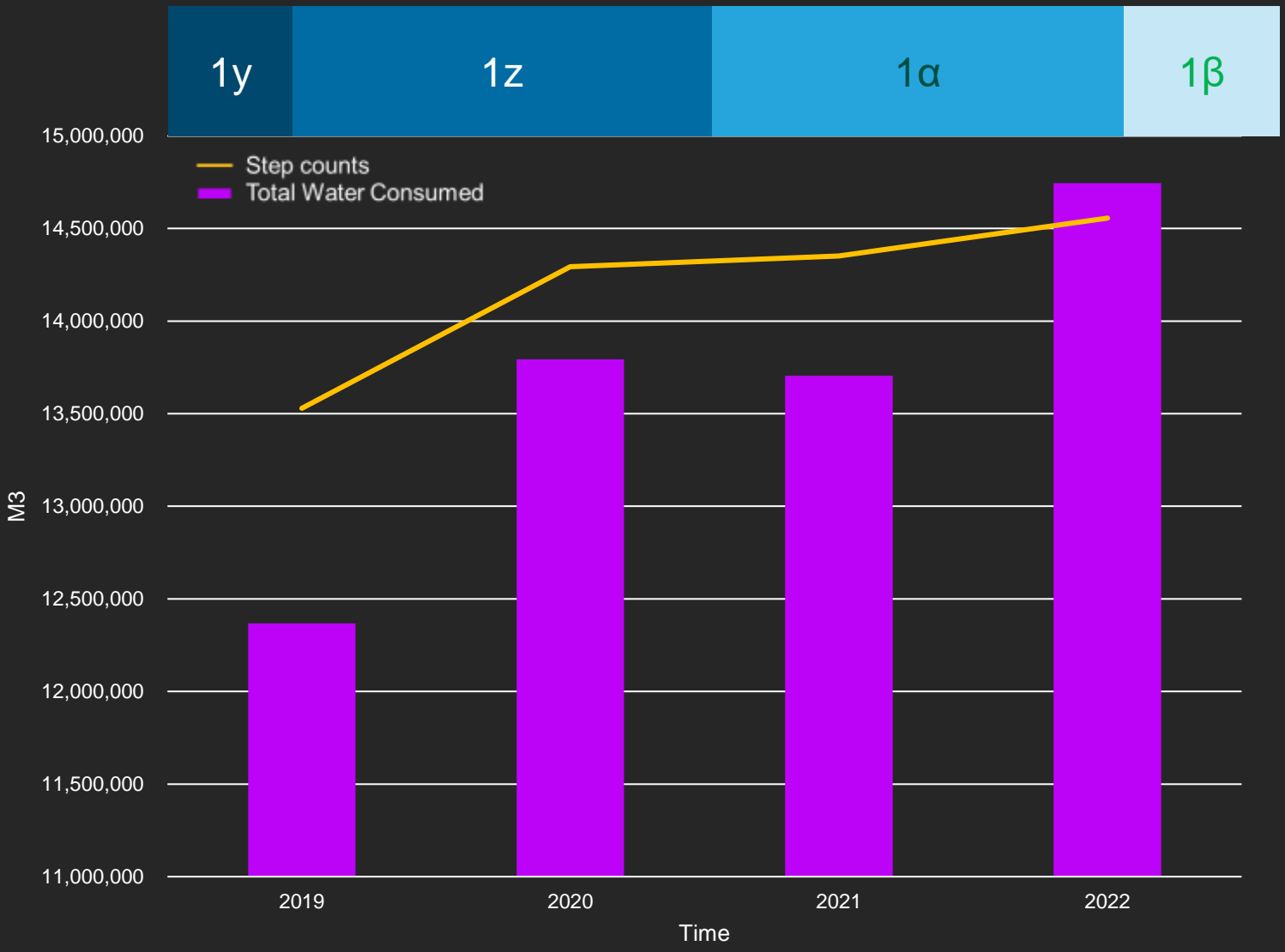
- “**Shift-left**” Mindset
- Building on certified ISO 14001:2015 environmental management system approach
- Working with suppliers in the **technology development** phase
- Continue to invest approximately **\$1 billion** by 2028 to advance the company's environmental goals



Water is an essential resource for semiconductor industry

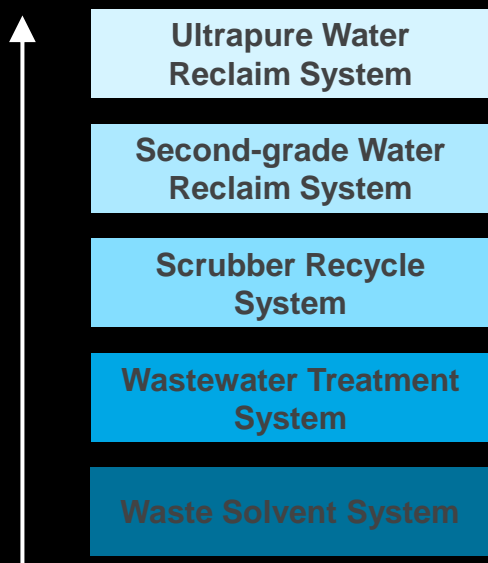
As the manufacturing technology has become more complex, the industry's demand for water has grown.

Tech-node

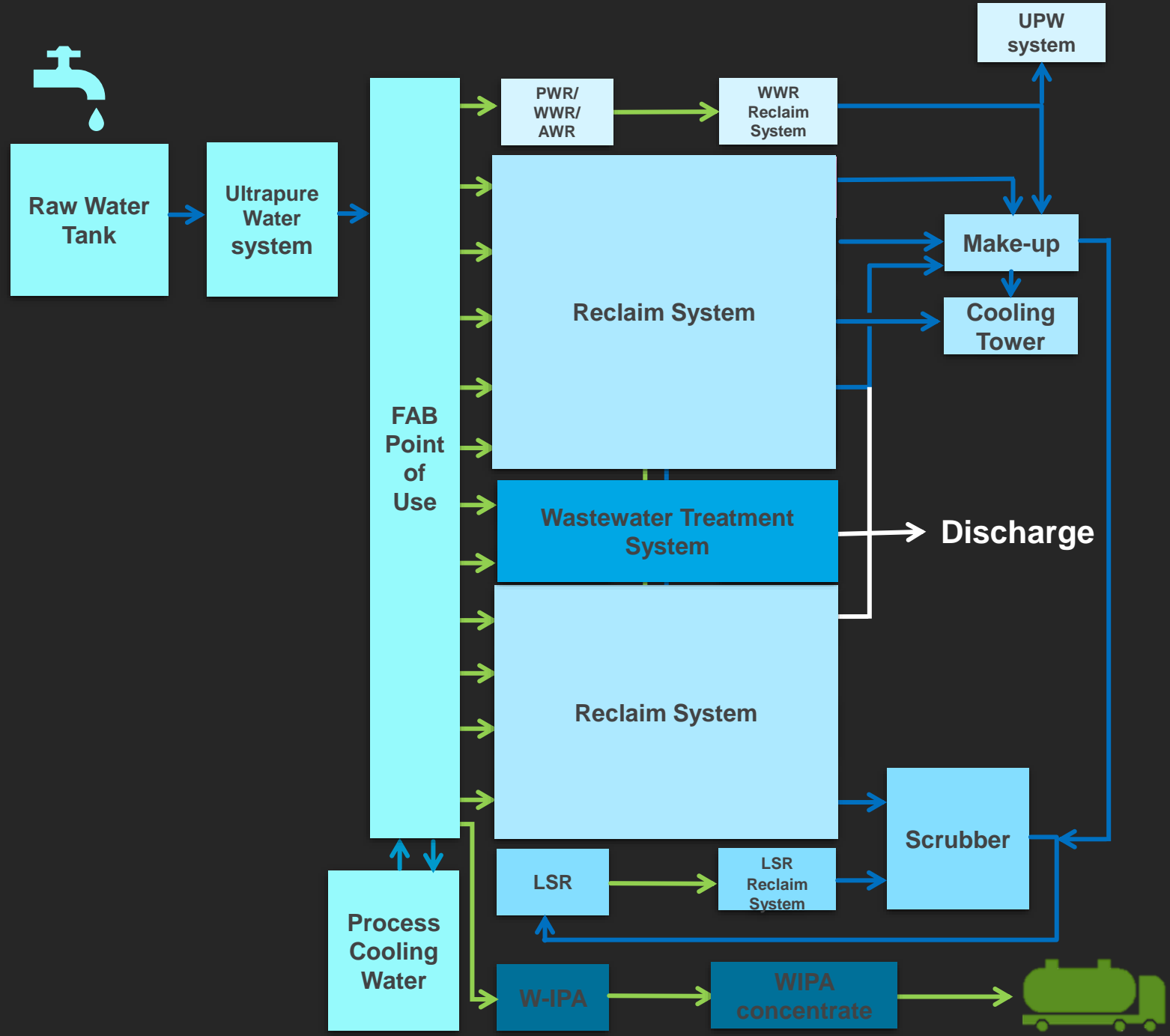


Water Journey in Semiconductor Factory

High Purity

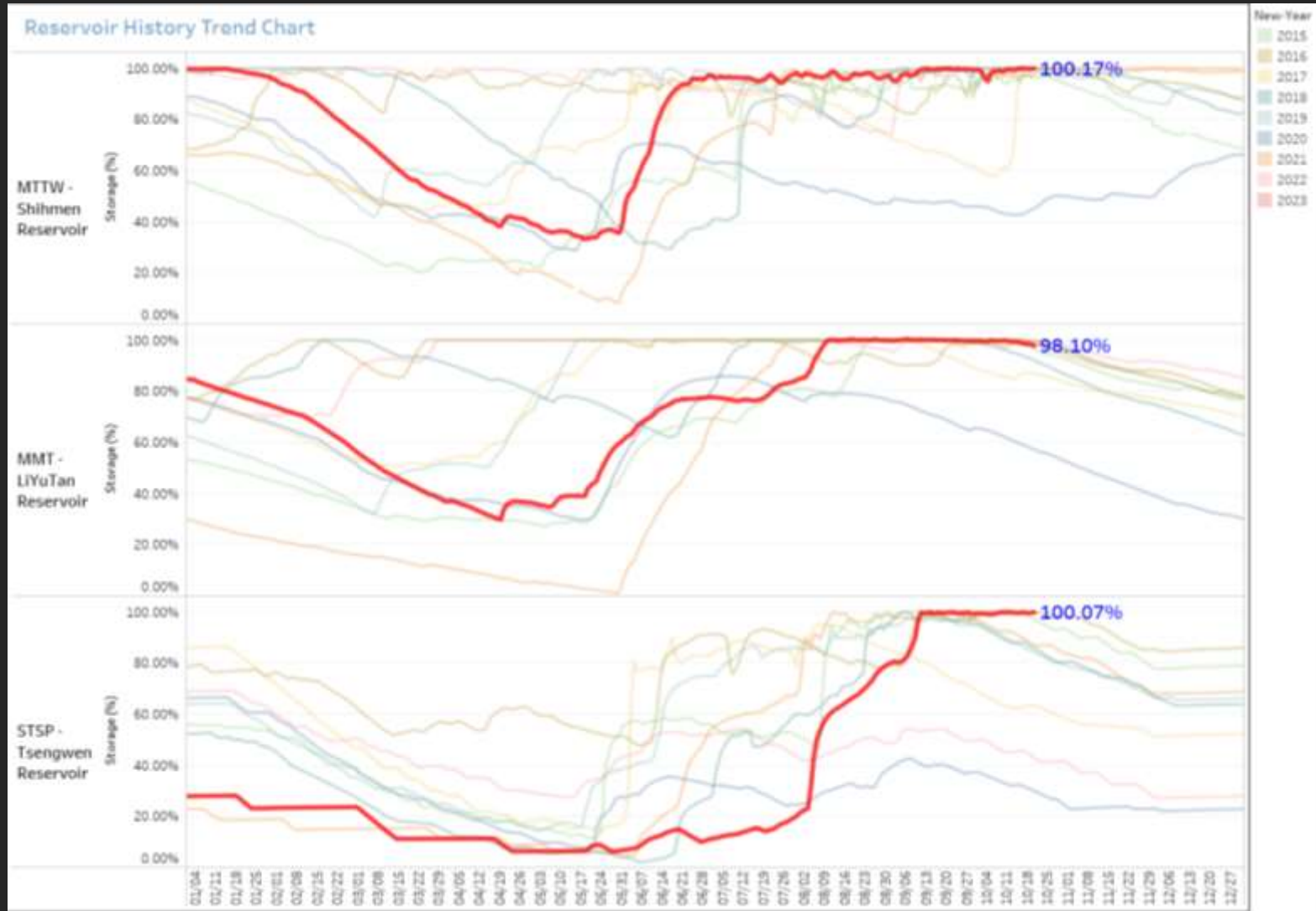


UPW: ultrapure water
Make-up: a tank storing second-grade water
W-IPA: waste isopropanol



Water management challenge in Taiwan

- **Climate Change**
 - Short precipitation duration with high intensity in limited region
- **Geography Restriction**
 - Over $\frac{3}{4}$ area is hillside in Taiwan
 - Rivers are steep and rapid



Deepening our environmental ambitions

Ambitious time-bound targets demonstrate our commitment to improving water recycling infrastructure at our global and local facilities.

Our environment targets

Emissions

42%

Absolute reduction in scope 1 emissions by CY30 from CY20 baselines

Net Zero

scope 1 and 2 emissions by CY50

Energy

100%

Renewable energy in the United States in CY25

100%

Renewable energy in Malaysia in CY22

Waste

95%

reuse, recycling and recovery, and zero hazardous waste to landfill in CY30

Water

75%

Water conservation in CY30

(Reuse, Recycle, Restore)



Micron Water Management Strategies

Internal

Enhancing water reuse and recycle infrastructure in our facilities

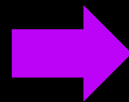


Green Infrastructure

- ✓ Design Standard in New FAB
- ✓ Existing facility upgrade



Process Optimization



Every drop of water is reused

3 times

in Micron Taiwan

External

Engaging in water restoration projects with government



Government



Academia



Community

Water Reuse and Recycle

Design Standard in New FAB



75%

Water reuse and recycle
Through process drain classification
design and rainwater harvesting



18,671m²

A3 new fab planting
= 3 football field



A3 new fab is certified by LEED Gold, WELL
and EEWB

LEED: Leadership in Energy and Environmental Design
EEWB: Ecology / Energy Saving / Waste Reduction / Health



Existing Facility Upgrade



Upgrade reclaim system and waste solvent system to reduce discharge of wastewater



LEED Gold certified for Building Operation & Maintenance: Existing Buildings

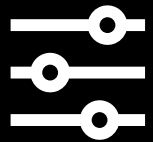
The **only** >15 years old Fab in Taiwan certified



Waste stream segregation

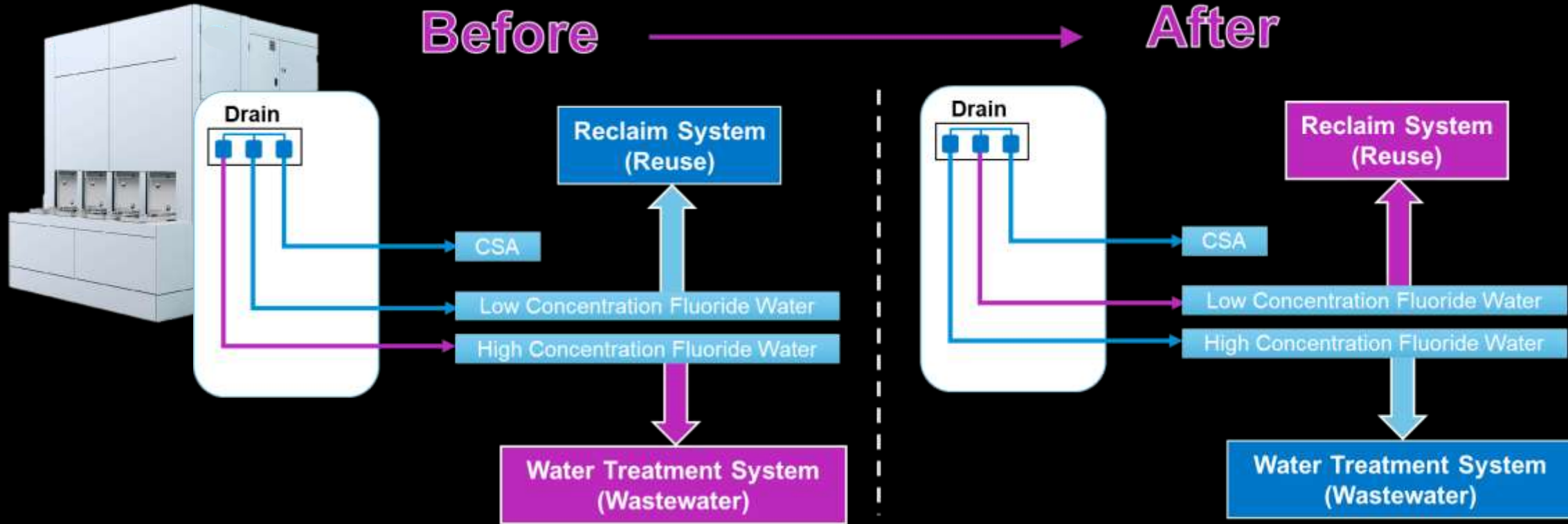


Process Optimization



Adjustment of water usage and drainage in tools

- ✓ Reduce water withdrawal
- ✓ Increase water reuse



*CSA: caustic ammonia

Water Restoration Projects

Collaborate with Water Resource Agency

- Support the dredging project that will restore storage capacity to the **Shihmen Reservoir**, the region's primary water source for more than three million people, agriculture and our Taoyuan site.
- This desludging effort will restore **6.55 million cubic meters** per year of water storage capacity — the **annual usage of 63,600 people** — which becomes especially crucial during drought season.



Collaborate with Taoyuan City Government

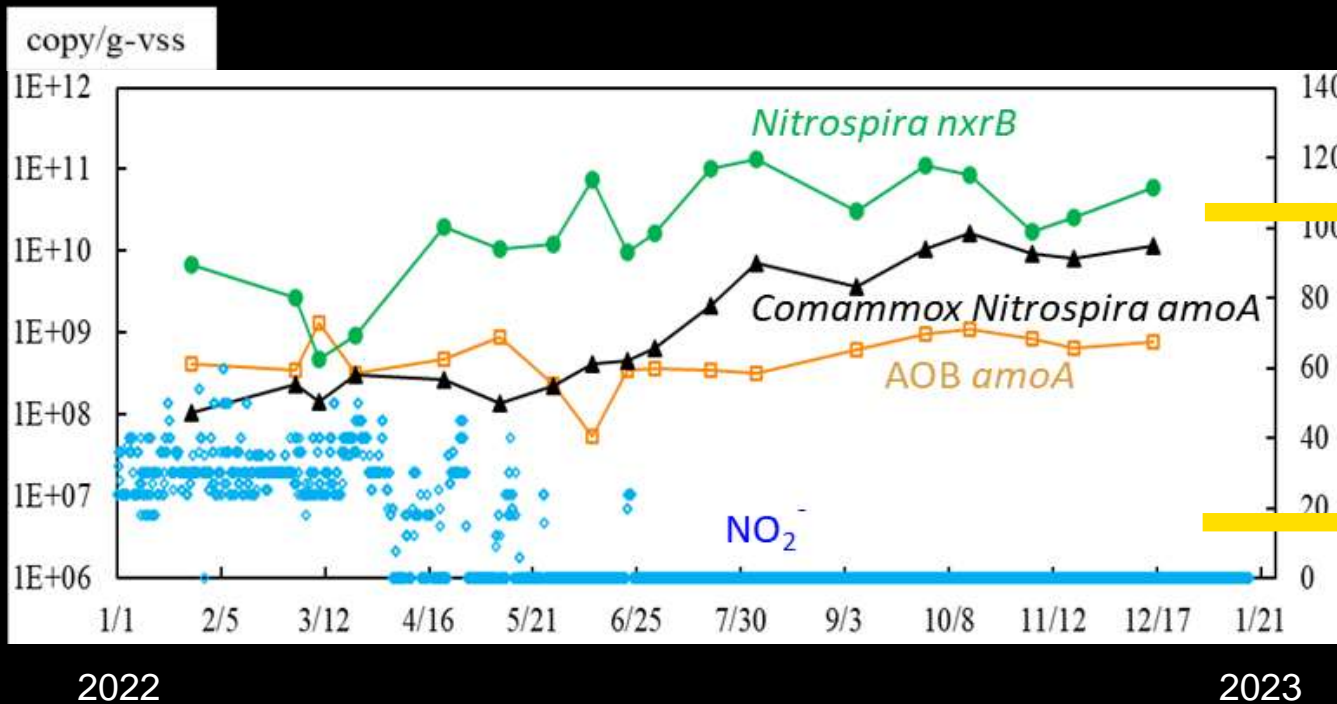
- Support City of Taoyuan to construct two water treatment facilities that will **improve water and soil quality on the Nankan and Dongmen rivers**, which are both classified as seriously polluted under the River Pollution Index.
- The facilities are expected to lower **486 kgs** of ammoniacal nitrogen concentration per day and restore nearly **10 million cubic meters** of water per year.



Collaboration with Academia

- Partner with National Cheng Kung University to find out a better “formula” for wastewater management
 - Regularly test wastewater quality with advanced equipment
 - Review and analyze the test result
 - Adjust and recommend the “wastewater management formula”

In partnership with



More stable water environment for different kinds of microorganism to survive.



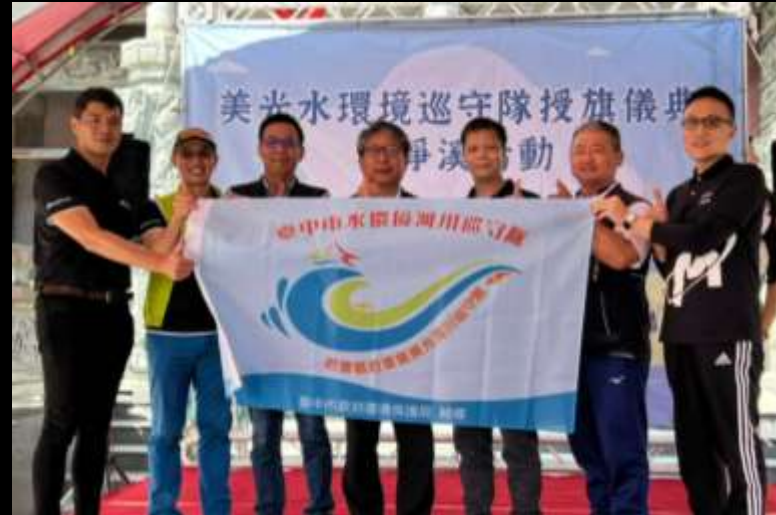
From 2022 May, the nitrite content in the wastewater has significantly trended towards stability.

Green Initiative

Micron Taiwan dedicated to environmental protection and community engagement events for **Water Restoration**



Beach Clean-up



River Patrol Team



Tree-Planting Marathon

Micron Taiwan Beach Adoption



11 Beach cleaning activities in 3 years

~ 3,000

Cumulative number of participants in past 3 years

10 Million ton trash out

Micron Taiwan cooperated with CTSP and Daan Community Development Association to hold beach clean events in Taichung Daan District Coast.



Micron Taiwan River Patrol Team



Micron reached many SDGs targets like Quality Education, Clean Water and Sanitation, Life below Water and Life on Land from UN.



1st

Technology company in Taichung organized water environment patrol

4

River Adoption Excellence Award by Taoyuan government



Micron Taiwan Tree-Planting Marathon



3,500

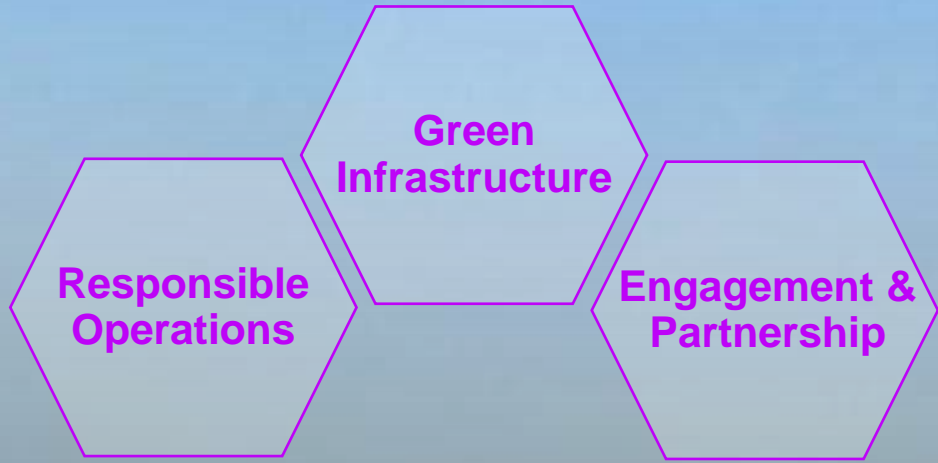
Trees planted

12

Micron tree-planting event

Micron Taiwan collaborated with the "Taiwan Reforestation Association" planted native tree species on the coastline of Da'an District, Taichung City from February to April 2023





Delivering Leading-Edge Products Responsibly

Joint efforts for a sustainable future with all the stakeholders

Micron

The logo features a stylized white 'M' with a white orbital ring around it, followed by the word 'micron' in a bold, lowercase sans-serif font, and a registered trademark symbol (®) at the end.

Micron®