Hydrothermal Liquefaction in the Waste2Road Project

Presenter: Geert Haarlemmer

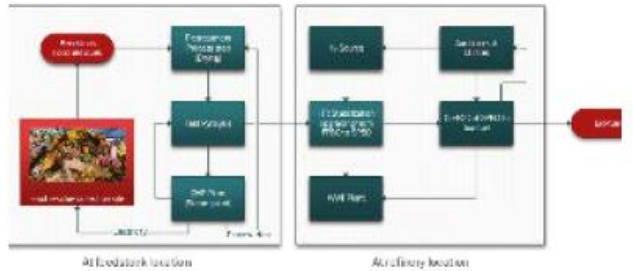
Meeting: HTL in the green energy transition

Location: Virtual

Date: January 28th 2021

Waste2Road Value Chain

Waste Sorting → Primary Conversion → Refinery Integration → Process Design

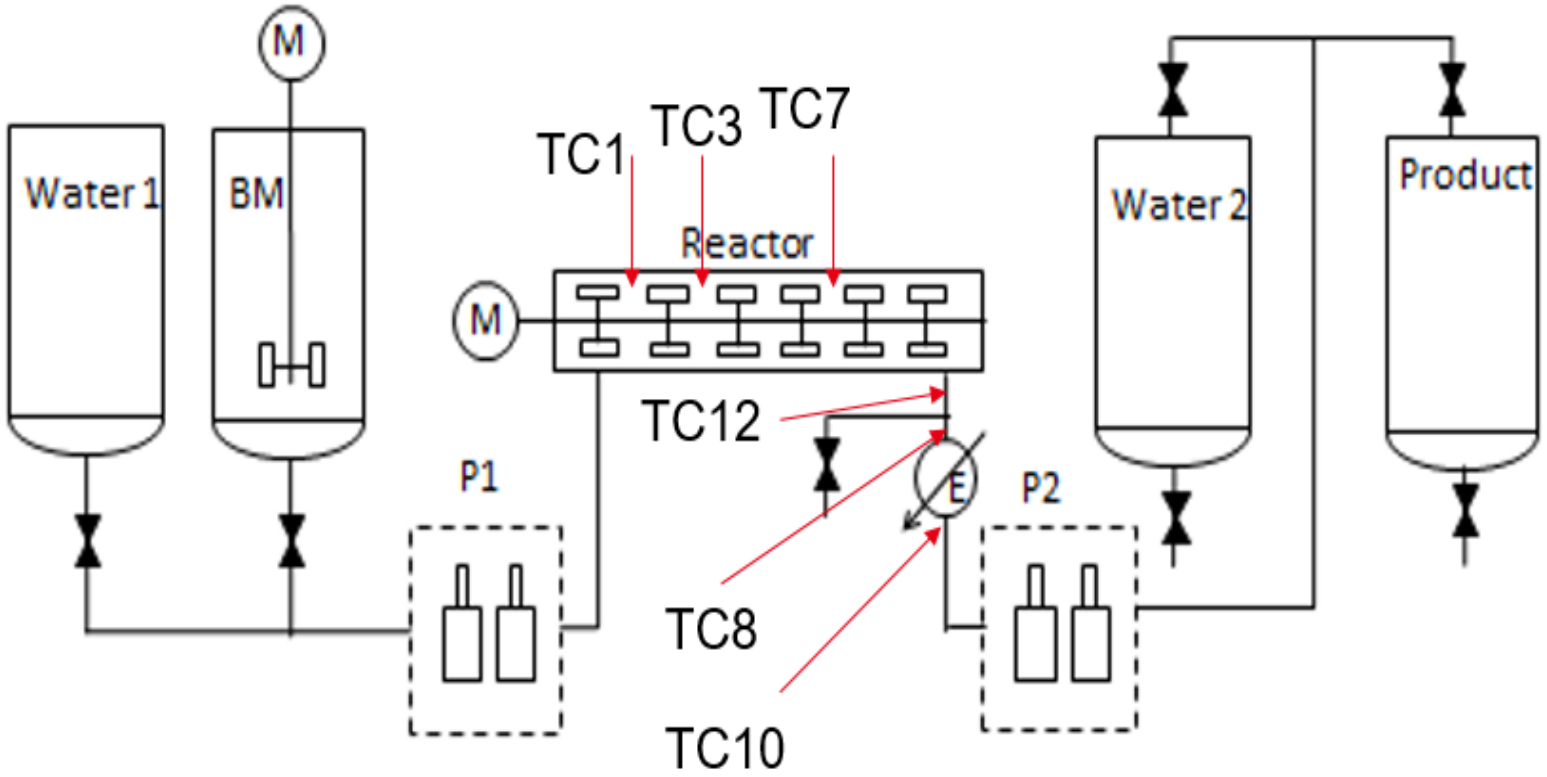


Resources considered for HTL

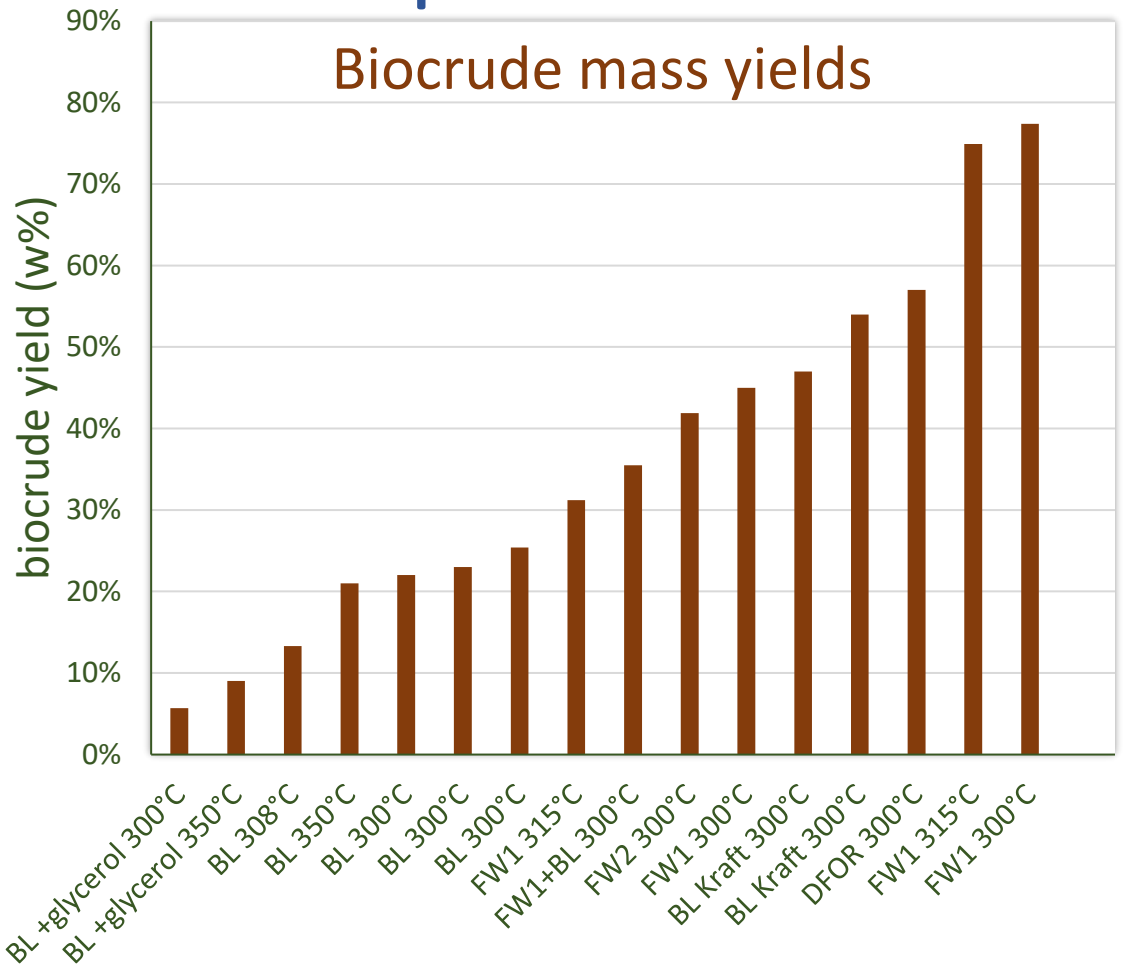
Experimental equipment

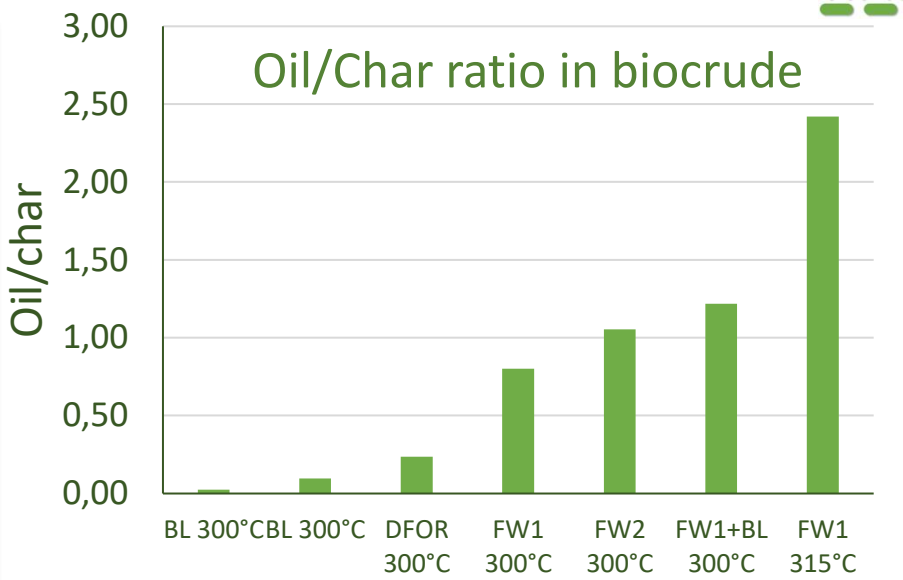
Batch Reactor

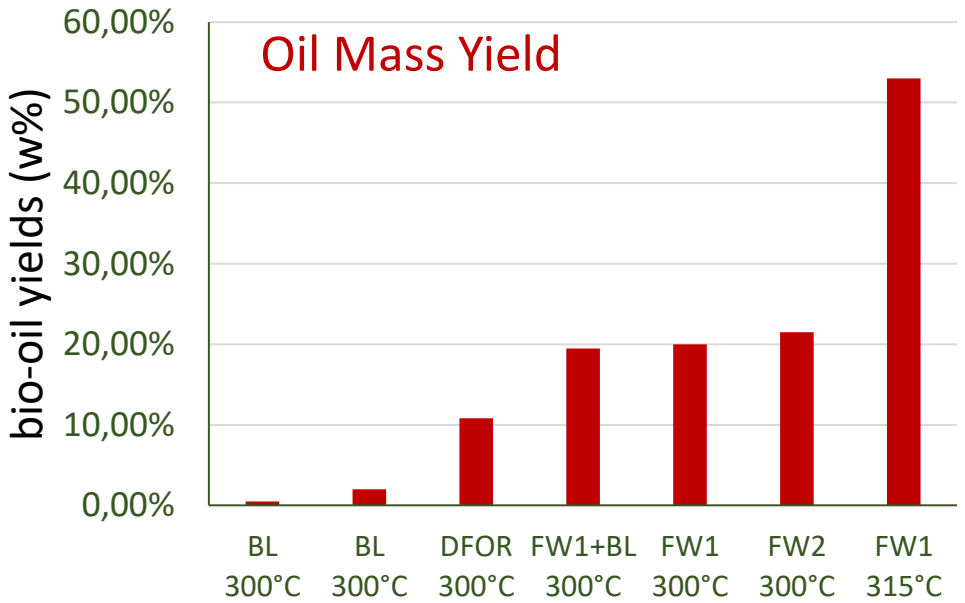
Continuous Reactor



Batch Experiments







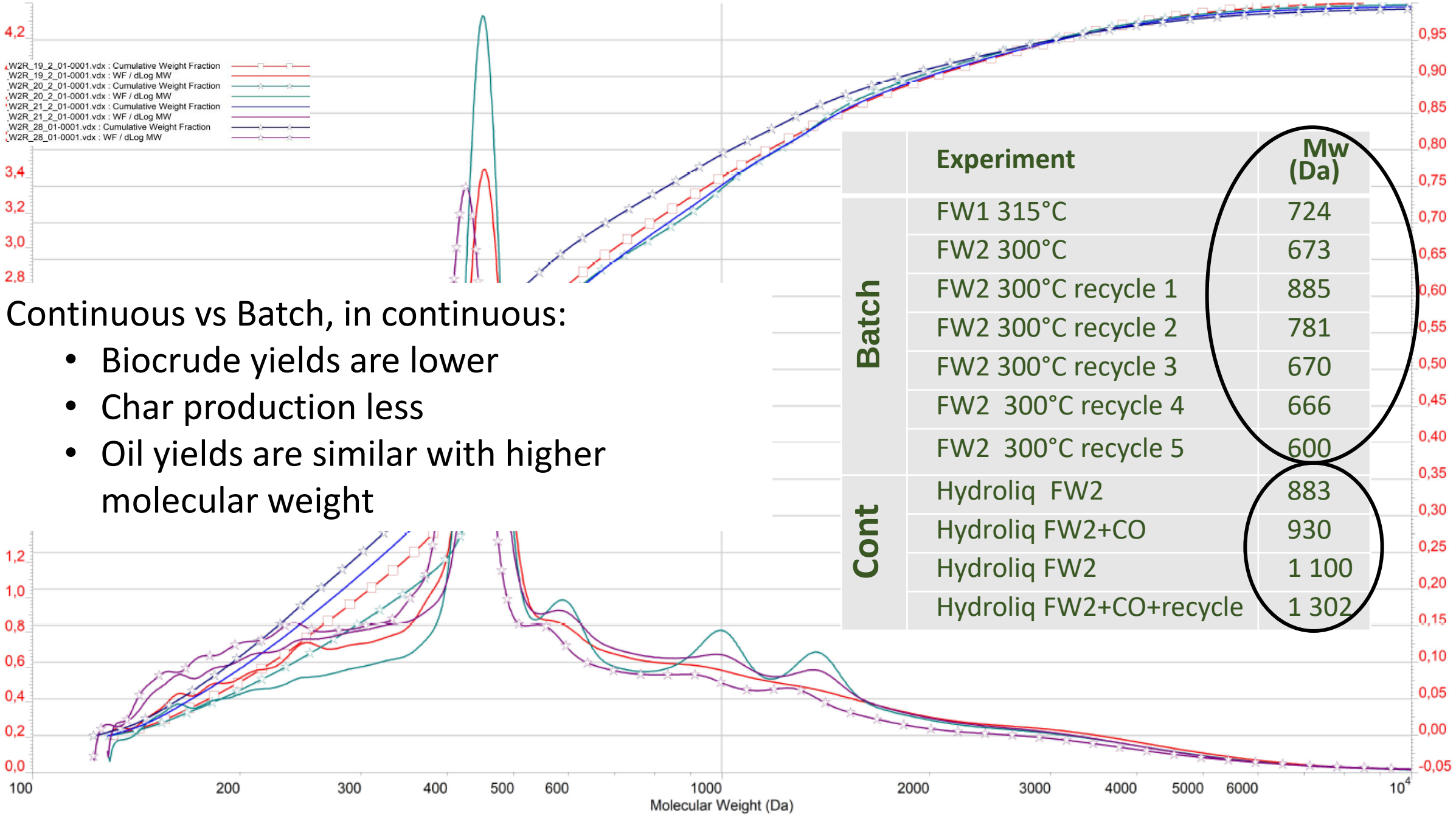
FW = Food Wastes
BL = Black Liquor
DFOR = Digestate

Continuous Experiments

Conversion conditions

- 300°C
- 150 bar
- 1.5 L/h
- Residence Time ~15 min

	W2R-19	W2R-20	W2R-21	W2R - 28	W2R - 30	W2R – 31
Resource1 – FW	10 %	10 %	10 %	10 %	10 %	10 %
Resource2 – Used Cooking Oil	-	1 %	-	-	1%	1 %
Bio-Liquid yield	NA	45 %	52 %	45 %	47 %	
Gas	NA	15 %	19 %	NA	NA	NA



Continuous vs Batch, in continuous:

- Biocrude yields are lower
- Char production less
- Oil yields are similar with higher molecular weight

	Experiment	Mw (Da)
Batch	FW1 315°C	724
	FW2 300°C	673
	FW2 300°C recycle 1	885
	FW2 300°C recycle 2	781
	FW2 300°C recycle 3	670
	FW2 300°C recycle 4	666
	FW2 300°C recycle 5	600
Cont	Hydroliq FW2	883
	Hydroliq FW2+CO	930
	Hydroliq FW2	1 100
	Hydroliq FW2+CO+recycle	1 302

To Conclude

- Screening of resources in batch with digestate, food wastes, black liquor
  - Best resource is food waste
  - Digestate contains too much ash
  - Black liquor must be mixed with food waste
  - Addition of glycerol has no positive effect on conversion of black liquor in our conditions

- About 10 kg biocrude has been produced for upgrading

- Other resources that will be tested
  - Vinasses
  - Fermentable Fraction of Municipal Organic Waste

WASTE2ROAD

Thank you for your attention!

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