

# FMH606 Master's Thesis

**Title:** Design and Implementation of Control System Prototype for Offshore Oil & Gas Installations using Renewable Power

**USN supervisor:** Hans-Petter Halvorsen

**External partner:** FMC

## **Task background:**

Deep Purple is a project focusing on refining the concept of powering an offshore oil & gas installation with stable renewable power.

This will be realized with the use of offshore wind turbines and a seasonal energy storage where the energy carrier is hydrogen.

Hydrogen will be produced utilizing electrolysis of water using the curtailed power from the wind turbines. During periods of little or no wind the hydrogen will be used to generate electrical power through fuel cells.

## **Task description:**

This project will be used as an initial development phase of a control system for the Deep Purple Project. It will also look into philosophy to operate an unmanned control station from shore.

The Deep Purple project has developed a MATLAB/Simulink model that can be used to investigate different operation philosophies.

## **Suggested Project Activities**

The following activities are relevant in this project (which tasks that shall be part of this project will be decided by the student in collaboration with the supervisors and external partners when the project starts):

- Give an overview of the Deep Purple Project and process by
  - Performing interviews and meeting with stakeholders to collect information.
  - Investigate operational philosophies based on the MATLAB/Simulink model.
- Definition of SCADA for Deep Purple Project
- Design a high-level architecture for the Control System
- Define a philosophy to establish unmanned offshore operation
- Identify high level requirements for Control System
- Make Design of the Control System
- Finally, make a working Prototype

**Student category:** IIA Online Student working at FMC

**Practical arrangements:**

Communication and supervision will be executed on Email and Skype.

Regular meetings can be done on Skype.

The student should at least be present at USN Porsgrunn for the final presentation.

FMC will provide an external sensor used for the assessment of the final work.

Open Access: All results of this project will be open for the public, meaning the results and report should be open access and will be public available on Internet and the results may be used in research and publications, etc.

**Supervision:**

As a general rule, the student is entitled to 15-20 hours of supervision. This includes necessary time for the supervisor to prepare for supervision meetings (reading material to be discussed, etc).

**Signatures:**

Supervisor (date and signature):

Student (write clearly in all capitalized letters):

Student (date and signature):