



## Work Group #4: Sustainable Marine Fuels

### Deliverable 3.1 Report Review Template

1. Report title	Roadmap to decarbonizing European Shipping
2. Publication date	November 2018
3. Author	Faig Abbasov
4. Client (organization and type of organization, specifying private/commercial/public; research institute/interest group etc.)	Transport & Environment
5. Context of study (e.g. project in the context of which report is published or titles of other reports if part of a series)	
6. Length (pages)	22
7. Link (or where to get if not available online)	<a href="https://sustainableworldports.org/wp-content/uploads/TE_2018_Roadmap-to-decarbonising-European-shipping-report.pdf">https://sustainableworldports.org/wp-content/uploads/TE_2018_Roadmap-to-decarbonising-European-shipping-report.pdf</a>
8. Sector coverage	
9. Main aim of the study	
10. Methodology	
11. Topic(s) and indication of the level of detail For example: <ul style="list-style-type: none"> <li>System Description - <i>A description of the full marine energy system.</i></li> </ul>	This report assesses potential technology pathways for decarbonising EU related shipping through a shift to zero carbon technologies and the impact such a move could have on renewable electricity demand in Europe. It also identifies key policy and sustainability issues that should be considered when analysing and supporting different technology options to decarbonise the maritime sector. The basis of the study is outbound journeys under the geographical scope of the EU ship MRV Regulation.

<ul style="list-style-type: none"> <li>• System Components - <i>A description of all the components.</i></li> <li>• Infrastructure requirements for new fuels</li> <li>• Applicability - <i>which of the new fuels are expected to replace existing fuels?</i></li> </ul>	
<p>12. What are the main conclusions from the report?</p>	<p>That the only viable option for fulfilling the goals of minimizing climate effects from shipping must be based on electricity and hence there is a large need for more renewable electricity production in the EU (and the world). For international shipping the options are hydrogen and/or ammonia and therefore these should be prioritized.</p>
<p>13. What fuel/energy type(s) are discussed in the report and in what level of detail? For example:</p> <ul style="list-style-type: none"> <li>• Fuel description e.g. type, energy density, specific energy density, flash point, boiling point, fire point, flammability limits, hazards</li> </ul>	<p>Mainly electricity in the form of battery-electric and hydrogen/ammonia for fuel cells. Not in detail but more on an overall system level.</p>
<p>14. What environmental aspects does the report consider? E.g. Air quality emissions, climate change emissions (GHG + BC), other (for example terrestrial or underwater noise, water quality, emergency releases, fugitive emissions, odour, water resources, mining)</p>	<p>The report is focussed solely on climate change.</p>
<p>15. Does the report consider exhaust emissions only, or life-cycle, or both (or some other range of emissions)?</p>	<p>Both, but not in detail.</p>
<p>16. If determined in the report, what are the emission rates by pollutant? NO<sub>x</sub>, SO<sub>x</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, ultra fine PM, VOC,</p>	<p>N/A</p>



<p>NH3, GHGs, Black carbon, and any others e.g. that may be unique to the fuel/energy.</p>	
<p>17. Does the report discuss barriers and opportunities for ships to use the fuel(s)/energy? Does the report identify the maturity level of the fuel on a regional or global scale with respect to use by vessels?</p>	<p>It includes the barriers and opportunities for ships to fulfil the decarbonization goals with one or the other fuel option, rather than whether the fuel is mature and available for use by vessels.</p>
<p>18. Does the report discuss barriers and opportunities for ports to provide the fuel(s)/energy? Does the report identify the maturity level of the fuel on a regional or global scale with respect to provision by ports?</p>	<p>It includes the barriers and opportunities for ships to fulfil the decarbonization goals with one or the other fuel option, rather than whether the fuel is mature and available for provision by ports.</p>
<p>19. Does the report include capital and operating cost estimates for the ship and/or land-side?</p>	<p>N/A</p>
<p>20. When are the fuel(s)/energy expected to be at a demonstration stage vs. commercialization? For example:</p> <ul style="list-style-type: none"> <li>• Technology Readiness Level of the system - <i>Estimated maturity of the system technology</i></li> <li>• On Board Safety Readiness Level of the system - <i>Estimated maturity of the risk mitigations on board (on a scale of 1-9)</i></li> <li>• External Safety Readiness Level of the system - <i>Estimated maturity of the risk mitigations for bunker operations (on a scale of 1-9)</i></li> </ul>	<p>N/A</p>



21. Are the fuels amendable for short and/or long (trans-oceanic) voyages?	N/A
22. Does the report identify/discuss potential issues around community acceptance for this fuel, or potential social/community impacts associated with the system?	N/A