

# PROJECT PROPOSAL FORM



| Project Proposal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                       |                                      |                           |                      |                |                                         |                   |
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| Company                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | DMT environmental Technology          | Website                              | www.dmt-et.com            |                      |                |                                         |                   |
| Address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Yndustrywei 3, 8501 SN, Joure         |                                      |                           |                      |                |                                         |                   |
| Contact Person                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Jort Langerak                         | E-mail                               | jlangesak@dmt-et.nl       |                      |                |                                         |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                       | Phone                                | +31513636789              |                      |                |                                         |                   |
| Area of Traineeship (*)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                       |                                      |                           |                      |                |                                         |                   |
| Mechanical Engineering                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Industrial and Management Engineering | Electronic and Computers Engineering | Environmental Engineering | Chemical Engineering | BioEngineering | Metallurgical and Materials Engineering | Civil Engineering |
| x                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | x                                     |                                      | x                         | x                    |                |                                         |                   |
| Project's Short Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                       |                                      |                           |                      |                |                                         |                   |
| <p>DMT Environmental Technology is a highly innovative engineering company operating on the cutting edge of green technology. DMT consists of a young dynamic team of approximately 80 employees, and is located in Joure (Northern part of the Netherlands). We are continuously developing and bringing to market technologies for (bio)gas upgrading, desulfurization and waste water treatment. Therefore, DMT is offering an internship position on the subject of:</p> <p><b>Electro chemical conversion:</b></p> <p style="margin-left: 20px;">a. <b>As society is moving to a circular economy, fossil based fuels and chemicals will be steadily replaced with more environmental friendly alternatives. One of the alternative routes is based on the electro chemical conversion of CO<sub>2</sub> (from emissions) into hydrocarbons. Through this process CO<sub>2</sub> is chemically recycled into zero or negative emission fuels and chemicals. DMT is currently working on the techno economical evaluation of this process and the development of a prototype installation to demonstrate the possibility of converting the off gas streams that are produced during biogas upgrading into useful hydrocarbons (such as oxalic acid, formaldehyde, ethylene and others).</b></p> <p>For this project you will work at the Product Development department of DMT. But in order to reach your goal you have to collaborate with different other disciplines within the company like Sales, Marketing and Engineering. During the internship the student will convert a rough idea into a (pre-engineered) concept design. As part of your work you will create a design including a technical documentation package (consisting of: PFD, Concept P&amp;ID, Base of Design, Concept Equipment list, Mass balance/design model, Energy Balance, concept process description) as well as perform a technical-economic evaluation of the concept.</p> |                                       |                                      |                           |                      |                |                                         |                   |
| Objectives and expected results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                       |                                      |                           |                      |                |                                         |                   |
| <p>The main goal of the internship project is to find the most promising product/market combination for DMT Environmental Technology. The project will start with creating an overview of technologies and market trends. The next step is to define product market requirements and to select those concepts that match best with DMT's long term strategic goals and capabilities. An assessment of the feasibility and economical potential of the routes will help to identify the most promising product/market combination. For at least one product market</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                       |                                      |                           |                      |                |                                         |                   |

combination further detailed technical screening will be performed, as well as the generation of a concept-engineering package.

Main objective: research and identify opportunities and generate preengineering documentation for at least one concept.

### Workplan

- Week 0-1: Get acquainted with DMT as a company and the productlines we commercialize
- Week 1-3: Read into the subject and finalize internship projectplan
  - Deliverable: final projectplan
- Week 4-5: Specify customer requirements for product market combinations
  - Deliverable: customer requirement overview
- Week 1-8: State of the art study
  - Deliverable: State of the art review incl. overview of IP & existing knowledge institutes
- Week 7-12: Concept generation and screening.
  - Deliverables: technology overview + selection based on HOQ method, technical screening of short list concepts.
- Week 9-14: Economic analyses of concept (in collaboration with marketing/sales/end user)
  - Deliverable: Techno-economical screening of short list concepts.
- Week 12-20: Pre-engineering:
  - Deliverable: Technical design package for short listed concept including:
    - PFD, Concept P&ID, Base of Design, Concept Equipment list, Mass balance/design model, Energy Balance, 2D drawings (optional), Concept Proces description
- Week 5-20: Internship report:
  - Deliverable: Final report & presentation.

### Student's Profile

Student has to be both team player as being capable to work individual. The student needs to have creative skills combined with engineering skills in order to design the most suitable process. The student must have an entrepreneurial mindset, as we work in Startup teams with the goal to commercialize the developed technology. Therefore student needs to be able to convert design into cost calculations based on equipment list and total cost of ownership calculations.

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**Additional information:**

(offer of accommodation, trips, meals; financial support, etc.)

**DMT offers:**

- Monthly financial compensation (375 euro)
- Office with computer
- Optional Housing (Shared apartment in the city center of Joure - The Netherlands)