



Lokale kretsløp for vann, avløp og avfall - Eksempel - Cicignon Park, Fredrikstad

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Co-funded by the Horizon 2020 programme
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of Science and Technology

Manhattan



Photo: P. D. Jenssen

Utfordringer

Klimaendringer

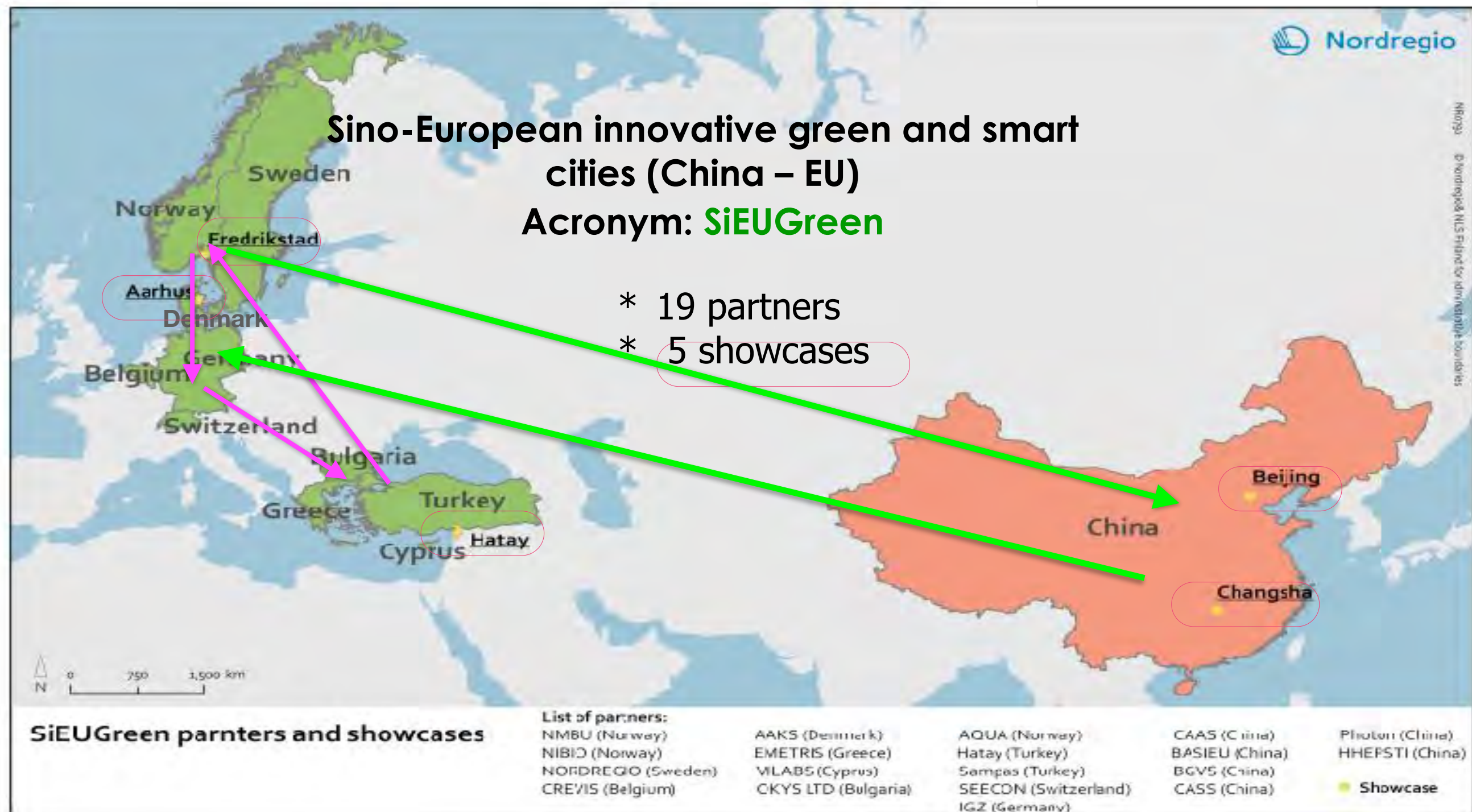
Avløp/forurensning

Vann

Matsikkerhet

Biodiversitet

Helse og trivsel



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20 - 40% of the water consumption in
sewered cities is used for flushing
toilets

(Gardner 1996)



Kan vi redusere vannforbruket med
90% uten å miste komfort?

Photo: P. D. Jenssen

Flow of resources - **import**



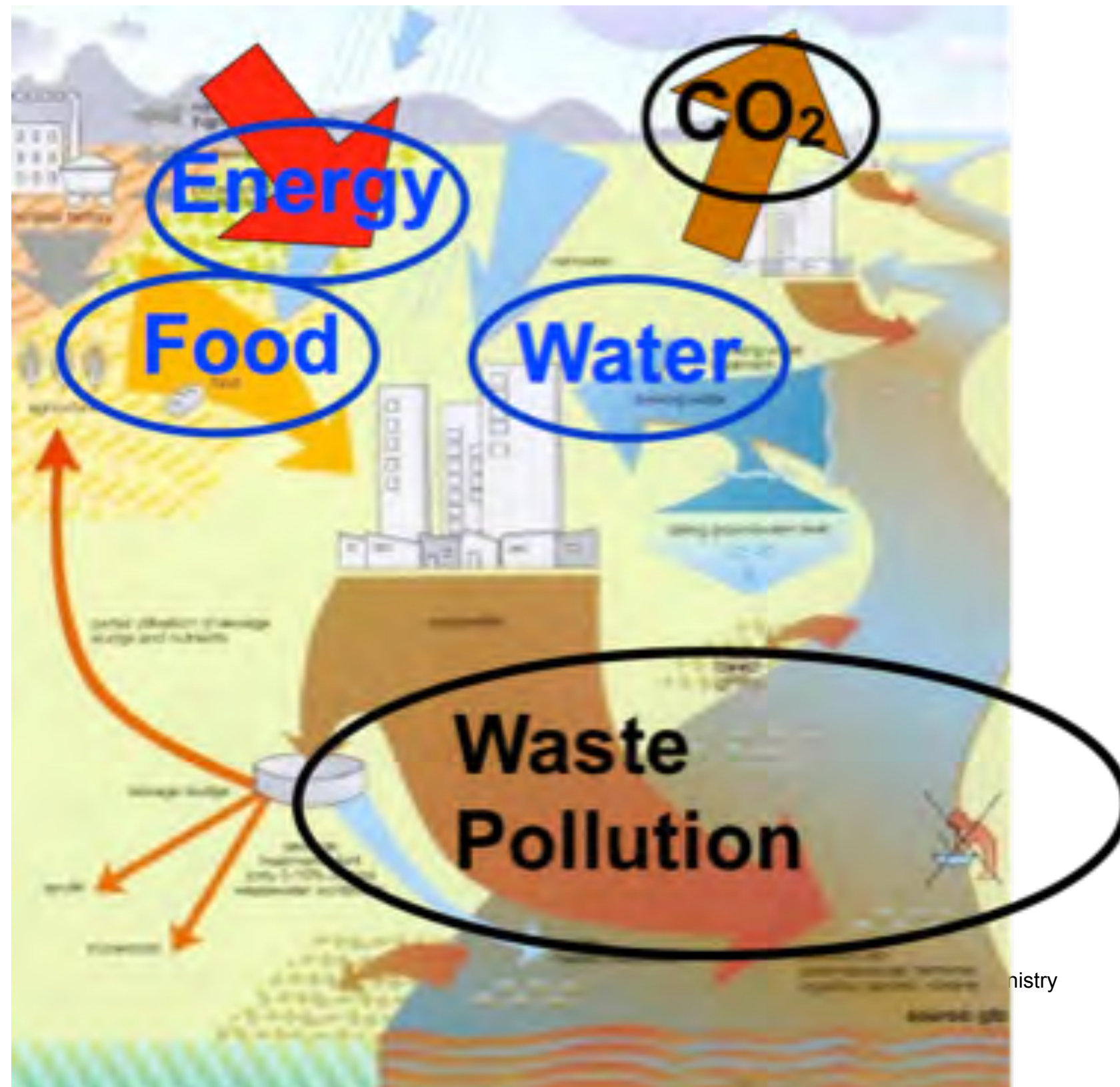
SiEU Green
Sino-European Innovative
green and smart cities



Flow of resources - **import/export**



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SiEUGreen - vision



Source: G

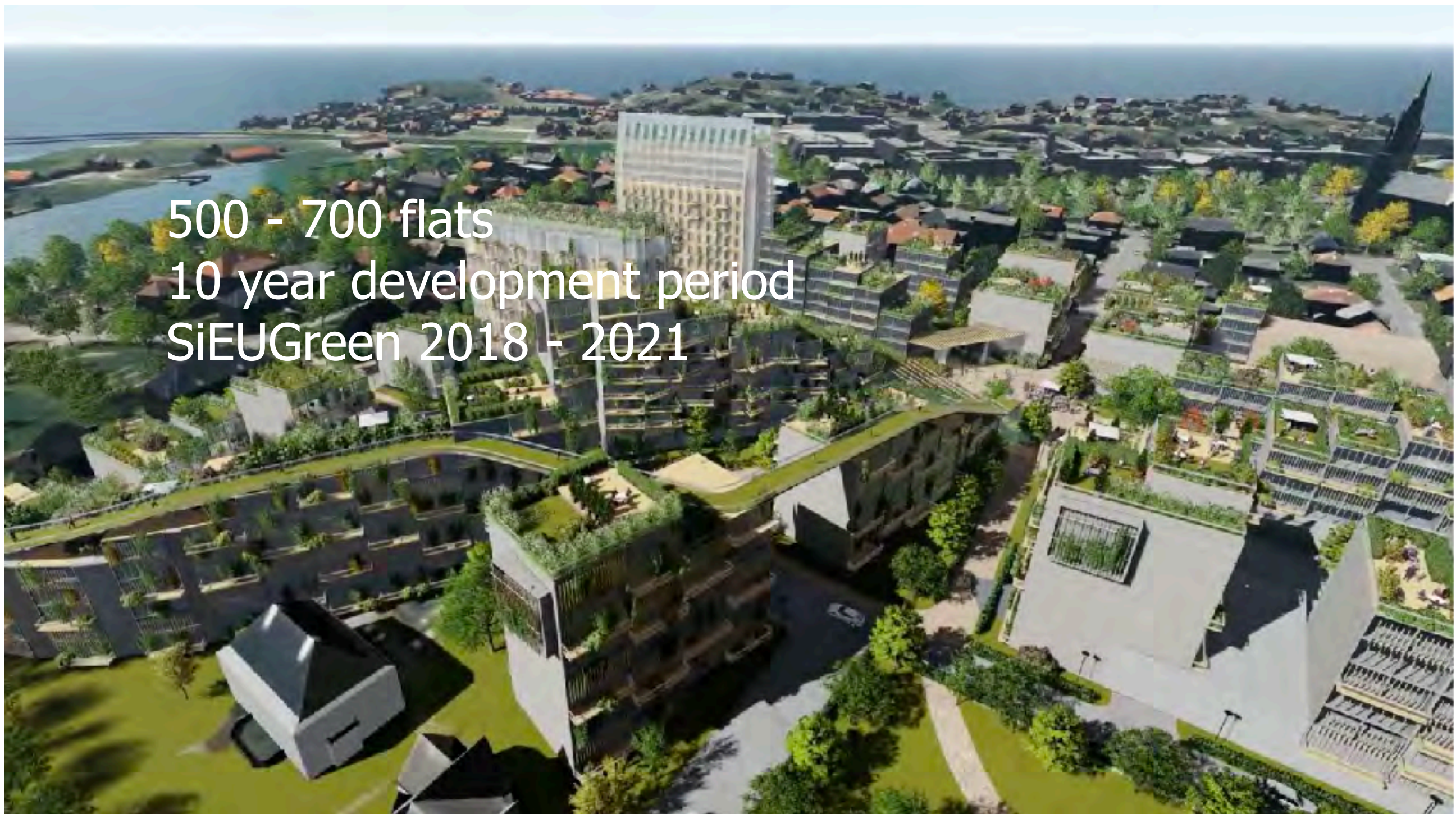
A sustainable green city that promote wellbeing, reduce water and energy consumption by up to 90% and eliminate/reduce emissions - **circular economy!**

SiEUGreen

- showcase Fredrikstad



500 - 700 flats
10 year development period
SiEUGreen 2018 - 2021



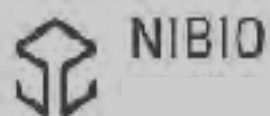
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Solar panels
Green roofs and walls
Vacuum toilets
Biogas production
A greenhouse for year around crop production

AFTER

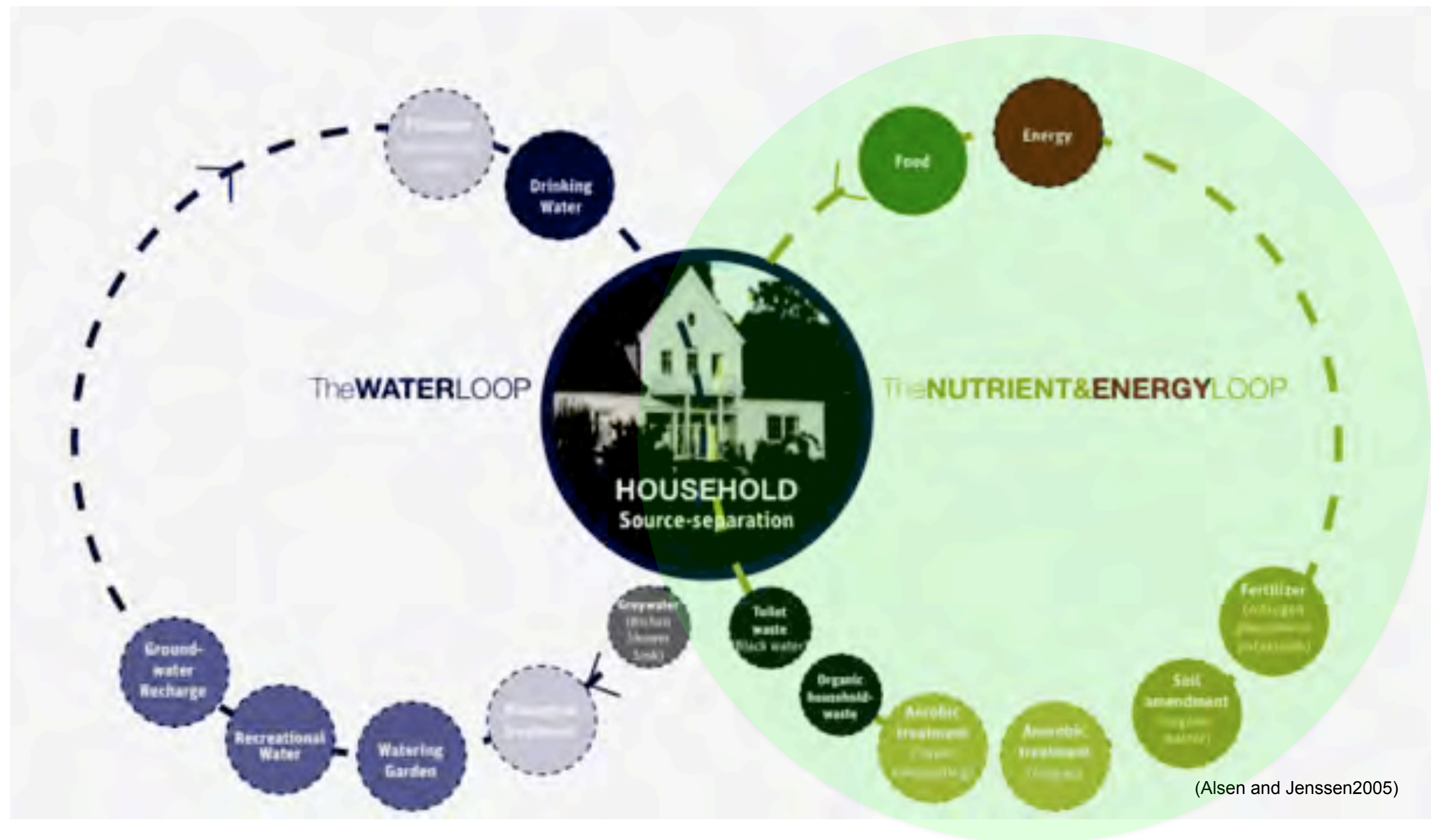


NIELSTORP+
11.10.2017

SiEUGreen - source separation



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Contribution from the toilet

- * 90 % of N
- * 90 % of P
- * 80 % of K
- * > 50 % of org. matter
- * Majority of the pathogens

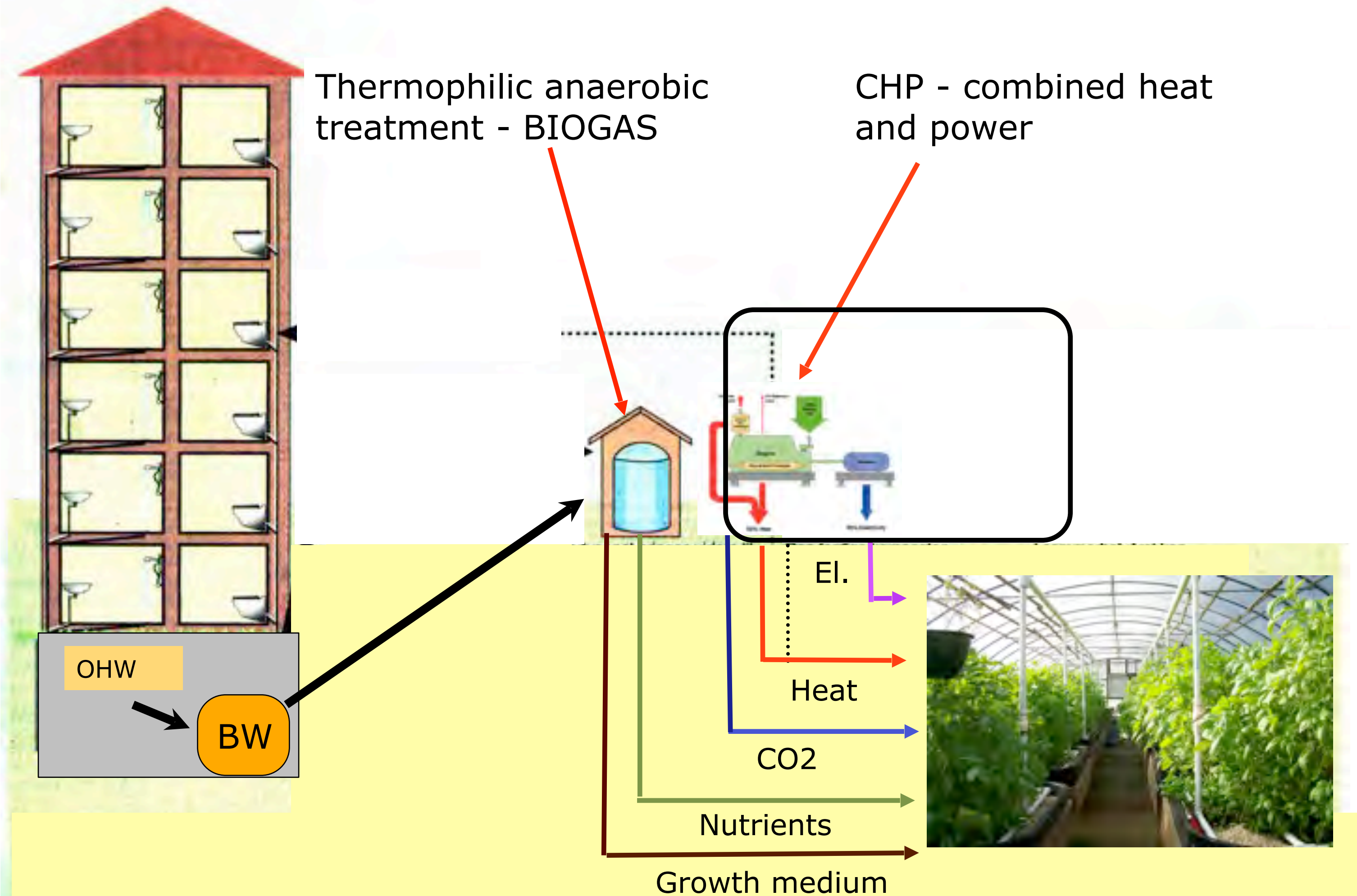
Todt et al. 2015



SIEUGreen Showcase Fredrikstad

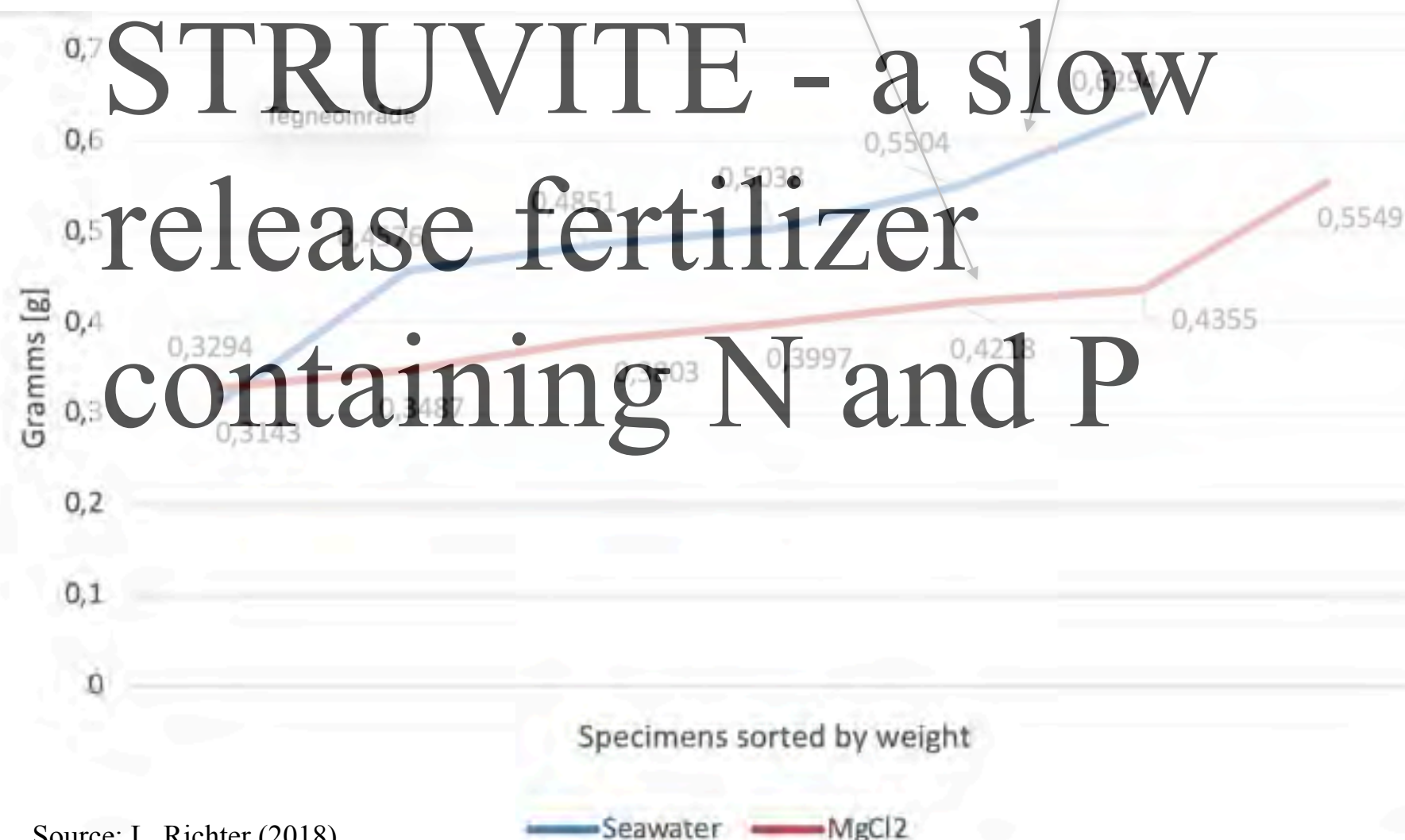
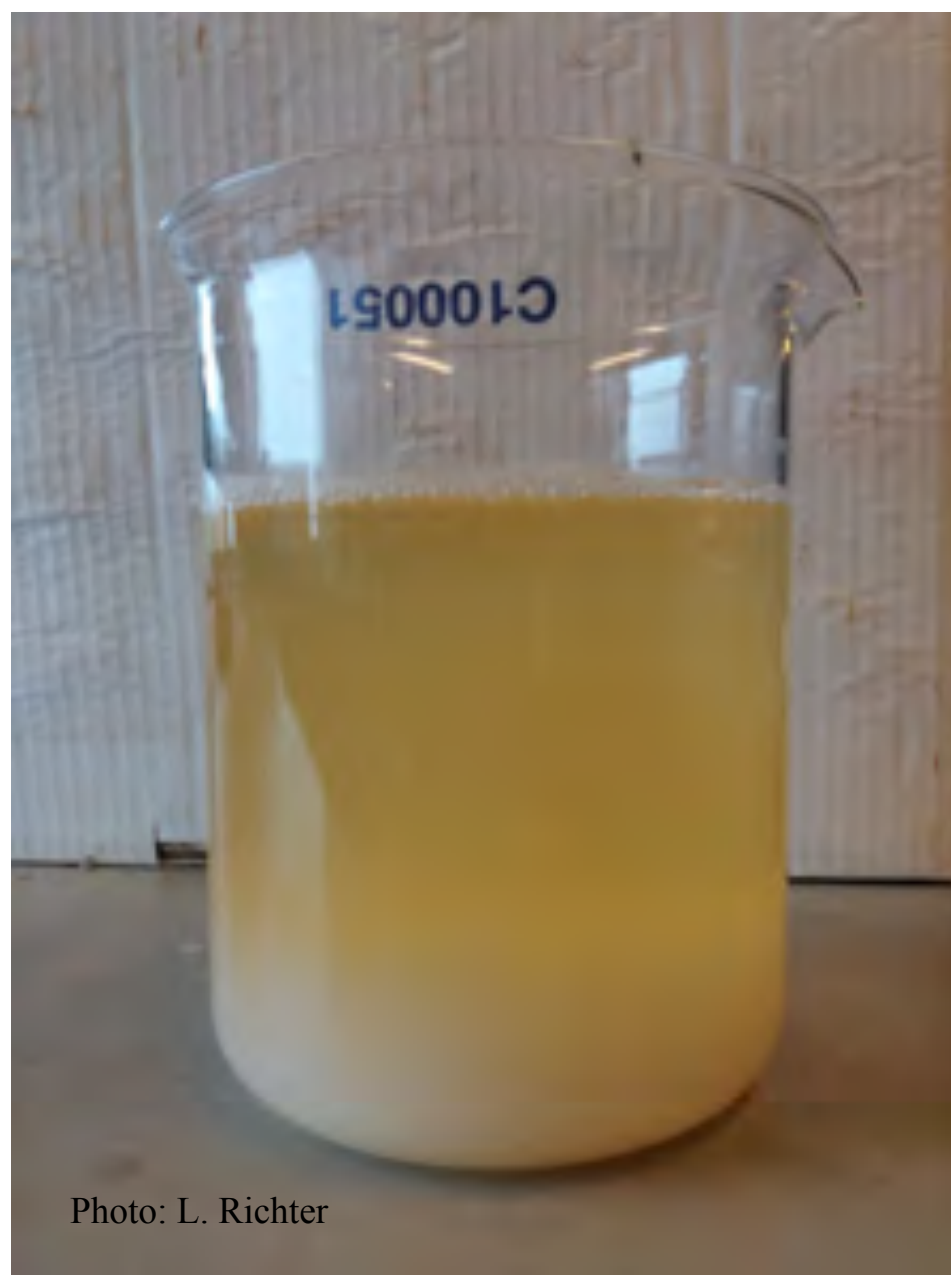
Thermophilic anaerobic treatment - BIOGAS

CHP - combined heat and power



Struvite production

Precipitation of STRUVITE with MgCl_2 and seawater



Algae production



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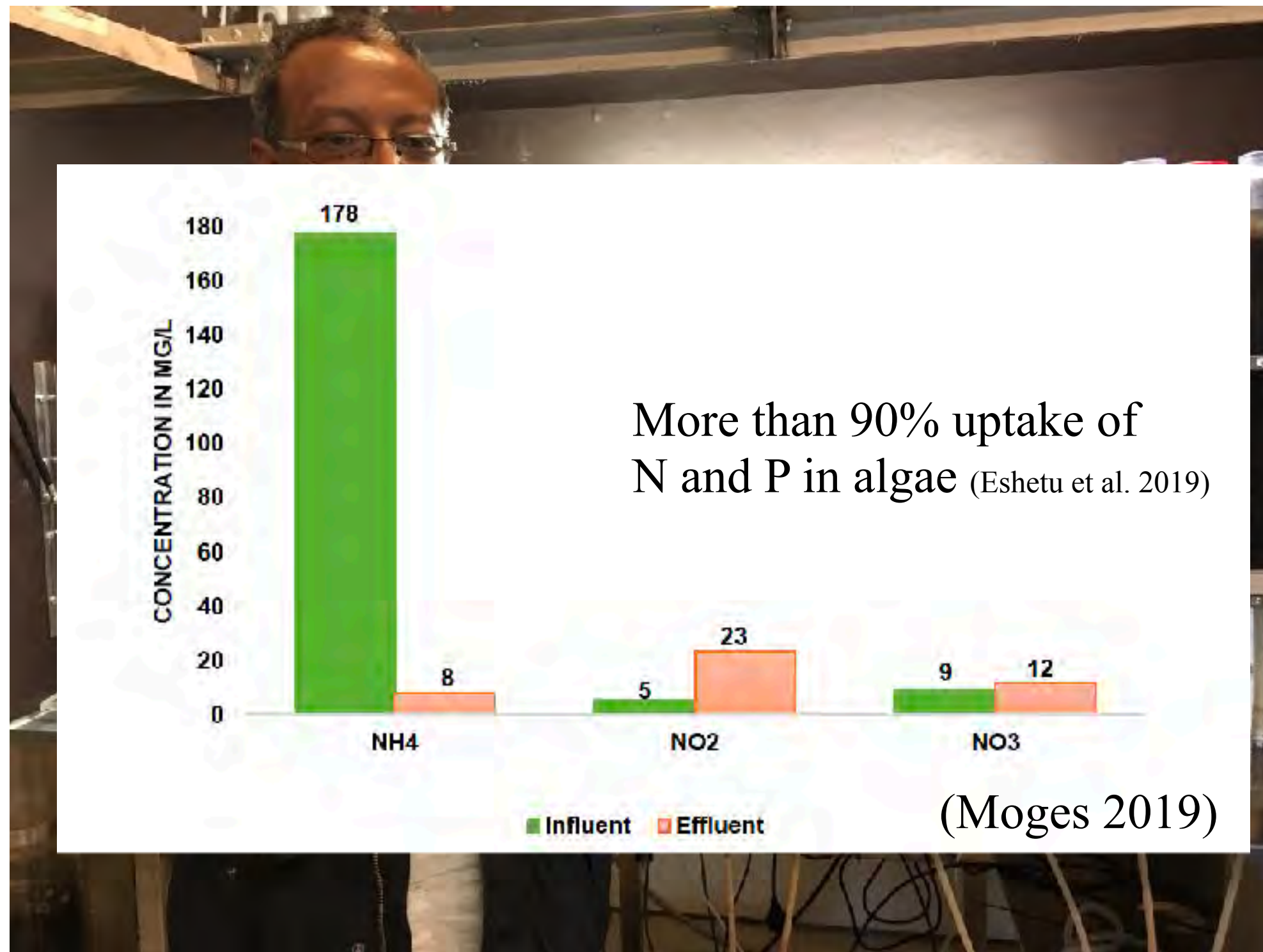


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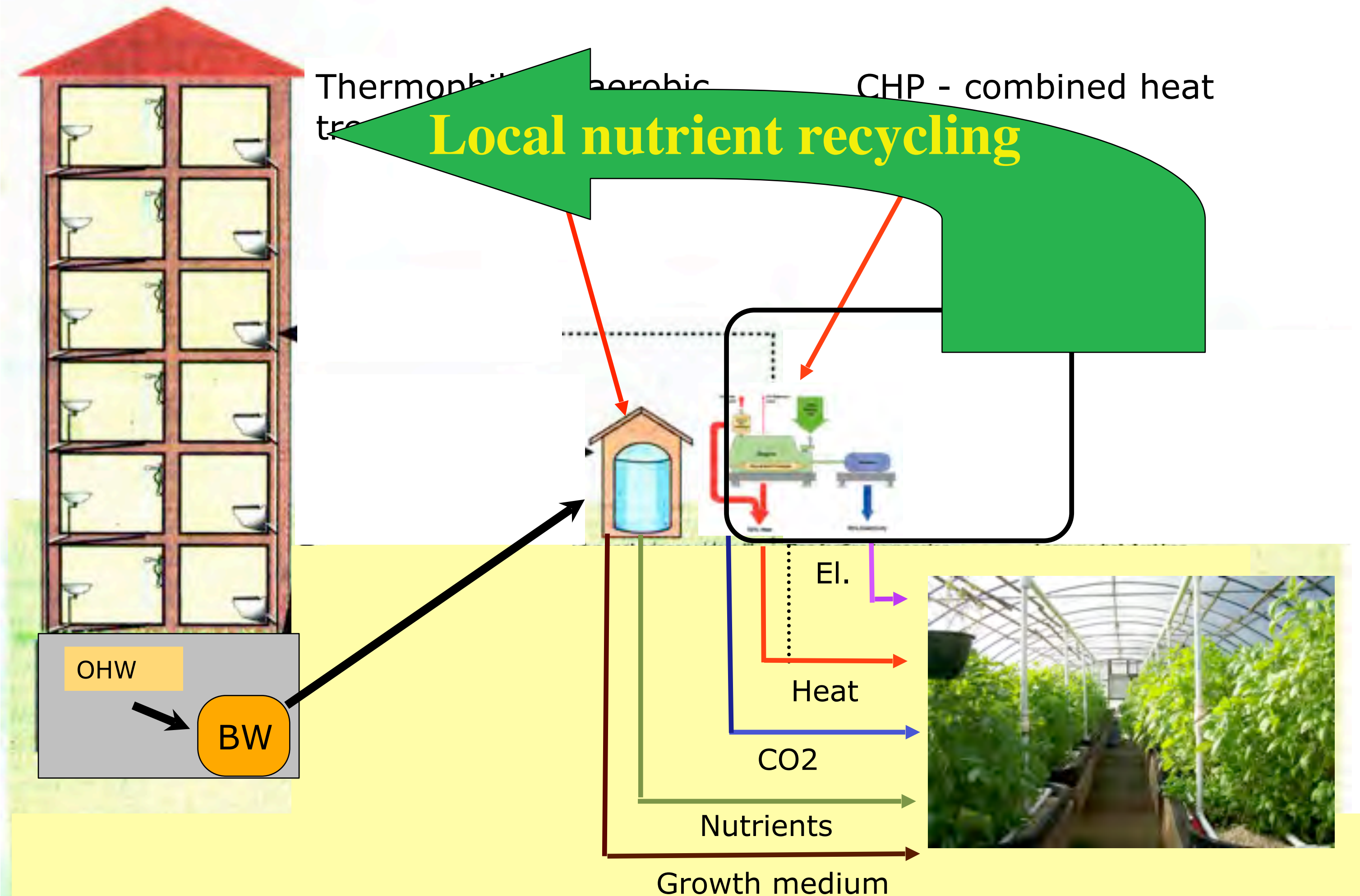
Algae production



SIEUGreen Showcase Fredrikstad

Thermophilic aerobic
tr
CHP - combined heat

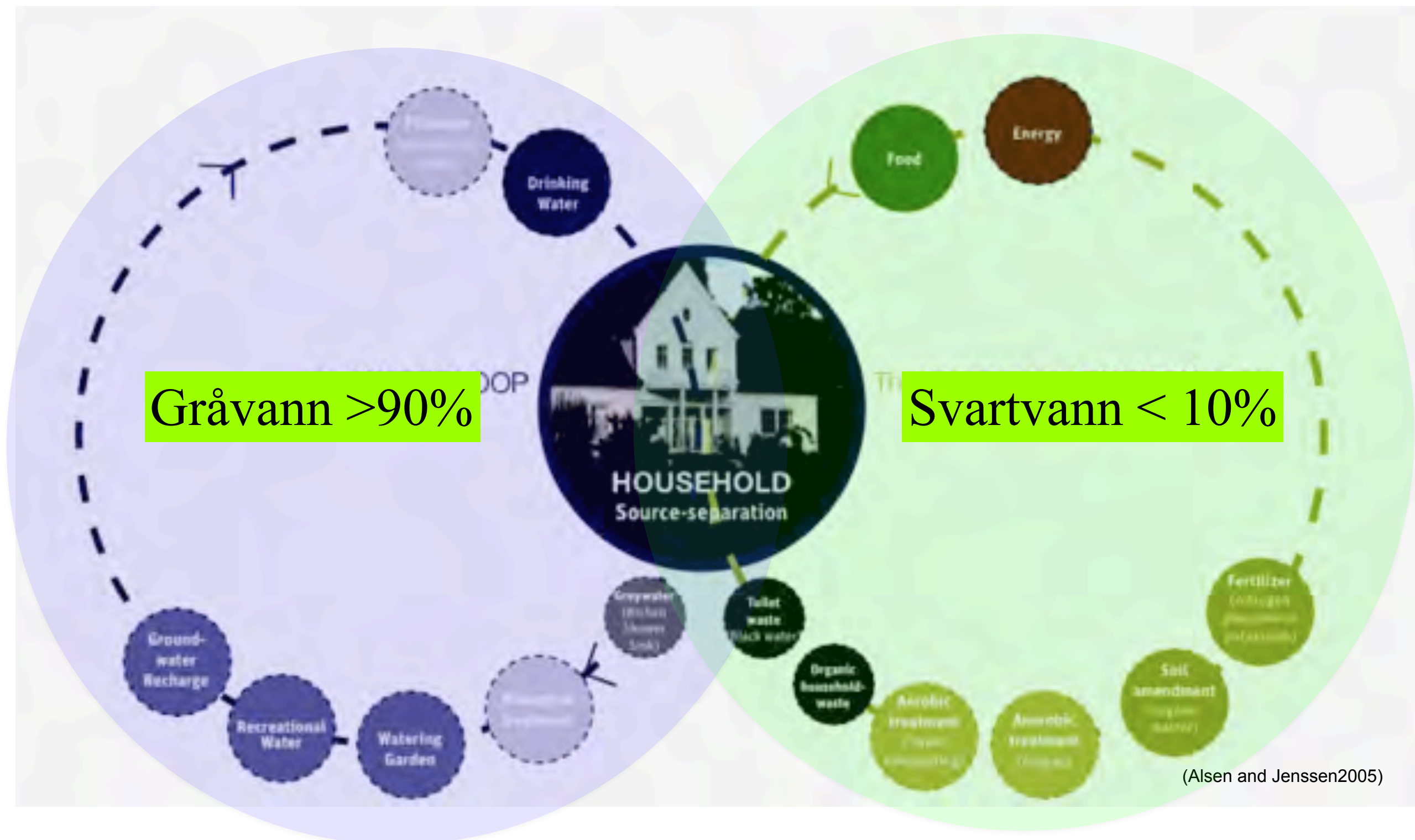
Local nutrient recycling



SiEUGreen - source separation



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(Alsen and Jenssen2005)



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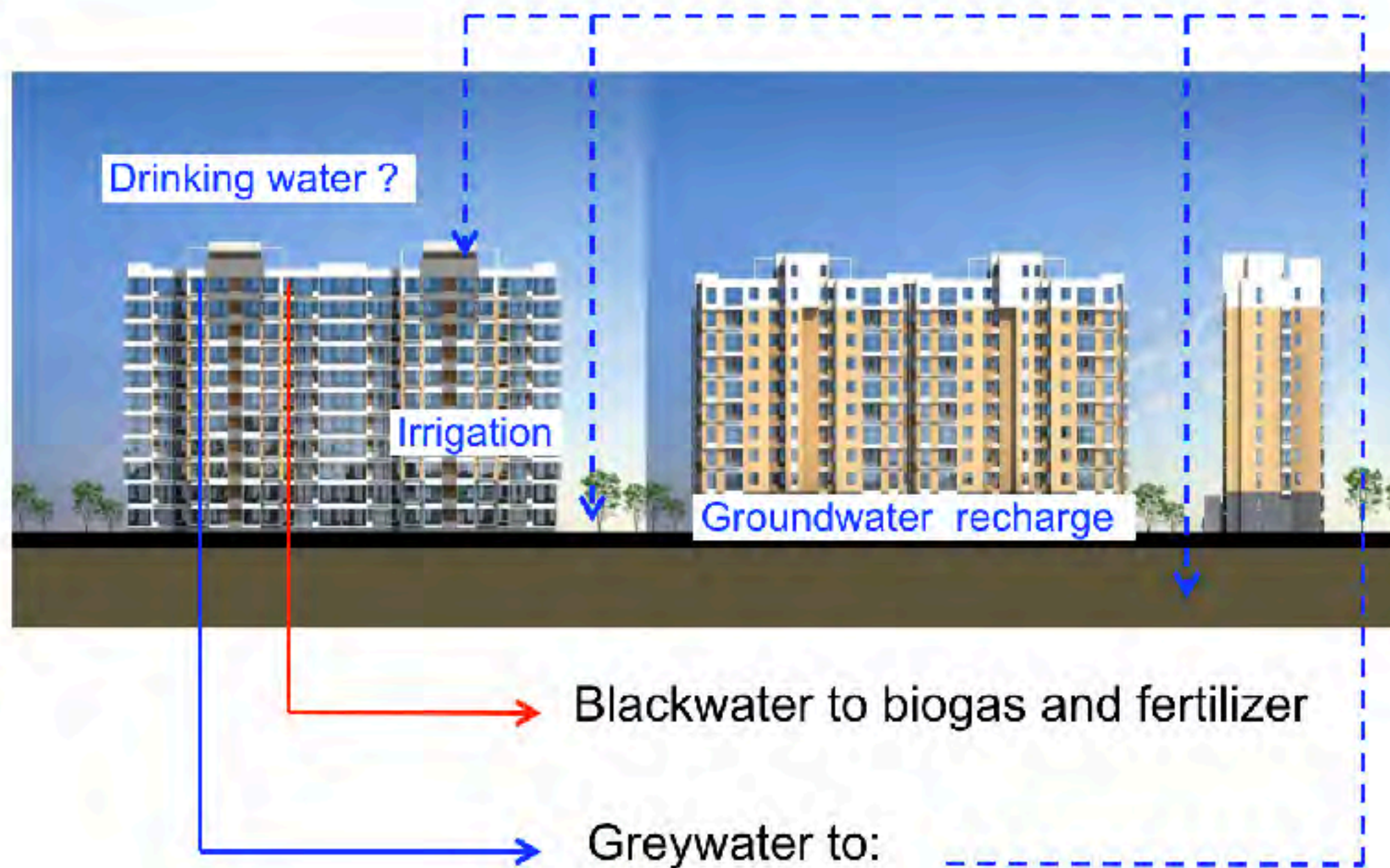


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Greywater treatment - Klostrenga, Oslo



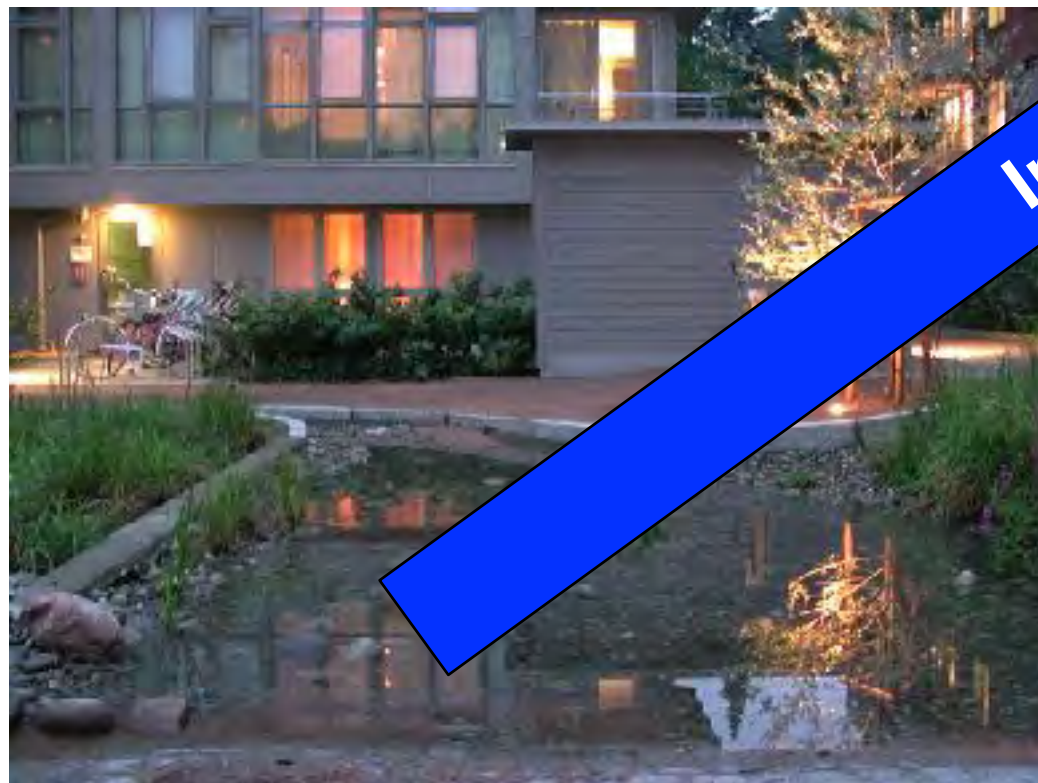
Greywater treatment at Klosterenga Oslo

Effluent values:

Fecal coliforms:	<20
Total-N:	2,5 mg/l
Total-P:	0,03 mg/l

(Sagen 2014)

Greywater treatment - Klosterenga, Oslo



Inhouse use ?

Greywater treatment at Klosterenga Oslo

Effluent values:

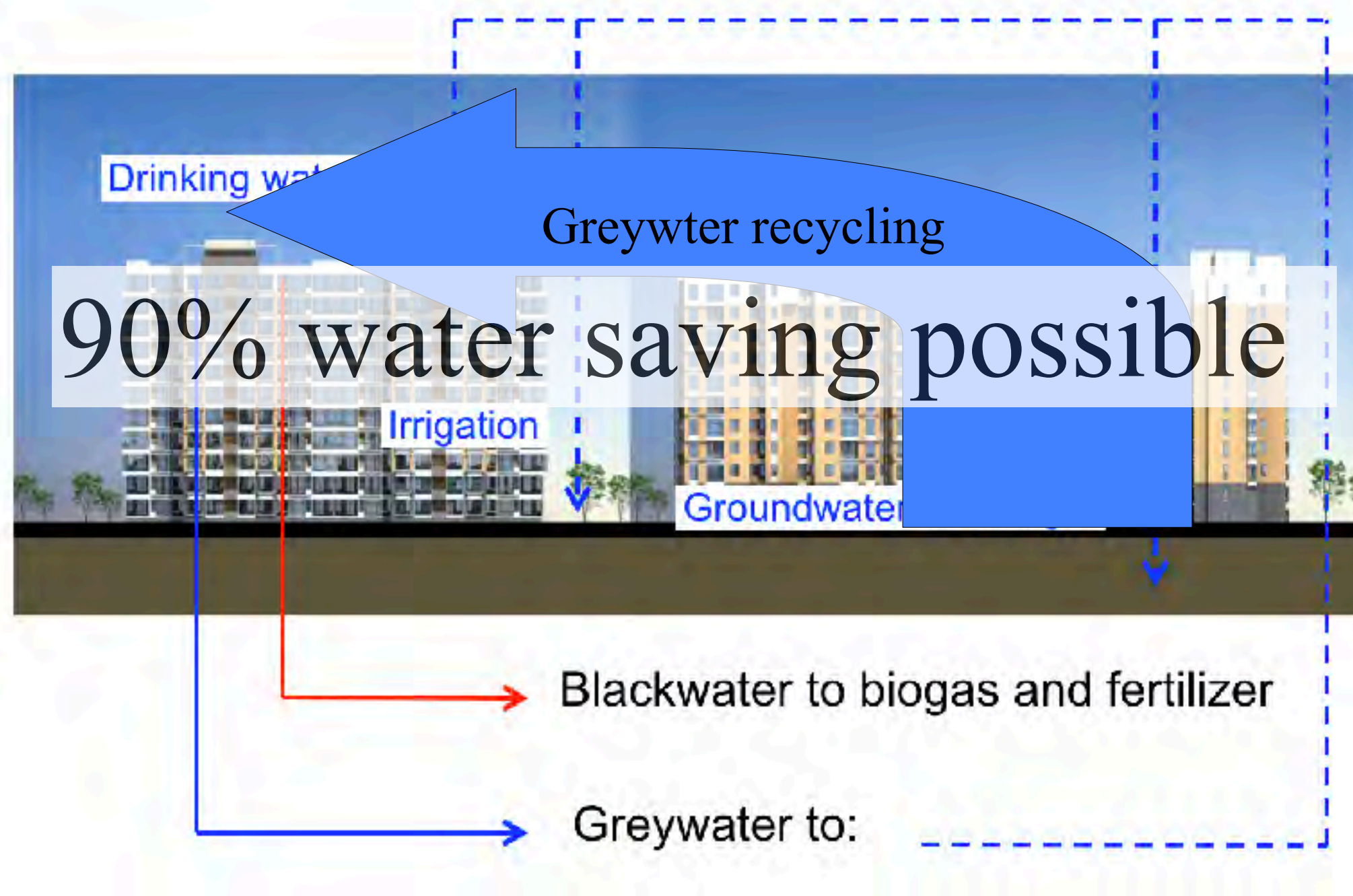
Fecal coliforms:	<20
Total-N:	2,5 mg/l
Total-P:	0,03 mg/l

(Sagen 2014)

SiEUGreen - source separation



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Manhattan

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Photo: P. D. Jenssen

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J A Q

Photo: P. D. Jenssen

Oppsummering

Fremtidens byer kan bli nav i en sirkulær økonomi som:

Produserer gjødsel og bioenergi for urbant og eks-urbant landbruk fra byens avløp og avfall

Nær eliminerer forurensning til luft og vann

Kan kutte klimagassutslipp og kostnader i VAR-sektoren

Gir nye fleksible muligheter for planlegging

Source: GTZ



**Takk for
oppmerksomheten!**

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