

# LIFE WATER FACTORY

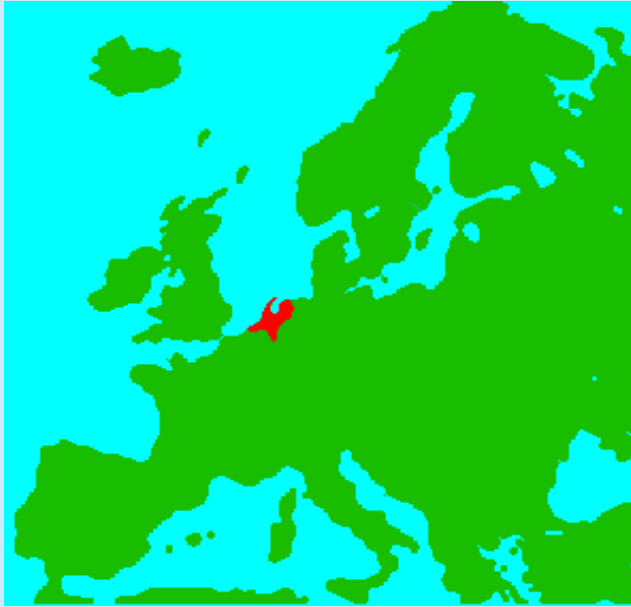


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# Netherlands = wetlands



# The Netherlands without dikes



29 % below sealevel  
26 % floodplains

55 % flood risk area

2.000.000.000.000 billion  
euro investment in houses  
and other buildings

10 million people

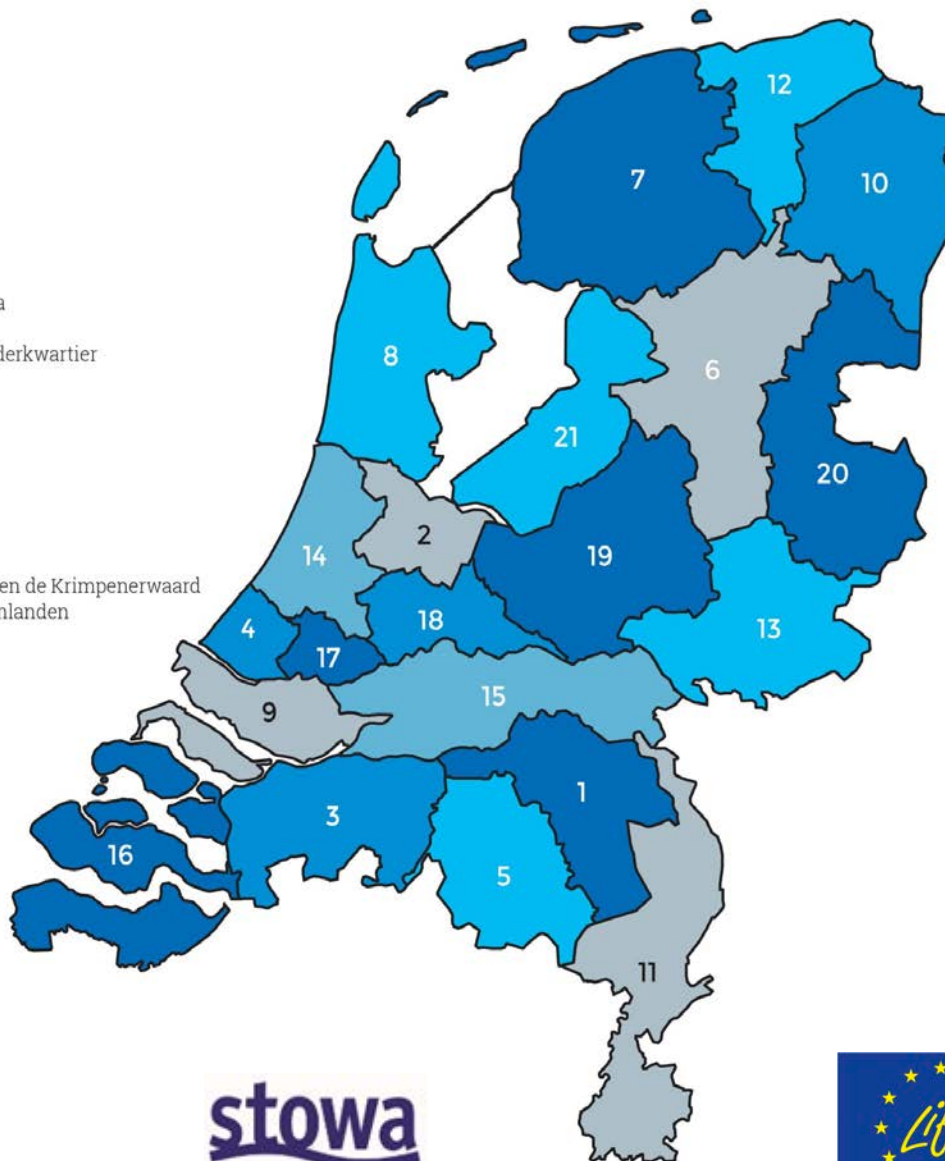


# Waterschappen (21) Regional water authorities (decentralised)

 UNIE VAN  
WATERSCHAPPEN

## LEGENDA

1. Waterschap Aa en Maas
2. Waterschap Amstel, Gooi en Vecht
3. Waterschap Brabantse Delta
4. Hoogheemraadschap van Delfland
5. Waterschap De Dommel
6. Waterschap Drents Overijsselse Delta
7. Wetterskip Fryslân
8. Hoogheemraadschap Hollands Noorderkwartier
9. Waterschap Hollandse Delta
10. Waterschap Hunze en Aa's
11. Waterschap Limburg
12. Waterschap Noorderzijlvest
13. Waterschap Rijn en IJssel
14. Hoogheemraadschap van Rijnland
15. Waterschap Rivierenland
16. Waterschap Scheldestromen
17. Hoogheemraadschap van Schieland en de Krimpenerwaard
18. Hoogheemraadschap De Stichtse Rijnlanden
19. Waterschap Vallei en Veluwe
20. Waterschap Vechtstromen
21. Waterschap Zuiderzeeland



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# SAFETY

Dikes – flood protection



# SUFFICIENT WATER

Water supply - irrigation



# CLEAN WATER

- Waste water treatment
- Licensing & enforcement



Drainage –

Flood protection

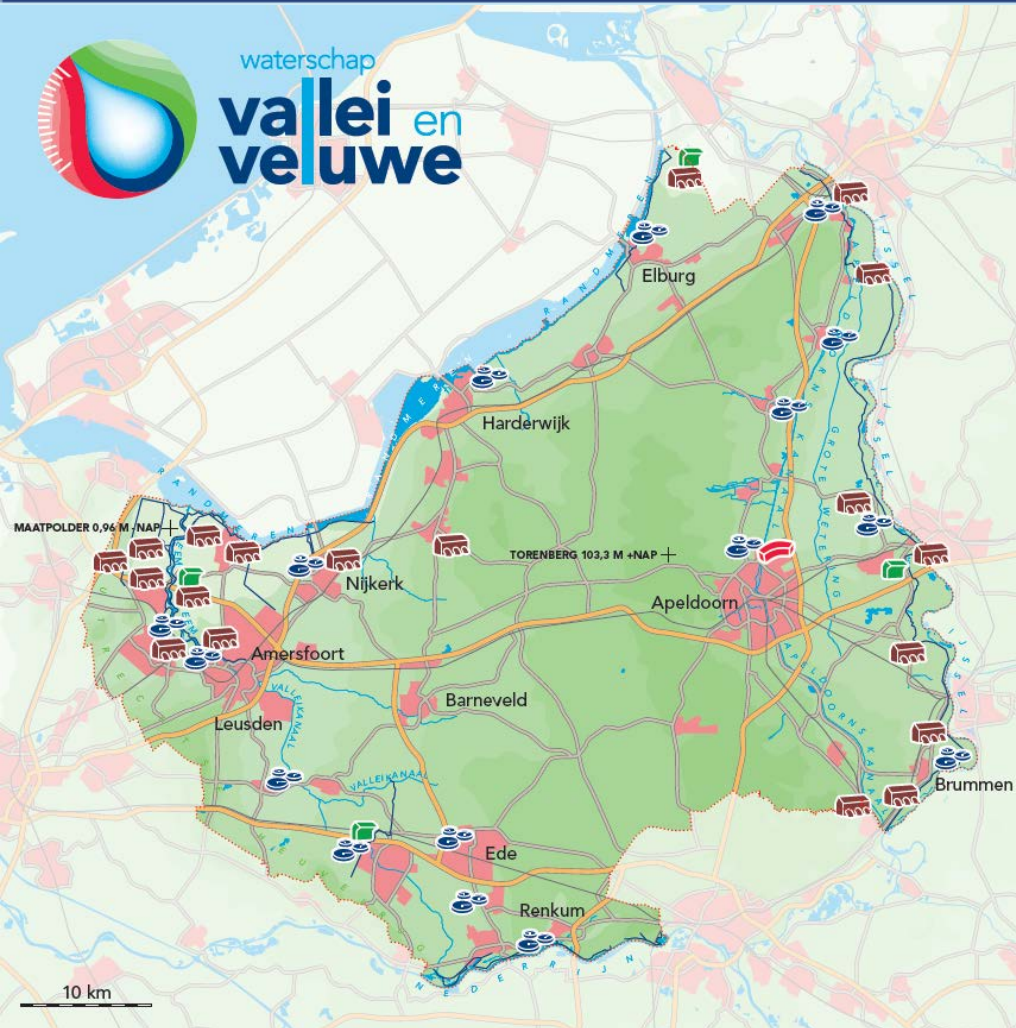




# Water Authority Vallei en veluwe



waterschap  
**vallei en  
veluwe**



245.000 ha

1.100.000 inhabitants

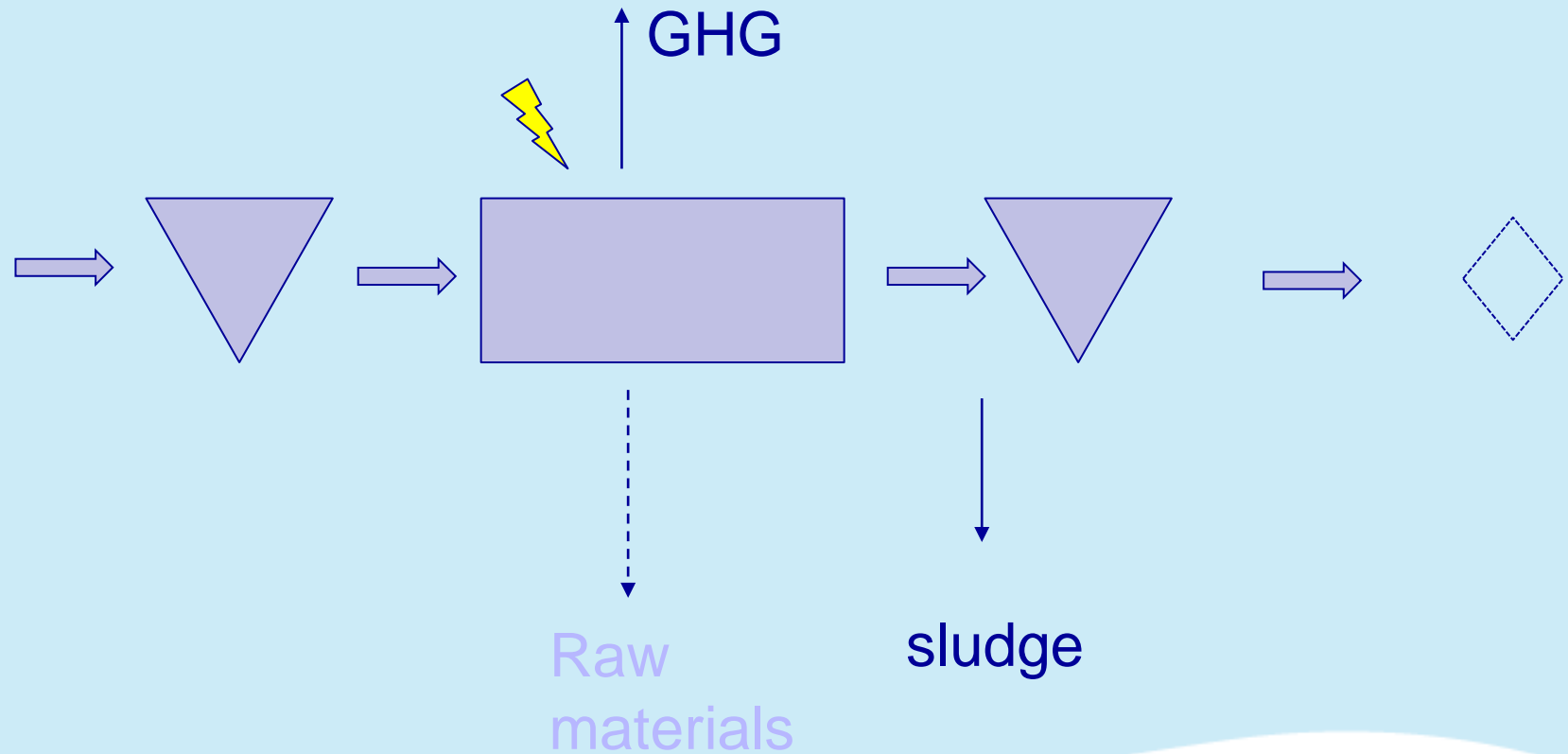
16 WWTP

1.500.000 PE

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# Conventional treatment



# New purification concept

Highly innovative physical sewage treatment process (*electro-chemical conditioning and physical separation*).

Crystal *clear water* is made to combat freshwater shortage.

Raw materials are extracted without a negative impact on environment.

Aim:

- to produce '*fit for use*' *high-quality water*
- *over 85 % recovery of value resources*
- creation, valorisation and improvement of *value chains*
- become the stepping stone for *replication*

<https://www.youtube.com/watch?v=Tb4fzjCTdsU>





# Proces LIFE Waterfactory Wilp



# Steps

Coarse screen

Sand trap

Fine sieves (belt, 350  $\mu$ )

Electro-coagulation (Fe/Al)

Dissolved air flotation

Nanomembranes (concentrate to ECF)

Ion exchange (softening and  $\text{NH}_4$  removal)  
(marble filter)

Wetland/helophytes (ecologisation)

Discharge local waterway or horticulture

Natural resources	Key indicators		Performance
- cellulose	1.400	tons/year	= 98% recovery
- ammonium	79	tons/year	= 96% recovery
- phosphates	5	tons/year	= 65% recovery
- organic biomass	15.000	tons/year	= 95% recovery
- sand	2	tons/year	= 80% recovery
- clean water	901.250	m3/year	= 98% recovery

*Sand*

*Cellulose*

*Organic and phosphate*

*$\text{NH}_4\text{SO}_4$*

*Water*

Environment and climate	Key indicators		Performance
- CO2	435	tons/year	= reduction
- water quality: OMP	901.250	m3/year	= 80% removal

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# Pilot (proof of concept)

2 m<sup>3</sup>/h

Half year

All components functioned well

Physical chemical separation results in very pure water

N and P complete removal; metals also well

COD not very low (?)

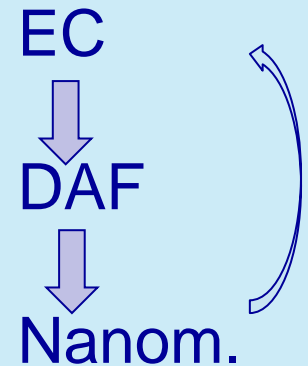
Medicine residues and other CEC's (also in IEX)

(benzotriazol and hydrochloorthiazide)

No greenhouse gases

Raw materials: cellulose and sand, challenge: flotat(4

%) and ammonia (1,5 % NH<sub>4</sub>SO<sub>4</sub>)





# What's next?

2023

50 m<sup>3</sup>/h

Optimisation coagulation-flocculation-flotation (ECF)

Long term performance membranes and ion-exchange

Impact recirculation of concentrate nanomembranes

Micropollutant removal

Minimisation energy and chemicals

Wetlands (micronutrients, O<sub>2</sub>, buffer-capacity)

Business development resources (quantity, quality, market demands)



# Busines Development



aqua  
minerals



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# Thank you for your attention

