PRESENT PAPER

ON

TECHNOLOGICAL INNOVATION IN SEAWATER DESALINATION, WASTEWATER MANAGEMENT AND ZERO LIQUID DISCHARGE

BY

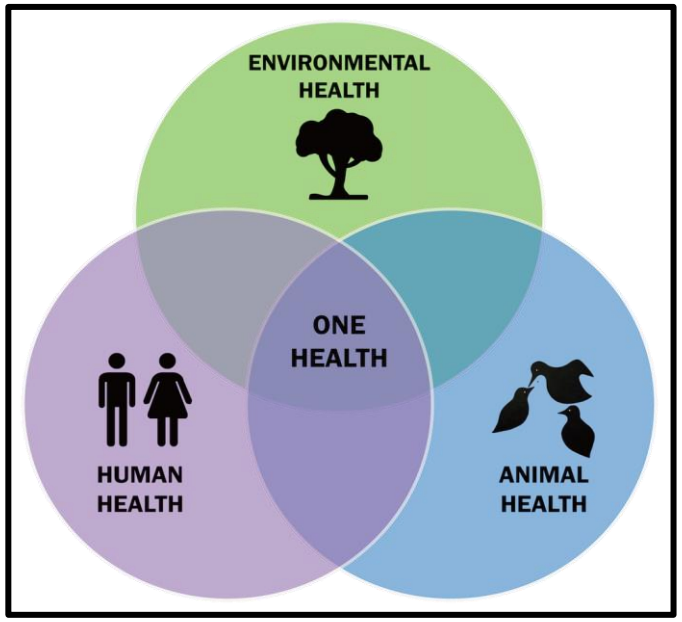
Lieutenant Commander (E) KHKM Abeysooriya, BTech Mech Eng, CEng (UK), CEng (Ind), AMIE(SL), AMIE (Ind), MIMarEST (UK)

SEQUENCE

- Introduction
- Advantages of ZLD
- Significance of ZLD
- ZLD Systems for Resource Recovery: Current State of the World
- Environmental and Operational effect of ZLD
- Conclusion

INTRODUCTION

Key danger to economic growth, water security, and ecosystem health is freshwater scarcity



Source: www.google.com

INTRODUCTION

Climate change, pressure from economic growth and industrialisation, and other factors

Source: www.google.com

INTRODUCTION

Public and industrial sectors use a sizable amount of freshwater Generating a sizable amount of wastewater

Wastewater discharge into the aquatic environment without proper treatment results in severe contamination

The recovery and recycling of wastewater have become a major trend

Reusing wastewater reduces freshwater withdrawal's negative effects on ecosystems

INTRODUCTION

Zero Liquid Discharge (ZLD) aims to eliminate any liquid waste from leaving the plant or facility border

ZLD is becoming a useful or even required solution for wastewater management

Earliest ZLD systems relied on independent thermal processes

ZLD systems have adopted reverse osmosis (RO), a membrane-based desalination technology, to increase energy and financial efficiencies

INTRODUCTION

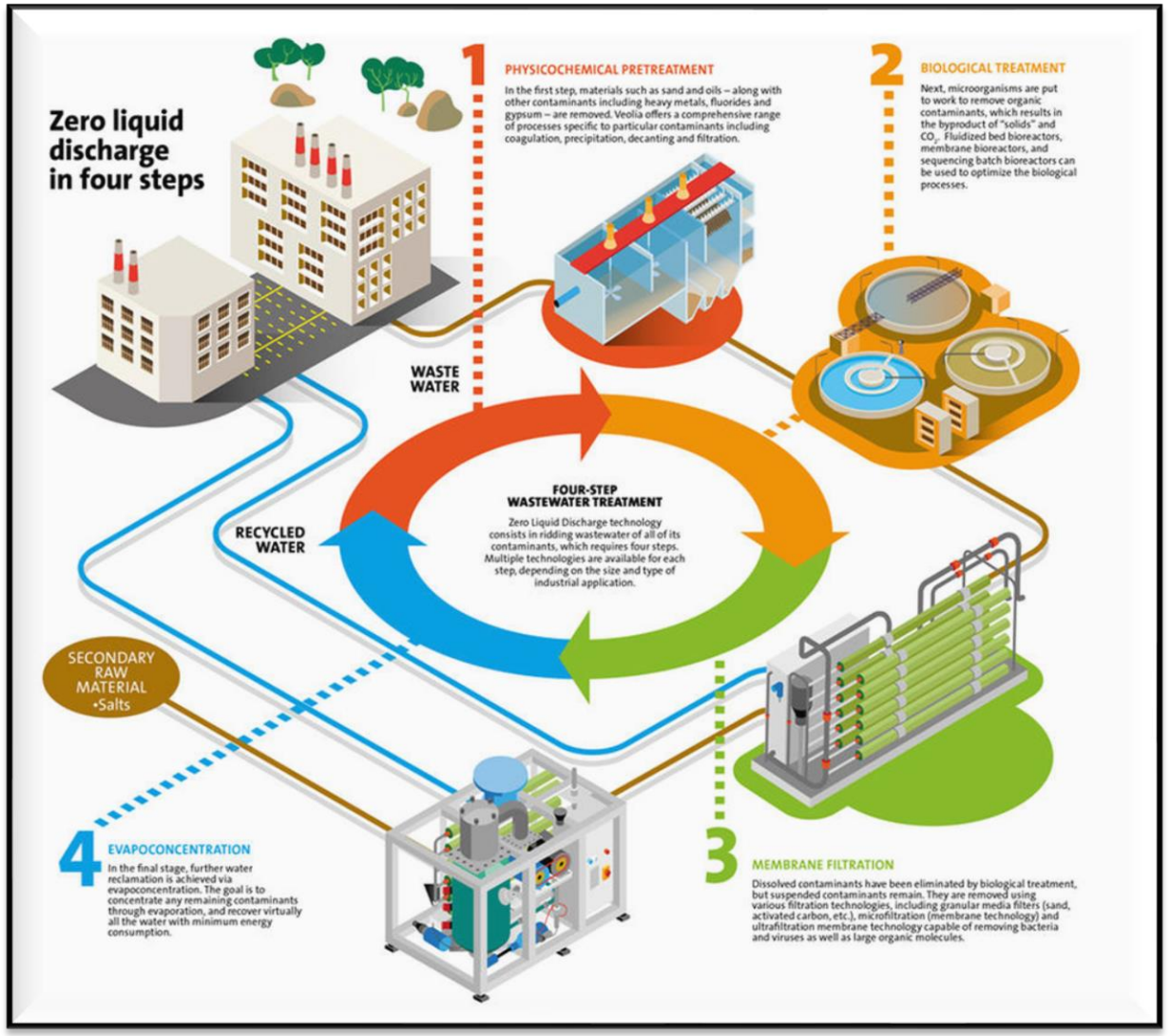
RO is far more energy efficient than thermal evaporation

Profitability of ZLD is dependent on striking a balance between the advantages of ZLD, energy consumption, and capital/operation expenses

Environmental effects of brine disposal from saltwater desalination plants and wastewater treatment plants are a matter of growing concern

Technologies based on membranes are a potentially appealing approach

INTRODUCTION



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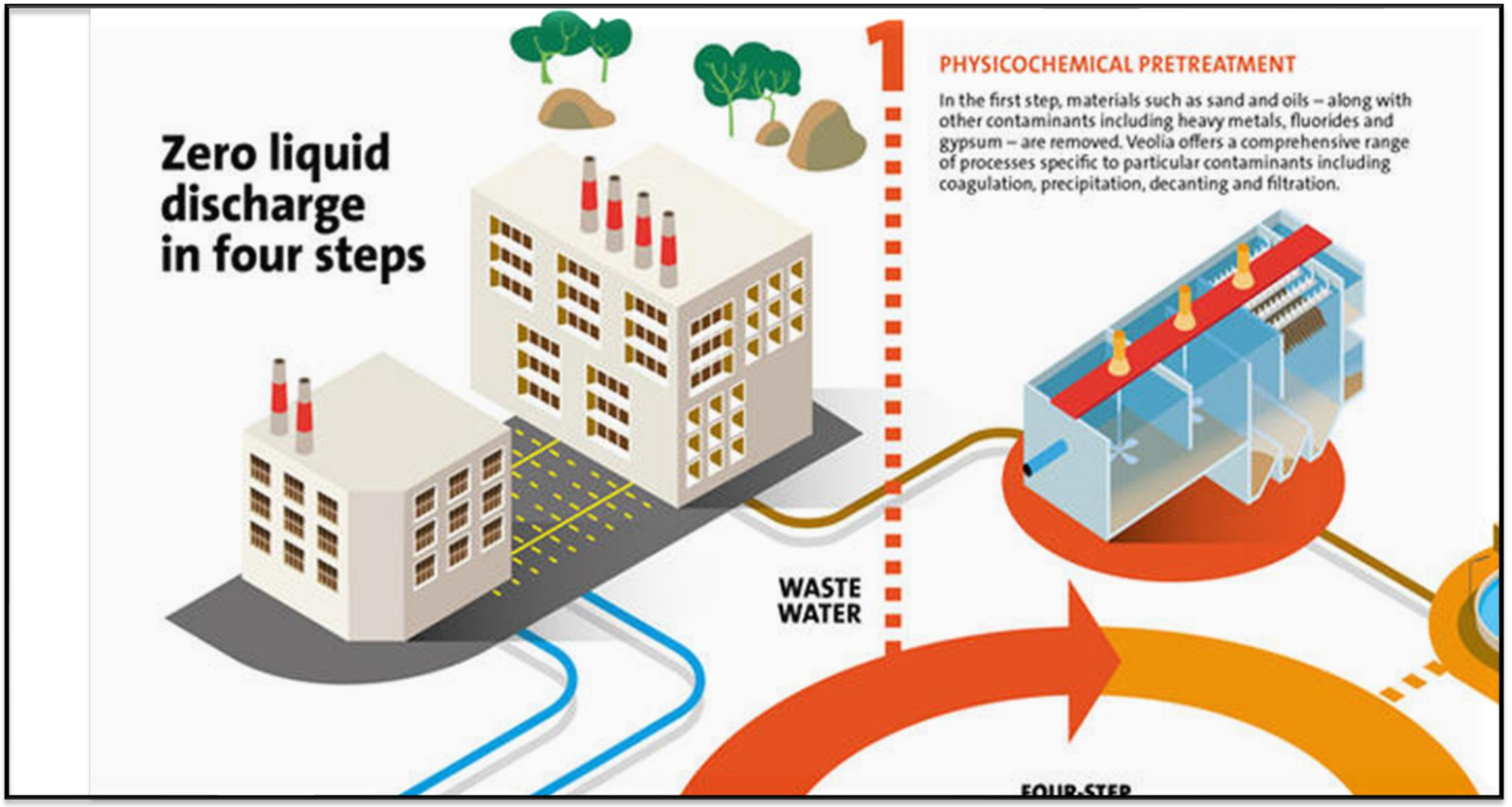

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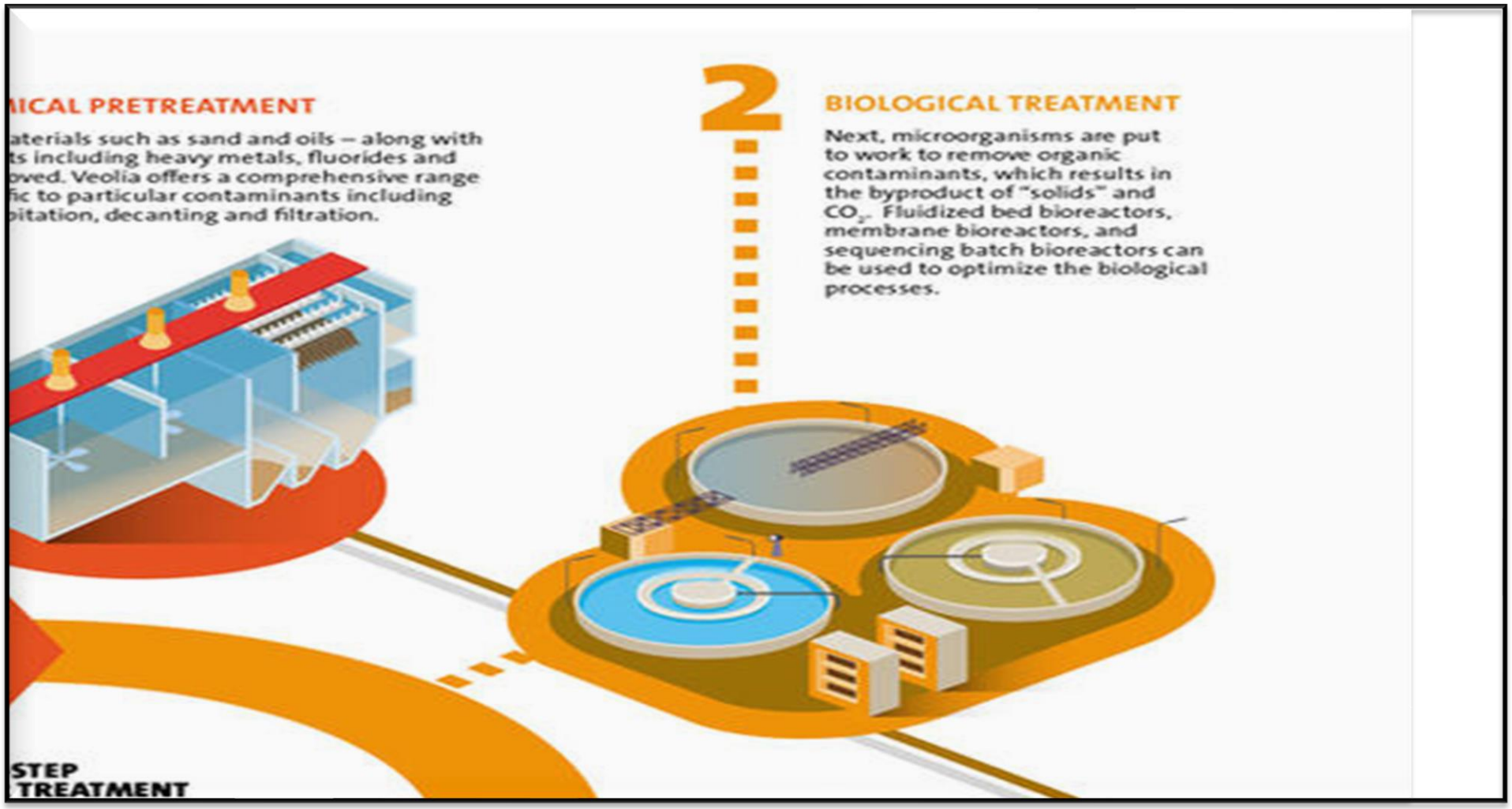

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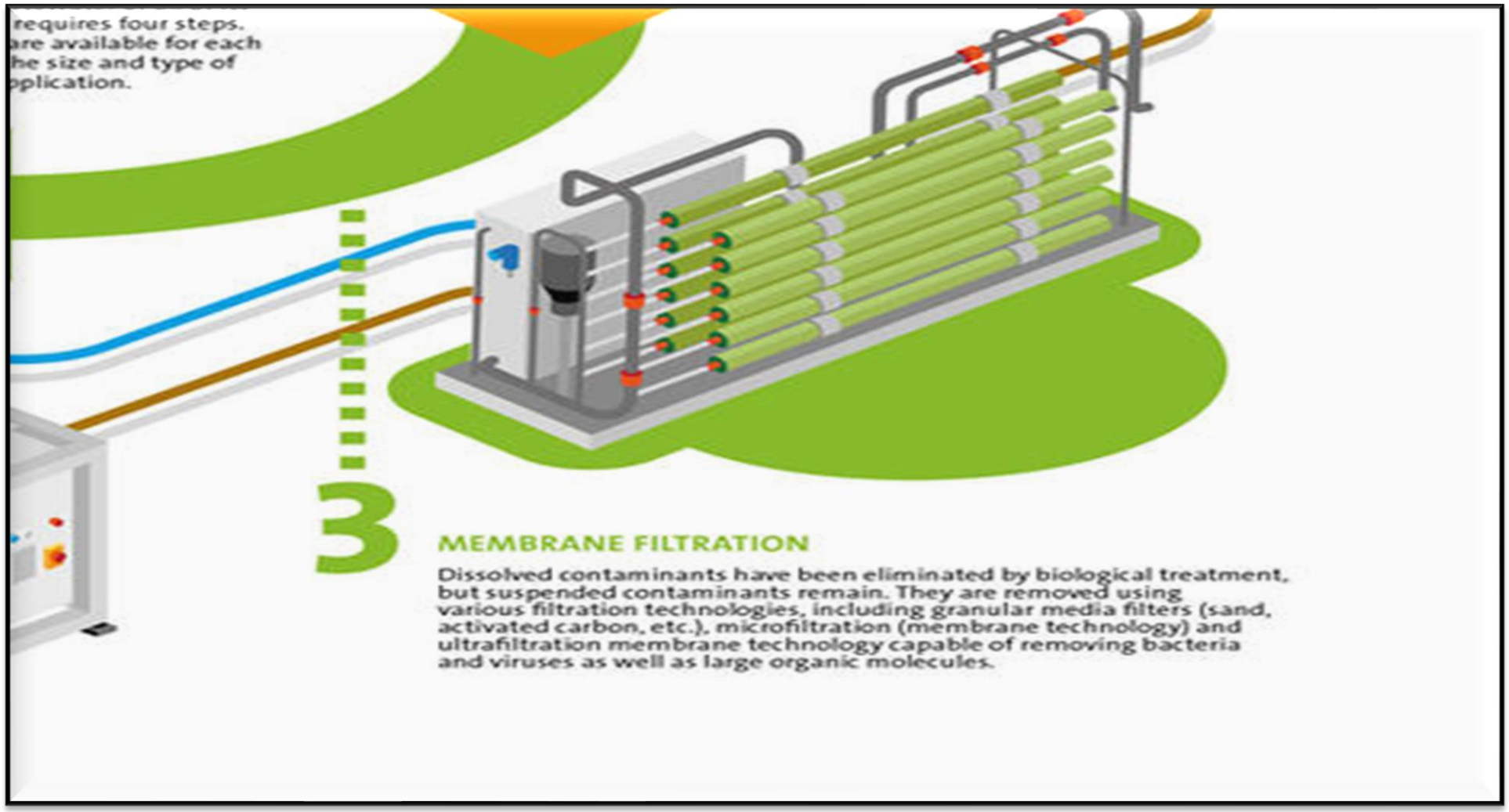

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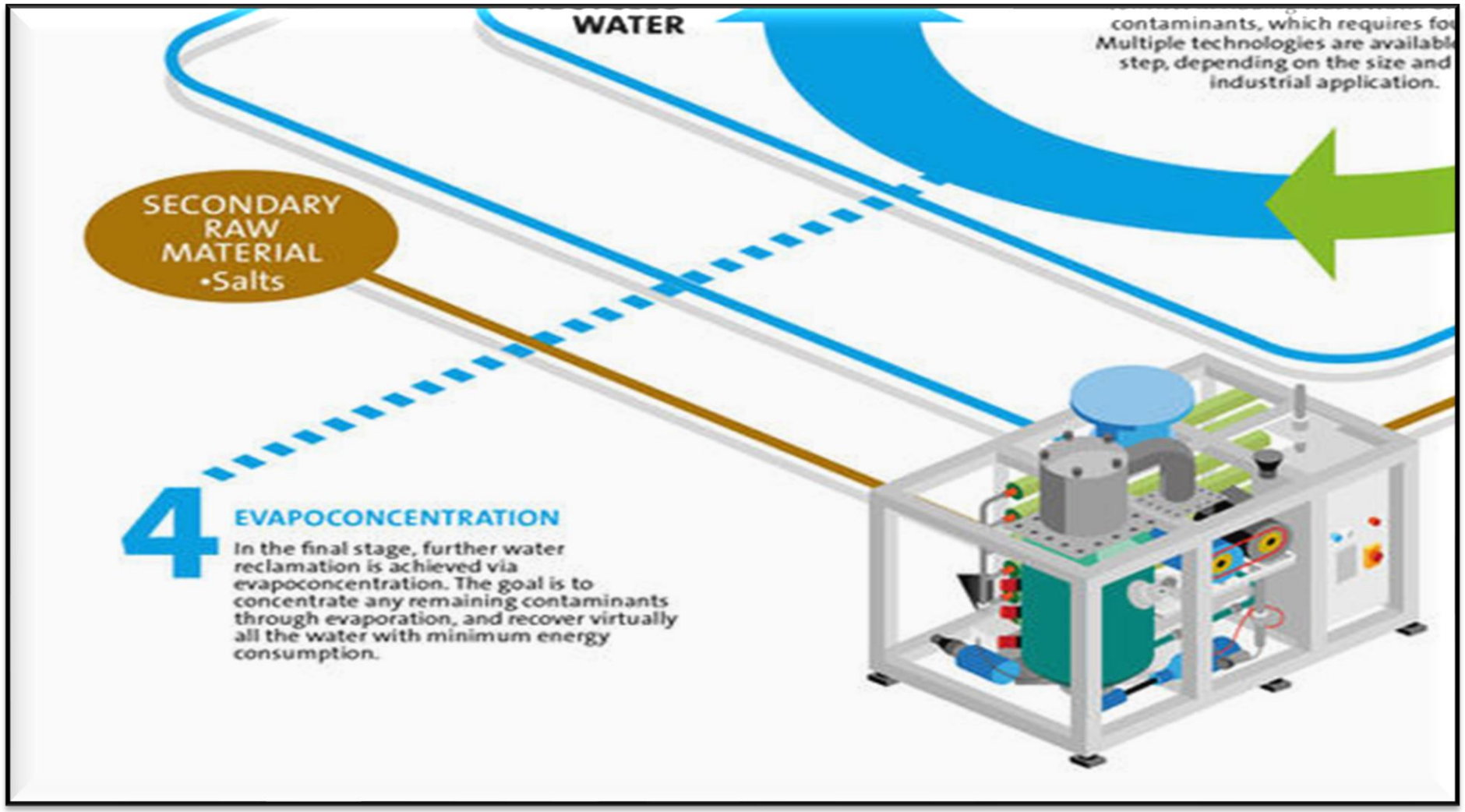

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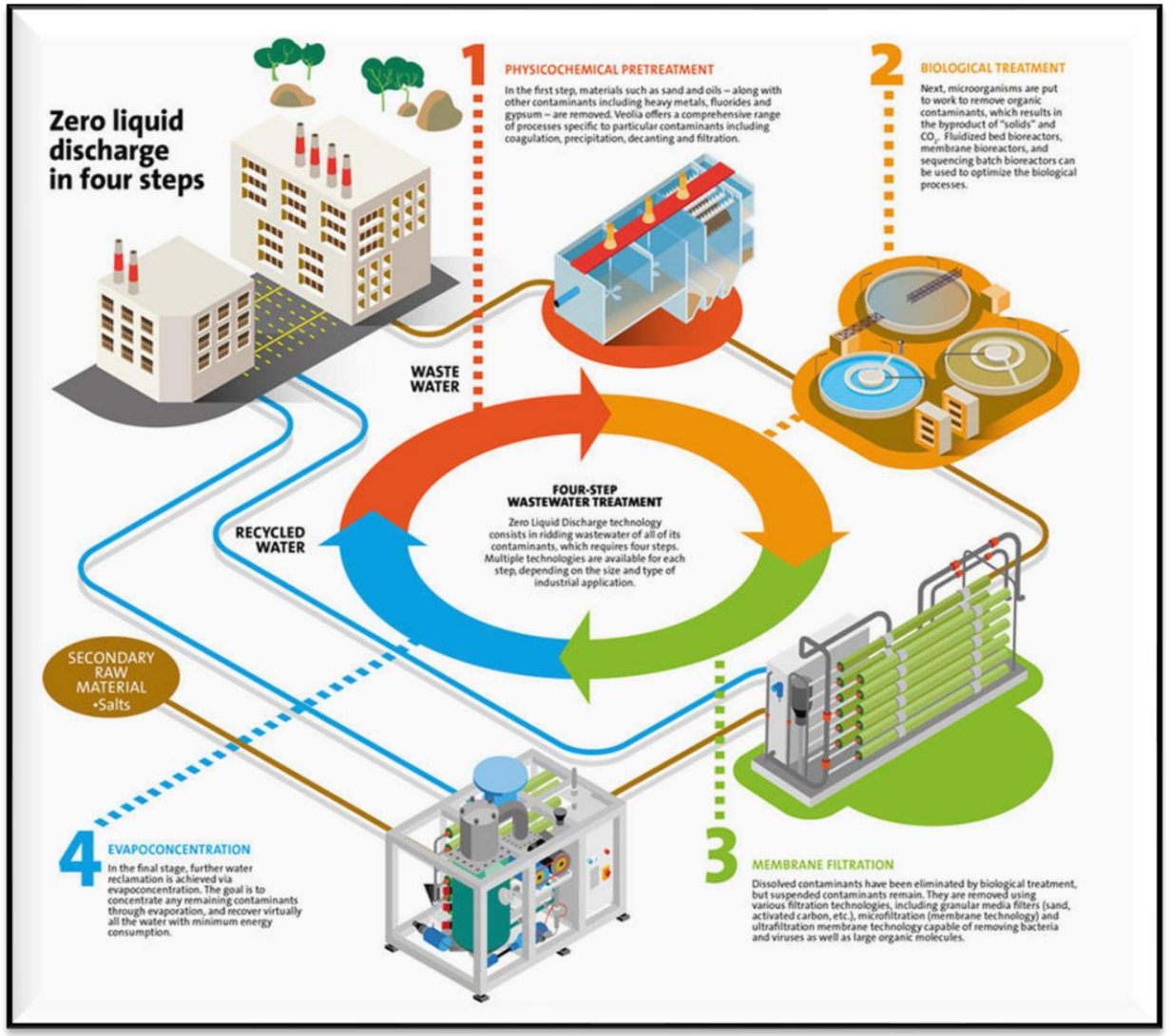

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ADVANTAGES OF ZLD

Reduced trash quantities lower the expense of waste management

Reduce the cost and risk of water acquisition by recycling water on the spot

save valuable resources

Reduce the number of trucks needed for off-site wastewater disposal

Increased regulatory risk profile and environmental performance for upcoming permits

SIGNIFICANT OF ZLD

Freshwater availability is under threat from industrial operations

Water is needed for many industrial operations

Less water is available for the environment or other processes

Contaminated water is released into the environment, causing harm

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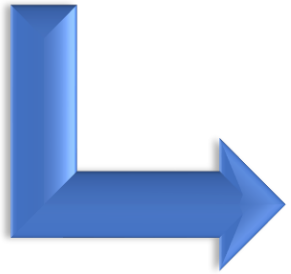
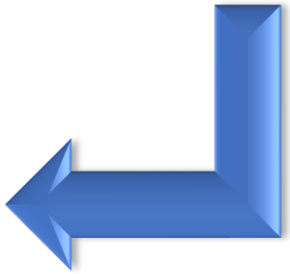
SIGNIFICANT OF ZLD

Capacity to recover resources from wastewater

Can sell the solids created

Reuse them as part of their industrial process

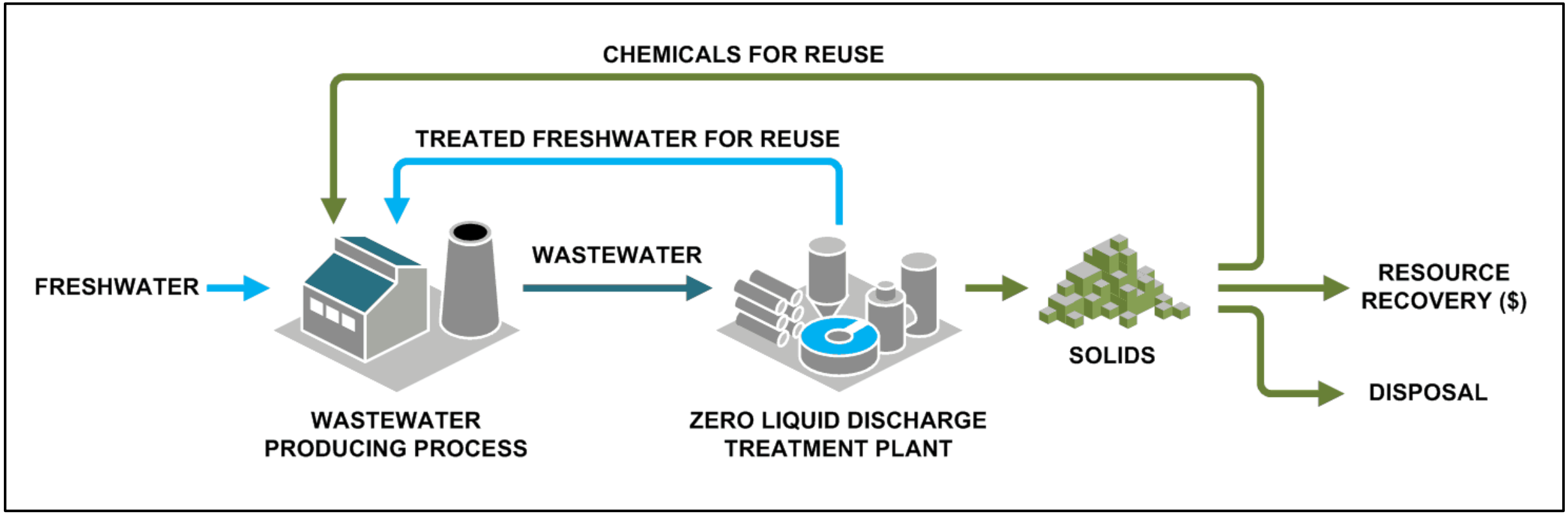




Target ZLD for trash

SIGNIFICANT OF ZLD

Recovery of Gypsum from mine water and wastewater from Flue Gas Desalination (FGD)



SIGNIFICANT OF ZLD

- Sound business practices
- Corporate accountability
- Environmental stewardship

ZLD

- Save disposal costs
- Increase water reuse
- Reduce greenhouse gas emissions
- Reducing the impact on regional ecosystems and the climate

ZLD SYSTEMS FOR RESOURCE RECOVERY: CURRENT STATE OF THE WORLD

- First implemented ZLD systems in the 1970s
- Environmental Protection Agency has updated its regulations for the discharge of wastewater
- Preferable alternative for power plants
- Brine management

ZLD SYSTEMS FOR RESOURCE RECOVERY: CURRENT STATE OF THE WORLD

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- Rapid economic expansion and urbanization
- Unveiled a new action plan to combat water pollution by 2020
- Construction of coal-to-chemicals plants, which use a lot of freshwater

ZLD SYSTEMS FOR RESOURCE RECOVERY: CURRENT STATE OF THE WORLD

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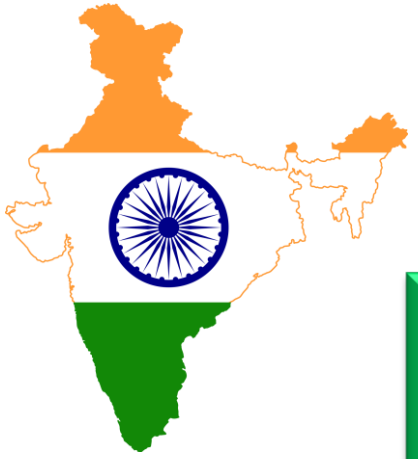
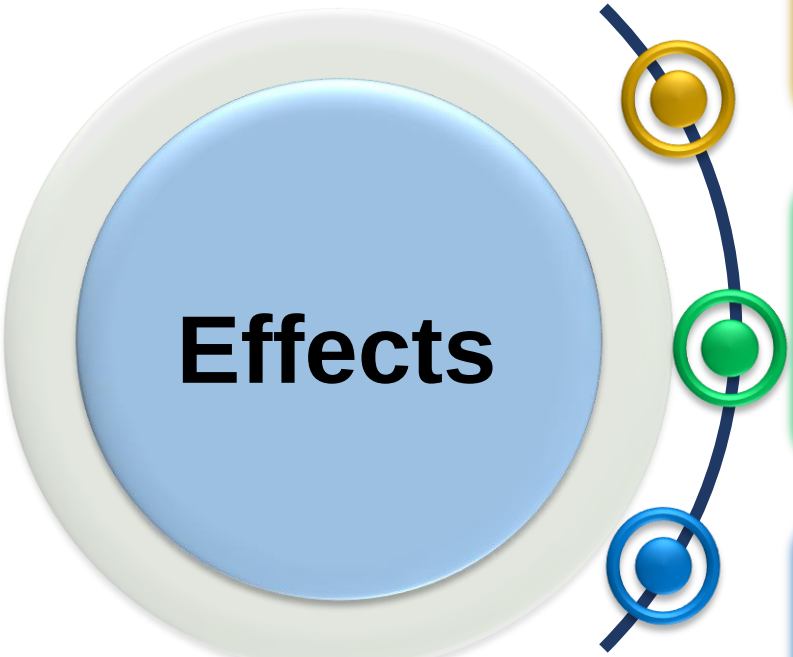


- Accelerated industrialization and urbanization
- Three-year goal for the "Clean Ganga" project
- Collect precious salts and water from textile effluent for reuse
- All textile factories produced more than 25m3 of wastewater per day
- Steel, power, pharmaceutical, chemical, textile, food, and beverage industries

ENVIRONMENTAL AND OPERATIONAL EFFECTS



Emit aromas, have an adverse effect on wildlife, and pose a risk of leakage

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Waste solids consequently pose substantial storage and disposal issues

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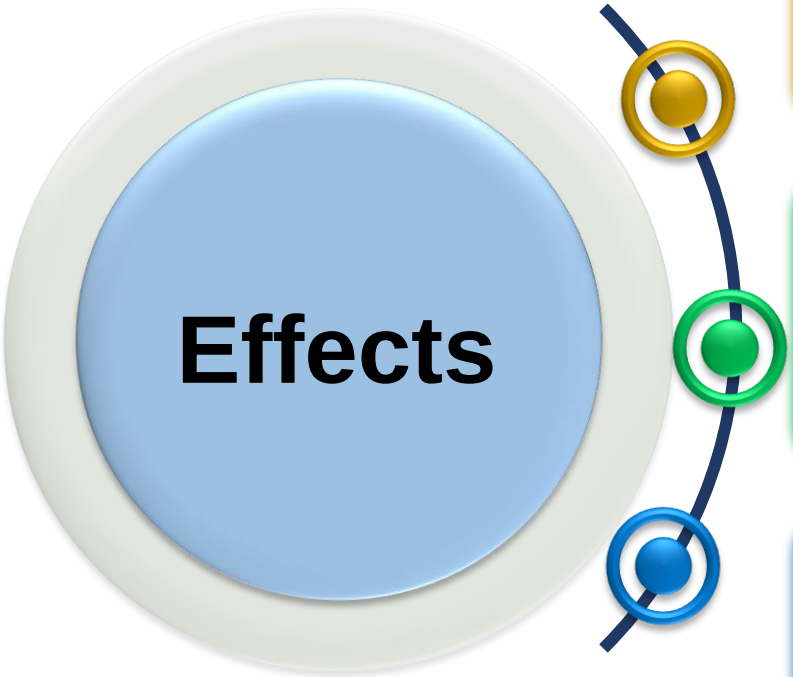
ENVIRONMENTAL AND OPERATIONAL EFFECTS



- High operational costs associated with current ZLD technologies
- Complex system design results in high chemical costs
- Significant sludge generation

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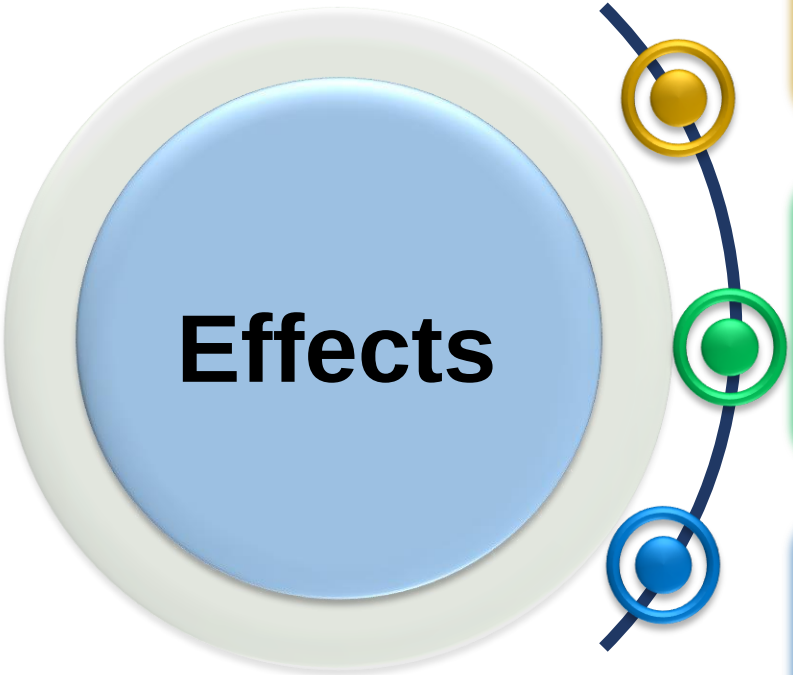
ENVIRONMENTAL AND OPERATIONAL EFFECTS



- Salt in the wastewater discharged downstream
- Pre-treatments that release CO2 into the environment
- Acidification and degasification

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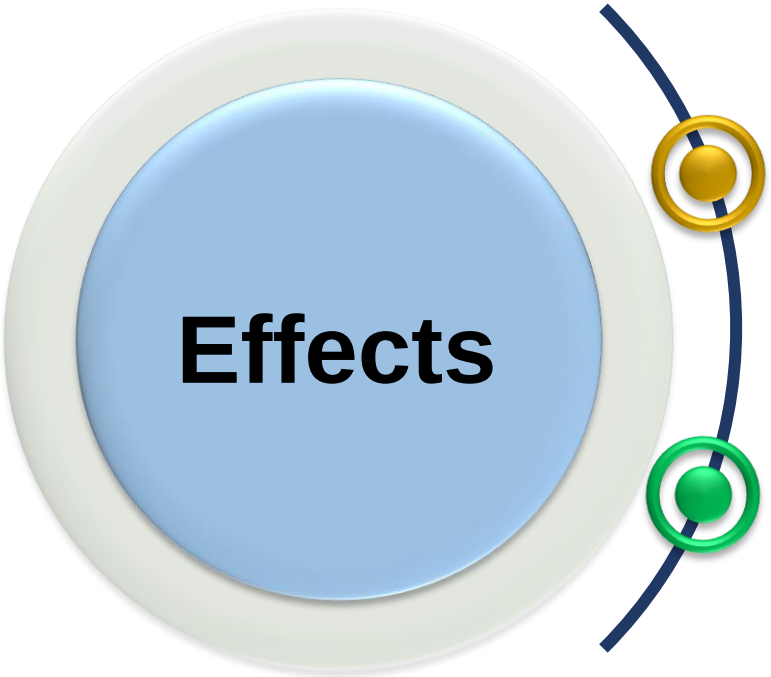
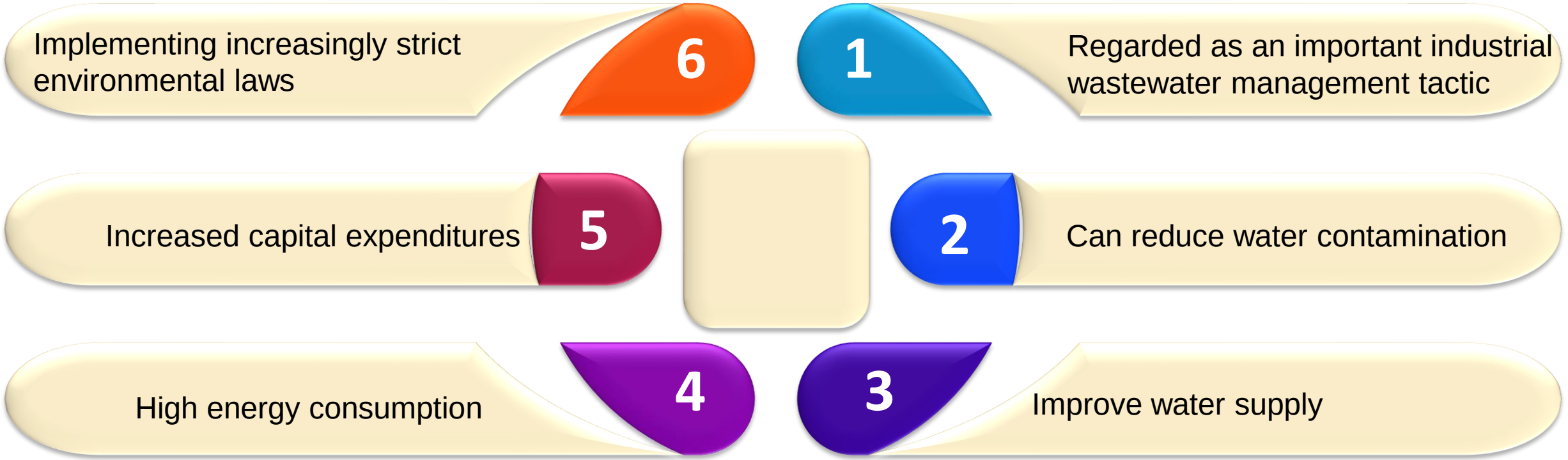
ENVIRONMENTAL AND OPERATIONAL EFFECTS



- Heavy greenhouse gas emissions
- CO_2 is released during decarbonization

CONCLUSION



Overuse of water resources and freshwater scarcity brought on by climate change

THANK YOU