

Interactive comment on “Exploitation of the far-offshore wind energy resource by fleets of energy ships. Part B. Cost of energy” by Aurélien Babarit et al.

Anonymous Referee #1

Received and published: 24 February 2020

This paper presents a new concept for converting far-offshore wind energy into methanol. The idea to utilize the rich far-offshore wind resources to produce fuel is compelling. The choice of producing methanol instead of a CO₂-free fuel like H₂ or NH₃ seems a bit arbitrary, and should be better argued. A sub-section should be included to compare alternative fuels that could be produced offshore.

The paper estimates the cost of producing methanol. It specifies the assumed cost elements, but does not show clearly how much the various cost elements contribute to the calculated total cost for producing methanol from energy ships. The paper should include a graph that clearly show the contribution of each cost element to the total cost.

C1

It should also be discussed if the assumed cost elements are realistic. For example, it is stated that the assumed cost pr MW installed generation capacity is about the same as for a bottom fixed wind farm (4000 EUR/MW). To judge if this is a fair estimate or not it would be good to compare the two constructions in terms of complexity, amount of steel, etc.

The calculated cost for methanol from energy ships is 0.87–2.08 €/kg (157 to 376 €/MWh_{th}). This is according to the paper 2 to 5 times the current market price for methanol, but can be competitive if cost reduction is achieved. It is stated that a learning rate of 10 % would make the system cost competitive if installing hundred or thousands of GW of methanol producing energy ships, or just a few GW if competing against gasoline price in EU. These are all relevant comparisons, but would be more interesting if the comparison could be made in more detail: this should include showing how much the various cost elements contribute to the calculated total cost for producing methanol from energy ships, and also discuss if the same learning rate can be applied to all the cost elements.

This should be discussed: What is the cost per kWh_{el} from the water turbine, and what is the cost of the power to methanol plant? If the cost of electricity from the water turbine in this concept is overly expensive, would it not make more sense to produce methanol on plant connect to a more standard wind farm onshore or offshore?

Interactive comment on Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2019-101>, 2020.

C2