

工業技術研究院

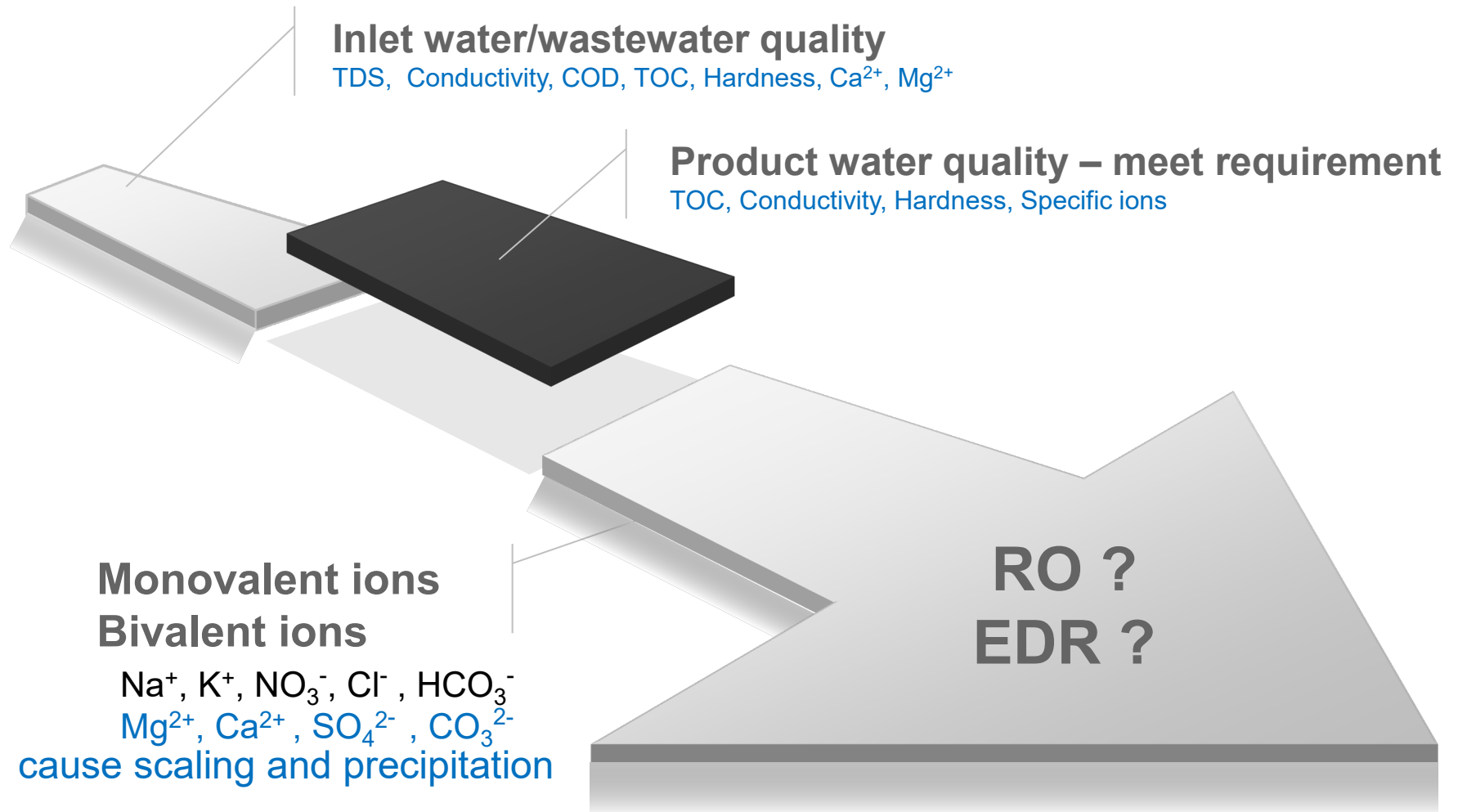
Industrial Technology  
Research Institute

# 產業用水效能提升計畫 EDR放流水回收評估試驗

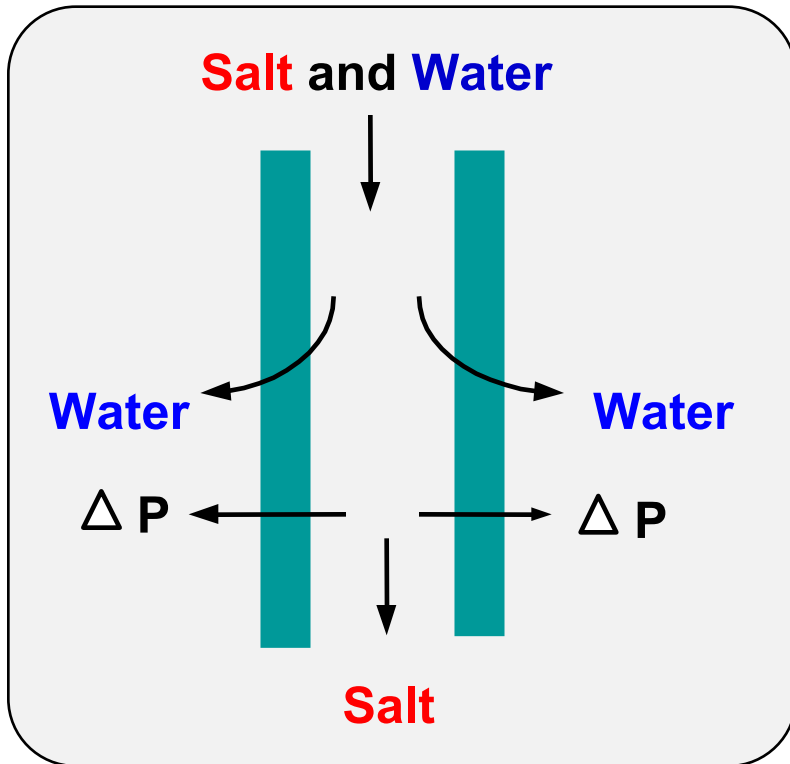
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2025/05/23



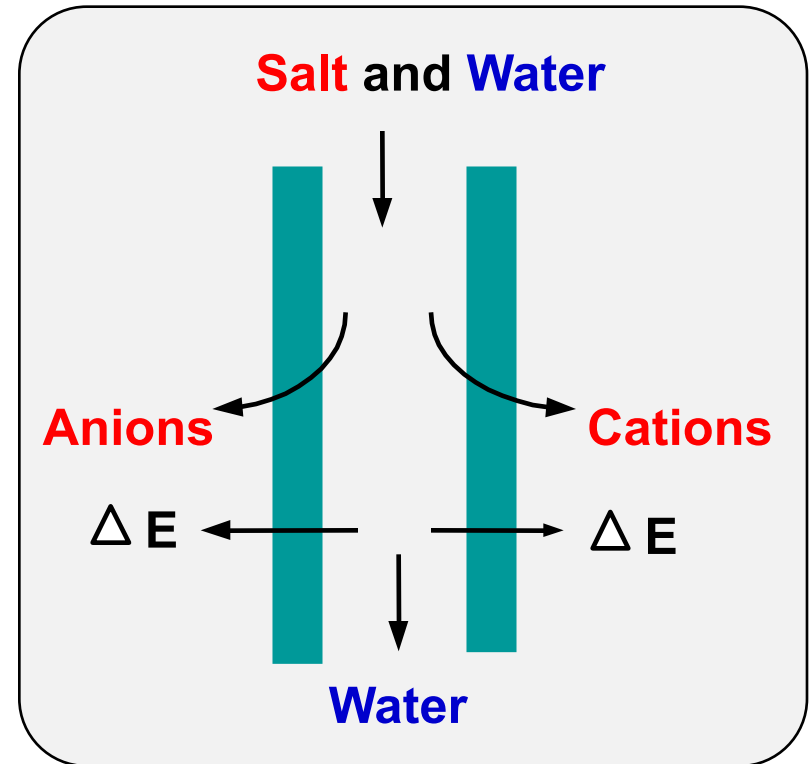
# Ions Separation



# Technical difference



**Reverse Osmosis**  
(半透膜)



**Electrodialysis**  
(離子交換膜)

# Inlet limitation

|                       | EDR                                                                  | RO                               |
|-----------------------|----------------------------------------------------------------------|----------------------------------|
| Typical Feed TDS      | 500 to 10,000 mg/l                                                   | <50000mg/L                       |
| Silica in Concentrate | unlimited                                                            | undersaturated                   |
| pH                    | 2 to 10                                                              | 3 to 10                          |
| SDI                   | <10(5 min. test) for continuous<br><15(5 min. test) for intermittent | < 4(15 min. test) for continuous |
| Turbidity             | < 0.5 NTU for continuous<br>< 2 NTU for intermittent                 | <0.3 NTU                         |
| Free Chlorine         | 0.5 mg/l for continuous<br>30 mg/L for intermittent                  | <0.1 mg/L                        |
| TOC                   | < 15 mg/l                                                            | <3 mg/L                          |
| COD                   | < 50 mg/l as O <sub>2</sub>                                          | < 10 mg/L                        |
| Iron                  | < 0.3 mg/l                                                           | < 0.05 mg/L                      |
| Manganese, Aluminum   | < 0.1 mg/l                                                           | < 0.05 mg/L                      |
| H <sub>2</sub> S      | < 0.1 mg/l                                                           | <10 mg/L                         |
| 回收率                   | 60% or above                                                         | 40~60%                           |

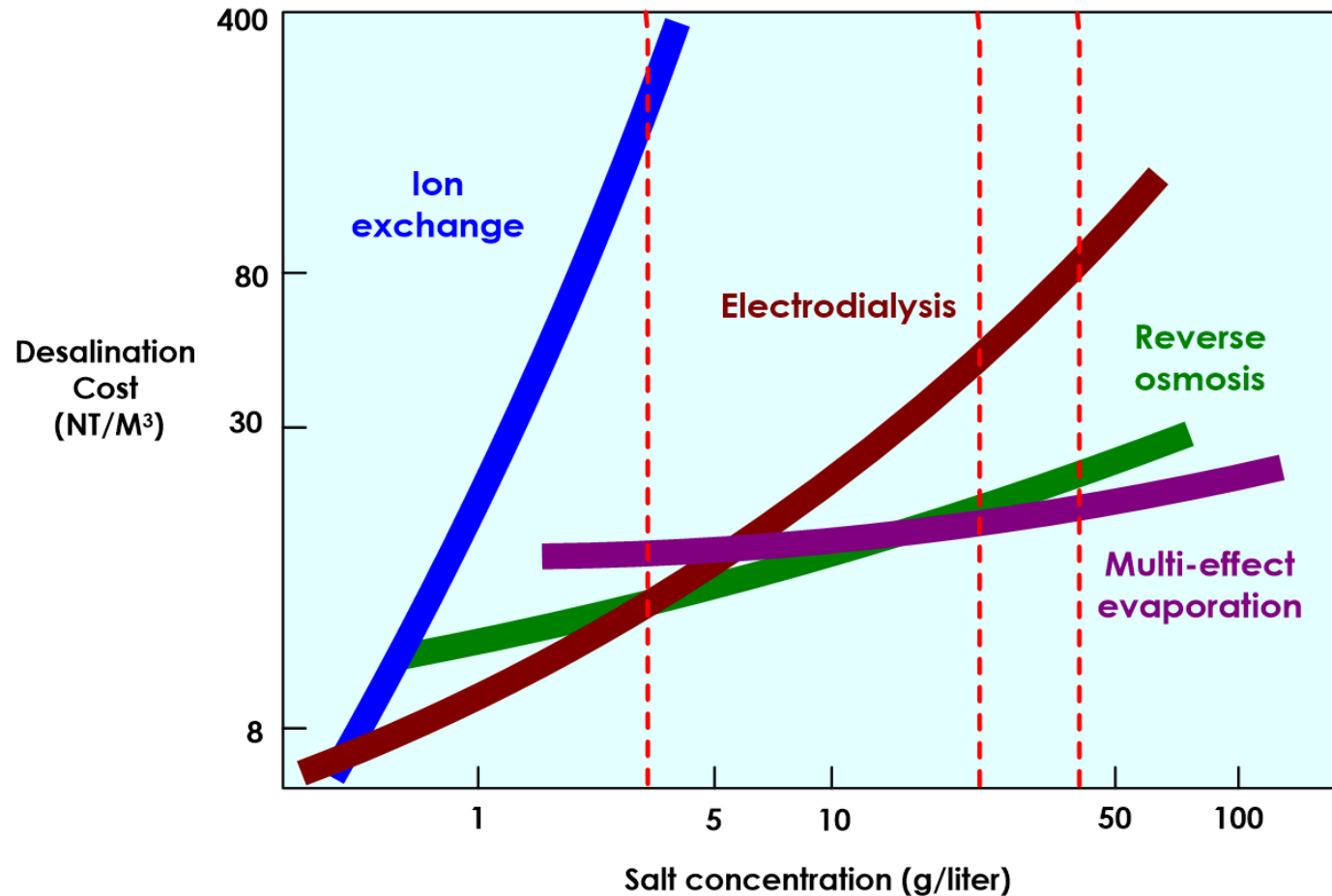
# Applications Integration

Process  
wastewater

Secondary  
treatment

UF+RO  
(UF)+ED

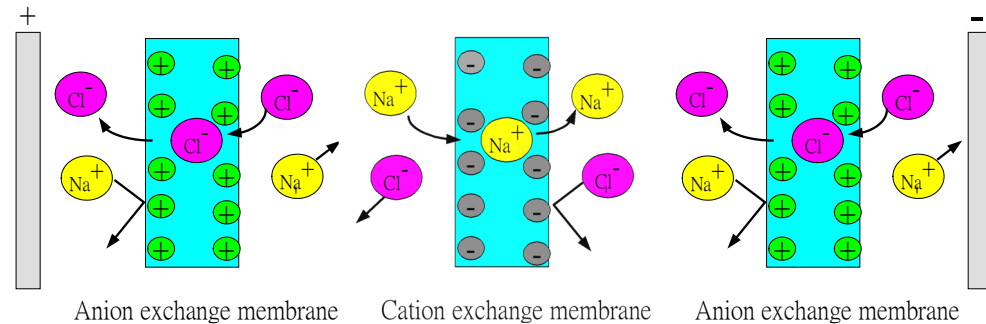
Reclaimed  
water



## ※ Principle of ED – Ion Exchange Membrane, IEM

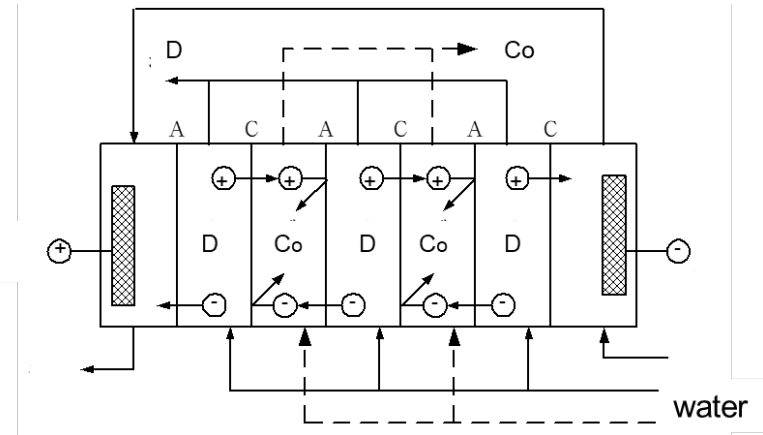
### Electrodialysis (ED)

removes ions from water and wastewater using a **direct electric charge** to transfer the ions pass through anion or cation exchange membranes. The **cations migrate to cathodes** and **anion migrate to anodes**.

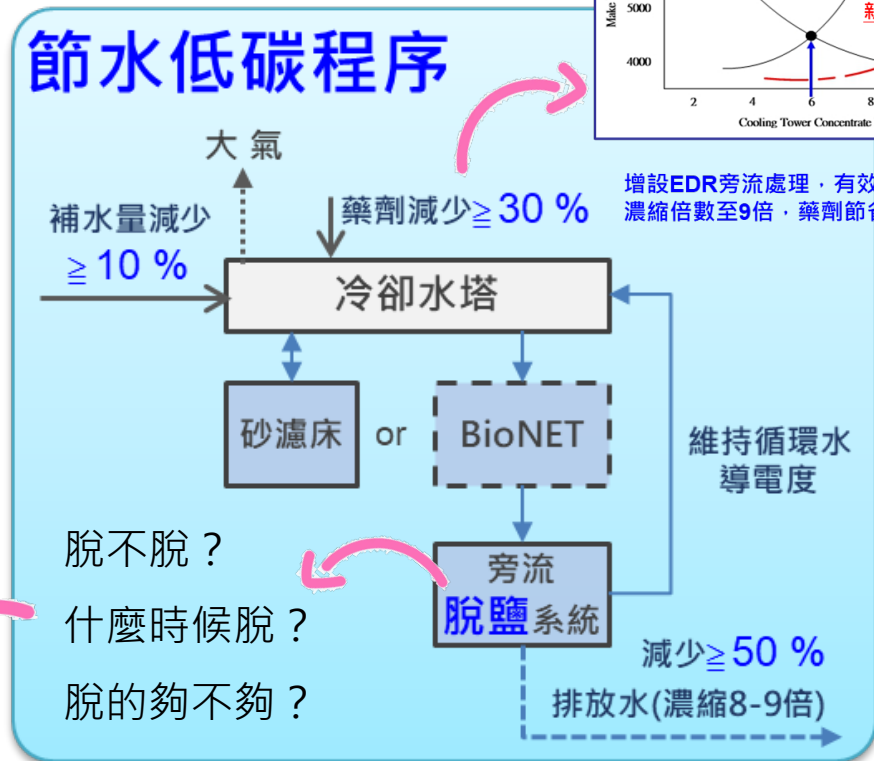
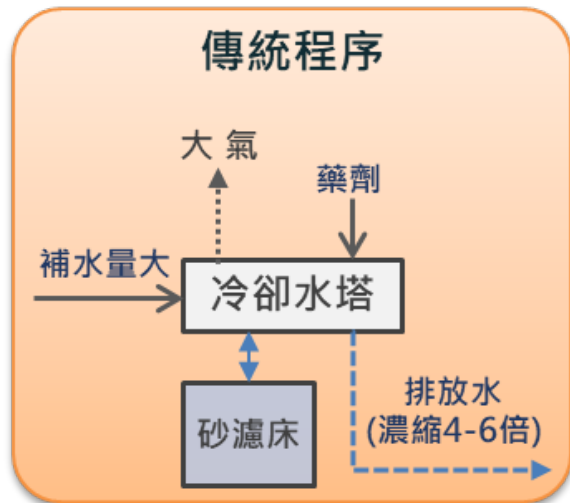
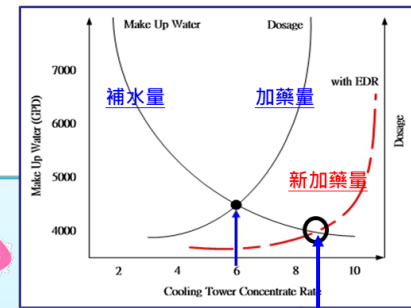


### Electro-Dialysis reversal (EDR)

**reverses the polarity of electrodes periodically** to improve anti-scaling and anti-fouling property, and also extends the lifetime of ion exchange membranes.



# Side-stream application



增設EDR旁流處理，有效提升冷卻水塔濃縮倍數至9倍，藥劑節省30%

脫不脫？  
什麼時候脫？  
脫的夠不夠？

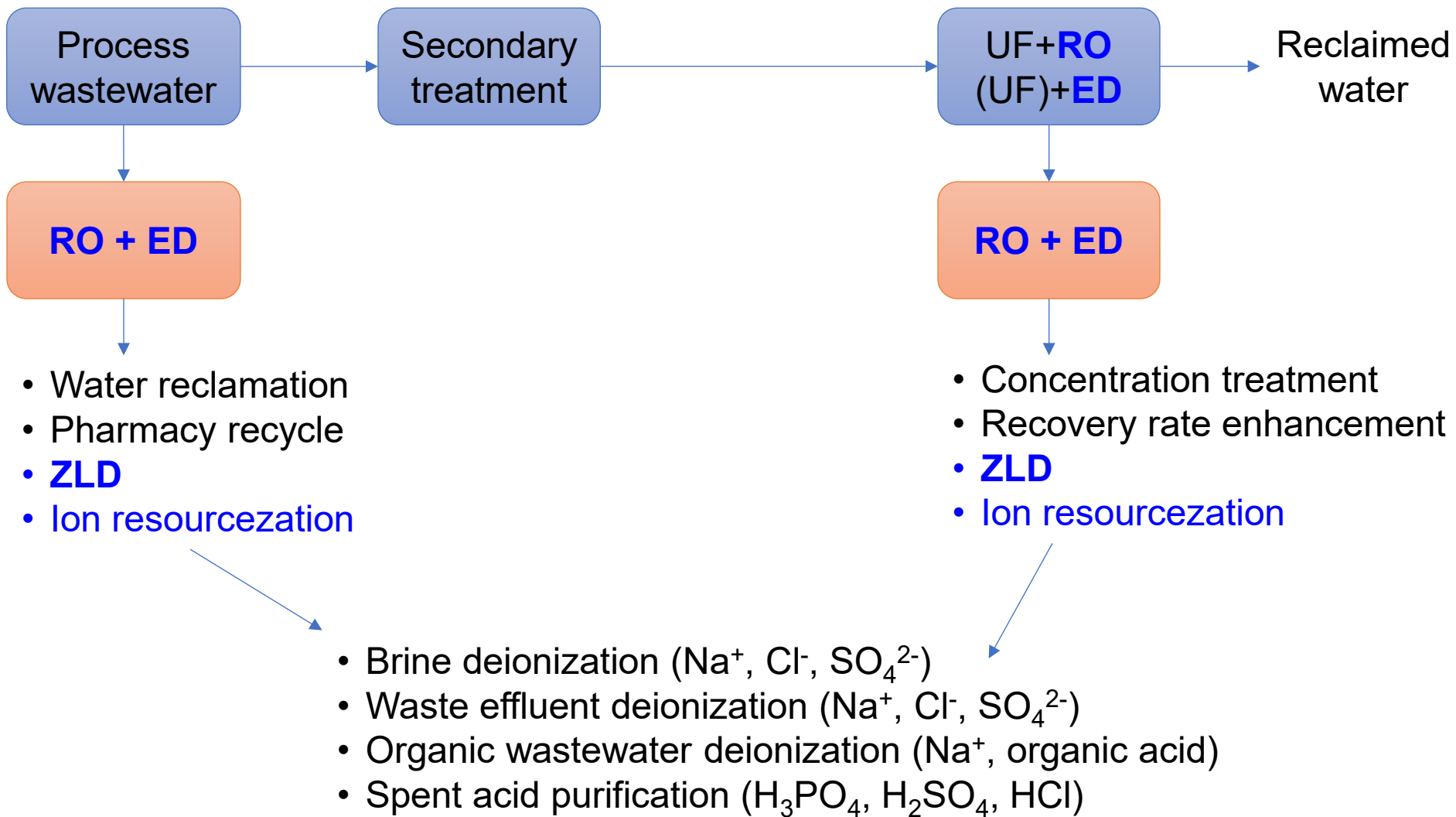


你想脫多少(鹽)  
就脫多少

## ◆ EDR

去除溶解性帶電鹽類，**連續式主動控制**冷卻循環水導電度！

# Applications Integration





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*Thanks*

