

Intro

These questions are related to if it is relevant to change the education of a Marine Engineer at Bachelor degree to meet the focus on environmental solutions and to meet IMO 2050.

The questions are based on a variety related to what the shipping industry expect to happen and to what will be the sources of energy to the propulsion, auxiliary and treatment of wastes onboard, and what my interviewers think/ believe will be relevant topics to have in a study plan to meet the green technology period the shipping is moving into.

My thesis is built on data collection with open-ended questions and exploratory research.

A Marine Engineer is a person licensed according to STCW to operate and maintain complex systems on a ship (or floating device) and have both practical and theoretical competence when receiving the Bachelor Diploma. After that he/ she starts sailing and will end up as the Chief Engineer on board. Typically, related, and simulated job titles ashore will be TCO, Technical Manager, Technical Leader, Technical Inspector, Technical Surveyor and Manager of maintenance.

My questions are not related to if or what themes of today's study plan can be removed or reduced.

As informant in this research, it is of great value you answer in hence the role of what your business sees in green technology on board a vessel the next decades.

Thank you for your help and attention!

Tentative title for the thesis

The role of green technology in education of Marine Engineers

An exploratory research in what the maritime industry in Norway assumes the marine engineer need to learn from the academia the next decades.

Tentative Research Question(s)

- *Shall hydrogen be the focus in the study plan for a marine engineer forward to 2030?*
- *Can academia prepare and make the marine engineer competitive for meeting the UN's sustainable development goals for 2030 and 2050?*
- *Is hydrogen the new change maker in shipping and therefore should be a primary theme in the education of Marine Engineers?*
- *Should green technology have an impact/ bigger influence on the study plan for Marine Engineers?*
- *Can the maritime industry have a benefit if the students learn more about green technology?*
- *Is hydrogen a major energy source in shipping in years to come, and is it relevant to implement in the Study Plan for Marine Engineers to meet the goal of zero emission?*
- *Shall hydrogen be the focus in the study plan for a Marine Engineer forward to 2030?*
- *Can the academic education follow up the need of competence for the Marine Engineer to reach the goal of zero emission in shipping?*
- *What topics are relevant for a Marine Engineer the next decades?*
- *Can the maritime industry in Norway contribute to raise competence in green technology in the education of Marine Engineers?*
- *How can academia achieve competence for the marine engineer in the relevance of green technology?*

Questions:

➤ *Are you;*

- *a shipowner*
- *a manufacture related to hydrogen*
- *a manufacture related to green technology*
- *a maritime education center (school/ teacher)*
- *a Marine Engineer with certification according to STCW*
- *a governmental authority*
- *a ship operator*

- Is scrubber one of the primary solutions to be zero-emission?
- Will scrubber be good solution from now and to 2030?
- Is simulator a good way to learn green technology?
- Should it be more simulators in the education?
- Will the focus on autonomous influence the engineers work?
- Should hydrogen be the main subject in the study plan?
- Is it enough to learn basic theory or deeply understanding how hydrogen is in structure?
- Is culture, organization, and human factors relevant topics?
- What are relevant subjects in years to come?
- What are missing today comparing to the hybrid solutions operating today?
- Documentation?
- Relevant to higher positions on shore?
- Should this education only be relevant to sea going personnel?
- Will operation, maintenance, monitoring and condition reporting take over for physical work?
- Is research-based learning a good way of learning for a marine engineer?
- Is innovative learning areas one way to go?
- What is the best way to teach the students the latest technology?
- What is the best way to teach the teachers/ instructors the latest technology?
- Digital tools?
- A more complex understanding in projects?

- What do you believe will the main topics in the study plan the next years?
- Is it necessary to look at HOW to teach in green technology?
- Do you believe/ think the Norwegian maritime schools should change the study plan for Marine Engineers to meet the further challenges and became more competitive in maritime industry?
- *Do you believe/ think learning objects today in the study plan is relevant in 2030?*
- *Do you believe/ think Norwegian authorities and education programs should take responsibility to speed the process for implementing green technology in the Marine Engineers study plan?*
- *What do you believe/ think will be/ is the primary energy source for ships in 2030?*
- *Do you believe/ think Scrubber is a permanent solution for non-emission in 2030?*
- *Do you believe/ think Hydrogen will have an impact as a primary energy resource for moving ships from now until 2050?*
- *Do you believe/ think Hydrogen will impact as a primary energy source for auxiliary power for ships from now until 2050?*
- *Do you believe/ think it is going to be radically changes in how to fuel a ship before 2030?*
- *Do you believe/ think the education of the Marine Engineers is covering hydrogen enough to operate it in board on a daily use (as it is per today)?*
- *Do you believe/ think it is primary to have knowledge about operating hydrogen for Marine Engineers?*
- *Do you believe/ think is relevant topics in a study plan for hydrogen for Marine Engineers?*
- *Do you believe/ think it should be laboratory exercises in the study plan for green technology for Marine Engineers?*
- *Do you believe/ think it is possible to use today's cadet program to implement green technology?*
- *Do you believe/ think the education for a Marine Engineer should be unchanged as it is today, and new subject should be covered be supplementary courses?*
- *Do you believe/ think it will be possible to operate and maintain the hydrogen by the Marine Engineer or will it be done by service firms?*
- *Do you believe/ think Hydrogen is the main source of fuel in the future?*
- *What do you believe/ think is going to be the main source of energy in 2030?*
- *What do you believe/ think is going to be the main source of energy in 2050?*
- *Do you believe/ think Hydrogen is the new change maker as energy resource in shipping fuel?*
- *Do you believe/ think fossil fuel will be replaced with Hydrogen before 2030?*
- *Do you believe/ think green technology will have come so far in in 2050 that it is possible for a shipowner to have a complete non-emission fleet (independent of type of vessels)?*
- *Do you believe/ think a Marine Engineer can have an advantage of competitiveness comparing to other professions on shore in operating and maintain green technology on a ship?*

- *If so, can that be a recruit argument to Marine Study program?*
- *What do you believe/ think this type of subjects, in bigger or less scope, should be in the study program for the Marine Engineer?*
- *Does your company focus on training when new technology is brought on board?*
 - *If yes, please explain how:*
- *Do you believe a stronger understanding, focus and learning about the ISM Code, Risk Analyses and methods regarding regulations will help the Marine Engineer with green technology?*
- *Do you believe more simulator use will help the Marine Engineer with green technology?*
- *Do you believe/ think it is enough to implement a course, like the IGF code course, to maintain and operate green technology?*
 - *Even if it could mean to implement a several courses after finished the education?*