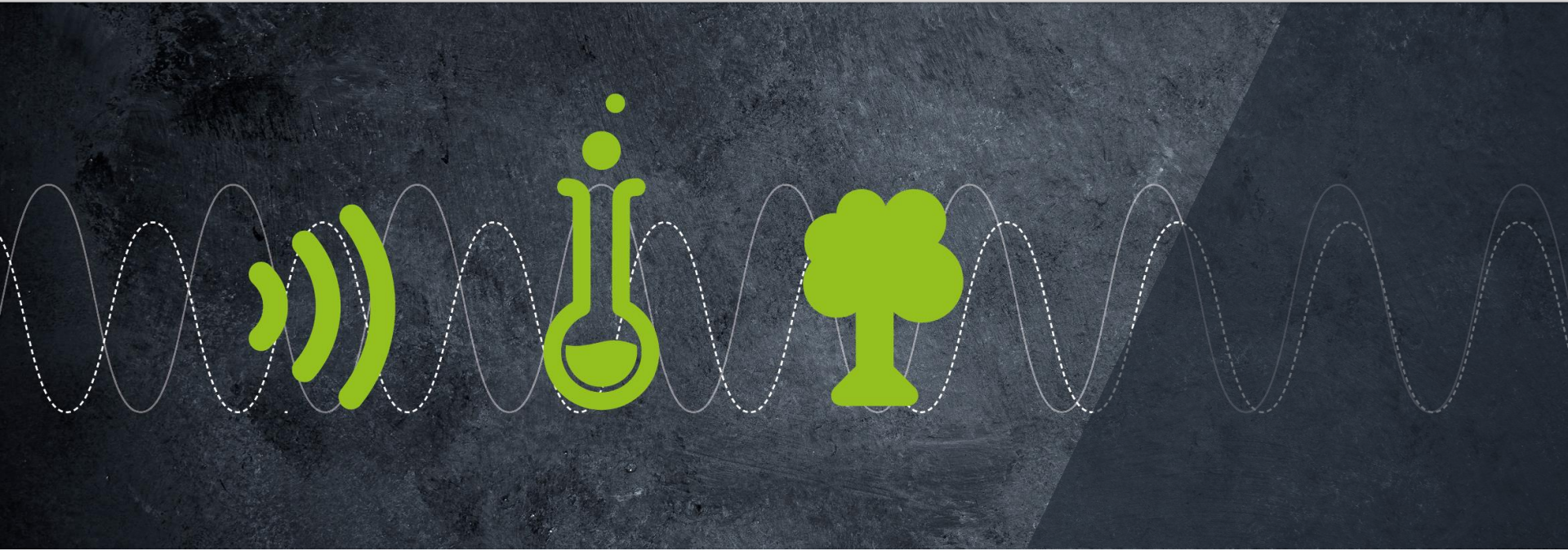
SIMPLIFY
SONICATION & MICROWAVE PROCESSING OF MATERIAL FEEDSTOCK



Welcome and Introduction

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SPIRE
Sustainable Process Industry through Resource and Energy Efficiency

Tom Van Gerven (KU Leuven)

SIMPLIFY consortium

KU LEUVEN

UNIMORE
UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA

technische universität dortmund

Fraunhofer ICT

MUEGGE

WEBER ULTRASONICS

Quantis

COATEX
ARKEMA GROUP

ARKEMA
INNOVATIVE CHEMISTRY

COLOROBBIA
CONSULTING

Dynergie

SIMPLIFY consortium

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- NTUA: Georgios Stefanidis, Ioanna Tzortzi & Katarina Zerva
- Modena University: Cristina Leonelli, Paolo Veronesi, Enrico Paradisi, Elena Colombini
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- Muegge: Joachim Schneider & Marcus Reichmann
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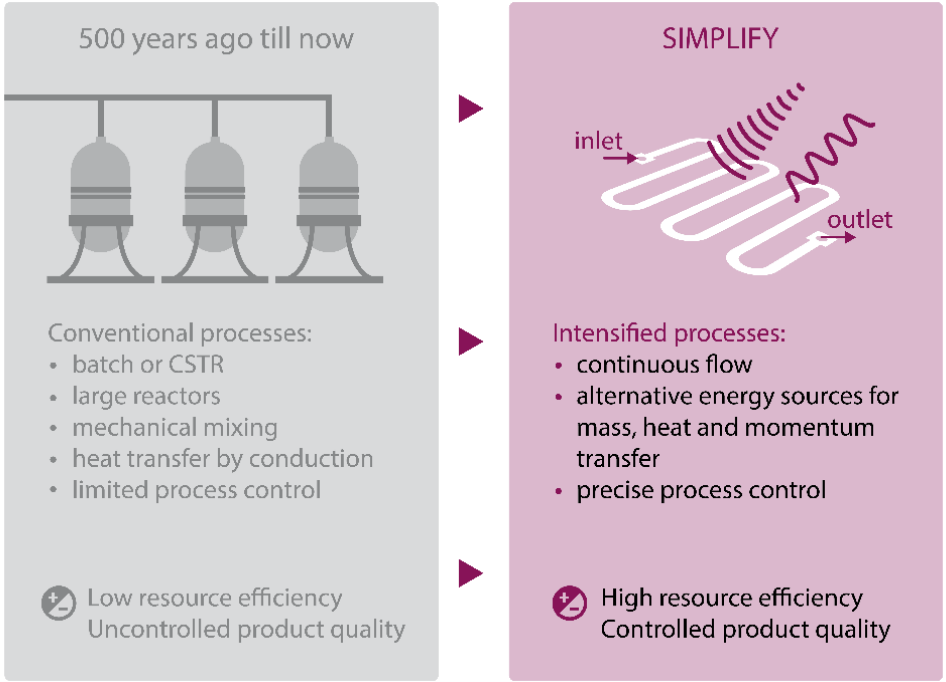
- Dynergie: Cédric Raoul
- Coatex: Yves Matter & Jean-Marc Suau
- Arkema: Cécile Lutz, Jean-Luc Dubois, Mafalda Valdez, Heidi Ramirez
- Colorobbia: Giovanni Baldi, Laura Niccolai & Valentina Dami

Context

- Sonication and Microwave Processing of Material Feedstock
- Main motivation: alternative energy forms – ultrasound (US) and microwaves (MW) – can act as enablers for the transition to flexible continuous processing of solids or viscous-phase containing processes, powered by electricity from renewable sources.



Case-studies

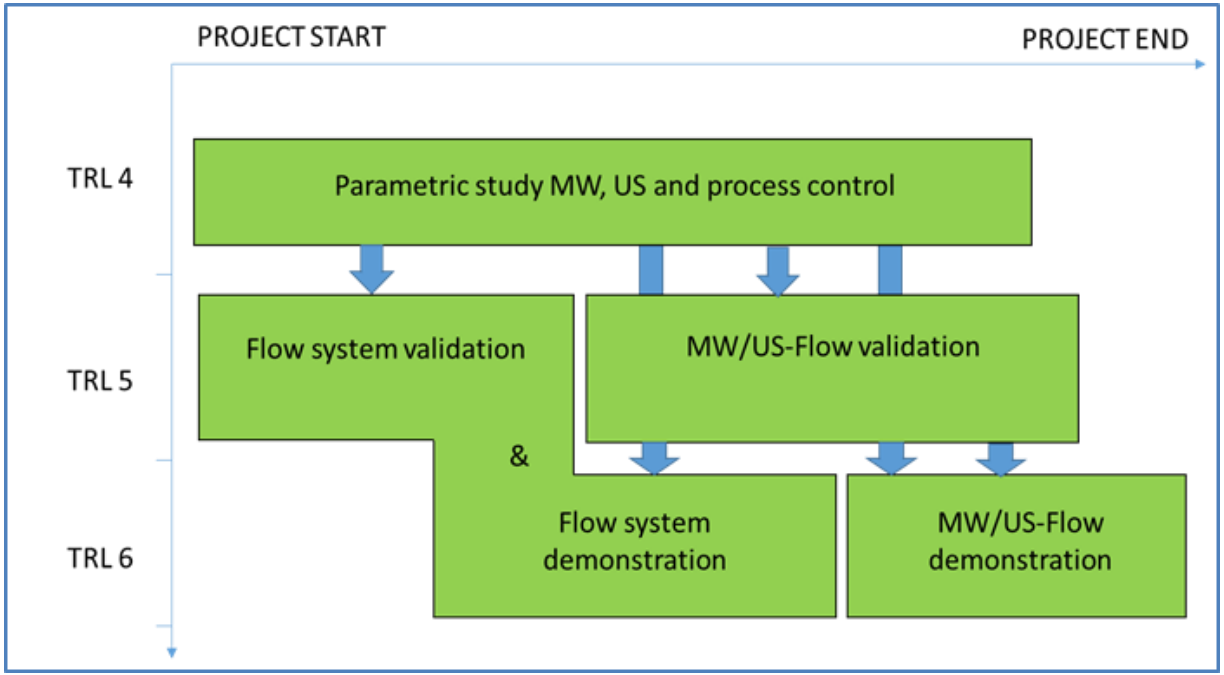
SIMPLIFY has selected three major cases of specialty processes to work on:

- **The class of chemical processes involving highly viscous streams**, with MW/US-assisted reactive extrusion of polyurethane as representative;
- **The class of chemical processes involving suspensions**, with
  - US/MW-assisted reactive crystallization of zeolite microparticles in a continuous oscillatory baffle reactor (COBR);
  - MW/US-assisted reactive crystallization of titania nanoparticle synthesis in a plug flow reactor (PFR).

Project Approach

- to **optimise, validate and demonstrate the use of alternative energy forms (US and MW)**
- to **design, develop and optimize the transition from batch to flow process assisted by alternative energy forms (US, MW)**
- to bring in **process control at every stage of industrial implementation, based on prior process control strategy development**
- to **ensure flexibility in the use of electric power in chemical processes**
- to **execute a full sustainability and techno-economic assessment** of the validated and demonstrated processes and to **exploit the obtained knowledge in other processes in the chemical industry**

Project Approach



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THANK YOU
for your attention!

Questions?