

# Conversion of Wastewaters into Resources

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Hydro Nation Scholars Programme

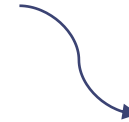


# WATER IS LIFE

“It is estimated that by 2040, global water demand could increase by more than 50%, putting additional stress on the vital resource” UN News, 2021

“The COVID-19 pandemic has demonstrated the critical importance of sanitation, hygiene and adequate access to clean water for preventing and containing diseases” UN Sustainable development goals, 2021

“It’s time to change our Relationship with water”  
Pr Bob Ferrier, CREW, 2021



**Circular Economy?**

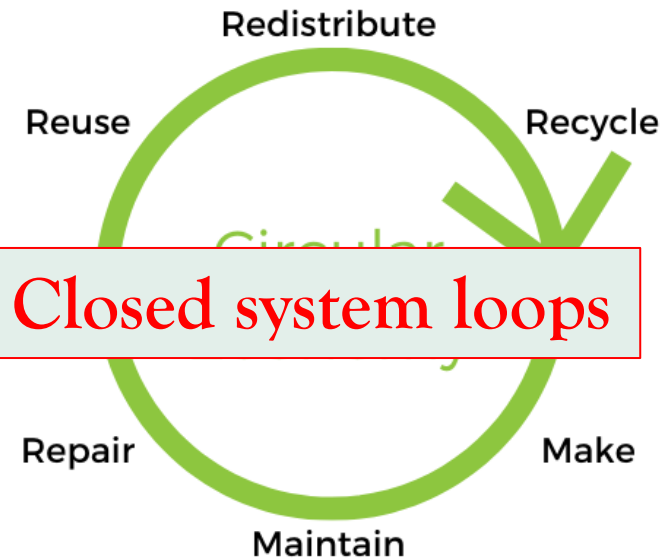


# WHY CIRCULAR ECONOMY?

**“DISPOSAL” to “REUSE”**  
and **“Resource recovery”**

Environmental protection  
Economical balance  
Social benefits

UNESCO, 2017



Take  
Make  
Use  
Linear  
Economy

Dispose  
Pollute



**User ----- Sewage system ----- Wastewater treatment plant ----- Treated water**



# BIOREMEDIATION, WASTEWATER TREATMENT



Aerobic wastewater treatment (microorganisms need oxygen to remove pollutants), **most**

**popular**

Efficient

Energy intensive and expensive

High sludge disposal

No resource recovery



Anaerobic wastewater treatment (fermentation, microorganisms do not need oxygen), **increased**

**Needs to be improved as a cost-effective process**

Maintenance

Low sludge disposal

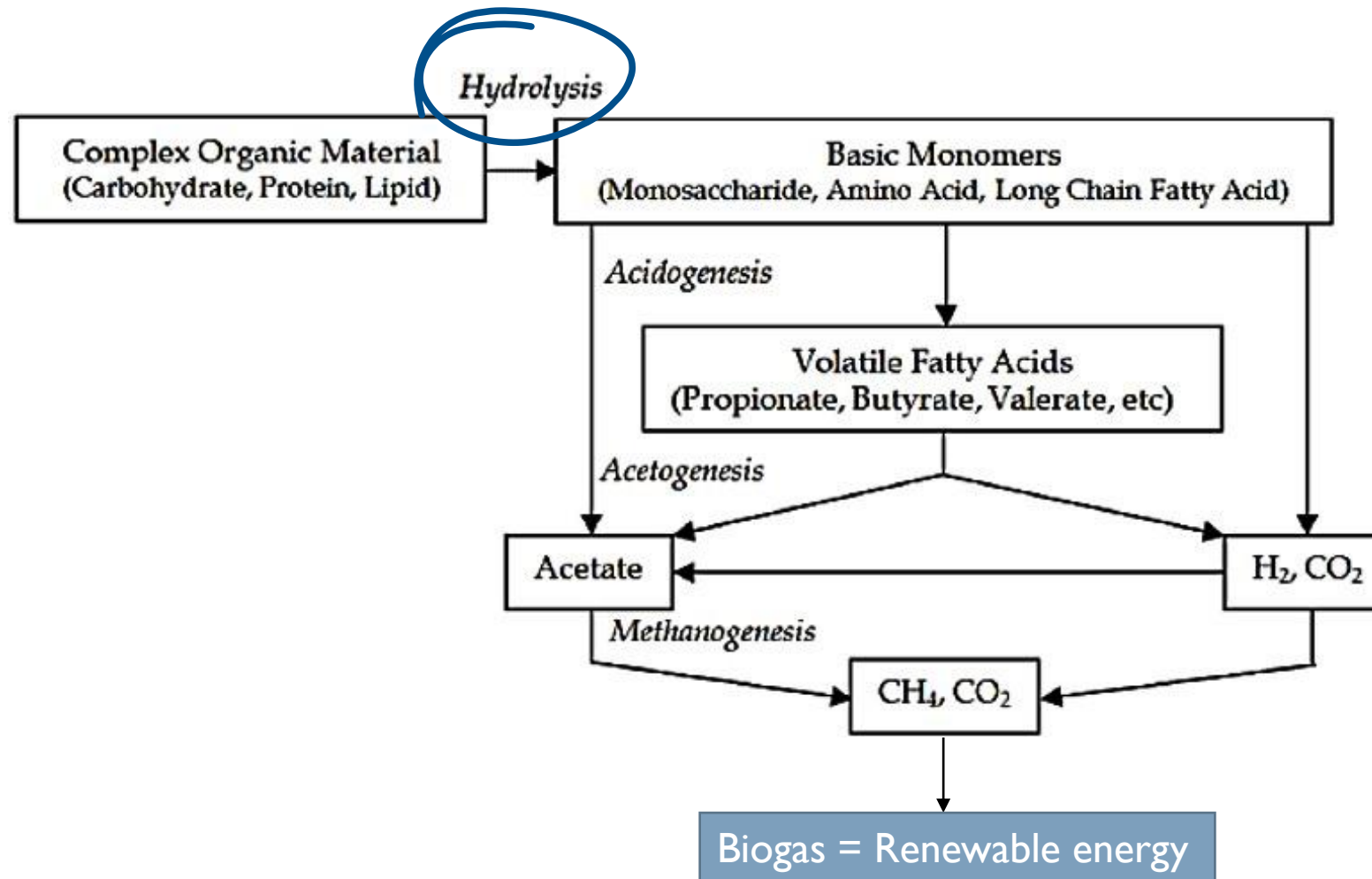
Recovery of valuable chemicals, energy and organic fertilizer

[Anaerobic vs. Aerobic Wastewater Treatment Systems: What's the Difference? \(samcotech.com\)](http://samcotech.com)

[Malaby\\_Biogas\\_570x360-1.jpg \(570x360\) \(adbioresources.org\)](http://adbioresources.org)



# ANAEROBIC DIGESTION



ERSAHIN, M.E., OZGUN, H., DERELI, R. and OZTURK, I., 2011. Anaerobic Treatment of Industrial Effluents: An Overview of Applications.

What is Carbon Pricing? | S&P Global

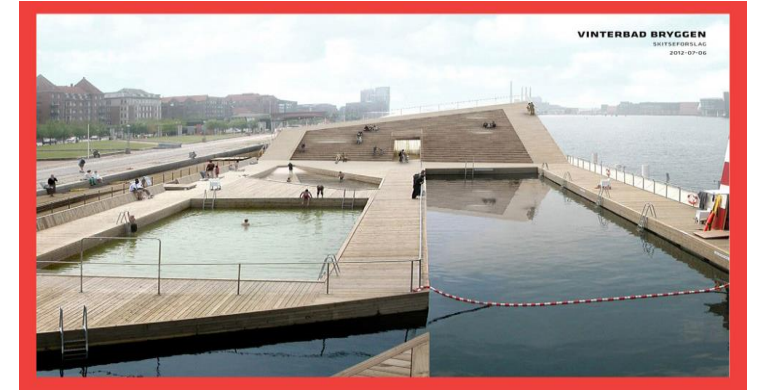
DIONISI, D. and SILVA, I.M.O., 2016. Production of ethanol, organic acids and hydrogen: an opportunity for mixed culture biotechnology?

# PROSPECTS

- Study the effect of different parameters on gas production, VFAs and ethanol
- **Microbial genomic analysis to identify microbial species involved in the fermentation**
- Effect of toxic metals on the fermentation process, using constitutive and non-constitutive biosensors



# CONCLUSION



**Water Safe  
for  
EVERYONE**

# ACKNOWLEDGMENTS

