Batu Thoms

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PROFILE

MSc Environmental Engineering student with a product development background, working as a student research assistant at SDU, implementing AI in sustainability. Work centres on designing and building products, measuring how they impact the environment, and building tools that automate and optimise workflows. Experienced in life cycle assessment, retrieval (RAG) pipelines and evaluating AI systems, and in working with industry partners under NDA.

EDUCATION

University of Southern Denmark (SDU) *Odense, DK*
MSc Environmental Engineering Sep 2025 – Jun 2027 (expected)
Focus: life cycle assessment, energy systems, Power-to-X, and sustainable industrial processes.

University of Southern Denmark (SDU) *Odense, DK*
BSc Product Development & Innovation Engineering Sep 2022 – Aug 2025
Bachelor thesis: Smart Water Systems, integration of wireless IoT pressure sensors into industrial valve infrastructure (AVK Holding).

FH Kufstein Tirol *Kufstein, AT*
Exchange Semester, Product Engineering & Management Sep 2024 – Feb 2025

SUSTAINABILITY & ENGINEERING EXPERIENCE

University of Southern Denmark (SDU) *Odense, DK*
Student Research Assistant, Department of Green Technology Apr 2026 – Present
Phase 2, since Sep 2026: automating the data extraction

- Built a Python RAG pipeline that extracts emissions, energy and other sustainability data from corporate reports and stores each value with its source passage.
- Implemented a local AI model in the RAG system, so it runs without an AI subscription and without sending data to a third party.
- Set up the evaluation: every run is scored against hand-checked answers, and automated tests cover the existing rules.
- Developing the web application that presents the extracted values with their sources.

Phase 1, Apr to Aug 2026: building the dataset by hand

- Designed the template for collecting GHG emissions, energy, water and product carbon footprint data from corporate sustainability reports.
- Extracted the data, recorded the source page for every value and benchmarked the companies. This dataset became the test set for phase 2.

AVK Holding A/S *Galten, DK*
Engineering Thesis Intern Feb 2025 – Jun 2025

- Developed and prototyped CAD-based integration concepts for battery-powered wireless pressure sensors in industrial gate valves.
- Worked hands-on with production valves, transmitters and sensors under NDA to validate mechanical and system integration.
- Captured operational and scalability requirements with AVK product development teams, and evaluated predictive maintenance potential and business model implications for smart water infrastructure.

SELECTED SUSTAINABILITY PROJECTS

Urban Material Flow Analysis: Building Stock of Odense *SDU, Odense*
Material Flow Analysis (Excel), team of five Spring 2026

- Quantified the materials embedded in Odense's building stock, estimated embodied carbon and assessed circular economy potential.

Comparative Life Cycle Assessment: Wind Turbine Blade Waste Recycling *SDU, Odense*
Life Cycle Assessment (OpenLCA), team of five Sep 2025 – Jan 2026

- Assessed pyro-methanization as a recycling route for composite blade waste and compared environmental impacts, energy balance and CO_2 footprint against conventional disposal.
- Defined system boundaries and functional unit, built the inventory, and interpreted results across impact categories.

Techno-Economic Assessment: Off-Grid Power-to-X E-Methanol Plant *SDU, Odense*
Process and Cost Modelling, team of four Sep 2025 – Jan 2026

- Modelled CAPEX, OPEX and unit production cost to test the economic feasibility of an off-grid e-methanol plant against fossil reference fuel.
- Ran sensitivity analysis on financing interest rate and heat revenue.

SKILLS & INTERESTS

AI and data: Retrieval and RAG (Python, embeddings, vector search, PDF parsing), evaluating AI systems (test sets, scoring scripts, error analysis), AI agents and automation (Claude Code, hooks, subagents), local AI models (Ollama).

Sustainability assessment: Life cycle assessment (OpenLCA), comparative product assessment, GHG Protocol Scope 1–3 accounting, corporate ESG and sustainability report analysis, techno-economic modelling of energy systems.

Technical: CAD (Autodesk Inventor or equivalent) advanced, Python for data extraction and analysis intermediate, Microsoft Office (Excel, Word, PowerPoint, Teams) advanced, AI tools (Claude, OpenAI, Gemini, Canva) advanced, 3D printing intermediate.

Languages: German native, English C2.

Interests: Circular materials and waste valorisation, sustainable energy systems, product design, outdoor and winter sports, international travel.