Gavin Allwright
Secretary General, International Windship Association (IWSA)

Non-Executive Director, World Wind Energy Association (WWEA)
IMO MTCC Stakeholders Advisory Committee Member
EU Interreg WASP, SAIL and DualPorts Projects: Advisor
IRENA: Renewable Energy in Shipping Report: Coordinator
IPCC 1.5C Climate Report: Expert Reviewer
Masters Degree: Sustainable Development
[specialising in small zero-emissions vessels in LDCs]
Hybrid W.A.V.E. “1.5C Target: All ships designed and built today must operate in a net zero emissions world at the end of their service life.”

<table>
<thead>
<tr>
<th>WIND</th>
<th>ACTIVITY</th>
<th>VESSEL</th>
<th>E-FUELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind –assist or primary wind power</td>
<td>Operational optimisation</td>
<td>Vessel optimisation</td>
<td>Renewable energy or waste derived fuels</td>
</tr>
<tr>
<td>-retrofit wind-assist (5-20% savings – possible up to 30%)</td>
<td>-voyage &amp; fleet management</td>
<td>-design</td>
<td>-2nd gen biofuels</td>
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<tr>
<td>-newbuild primary wind 30%++</td>
<td>-weather routing</td>
<td>-size &amp; capacity</td>
<td>-batteries</td>
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<tr>
<td>-today’s tech</td>
<td>-speed reduction</td>
<td>-energy management</td>
<td>-synthetic fuels + CCS</td>
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<tr>
<td>+optimise &amp; cheaper</td>
<td>-virtual arrival</td>
<td>system</td>
<td>-bio-gas/liquids</td>
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<td>-lease/OPEX approach</td>
<td>-crew training</td>
<td>-energy efficiency measures</td>
<td>-H2 &amp; H2 carriers</td>
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<td></td>
<td>-data/ blockchain</td>
<td>-air lubrication</td>
<td>*Electric propulsion systems enables modular approach</td>
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<td></td>
<td>-new business models etc.</td>
<td>-reduced engine power etc.</td>
<td></td>
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</tbody>
</table>

| 20-30%                      | 20%         | 20-30%                               | 20-40% |

Note: Figures are estimates & any one measure/category could provide a significant % saving.
Facilitation/Cooperation Examples

IWSA Network: 120+ Members & registered supporters
+ Five regional wind propulsion hubs under development

WASP: EU Interreg North Sea Project
- Five wind-assist installations - monitor & verify
- Develop business models
- Recommendations to help facilitate wind propulsion uptake.

WiSP: Joint industry Project
- Improve methods for transparent performance prediction + provide ship owners/operators with fast low-cost predictions for their fleet
- Review the regulatory perspective including status of rules and regulations, EEDI etc.

IMO-EU MTCC Network
- Five Maritime Technology Cooperation Centres—Asia, S. Pacific, Africa, Latin America & Caribbean
- Promoting technologies and operations to improve energy efficiency + Capacity Building

ACEF 2020: Economy-wind Energy Evolution
Manila 16 Jun 2020
Key Considerations.....

- Hybrid Approach vs One-Size Fits All
- Sustainability = Efficiency + RESILIENCE
- Vision: Two- or Three-Tier Industry?
- Today’s Solutions = We have the tools NOW!
- Facilitation: Circular Carbon Levy?
- Future: High Ambition vs Lowest Bar Compliance
- Future Proofing: Stranded Assets vs Predictability