

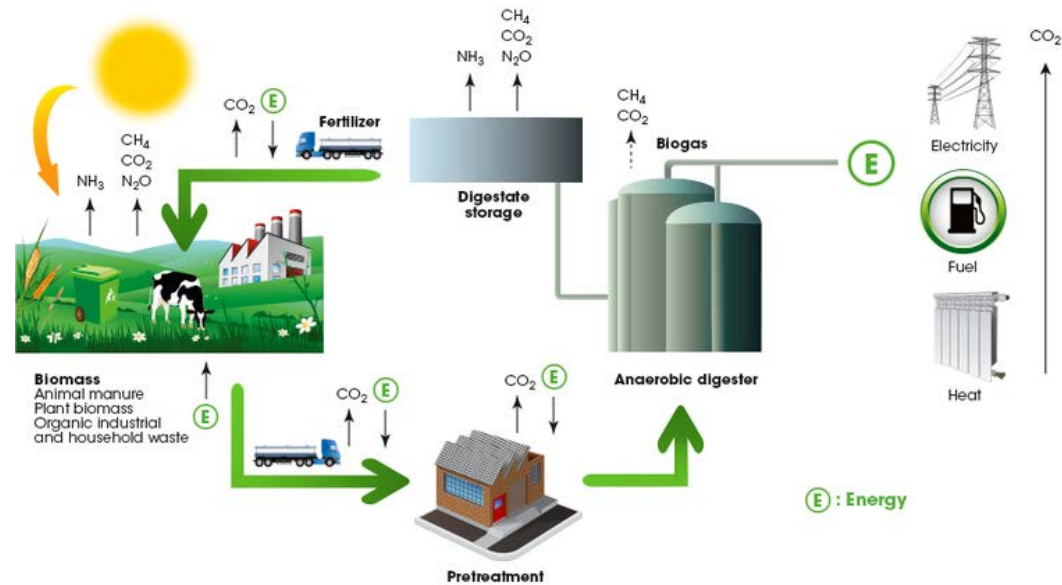
Work Package 3

Biomass analysis

Objective and results

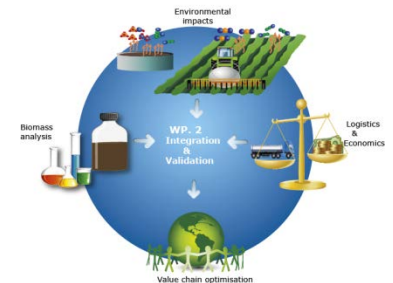
Objective: Develop fast and reliable **methods** for BMP determination, **characterization** of biomass

Result: Analytical **method**, sample **archive**, composition of biomass (e.g. BMP, C and nutrient pools), model for **prediction** of OM conversion



Deliveries (D) and Milestones (M)

- M: Collection of biomass samples (June 2014)
- M: Analysis of all biomass samples completed (June 2016)
- D: Fast analytical procedure for BMP (2016)
- D: BMP and biomass transformation prediction model (2016)



Achieved

Staff

- Post Doc (From 1st November) Jin Mi Triolo have started contributing to this work in June 2013
- Senior Researcher Alessio Boldrin started contributing in May 2013
- PhD fellow > Ali Heidarzadeh at SDU (Late October 2013)
- 1 PhD candidate shortlisted at DTU (“in-person” interview 09th October 2013)

Progress

- Agreement on substrates
- Agreement on analytical activities
- Comparison of biogas chain models started (SDU, DTU)

Substrates

SDU:

- Agricultural residues
- Near-agricultural residues
- Manure
- Algae

DTU:

- Organic household waste
- Organic industrial waste
- Sewage sludge
- Garden & park waste

Analytical activities

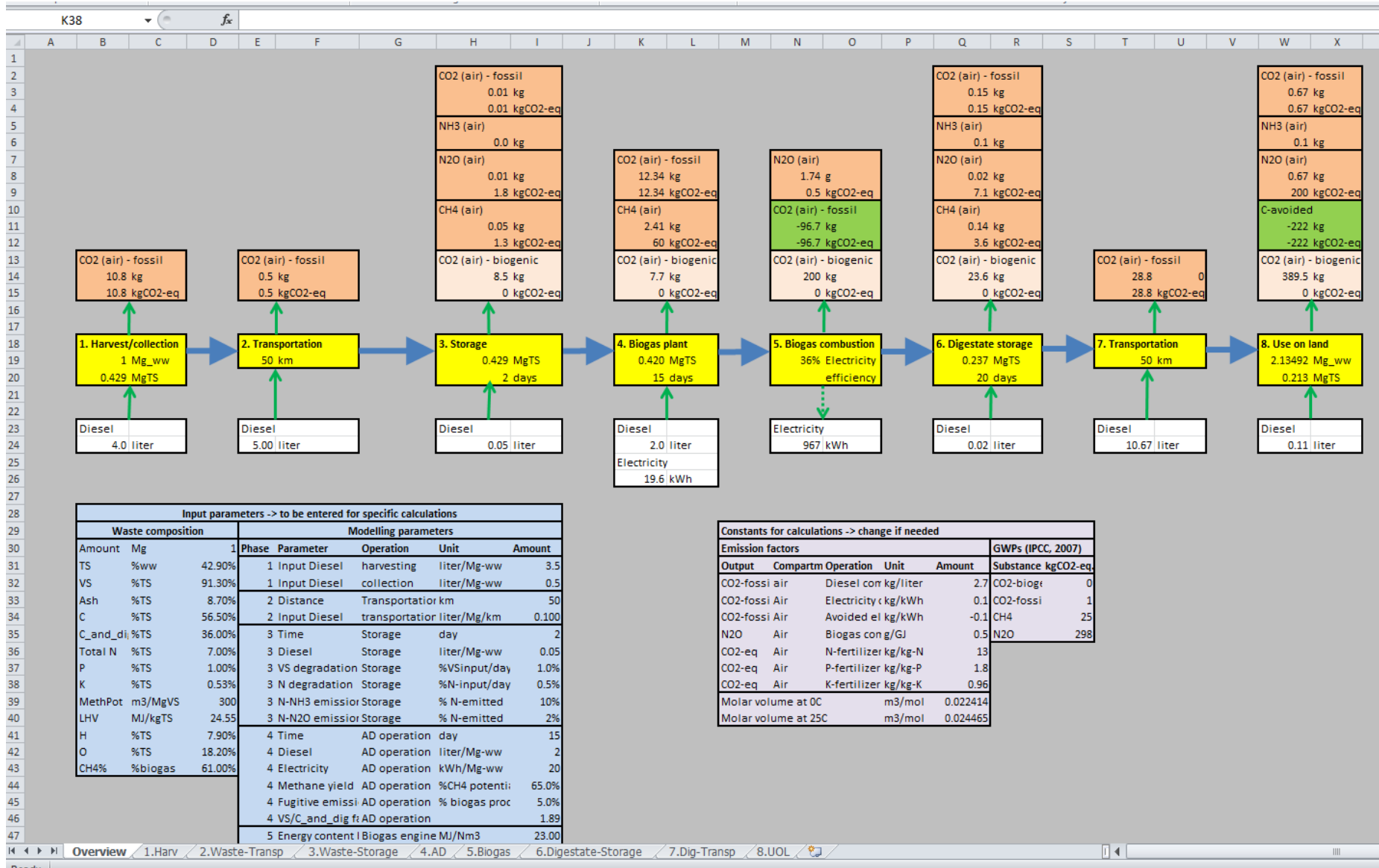
SDU:

- Digestible, slowly digestible
- NIR (e.g. TAN, lignocellulose, VFA)
- Reactors (3L) → 3 RTs
- BMP

DTU:

- Metals
- C, H, N, O, S
- Lipids, carbohydrates
- Reactors (3L) → 3 RTs
- BMP

Excel model (DTU)



Mass/energy balance model

- Preliminary issues/considerations:
 - Storage stages → aerobic/anaerobic degradation → the C pools have different VS/C ratios
 - Fugitive emissions: generally unknown, potentially crucial for GHG balance
 - Fugitive emissions → need accurate C balance
 - For organic waste, transportation marginal, digestate transportation more significant → water content
 - Proper modelling of field application needs predefinition of conditions

Contributions from biogas- & waste companies

- Access to waste streams
- Assistance during sampling → representative sampling: significant amounts, repetitions

Questions / Challenges

- Sample heterogeneity
 - Number of samples, sample representativeness
 - Temporal and spatial variations
- Assessment of fugitive emission
 - Which technique?
- Biomass analyses
 - Characteristics of the analytical tool?
 - Cost of the tool?
 - Other tools?
 - Other relevant parameters to measure?