

Algal flue gas sequestration and waste water treatment: An industrial experiment

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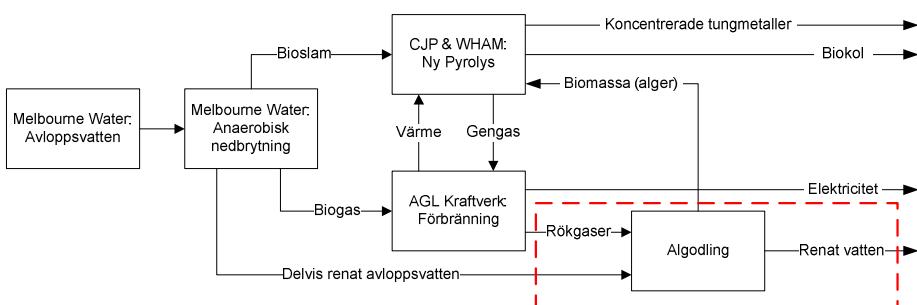
WHAM

CJP Solutions

Melbourne Water

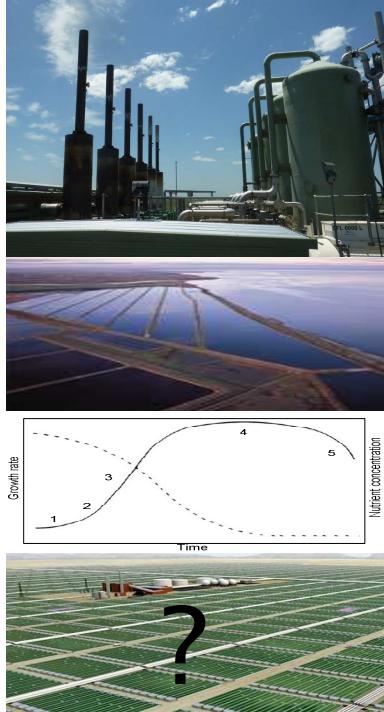
AGL Energy in action.

Background

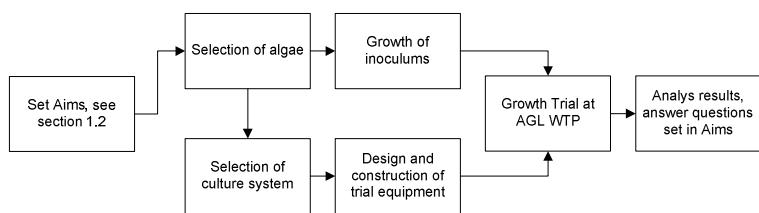


Aims

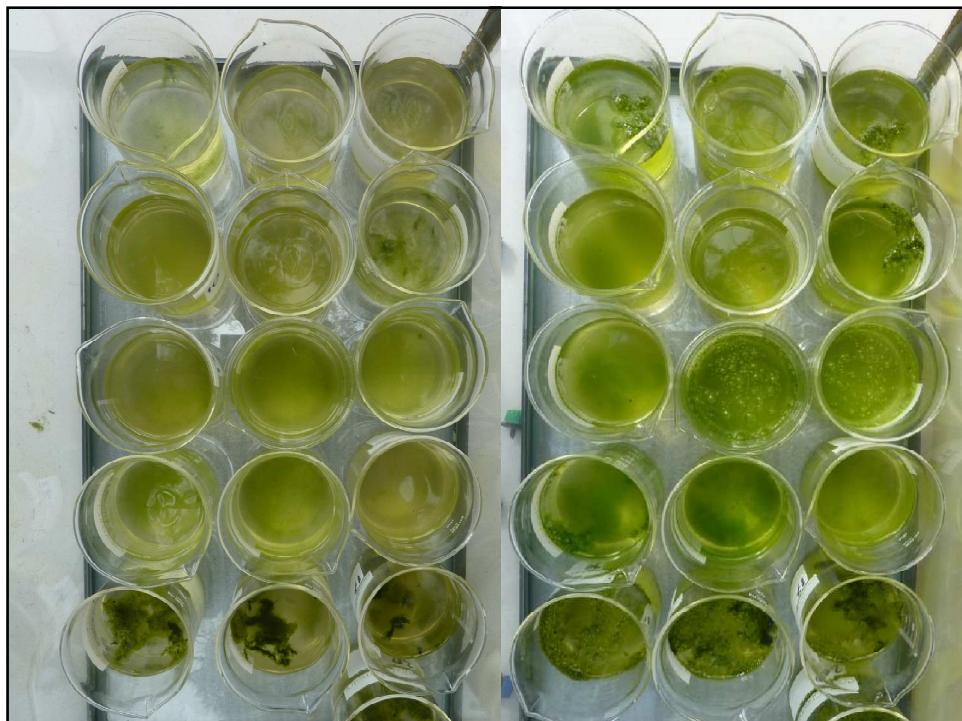
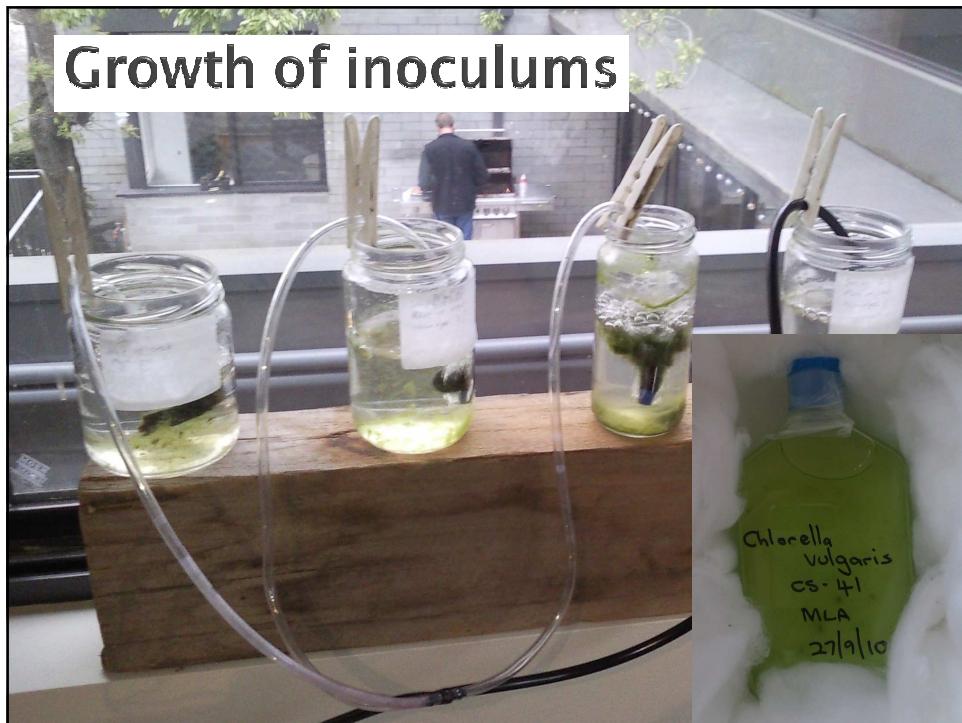
- ▶ Algal flue gas sequestration:
 - Gas engine exhaust
 - CO₂, NO_x, SO₂, etc
- ▶ Wastewater treatment:
 - N, P, Heavy metals,
- ▶ Growth rate of algae
- ▶ Scale-up estimate

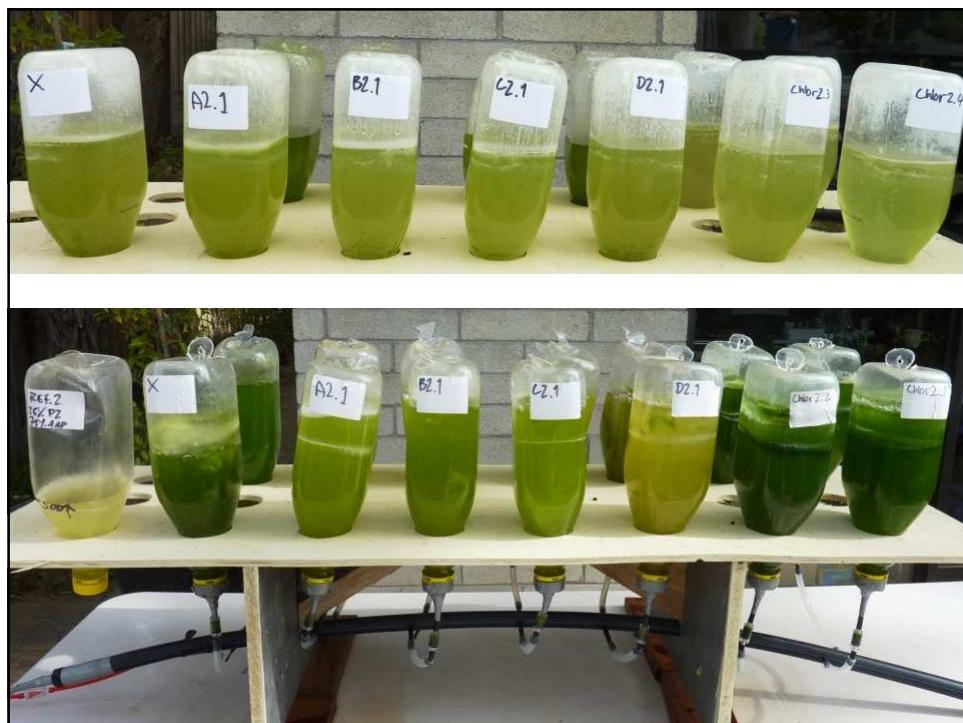


Method

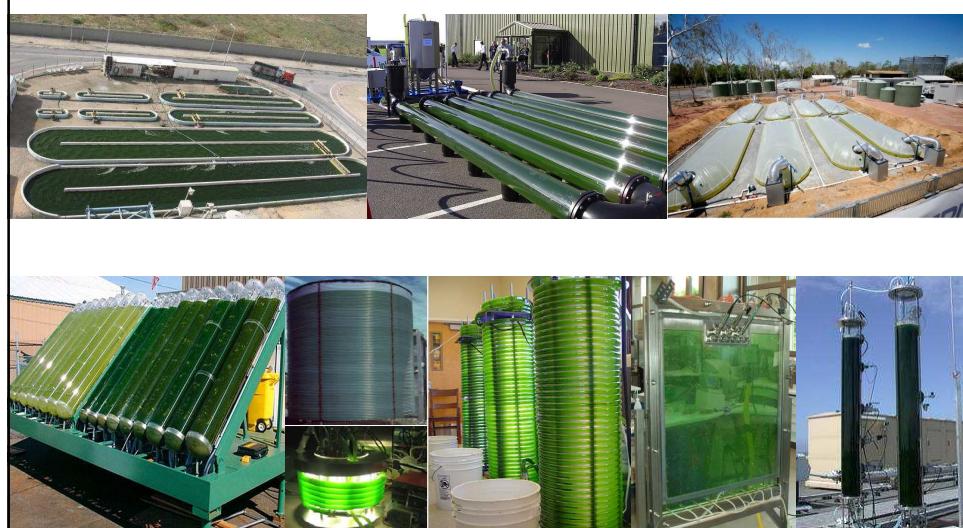


Growth of inoculums





Selection of culture system



Equipment: Columns



Equipment: Pond



Growth Trial at AGL

- ▶ 3 weeks of testing for:
 - Chl a, TOC, BOD, COD
 - N, P, Heavy metals, + more
 - Flue gas analysis
- ▶ Lab work conducted by: ALS,
Certified laboratory



Results: Phase 1

- ▶ Day 1



► Day 2



► Day 3



► Day 4



► Day 5



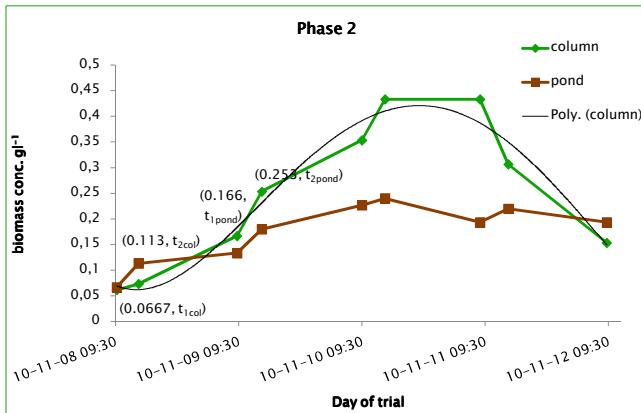
► Day 6



► Day 7



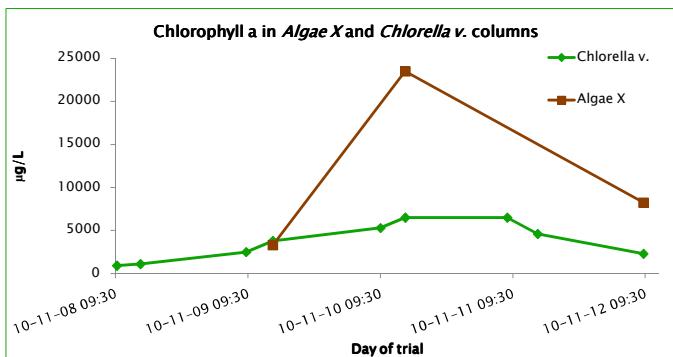
Results: *Chlorella v.* biomass



$$P_c = 0.43 \text{ [gL}^{-1}\text{d}^{-1}\text{]}$$

$$P_p = 0.26 \text{ [gL}^{-1}\text{d}^{-1}\text{]}$$

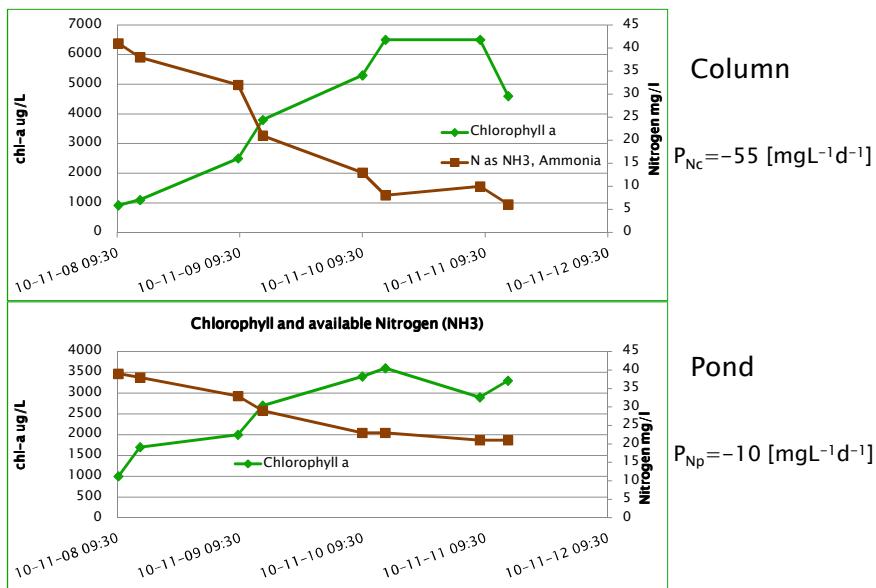
Results: *Algae X* vs *Chlorella v.*



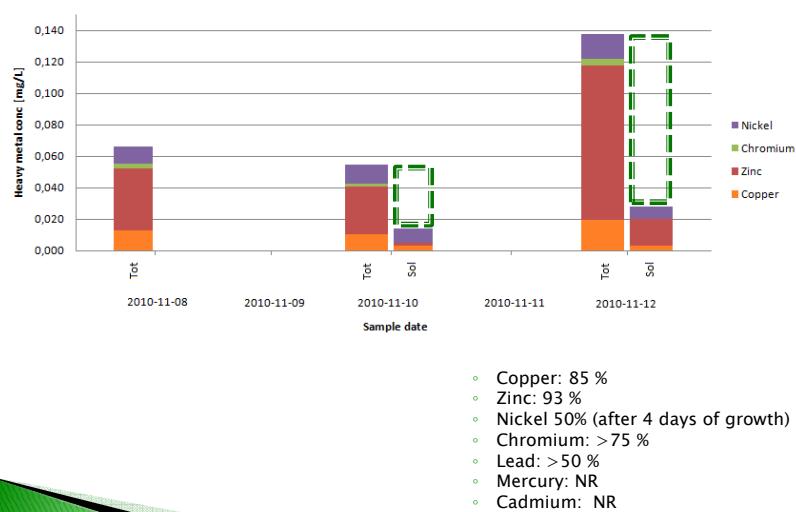
$$P_x = 1.02 \text{ [gL}^{-1}\text{d}^{-1}\text{]}$$

$$P_c = 0.43 \text{ [gL}^{-1}\text{d}^{-1}\text{]}$$

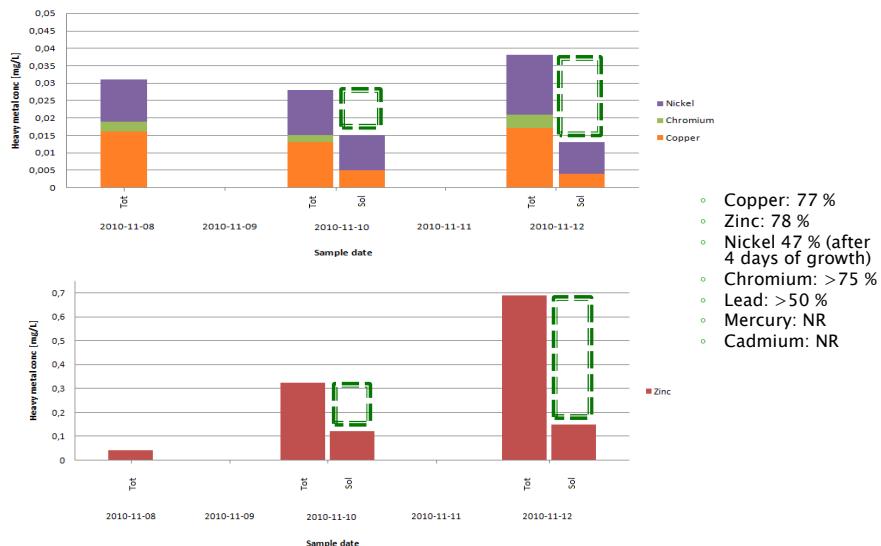
Results: Nitrogen



Results: Heavy metals, columns



Results: Heavy metals, pond



Results: Flue Gas Analysis

- ▶ CO₂ removal: 44 %
- ▶ NO_x removal: 70 %
- ▶ SO₂ removal: 100%



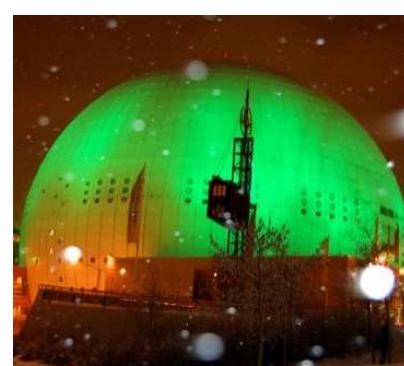
Results: Scale-up estimate: 77 Ha

AGL
Power
Station



ÅF Projekt

- ▶ Kartläggning kritiska faktorer i Sverige
- ▶ Förstudier till processindustri



Thank–you all,

Regards:

"Partners in Slime"

Max Larsson &
Jonas Lindblom



Questions?

