

# ENERGY FROM BIOMASSES

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## Get energy from your organic residues

The TCR<sup>®</sup> technology (Thermo-Catalytic Reforming) converts biomass residues from agricultural, forestry, industry and municipal operations into high quality synthesis gas, bio-oil and bio-char. Low grade feedstock such as animal manure, digestate, sewage sludge and organic waste even with residual plastics content can be processed. Other examples include all types of lignocellulosic residues from plantations and processing such as pruning and logging chips, oil and fruit pomace. Also animal by-products from the food industry can be treated.

The optional Bio-Activated Cracking (BAC) add-on extends the range of feedstock to plastics wastes, animal grease, glycerol, spent oils, fats and wax.

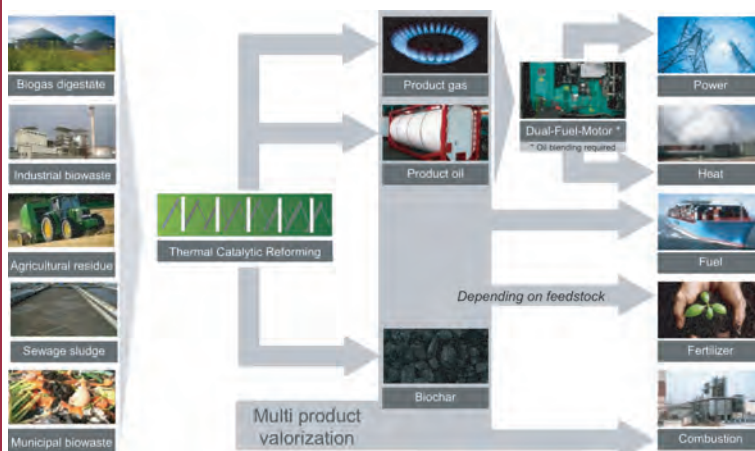
In collaboration with Fraunhofer UMSICHT, Institute Branch Sulzabach-Rosenberg, we propose innovative solutions based on TCR<sup>®</sup>, a mature technology ready to be applied at industrial scale.



Thermo-Catalytic Reforming<sup>®</sup>

## Keywords:

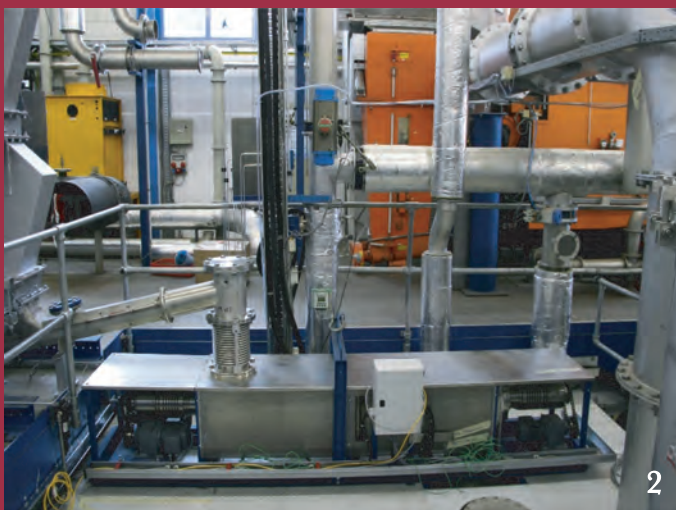
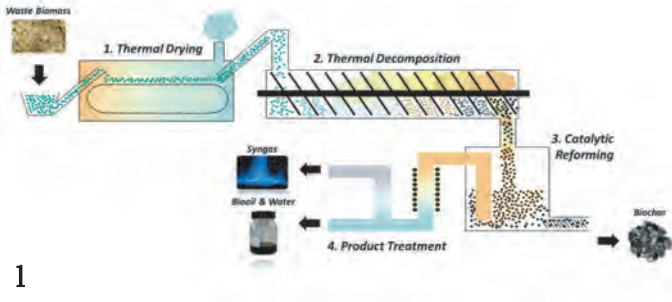
- Innovation
- Thermochemical processes
- Biofuels
- Waste treatment



TCR<sup>®</sup> is a proprietary technology of Fraunhofer UMSICHT and Susteen GmbH whose development is covered by the Collaboration Agreement between the University of Bologna (CIRSA, CIRI-EA) and Fraunhofer UMSICHT, Institute Branch Sulzabach-Rosenberg.

## Target groups

- Energy industries
- Waste management industries
- Utility companies
- Anaerobic Digestion plants
- Plant engineering
- Environmental technology



1. TCR<sup>®</sup> working principles
2. The 750 kg/day pilot plant in Sulzbach-Rosenberg
3. Bio-oil from TCR<sup>®</sup> after HydroDeOxygenation (HDO) upgrading

**Technical equipment:**

- 2 kg/h TCR<sup>®</sup> for fast test of feedstocks
- 30 kg/h TCR<sup>®</sup> for long duration tests
- Laboratory for chemical analysis of feedstocks and products

**Our services:**

- Preliminary studies of the potential application
- Technical and economic evaluation for adapting to industrial systems and needs
- Organization of visits to the pilot plant in Sulzbach-Rosenberg
- Yield tests
- Chemical analysis of products
- Financial services
- Subsidized financing (tax credit)
- Access to public-private projects

**Your benefits:**

- Better waste management
- Reduction of disposal costs
- Accumulation of energy as intermediate products (bio-oil, biochar and hydrogen) that can be employed according to the needs of the industrial process
- Versatility of the process capable of treating different types of biomasses
- Integration within the industrial processes of the company

Parameters	TCR 300	TCR-BAC 80	TCR-BAC 800
Treatment capacity (tonnes/y - dry weight)	1700-2100	225 biomass A 375 biomass B	2300 biomass A 3800 biomass B
Electric Power	200-250 kW <sub>e</sub>	200 kW <sub>e</sub>	2 MW <sub>e</sub>
Biomass type	digestate, poultry manure, sewage sludge, organic residues	Biomass A: digestate, poultry manure, wood chips Biomass B: animal fat, cooking oils	Biomass A: biomass residues Biomass B: plastic residues
Status	Available 2016	Available 2015	Demo under construction