

MASTER'S THESIS

Selection, Design, Simulation, and Techno-Economic Analysis of CO₂-Utilization Concepts for the Waste-to-Energy Plant Darmstadt



TECHNISCHE
UNIVERSITÄT
DARMSTADT

Institut für Energiesysteme
und Energietechnik



Prof. Dr.-Ing. Bernd Epple

Otto-Berndt-Str. 2
64206 Darmstadt

www.est.tu-darmstadt.de



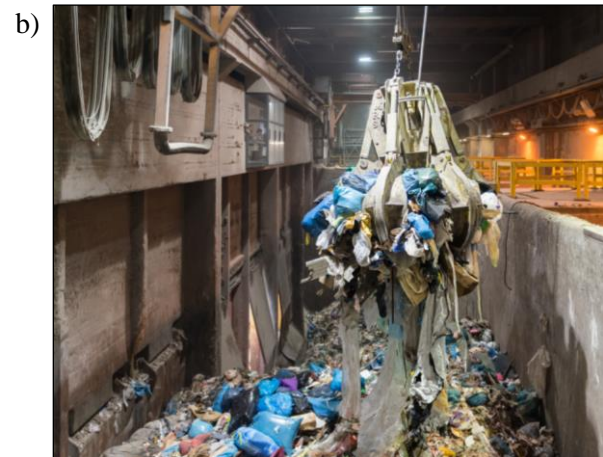
Darmstädter Energie-Labor für
Technologien in der Anwendung

Background

Within the DELTA Project, applied solutions to contribute to the energy transition in Darmstadt are being developed. To reduce greenhouse gas emissions, CO₂ can be captured from the Waste-to-Energy plant Darmstadt, and utilized to produce chemicals such as methanol. To achieve this, an efficient tailored process to capture and utilize CO₂ (CCU) is required.

Aim and Method

The aim of the thesis is to select, design, optimize and assess different concepts for utilizing the CO₂ captured from the Waste-to-Energy plant Darmstadt. For this, techno-economic models in MATLAB/excel will be developed, and process modelling (e.g. with Aspen Plus) will be carried out. The results will serve as a basis for the design of a suitable CCU facility in Darmstadt.



Waste-to-Energy plant Darmstadt. a) Aerial photograph of the plant. b) Municipal waste feedstock. Source: Entega AG.

Proposed Work Structure

The following structure is proposed for the development of the thesis:

- Initial review of relevant literature, and determination of reference key performance indicators.
- Assessments of different CO₂ utilisation and storage (CCUS) methods
- Simulation of CO₂ utilization processes (e.g. with ASPEN Plus)
- Calculation of technologic and economic key performance indicators: CAPEX, OPEX, etc.
- Discussion of results, and reporting

Information for the Application

The thesis can be submitted in English or in German.

For applications and further information, please contact:

M. Sc. Martin Greco-Coppi

Wissenschaftlicher Mitarbeiter

EST // L1|01 Room 343 // Tel: 06151 16-22679

email: martin.greco@est.tu-darmstadt.de

