Evalueringer af fremtidens vandhåndtering

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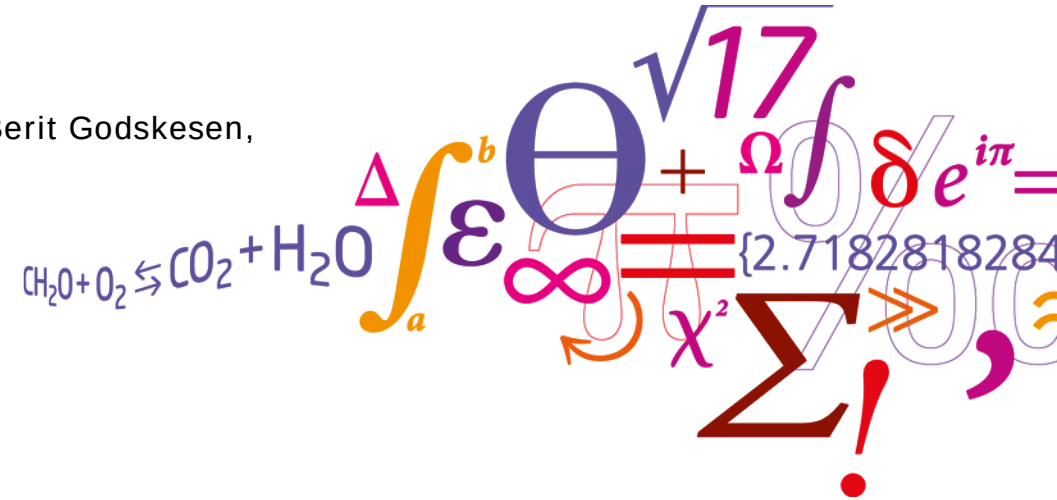
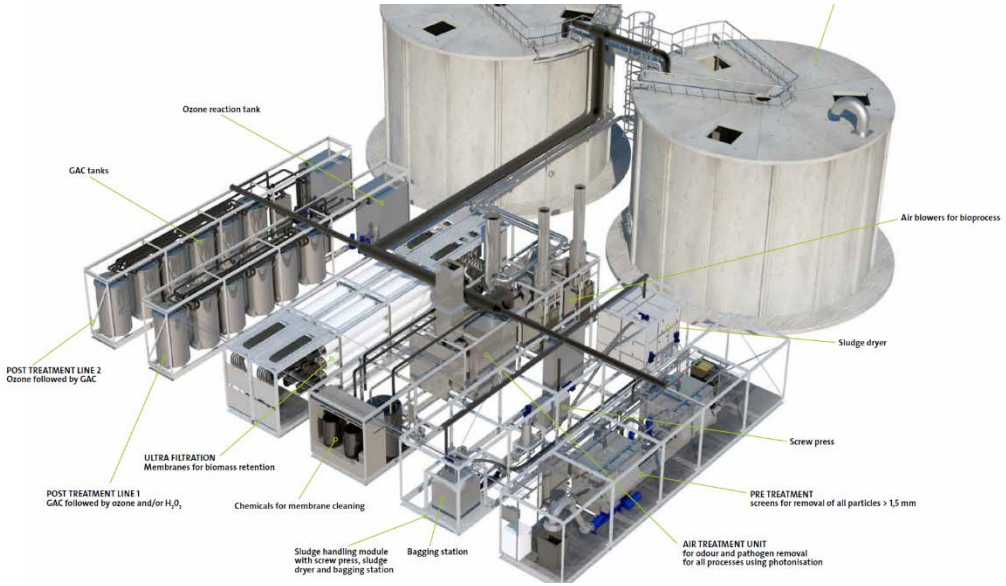


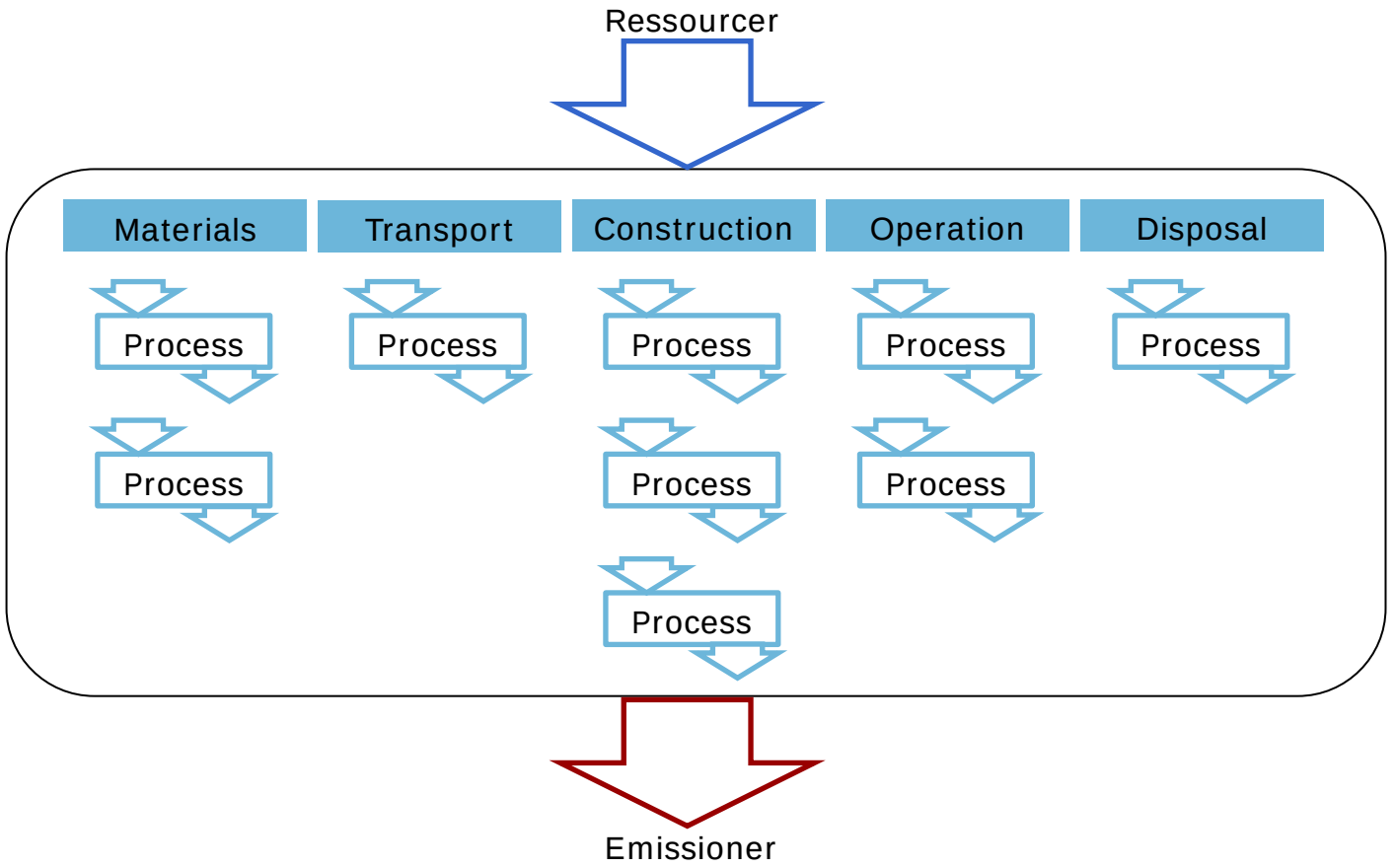
DTU Miljø
Institut for Vand og Miljøteknologi

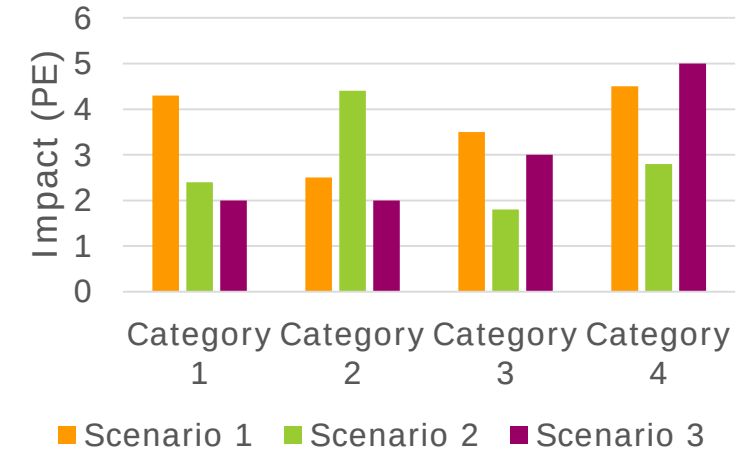
Nye krav til udledninger, fx hospitaler

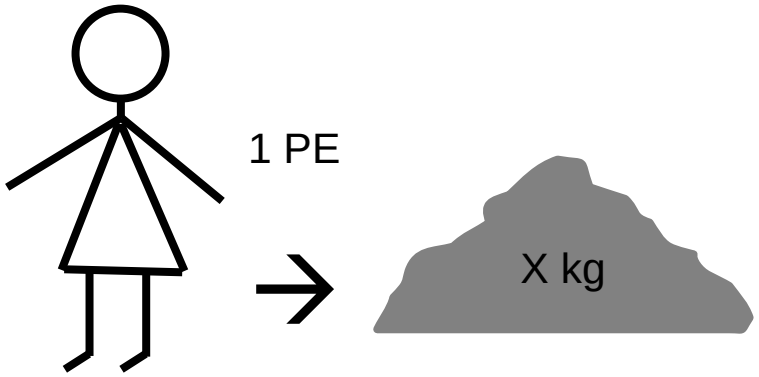


Treatment steps Barriers	Windhoek, Namibia	Orange County, USA	Newater, Singapore	Biobooster, Herlev Hosp.
Conventional WWTP	X	X	X	X
O_3-oxidation	X			X
Flocculation	X			
Activated org. carbon	X			X
Microfiltration		X	X	
Ultrafiltration	X			X
Reverse osmosis		X	X	
UV		X	X	X
Chlorination	X	X	X	
Infiltration to groundwater		X		
Conventional DWTP		X	X	
No. of barriers	6	7	6	5
Drinking water quality	Yes	Yes	Yes	(Yes)

Livscyklusvurdering





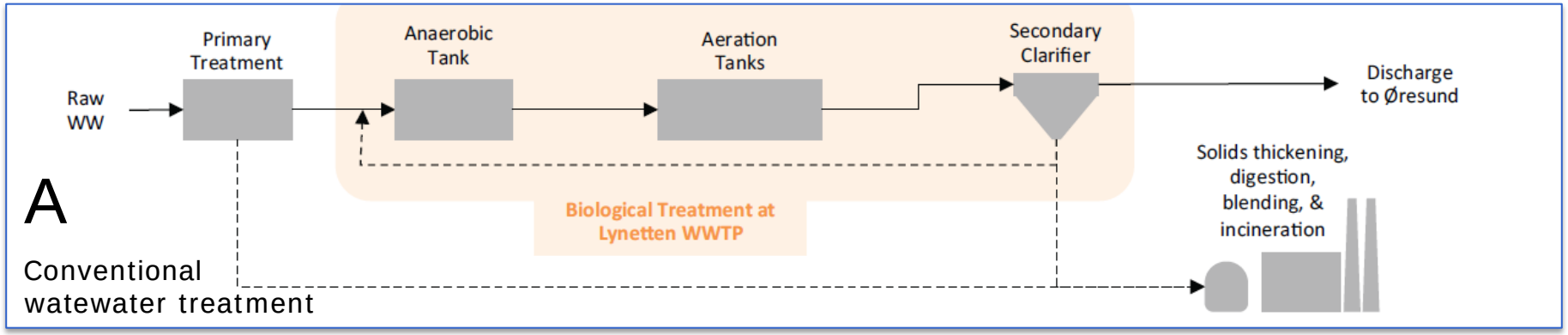


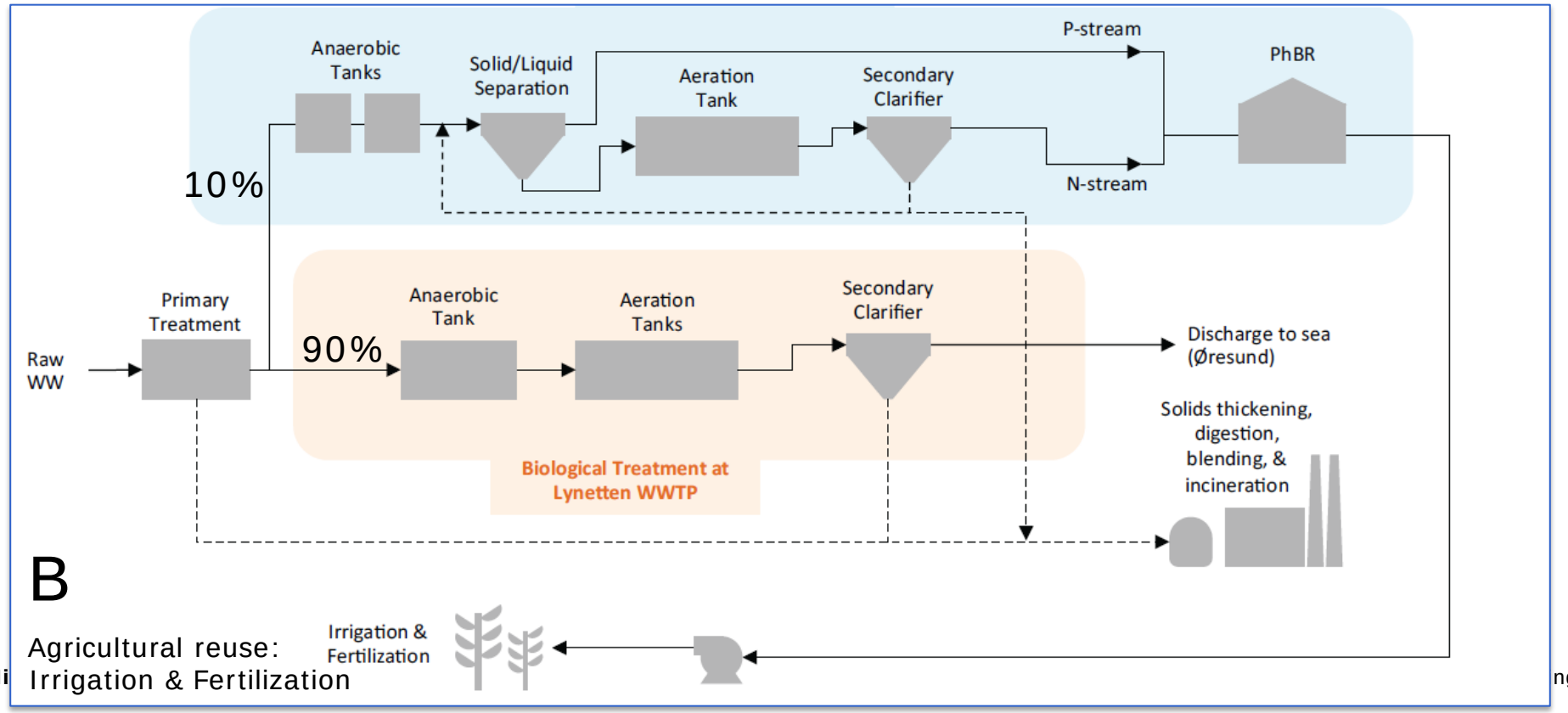
Værdiskabelse – Value Added

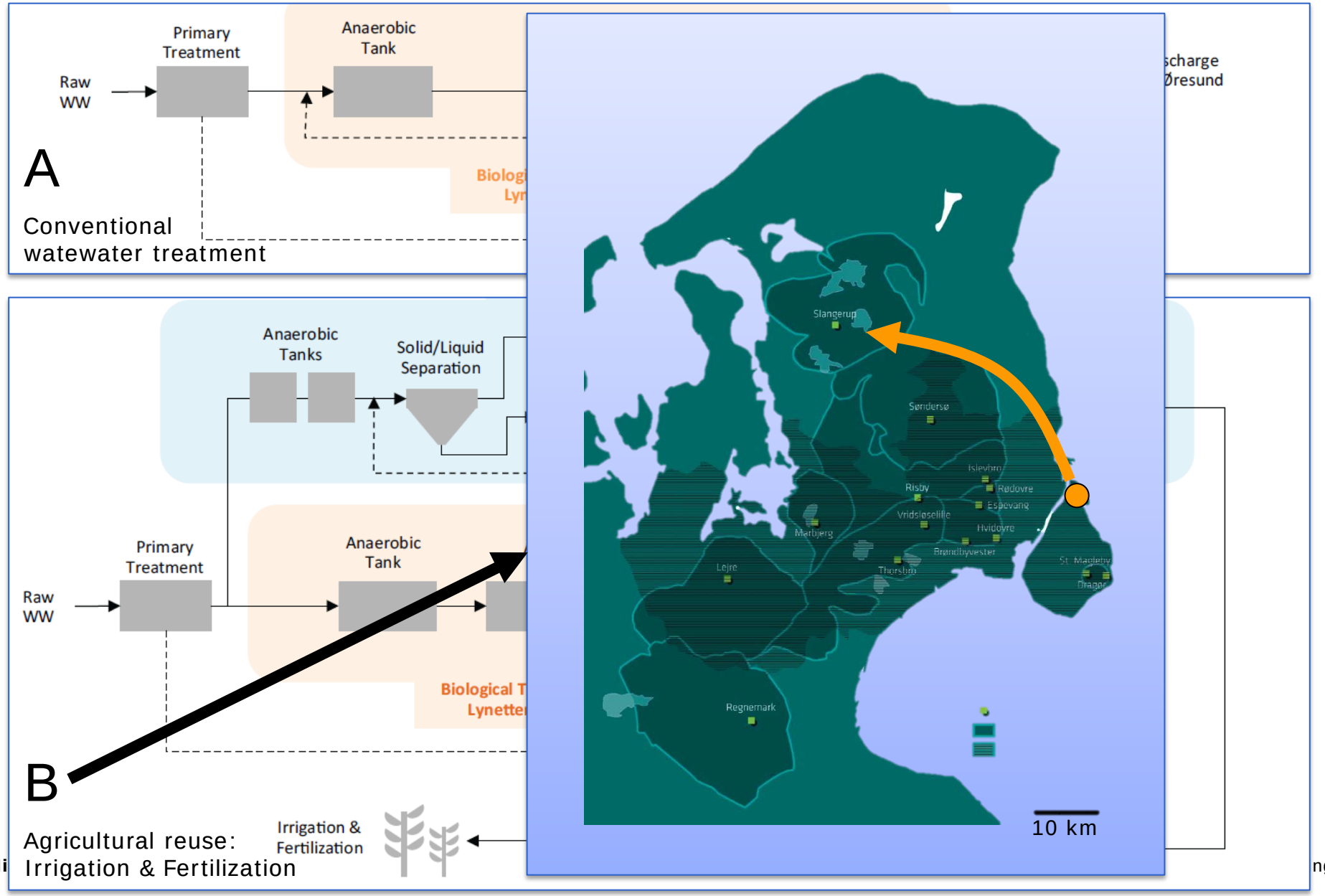
$$VA\ (kr/år) = \sum_{i=1}^{n} \left(Q_{ind} \cdot EP_{ind} - (Q_{ud} \cdot EP_{ud} + ÅAO)\right)$$

$$= \boldsymbol{virksomhedskapital + lønninger + investeringer}$$

Fra renseanlæg til ressourceanlæg: TRENS

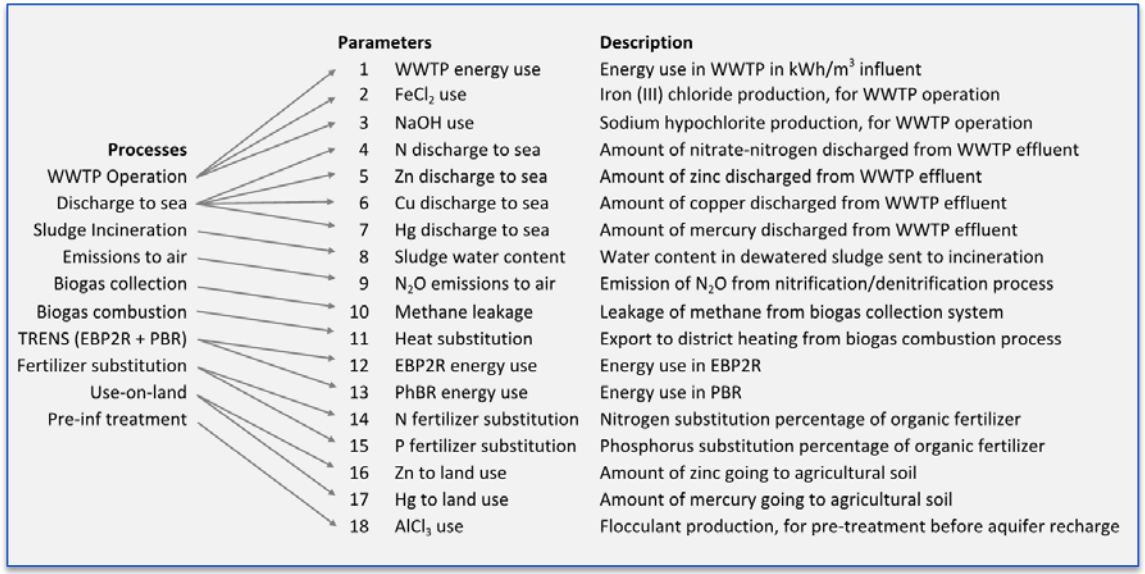




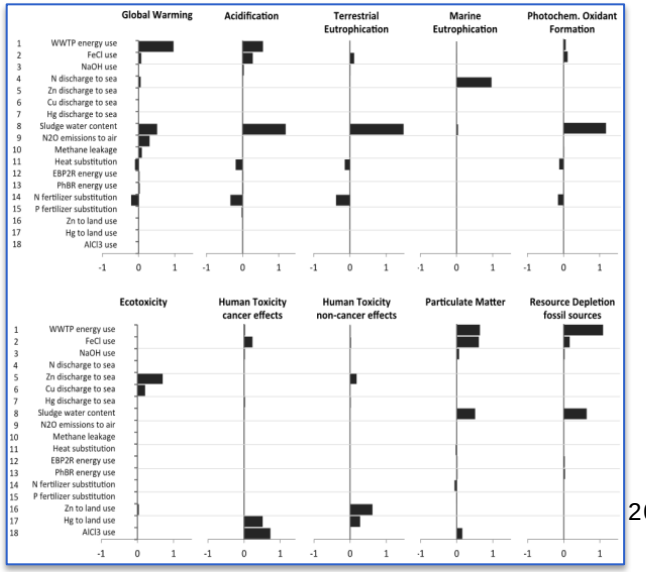

Primary Treatment
Anaerobic Tank
Raw WW
A
Conventional watewater treatment
Anaerobic Tanks
Solid/Liquid Separation
Primary Treatment
Anaerobic Tank
Raw WW
B
Agricultural reuse: Irrigation & Fertilization
Irrigation & Fertilization
Slangerup
Sønderø
Risby
Vridsløselille
Merbjerg
Lejre
Thorsbro
Regnemark
Hvidovre
Rødovre
10 km

Væsentligste beskeder til TRENS-udviklerne

- TRENS kan medføre ca 10-15% reduktion af miljøpåvirkningen i forhold til konventionel spildevandsbehandling
- Reduktionen næringsstofbelastning er meget afhængig af kontrolleret frigivelse af kvælstof fra algerne
- Tungmetallernes skæbne i TRENS er ukendt men vigtig for den samlede miljøpåvirkning
- Produktionen af lattergas N_2O i fotobioreaktoren bør undersøges nærmere
- Materialevalg bør overvejes nu

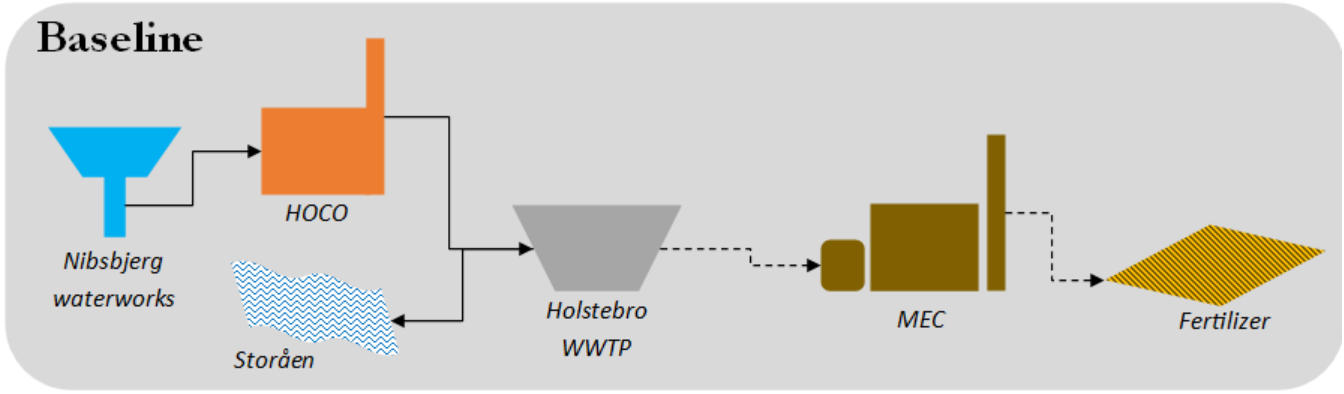


	Parameters	Description
1	WWTP energy use	Energy use in WWTP in kWh/m^3 influent
2	$FeCl_2$ use	Iron (III) chloride production, for WWTP operation
3	NaOH use	Sodium hypochlorite production, for WWTP operation
4	N discharge to sea	Amount of nitrate-nitrogen discharged from WWTP effluent
5	Zn discharge to sea	Amount of zinc discharged from WWTP effluent
6	Cu discharge to sea	Amount of copper discharged from WWTP effluent
7	Hg discharge to sea	Amount of mercury discharged from WWTP effluent
8	Sludge water content	Water content in dewatered sludge sent to incineration
9	N_2O emissions to air	Emission of N_2O from nitrification/denitrification process
10	Methane leakage	Leakage of methane from biogas collection system
11	Heat substitution	Export to district heating from biogas combustion process
12	EBP2R energy use	Energy use in EBP2R
13	PhBR energy use	Energy use in PBR
14	N fertilizer substitution	Nitrogen substitution percentage of organic fertilizer
15	P fertilizer substitution	Phosphorus substitution percentage of organic fertilizer
16	Zn to land use	Amount of zinc going to agricultural soil
17	Hg to land use	Amount of mercury going to agricultural soil
18	$AlCl_3$ use	Flocculant production, for pre-treatment before aquifer recharge

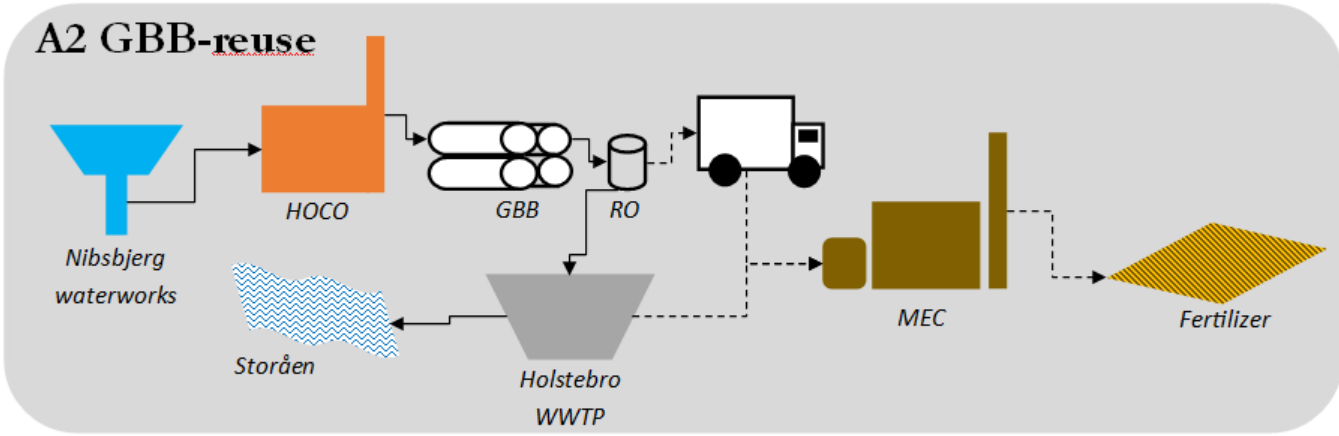


Lokal vandgenindvinding på mejeri

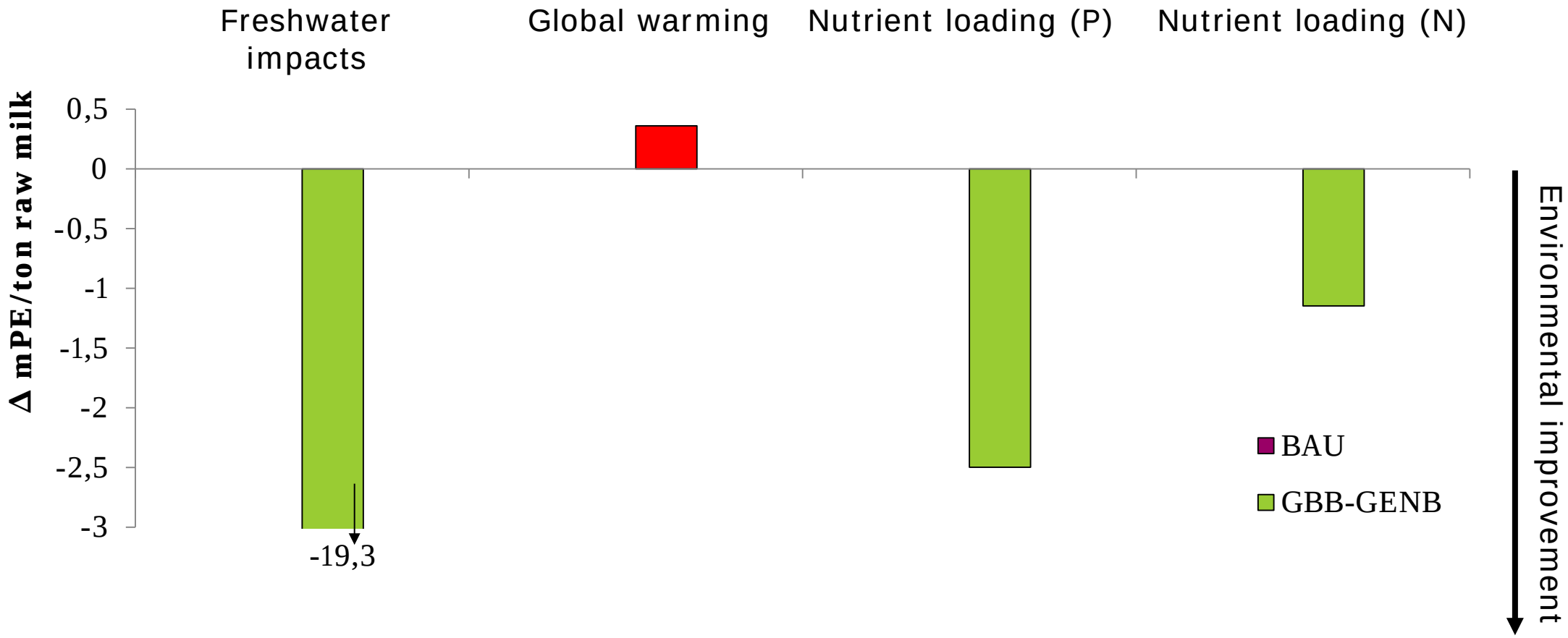
BAU



GBB-Genb



Livscyklusvurdering af lokal vandgenindvinding på mejeri



Værdiskabelse – Mejeri vs system

	Værdiskabelse [DKK/ton råmælk]				
	Vand-forsyning	Mejeri	Renseanlæg	Biogasanlæg	**Total**
Forskel BAU og GBB-GENB	-4.25	12,17	-13,85	-0,46	**-6,38**
	☹	☺	☹	☹	☹

Tag med

1. Flere drivkræfter skubber på udviklingen af byens vandsystemer
2. Større aktører vil påvirke af op- og nedstrøms forsyninger
3. Vi udvikler værktøjer, der kan beregne effekterne for hele systemet

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