CIRCULAR CARBON TECHNOLOGY

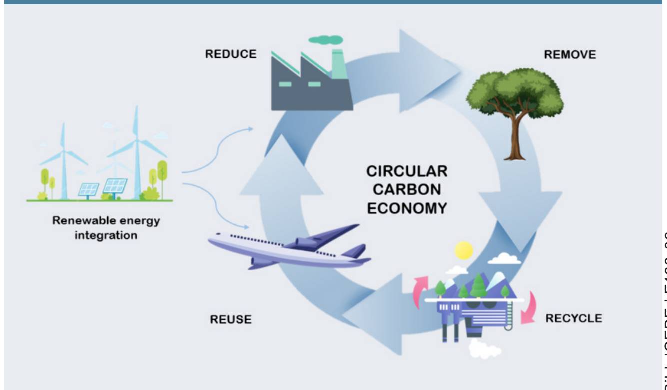
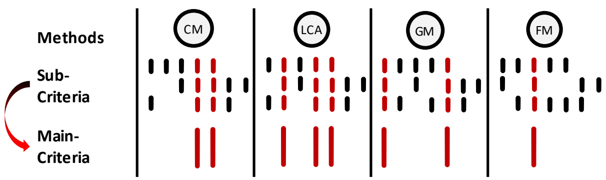


Bild: ICEBE | E166-06

Toolbox for sustainable technology and process assessment:

- Circularity Metrics
- (P)LCA
- Green Metrics
- Footprint Methods



Objective:

- Develop a comprehensive framework for all stake-holders in the energy and chemical industries to help them plan their respective contributions to internationally agreed climate goals.
- Collecting reviews of assessment tools and taking their goals/criteria/factors used for comparison as a single sub-criteria (small bars, one line equals one report).
- Identification of consistent factors that serve as Main-criteria (red bars) for sustainability across all methods.

CIRCULAR CARBON TECHNOLOGY

Future Research Work

- Multiscale optimization techniques towards all design stages for holistic carbon treatment technologies.
- Identification of critical indicators used for assessment during the development of circular processes.
- Flexibility in superstructure design as an additional target in the optimization framework.
- Identification of cost-effective schemes, prone to minimal risk, including present and future opportunities for carbon treatment technologies.

Contact: Prof. Dr. Stavros Papadokonstantakis
Chair of Process Systems Engineering
(Systemverfahrenstechnik)
stavros.papadokonstantakis@tuwien.ac.at
+43 1 58801 166600

Address: TU Wien, Institute of Chemical, Environmental and Bioscience Engineering
Getreidemarkt 9/166, 1060 Vienna

Here you can find more about open positions and Master Thesis Projects:

FOLLOW & STAY TUNED

HIRECORD LinkedIn

Circular Fuels LinkedIn

Further information

Herausgeberin: Institut für Verfahrenstechnik
Technische Universität Wien
Getreidemarkt 9/166, 1060 Wien
www.tuwien.at/tch/icebe
Für den Inhalt verantwortlich:
stavros.papadokonstantakis@tuwien.ac.at
Coverbild: Institut für Verfahrenstechnik
Grafik: Institut für Verfahrenstechnik
Druck: Druck.at
Stand: 05/2024

TU WIEN

ICEBE IMAGINEERING NATURE

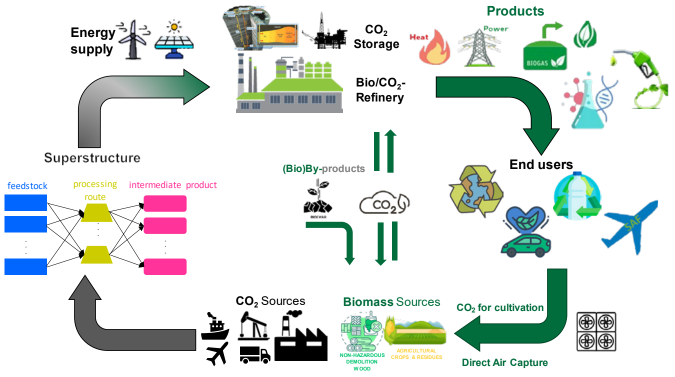
INSTITUTE OF CHEMICAL, ENVIRONMENTAL AND BIOSCIENCE ENGINEERING

INSTITUT FÜR VERFAHRENSTECHNIK, UMWELTTECHNIK UND TECHNISCHE BIOWISSENSCHAFTEN

Superstructure Development and Optimization for Circular Carbon System

Stavros Papadokonstantakis - Head of Research Division
www.tuwien.at/tch/icebe/e166-06

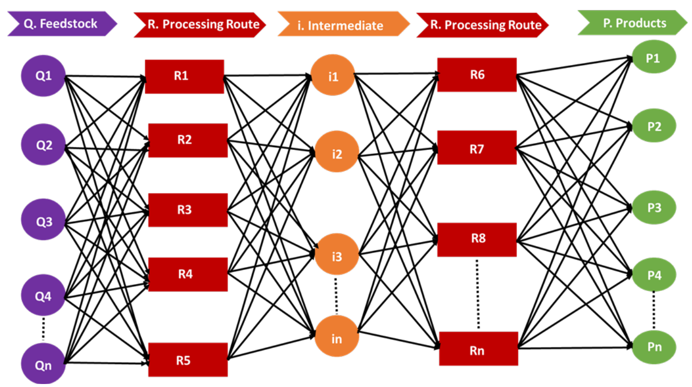
CONCEPT OF BIOREFINERIES & CCS/CCUS



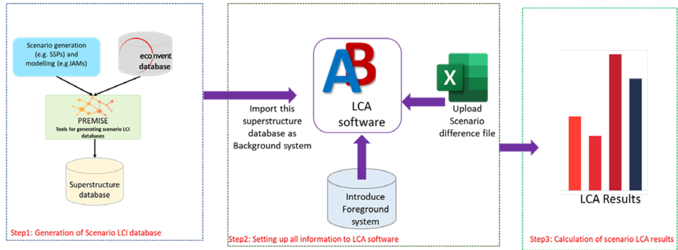
Objective:

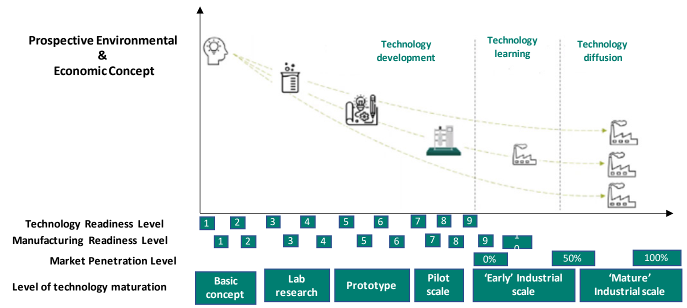
- Generate Innovative Sustainable Alternatives for the Replacement of Conventional Fuels
- Systematic Approach to Manage Complexity
- Environment Friendly
- Economic Profitable
- Integration of the Bioeconomy
- Flexible Framework for Biofuel/Biochemical/ Bio-by-product Production
- Alignment with European Policy

DEVELOPMENT OF SUPERSTRUCTURE

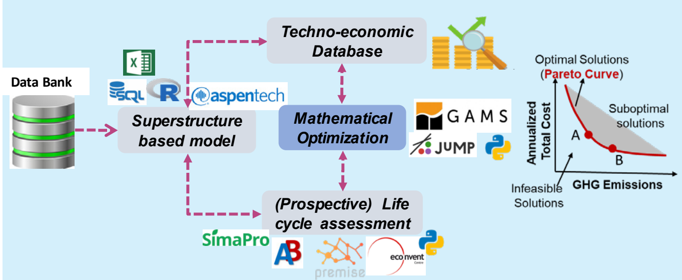


PROSPECT LIFE CYCLE ASSESSMENT





An optimization framework

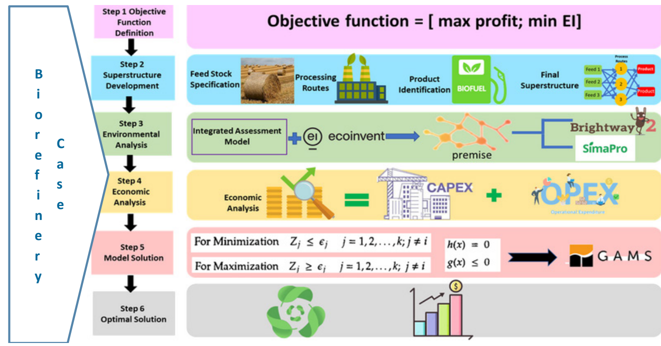


Objective:

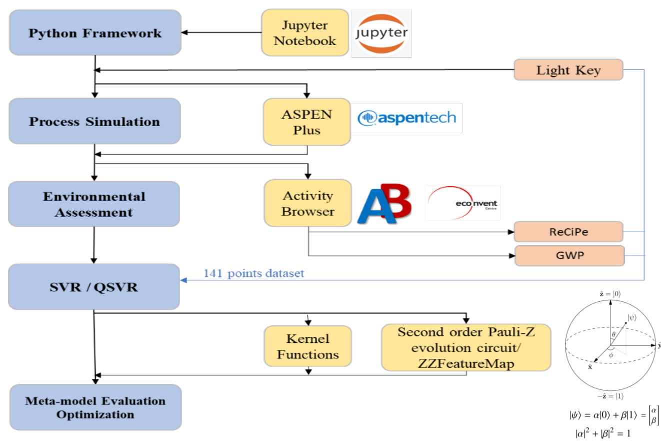
Prospective Life Cycle Assessment (LCA) evaluates the potential environmental impacts of future products and technologies. It anticipates changes and innovations, guiding sustainable development and decision-making. This forward-looking approach helps minimize future environmental footprints, supporting the transition to more sustainable solutions.

OPTIMIZATION FRAMEWORK

Example of optimal Solution



Quantum computing machine learning for process system engineering



Objective:

Integrating Quantum Computing and Support Vector Machine (SVM) metamodels into PSE complex process operations to accelerate process design and optimization, Techno-Economic Assessment (TEA), and LCA generation.