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Marine Decarbonization Framework

Workshop Summary for workshops held in February 2025

Context and outcomes

What was the context of the policy workshops?

A two-day virtual workshop was held on February 26-27, 2025 bringing together a core group of Canadian experts and stakeholders from across the marine value chain to discuss the realities and opportunities of decarbonizing Canada's marine sector, including:

- Perspectives on issues and commercial imperatives facing the sector and the entire economy in transitioning to a sustainable future
- Key challenges, barriers, risks and opportunities for the marine sector and its industrial partners and identify actions and solutions where industry and government can separately take leadership roles and in other areas can work together.

The workshop was not a formal government consultation, but a platform to inform the development of a marine decarbonization plan.

What was the goal?

To identify priority areas of action and leadership by government and industry to inform the development of a phased-in sustainable plan that will reduce marine emissions while simultaneously supporting cost competitiveness, affordability and economic prosperity in Canada.

What's next?

Input will inform the marine decarbonization framework that sets out a phased approach consisting of concrete areas of leadership and action by government and industry that will support the decarbonization of the domestic maritime sector. This will cumulate in the inclusion of a marine chapter into a multi-modal transportation decarbonization plan to be published in early 2026. This plan will be evergreen and adjust as circumstances evolve in Canada and beyond – including advancement of global standards, relations with the United States, evolution of sustainable clean fuels of the future, and more.

What were the workshop objectives?

Hear different perspectives

- What are the broad scope of issues and commercial challenges and opportunities facing the sector?
- How do these align the with issues facing the entire economy in transitioning to a sustainable future, particularly in consideration of emerging trade disputes with the U.S.?

Confirm and validate

- Review the key challenges, barriers, risks and opportunities for the marine sector and its industrial partners, including fuel and technology suppliers.
- What are the impacts and opportunities arising from potential U.S. tariffs?

Identify potential solutions and actions

- Where can industry and government take separate leadership roles?
- In what areas can they work together?
- What measures could be taken to reduce impacts and risks of U.S. tariffs as we decarbonize?

Workshop participation

Who attended?

Over 100 attendees joined each day of the workshop (107 on Day 1 and 78 on Day 2). A summary of attendees is provided below.

Ports
- Port of Vancouver
- Port of Halifax
- Port of St. John
- St. John's Port Authority
  Ports of Thunder Bay
  Nanaimo Port Authority
  Port of Yarmouth
- Port of Charlottetown
- Port of Prince Rupert
- Windsor Port Authority
  Ports of St. John's
- Port de Sept-Îles

Vessels
- Vard Marine Inc.,
- Wartsila
- Robert Allan Ltd.,
- Algoma
- The CSL Group Inc
- BC Ferries
- ABS
- FedNav

Shipping and Maritime Industry Associations
- Association of Canadian Port Authorities
- Chamber of Marine Commerce,
- Cruise Atlantic Canada,
- BC Chamber of Shipping
- Association of BC Marine Industries,
- Shipping Federation of Canada
- St Lawrence Seaway Management Corporation,
- St Lawrence Economic Development Council
- Cruise Lines International Association,
- Société des traversiers du Québec

Clean Energy, Technology, and Decarbonization
- Clear Seas
- Greenfield Global
- REFUEL
- Canadian Fuels Association
- Oceans North
- Clean Resource Innovation Network
- AKA Energy Systems
- C40 Cities
- Green Marine
- The PIER

Classification Societies and Consulting Firms
- DNV GL
- American Bureau of Shipping
- Bureau Veritas

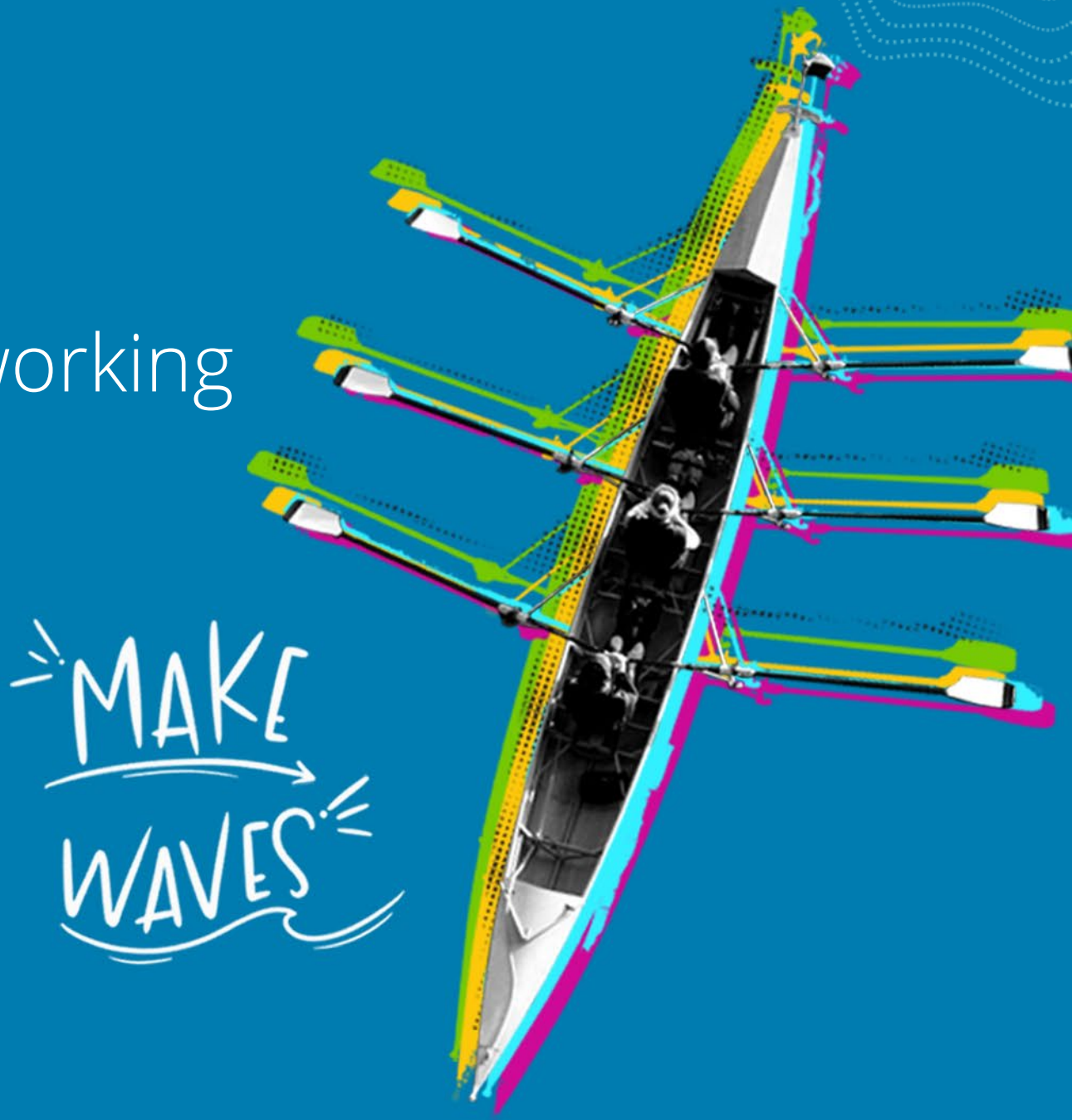
Provincial and Regional Stakeholders
- PEI
- New Brunswick
- Nova Scotia
- British Columbia Quebec

Academic and Research
- Université de Montreal
- Memorial University Marine Institute

Regulatory Bodies and Government Agencies
- Transport Canada (TC)
- Innovation Science Economic Development Canada (ISED)
- Environment and Climate Change Canada (ECCC)
- Employment and Social Development Canada (ESDC)
- Department of Fisheries and Oceans (DFO)
- Canadian Coast Guard

Other stakeholders
- Trigon
- CISMaRT Canada
- BC Hydro
- Policy Consultancy

Themes from stakeholder working session



Where was the conversation focused: Themes from Working Session (1)

	Cost and Economic Viability of Alternative Fuels	Policy Uncertainty and Durability	Collaboration Across Stakeholders
Description	The transition to alternative fuels is hindered by high costs for production, infrastructure, and vessel adaptations. Concerns about the economic challenges of biofuels, hydrogen, and other alternatives, as well as the lack of financial incentives to support early adopters.	Inconsistent and unclear government policies create barriers to investment and adoption of clean technologies. There was a call for durable, long-term policies that align with international standards.	Collaboration between federal departments, ports, vessel owners, fuel producers, and civil society was identified as essential for addressing decarbonization challenges. Attendees discussed the need for forums, data sharing platforms, and coordinated strategies.
Key Discussion Points	• Cost of fuel production and infrastructure development. • Economic risks for early adopters. • Policy-driven market uncertainty.	• Lack of clarity on carbon pricing mechanisms. • Need for policy integration across departments and jurisdictions.	• Government-supported forums for cross-sector collaboration. • Regional coordination for fuel supply and infrastructure. • Smaller group collaboration to share best practices. • Data sharing to facilitate decision-making.
Quotes	*Biofuels are the clear solution to reduce carbon emissions in the short term, but the price gap between biofuel and diesel is still significant* *The cost is a big one for ports; who pays, who invests, who maintains?* *Low carbon fuel right now is an artificial policy-driven market, so the stronger policy signal, the better*	*Policy cohesion is critical; we can't make commitments without policy support* *The marine strategy will be more successful if it is tied to other policy frameworks*	*We need a government-supported forum for collaboration between users, fuel providers, and infrastructure providers to tackle challenges* *Industry ends up bearing a disproportionate amount of risk—how can it be shared and reallocated?*

Where was the conversation focused? Themes from Working Session (2)

	Supply Chain Challenges and Fuel Availability	Infrastructure Gaps and Port Contraints	Data Sharing and Technology Adoption
Description	The availability and security of alternative fuels were recurring concerns, with participants emphasizing the importance of domestic production and reliable supply chains.	Ports face significant challenges in building infrastructure to support alternative fuels and technologies. Issues include limitations to funding and financing options (equity partnerships) regulatory barriers, and stranded asset risks.	The need for better data sharing frameworks and transparency was emphasized to support decision-making and clean technology adoption. Concerns about confidentiality and fragmented data supply chains were raised.
Key Discussion Points	• Domestic production versus reliance on imports. • Security of supply for biofuels and other alternatives. • Regional opportunities for fuel production.	• Governance and financing constraints under the *Canada Marine Act*. • Shore power connectivity and utilization challenges. • Regional coordination for energy planning.	• Maritime single window for data governance. • Role of emerging technologies like AI and digital twins. • Transparency in reporting and data sharing.
Quotes	• *Knowing there will be supply for x years would allow for more collaboration with fuel suppliers* • *How do we know marine will have access to it?* • *Domestic production is supportive of the agricultural sector (e.g., corn and canola), but producers will go where they can get the best return, which right now is the USA*	• *Shore power improves air quality but is a small portion of maritime emissions; utilization comes at a cost to vessel owners and ports* • *Ports are doing what they can, but what do we need to do to support them to enhance their role in marine decarbonization* • *Project approvals need to be fixed; duplication of governance (federal and provincial reviews) slows things down and prevents infrastructure from being built*	• *Data is not very well captured across the whole supply chain—it's very fragmented* • *Modern ships have 100x more data on their operations; the challenge is how to use it efficiently*

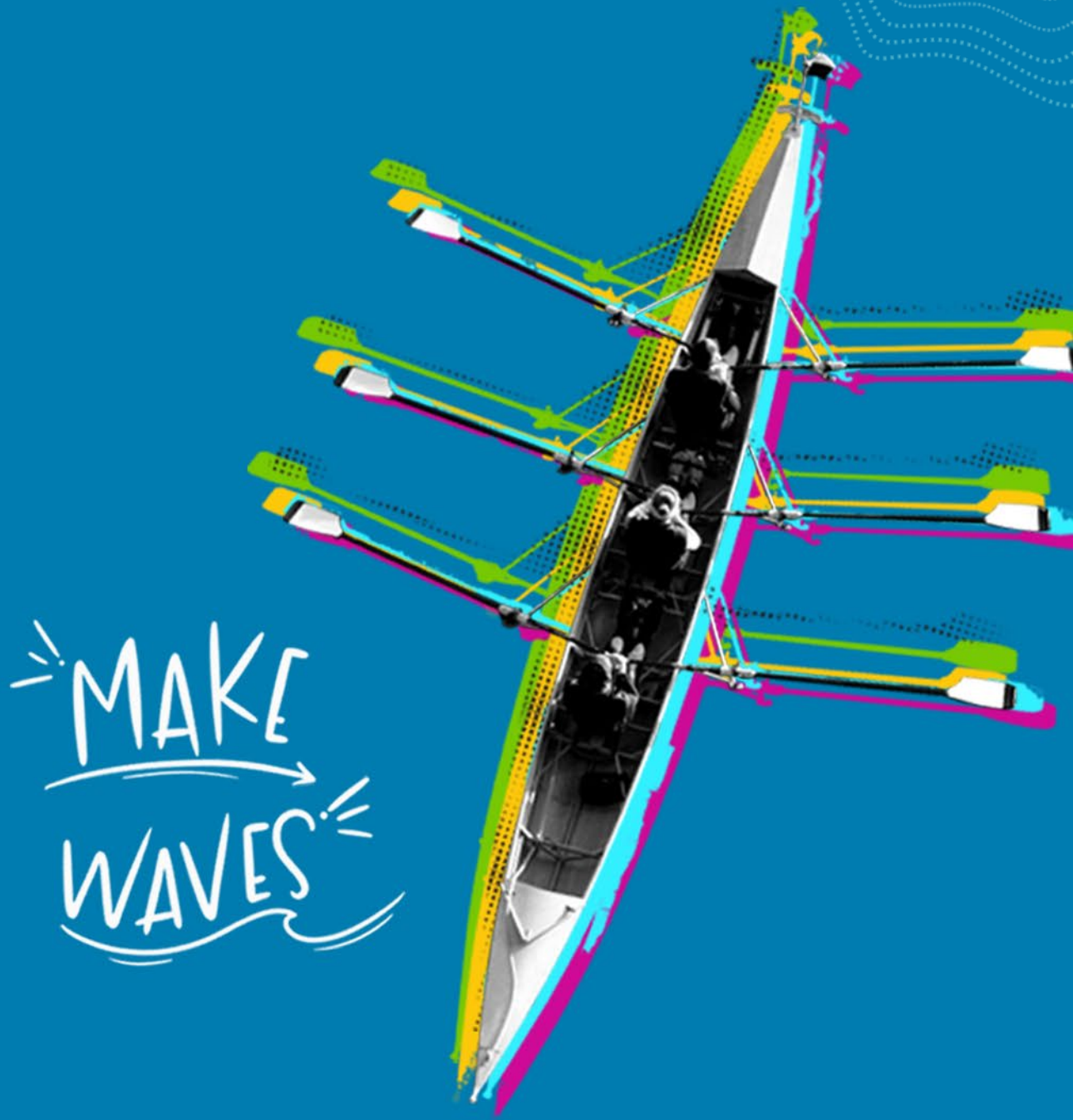
Where was the conversation focused? Themes from Working Session (3)

	Investment Challenges	Skilled Workforce and Training Needs
Description	Difficulty in securing funding for decarbonization initiatives, with calls for predictable government programs and innovative financing mechanisms.	A shortage of skilled workers and training programs was identified as a barrier to adopting new technologies and fuels. Importance of integrating emerging technologies into curriculums.
Key Discussion Points	• Borrowing limits and governance issues for ports. • Role of carbon pricing in driving investment. • Need for public-private partnerships. • Information sharing is required to identify opportunities for investors and lenders.	• Simulation training for new marine technologies. • STEM programs with a marine focus.
Quotes	• *Programs need to be predictable, not piecemeal, and they should have short application times* • *Without government funding or obligations on customers, [we] run~~s~~ biofuels at a loss*	• *Training institutes exist in NL and BC teaching new skills alongside existing skill sets* • *BC Ferries trained all relevant staff on LNG technology—this is a good model*

Where was the conversation focused? Themes from Working Session (4)

	Public Awareness and Advocacy	International Coordination
Description	The marine industry's role in decarbonization is not well understood by the public, hampering investment and policy support. There needs to be better advocacy, awareness and education.	The importance of harmonizing regulations and sharing best practices globally to support decarbonization efforts.
Key Discussion Points	• Publicizing the importance of marine decarbonization. • Advocacy for funding and policy changes. • Education on the economic and environmental benefits.	• Engagement in IMO forums and global collaboration. • Harmonization of North American fuel regulations. • Learning from international green shipping corridors.
Quotes	*Need more publicity for the marine industry—outside of stakeholders, it is not well known* *Bring investors and innovators together*	• *The IMO allows non-government organizations to attend as observers—important to have industry at these tables* • *FuelEU and ETS are great ways to stimulate demand for biofuels—Canada can take daring approaches like this*

Breakout room summaries



Breakout: Fueling the Transition

KEY DISCUSSION POINTS

High costs of hydrogen and biofuels, with policy and regulation inconsistencies complicating adoption.
Safety concerns and societal acceptance of alternative fuels.
Lack of infrastructure and financing for early adopters.

CHALLENGES & OPPORTUNITIES

➢ **Challenges**

- Uncertainty in costs, incentives, and long-term policy support.
- Limited infrastructure for alternative fuels and shore power.
- Coordination and standardization issues across jurisdictions and departments.

➢ **Opportunities**

- Establish a task force to address biofuel hurdles and foster collaboration.
- Incentivize biofuel use with credits, accelerated depreciation, and fiscal responses to match U.S. subsidies.
- Regional capacity assessments and green shipping corridors to align needs.
- Promote a technology-neutral, lifecycle-based carbon intensity fuel policy.

ACTION ITEMS

- Develop a national framework for fuel incentives and supply security.
- Convene a government-supported forum for collaboration among stakeholders.
- Explore opportunities to showcase short-sea shipping that utilizes clean fuels or electricity as a decarbonization option.

Breakout: Ports & Vessels

KEY DISCUSSION POINTS

Financial risks to the organization brought on by high costs in uncertain fuel transitions, as well as risks of stranded assets if investments are made too soon.
Regulatory challenges under the *Canadian Marine Act* and governance limitations.
Financing constraints and the need for public funds or equity stakes for ports.

CHALLENGES & OPPORTUNITIES

➢ **Challenges**

- Slow project approvals due to overlapping governance (federal, provincial, municipal).
- Shore power adoption is costly and underutilized, with limited emissions impact.
- Difficulty in aligning regional energy planning and infrastructure development.
- Extremely limited domestic shipyard capacity for retrofit or new commercial vessel builds

➢ **Opportunities**

- Streamline governance and project approval processes.
- Integrate climate risks into business strategies as a value driver – demonstrates leadership and enhances competitiveness.
- Explore new funding models, including borrowing limit adjustments for ports.
- Enhance regional collaboration for energy planning and infrastructure.

ACTION ITEMS

- Establish a systematic assessment of regional energy needs and decarbonization strategies.
- Develop data-sharing initiatives to optimize port operations.
- Advocate for policy cohesion and federal leadership to guide decarbonization.

Breakout: Technology, Innovation, and Data Sharing

KEY DISCUSSION POINTS

Validation of technology claims and high costs of hydrogen and biofuels.
Challenges with data sharing due to confidentiality and fragmented supply chains.
The need for consistent standards and transparency in regulatory planning.

CHALLENGES & OPPORTUNITIES

➢ **Challenges**

- Limited collaboration between industry players and government departments.
- Fragmented data sharing.
- Lack of a centralized maritime single window for data exchange.
- High costs of retrofitting older vessels for digital and fuel-efficient technologies.
- Extremely limited domestic shipyard capacity for retrofit or new commercial vessel builds

➢ **Opportunities**

- Create a data-sharing platform with governance frameworks to protect proprietary information.
- Promote digital twins, AI, and just-in-time arrivals to optimize operations.
- Integrate decarbonization into broader trade and supply chain strategies.

ACTION ITEMS

- Develop a Canadian maritime single window system to share information, aligned with IMO standards that Canada has acceded to.
- Increase funding for digitalization and data-sharing initiatives.
- Encourage interdepartmental collaboration to unify regulatory requirements.

Breakout: Regulations, Permitting, Codes and Standards

KEY DISCUSSION POINTS

Regulatory misalignment between Canada and the U.S. (e.g., exemptions for U.S. vessels).
Lack of early communication on regulatory changes (e.g., electric tug requirements).
Need for better interdepartmental cooperation within the government.

CHALLENGES & OPPORTUNITIES

➢ **Challenges**

- Regulatory exemption processes (e.g., MTRB decisions) are burdensome and lengthy.
- Uncertainty in regulatory frameworks and lack of long-term policy durability.
- Operational challenges, including workforce shortages and safety requirements for new technologies.

➢ **Opportunities**

- Implement a maritime single window for streamlined data sharing and regulatory reporting.
- Use policy frameworks to integrate marine decarbonization into broader strategies (e.g., energy, trade).
- Ensure early engagement with industry on new regulatory requirements to reduce risks

ACTION ITEMS

- Involve civil society and supply chain partners in regulatory planning.
- Identify ways to integrate marine strategies within other national policies.
- Incentivize early compliance through credits or cost-sharing mechanisms.

Breakout: Investment

KEY DISCUSSION POINTS

Need for consistent and predictable government support programs.
Lack of alignment between funding priorities and industry needs.
Challenges in scaling alternative fuels due to financial risks and supply chain gaps.

CHALLENGES & OPPORTUNITIES

➢ **Challenges**

- High costs of alternative fuels and insufficient domestic production.
- Policy uncertainty and lack of durable regulatory frameworks.
- Limited access to private sector capital and affordable financing options.

➢ **Opportunities**

- Create funding programs that bridge the gap between pilot projects and commercial scalability.
- Encourage collaboration across supply chains through commodity corridors.
- Introduce financial incentives (e.g., green loans, harbor dues reductions) to support clean fuel adoption.

ACTION ITEMS

- Engage finance professionals and investors in future workshops.
- Advocate for global carbon pricing mechanisms and reward systems through the IMO.
- Develop a national strategy that aligns decarbonization with broader economic and trade goals.

Breakout: Skilled Workers

KEY DISCUSSION POINTS

Need for improved training programs to address the shift towards advanced marine technologies, such as LNG systems or battery/electric.
Questions raised about whether schools are incorporating new marine technologies into their curriculums and the potential role of simulation training.
Younger generations expect internet access onboard, influencing recruitment and retention strategies.

CHALLENGES & OPPORTUNITIES

➢ **Challenges**

- Significant differences in skill sets required across various ship operations, including electronics and computer systems.
- Issues related to expectations on work-life cycles and onboard connectivity.
- Difficulty in attracting recruits due to the demanding nature of the job and lack of modern amenities.
- Limited opportunities for remote training and certifications, especially for emerging technologies.

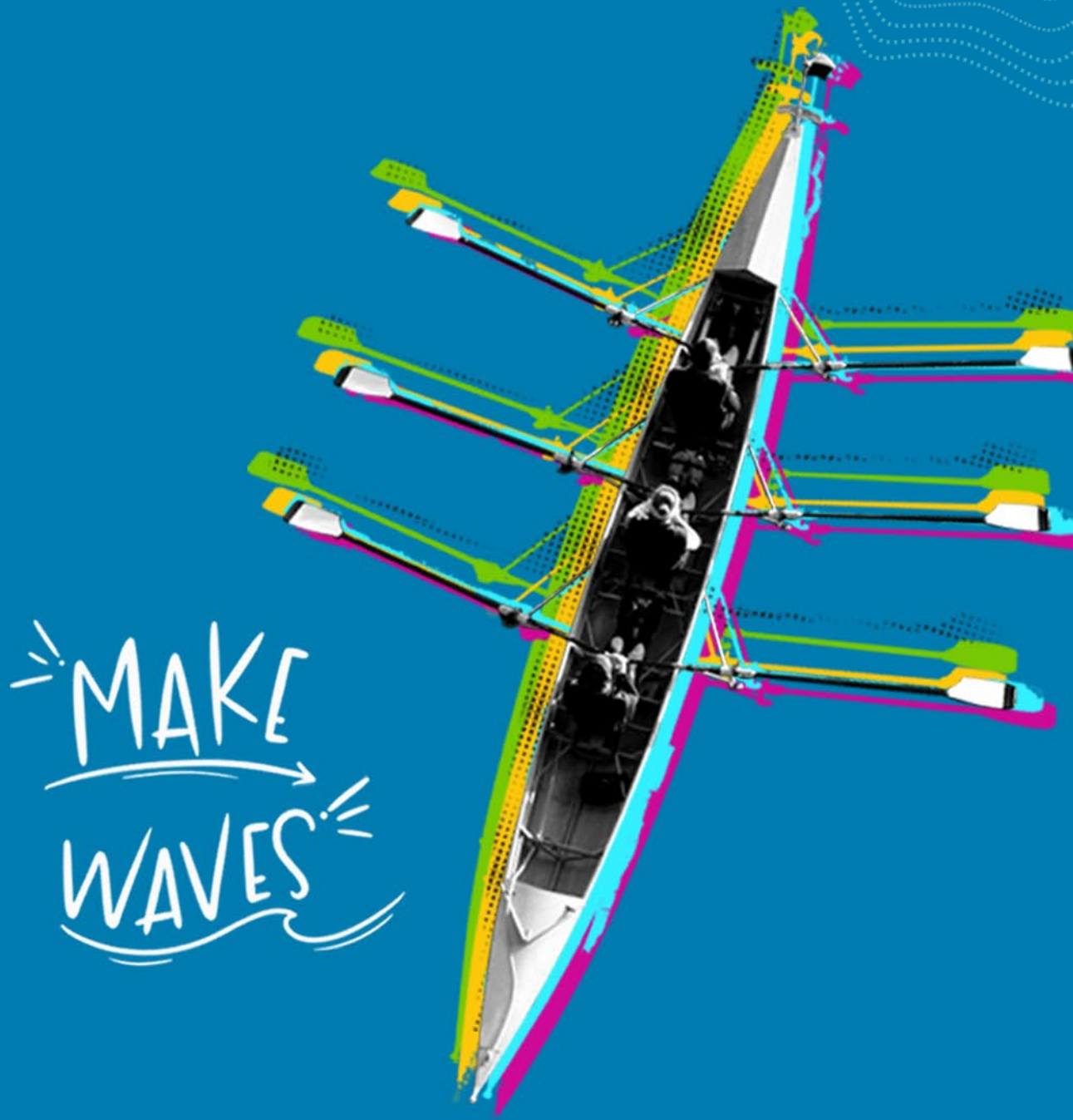
➢ **Opportunities**

- Partnerships with training institutes in Newfoundland and Labrador and British Columbia -to develop programs addressing both new and existing skill sets.
- Explore the use of AI simulation technology for training purposes.
- Emphasis on maintaining the marine connection within STEM programs to attract younger talent.
- Expand remote learning opportunities to provide certifications and training that meet the needs of emerging technologies.

ACTION ITEMS

- Develop and enhance training programs focusing on LNG and other emerging technologies.
- Collaborate with educational institutions to incorporate new technologies into marine curriculums.
- Investigate the feasibility of AI simulation training for maritime roles.
- Address generational expectations by providing onboard internet access and modern amenities.
- Expand remote learning opportunities to attract and retain skilled workers.

Collaboration



Priority collaborations highlighted throughout the workshop

Government-Supported Forums for Collaboration

- Calls for creating platforms where users, fuel providers, infrastructure developers, and policymakers can address shared challenges collaboratively.
- Specific suggestion for a task force to tackle biofuel hurdles involving shipowners, Transport Canada (TC), and Environment and Climate Change Canada (ECCC).
- Align regional and national strategies while addressing local energy needs and decarbonization goals.
- Port-specific initiatives should be tied to broader national and international decarbonization frameworks.

Data Sharing for Better Collaboration

- Advocacy for open data-sharing platforms to facilitate understanding of fuel/technology options and operational performance.
- Concerns raised about confidentiality and competition, with suggestions to use models like the Maritime Single Window to address trust issues.

Interdepartmental and Intergovernmental Collaboration

- Emphasis on the need for better coordination across federal departments (e.g., TC and ECCC) to present unified policies and clear signals to the industry.
- Integration of marine decarbonization strategies with broader policy frameworks like energy transition, critical minerals, and trade.

Green Shipping Corridors

- Advocacy for financial and regulatory support to enable green shipping corridors, requiring collaboration between ports, vessel owners, and regional stakeholders.
- Example from the North Sea Port agreement cited as a successful model.

Specific Collaboration Needs Identified

- Fuel Supply Chain Security:
  - Collaboration between fuel producers, policymakers, and vessel owners to put in place long-term agreements ensuring the availability and acceptance of alternative fuels.
  - Opportunity for domestic producers to work with regulators to establish recognized standards for alternative fuels.
- Cross-Sectoral Stakeholder Engagement:
  - Involvement of cargo owners, terminal operators, and Indigenous communities in decision-making processes to ensure inclusive and strategic planning.
  - Recognition of the need to integrate maritime decarbonization into other sectors' strategies (e.g., transportation (including ship-building), energy, and trade).
- Technology and Innovation Collaboration:
  - Industry participants highlighted the need for collaborative testing and validation of technologies (e.g., biofuels, electrification, digital twins).
  - Suggestions for public-private partnerships to reduce risks for first movers and early adopters.
- International Collaboration:
  - Recognition of the need to harmonize regulations with international bodies like the IMO.
  - Suggestion to learn from international models (e.g., EU green fuel adoption, Singapore's Maritime Single Window).

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