



Work Group #4: Sustainable Marine Fuels

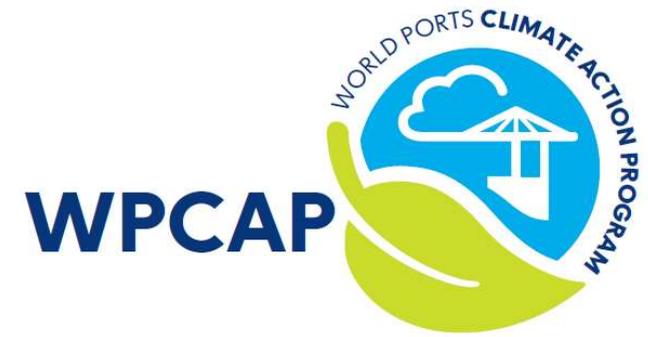
Deliverable 3.1 Report Review Template

1. Report title	Renewable methanol report
2. Publication date	December 2018
3. Author	Charlie Hobson, Carlos Márquez (editor) from ATA Insights ATA Insights is a strategic communications firm and a brand of ATA Markets Intelligence.
4. Client (organization and type of organization, specifying private/commercial/public; research institute/interest group etc.)	Methanol Institute The Methanol Institute is a global trade association for the methanol industry.
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)	n/a
6. Length (pages)	26
7. Link (or where to get if not available online)	https://sustainableworldports.org/wp-content/uploads/Methanol-Institute_2018_Renewable-methanol-report-report.pdf
8. Sector coverage	Fuel production, transport sector, maritime shipping, power generation
9. Main aim of the study	Main aim of the report is to inform on the benefits of renewable methanol and to provide information on the production and potential use of renewable methanol.
10. Methodology	

<p>11. Topic(s) and indication of the level of detail For example:</p> <ul style="list-style-type: none"> • System Description - <i>A description of the full marine energy system.</i> • System Components - <i>A description of all the components.</i> • Infrastructure requirements for new fuels • Applicability - <i>which of the new fuels are expected to replace existing fuels?</i> 	<p>The following topics are covered in detail:</p> <ul style="list-style-type: none"> • Legislative drivers – a high level overview of policy measures, incentivizing the uptake of renewable fuels are given • Renewable methanol production – <i>production pathways and case studies are presented</i> • Application – <i>potential use of renewable methanol in different sectors is presented on a high-level; maritime shipping is one the these sectors</i>
<p>12. What are the main conclusions from the report?</p>	<p>Industrial scale production of ultra-low carbon renewable methanol is already happening. Renewable methanol has a clear potential to help reduce greenhouse gas emissions if it's adopted in place of fossil fuels. Renewable methanol is versatile (range of inputs/conversion routes), affordable and a stable energy source that's well suited to use in transportation (fuel) and industry (chemical feedstock). Diverse and successful trials in both production and application, along with substantial worldwide commercial investment in renewable methanol technologies, is seen as an indicator that renewable methanol will play a significant role in transportation and chemical production in the coming decades.</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"> • Fuel description e.g. type, energy density, specific energy density, flash point, boiling point, fire point, flammability limits, hazards 	<p>The report focusses on renewable methanol, which is discussed in detail.</p> <p>Specifically, the following details are stated (for methanol as well as methane, LNG and diesel):</p> <ul style="list-style-type: none"> • molecular formula • carbon contents • density at room temperature • boiling point • net heating value

	<ul style="list-style-type: none"> • auto-ignition temperature • flashpoint • cetane rating • flammability limits • water solubility • sulfur content
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)	The report considers both greenhouse gas and air pollutant emissions.
15. Does the report consider exhaust emissions only, or life-cycle, or both (or some other range of emissions)?	<p>The maximum exhaust gas emission reduction potential of renewable methanol is presented for CO₂, NO_x, SO_x and PM, without specifying the application or the energy carrier to which methanol is compared.</p> <p>For road transport, well-to-wheel CO₂ emission factors (g CO₂/km) for different fossil/green fuel types are presented (see Figure 7)</p>
16. If determined in the report, what are the emission rates/factors by pollutant? NO _x , SO _x , PM ₁₀ , PM _{2.5} , ultra fine PM, VOC, NH ₃ , GHGs, Black carbon, and any others e.g. that may be unique to the fuel/energy.	<p>The maximum exhaust gas emission reduction potential of renewable methanol is presented for CO₂, NO_x, SO_x and PM, without specifying the application or the energy carrier to which methanol is compared.</p> <p>For road transport, well-to-wheel CO₂ emission factors (g CO₂/km) for different fossil/green fuel types are presented (see Figure 7)</p>
17. Does the report discuss barriers and opportunities for <u>ships</u> 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>As a disadvantage of methanol use in shipping, the lower energy density compared to conventional shipping fuels is mentioned.</p> <p>The following advantages of methanol as marine fuel are mentioned:</p> <ul style="list-style-type: none"> - GHG and sulphur reduction potential - methanol as a liquid fuel does not require cryogenic storage

	<p>- ships have proven to be retrofittable for the use of methanol</p> <p>The report mentions that there are some methanol-fuelled ships already in place.</p>
<p>18. Does the report discuss barriers and opportunities for <u>ports</u> 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>The report mentions that supply infrastructure for fossil methanol is already in place in many ports around the world.</p>
<p>19. Does the report include capital and operating cost estimates for the ship and/or land-side?</p>	<p>This is not specified in the report.</p>
<p>20. When are the fuel(s)/energy expected to be at a demonstration stage vs. commercialization?</p> <p>For example:</p> <ul style="list-style-type: none"> • Technology Readiness Level of the system - <i>Estimated maturity of the system technology</i> • On Board Safety Readiness Level of the system - <i>Estimated maturity of the risk mitigations on board (on a scale of 1-9)</i> • External Safety Readiness Level of the system - <i>Estimated maturity of the risk mitigations for bunker operations (on a scale of 1-9)</i> 	<p>E-methanol and especially biomethanol are stated to be commercially produced in a small number of companies (see Figure 3).</p>
<p>21. Are the fuels suitable for short and/or long (trans-oceanic) voyages?</p>	<p>This is not specified in the report.</p>



22. Does the report identify/discuss potential issues around community acceptance for this fuel, or potential social/community impacts associated with the system?	This is not specified in the report.