"Delivering low carbon anaerobic wastewater treatment and renewable energy production"

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ATWARM

MARIE CURIE ACTIONS

QUESTOR CENTRE

PEOPLE

http://www.cranfield.ac.uk

Project summary

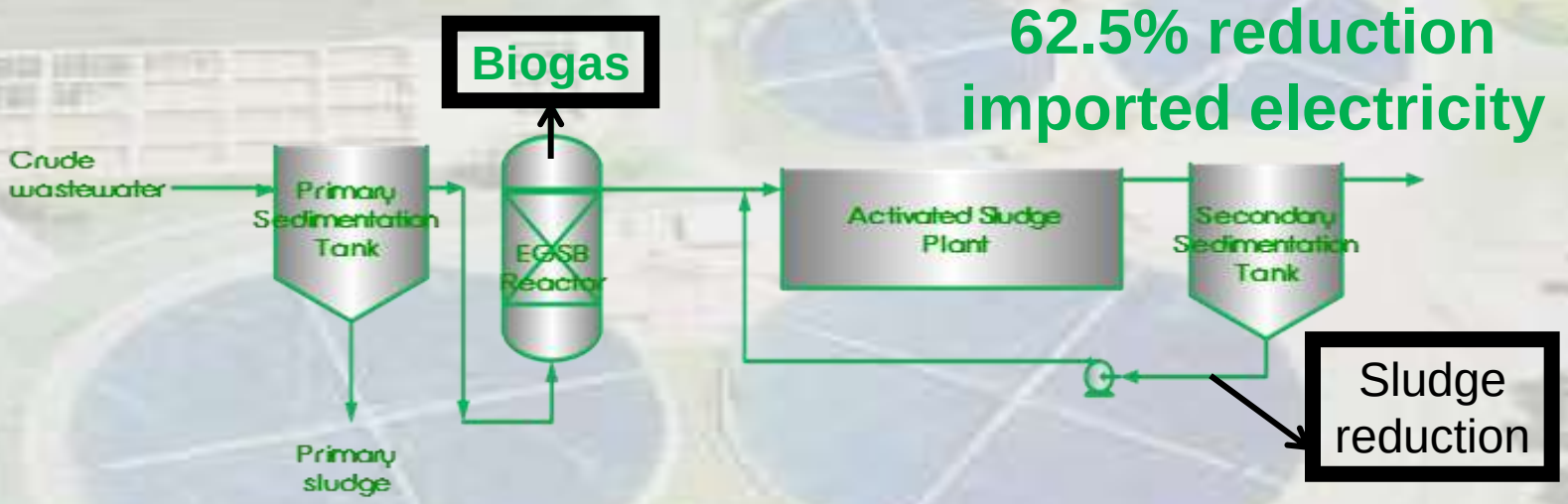
Conventional wastewater treatment

55% energy aeration

Currently: energy is used to treat wastewater

Integration of anaerobic wastewater treatment

62.5% reduction imported electricity



Future: energy generated whilst treating wastewater

Objectives

EXAMINING REACTOR PERFORMANCE BY:

Enhancing organic strength through fortification

Studying the integrity of granular sludge

Long term performance

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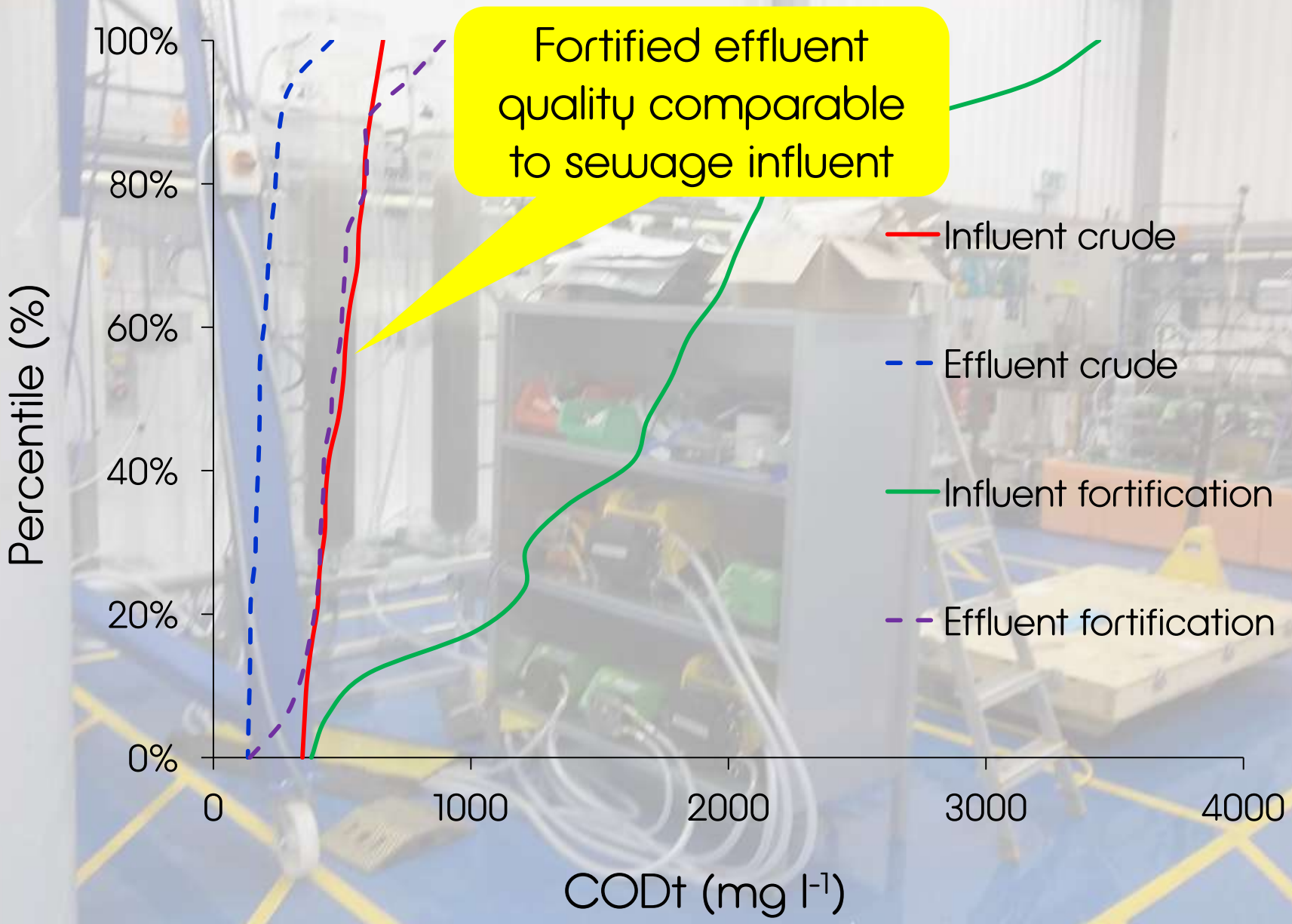
Effluent quality



Biogas source of energy

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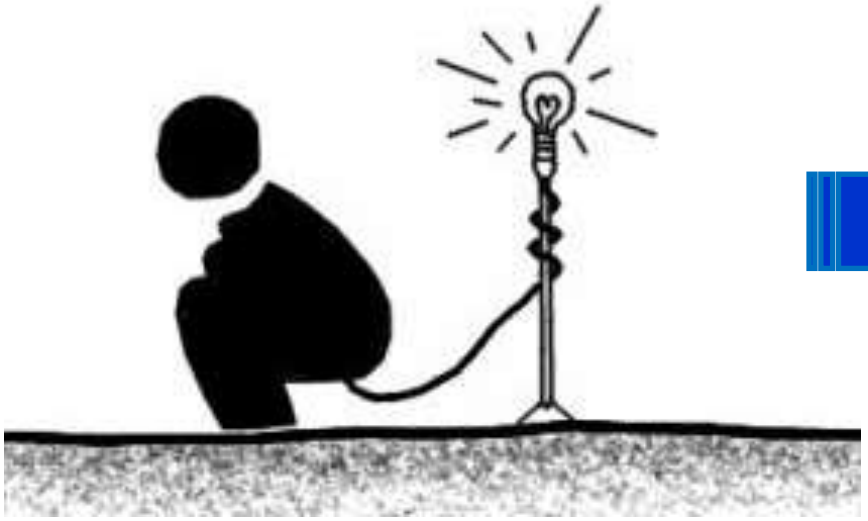
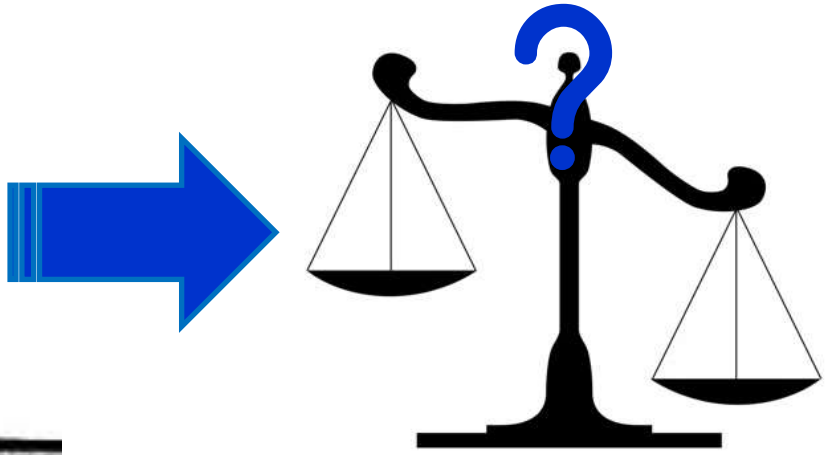
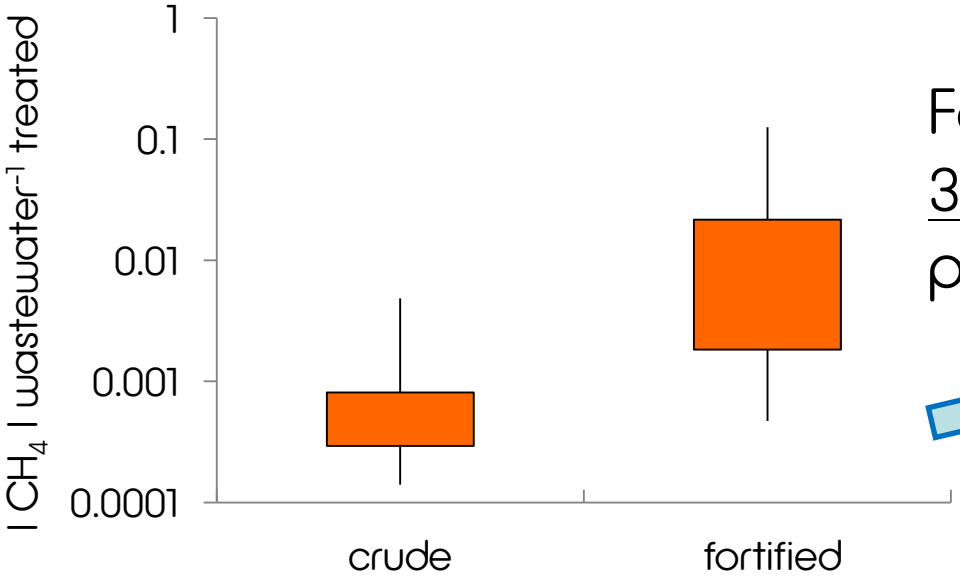
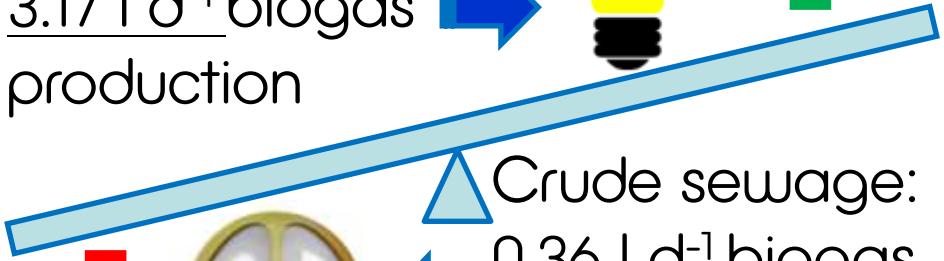




Energy balance



Fortified sewage:
3.17 l d^{-1} biogas production



Crude sewage:
0.36 l d^{-1} biogas production

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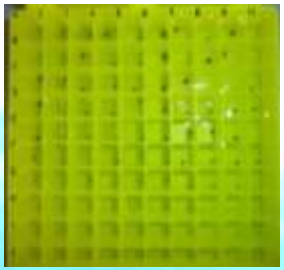
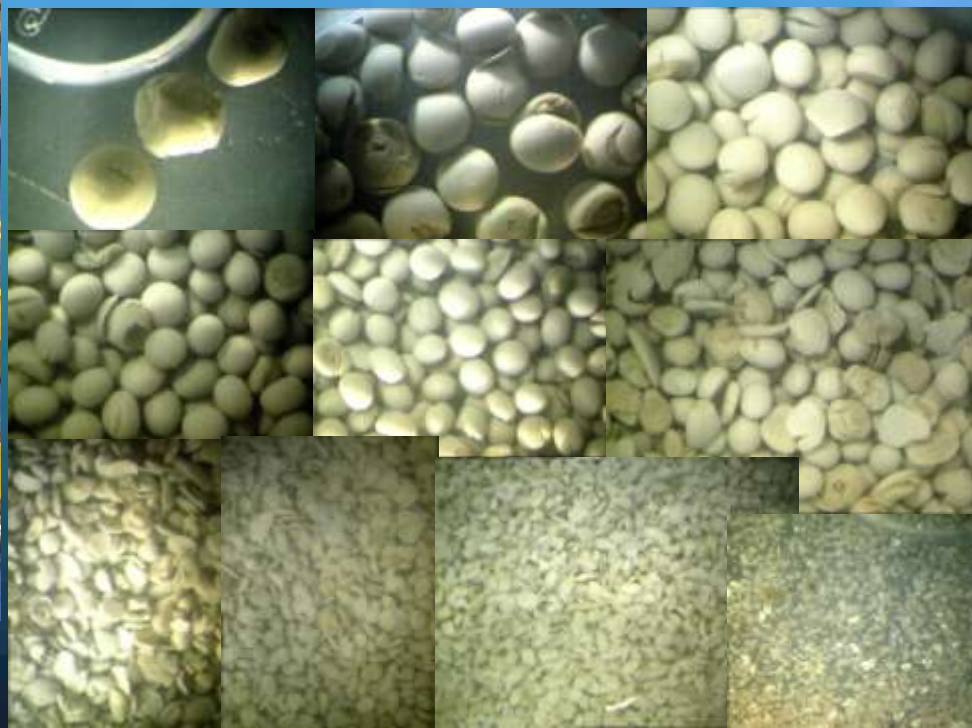
Attrition test

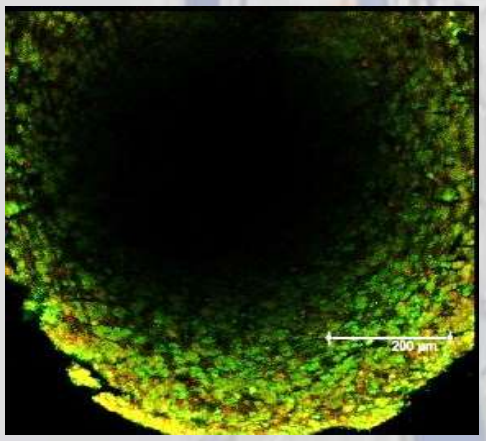




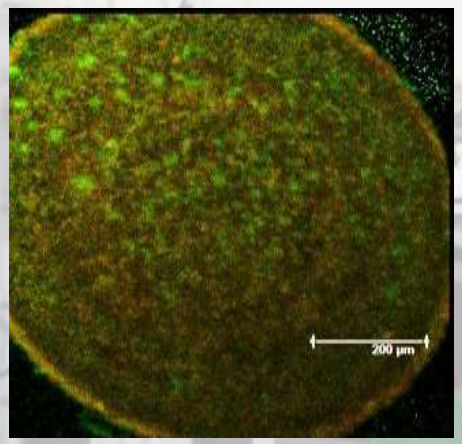
Bacterial activity

Alive/dead

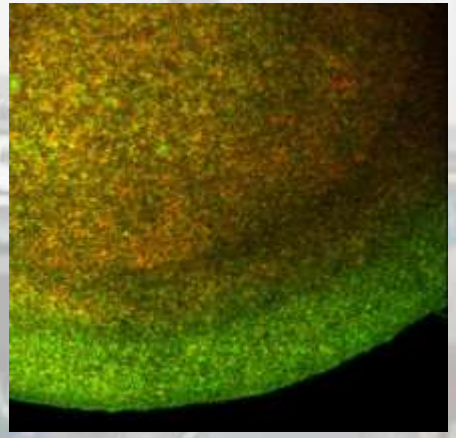
stored for 4 years



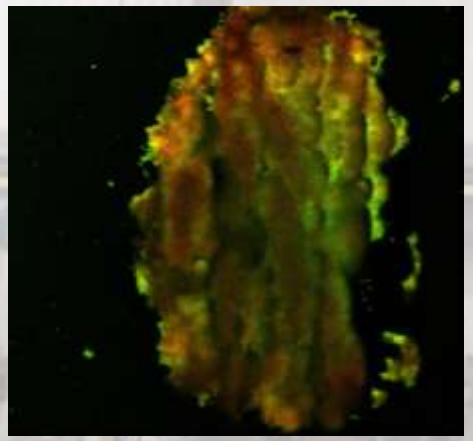
Fortification



t=0 months



t=12 months



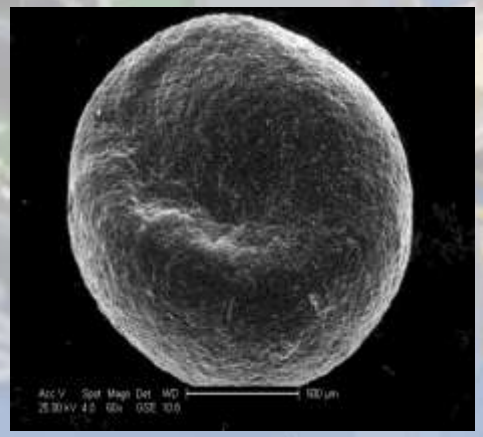
TEM

t=0 months

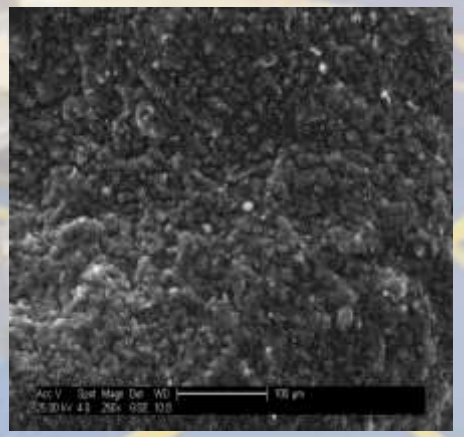
t=12 months

SEM

t=16 months



t=16 months



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t=0

Real sewage

Pilot scale

24/7

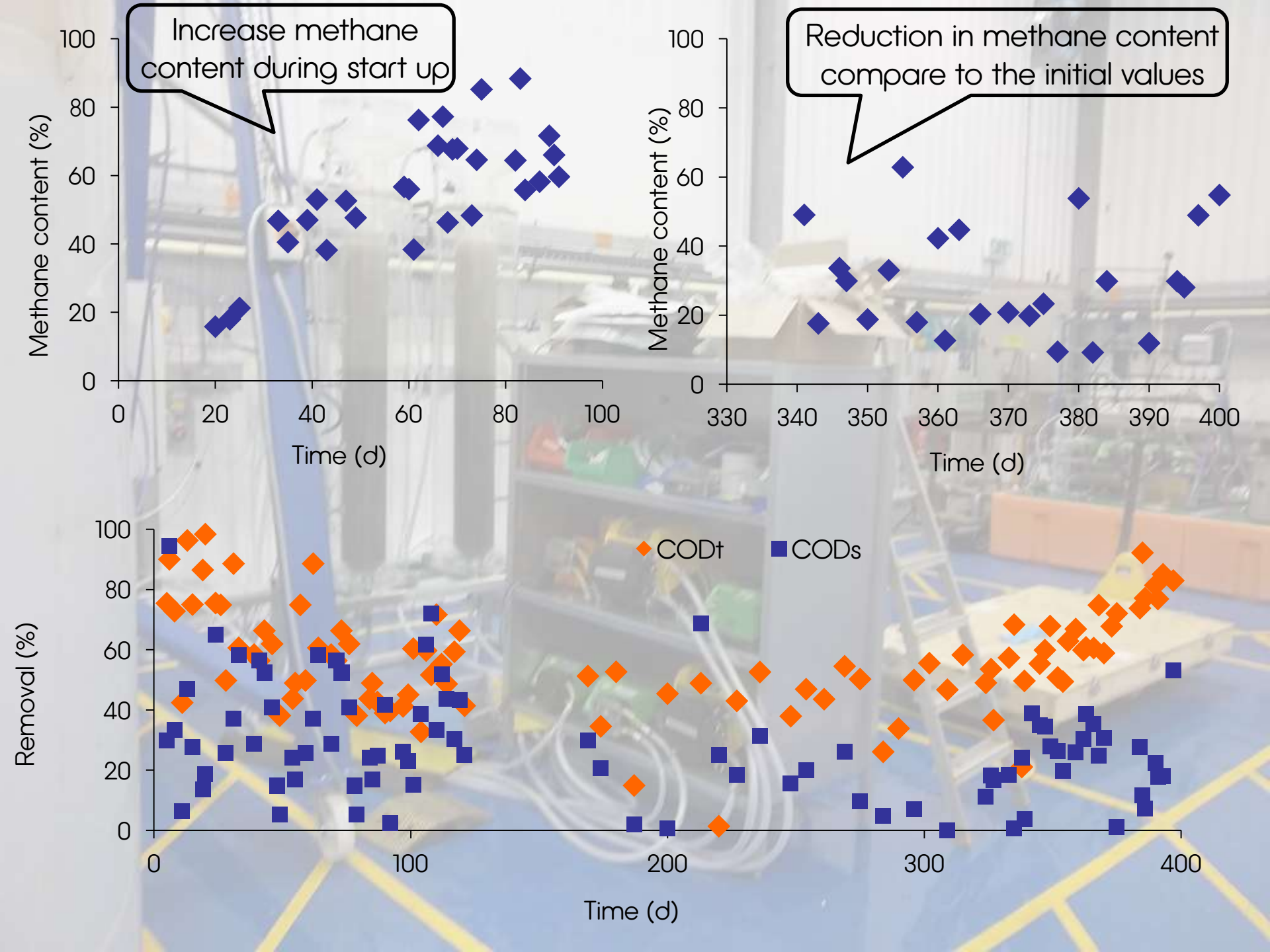
Start up

Analysis on bacteria

Performance in terms of removals?

t=2 YEARS

Performance in terms of biogas production?


Increase methane content during start up
Methane content (%)
Time (d)
Reduction in methane content compare to the initial values
Methane content (%)
Time (d)
CODt
CODs
Removal (%)
Time (d)

Impact of the project

REDUCTION IN ENERGY CONSUMPTION. Novel concept for UASB/EGSB reactors; fortification and its application in real wastewater treatment plants

APPROPRIATENESS GRANULAR SLUDGE. Study of granular sludge for a better understanding of its stability

DESIGN CRITIRIA FOR INTEGRATING ANAEROBIC TECHNOLOGY. Assessment of anaerobic reactor long term performance at low temperatures

Further steps

Consideration of optimum site for full scale implementation of fortification

More specific study of granular sludge bacteria and their structure

Enable granular sludge life prediction for maximum yield and efficiency


Thank you for your attention
Questions?