



# Suido Kiko Middle East

## Water Reuse In Industrial Application

**Presenter:**

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# 1. SKME introduction

- Is an EPC company specialized in water treatment
- Provides integrated solutions in water & wastewater sector.
- **JV** between Saudi Brothers Commercial Company & Suido Kiko Kaisha.
- Winner of Global Water Award - 2011 for the Water Reuse Project Category .





## 2. Suido Kiko Kaisha

- Suido Kiko Kaisha one of the largest engineering & construction companies in Japan → specialized in the fields of water & wastewater treatment.
- A Pioneer company in Reuse water for industrial applications → implementing MBR technologies





# 3. Treatment Technologies

**WWTP**

- Industrial & municipal
- MBR technologies
- Conventional Treatment
- Water Reuse

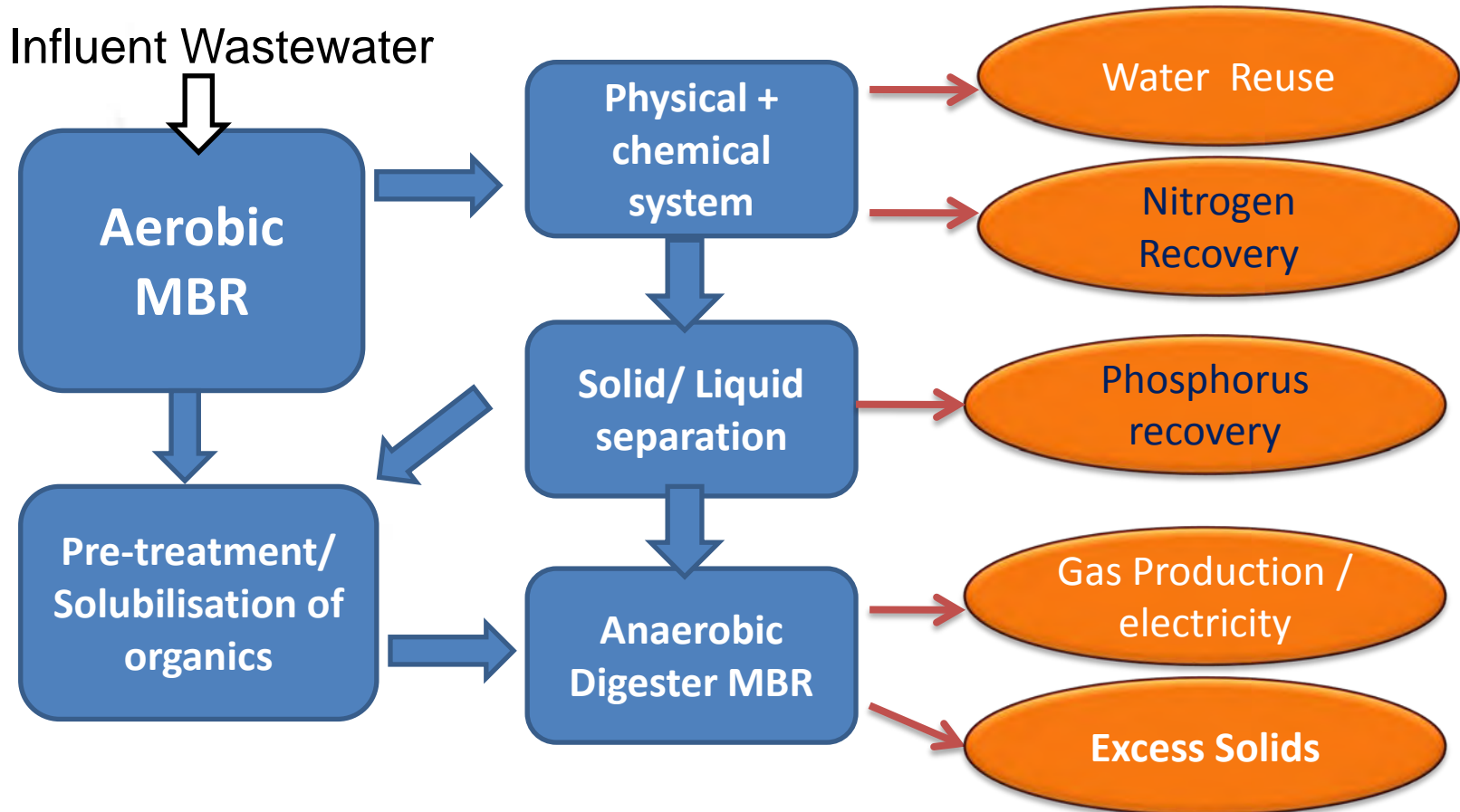
**Desalination**

- RO ( Reverse Osmosis)
- UF, NF & MF
- Filtration system
- Chlorination system
- Chemical dosing system
- Others



## 4. Sewage Water is a Resource not Waste

- Did we enter the waste water refinery age ?





## 5. Wastewater Reuse

**5.1 Water Reuse & Definition**

**5.2 Why Reuse Water**

**5.3 Wastewater Reuse analysis**

**5.4 Application for Reuse**

**5.3 Reuse in Kingdom of Saudi Arabia**





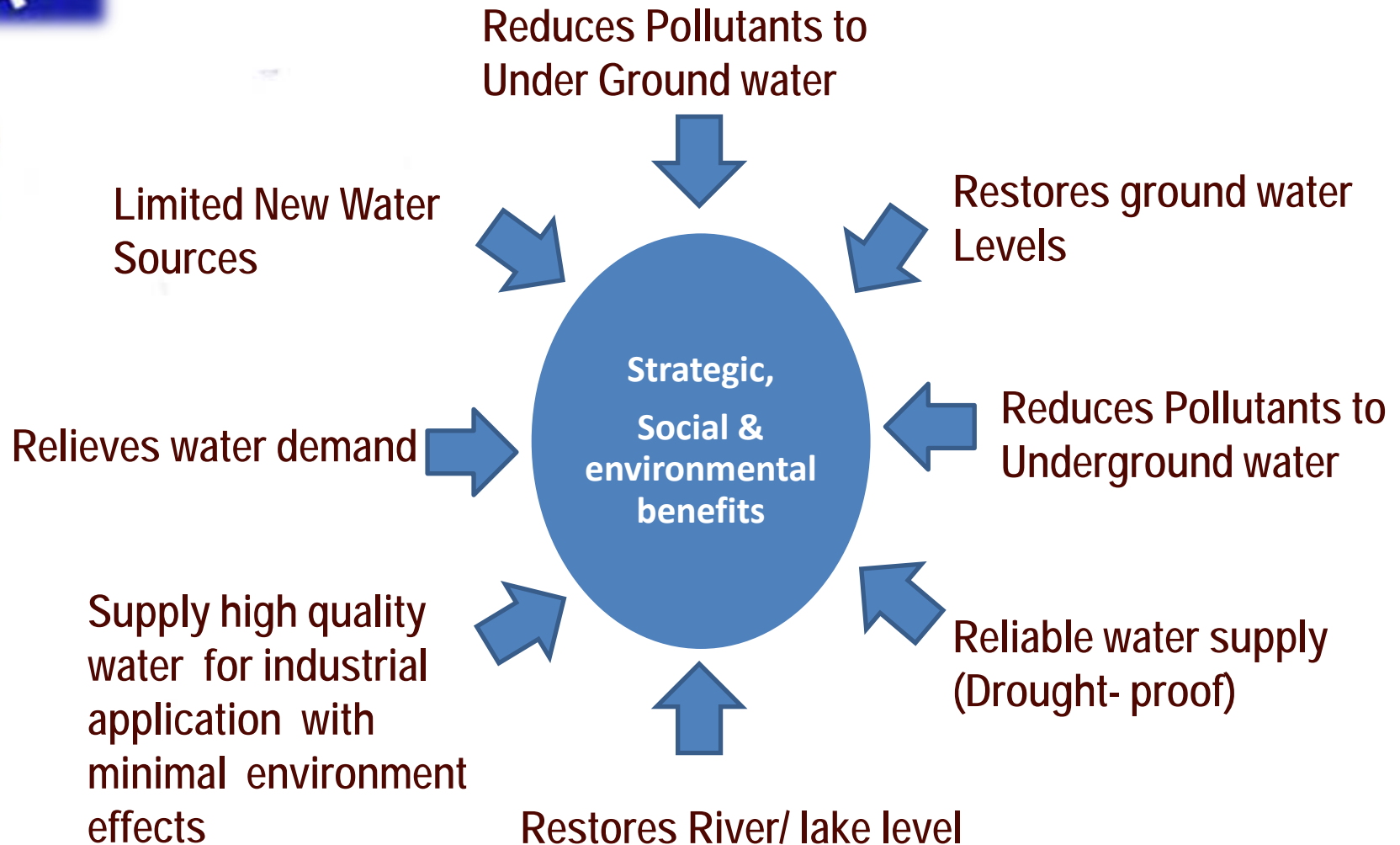
# 5.1 Water Reuse - Definition

- **Reclaimed water** → wastewater that has been treated to a level that allows for its reuse for a beneficial purpose
- **Reuse** → using a product / component in its original form more than once
- **TSE ( Treated Sewage Effluent )** → might require further treatment if it needs to be used in industrial applications





## 5.2 Why Reuse Water ?

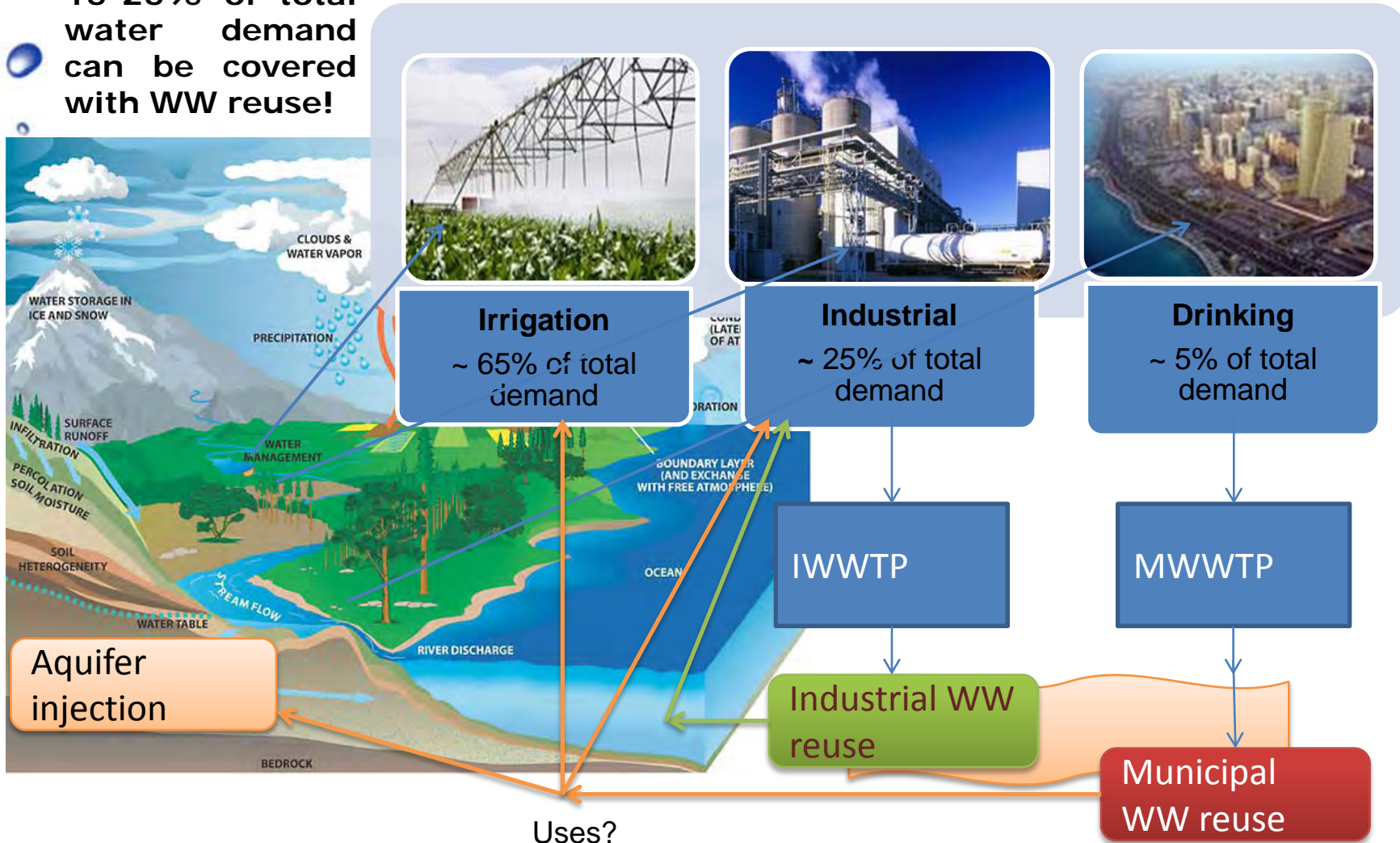






## 5.3 Wastewater Reuse analysis

15-25% of total water demand can be covered with WW reuse!





## 5.4 Types of Water Reuse

### Potable Reuse

- Direct – not practical in KSA
- Indirect – aquifer recharge, Tanker discharge

### Non-Potable Reuse

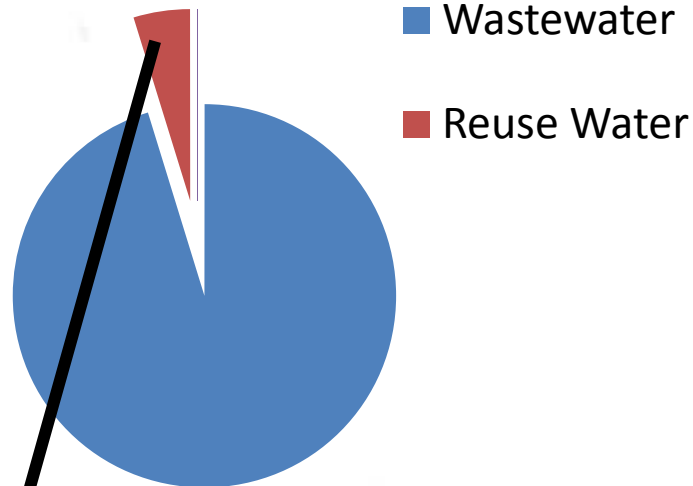
- **Direct** – irrigation, cooling water, fire suppression
- **Indirect** – wetlands restoration, groundwater recharge





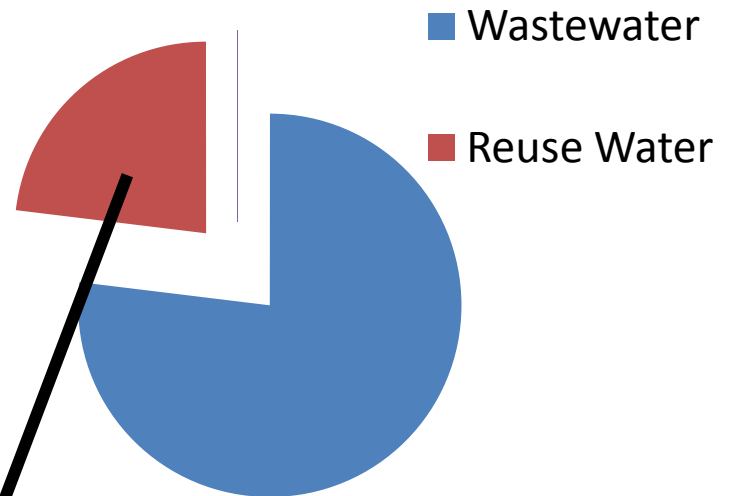
## 4.5 Water Reuse in KSA

### Projected Water Reuse 2010



Water reuse account for  
1% of Saudi Arabia's  
water supply

### Projected Water Reuse 2020



Water reuse account for  
about 30 % of Saudi  
Arabia's water supply



## 6. Our experience in Water Reuse

- 6.1 60,000 m<sup>3</sup>/d Misk lake Treatment Plant
- 6.2 Misk Lake Purification- Irrigation
- 6.3 Luna Industrial Recycling WWTP
- 6.4 25,000 m<sup>3</sup>/d Industrial WWTP, Al Koumra-Jeddah



Treated water quality





# 6.1 Misk Lake Treatment Plant

- Capacity:  
30,000 m<sup>3</sup>/d MBR  
30,000 m<sup>3</sup>/d conventional



- Treated water was used in irrigating the Eastern Forest in Wadi Asla







## 6.2 Misk Lake Purification for Irrigation

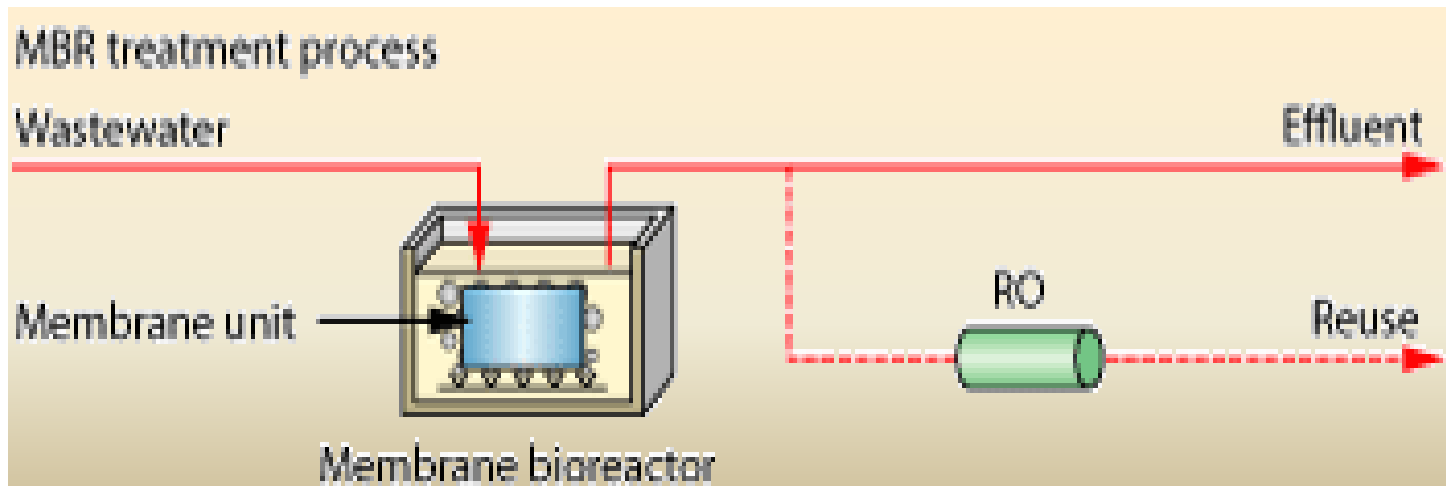
- MBR system was chosen to achieve a high level of treated effluent.
- Contributed to the improvement of the environment in Jeddah





## 6.3 Luna Industrial Recycling WWTP

- 12 different streams of influent water.
- Each stream has different water characteristic.
- Treated water needs to be of very high quality → to be used in cooling system ( Make- up) & boilers feed water.





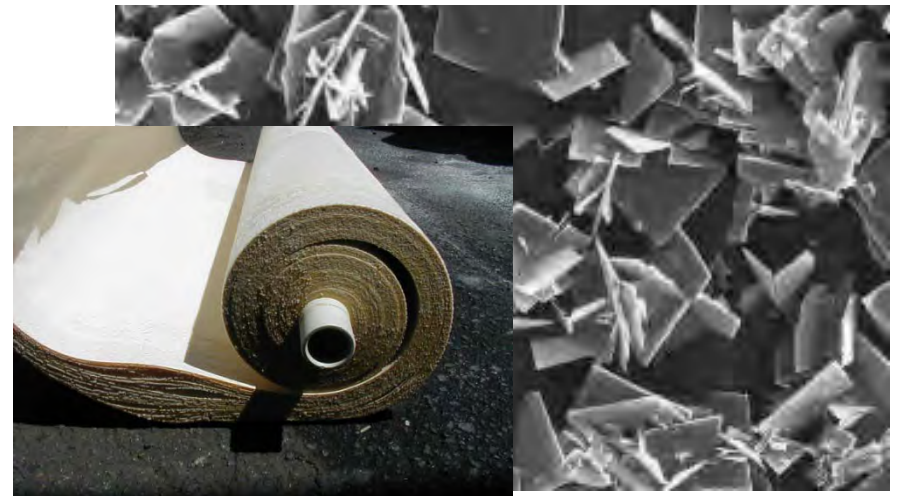
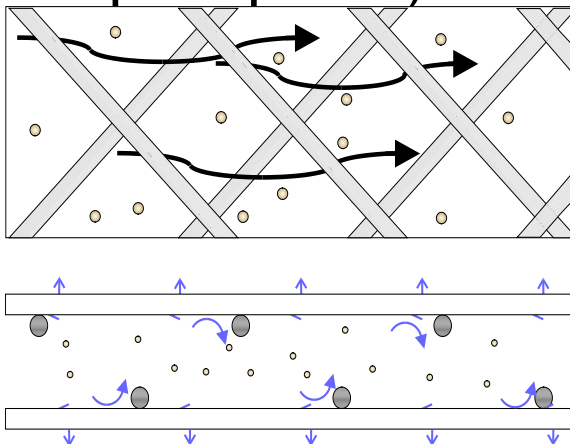
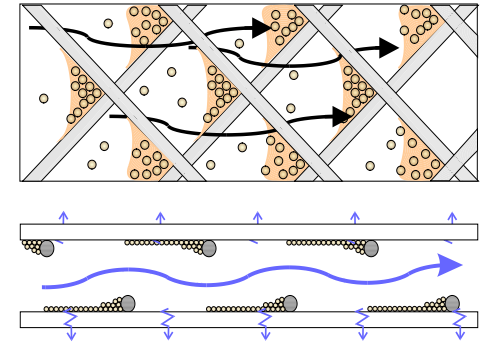
## 6.4 25,000 m<sup>3</sup>/d Industrial WWTP, Al Komura- Jeddah

- Capacity: 25,000 m<sup>3</sup>/d municipal WWTP  
25,000 m<sup>3</sup>/d Industrial WWTP
- Industrial WWTP
  - ❖ Influent → very high BOD, COD & TSS about 4,500 ppm as per current conditions.
  - ❖ Effluent water → for irrigation & industrial reuse.
  - ❖ Primary treatment → unique with different technologies ( Mechanicals + chemicals)  
PH control, Heavy  
Metal, Phosphate, Ammonia, Nitrate...etc...tr  
eatment → all being considered in the  
design.



## 7. Limitation of Recycling TSE

- Variable quality, needs expertise to control.
- Fluctuation in flows
- Contains bacterial nutrients such as nitrates, ammonia & phosphates.
- Contains unusual scale forming salts (calcium phosphate)





## 8. Advantages of TSE

- Availability of supply
- Inexpensive range of 1.0 – 4.00 SR per meter cube  
(Pay back period could be < 5 years based on plant capacity & structure)
- Positive Social & Environmental Impact
- Minimizing total manufacturing cost by reducing water consumption & by reusing industrial wastewater





## 9. Water Reuse Applications

- Water reuse can be applied for a large range of industrial applications ( cooling + steam boiler feed water +construction works+ cleaning + Machine wash)
- Could be used for varied process applications
- Different treatment technologies adopted for different industrial waste water type : organic/inorganic





## 10. Conclusion

- ✓ More recycling needed as a matter of water security
- ✓ Water availability to alleviate stress on existing water resources.
- ✓ Implementing cutting edge technologies to secure clean & safe water for industrial reuse.
- ✓ Waste Water refinery age started!!
- ✓ Are we the oil wells of the future ?



# Thank You

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