Fraunhofer UMSICHT

mission

Fraunhofer UMSICHT is a pioneer of a sustainable energy and raw materials management by providing and transferring scientific results in business, society and politics.

Together with partners, the committed UMSICHT team researches and develops sustainable products, processes and services that inspire.
Our services

From the idea ... Consulting & studies prototypes
Development & engineering pilot operation

Feasibility ● Economic viability ● Ecology ● Security ● Legal/political framework

... to the product
...process implementation
Fraunhofer UMSICHT

OBERHAUSEN 2017

Staff: 411
Budget EUR: 31.1 million
Technical Infrastructure: 4500 m²

Energy
Processes
Products

INSTITUTE PART SULZBACH-ROSENBERG

Staff: 100
Budget EUR: 9.1 million
Technical Infrastructure: 2100 m²

Renewable Energy
Recycling Processes
Biological Process Engineering

Energy Processes Products

Fraunhofer UMSICHT
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The team in Sulzbach-Rosenberg
Location Sulzbach-Rosenberg
Technologies for Germany, Europe and the world

TCR30
TCR30
TCR2
SUWAMTU
eMiskWaste
JITRI Technology Cooperation
Polymer Recycling
TCR Roadshow

TCR2
Marine Litter
Ghana Sustainable WEEE Treatment

TCR2
TCR 2 for FH Nordwest Schweiz for Sewage Sludge

Project aim: Generation of TCR char from sewage sludge for academic investigations and staff training

Period: III/2014 - II/2015
Budget: 65,000 EUR
Purchaser: Susteen Technologies GmbH

Industrial project
TCR 2 for FH Nordwest Schweiz for Sewage Sludge

- **Throughput:** 3 kg per hour
- **Heat supply:** Electrically heated
- **Application:** Research for FHNW Schweiz
- **Feedstock:** Mainly sewage sludge

Containerized Plant

Compact laboratory plant
Project Overview

SUWAMATU

Analysis of current situation and conceptual design phase

- Research based on available information
- Determination of model regions
- Workshops in Tunisia and Bavaria
- Visit of model regions and identification of gaps and needs
- Determination of necessary topics and waste streams for implementation projects
- Conceptual designs for implementation projects
- Research for funding next project phase

Duration: August 2018 - December 2018

Funding: State of Bavaria
Project Overview
WEEE collection and treatment for Siliana, Tabarka, Douar Hicher
Research Project SeMoBioEnergy – Bioenergy application for Chile

- German-Chilean research project ‘Semi-Mobile Bioenergy from Agricultural and Forest Residues in Chile and beyond’ - ‘SeMoBioEnergy’.
- Funded by the BMBF, started in September 2015.
- ‘SeMoBioEnergy’ aims at developing feasible concepts for regional bioenergy chains using residues from agriculture and forest plantations.
- The central idea is to use mobile pre-treatment units (see picture) to densify biomass resources directly at the harvesting site.
- Through this innovative process, it will become possible to use residues more efficiently for energy production while increasing local value creation and reducing Chile’s dependency on energy imports.
Research Project SeMoBioEnergy – Bioenergy application for Chile

- The TCR 2 plant was designed, built and commissioned at UMSICHT and transported to UDT in Chile.
- Several types of biomass have been tested successfully.
- Demonstration of the potential of the TCR process
Research Project SeMoBioEnergy – Bioenergy application for Chile

Containerization: Continuous operating semi-mobile TCR plant

From desk to reality
Industrial Project TCR 80 for UK, Birmingham

Purpose:

- The delivery of a TCR 80 plus a TCR 2 to University of Birmingham
- Demonstration of conversion of biomass plus plastics to heat and power
- Purchaser: Susteen Technologies GmbH
Biobattery
Canada
Biobattery – Decentralized production of fuel from waste

The approach

TCR® technology

Bio-oil

Syngas

char / biochar

CHP

H₂

Green hydrogen

Power

Heat

Liquid fuels refinery

Gasification

Soil amendment
Biobattery – Decentralized production of fuel from waste
Work package of Fraunhofer UMSICHT

TCR®2: is certified in accordance to Canadian standards and delivered

TCR®30: is still under construction and will be delivered in autumn 2019
Biobattery – Decentralized production of fuel from waste

The consortium

Project lead by:

Partners and sponsors:

Workshop with staff of University of Alberta for training in TCR® operation
Surveying and Establishment of a Comprehensive Database for Waste Management in Kuwait eMISKWaste

Current Situation in Kuwait
Surveying and Establishment of a Comprehensive Database for Waste Management in Kuwait eMISK\textsubscript{Waste}

Aims, partners and duration

- **Data collection and Survey**
  - Waste Types and Amounts, Sources
  - Collection and Transport
  - Treatment and Landfills
  - Legislation
  - Finance

- **eMISK\textsubscript{Waste}**
  - Geodatabase and Systems for Data Storage, Processing, Analysis and Presentation
  - Basis for Decision Making
  - Monitoring
  - Web-Applications
  - Beatona.net

- **National Waste Management Strategy**
  - Forecasts
  - Goals, Indicators, Target Values
  - Action Plans
  - Treatment and Recycling Technologies
  - Landfill Concepts
  - Capacity Planning
  - Finance Plans
  - Legal Framework

**Partners:**

**Project Duration:**
January 2017 - December 2020
Surveying and Establishment of a Comprehensive Database for Waste Management in Kuwait eMISK

Field works in Kuwait

Waste Survey

Landfill Survey
Umweltsünde Plastikmüll
Der Präsident, das Paradies und das Plastik
15.02.2019 11:25 Uhr


Quelle: https://www.zdf.de/nachrichten/heute/der-praesident-das-paradies-und-das-plastik-100.html; Abrufdatum: 25.06.2019
Marine Litter

Ecuador

Marine Litter
Ecuador

SYMPOSIOUM »NETZWERT« 2019

IDEENWETTBEWERB «WAS IST DEINE MOONSHOT-VISION?»


Ausschreibung: 30.11.2018
Mehr Infos unter:
http://info.fraunhofer.de/netzwert
Hier reicht du deine Idee ein:
https://innovationhub.fraunhofer.de/netzwert-2019
Energy and Raw Materials from Waste

China
University of Birmingham and Fraunhofer UMSICHT
Joint Research Platform
University of Birmingham, Fraunhofer UMSICHT and JITRI
Joint Development and Market Implementation

The Bridge

To Industry

Mobile Waste Heat
Battery Systems
Compressed liquid air storage
Small scale and specialised AD
Thermo-catalytic Reforming TCR®
Heat and cold storage
E-Scrap
Global Situation

- Global E-Scrap Recycling: <20 %
  - While its about 55 Bio. US-

- Is it our E-Scrap?
  - 77 % of E-Scrap in Nigeria from European Union
  - ...20 % from Germany

- Illegal exports from Germany
  - ≈ 400,000 t

**MISSION:**
**IMPROVING E-WASTE SITUATION IN AFRIKA**
E-Scrap
Solution for Ghana: Decentralized, safe, and economic treatment
Fraunhofer UMSICHT in Sulzbach-Rosenberg -
a modern research and development partner for customers all over the world
Technologies for Germany, Europe and the world

TCR30

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Sustainable WEEE Treatment

eMiskWaste

WEEE

TCR Roadshow

Technology Cooperation