



# Unlocking Biomass Potential

2022

Yilkins - enabling circularity  
and sustainability

# About Yilkins

Yilkins is an innovative, new technology Company dedicated to the development and manufacturing of biomass residues valorization. The Company advances processes of biomass and organic residues for their clients, enabling them to create circular economy solutions by taking waste residues and recycling those residues into energy production and high value-added products. Yilkins has created proprietary drying and torrefaction technologies with proven commercial use. The systems technology enables companies to reduce their dependence on fossil fuel energy sources and helps to reduce the environmental impact of industrial activities. Yilkins' system solutions offer clients cost-savings benefits.

The Company's technology platform offers solutions in drying, torrefaction, gasification, separation of residue streams and high carbon containing products like biochar. The technology platforms can be incorporated as customized client solutions. At its core, Yilkins develops, licenses and manufactures system equipment for client solutions in the biomass industry.

Yilkins is a registered entity in The Netherlands, its headquarters, with 10 employees. The Company was founded in 2016 and is a family owned and operated business. Yilkins sources equipment mainly from The Netherlands. The Company is revenue producing and has a robust project pipeline.

# Board of Directors YILKINS – proven track record



## **Rob Voncken (CEO)**

- Former DSM executive in biochemical (business development, strategy, innovation) incl. Managing Director Incubator and Vice President Strategy.
- CEO of BioMCN, a leading 2nd generation biofuel (biomethanol) producer.
- Initiator and President of the Dutch Association of Sustainable Biofuels.
- Entrepreneur in the Bio-based business landscape.



## **Patrick (Peter) Bergman (CTO)**

- ECN Research & Development - reigniting and driving torrefaction research
- Consultant renewable development at HVC. Focused on conceptualizing and optimizing the biomass cascading processes.
- R&D manager Topell - redesigning the operations of a torrefaction process.
- “Thinking and Doing” in all thermal conversion processes and biomass cascading. Top authority in the field of torrefaction/gasification.

# Yilkins proposition

- Yilkins is a renewable technology company and strategic partner for its customers, enabling them in the upgrading of biomass residues into high value products for electricity, heat and chemical applications.
- Yilkins proprietary and proven technology offers complete solutions for replacement of fossil resources, high energy efficiency, lowest Total Cost of Ownership and carbon negative footprint thus contributing to the realization of a net zero economy.
- Yilkins offers its technologies at large scale - as well as “local to local”, with an optimal balance of plants approach.
- Feedstock is derived from biomass residues and organic waste material (including herbaceous, agricultural biomass and sludges)
- Valorization and cascading of biomass residues are our leading principles.



# Why invest in Yilkins platform technology?

Yilkins proprietary design is based on fluidized bed principles and applicable for both drying and torrefaction of biomass residues

## Technology

- Own patented technology
- Static reactor, no moving parts, no risk of failure
- Compact design, small footprint, skid based.
- Complete technology package, including balance of plant.

## Process

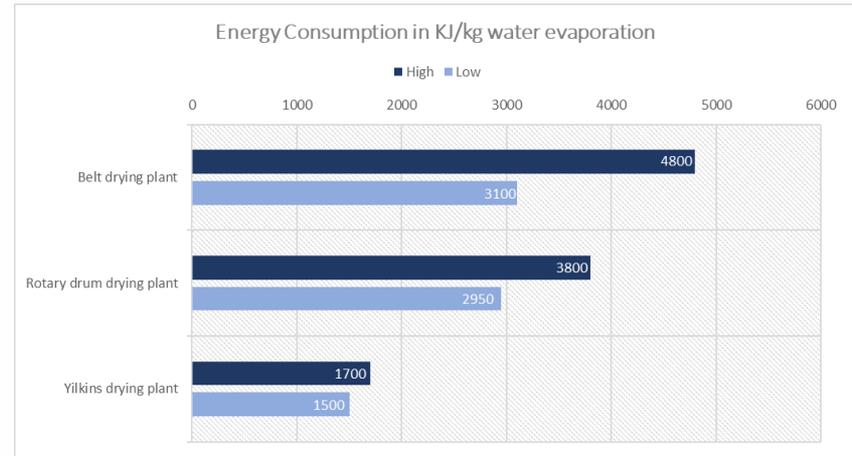
- Very fast heat transfer between gas and solids
- High efficiency / low energy usage
- Uniform product quality
- Feedstock flexibility
- Safe operation (no oxygen presence in both drying and torrefaction)

## Emissions

- Low emission profile: CO<sub>2</sub>, NO<sub>x</sub>, VOC's

## Commercial

- Technology Readiness Level 8 – System complete and qualified
- Due Diligence report by DNV-GL: bankable technology
- Guarantees according to Orgalime S114
- Performance warranty back stop (optional)
- Lowest Total Cost of Ownership



*The energy efficiency of Yilkins technology in perspective*

## Why torrefaction?

Torrefaction is a technological process in which biomass is heated to 250-350 degrees C in a low-oxygen environment. The composition of the raw material is converted during the process, resulting in refined “black” product with optimized characteristics. Biomass is a continuous and reliable source of renewable energy and included in the Paris Climate agreement (CoP21).

Torrefied biomass has the potential to become a mainstream solid biofuel, replacing fossil fuels and making a large contribution to fight climate change.

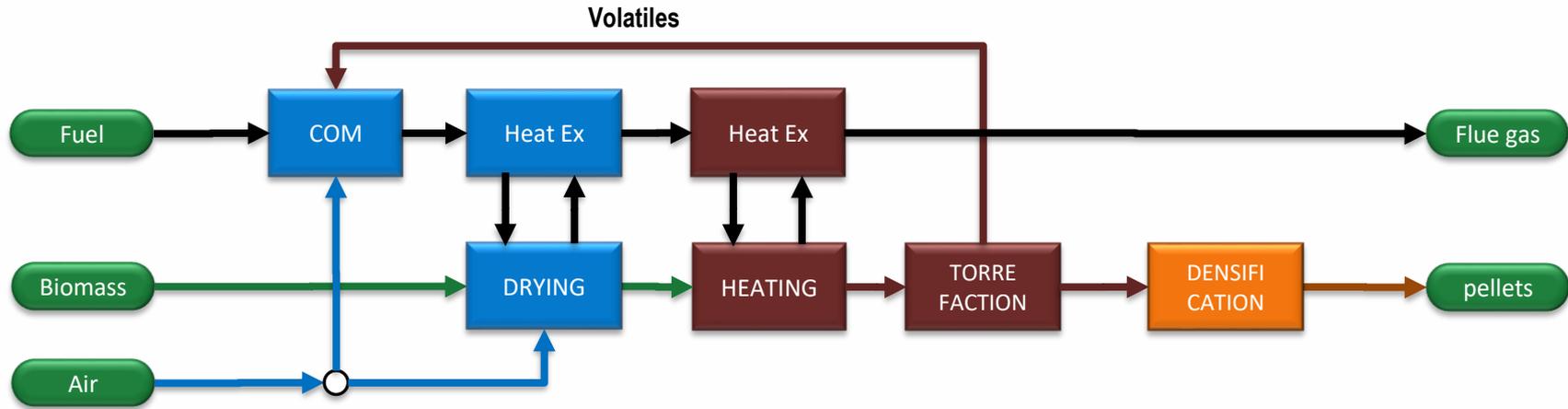
## Why Yilkins ?

- Proven technology – ready for upscaling/bankable
- Feedstock and product flexibility
- High energy efficiency and small footprint
- Superior quality of (end)product
- Safe and reliable operation
- Entrepreneurial team with proven track record



*Construction-phase of 6 torrefaction lines in Portugal, 2019*

# Integrated approach – Full plant layout



- Feedstock flexibility
- Free flowing behaviour
- Feedstocks:
  - Herbaceous (sorghum, verge grass, banagrass, straw)
  - Woody (all kind of woods, soft, deciduous, waste wood)
  - Other (sludge, brewery spent grains, bagasse, agricultural wastes)

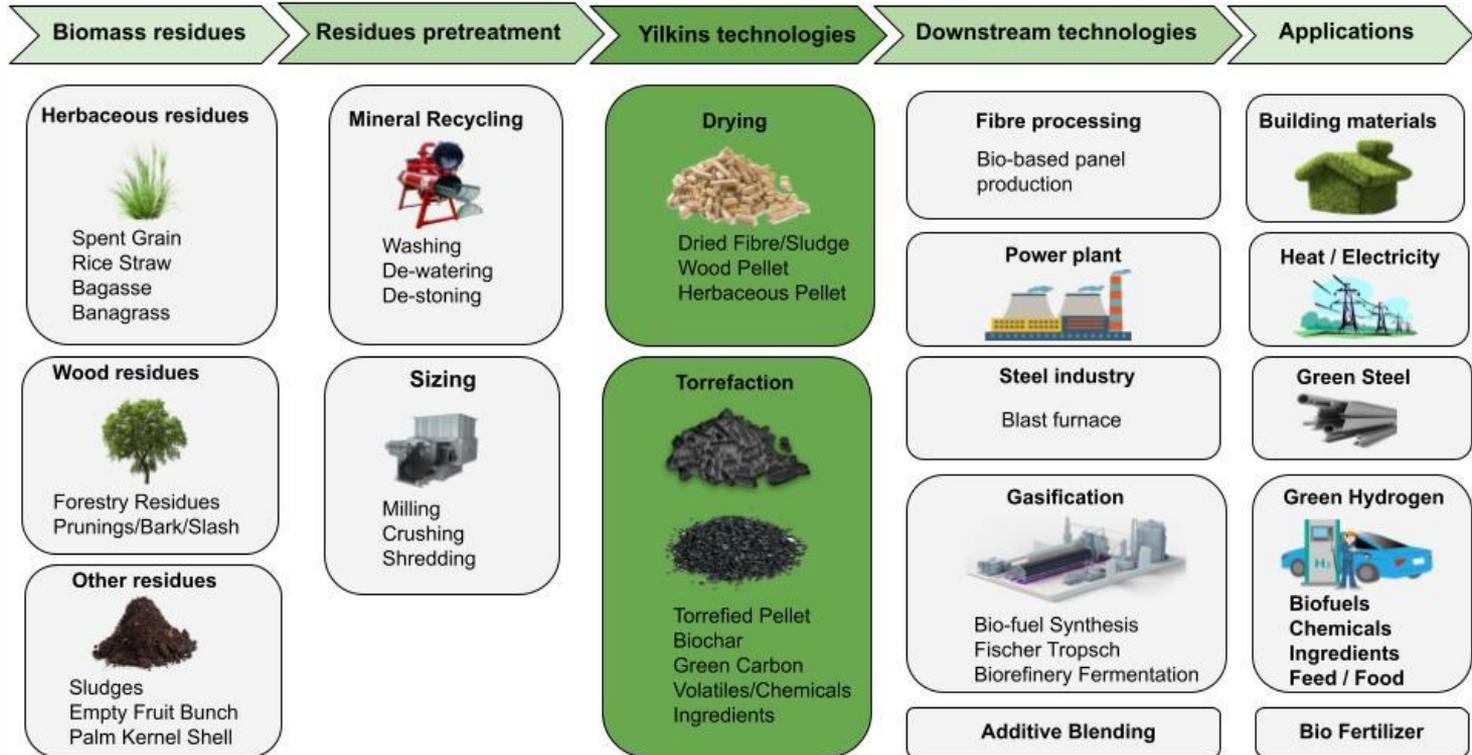
- Swirl bed technology
- 1 or 2 stage drying concepts
- Inherently safe due to absence of oxygen in drying medium
- Unique CO<sub>2</sub> footprint
- Complete Combustion of volatiles

- Staged torrefaction with swirl bed technology
- Indirectly heated, no contact with oxygen
- Uncoupled scale-up and product quality
- Maximised control over torrefaction conditions
- Designed to avoid condensation issues

- Torrefaction process “engineered” to pelletize
- High durability, homogeneous product
- No binding agents required
- Energy consumption comparable to white pelleting

# Value Chain Opportunities – market potential

Yilkins technologies enabling sustainability and circularity



# Yilkins project portfolio – ready for upscaling

- From laboratory set-up, pilot plant to demonstration plant in 4 years
- Funded by founders, family & friends
- 2 commercial projects realized; Streekpellets - 2018, Futerra - commissioning 2021, now in start-up phase
- Due Diligence by DNV-GL considers Yilkins technology bankable
- Potential customers are energy/heat producers, steel & concrete, food/feed industry and chemical industry
- Project portfolio sums up towards 400 million Euro – investment opportunities



*Demonstration plant in Ruurlo, Netherlands, 2017/2018  
Capacity: 250 kg per hour*



*Streekpellets white pellet  
plant, Netherlands, 2018  
Capacity: 10 kton*



*Construction-phase of 6 torrefaction lines in Portugal,  
2019/2020  
Capacity: 120 kton (Futerra project)*

# Yilkins technology creates circularity and sustainability

- Yilkins solutions make it possible to produce high quality products from biomass residues for energy, industrial and chemical applications
- Torrefaction technology opens routes to sustainable and competitive aviation fuels and green hydrogen
- Yilkins technology license model is ready for accelerated scale-up and paves the path to develop integrated eco systems
- Yilkins intends to set up a financial services model (equipment as a service/lease) in combination with maintenance and online monitoring and offers a platform for impact investments
- Yilkins – enabling a net zero economy





From biomass to energy, heat and  
chemistry • From spent mushroom  
compost to soil improver • From  
digestate to phosphate-rich soil  
improver

**YILKINS** Drying Solutions

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