

# HTE FOR SUSTAINABLE RESOURCES



THE HIGH THROUGHPUT  
EXPERIMENTATION  
COMPANY



Novel processes for obtaining high-value products based on feedstocks from renewable and recycled materials are very important, as they allow the use of **sustainable resources** and support a **circular economy**. The goal is to reduce **carbon footprint** and also to open new pathways to **platform chemicals** and **drop-in fuels**.

High throughput experimentation (HTE) has proven the most efficient tool to accelerate the development of new catalytic processes and to ensure a short time to market for renewable products.

## OUR SOLUTIONS

- Processing and screening of various feedstocks gained from renewable & recyclable materials
- Supporting process optimization and feedstock evaluation (e.g. co-processing)
- Upscaling from batch to continuous process
- Catalyst synthesis and characterization from powder to commercial shapes
- Offline and online analytics, including method development and separation techniques

## YOUR BENEFITS

- Short time to market for new products and processes
- Evaluate processability of new feedstocks
- Testing support for industrial operation (e.g. troubleshooting)
- Independent and customized R&D services with excellent track record in catalyst synthesis and testing

LIGNOCELLULOSE  
CELLULOSE  
HEMICELLULOSE

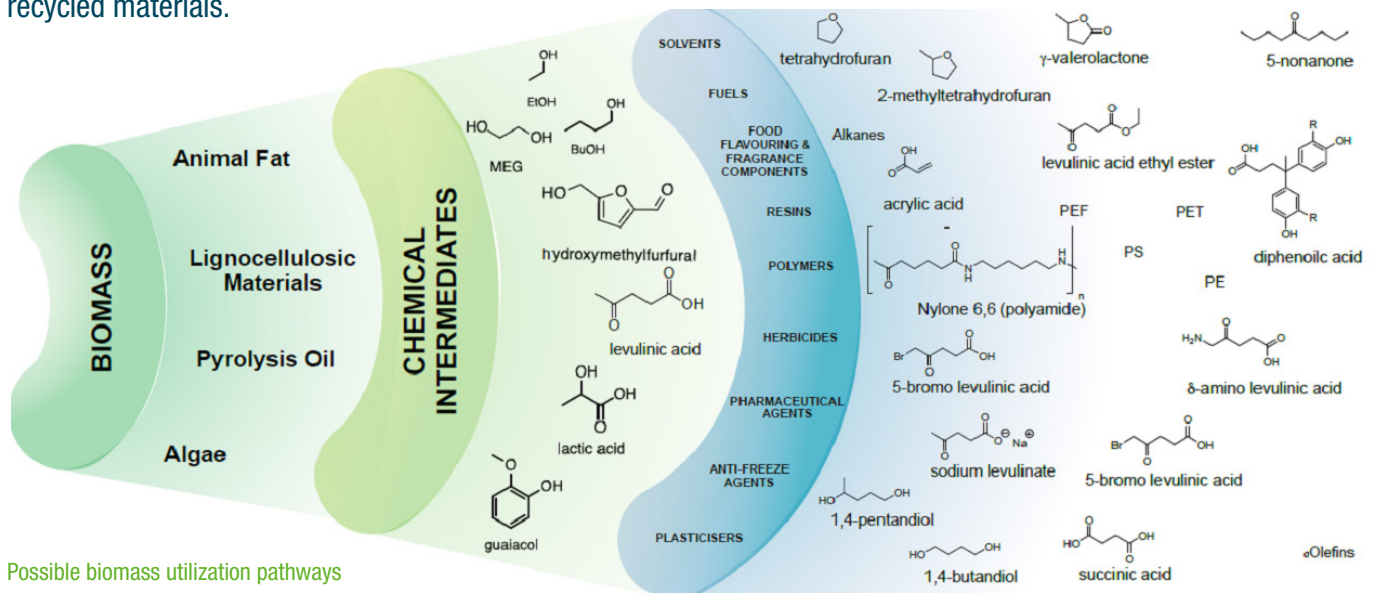
LIGNIN  
CARBOHYDRATES  
SUGARS

ALGAE OIL  
PYROLYSIS OIL  
PLASTIC WASTE

ANIMAL FATS  
VEGETABLE OILS  
BLACK LIQUOR

# BIOMASS OFFERS UNIQUE OPPORTUNITIES TO CREATE VALUABLE PRODUCTS

hte is your partner for decreasing your time to market for new products based on feedstocks from renewable and recycled materials.



## SUCCESS STORIES FROM OUR PROJECTS

### FROM BIOMASS TO "GREEN" NYLON

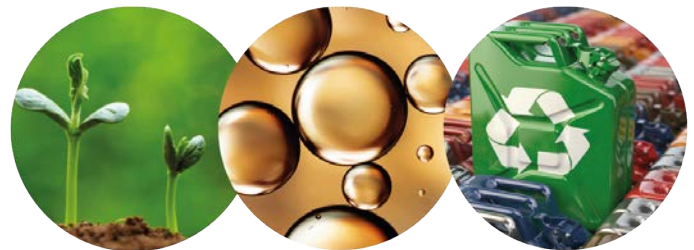
In this project, C5/C6 polyols derived from biomass intermediates were converted into high-value 1,6-hexanediol using a new catalytic process; a key monomer for polyamide 6.6 known as nylon. The entire process was successfully developed at hte. It includes:

- Synthesis and screening of 500 catalysts
- 26 test runs with 16-fold HTE unit
- Upscaling of 44 catalyst formulations
- Screening of 30 feed blends in 8-fold bench scale unit



Biomass → Sugars → Polyols → Polymer

### HYDROTREATED VEGETABLE OIL AS DROP-IN FUEL



Biomass → Oil → Drop-in fuel

Feedstock, such as vegetable oil, can be upgraded by catalytic hydrogenation. In this catalytic process, the feedstock is converted into long-chain hydrocarbons, which can be used as drop-in fuels and kerosene.

In this project, a test system with 16 parallel reactors and small amounts of catalyst were successfully applied for testing a commercial hydrotreating process for converting rapeseed oil into drop-in fuel.

Our hte technologies have an excellent track record for processing 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> generation bio-oils.

Get more  
information here

