

# innovations for a new climate reality

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water is big on most global agendas

mitigation starts with wastewater

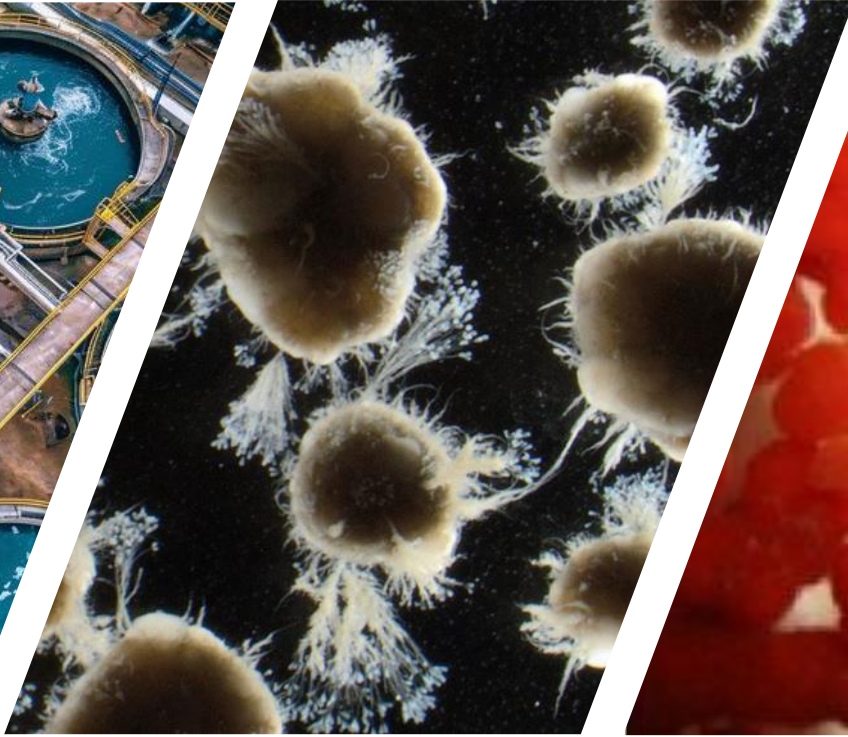
innovations in wastewater treatment that deliver low carbon solutions



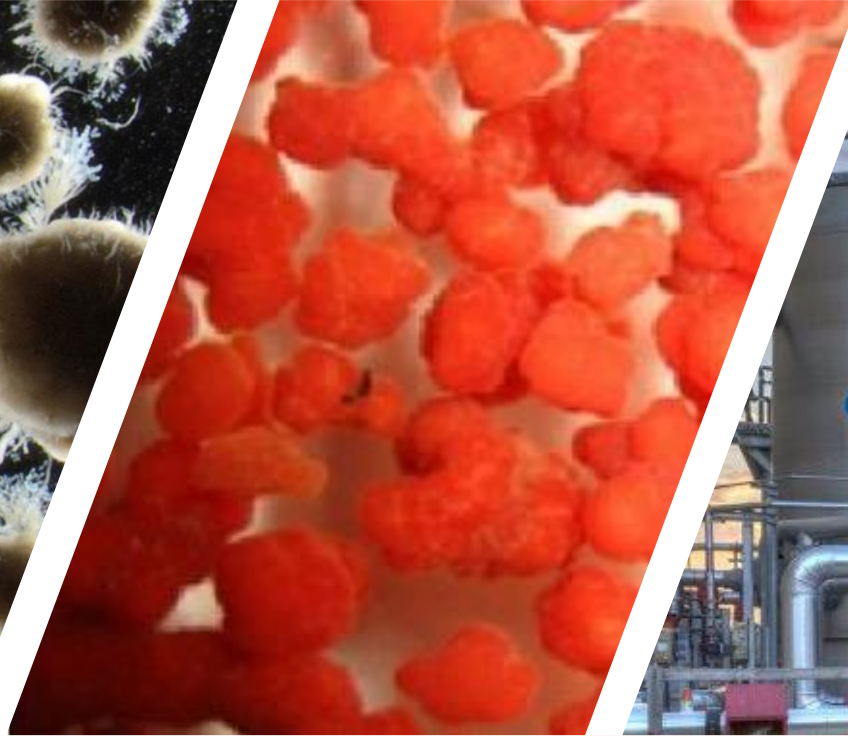
# these innovations focus on intensification



Carbon Redirection



Aerobic Granular Sludge

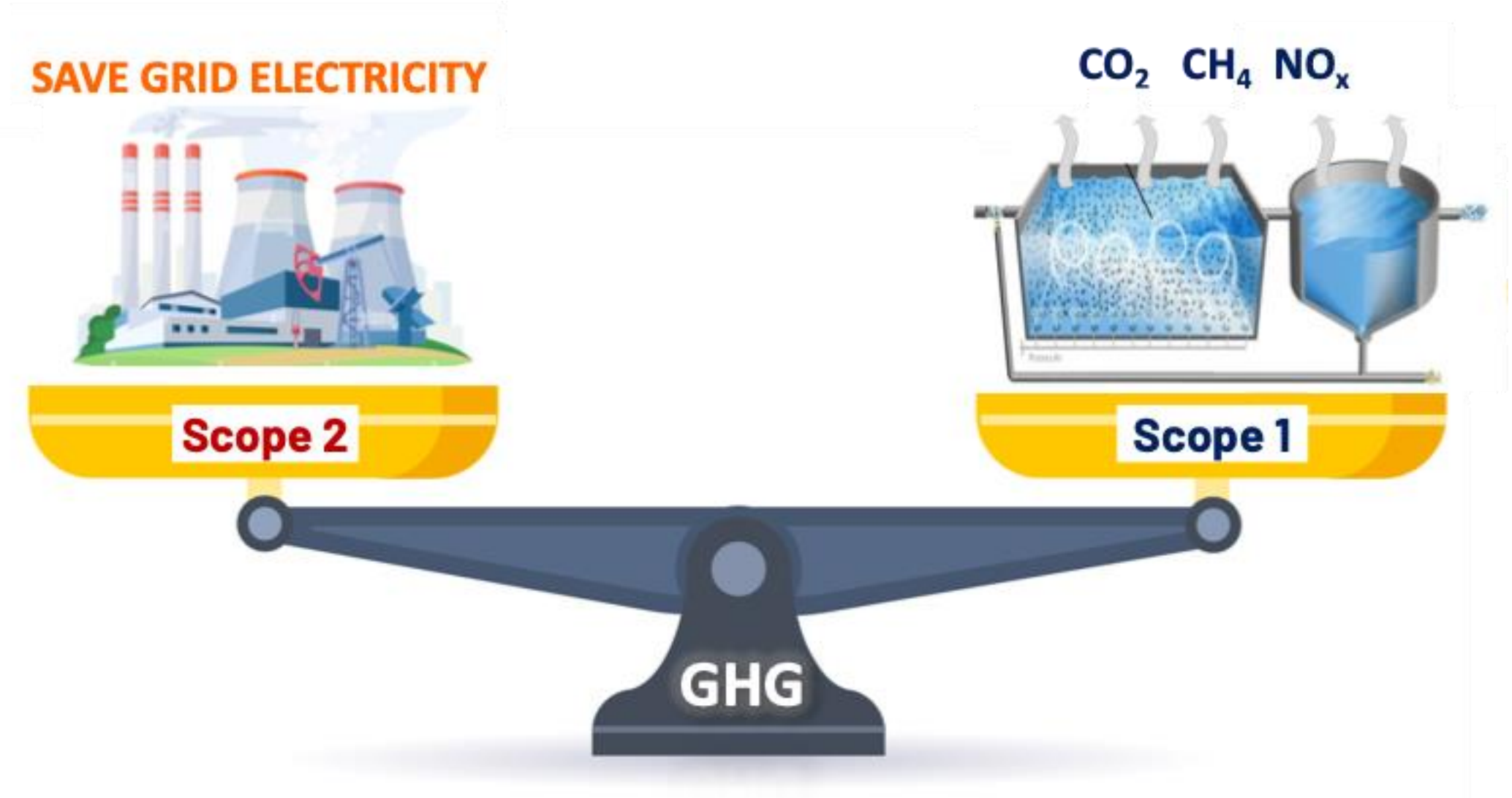


Anammox



Thermal Hydrolysis

energy cuts  $\neq$  GHG cuts: know the difference

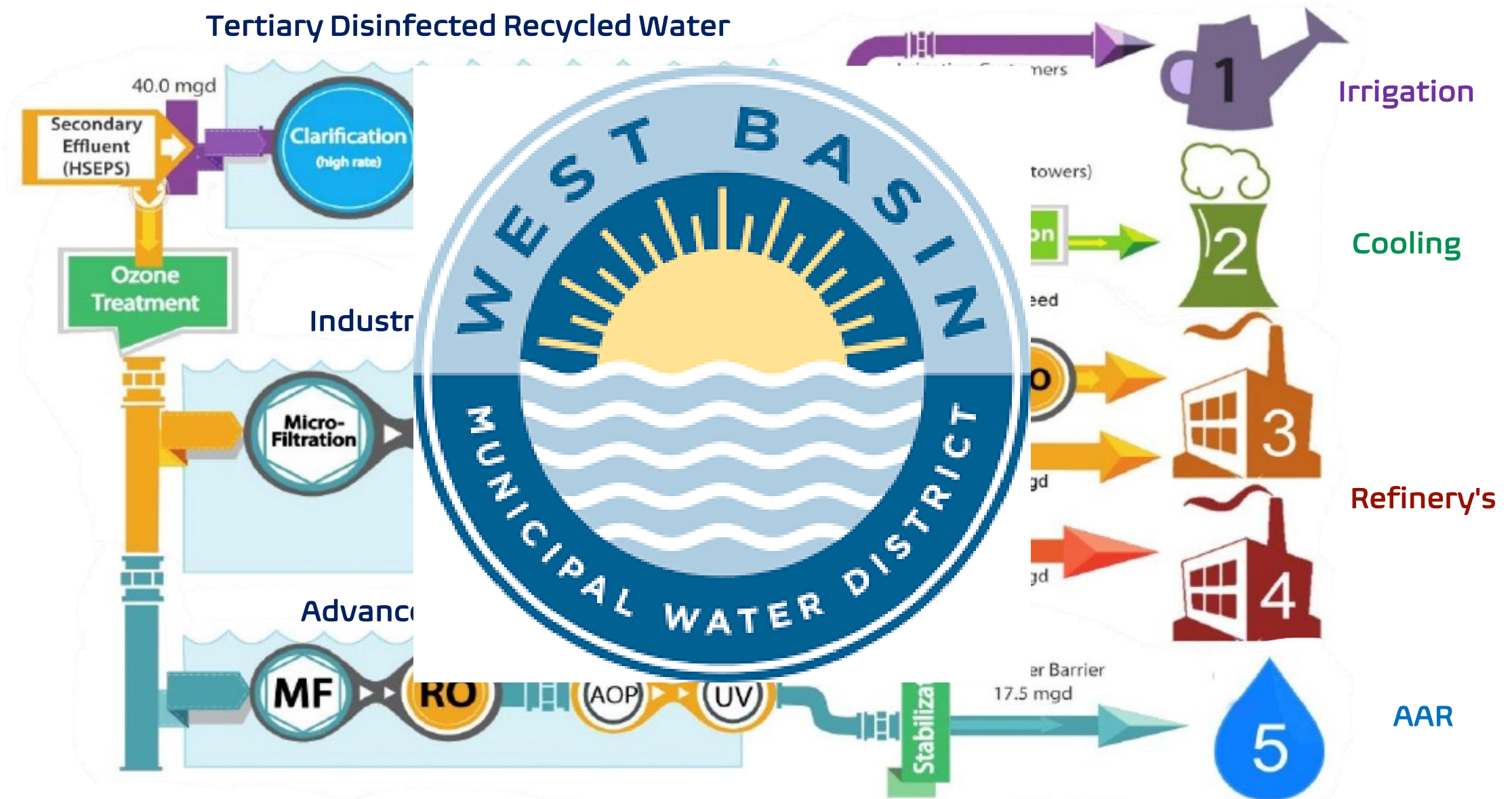


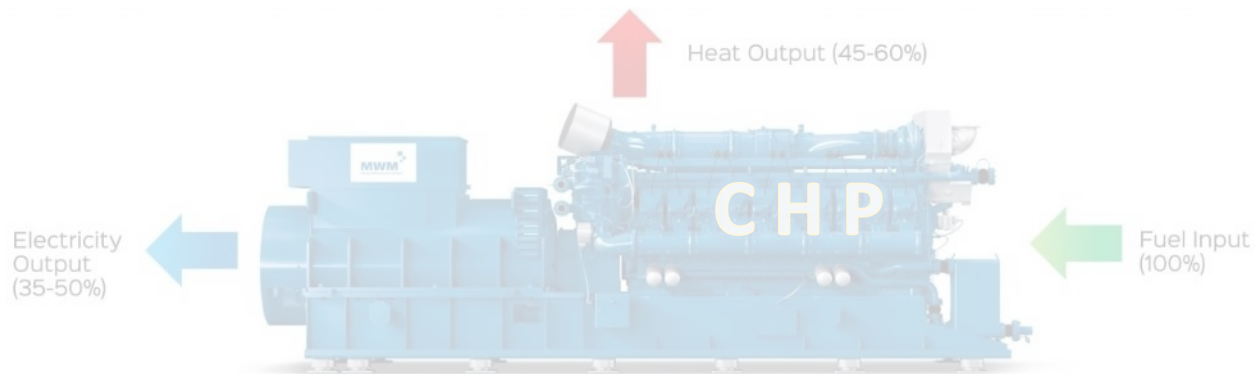
# adaptation - supply chain resiliency

innovations focus on **water productivity** - matching quantity & quality to use;  
and **circular approaches** that recover valuable resources from wastes

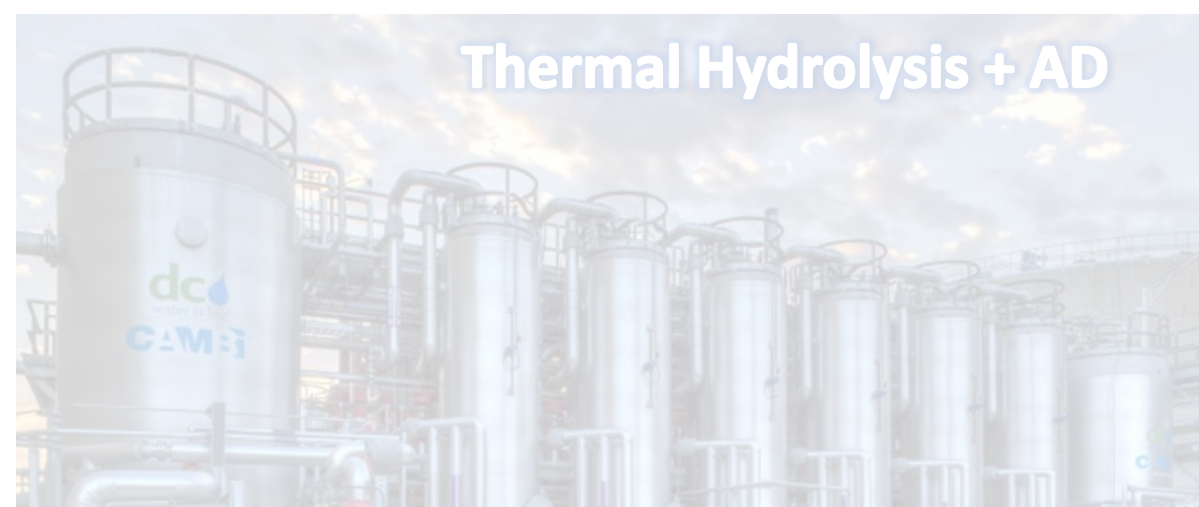


# designer waters, waters of different flavours



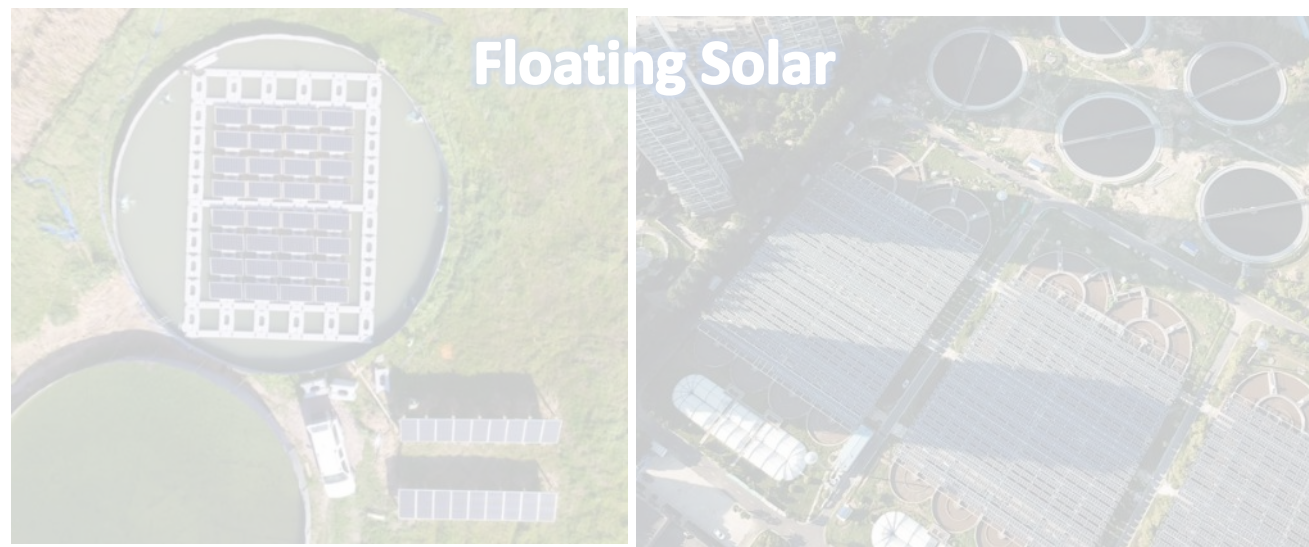


Biogas produces both electricity & heat maximises energy utilisation (Denmark for district heating)



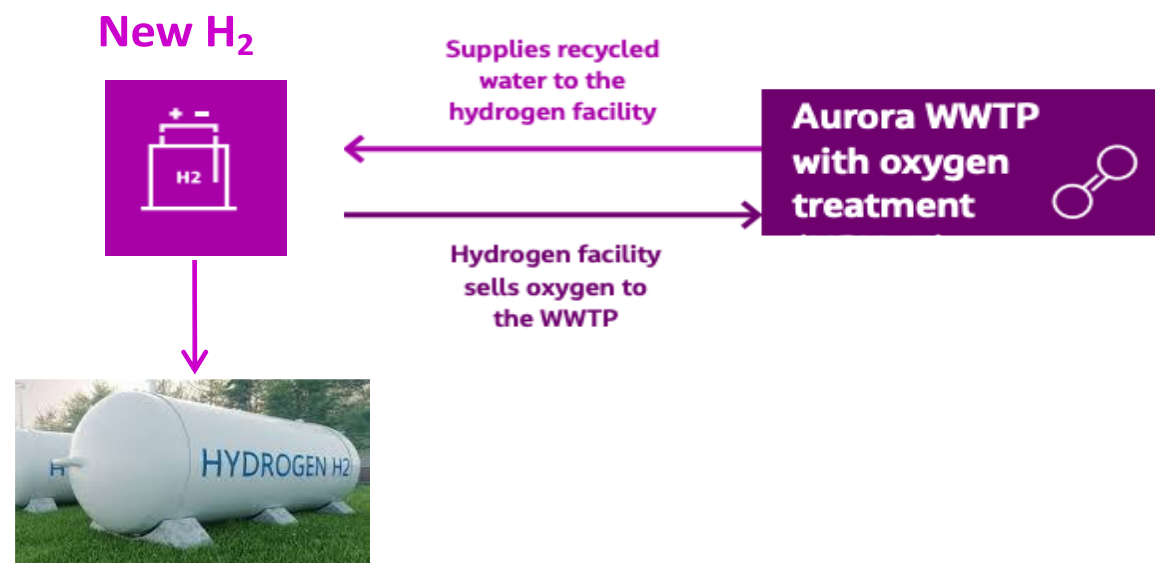
## Thermal Hydrolysis + AD

Increases biogas production. Co-digesting with food waste triples energy yield (Singapore, Beijing)



## Floating Solar

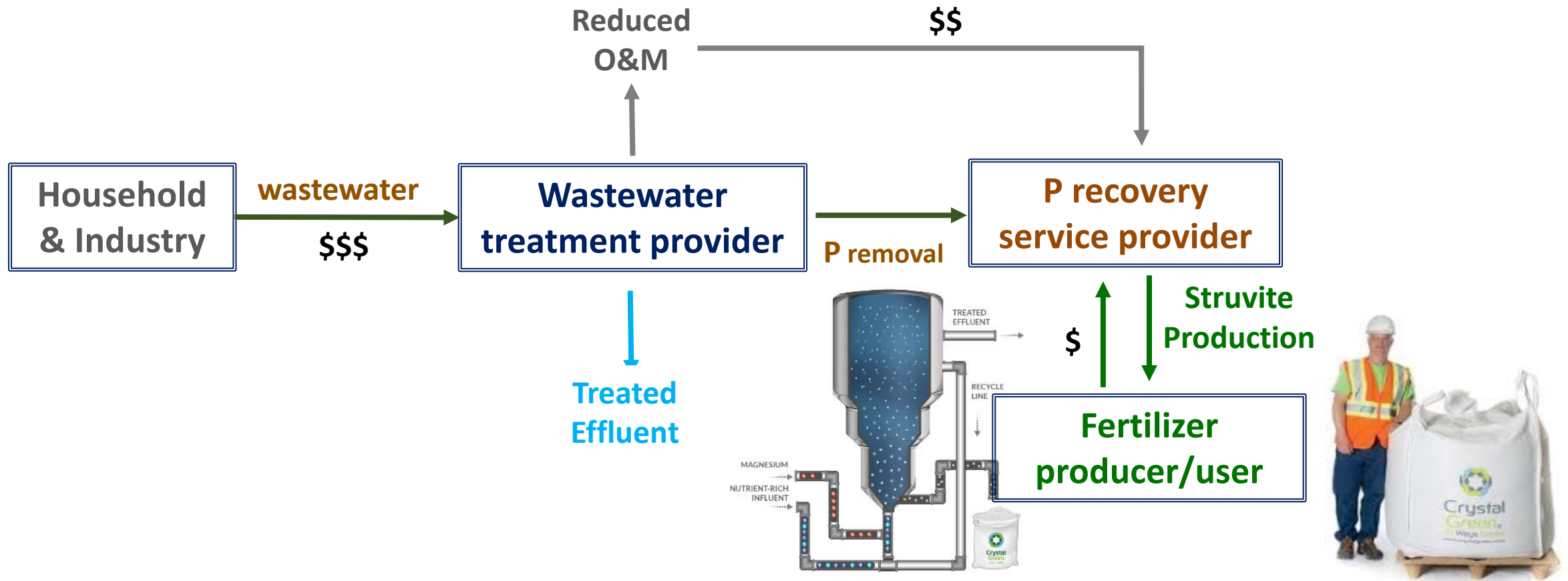
Cape Town (SA) & Shisi + Beijing (China) - Solar on tanks & reservoirs (energy + lower evaporation)



Yarra Valley (Aus) exploring H<sub>2</sub> production at WWTP (O<sub>2</sub> used to reduce aeration needs)

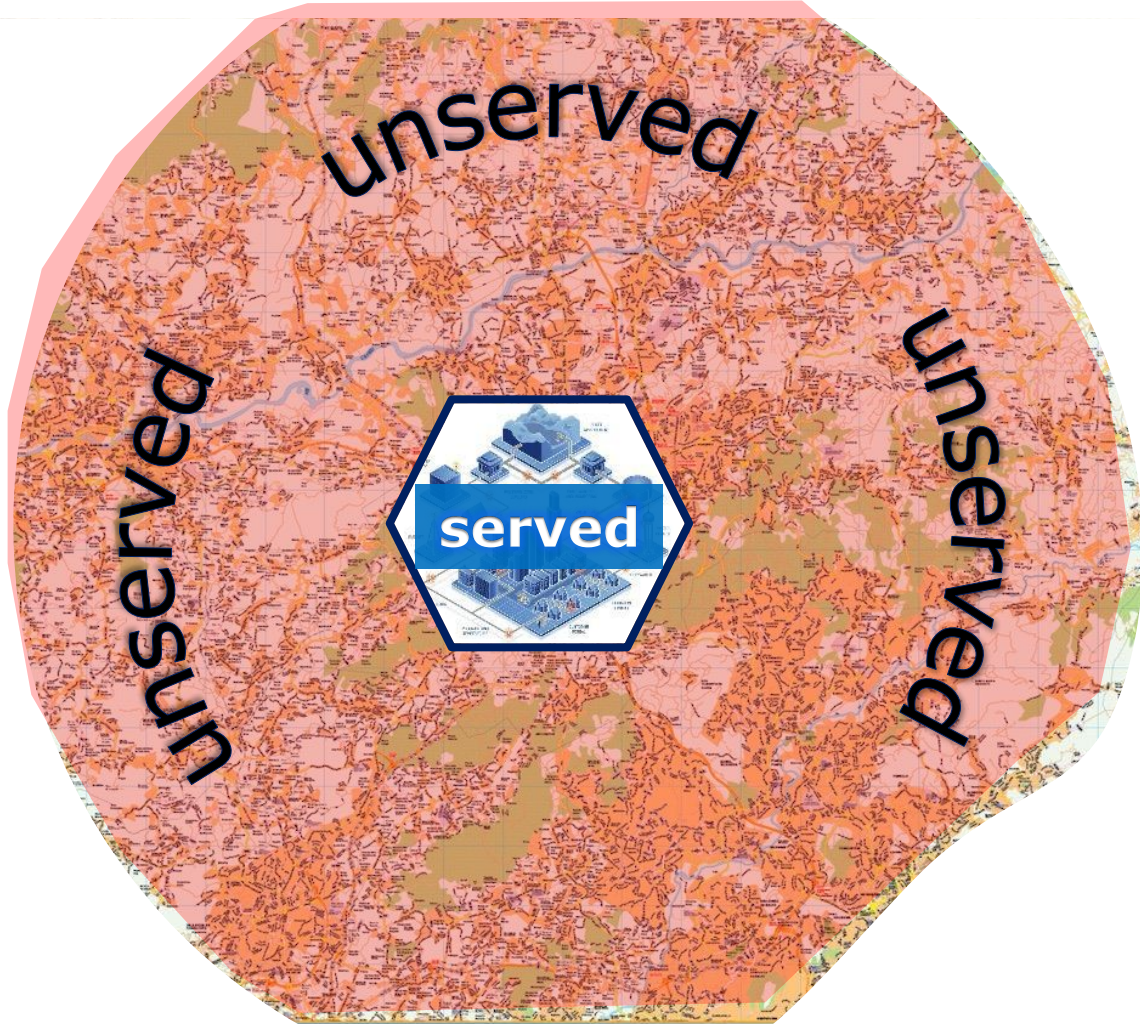


# important to understand business models



decentralization is a tactical opportunity  
it allows us to be nimble, frugal, and speedy

centralized systems are heavy and slow to get moving



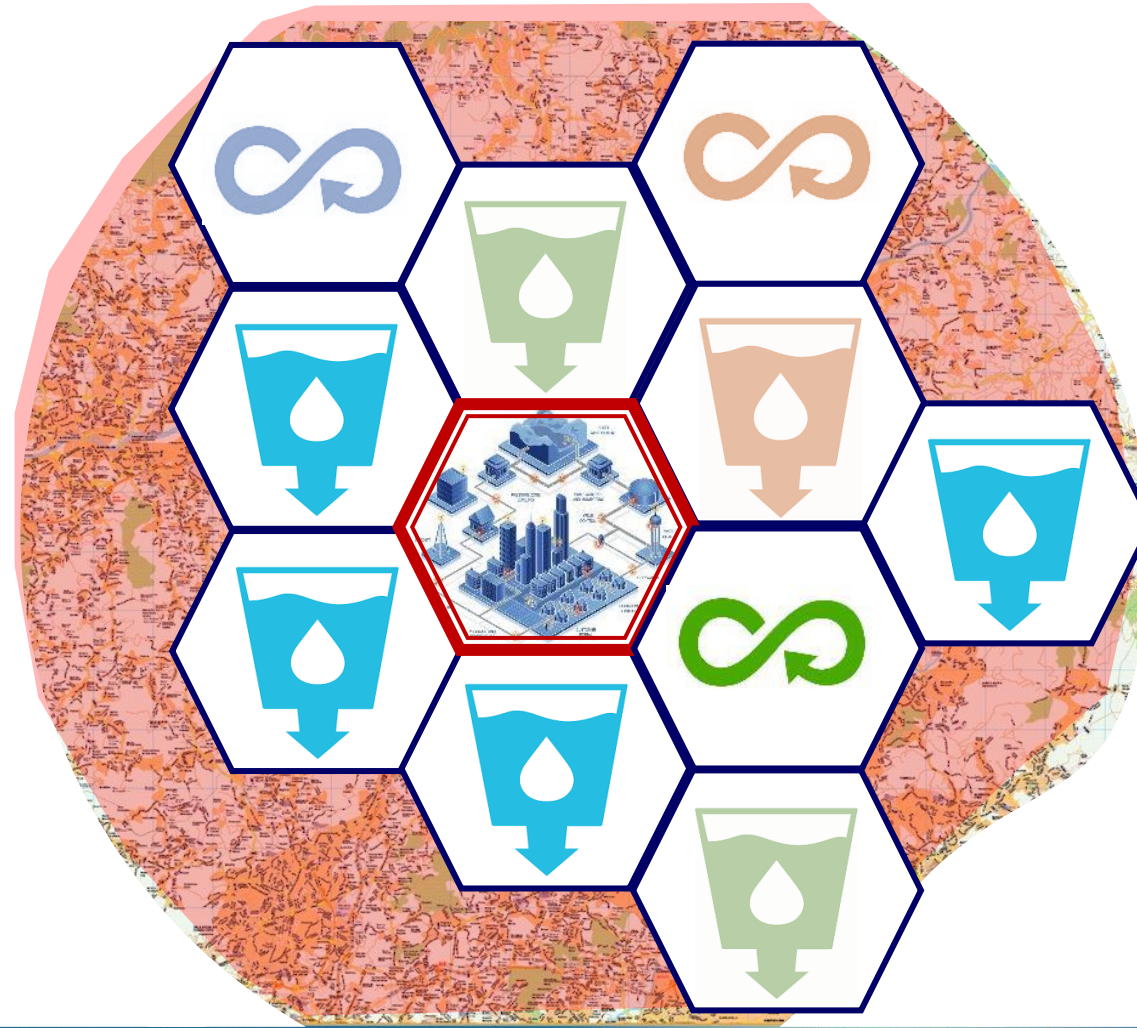


# distributed systems have advantages



staged growth • technology agnostic • increased resiliency • flows minimized

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# distributed systems: proven & emerging



Hamburg,  
Watercycle



Battery Park  
New York City



Helsingborg  
Oceanshamn



Hammarby  
Sjöstad

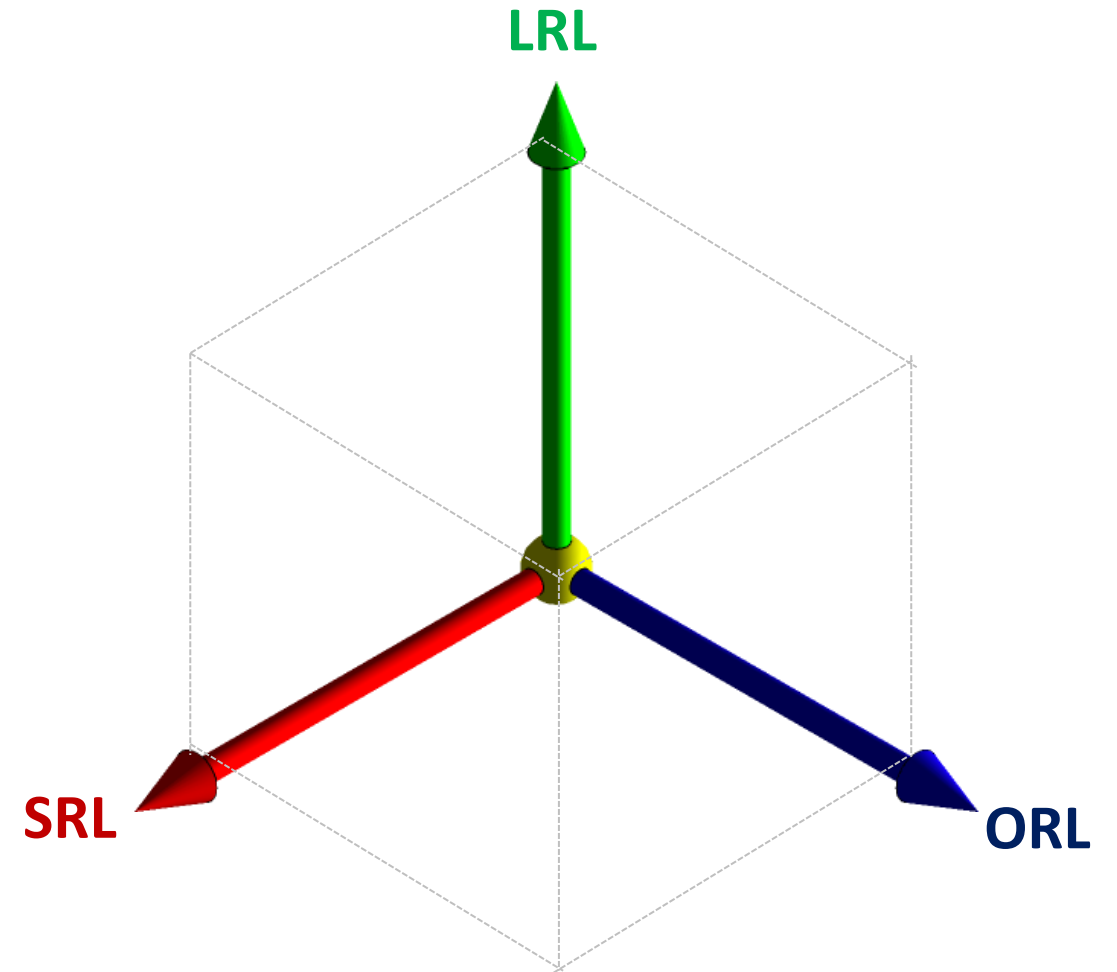


# innovation uptake and readiness

readiness is not just about technology – it's **multidimensional**

# understanding 'readiness' is important

Technology	Societal	Organisational	Legal
<b>TRL</b>	<b>SRL</b>	<b>ORL</b>	<b>LRL</b>
9	9	9	9
8	8	8	8
7	7	7	7
6	6	6	6
5	5	5	5
4	4	4	4
3	3	3	3
2	2	2	2
1	1	1	1



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waste to energy



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direct potable reuse

# choices before us



