FlexSNG: Topical Workshop

Turning low cost bio-feedstocks into valuable products

Topical Workshop

Karlsruhe, Germany

November 3, 2022

Workshop agenda 1/3

Event Agenda				
Time	**Topic**	**Partners**	**Presenter**	**Duration**
09:30	Welcome tea & coffee Morning networking			
10:15	Workshop Opening & Agenda **FlexSNG Project Introduction** - Introduction to the FlexSNG process, including gasification - Biochar as an output of FlexSNG process	VTT EIFER	Sanna Tuomi Stephan Seidelt	15 mins each
10:45	**FlexSNG Process Innovation** - Creative Optimization – Feedstock supply chain optimization - Sumitomo SHI-FW - industrial gasification and link to FlexSNG: Sumitomo Foster Wheeler's fluidised-bed gasification technology for converting biomass residues and wastes into syngas. - Wood. : the proven technology and link to FlexSNG: VESTA methanation technology for pipeline-quality SNG production.	Creative Sumitomo (online) Wood (Online)	Erik Rönnqvist Frank Ligthart (online) Fabio Ruggeri (Online)	20 mins each
12:30	Lunch			

Workshop agenda 2/3

Event Agenda				
Time	**Topic**	**Partners**	**Presenter**	**Duration**
14:00	**FlexSNG Products and markets** - Session overview and introduction	VTT	Ilkka Hiltunen	
	- The EU policies for renewable fuels	EC DG RTD (Online)	Maria Georgiadou (Online)	20 mins each
	- Gasification from biomass: market potential and national strategies.	Guide-house (Online)	Sacha Alberici (Online)	
	- Effects of biochar on crops under different climatic conditions	LTZ	Kurt Möller	
	- BioSNG: product specifications and market value Introduction.	EIFER	Stephan Seidelt	
15:30	- Biochar: a world of possible applications.	POLITO (Online)	David Chiaramonti (Online)	
15:50	Break			

Workshop agenda 2/3

Event Agenda				
Time	**Topic**	**Partners**	**Presenter**	**Duration**
16:00	**Industrial symbiosis and the case studies** - Industrial symbiosis and its critical role in the economic viability of biofuel processes, with an introduction to Greenfield Global and their business strategy to the world of biofuels. - A tale of 4 case studies being considered in the FlexSNG H2020 Project. **Discussion of "winning conditions" for the FlexSNG Process.** **Workshop round up with closing remarks.**	Polytech Montréal CERTH (Online) All Partners	Paul Stuart Kostis Atsonios Christina Antonopoulou Discussion chair: Paul	1 hour
17:00	Networking			
18:00	Event close			

FlexSNG project:

“Flexible Production of Synthetic Natural Gas and Biochar via Gasification of Biomass and Waste Feedstocks”

FlexSNG Topical Workshop: Turning low cost bio-feedstocks into valuable products
November 3, 2022 - Karlsruhe, Germany

Sanna Tuomi (project coordinator), VTT Technical Research Centre of Finland Ltd

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 101022432 and the Government of Canada’s New Frontiers in Research Fund (NFRF) and the Fonds de recherche du Québec (FRQ).

FlexSNG in brief

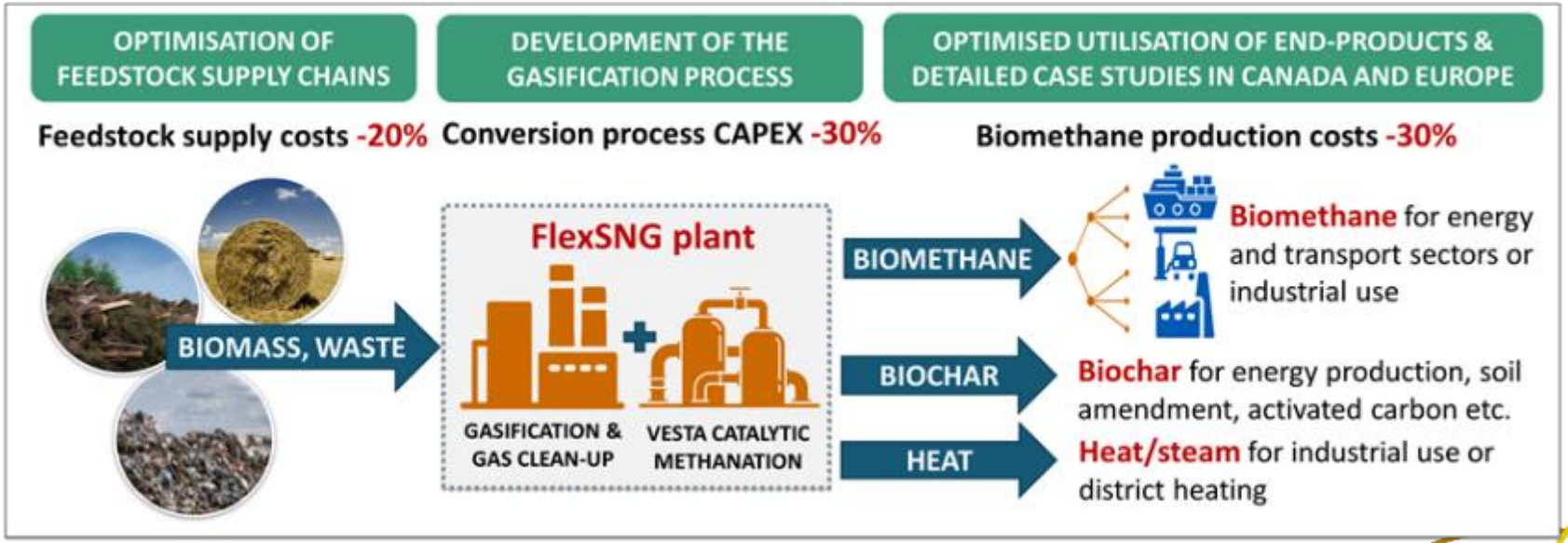
- **“Flexible Production of Synthetic Natural Gas and Biochar via Gasification of Biomass and Waste Feedstocks”**
- Type of action: Research and Innovation
- Duration: 36 months (1 June 2021 – 31 May 2024)
- EU funding: ~ 4.5 M€
- 12 partners from 8 countries (Finland, Greece, Italy, Denmark, Sweden, Germany, UK, Canada)

Call topic: “International cooperation with Canada on advanced biofuels and bioenergy”

Specific challenge: Optimisation of advanced biomass supply chains and overcoming specific conversion technology barriers are needed to improve the market up-take of sustainable advanced biofuels and bioenergy and accelerate their deployment for replacing the use of fossil fuels in the transport, power and heating sectors.

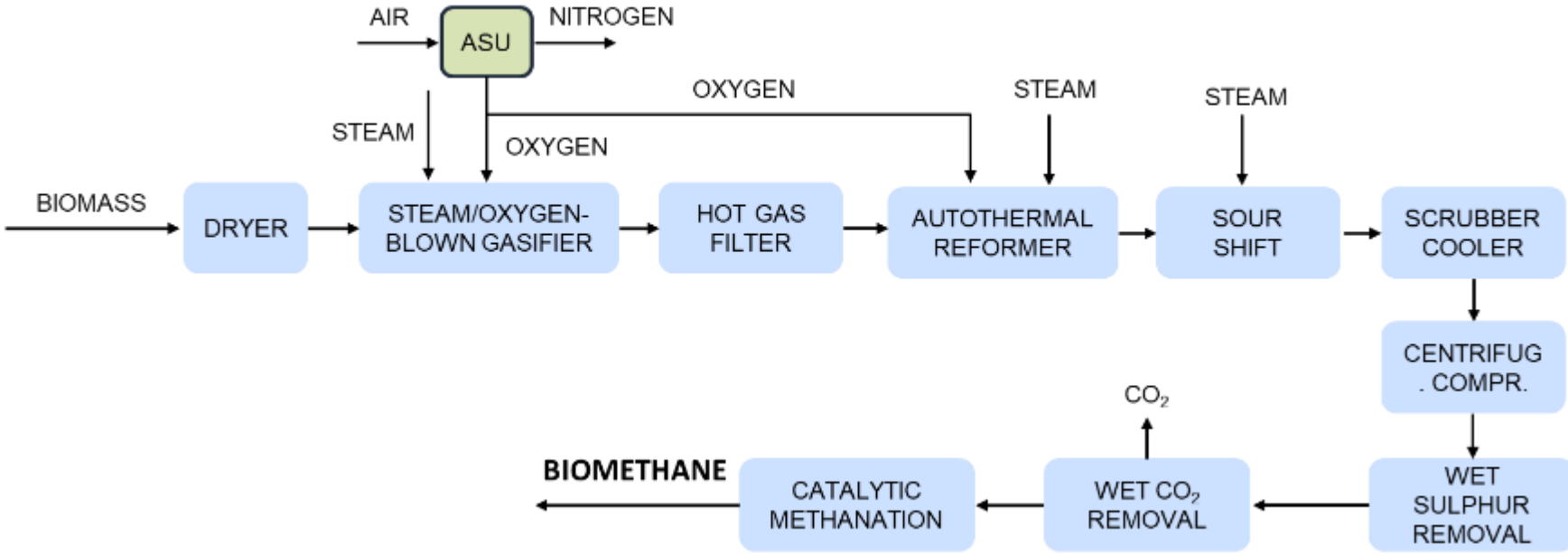
FlexSNG in brief

Our vision is to develop and validate (TRL5) a **flexible and cost-effective gasification-based process** for the production of **pipeline-quality biomethane**, **high-value biochar** and **renewable heat** from a wide variety of **low-quality biomass residues and biogenic waste feedstocks**.



State-of-the-art biomass-to-SNG concept

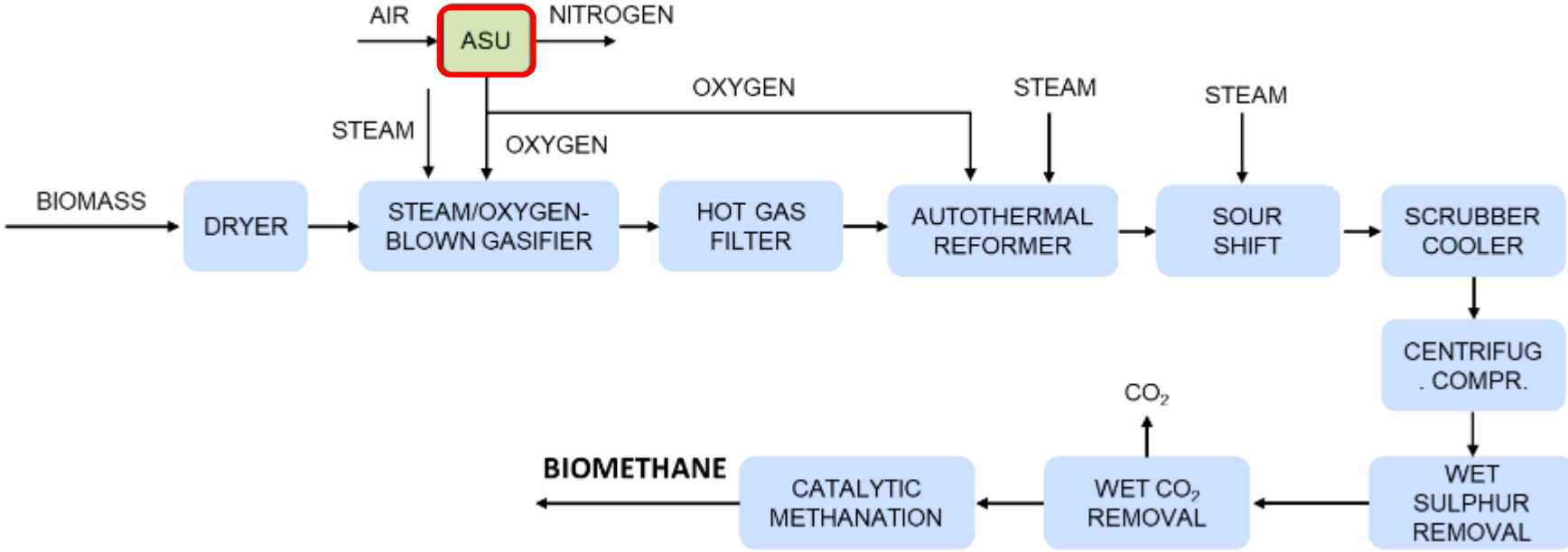
- Based on steam/oxygen-blown circulating fluidised-bed (CFB) gasification



State-of-the-art biomass-to-SNG concept

FlexSNG

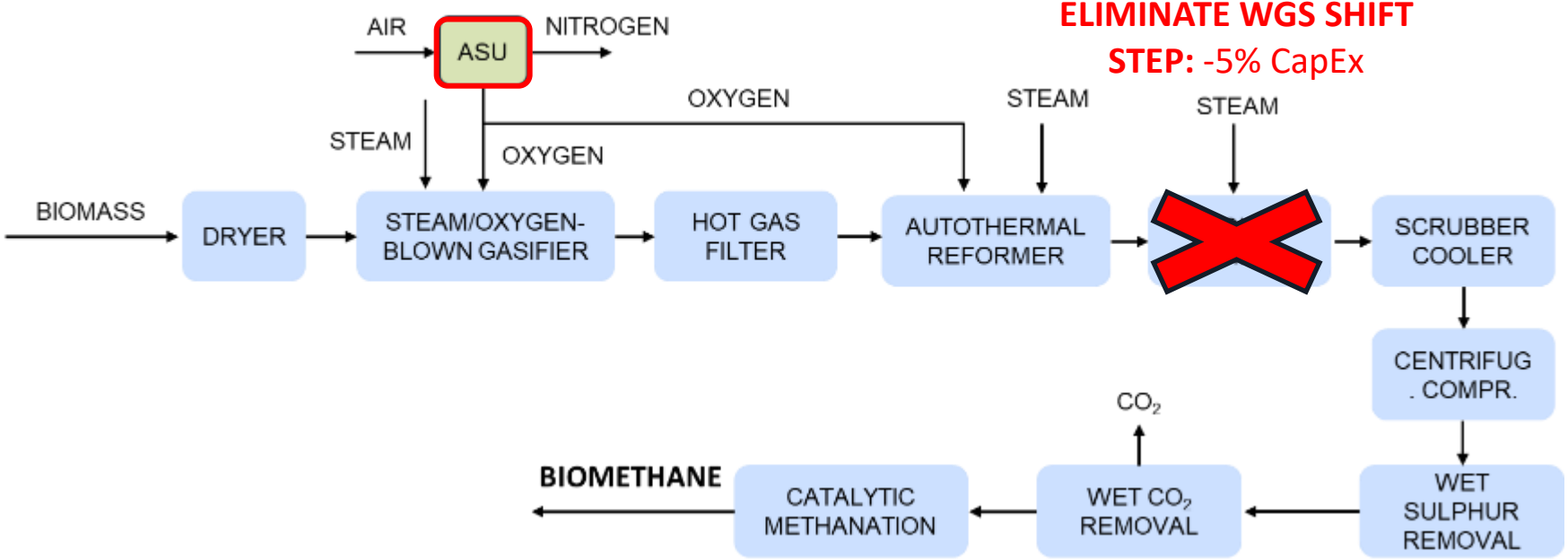
MINIMIZE OXYGEN DEMAND AND NEW INNOVATIVE OTM TECHNOLOGY: -10% CapEx



State-of-the-art biomass-to-SNG concept

MINIMIZE OXYGEN DEMAND AND NEW INNOVATIVE OTM TECHNOLOGY: -10% CapEx

ELIMINATE WGS SHIFT STEP: -5% CapEx



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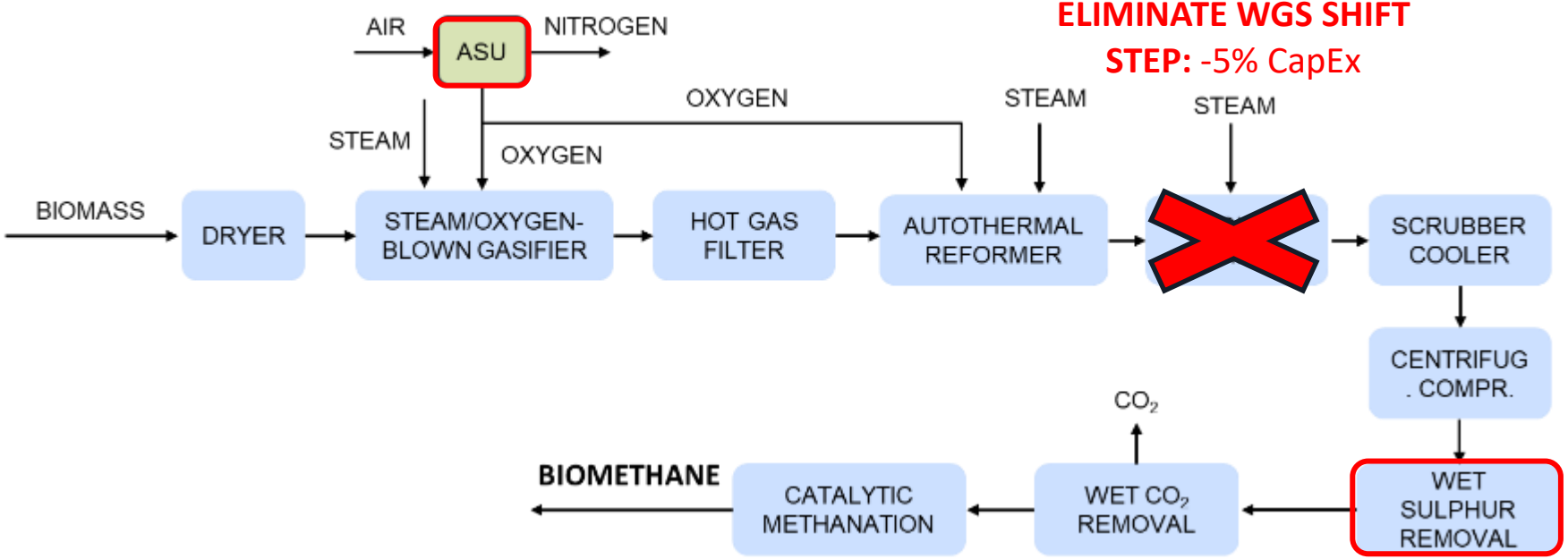

REPLACE WITH DRY SULPHUR REMOVAL: -5% CapEx

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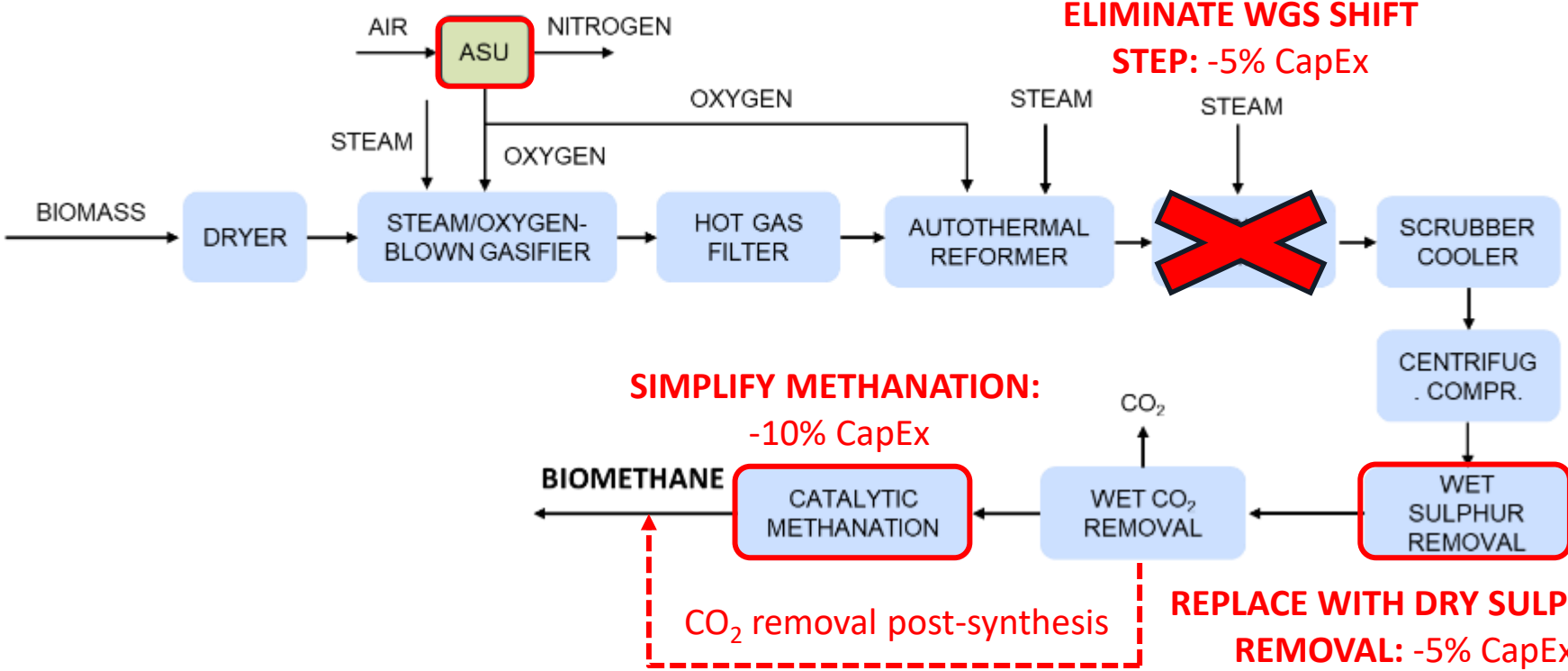

SIMPLIFY METHANATION: -10% CapEx

REPLACE WITH DRY SULPHUR REMOVAL: -5% CapEx

State-of-the-art biomass-to-SNG concept

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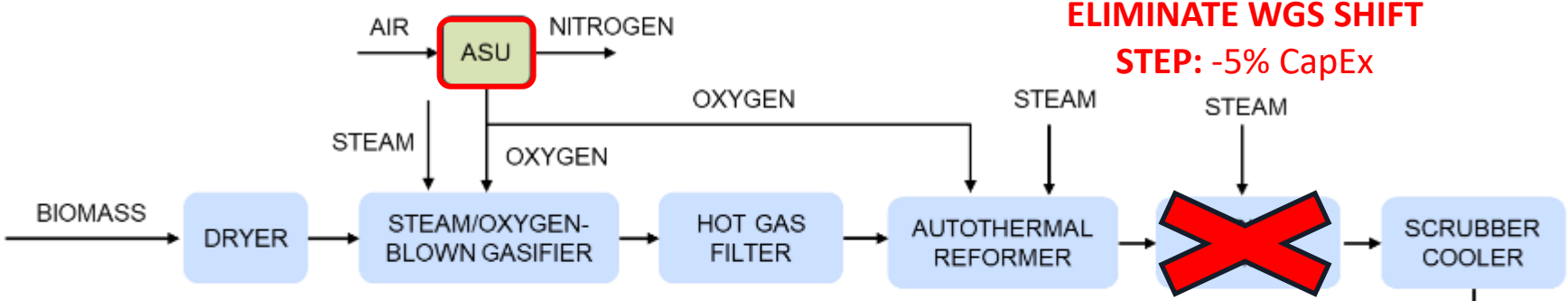


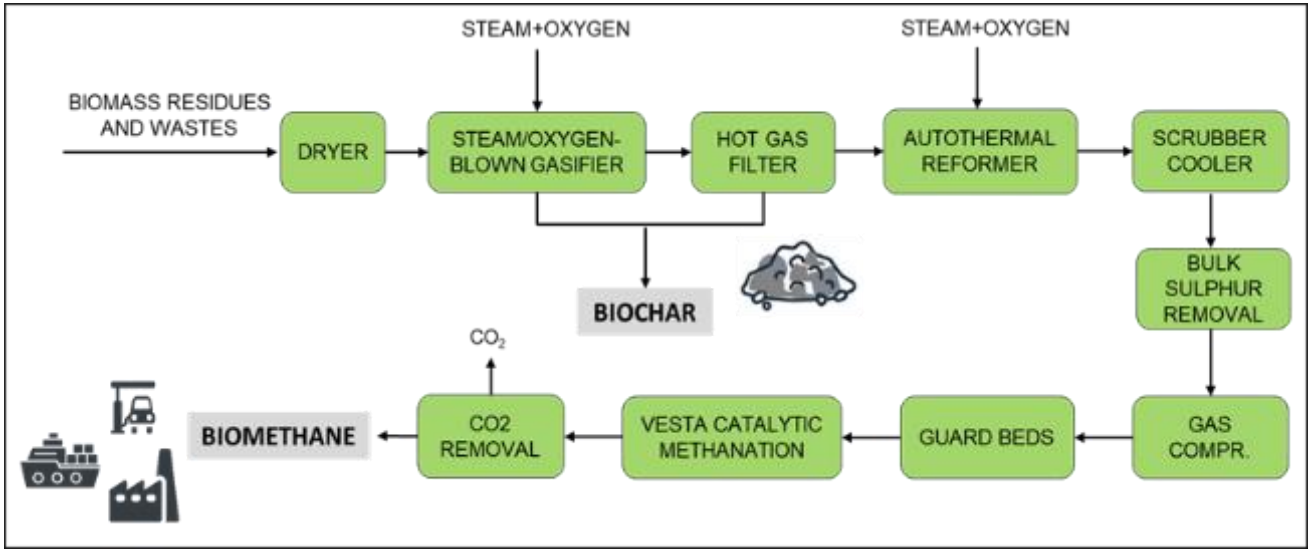
SIMPLIFY METHANATION: -10% CapEx

REPLACE WITH DRY SULPHUR REMOVAL: -5% CapEx

COST SAVINGS VS. STATE-OF-ART	
Oxygen supply	-10 %
WGS step	-5 %
Sulphur removal	-5 %
Methanation	-10 %
TOTAL:	**-30%**

FlexSNG – flexible production of SNG and biochar

"One plant, two modes of operation"



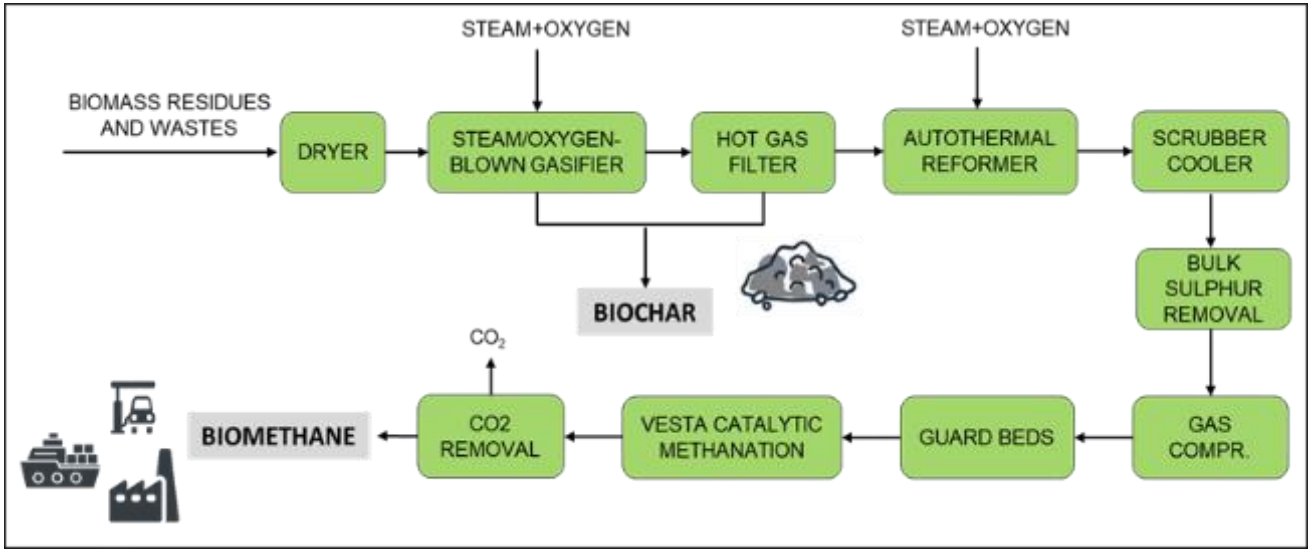
Target scale:
50-150 MW_{th}

Co-production of biomethane, biochar and heat:

- Target: 45% conversion to biomethane, 25% to biochar and 10% to usable heat
- Feedstock carbon conversion to gas restricted to 70-80%; around 20% of biomass carbon recovered as biochar

FlexSNG – flexible production of SNG and biochar

“One plant, two modes of operation”

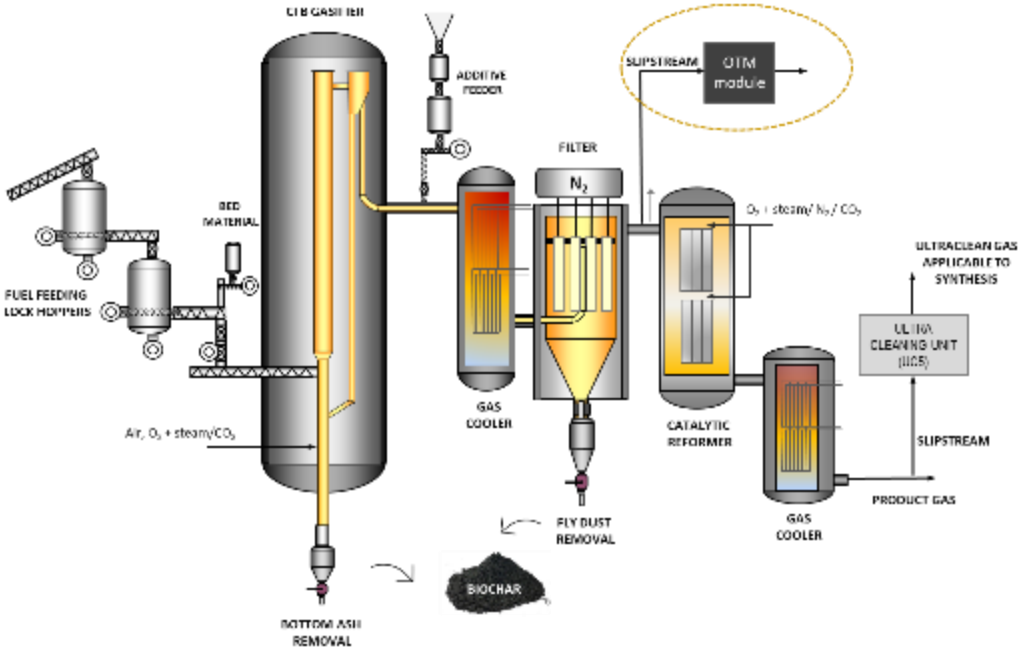


Target scale:
50-150 MW_{th}

Maximised production of biomethane and heat:

- Target: 70% conversion to biomethane and 15 % to heat
- Feedstock conversion to syngas maximized; biochar can be used as co-feed to ”upgrade” more challenging waste and agro feedstocks as suitable feeds for gasification

The key enabling FlexSNG technologies validated to TRL5 during the project



Pressurised fluidised-bed gasification pilot as the test platform (@ VTT Bioruukki in Espoo, Finland)

Thank you!

FlexSNG

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https://www.linkedin.com/company/flexsng-project-h2020/

https://twitter.com/flexSNG

VTT DTU skogforsk Sumitomo SHI FW wood. eifer etaflorence renewableenergies

CREATIVE OPTIMIZATION JM Johnson Matthey Inspiring science, enhancing life CERTH CENTRE FOR RESEARCH & TECHNOLOGY HELLAS POLYTECHNIQUE MONTRÉAL UNIVERSITÉ D'INGÉNIERIE UNIVERSITÉ LAVAL