GO-GRASS

Grass-based circular business models
for rural agri-food value chains

GO-GRASS Final Event
Dutch demo

Gosse Hiemstra (HB)

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Dutch Demo

Objective

Creating high value products from low quality grass by retrieving the grass fibers from it and utilise them for paper and carton production.

Processes:

Grass: harvesting – storage – delivery.

Fibers: (grass cleaning) – digesting – fibers.

biogas.

Paper: testing - manufacturing

Valorise: paper with fibers from tomato plants

Grass fibers for paper production

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **N° 862674**

Grass paper – two types

1. Adding dried small particles of grass to the paper pulp.

    -Maximum 7-8%. -Objective: esthetics, particles visible to end-users

    -No contribution to strength of paper

2. Use grass cellulose fibers to substitute (partly, totally) wood cellulose

    -**This is the objective Dutch demo**

3. Problem in previous attempts to grass paper: removal of sugars and proteins

4. Expectation: digestion would solve this problem easily and than up-scaling

    -This was a miscalculation!

5. Solution: mild alkali treatment. Also needed for lignin.

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Paper making (labscale)

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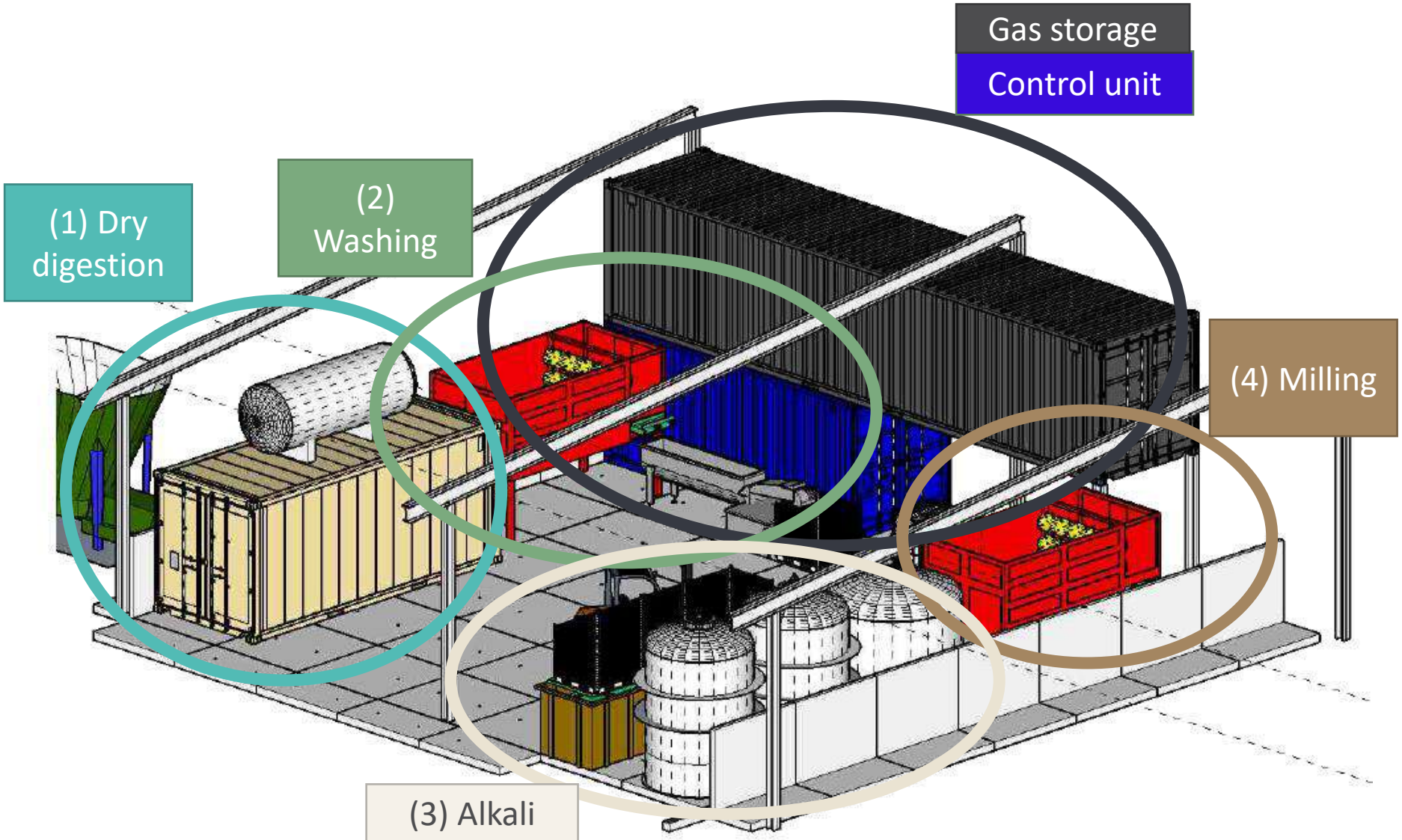
- Capable of making grass paper with 0-100% substitution woodcellulose
- Good strength and dewatering capacity on labscale. Speed of papermaking machine
- Good removal of sugars and proteins
- Good liberation of cellulose from grass bundless.
- Schut papier is enthousiast, high expectations

Scale-up fiber production technology

WP3
DUTCH
DEMO

GO-GRASS



Opening and shreddering grass bales

Dry digester with percolate tank


ALTISOL
TOYOTA
Tonero
35 SAS
3

Garbage detection and removal from road-side grass

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Vision camera detection and Deep learning technology.

Develop database of 15.000 pictures of garbage

Training of algorithm

Good results!

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Outlook

1. Fiber production technology fit for purpose. Further research, testing and initial production at Schut papier
2. No financial feasibility for this set up (1 digester).
3. Up-scaling to 5 digesters is OK. Different retention time digester and other steps
4. Many possibilities for improvement and cost reduction
5. Flexibility. i.e. biogas production, other biomass types, easy scale-up
6. LCA is at least 10 times better than wood cellulose
7. Enough low quality grass for 500 digesters in the Netherlands. Not enough grass biomass to replace all yearly virgin cellulose in Dutch paper industry
8. **Solid base for economic feasible grass fiber production**

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Some lessons learned and Next steps

1. Everything takes more time than expected. i.e. Teething problems, delivery times, depth of insight in dry digestion.
2. Collaborative engineering. Start earlier and paralel with scale-up

Next steps.

1. Re-engineering the fiber production technology. Calculate optimal scale and number of digetyaser. New project.
2. Explore business model with separate digesters sourcing more centralised grass fiber upgrading.
3. Explore development of Carbon credits

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Thank you

Questions?

Gosse Hiemstra

Rommie van der Weide

Jelle Pilat

Stefan Hol

Kimberly Wevers

David Meijvogel

Sjaak van Brugge

Durk Durksz