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Project 3.1 Retrofitting

Objective:

- Integrate new technologies in refitting of existing installations.
- Prepare the design for refitting modules:
    - Easy to implement / short payback time.
    - Modular – repeatable.

Re-focus in following modules

1. Testing Hogen technology (gras & rice straw) at lab.scale.
2. Cavitation technology has been succesfully tested. Originated in Ukraine.
3. Cleaning liquid digestate by O2 (instead of air)
4. Sanitation of manure. Design of a sanitation unit (2m3/hr). Built for a NL project.
5. Digestion in “manure sack”.
6. Removal of H2S through “Vitrisol®” for farmscale projects.
7. Nutrient dosing. Efficiency of nutrient application on digestion process.

Results of modules will be reported in product flyers / leaflets

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Project 3.1 Retrofitting: Result to date

Module Testing Hogen® technology on grass and rice straw.

- Test on roadside grass.
  - Main challenge was to get it clean.
- At labaratory schale Hogen® proved to be a stable process.
- Better digestion and increased production vs normal CSTR.

Module Cavitation technology.

- Succesfully tested.
- Achieved higher biogas production (±10 %)
- Design and initial tests completed.
- Next step: implementation in project.

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Project 3.1 Retrofitting

Module Design for a “low cost” liquid manure digester .

Example of Design:

- 23 x 12 m “sack-digester”.
- 200m3 biogas storage.
- 600m3 liquid manure storage.
- Implemented in Belgium.

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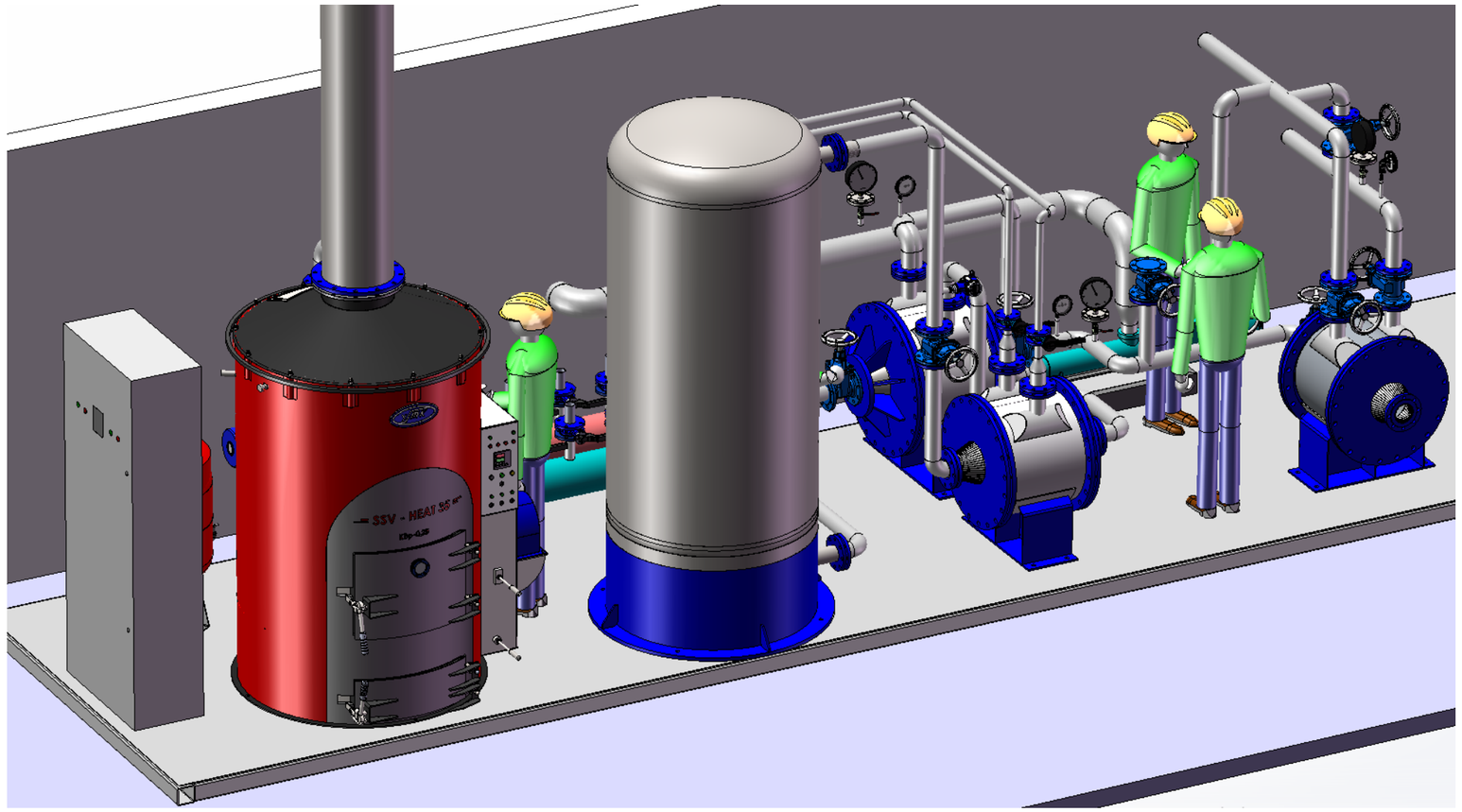
Project 3.1 Retrofitting

Module: Design of a sanitation unit.

- Boiler on biogas (alternative fuel: wood)
- 2m3 digestate / hour.
- 1 hour retention time
- Temperature 70° C.
- Project is under construction for Dutch farmer.
- Supplier from Ukraine.
- Budget price € 97.500



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Project 3.1 Retrofitting

Module: Removal of H2S from biogas

- Complete removal of H2S through an innovative absorption technology®.
- Proven technology.
- Replacement for active coal.
- Recovery of absorption medium.
- Recovery of “Sulphur”.

- In this module we aim to develop a design for an efficient “farmscale” application.