HARDFERM

The future of turning challenging waste fractions to biogas

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MEETING AGENDA

- INTRODUCTION OF THE SPEAKER AND DORANOVA OY
- INTRODUCTION TO BIOGAS PRODUCTION
- INDUSTRY CHALLENGES AND DORANOVA HARDFERM AS A LONG TERM SOLUTION TO THEM
Antti Mylärinen
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Education
MSc, Finance

Prior work Experience
Snowek Oy, CEO
McKinsey&Company, consultant
SEB, analyst
DORANOVA IN BRIEF

TWO BUSINESS LINES
BIOGAS AND LANDFILL GAS SOLUTIONS
SOIL AND GROUNDWATER REMEDIATION

INTERNATIONAL EXPERIENCE
A GROUP OF 20 HIGHLY EDUCATED EMPLOYEES WORKING IN TAMPERE REGION IN FINLAND
PROJECT REFERENCES FROM CHINA, VIETNAM, ZAMBIA, RUSSIA ETC...

CONTINUOUS R&D ACTIVITIES
IN-HOUSE R&D ACTIVITIES ON BOTH BUSINESS LINES
GRANTED PATENTS AND PATENTS PENDING IN EUROPE, CHINA AND RUSSIA
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The focus of this session is on reactor technology.
THERE ARE BASICALLY THREE TYPES OF BIOGAS PLANTS

- Wet fermenters (continuously operated)
- Dry fermenters (continuously operated)
- Dry fermenters (batch operated)
THE DEVELOPMENT OF EUROPEAN BIOGAS SECTOR

NEW ERA:
- Only the most challenging substrates are left for usage, as OFMSW

SATURATION:
- Green electricity tariffs come into effect in Europe.
- A lot of energy crops used as substrates

THE BEGINNING:
- Industry growth driven by waste water treatment plants

Only the most challenging substrates are available for biogas production. Dry fermentation captures the market.
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MAIN REASONS FOR THE GROWTH OF BIOGAS PRODUCTION ALSO IN THE FUTURE – WHY NEW REACTOR TECHNOLOGY IS NEEDED?

GLOBAL WASTE GENERATION IS EXPECTED TO GROW AT LEAST FOR THE NEXT 60 YEARS

LANDFILLING IS GETTING BANNED – INCINERATION IS GAINING GROUND

INCINERATION PROCESS SUFFERS FROM ORGANICS – BIOGAS TECHNOLOGY CAN’T HANDLE IMPURITIES

1. Biowaste only produces 3 MJ/kg when incinerated compared to 11 MJ/kg of other MSW.
2. Organic fractions increase flue gases in incinerators because of lower burning temperatures.
3. Current biogas technology poorly handles impurities such as sand and stones.
DORANOVA’S ANSWER FOR THE GROWING NEED TO PROCESS ORGANIC FRACTIONS OF MSW IS HARDFERM

SUITABLE FOR ALL WASTE FRACTIONS
Hardferm plant is built especially for challenging and impure waste fractions (e.g. mechanically separated OFMSW) but is well suited also for field biomasses and other more traditional substrates.

PATENTED TECHNICAL SOLUTIONS
Hardferm plants reach the optimal biogas production because of efficient double shaft agitator mixing. In addition, the plant offers superior heat efficiency due to an integrated hygienization process.

SCALABLE CONCEPT
Hardferm plants are scalable and suitable for multiple different needs. The smallest plant concept can process 7-12,000 tons of substrates annually while the largest plant can process over 150,000 t/a.

COST EFFICIENCY WITH LOCAL SOURCING
While the most critical process technology is always produced in Finland, Doranova has engineered Hardferm plants so that the process buildings and reactor structures can be built locally.
THE EFFICIENCY OF HARDFERM IS SECURED BY THREE KEY DIFFERENTIATORS

1. Hardferm reactors have a robust double-shaft agitators that ensure efficient substrate mixing and low electricity consumption

2. Heated agitator shafts ensure stable process heat also during cold winter months

3. Pre-treatment options make Hardferm a second to none when comparing investment profitability
Hardferm concept is easily scalable from a small size plant of 12-15,000 t/a up to 150,000 t/a.

The investment price of Hardferm reactors is significantly less compared to traditional reactor manufacturers due simple, but yet efficient design (horizontal reactors, modularity, simple and light foundations, no underground structures, small area requirements).

Localization possibilities further increase cost reduction potential.
HARDFERM CONCEPT OFFERS LOWEST POSSIBLE OPERATION COSTS

- Continuously operated process combined with the best-in class heat recovery offers the great net energy production
- All maintenance works can be conducted from outside of the reactors
- Reactors don’t need to be stopped during maintenances
- High-torque power train enables low electricity consumption in substrate mixing
- Fast process ramp-up
- Remotely controlled process control helps operators to optimize plant operations
THE FIRST PLANT WILL BE BUILT TO WESTERN FINLAND BETWEEN H2/2018-H1/2019 – THE SECOND PROJECT WILL BE PUBLISHED IN AUGUST 2018
THANK YOU!

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