



Surplus electricity to biogas via hydrogen

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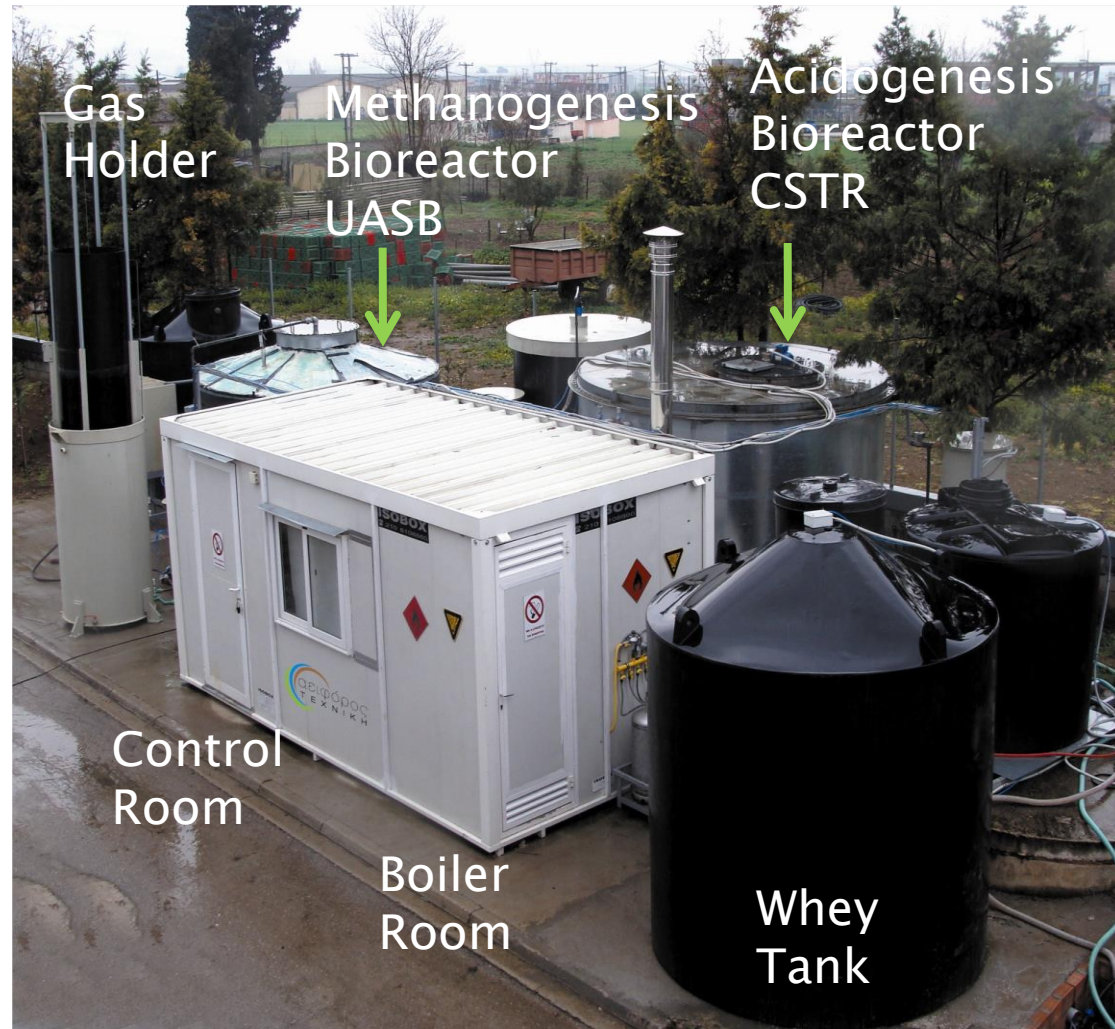
Education – Work Experience

- **Bachelor studies:** Chemistry

Direction: Chemical Analysis – Environment

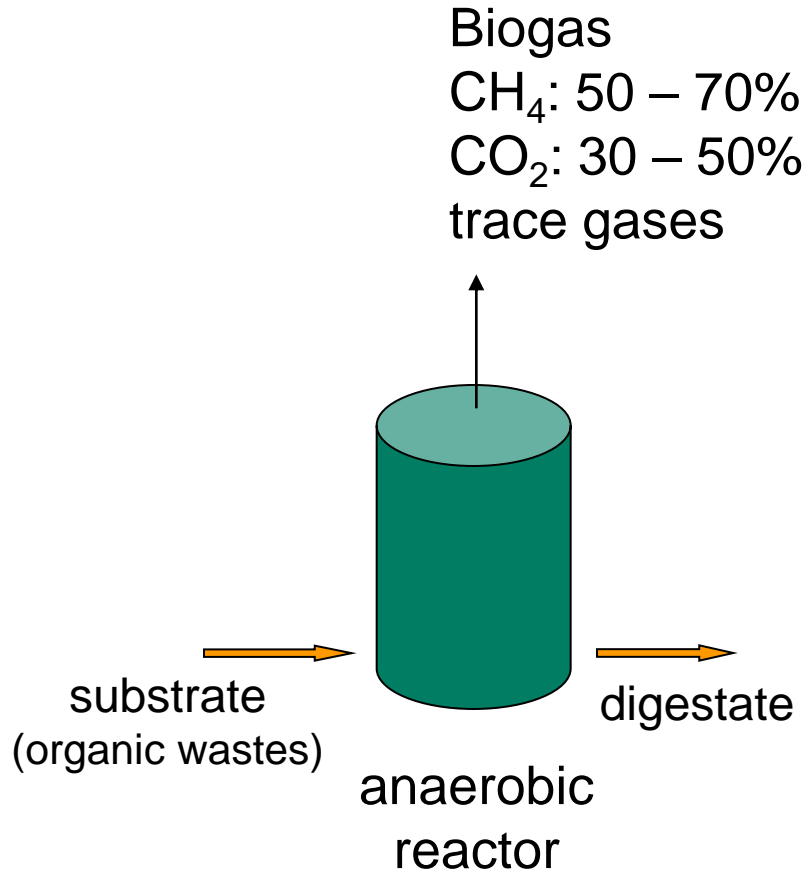
- **Master studies:** Environmental Engineering

Direction: Management of waste and water resources

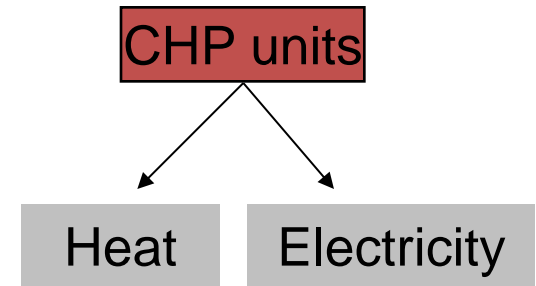


Biogas production and utilisation

Anaerobic digestion

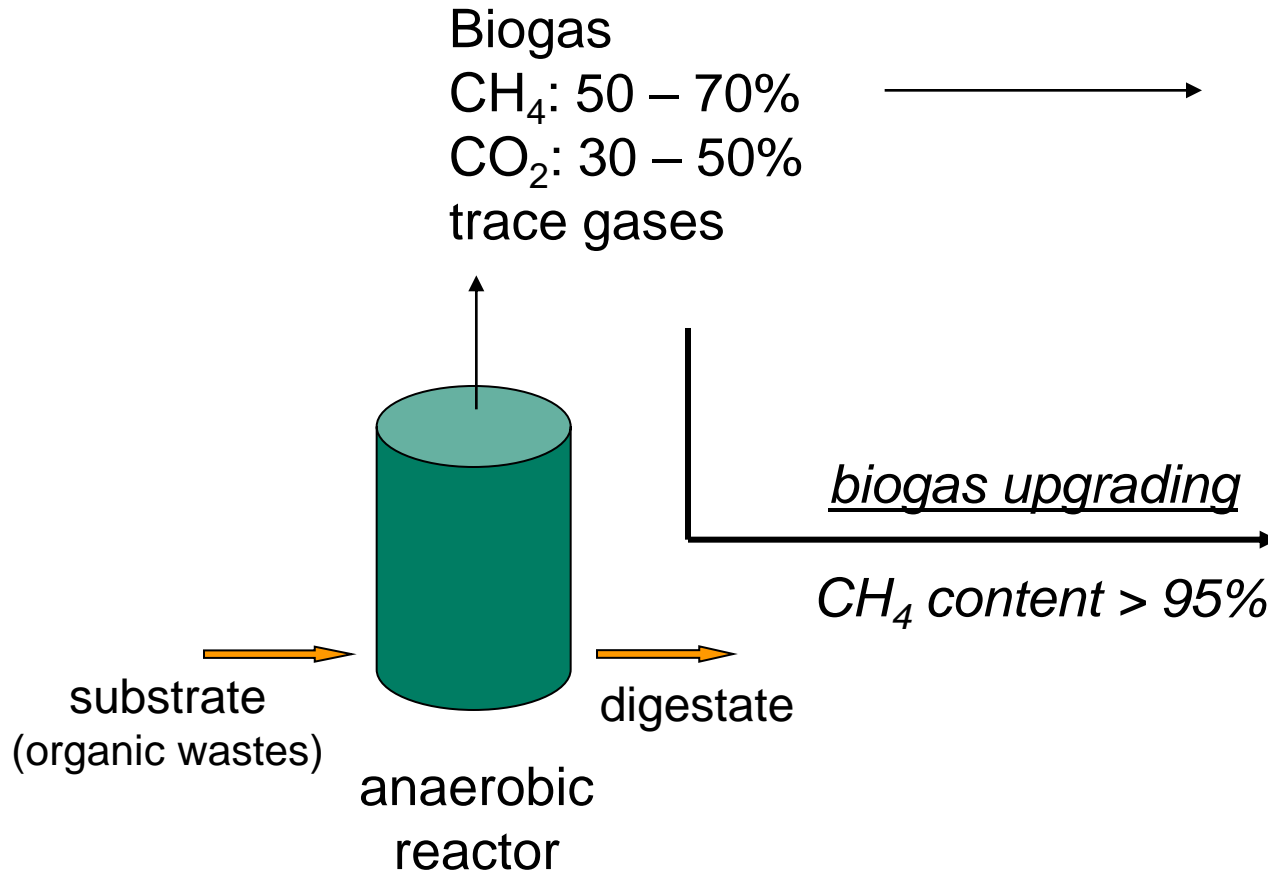


Biogas utilisation:

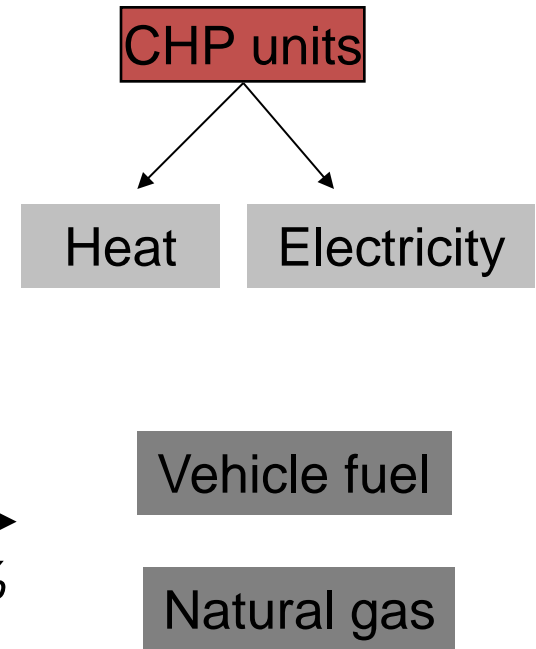


Biogas production and utilisation

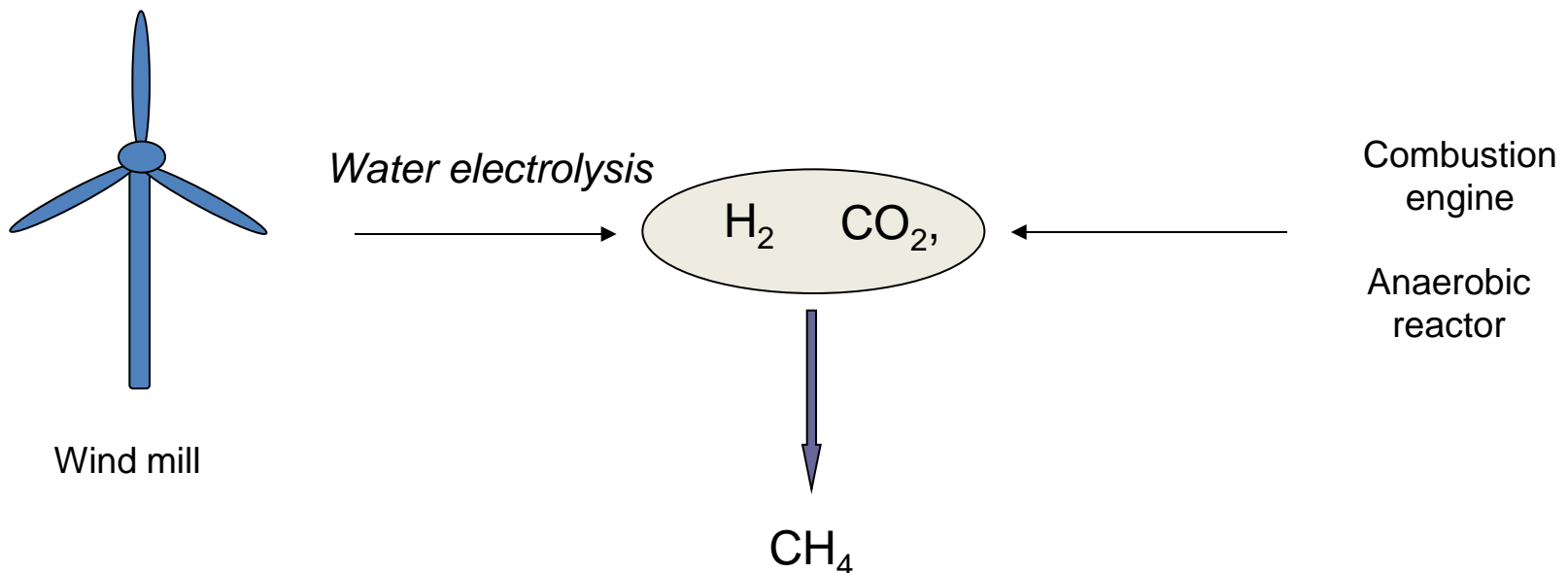
Anaerobic digestion



Biogas utilisation:



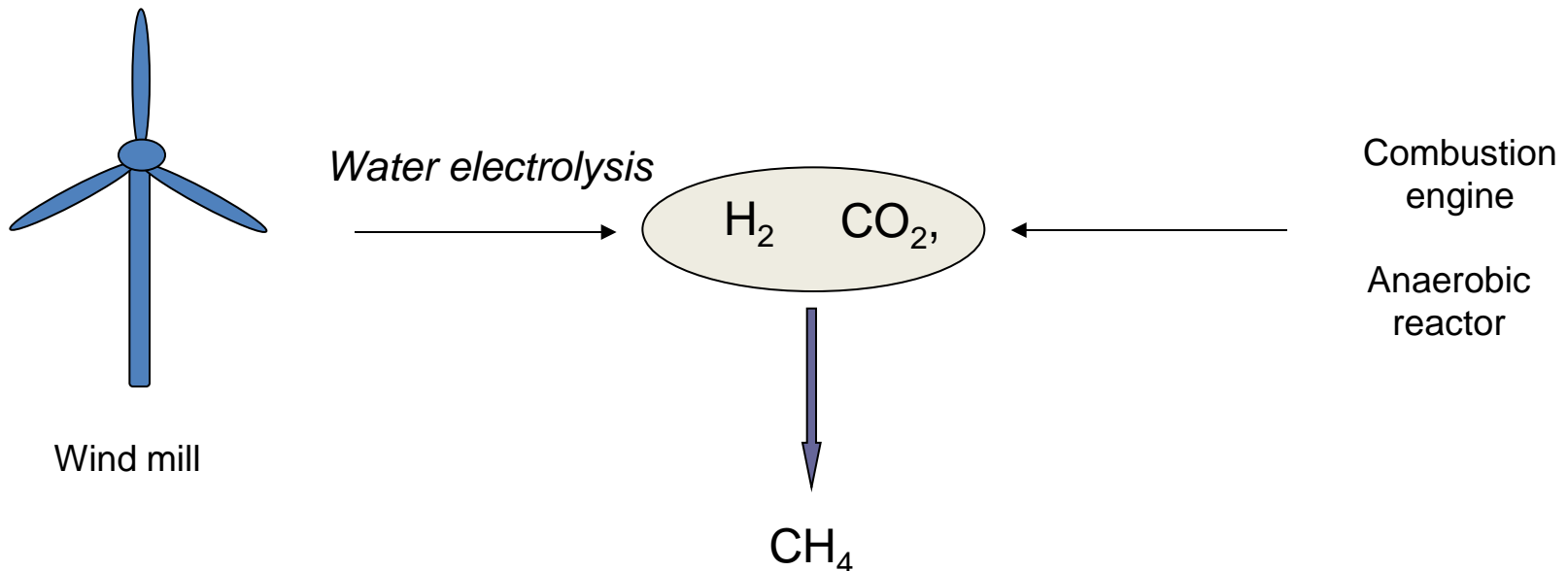
Biogas production and utilisation



Biogas production and utilisation



Hydrogenotrophic methanogenic archaea

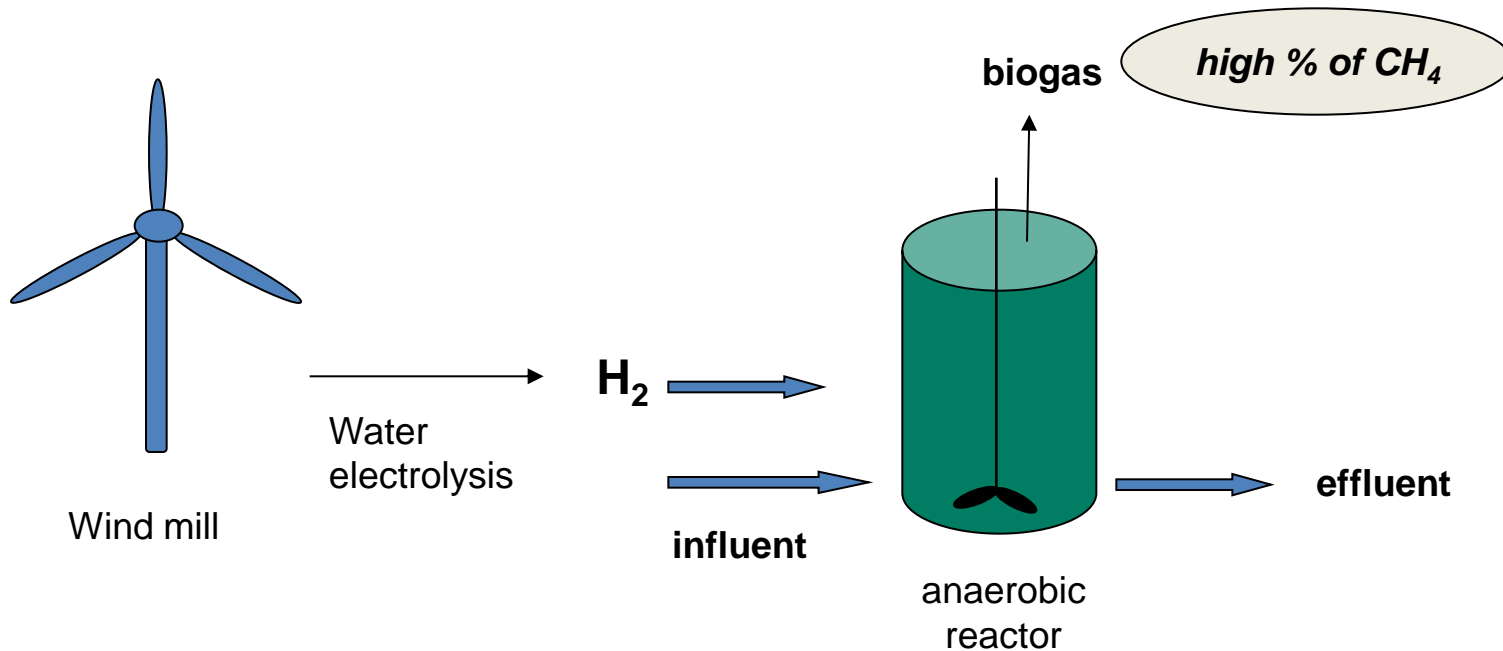


Objectives

- Develop an efficient process for the utilisation of H₂ and CO₂ mixture, regardless the availability of biomass
- Modify the anaerobic configuration so that H₂ is used to upgrade the biogas efficiency
- Optimize H₂ consumption by the hydrogenotrophic methanogens in anaerobic reactors

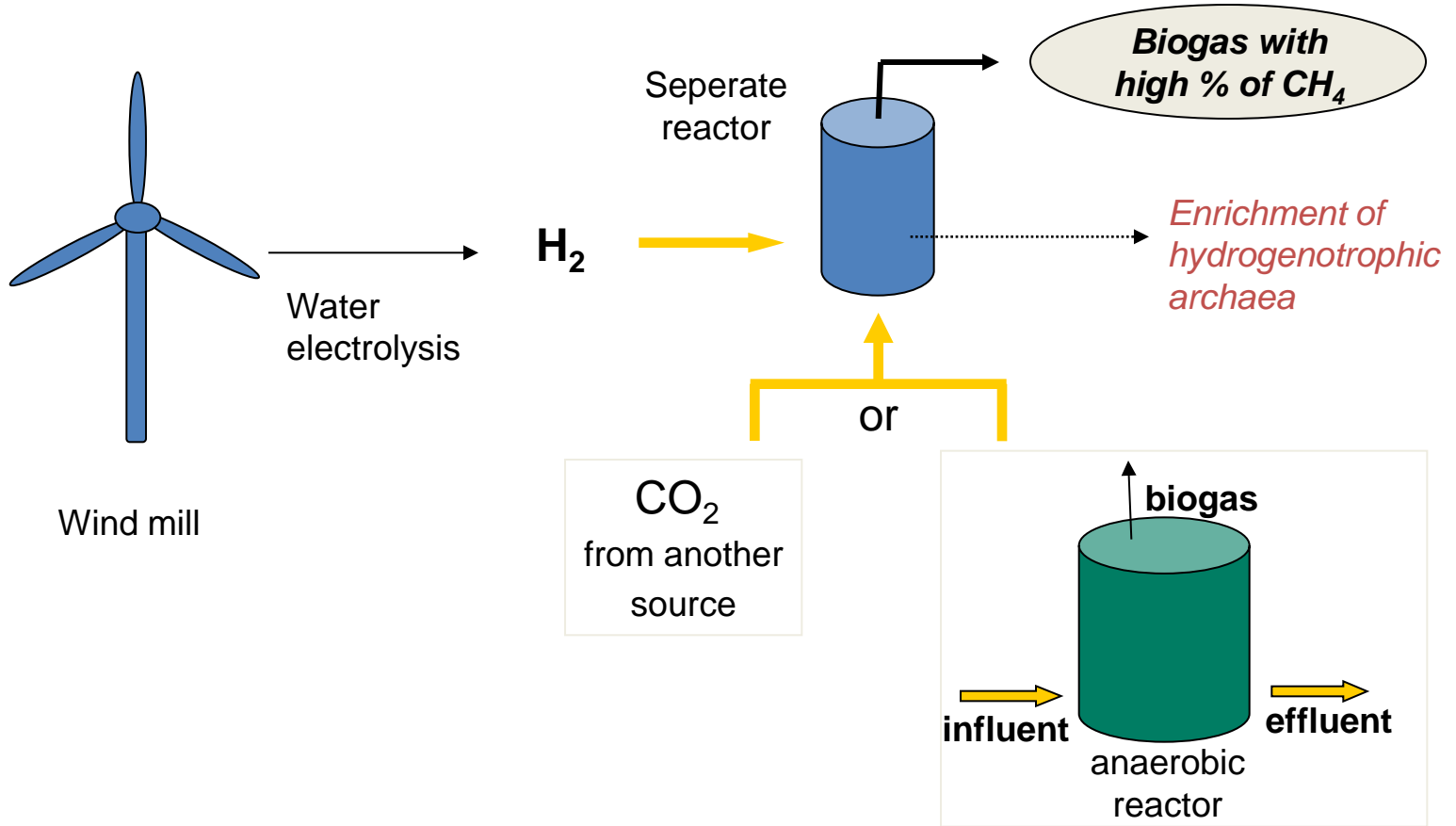
Biological method for biogas upgrading

1st strategy: *Enhance CH₄ content of biogas through injecting H₂ to the organic waste influent of the anaerobic digester*



Biological method for biogas upgrading

2nd strategy: Convert CO_2 into CH_4 through biological method



Advantages

Biological conversion of CO₂ to CH₄ can result in:

- increased net CH₄ production for biogas plants
- increased heating value of biogas
- extended biogas utilisation
- use the existing infrastructure of biogas plants
- full use of the potential of wind mills

Conclusions

Surplus electricity to biogas via hydrogen could lead to:

- High CH₄ content biogas.
- Easier storage of excess wind power as CH₄.
- The existing natural gas grid can be fully used.

Main advantage / possibility: *use of biogas as alternative to natural gas*

Thank you for your
attention!

