

16th Kawasaki International Eco-Business Forum

Water environmental preservation and recycling by ZLD system

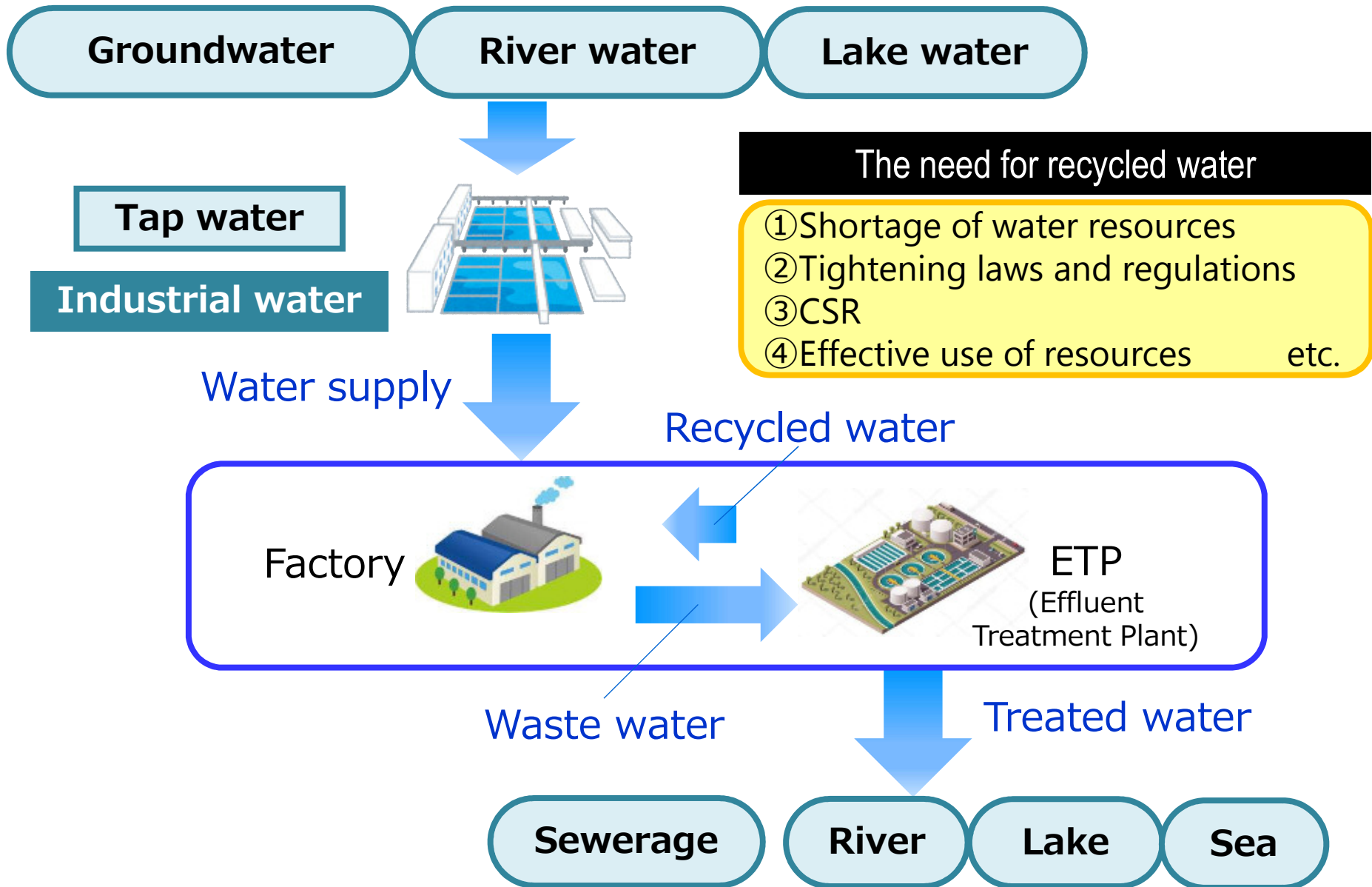
TOSHIBA

Toshiba Infrastructure Systems & Solutions Corporation

November 13, 2019



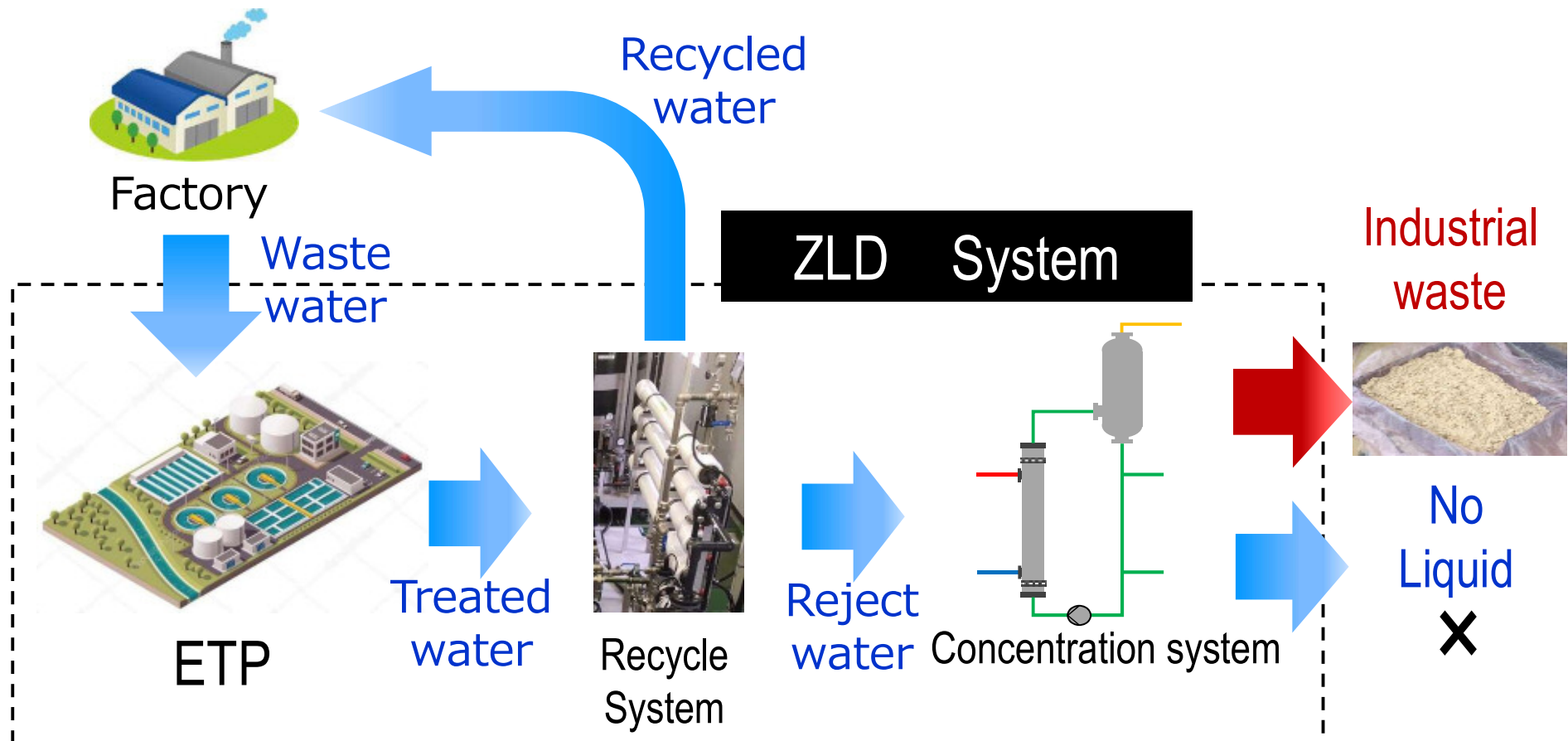
Industrial water flow



What is the ZLD system

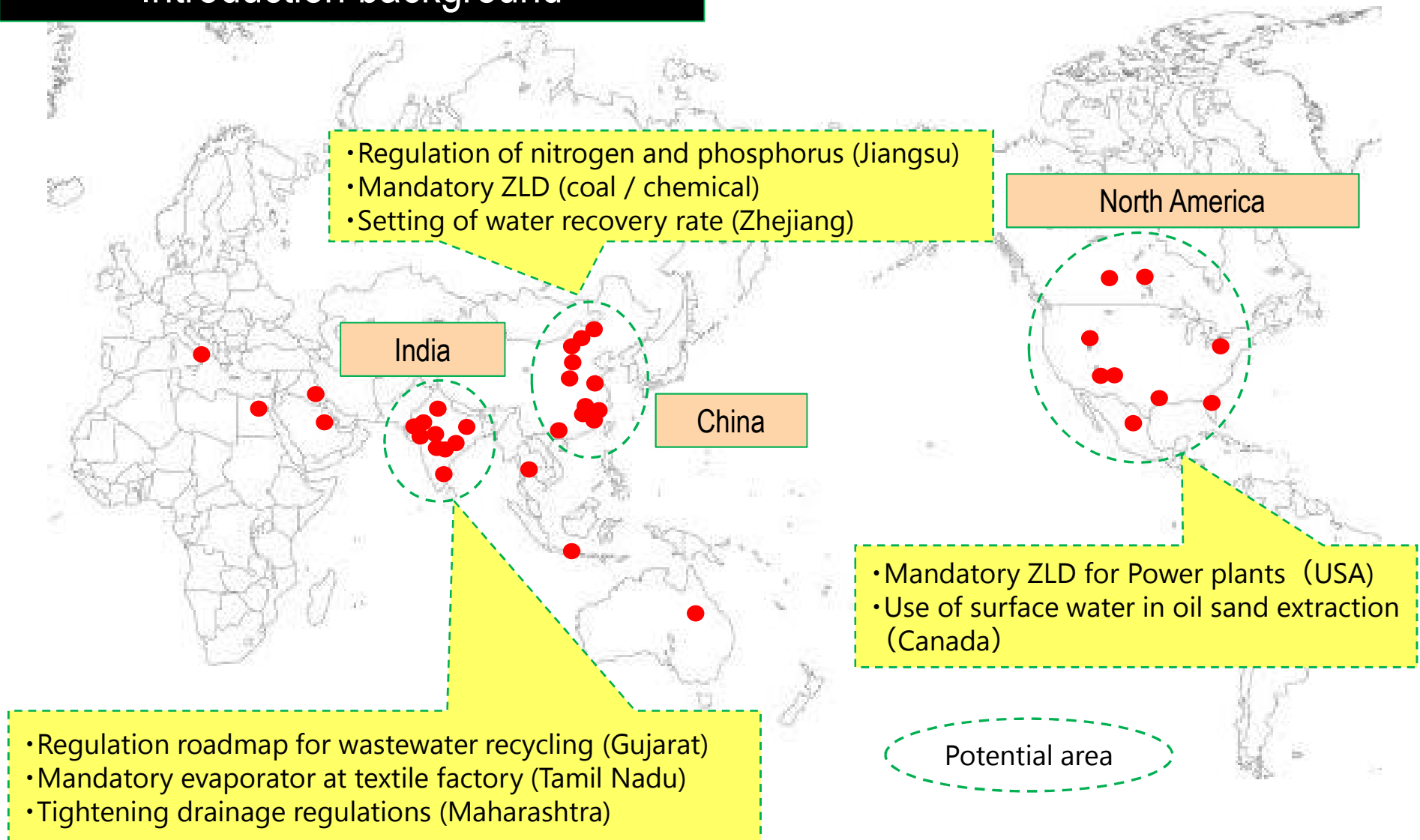
ZLD = Zero Liquid Discharge

Wastewater treatment system with **zero liquid waste**



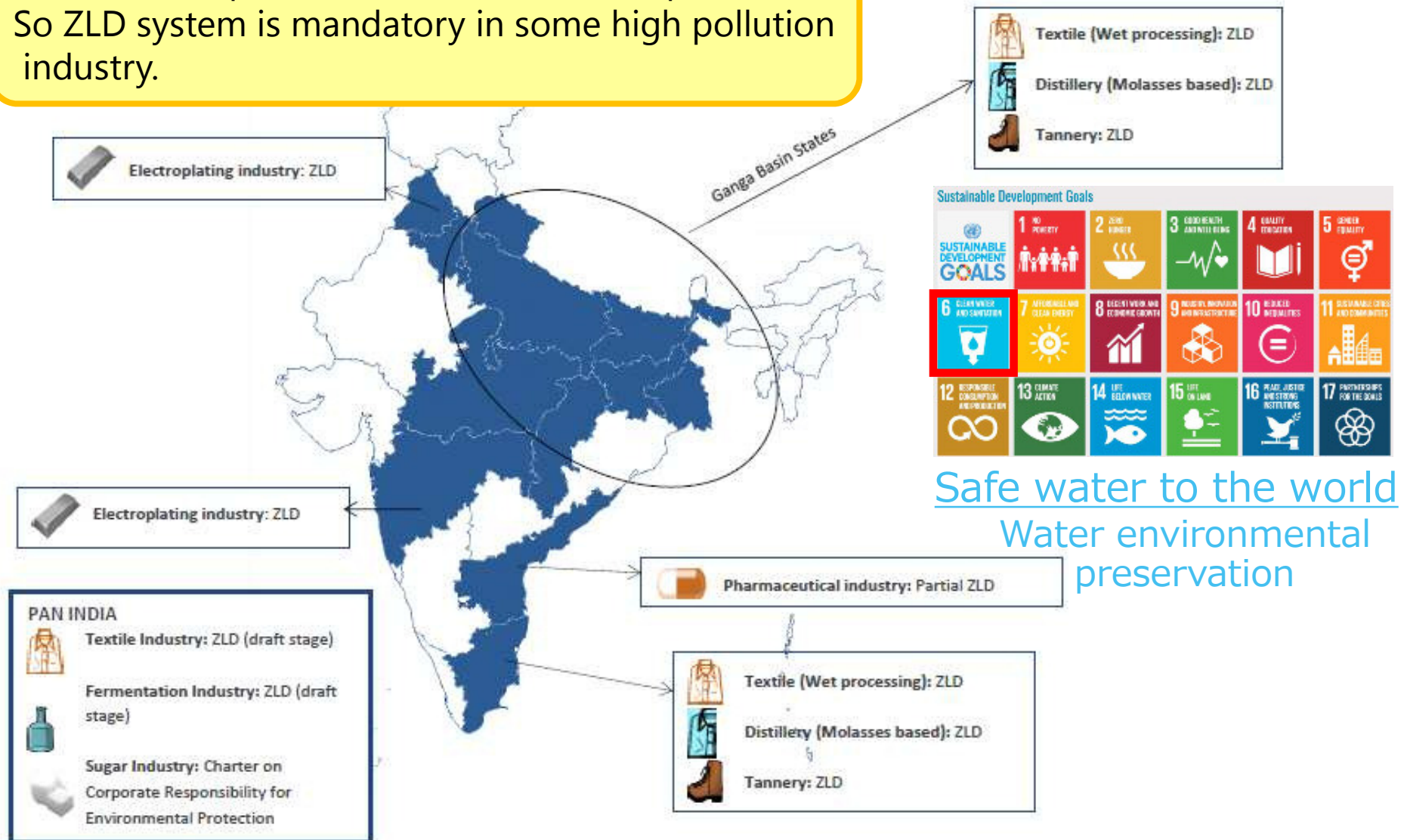
Where the ZLD system is used

Introduction background



ZLD for India (Area we are targeting in India)

In India, river pollution is a serious social problem. So ZLD system is mandatory in some high pollution industry.



Solution to technical problem of ZLD system

Problem

Treated water

pH : ~7

Recycle System



Reject water

Solution

- ① Scale ($\text{CaCO}_3, \text{SiO}_2$)
- ② Bio-fouling (Bacteria, Organic, Colloid)

Step 1

Step 2

Step 3

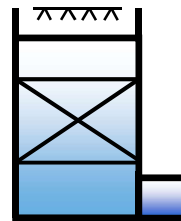
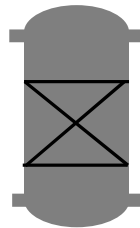
Ion Exchanger

Degasser

Alkalization

Recycle System

Treated water



pH8.5~

Remove cations
(Ca, etc)

Remove HCO_3^-

Next page



Why adjust pH (Alkalization)

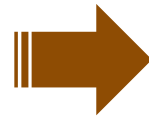
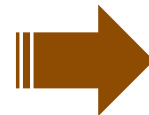
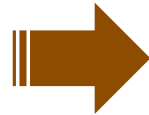
Causative substance of fouling and scaling

SiO₂

Organic

Bacteria

Colloid



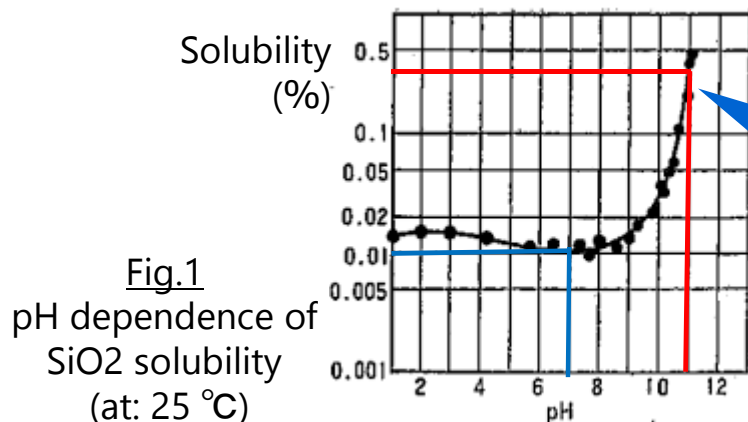
Running at high pH

Improved solubility (Fig. 1)

Adhesion prevention by saponification

Inactive

Zeta potential rise



Solubility improved by
about 3.5 times

Our case study in India

We have already installed our ZLD system at the following 3 locations. Here is one of the case.



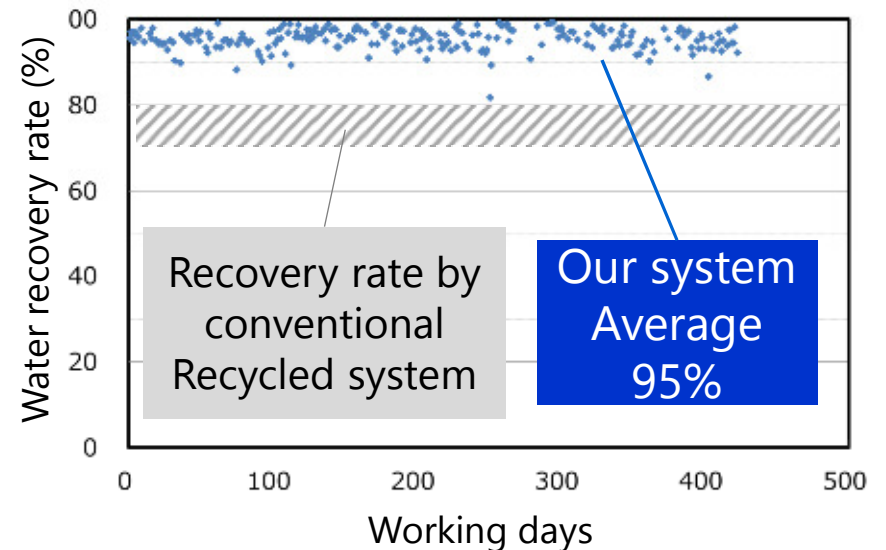
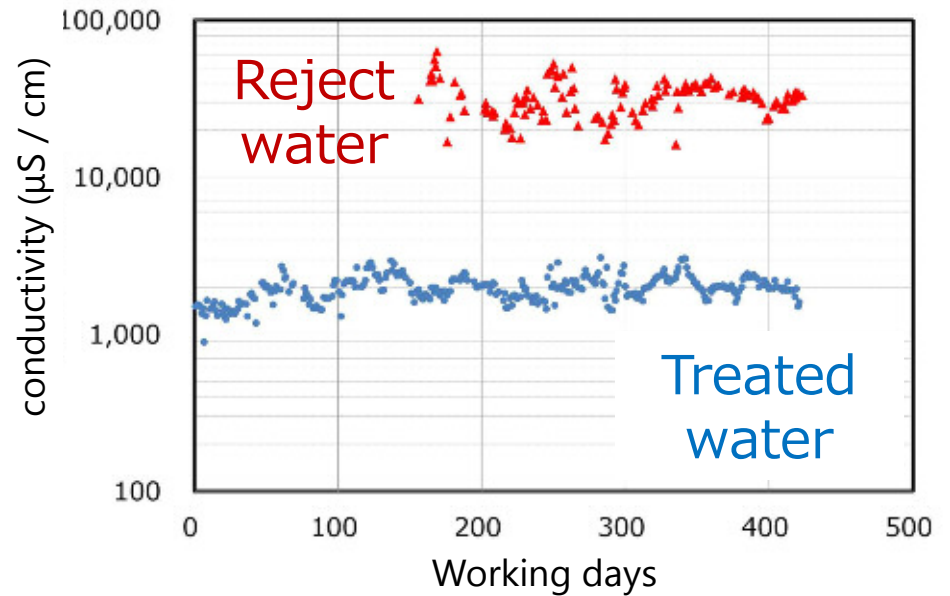
Reject water

Recycled water

Treated water



Responsibility to make Water recycling



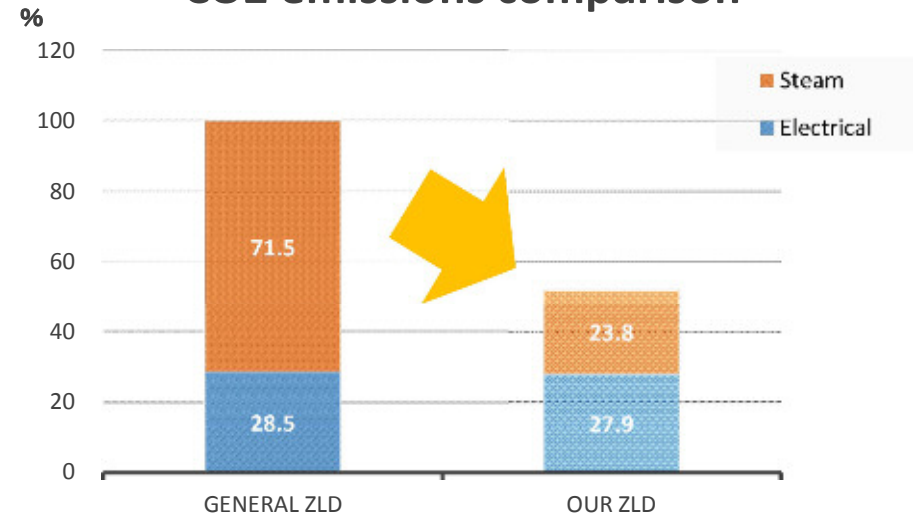
For further environmental preservation promotion

Our ZLD system not only protects the water environment, but also reduces the amount of energy used by improving the water recovery rate.



We will aim to reduce reject water for further energy reduction.

CO2 emissions comparison



Climate change issue
Saving energy

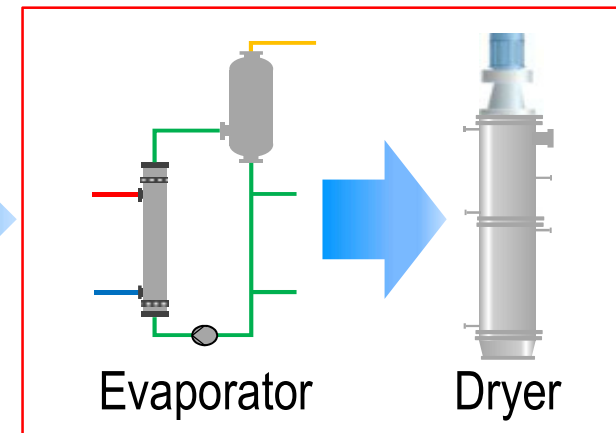
Recycle System



Reject water

5%

Concentration system



Epilogue



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