IMO CARES

IMO CARES 3 DAYS FORUM

24 - 26 June 2024

REPORT

Contents

1.0 Executive Summary

This report presents an overview of the IMO CARES Forum conducted in June 2024, detailing the primary objectives, key discussions, and outcomes of the event. Organized to promote the IMO CARES project and its main objectives, the event facilitated collaboration among a diverse group of stakeholders, including representatives from the IMO, the Kingdom of Saudi Arabia (KSA), Maritime Technology Cooperation Centres (MTCCs), expert consultants, recipient countries, and technology providers. The forum included a review of project activities and progress to date, along with engaging discussions and presentations from technology providers and representatives of the project beneficiary countries.

As this event marked a pivotal moment in the project's lifecycle, participants focused on reflecting on accomplishments and identifying lessons learned, while also exploring the potential for a Phase II. The collaborative sessions allowed stakeholders to outline strategies that not only address regional challenges but also pave the way for the future of sustainable maritime practices in the relevant regions.

2.0 Primary Objectives

The primary objectives of the IMO CARES event were:

- **To promote the IMO CARES project and its activities**
- **To recognize the contribution of TGA**
- **To facilitate collaboration among key project stakeholders**

3.0 Logistics and Venue

The activities took place at the IMO Headquarters in London from 24 to 26 June 2024, in parallel with the IMO Technical Cooperation Committee meeting (TC 74).

4.0 Detail of Events - Day 1: Monday, 24 June

(See Full Agenda in Appendix I)

4.1 IMO CARES Presentation

Time: 12:30 – 12:45
Location: TC 74 main plenary, IMO HQ
Participants: IMO & KSA representatives, IMO Cares Project Coordination Unit (PCU), TC 74 delegates

The event commenced with opening statements from Jose Matheickal, Director, Technical Cooperation and Implementation Division and Kamal Al Junaidi, General Manager of Maritime Transport Policies & International Organisation Affairs, TGA, followed by CARES project presentation by the Project Manager Mr. Anton Rhodes, and concluded with a Q&A session.

4.2 IMO CARES Technical Coordination Meeting

Time: 14:30 – 17:00
Location: Committee Room 3-5, IMO HQ
Participants: KSA, Maritime Technology Cooperation Centres (MTCCs), PCU, Technology providers, recipient countries

4.2.1 Activity 1: Project Proposal Retrospective

Time: 14:30 hrs onwards
Duration: 55 minutes

The session began with a brief introduction to the retrospective exercise. The facilitator outlined the goals, emphasizing the importance of reflecting on the project proposal to identify strengths, potential pitfalls, and areas for improvement. The goal was to collaboratively analyze the project, addressing various factors that could influence its success or failure. The session involved a review and discussion of Global Challenge technical proposals, identifying issues related to GHG monitoring and measuring processes, and finding solutions for tech demonstration work. Using the Sailboat methodology, participants collaboratively reflected on the draft project proposals and identified elements that can accelerate progress (wind), obstacles that can hinder (anchors), challenges and risks (rocks), and the achievement of the proposed objectives (destination). This structured reflection enabled the participants to acknowledge strengths, address challenges, and set actionable steps for improvement in the project proposal while providing an opportunity for enhanced collaboration.

Participants were seated according to their project groups, which facilitated targeted discussions within each team.

Destination: Each group discussed their project's primary and secondary objectives. The focus was on ensuring that these objectives were clearly defined and measurable. Teams evaluated whether the goals were aligned with the overall mission and discussed methods to track progress effectively.

Wind: The discussion then shifted to identifying actions that could significantly contribute to the project's success. Participants highlighted key strategies, resources, and stakeholder engagements that could propel the project forward.

Anchor: Groups analyzed potential hindrances that could slow down or hold back the project. Common concerns included resource limitations, potential delays, and challenges in coordination across teams. The exercise aimed to bring these issues to the forefront so they could be addressed proactively.

Rocks: Participants identified risks associated with the project. These included financial uncertainties, technological challenges, and external factors such as regulatory changes. The discussion helped to prioritize which risks needed close monitoring and mitigation strategies.

Sun: The session concluded with a focus on the positive aspects of the project. Teams shared what made them feel optimistic about the project, such as strong team collaboration, innovative ideas, and the potential impact of the project.

Collection of Summary Notes: Summary notes from each group were collected at the end of the session. These notes captured key insights and would serve as the basis for further discussions. (See Appendix II)

4.2.2 Activity 2: Discussion on Anchors and Rocks to Identify Issues and Impact Measurement Methodology

Time: 16:00 hrs onwards
Duration: 60 minutes

The second activity began with a brief introduction, explaining the purpose of further analyzing the issues identified in the Activity 1 session. The session aimed to delve deeper into the challenges and develop a methodology for measuring the impact of the project. Participants revisited the summary notes collected from Activity 1. The session involved a group reflection on the identified anchors (hindrances) and rocks (risks). The goal was to understand these challenges in greater detail and to brainstorm potential solutions.

Categorizing Main Challenges: The groups categorized the main challenges identified in the previous reflection. This step was crucial in organizing the issues into manageable segments, such as resource constraints, technical difficulties, or regulatory hurdles.

Impact Measurement and Technical Proposal: Participants discussed how to measure the impact of the project effectively. They worked on aligning the impact measurement methodology with the technical proposal, ensuring that the metrics were both relevant and measurable.

Quantitative Reduction in GHG - Measuring and Monitoring Process: The discussion focused on the processes for measuring and monitoring the project's impact on greenhouse gas (GHG) reductions. The group explored different methodologies, data collection processes, and the importance of consistent monitoring to ensure the project's success.

Collection of Summary Notes: The session concluded with the collection of summary notes, which documented the outcomes of the discussions. These notes would inform the next steps and ensure that all identified issues were addressed systematically.

Conclusion:

The two activities in Session 1 provided a structured approach to reflect on the project proposal, identify challenges, and develop a robust impact measurement methodology. The discussions were instrumental in aligning the project’s objectives with actionable strategies and in preparing for the next stages of the project’s implementation.

5.0 Detail of Events - Day 2: Tuesday, 25 June

5.1 IMO CARES Sponsored Lunch

Time: 12:30 – 14:00
Location: 1st floor delegates lounge
Participants: All

The sponsored lunch offered a valuable opportunity for informal networking and interaction among TC delegates and Project stakeholders.

5.2 IMO CARES Side Event: Domestic Shipping & Decarbonization in Developing Regions

Time: 13:45 - 16:45
Location: Committee Room 3 to 5
Participants: KSA, MTCCs, PCU, Technology providers, recipient countries

The side event commenced with a welcome address and agenda introduction by Mr. Anton Rhodes, Project manager, IMO CARES. This was followed by high-level opening remarks from Jose Matheickal, Director, Technical Cooperation and Implementation Division and Kamal Al Junaidi, General Manager of Maritime Transport Policies & International Organisation Affairs, TGA, who emphasized the importance of international collaboration in decarbonizing the shipping industry, particularly in the context of domestic shipping.

Opening of the event was followed by presentation from Petra Ghassemi Ahari, IMO Cares Project Analyst, providing an overview of the CARES initiative and global technology challenge aimed at decarbonizing the domestic shipping.

Prof. Dr. Mustafa Insel and Capt. Dr. Seyedvahid Vakili presented the results of the technical report on the Decarbonisation of Domestic Shipping in Africa and the Caribbean region. The presentation provided the status of the current uptake of energy efficiency technologies and alternative fuels for domestic and international shipping. It also highlighted the decarbonisation potential in the domestic shipping of SIDS and LDCs (Africa and the Caribbean) while emphasising the barriers.

The winners of the global technology challenge delivered their presentations highlighting the unique features, relevance and advantages of their technologies w.r.t. identified technology beneficiaries The presentations emphasized the practical applications of these technologies in selected ports, demonstrating their potential to significantly lower greenhouse gas emissions and promote sustainable shipping practices. The winners also discussed the scalability and adaptability of their solutions, making a strong case for their integration into the maritime operations.

5.2.1 Panel Discussion: Decarbonization Challenges in Domestic Shipping for Developing States

Participants:
MTCC Africa: Ms. Lydia M Ngugi
MTCC Asia: Mr. Wei Ruan
MTCC Caribbean: Ms. Vivian R Parasram
MTCC Latin America: Mr. Ervin V Wilson
MTCC Pacific: Ms. Faranisese Kinivuwai
Moderator: Capt. Sukhjit Singh

The panel discussion, focused on the unique challenges faced by developing states, particularly SIDS and LDCs, in decarbonizing domestic shipping. These regions often struggle with economic constraints, technological limitations, and regulatory hurdles, which complicate efforts to reduce GHG emissions in their maritime sectors. The discussion aimed to explore these barriers and identify innovative solutions to support the sustainable development of domestic shipping in these regions. The highlights from the panel discussion are presented below:

- **Defining Domestic Shipping and Regional Uniqueness**
    - Domestic shipping in Africa is primarily voyage-based, focusing on the specific routes taken within national boundaries. The region's shipping is characterized by smaller, older vessels operating on short, coastal voyages, which poses challenges in applying international GHG mitigation strategies. In Asia, domestic shipping is often defined by the distance from shore. The region faces complexities due to a mix of small-scale local operations and larger, regional trade routes, creating a unique regulatory environment. The Caribbean defines domestic shipping largely based on

operational scope within island chains, where short distances and the age of vessels make decarbonization particularly challenging. Latin America's domestic shipping is characterized by a mix of coastal and riverine shipping, with vessels often being older and less efficient, complicating GHG mitigation efforts. The Pacific Islands' domestic shipping is distinct due to the vast distances between islands and reliance on smaller vessels, making decarbonization efforts difficult and costly.

- **Challenges in Decarbonizing Domestic Shipping**
  - Limited access to modern technologies and financing significantly hampers decarbonization efforts. And reliance on older vessels exacerbates emissions, and there is a significant gap in capacity and technological know-how.
  - The diversity of shipping operations, from small-scale coastal to large regional trade, presents a challenge in implementing uniform decarbonization strategies. There are significant gaps in both technology and financial resources.
  - Aging fleets and a lack of infrastructure to support new technologies. Financial constraints and limited technical capacity further impede progress.
  - The high cost of decarbonization technologies and the distances involved in shipping between islands create unique challenges. The Pacific region is highly dependent on external funding and aid, which complicates long-term sustainability efforts.
- **Economic Impact on Decarbonization Efforts**
  - Across all regions, limited access to capital, high upfront costs, and competing government priorities are significant barriers to investing in decarbonization. Developing states often depend on development aid or loans, which come with their own challenges, such as stringent selection criteria and lack of maritime priority in development agenda. Additionally, the technology gaps in these regions create a high-risk environment for investment, further discouraging private sector participation.
- **MTCC's Role in Overcoming Challenges**
  - Panellists emphasized the need for the MTCCs to play a more proactive role in facilitating access to financing and technology. This could include raising the profile of maritime sector at national and regional level, advocating for more inclusive climate financing criteria, providing technical assistance to bridge the technology gaps, and fostering regional collaborations to share best practices. Additionally, MTCCs could support capacity-building initiatives to enhance the local workforce's ability to implement and maintain decarbonization technologies, ensuring that developing states are not left behind in the global push for sustainable maritime practices.
- **Conclusion**
  - The panel discussion highlighted the complex and varied challenges faced by developing states in decarbonizing their domestic shipping sectors. Despite these challenges, there is potential for significant progress through targeted interventions, innovative solutions, and collaborative efforts, particularly with the support of international funding and MTCCs. The session underscored the importance of continued dialogue and action to ensure that all regions can participate in the global transition towards a sustainable maritime future.

5.2.2 Panel Discussion: Panel discussion Role of Technology in Maritime Decarbonization

Participants:
Mr. Niraj Rughooputh, Mauritius Ports Authority, Mauritius
Mr. Stefanus Gariseb, Namport (Namibian Ports Authority), Namibia
Ms. Michelle Scipio-Hosang, National Energy (NEC), Trinidad and Tobago
Mr. Shawn O'Garro, The St. Christopher Air & Sea Ports Authority (SCASPA), St. Kitts and Nevis
Moderator: Capt. Sukhjit Singh

The panel discussion centered around the role of technology beneficiaries in maritime decarbonization. It emphasized that while innovative technologies are essential for reducing carbon emissions in maritime operations, the involvement of technology beneficiaries—such as port authorities—is crucial for successful implementation and scaling. The discussion explored how these entities actively engage with, evaluate, and integrate new technologies, making them key drivers in the journey toward sustainable shipping. The highlights from the panel discussion is presented below:

- **Staying Informed and Evaluating Technologies**
    - Mr. Niraj Rughooputh from Mauritius Ports Authority shared that their organization actively monitors global trends and technologies in maritime decarbonization through industry networks, conferences, and collaborations with international bodies like IMO CARES.
    - Ms. Michelle Scipio-Hosang shared their approach which involves rigorous evaluation of new technologies based on relevance, cost-effectiveness, and potential environmental impact. She noted that engagement with IMO CARES has been very helpful in enhancing their understanding and selection of appropriate solutions.
    - Mr. Stefanus Gariseb of Namport highlighted the importance of continuous learning and engagement with technology providers to stay updated on new developments. He emphasized the value of IMO CARES in facilitating access to a broader range of technologies and expertise, which has significantly supported Namport in its decarbonization efforts.
- **Appropriateness and Availability of Technology**
    - Ms. Michelle Scipio-Hosang from NEC discussed the challenges of choosing the right technology amid numerous available options. She stressed that the appropriateness of a technology is often specific to the operational context of each port, including factors such as port size, climate, and existing infrastructure. This makes the selection process complex and requires a tailored approach. Mr. Shawn O'Garro of SCASPA echoed this sentiment, adding that the technology must not only be appropriate but also scalable. He described the difficulties in aligning the latest technologies with the specific needs of smaller ports like St. Kitts and Nevis, where financial and operational constraints can limit options.
- **Evaluating Technology Effectiveness**
    - All panellists emphasized the importance of using clear metrics and KPIs to assess the effectiveness of adopted technologies. KPIs such as reduction in fuel consumption, decrease in carbon emissions, and cost savings are crucial in evaluating the success of their technological investments. It was also mentioned that operational KPIs such as improvements in energy efficiency, operational downtime reduction is also important along with environmental KPIs.
- **Challenges in Scaling and Maintaining Technologies**
    - Panellists highlighted that one of the biggest challenges in scaling technologies is the integration with existing systems. Specially where the adoption of a new energy management system requires significant customization and staff training, leading to delays and higher costs. The importance of long-term planning and stakeholder engagement in addressing maintenance challenges was also highlighted. It was suggested that future projects should incorporate robust training programs, ongoing technical support, and financial planning to ensure sustainable technology adoption.
- **Conclusion:**
    - The panel discussion underscored that while technology is a key enabler of maritime decarbonization, its success equally depends on the active involvement of technology beneficiaries. These entities must be well-informed, selective, and proactive in their

approach to adopting and scaling technologies. The discussion also highlighted the need for clear metrics to evaluate effectiveness and the importance of addressing challenges related to appropriateness, integration, and maintenance in future projects.

6.0 Detail of Events - Day 3: Tuesday, 26 June

6.1 CARES Monitoring and Feedback Session

Time: 10:00 – 12:00
Location: Committee Room 3 to 5
Participants: MTCCs, IMO, IOEO, KSA, Tech providers & recipient countries

The IMO Internal Oversight and Ethics Office took advantage of the presence of the Project key stakeholders in London to collect data through outcome mapping/harvesting workshop. In addition to identify key project outcomes, data collected through this workshop will feed into the evaluation planned for the second half of 2024 - the evaluation will be aimed at documenting good practices, challenges and opportunities to inform the continuation of IMO CARES through an eventual second phase.

- Key stakeholders in-person – 35 participants divided into nine groups according to role in the project and region.
    - Implementing partners: MTCC Africa and MTCC Caribbean
    - Beneficiaries: maritime authorities/port operators from Mauritius, Namibia, St. Kitts and Nevis, and Trinidad and Tobago.
    - Technology providers: Bergmann Marine, Clean Marine Shipping and Sygtech.
    - MTCC Asia, MTCC Latin America and MTCC Pacific also participated, though asked to reflect about experiences with similar IMO projects.
- Method adapted to stakeholders. First part consisted of spontaneous questions to reduce response bias. Mentimeter used to allow for anonymous responses.
    - What comes to their mind when thinking of IMO CARES or similar IMO project:

    - What do you like the most?
        - Interaction/collaboration with colleagues from same region and/or similar concerns for knowledge and experience transfer.
        - Different stakeholders working together towards same goal.
        - Knowledge access/sharing and capacity development.
        - Regional solutions – appropriate solutions.

- Opportunity to discuss best practices/contribute to something globally relevant.
- Technology demonstration.

- What do you like the least?
  - Limited alignment with countries' needs, particularly SIDS. No clarity on appropriateness of technologies.
  - Focus on direct beneficiaries as opposed to national priorities as a whole.
  - Insufficient clarity re process and objectives.
  - Uncertainty of funding.
  - Lengthy process, though short deadlines for decision-making.

Second part of the session consisted of a storytelling exercise to collect data disaggregated by type/group of stakeholder, as they might have had different experiences, perceptions and expectations in relation to IMO CARES. Data collected through this workshop will be triangulated and validated within the scope of the upcoming evaluation of IMO CARES.

6.2 CARES Internal Planning Meeting

Time: 13:15 – 16:15
Location: Committee Room 3 to 5
Participants: PCU & MTCCs

The primary focus of this session was a discussion and brainstorming session with local stakeholders, aimed at generating ideas for the Phase II CARES Proposal. Participants focused on discussing the specific needs of the relevant regions to ensure that the project effectively addresses local priorities while advancing its overall goals.

Some of the key ideas discussed included:

- Expand the Global Challenge to continue close engagement with tech providers
- Build a tech demonstration programme that utilises countries National Action Plans, IMO Audits and port energy efficiency audits by MTCCs.].
- Specialise on testing specific technologies such as fuels, wind or solar.
- Ensure closer alignment with other IMO GHG initiatives like Green Voyage

These suggestions will be considered during the development of the IMO CARES II proposal, should the initiative move forward.

The meeting concluded with a review of the IMLA Proposal for strengthening the global training and development network in pursuit of the IMO GHG emission reduction strategy to IMO Technical Committee 74 (TC 74), presented by co-authors from MTCC Asia, offering constructive feedback.

6.3 Workshop on MTCCs Financial Reporting

Time: 16:15 – 17:15
Location: Committee Room 3 to 5
Participants: PCU, MTCCs, Admin Division

Andrew Richardson, Head, Finance and Budget Services, IMO provided training and advice on MTCCs financial reporting.

7. Conclusion

The IMO CARES Forum held in June 2024 successfully convened a diverse group of stakeholders to advance the objectives of the CARES project. The event facilitated meaningful collaboration and focused discussions centered on the project's aims and activities.

Key Outcomes

1. **Review of Technology Project Proposals:**
    - A comprehensive review of project proposals was conducted, employing a structured approach to identify challenges and opportunities for impact measurement.
2. **Panel Discussions:**
    - Engaging panel discussions highlighted the unique challenges faced by developing states in decarbonizing domestic shipping. The discussions emphasized the need for tailored strategies and the crucial role of technology in achieving sustainability goals.
3. **Presentations of Innovative Solutions:**
    - Notable presentations from the IMO CARES Maritime Technology Global Challenge winners and experts showcased innovative solutions that have the potential to significantly reduce GHG emissions in the maritime sector.
4. **Collaborative Brainstorming Sessions:**
    - Collaborative brainstorming sessions generated valuable insights that will inform the development of the Phase II CARES Proposal, ensuring that local priorities are taken into consideration.

Future Steps

Moving forward, stakeholders emphasize the importance of ongoing dialogue and proactive engagement to navigate the complexities of maritime decarbonization.

Overall, the event served as a vital platform for fostering collaboration, sharing knowledge, and setting the stage for the future of sustainable maritime practices.

Photos capturing key moments from the IMO CARES Forum as well as presentations can be found in Appendix III.

8.1 Appendix I – Agenda for IMO CARES side event

Agenda for IMO CARES side event and related activities
24 – 27 June 2024

Primary Objectives: The activities will promote the CARES project, recognise the key role of TGA, bring together key project stakeholders (IMO, KSA, MTCCs, expert consultants, recipient countries and Technology providers), undertake technical meetings for completion of the Global Challenge Technical Proposals, and undertake planning meetings for next steps in the CARES project development.

Logistics: **Activities to be delivered in parallel with IMO Technical Cooperation Committee meeting (24 – 27 June) at IMO HQ, London.**

Important: **The CARES Side Event is a separate event to TC 74. Participants to the CARES event cannot attend the TC 74 meeting unless they are specifically registered to attend that event.**

Time	DAY 1 – Monday 24 June	Participants
12:30 – 12:45	**IMO CARES Presentation (TC 74 main plenary, IMO HQ)** - *Opening statements - Jose Matheickal & Kamal Al Junaidi (5 mins)* - *CARES presentation by PCU (5mins)* - *Q & A (5mins)*	***KSA, IMO, PCU***
14:30 – 17:00	**IMO CARES Technical coordination Meeting (Committee Room 3-5, IMO HQ)** - Review and discussion on Global Challenge technical proposals **COFFEE BREAK – 15mins** - Identifying issues (GHG monitoring and measuring process) and solutions for tech demonstration work CARES monitoring and feedback session	***KSA, MTCCs, PCU, Tech providers & recipient countries***
Time	**DAY 2 – Tuesday 25 June**	**Participants**
12:30 – 14:00	**IMO CARES sponsored lunch (1st floor delegates lounge)**	***KSA & All***
13:45 - 16:45	**IMO CARES side event – Domestic shipping & Decarbonization in developing regions (Hybrid event – Committee Room 3 to 5)** **2 mins – Welcome, agenda introduction and introductions – Anton Rhodes (IMO)** ***8 mins - High level opening – Jose Matheickal (IMO) & Fawaz Al Sahli (KSA)*** ***10mins – CARES overview (Petra Ghassemi-Ahari)*** ***10mins – Decarbonizing domestic shipping presentation (CARES consultants)*** ***30mins – Panel discussion – Challenges for domestic shipping (MTCCs)*** ***20mins – Q&A***	***KSA & All***

	BREAK – 30mins – Official photos ***5mins – Global Challenge presentation (Petra Ghassemi-Ahari)*** ***20mins – Winning technologies presentations (winning Tech providers)*** ***20mins – Panel discussion – The role of technology - (CARES recipient countries)*** ***20mins – Q&A*** ***5mins – Event closure (Anton Rhodes)***	
Time	**DAY 3 – Wednesday 26 June**	**Participants**
10:00 – 12:00	**CARES monitoring and feedback session *(Committee Room 3 to 5)*** - *Identifying issues (GHG monitoring and measuring process) and solutions for tech demonstration work*	***MTCCs, PCU, Tech providers & recipient countries***
12:00 – 13:15	***Lunch break***	
13:15 – 16:15	***CARES & GMN II internal planning meeting (Committee Room 3 to 5)*** - *Focus on monitoring and reporting procedures of MTCCs* ***Coffee break – 20mins*** - *Brainstorming on ideas for Phase II CARES Proposal* - *Feedback on IMLA proposal*	***PCU & MTCCs***
16:15 – 17:15	***Workshop on MTCCs financial reporting (training and advice)*** ***(Committee Room 3 to 5)*** - *Richard, Andrew to present*	***PCU, MTCCs, Admin Division***

Thursday 27 June: IMO Sub-Division for Partnerships and Projects (SDPAP) Exposition

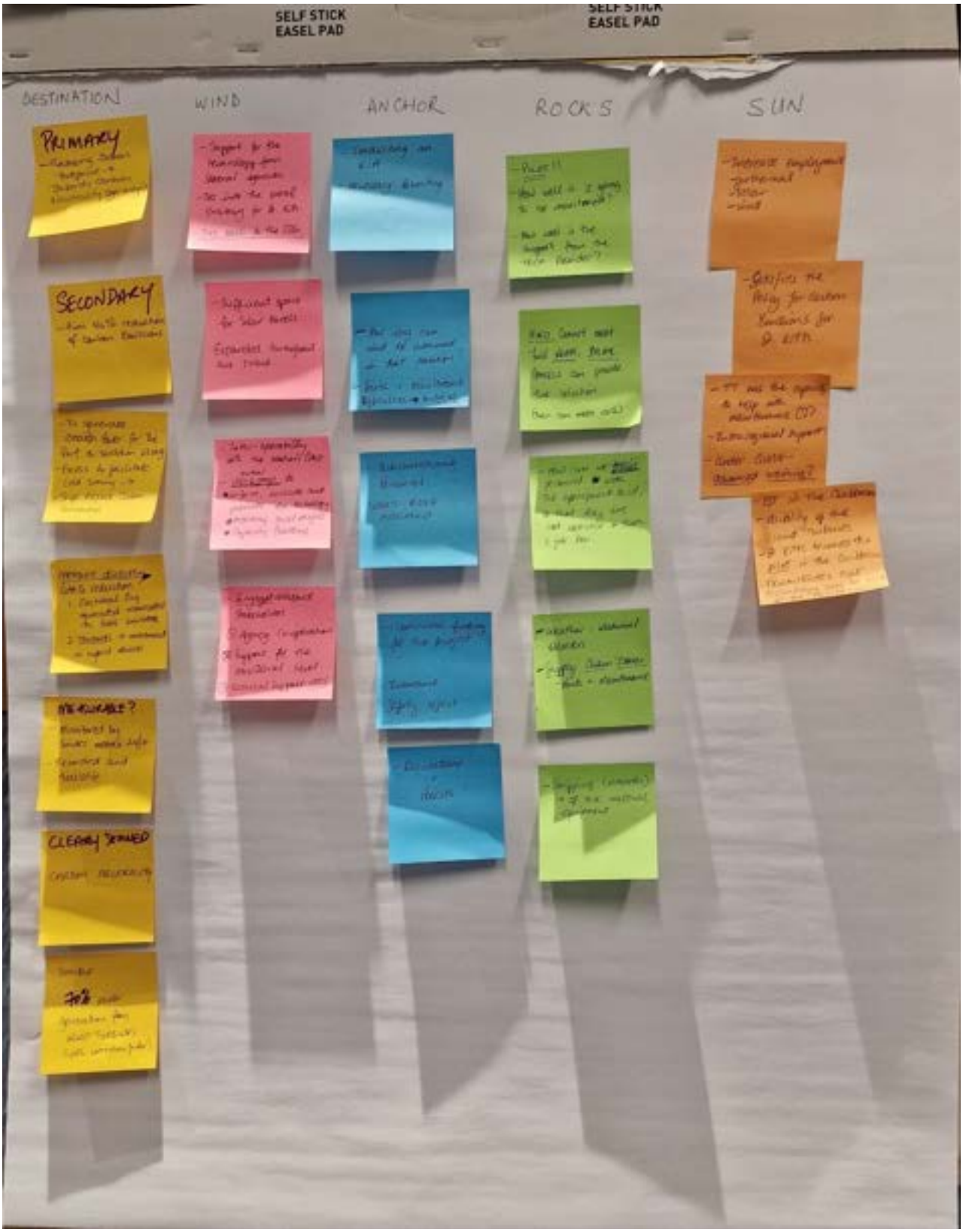
- MTCCs and Recipient countries presence is required
- A separate agenda for this event will be circulated in due course

8.2 Appendix II – Activity 1 charts

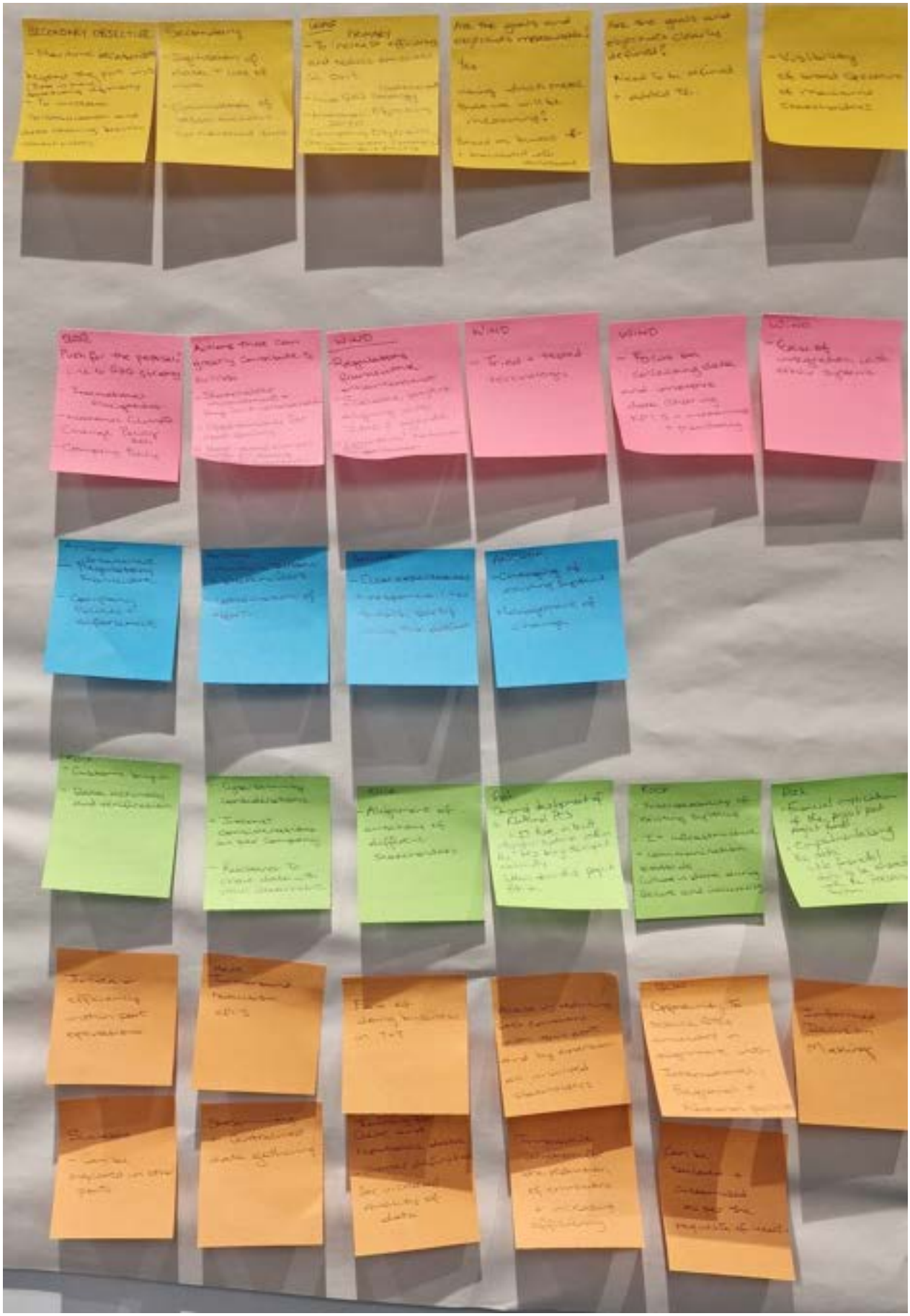
Group 1 Activity Chart

Group 2 Activity Chart

Group 3 Activity Chart



Group 4 Activity Chart



8.2 Appendix 2 – Activity 2 reports

Group 1: Rocks and Anchors

Group 1: Brainstorming Session | 24th June 2024
Main Challenges and Mitigation Strategies

1. **Bureaucracy within Institution/between Stakeholders**
    - **Challenges**: Delays and inefficiencies caused by bureaucratic processes within and between institutions and stakeholders.
    - **Mitigation Strategies**:
        - **Involve Stakeholders in Project Planning at All Stages**: Ensure that all relevant stakeholders are included in the planning process from the beginning to foster collaboration and buy-in.
        - **Stakeholder Analysis**: Conduct a thorough analysis to identify key stakeholders and understand their interests, which will help in managing expectations and ensuring active participation.
    - **Impact Measurement**:
        - Number of stakeholder engagement sessions held and feedback received.
        - **Time to Implement**: Track the time it takes to complete key implementation milestones. This helps identify areas where bureaucratic processes are causing delays.
        - **Process Streamlining**: Measure the effectiveness of efforts to streamline processes. This could involve tracking changes in approval times or the number of steps required for specific tasks.
    - **Monitoring Strategy**: Implement a project management dashboard that tracks and logs all stakeholder meetings, engagement sessions, and feedback received. Use regular feedback loops to ensure continuous improvement.

2. **Regression in Stakeholder Buy-in/Breakdown in Information Sharing**
    - **Challenges**: Loss of stakeholder support and inadequate information sharing among persons involved in implementing the system.
    - **Mitigation Strategies**:
        - **Introduce Policies at the Port Level**: Implement policies that compel parties to share necessary data, ensuring transparency and collaboration.
        - **Mandatory Data Sharing Directives**: Enforce directives from the port authorities to make data sharing obligatory, fostering a culture of openness
        - **E-Learning Platforms**: implementing E-learning platforms which can facilitate information exchange. These platforms can host training materials, best practices forums for trainers.
        - **Standardization:** Develop clear guidelines and protocols for involved parties who will be implementing the technology on how to share information. This could include templates for reports, communication channels, and timelines for sharing updates.
        - **Project Ownership:** The Port must assume full ownership of the project from its inception, designating a dedicated focal person to maintain continuous momentum and drive for implementation.
    - **Impact Measurement**:
        - Percentage of stakeholders complying with data-sharing policies.

        - Percentage usage of the tool in the early phases of inception.
        - **Change Management:** Develop a change management strategy to ensure smooth adoption of the new system. This might include training on using the system.
    - **Monitoring Strategy**:
        - Regular audits and reports can be generated to ensure adherence to data-sharing policies.
        - Usage trends

3. **Change in Politics/Leadership**
    - **Challenges**: Changes in political leadership and policies can disrupt project continuity.
    - **Mitigation Strategies**:
        - **Develop a Change Management Plan**: Create a comprehensive plan to manage transitions in leadership and policy changes.
        - **Capacity Building**:
            - **Training of Trainers**: Train key individuals who can then train others, ensuring continuity of knowledge.
            - **Technology Provider Training**: Utilize e-learning platforms provided by technology partners to train new employees.
        - **Project Transparency and Data Sharing**: Maintain transparency in the project and ensure data is shared openly to build trust among new leaders and stakeholders.
    - **Impact Measurement**: Number of training sessions conducted and number of participants successfully trained. Number of superusers identified and trained locally to provide local support to the business solution.
    - **Monitoring Strategy**: Develop an e-learning management system (LMS) that tracks training progress, completion rates, and participant feedback. Regularly review and update training materials based on feedback and changing needs. Usage trends of the proposed solution.

4. **Data Hosting, Laws, and Cybersecurity**
    - **Challenges**: Ensuring the security and compliance of data hosting and management.
    - **Mitigation Strategies**:
        - **Cloud Hosting Company Management**: Use reputable cloud hosting services to manage security, redundancy, and data backups, ensuring compliance with relevant laws.
    - **Impact Measurement**: Number of security breaches or data incidents reported.
    - **Monitoring Strategy**: Regular security audits and vulnerability assessments should be conducted to ensure compliance and security.

5. **Financial Sustainability**
    - **Challenges**: Securing ongoing funding and financial resources for the project.
    - **Mitigation Strategies**:
        - **Additional Functionality**: Integrate additional functionalities like the National Single Window into the system to demonstrate value and justify funding.
        - **Efficiency Savings and Data-Driven Policy Making**: Showcase how the system improves efficiency and informs better policy decisions to attract funding.
        - **Strong Investment Plan**: Develop a robust plan that outlines the financial benefits and sustainability of the project.
        - **Alignment with Port Strategy**: Ensure that project objectives align with the port's existing and future strategic plans to secure funding and support.
    - **Impact Measurement**: Amount of cost savings realized and additional funding secured post-pilot phase. The efficiencies achieved during the pilot phase warrant further

investment in the business solution. Similarly, the reductions in greenhouse gas (GHG) emissions resulting from the solution also justify continued investment.
    - **Monitoring Strategy**: Implement a financial performance tracking system that monitors cost savings, efficiency improvements, and new funding sources. Use detailed financial reports and dashboards to provide transparency and justify further investments.

6. **Not Meeting GHG Targets**
    - **Challenges**: Difficulty in achieving greenhouse gas (GHG) reduction targets.
    - **Mitigation Strategies**:
        - **Expand Project Scope**: Include initiatives like "just-in-time" arrival for ships and improved hinterland connectivity for trucks to reduce emissions.
        - **Socio-Economic Initiatives**: Incorporate business initiatives that have socio-economic benefits alongside environmental goals.
        - **Combine Measurements of Ports**: Aggregate GHG measurements from multiple ports to meet overall targets more effectively.
        - **Inclusion of Tug Boats**: Optimize tug boat operations to reduce fuel consumption, leveraging the software for efficient scheduling.
    - **Impact Measurement**: Reduction in GHG emissions (measured in CO2 equivalent) from port operations through port efficiencies.
    - **Monitoring Strategy**: Install real-time emissions monitoring systems at key points within the port and on participating vehicles and vessels. Use data analytics to track emissions over time and identify areas for improvement. Allow for just-in-time arrival notifications to record fuel levels accurately, this can effectively monitor and calculate the CO2 emissions of vessels during their stay. This approach helps in tracking environmental impact and promoting sustainability in maritime operations.

7. **Lack of Capacity to Utilize Tools and Availability of Tools**
    - **Challenges**: Insufficient capacity and access to necessary tools and technologies.
    - **Mitigation Strategies**:
        - **Mobile Access to Software**: Ensure the software can be accessed via mobile devices to increase accessibility.
        - **Capacity Building Plan**: Establish a comprehensive plan for building capacity among stakeholders.
        - **Maintenance-Free Hardware**: Use hardware like CO2 sensors that require minimal maintenance, with solar-powered batteries needing replacement only after two years.
        - **Third-Party Maintenance**: Contract third-party providers for maintenance services to ensure tools remain operational.
    - **Impact Measurement**: User adoption rate of the new tools and technologies. Number of Superusers identified for the solution. A superuser has the highest level of authority within a software solution, allowing them to oversee and manage the entire system comprehensively. This role is crucial for maintaining the integrity, security, and efficient operation of the software.
    - **Monitoring Strategy**: Deploy user analytics software that tracks how often and effectively the tools are being used. Provide ongoing support and training based on usage data to increase adoption and proficiency.
8. **Procurement as a challenge:** noting procurement as a challenge, the system will not undergo a procurement process, however there is a need to ensure that the implementation of the system aligns with the specific guidelines outlined by the IMO CARES project.

Group 3: Rocks and Anchors

Matrix for Measuring Success: Indicators, Methods, etc.

Procurement

Procurement of Raw Materials:

- **Availability on the Manufacturing Side:** All necessary raw materials are available on the manufacturing side.
- **Hydraulic Parts:** Can be sourced from the US and accessed easily afterwards. There is a guarantee for these parts, ensuring compatibility. Although SYGTECH typically does not use US parts, they are making an exception for St. Kitts due to ease of access and quality.
- **Solar Panels:** Require additional funding. The EU usually prefers PV material sourced from European companies, which, although more expensive, is more reliable.

Procurement of Human Resources:

- **Installation:** Local equipment (crane, auger) is available on St. Kitts. St. Kitts will be responsible for this, potentially involving private providers. Further discussion is needed regarding payment for this service related to installation.
    - **Responsibility:** Is this covered by SYGTECH or St. Kitts?
    - **Donor Timeline:** The donor needs to see the timeline and understand how MTCC will administer this. MTCC must disburse funds to either the technology provider or St. Kitts personnel, depending on the procurement policies of the host institutions.
    - **Cost Proposal:** The technical proposal should include prepared land, access to service providers, etc. SYGTECH needs to be informed by St. Kitts about the costs associated with these services.
    - **Site Matrix Decision:** Costs associated with each site must be considered. Details on site preparation requirements should be provided to St. Kitts for quotation to SYGTECH.

GHG Emissions:

- **Manufacturing Equipment:** Possible considerations for GHG emissions.
- **Shipping CO_2 Footprint:** Needs to be evaluated.

Mobilisation

- **Shipping:** No issues identified.

Installation

- **SCASPA Involvement:** SCASPA needs to be involved in the installation process.

Implementation/Operationalisation

- **Routine Maintenance Schedule:** A proposed routine maintenance schedule should be included.
- **Hands-On Workshop:** Part of the package, providing experience/ training on assembly, etc.
- **Smart Readers Monitoring:** This could be conducted via an online session.

- **Structural Health Monitoring:** Monitoring the structural health of the turbine to track fatigue.
- **Timeline Considerations:** Installation must avoid the hurricane season (June to November). A maintenance schedule and timeline should be factored into the procurement process.
- **Warranty Period:** 4 years, covering the project lifecycle under the IMO CARES program.

Environmental Impact Assessment (EIA), Policies, and Regulation

- **Engagement:** Discussion with ministerial agencies, stakeholders, and other agencies for a smooth transition and implementation.
- **Scope Definition:** Define the scope of the EIA.
- **Timeline:** Implementation within 6-8 months.
- **Current Engagement:** Calvin has already engaged with EIA and physical planning.

Impact and Measurement

- **GHG Emissions:** Can be captured through equipment monitoring data.

Safety and Insurance

- **Responsibility:** SCASPA and SYGTECH will sort out safety and insurance.

Continuous Funding

- **Funding:** GMN will fund the implementation, followed by monitoring phases. After 4 years, SCASPA will handle continuous maintenance.
- **Cost Savings:** Perceived cost savings should help develop a maintenance budget. Major parts costs can be provided to SCASPA.

SYGTECH's Commitment to St. Kitts

- **Success:** The success of the turbine for SYGTECH is a success for St. Kitts.
- **Continuous Improvement:** Continuous improvement of technology and equipment will be provided to St. Kitts.

Mechanisms for Continuous Feedback

- **Accessibility and Support:** Mechanisms for continuous feedback and support must be defined.
- **Lifespan:** The expected lifespan of the wind turbine is 10 years.

Group 4: Rocks and Anchors

Below is a summary of the Rocks and Anchors identified for the implementation of the DigiPort Project proposed by Bergmann Marine for National Energy, Trinidad and Tobago. This summary highlights key areas to be addressed in the technical proposal. The Anchors represent factors that can hinder or slow down the proposed project, while the Rocks represent risks involved in the project. Included are mitigative measures considered to address these issues.

Anchors

Mobilization

- **Coordination of efforts among multiple stakeholders:**
    - National Energy's port operations involve multiple "port users" who are at different levels of decarbonization.
    - The DigiPort concept relies on the cooperation of key stakeholders involved in the port call process.

Mitigative Measures:

- Mapping of key stakeholders.
- Establishment of MoUs with key stakeholders.

Implementation and Operationalization

- **Enhancement of Regulatory Framework (National Legislation and Company Policies):**
    - Monitoring emissions requires the collection of fuel consumption data from vessels. If this remains voluntary, low response rates are likely. Developing legislation for mandatory sharing of this data is proposed, but this process could be lengthy, affecting the project's implementation timeline.

Mitigative Measures:

- Utilization of alternative monitoring systems such as placement of sensors and AIS data.
- Use of other metrics like average anchorage time, vessel turnaround time, reduction of transit times for tugs, and frequency of tug reallocations.

- **Responsible Parties:**
    - Determining who is responsible for what data and ensuring the accuracy of the data input into the system.

Mitigative Measures:

- Establishing definitions of data points, referencing the Just in Time Arrival guide.
- Identifying ideal stakeholders to provide specific data points (e.g., agents for the ETA of vessels).
- Modifying interface capabilities based on the user's specific role in the port call process.

- **Resistance to change:**
    - New systems can meet resistance from stakeholders, affecting the effectiveness of the new system. The DigiPort project will bring significant changes to the current port call process particularly at Point Lisas Port, and can increase berth allocation efficiency at the Port of Galeota. Current systems utilised at both ports entail heavy use of telecommunication and email communication among stakeholders involved. The introduction of a new system without the support/ cooperation of stakeholders involved, can lead to project inefficiencies.

Mitigative Measures:

- Mapping of key stakeholders.
- Establishment of MoUs with key stakeholders.
- Include training and technology demonstration for relevant stakeholders

Rocks

Procurement

- **IT Infrastructure and Communication Protocols:**

- Concerns about what happens during failures and inaccessibility.
- Consideration of internet access and cybersecurity.

Mobilization

- **Alignment of ambitions of the stakeholders involved.**
  - Differing goals by varying stakeholders can impede the implementation of the project.
- **Customs Buy-in:**
  - Customs' role can hinder turnaround times. Lack of cooperation from Customs can hamper the project's success.

Implementation and Operationalization

- **Interoperability of existing and future systems.**
  - There is a port community system being developed for the containerized segment in the Port of Port of Spain and Point Lisas Port. The interoperability of this system with the proposed project can affect the long-term use of the PERSEUS system. Greater emphasis can be placed on ensuring these two systems compliment each other.
- **Data Analysis:**
  - Explore the possibility of engaging and utilizing the University of Trinidad and Tobago to lead data analysis (monitoring). Setting up a sustainable system for continuous monitoring and measurement of KPIs.

KPIs Identified:

- **Reduced waiting time at anchorage:** Decreases ship emissions and increases efficiency by optimizing process chains. The goal is shorter waiting times through improved planning and coordination.
- **Improved utilization of berths:** Pre-planning functionality aims to reduce total turnaround times and improve berth utilization, decreasing ship emissions and increasing operational efficiency.
- **Improved utilization of Tug Operations:** Pre-planning functionality aims to reduce transit/operational times of tugs, reducing the frequency of tug reallocations and improving tug utilization, leading to decreased emissions and increased efficiency.
- **Historical data analysis:** Using historical data to provide a comparative baseline for emissions and turnaround times. Regular comparisons of historical and new data will help in assessing improvements and refining processes.

These measures focus on enhancing the efficiency of port operations and reducing the environmental impact of maritime activities by minimizing waiting times, improving berth and tug utilization, and ensuring long-term sustainability.

Not achieving your destination.

- With multiple stakeholders involved, management of contributary efforts are important to achieving the aims identified in the proposal. In addition, there are other factors that may be beyond the scope of this proposal that can affect some of the KPIs identified for monitoring the success of the project (e.g. low loading rates due to machinery malfunctions and unfavourable weather can increase vessel turn around time).
- Would current contractual obligations and scheduling policies affect the actual success of the proposed technology? In the case of Point Lisas Port, current policies include prioritised berthing for container vessels. The scope of the project does not cover this trade segment allocation and scheduling.

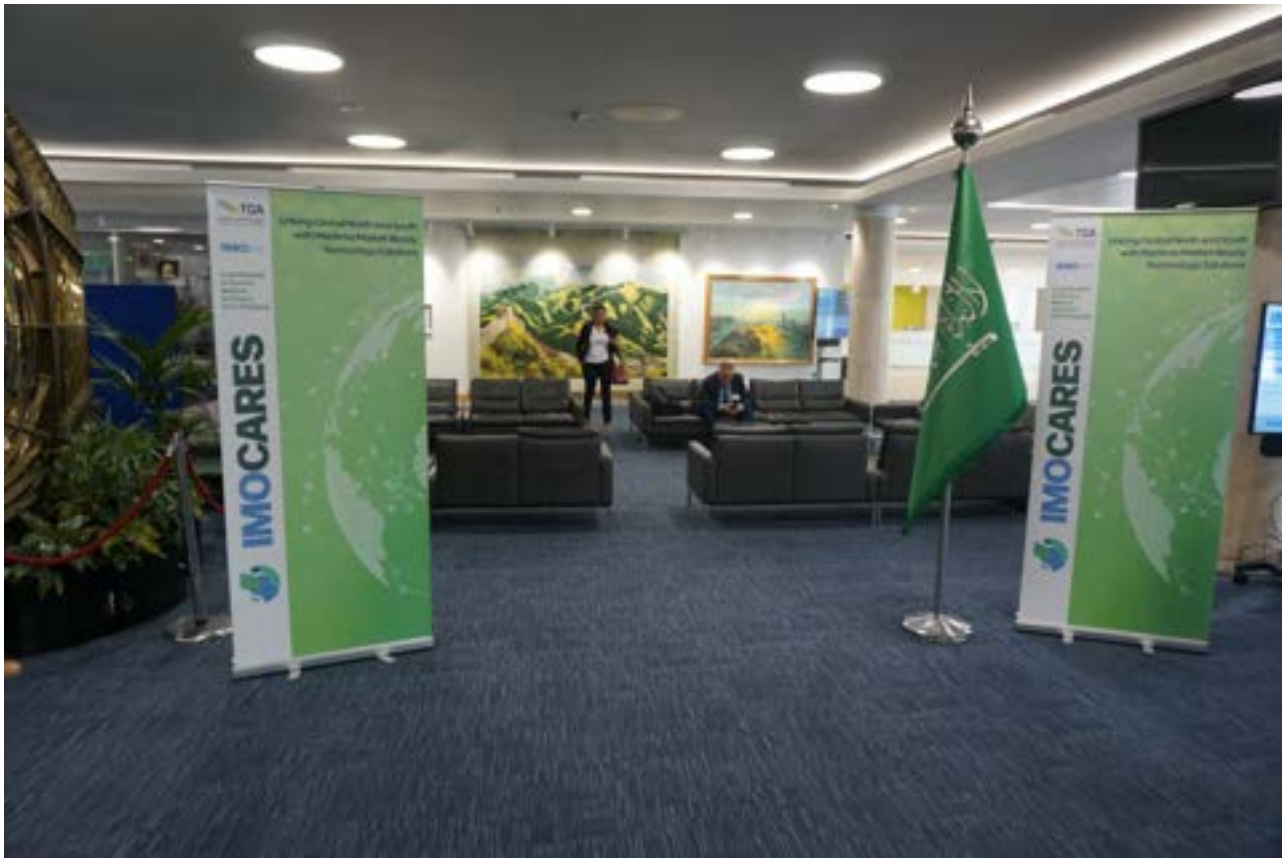
- **Resistance to share data:**
  - Concerns about access to commercially sensitive data among stakeholders.

Mitigative Measures:

- A flexible front-end interface that can be modified based on each user's roles and needs related to the port call process.
- Determination of the information each stakeholder needs to provide and what information is relevant to each stakeholder.

- **Sustainability of the project financially (post-project funding):**
  - Determining if the operational efficiency gains justify continued funding by the beneficiary organization.
  - Ensuring the system aligns with the sustainable development plans or strategies of National Energy.

8.3 Appendix III – Photos & Presentations




Emissions from Shipping
tions for ports and domestic vessels in developing countries


IMOCARES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COORDINATED ACTIONS FOR THE REDUCTION OF EMISSIONS FROM SHIPS

Coordinated Actions to Reduce Emissions from Shipping

Enabling the implementation of Maritime Technology Solutions for ports and domestic vessels in developing countries

INTERNATIONAL MARITIME ORGANIZATION

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Transport General Authority

CARES CONNECTS NETWORKING EVENT

CONNECTING DEVELOPING COUNTRIES WITH DONORS AND TECHNOLOGY PROVIDERS FOR MARITIME GHG REDUCTION

- London, September 2023
- Attendees: donors, tech providers, and country reps from Africa & the Caribbean.
- **Outcomes**: Enabled collaboration and knowledge sharing, laying the groundwork for future maritime decarbonization projects

THE MARITIME TECHNOLOGY GLOBAL CHALLENGE

Technology providers submit decarbonization solutions for African and Caribbean ports & domestic shipping

Timeline:

- 4 beneficiary countries: Namibia, Mauritius, St Kitts and Nevis, Trinidad and Tobago
- 21 technology solutions submitted
- 3 winning submissions announced in April 2024
  - wind turbines, shore-to-ship power supply systems, and port call data sharing
- 4 detailed technical proposals to be completed in July ‘24

IMO CARES REPORT:

DECARBONIZATION OF DOMESTIC SHIPPING

- Overview: Comprehensive analysis of optimal practices and technologies for greening domestic shipping in developing regions.
- Objective: To accelerate the transition to energy-efficient practices in domestic shipping within developing countries.
- Key Contributions: Offering practical guidance and strategies to enhance sustainable initiatives in developing countries, fostering knowledge exchange and effective investment in GHG reduction solutions.
- Release Date: Scheduled for July 2024.

IMOCARES
COORDINATED ACTIONS FOR THE REDUCTION OF EMISSIONS FROM SHIPS

IMO CARES: TECHNOLOGY AND DECARBONIZATION EVENT

Updates & discussion on the move to decarbonise ports and domestic shipping in developing regions

Live from IMO HQ in London

JOIN US FOR THE IMO CARES PROJECT EVENT!

TUESDAY, JUNE 25TH, 2024
13:45 – 16:45 (BST)

REGISTER FOR THE ONLINE EVENT VIA THE FOLLOWING QR CODE:

Event Highlights:

Discover the impact and outcomes of the IMO CARES Project, building technology focused partnerships to enhance energy efficiency in developing countries' domestic shipping sectors.

Speaker Highlights:

Tune in to discussions with industry experts, including winners of the IMO CARES Maritime Technology Global Challenge, panellists from beneficiary countries, and insights from the CARES Report on the decarbonization of domestic shipping.

TGA الهيئة العامة للنقل Transport General Authority

IMO INTERNATIONAL MARITIME ORGANIZATION

The IMO CARES project is funded by the Transport General Authority of the Kingdom of Saudi Arabia and implemented by the International Maritime Organization

imo_cares@imo.org

Thank you!!

IMOCARES

COORDINATED ACTIONS FOR THE REDUCTION OF EMISSIONS FROM SHIPS

Coordinated Actions to Reduce Emissions from Shipping

Enabling the implementation of Maritime Technology Solutions for ports and domestic vessels in developing countries

IMO INTERNATIONAL MARITIME ORGANIZATION

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Transport General Authority

Key focus on:

- TECHNOLOGY & PILOT IDENTIFICATION
- DOMESTIC VESSELS AND PORTS
- ASSISTING DEVELOPING COUNTRIES , ESPECIALLY SIDS AND LDCs

KEY ACTIVITIES

GLOBAL CHALLENGE

NETWORKING EVENTS

REPORT ON DECARBONIZATION OF DOMESTIC SHIPPING

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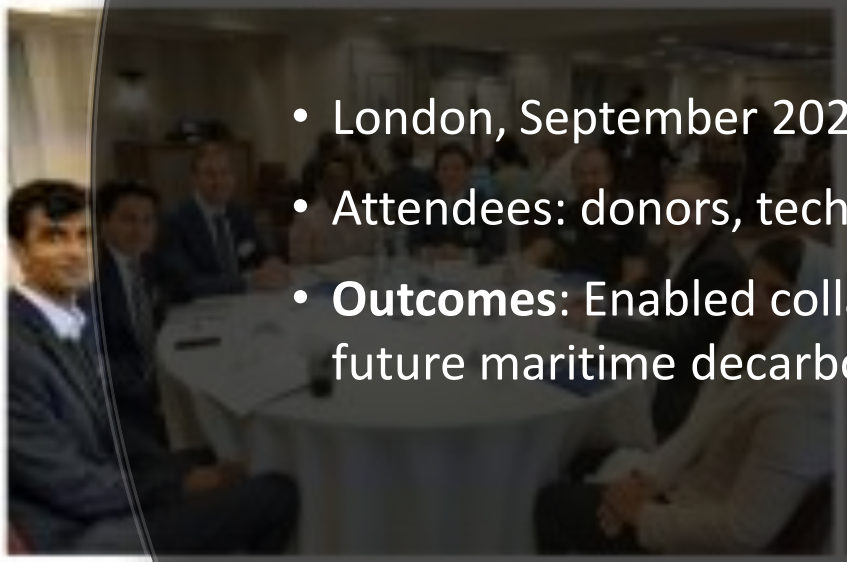

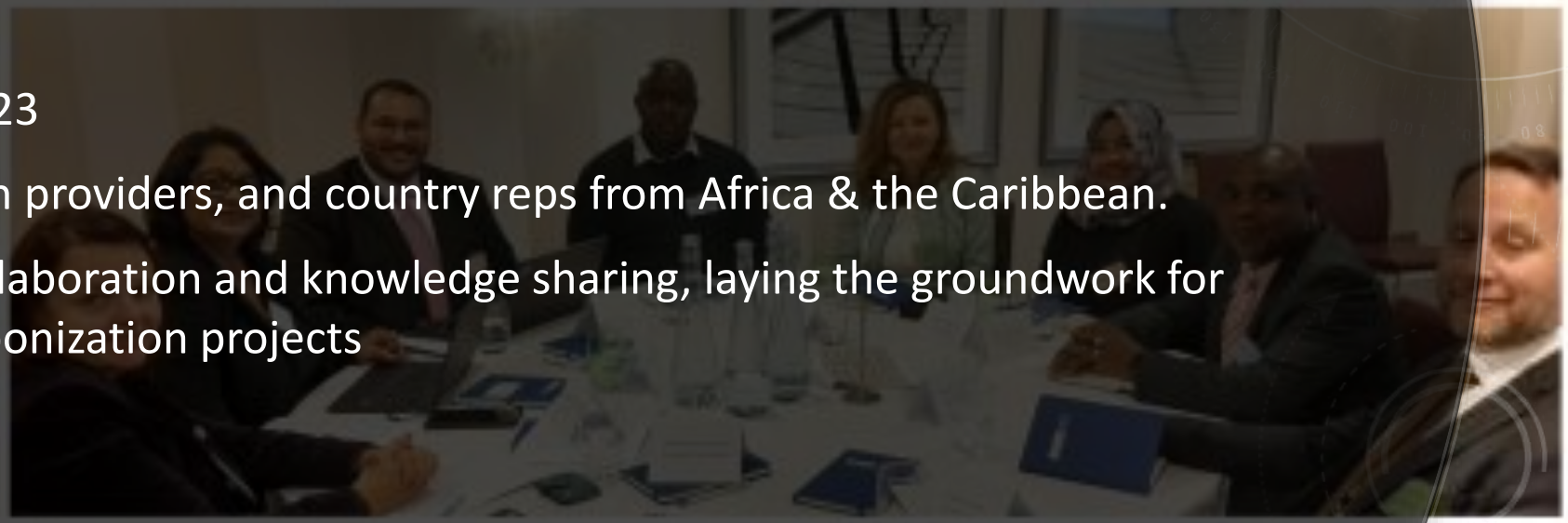

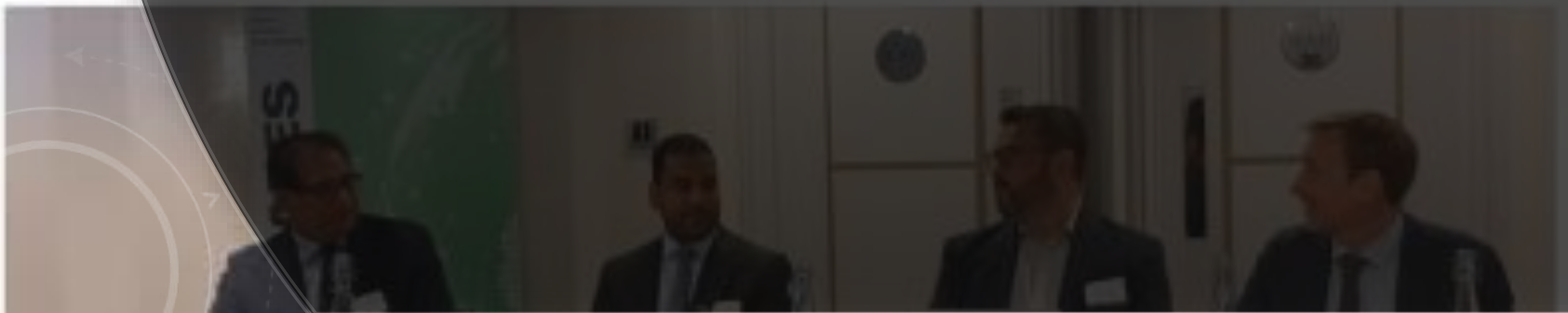

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- **Release Date:** Scheduled for July 2024.

IMOCARES
COORDINATED ACTIONS FOR THE REDUCTION OF EMISSIONS FROM SHIPS

ACHIEVEMENTS AND IMPACT

- Identified regional decarbonization needs
- Built partnerships and solutions
- Developed tech demonstration proposals
- Implementation planned for Africa and the Caribbean

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Day 1
1430 – 1700 hrs
Technical Proposal Coordination meeting

- Welcome and Introduction
- Review and discussion on Global Challenge – Technical Proposals
- Coffee
- Discussions to identify issues and Impact measurement methodology

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Transport General Authority

Group 1

- Lydia M Ngugi (MTCC Africa)
- Asiva Coopen (MPA)
- Parvatee SOHATEE-TULLOO (MPA)
- Bussunth Kumar Rughooputh (MPA)
- Isabela Tatu (CMS)
- Nicholas Abson (CMS)
- Faranisese Kinivuwai (MTCC Pacific)
- Anthony Talouli (SPREP)
- Javier Diaz (MTCC LA)

Group 2

- Ruth M Mwafondo (MTCC Africa)
- Musa Jeffer (MTCC Africa)
- Stefanus Gariseb (NAMPORT)
- Shapua Kalomo (DMA, Namibia)
- Petrina Kapembe (DMA, Namibia)
- Michael Bergmann (Bergmann marine)
- Ervin Vargas Wilson (MTCC LA)
- Zullah Mohammed (SPREP)

Group 3

- Michael Razack (MTCC Caribbean)
- Sarita Emmanuel (MTCC Caribbean)
- Clement A. C. Imbert (MTCC Caribbean)
- Vaughn Woodley (SCASPA)
- Shawn O'Garro (SCASPA)
- Wayne Edmeade (DMA, St. Kitts and Nevis)
- Solomon Powell (DMA, St. Kitts and Nevis)
- Tarik Ozkul (Sygtech)
- Víctor Luna Barahona (MTCC LA)

Group 4

- Suzette Balkaran (MTCC Caribbean)
- Nathanael Davis (MTCC Caribbean)
- Stephen Joseph (MTCC Caribbean)
- Michelle Scipio-Hosang (NEC)
- Hadyn Poon (NEC)
- Ronald Alfred (MSD, Trinidad and Tobago)
- Richmond Basant (MSD, Trinidad and Tobago)
- Falk Bethke (Bergmann marine)
- Jens Krueger (MTCC Pacific)

IMO CARES Technical Coordination Meeting
Review and discussion on Global Challenge – Technical Proposals

Destination (Goal)

- What are we working towards? (Primary and Secondary objective)
- Is it clearly defined?
- Is it measurable?

Wind

- What is pushing the proposed project forward?
- What actions can greatly contribute to the success of the proposed project?

Anchor

- What can hold us back during this project?
- Anything that could slow down the proposed project?

Rocks

- What risks do we face?
- What are some of the issues we need to pay close attention to?

Sun

- What is making us feel good about the proposed project?

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COORDINATED ACTIONS FOR THE REDUCTION OF EMISSIONS FROM SHIPS

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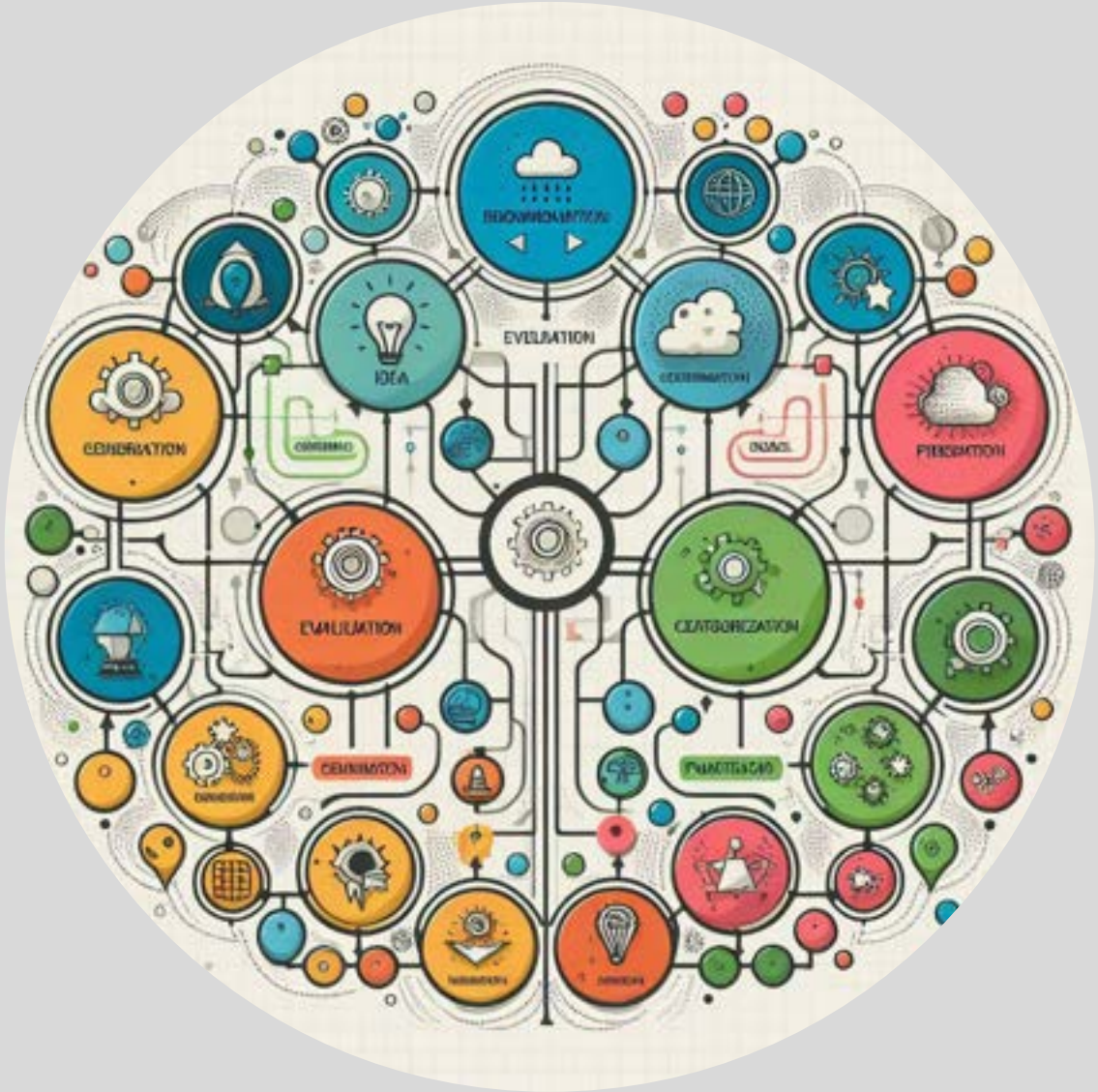

Brainstorming session
Duration - 60 minutes

Reflection on the Proposal retrospective

Highlighting and categorizing main challenges

- Procurement
- Mobilization
- Installation
- Implementation / Operationalization

Impact measurement - metrics for measuring success

Explore strategies for successful measuring and monitoring process

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Panel discussion - 1
Maritime Decarbonization Challenges for Domestic Shipping in developing states
25th June 2024

MTCC Africa - Ms. Lydia M Ngugi
MTCC Asia - Mr. Wei Ruan
MTCC Caribbean - Ms. Vivian R Parasram
MTCC Latin America - Mr. Ervin V Wilson
MTCC Pacific - Mr. Jens Kruger

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COORDINATED ACTIONS FOR THE REDUCTION OF EMISSIONS FROM SHIPS

Tue, 25th June

Panel discussion
Role of Technology in Maritime Decarbonization

- Mr. Niraj Rughooputh, Mauritius Ports Authority, Mauritius
- Mr. Stefanus Gariseb. Namport (Namibian Ports Authority), Namibia
- Ms. Michelle Scipio-Hosang National Energy (NEC), Trinidad and Tobago
- Mr. Shawn O'Garro, The St. Christopher Air & Sea Ports Authority (SCASPA), St Kitts and Nevis
- Moderator: Capt. Sukhjit Singh

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Day 3
1000 – 1200 hrs
Outcome Harvesting

- Outcome Statement
- Outcome Description – What occurred?
- Significance – Why is this outcome important?
- Contribution – How did project contribute to this outcome?

Reflection and Wrap-Up

INTRODUCTION
IMO CARES PROPOSAL
DIGIPORT

June 2024

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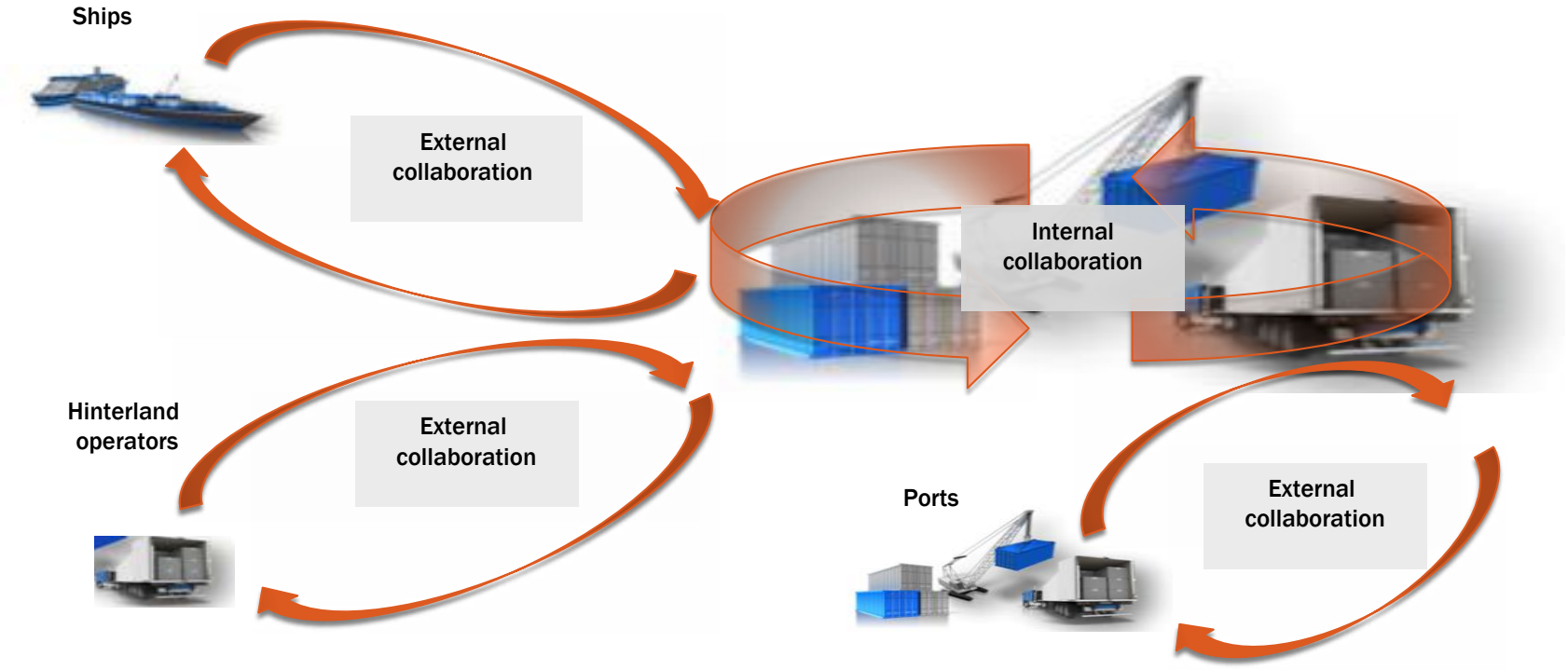
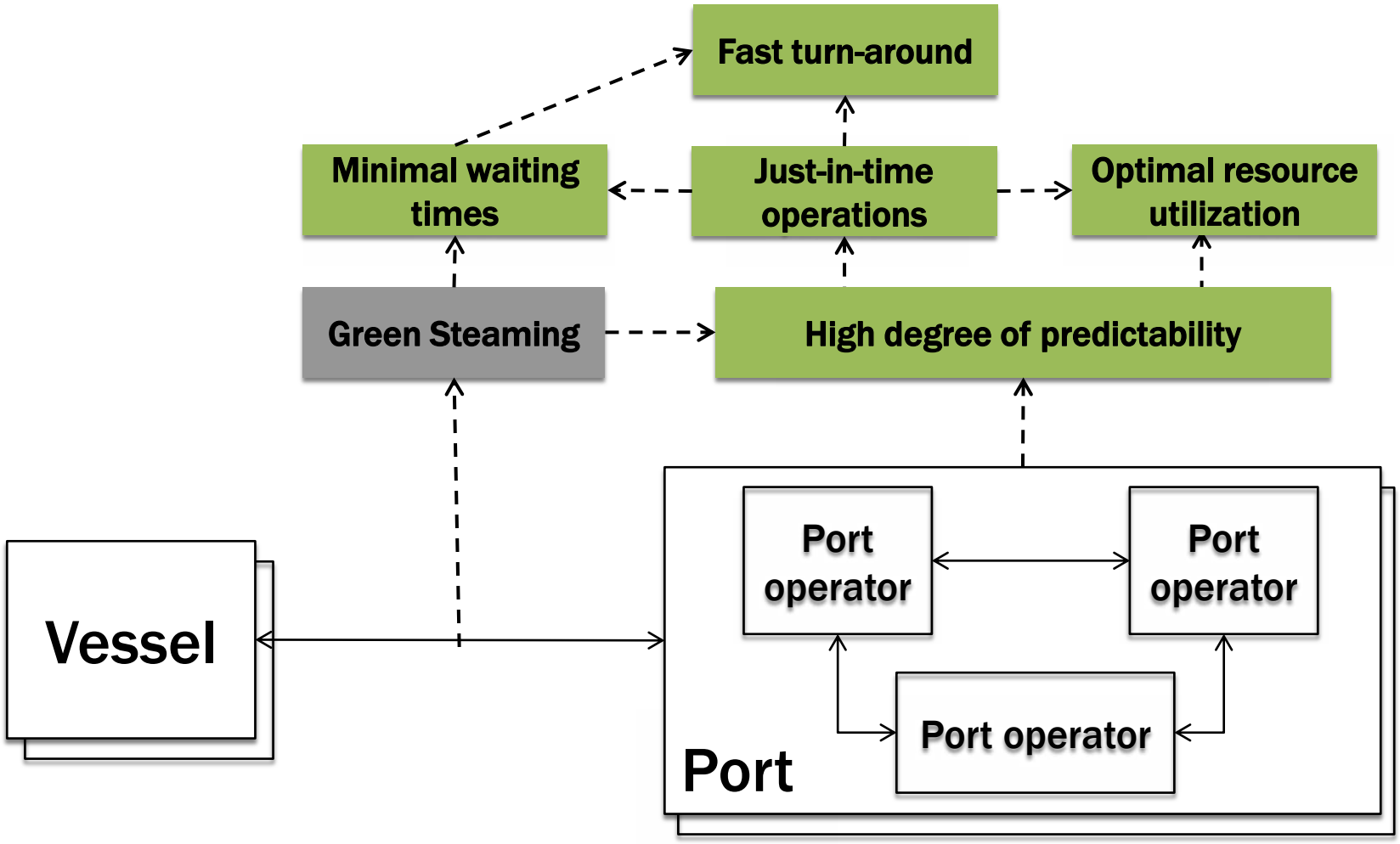
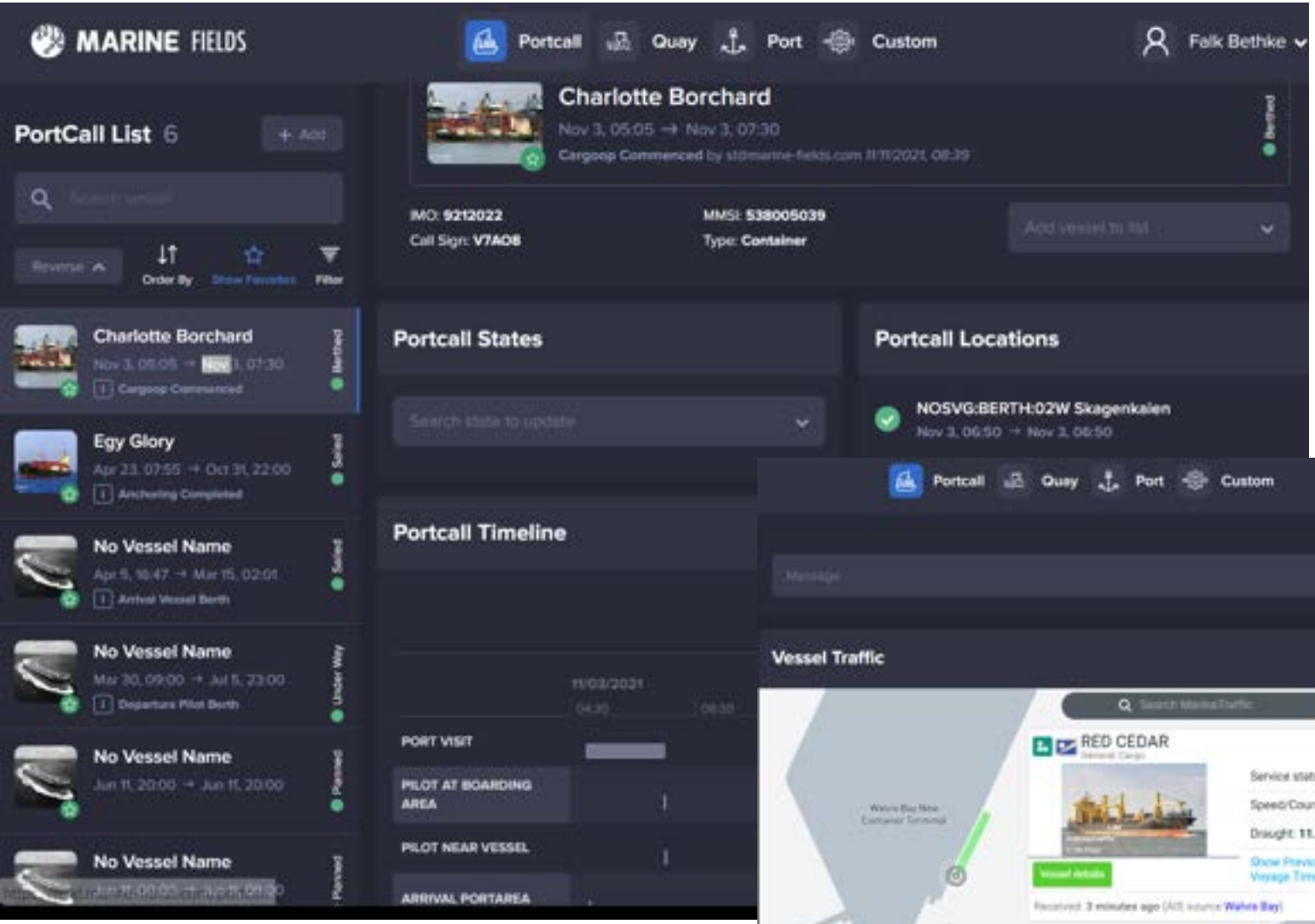
SMART SHIPPING: COLLABORATION IS PARAMOUNT



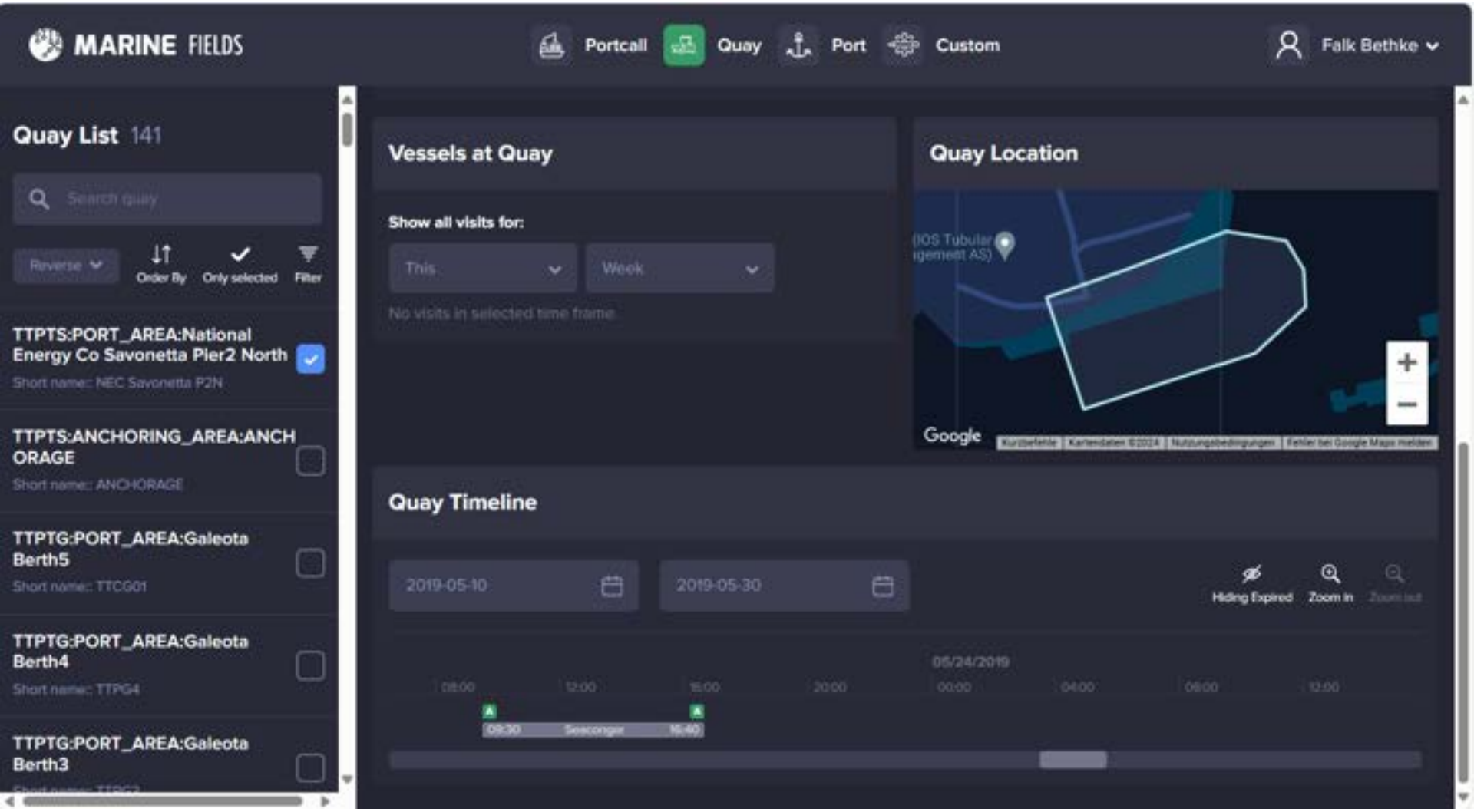
Source: STM Validation Project 2018

DESIRED PORTCDM EFFECTS





PERSEUS Dashboard Port Call including timeline and graphical indication of ships position



PERSEUS Menu for berth details inclusive berth utilization planed, targeted and actual

GHG REDUCTION

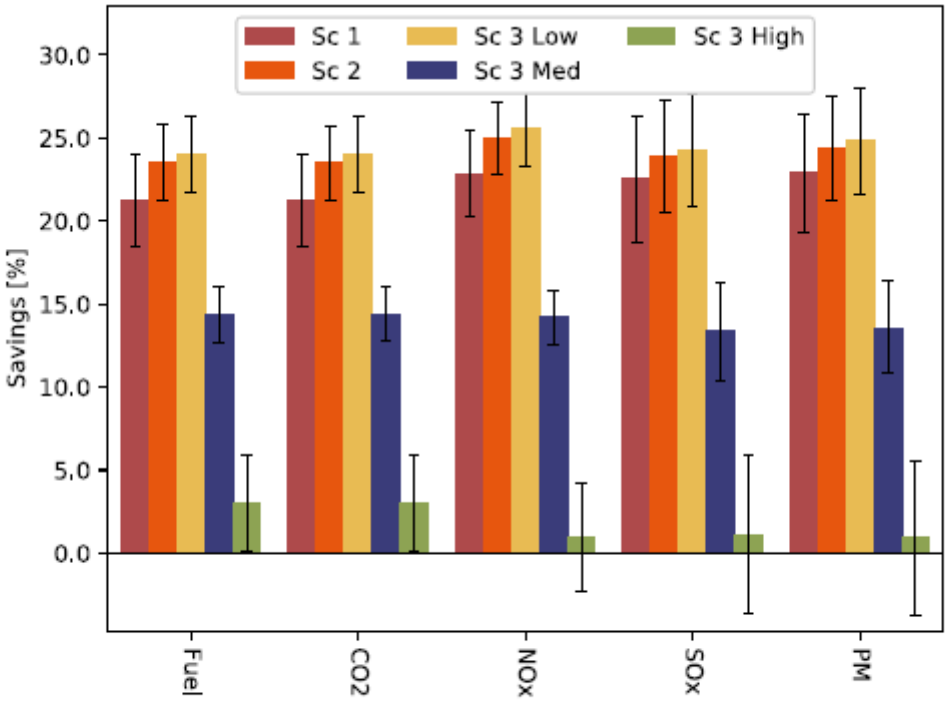


Figure 67. Overview of the savings in fuel consumption and emissions in each scenario for CS2

Source: STM Validation Project final report

GHG REDUCTION

Monetary Savings in ports	Pessimistic scenario	Moderate Scenario	Optimistic Scenario
Amount of Fuel saving in Ports	7,081,873 €	18,038,119 €	31,733,425 €
Amount of CO_2 saving in Ports	1,034,171 €	2,634,120 €	4,634,056 €
Amount of NO_X saving in Ports	3,699,138 €	9,422,013 €	16,575,605 €
Amount of SO_X saving in Ports	428,813 €	1,092,221 €	1,921,482 €
Amount of PM_X saving in Ports	113,224 €	288,391 €	507,349 €
Amount of GHG saving in Ports	5,275,346 €	13,436,745 €	23,638,492 €

Table 8. Monetary savings in ports estimation

Monetary Savings (€) in Navigation	Scenario 1	Scenario 2	Scenario 3 Low	Scenario 3 Med	Scenario 3 High
Amount of Fuel (MGO) saving in Navigation	669,921,549€	943,443,891€	1,212,719,733€	553,702,303€	-21,505,761€
Amount of CO_2 saving in Navigation	97,829,149€	137,771,823€	177,094,378€	80,857,565€	-3,140,502€
Amount of NO_X saving in Navigation	349,926,143€	492,797,526€	633,450,797€	289,220,300€	-11,233,297€
Amount of SO_X saving in Navigation	40,564,238€	57,126,215€	73,431,064€	33,527,078€	-1,302,189€
Amount of PM_X saving in Navigation	10,710,603€	15,083,636€	19,388,777€	8,852,507€	-343,831€
Amount of GHG saving in Navigation	499,030,134€	702,779,201€	903,365,015€	412,457,451€	-16,019,820€

Table 10. Monetary savings in Navigation estimation

Source: STM Validation Project final report

MESSURABLE KPI

Scope	NAMPORT tCO2e (tonnes of Carbon)					
	2018/2019	2019/2020	2020/2021	2021/2022	2022/23	2023/24
Scope 1	5,714	5,262	3,912	4,340	4,687	5,250
Scope 2	5,561	5,705	4,657	4,616	4,079	3,601
Scope 3	6,878	7,382	7,271	7,652	7,089	8,851
Scope 1 & 2	11,275	10,967	8,569	8,956	8,766	8,209
Total Carbon Emissions	18,154	18,349	15,840	16,608	15,855	17,060
Total TEUs	144,109	142,957	154,207	166,545	160,368	171,151
CO2 Emissions per TEU= Total Number of TEUs Handled/ Total CO2 Emissions	126 $kgCO_2e$/ TEU	128 $kgCO_2e$/ TEU	102 $kgCO_2e$/ TEU	99 $kgCO_2e$/ TEU	98 $kgCO_2e$/ TEU	99.7 $kgCO_2e$/ TEU

KPI for emission reduction

KPI for efficiency improvement

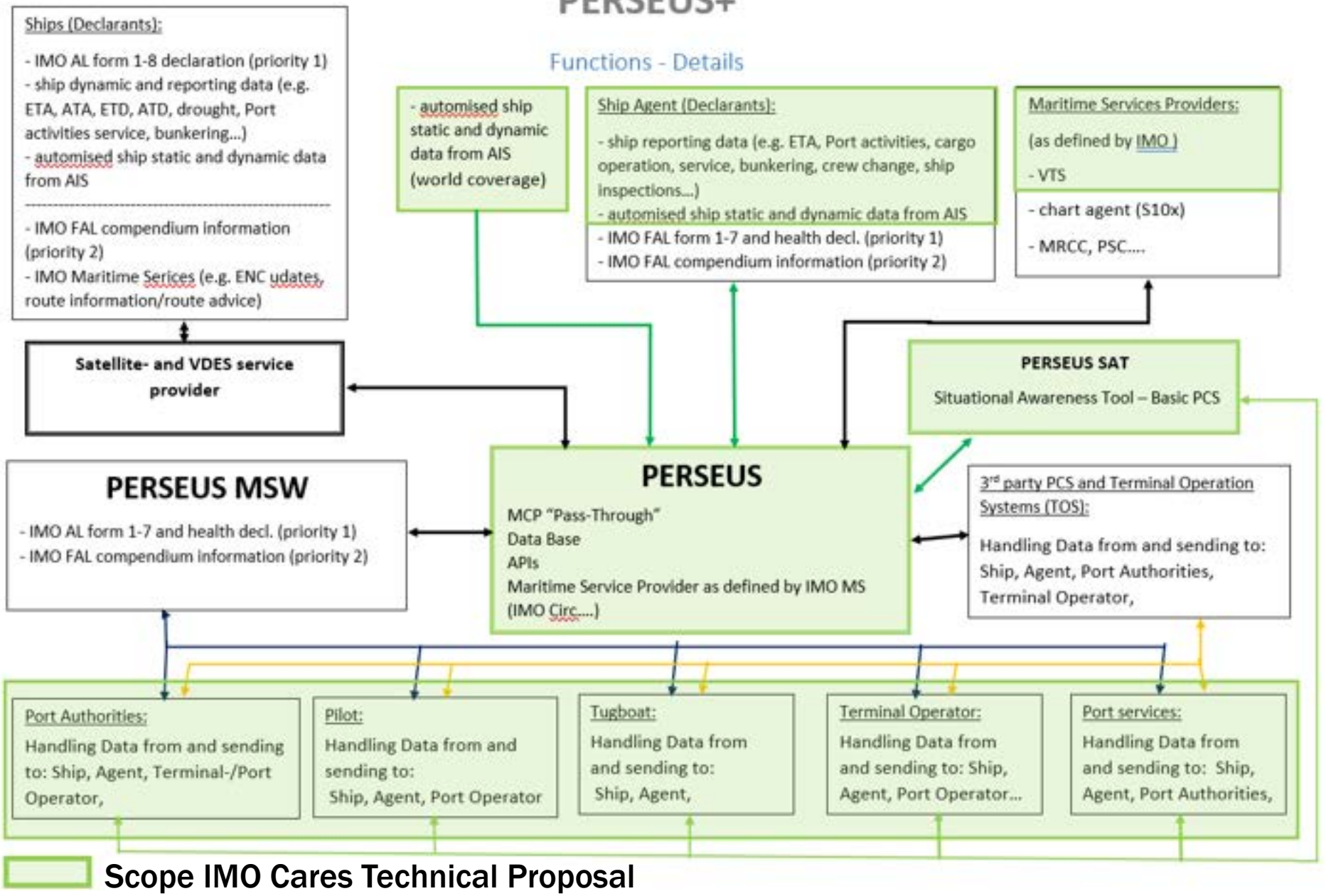
	Apr 21	Mai 21	Jun 21	Jul 21	Aug 21	Sep 21	Okt 21	Nov 21	Dez 21	Jan 22	Feb 22	Mrz 22
Monthly Progressive Average	2,95	2,64	2,47	2,35	2,63	2,76	2,87	2,94	2,95	2,95	2,98	2,99
Monthly Index Score	2,95	2,33	2,13	1,97	3,76	3,39	3,58	3,43	3,04	2,96	3,26	3,13

	Apr 22	Mai 22	Jun 22	Jul 22	Aug 22	Sep 22	Okt 22	Nov 22	Dez 22	Jan 23	Feb 23	Mrz 23
Monthly Progressive Average	3,30	3,28	3,15	3,19	3,20	3,25	3,28	3,29	3,29	3,32	3,35	3,36
Monthly Index Score	3,30	3,26	2,89	3,31	3,26	3,49	3,46	3,34	3,28	3,59	3,62	3,57

	Apr 23	Mai 23	Jun 23	Jul 23	Aug 23	Sep 23	Okt 23	Nov 23	Dez 23	Jan 24	Feb 24	Mrz 24
Monthly Progressive Average	3,88	3,62	3,40	3,35	3,39	3,37	3,40	3,42	3,44	3,41	3,46	3,49
Monthly Index Score	3,88	3,36	2,96	3,21	3,56	3,23	3,58	3,58	3,57	3,20	3,91	3,80

PERSEUS+

Functions - Details



Scope IMO Cares Technical Proposal

THANK YOU!

Michael Bergmann

michael.bergmann@bergmann-marine.com

CMS
Clean Marine Shipping

BioH2Energy: GHG Reduction Hydrogen Maritime Hub for Decarbonisation at the Port of Port Louis

Isabela Tatu

Current Analysis
Decarbonisation of shipping & GHG reduction

Technology
Circular bio-derived fuels conversion to hydrogen for fuel cells

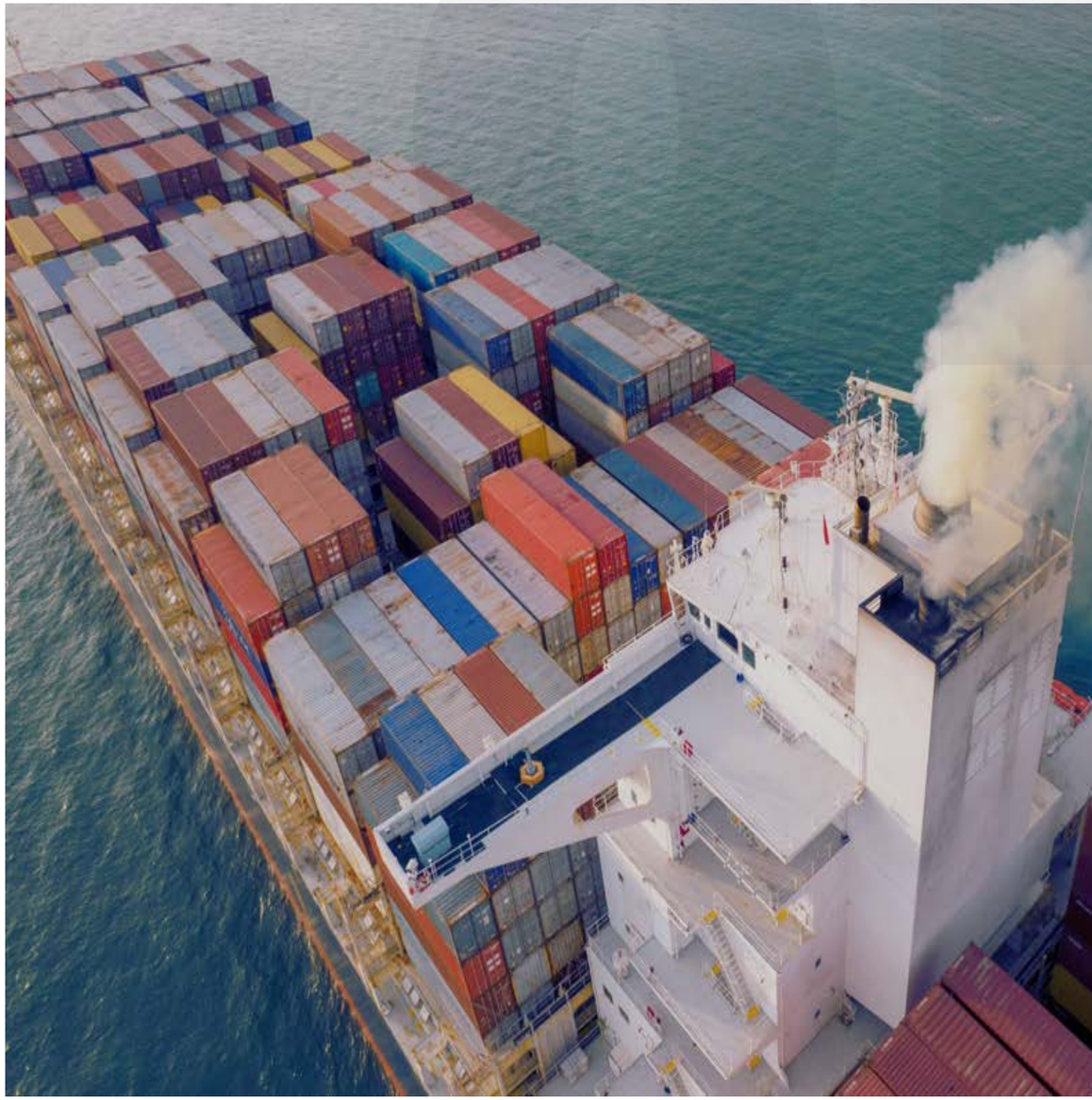
Implementation
Maritime Integration and adoption

Further Discussion

Introduction

Clean Marine Shipping (CMS) examines the potential of utilising circular bio-derived fuels for energy conversion employing hydrogen technologies (BioH2Energy) as a strategy for decarbonising maritime and port operations at the port of Port Louis, Mauritius.

Objective: To reduce GHG emissions and enhance sustainable development in Port Louis by integrating CMS technology to convert organic waste into valuable energy resources.

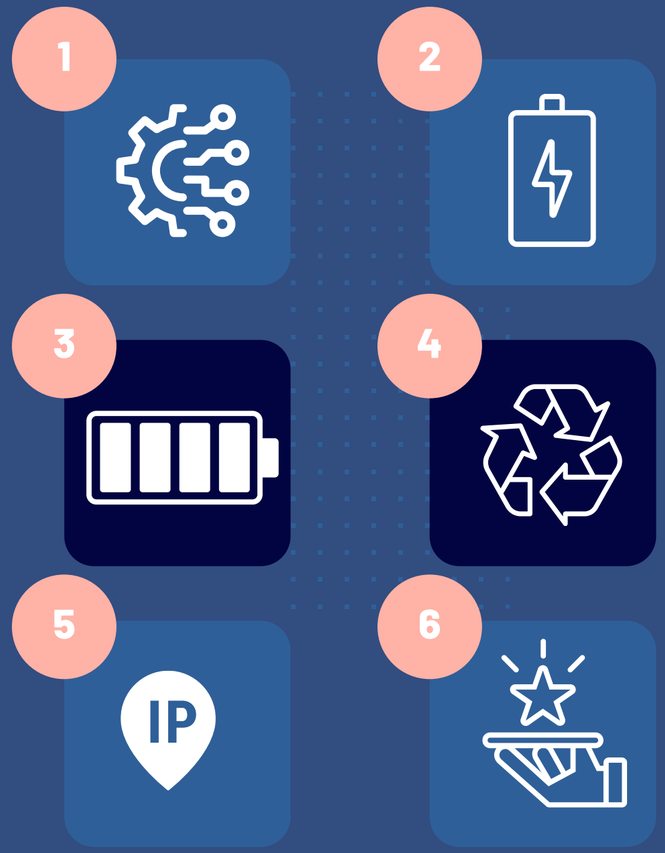


Clean Marine Shipping

Technology

Alkaline

IP



Hydrogen Fuel Cell

Bio-derived Fuels

Exclusivity

Isabela Tatu

25+ years in shipping and trading, metals, fuels and renewable energy. Led industry transitions and decarbonization efforts for 7+ years. Women in Hydrogen 50, TedX Impact Speaker

Nicholas Abson

British-born fuel cell expert, active in EU commission committees and academic research for 20+ years. Specializes in innovative fuel cell tech since the 1990s

Competitive & Unique Advantages

Modular Alkaline Fuel Cell

Large Electrode

Liquid Electrolyte

Exceptional Lifespan

Lower Precious Metal

Heat Generator

Robust & Adaptable Design

Water Source

Non-exotic Materials

Flexible Manufacturing

Technology Process

01

Waste-to-gas conversion

The initial process involves converting MSW, composed of organic materials such as food waste and processing waste, into a gaseous product through thermal decomposition.

02

Gas-to-hydrogen conversion

The syngas produced during gasification undergoes further processing to increase hydrogen yield through the water-gas shift reaction.

03

Hydrogen-to-electricity

Hydrogen is converted into electricity using electrochemical processes, specifically fuel cells, known for their efficiency and safety.

Technology Process

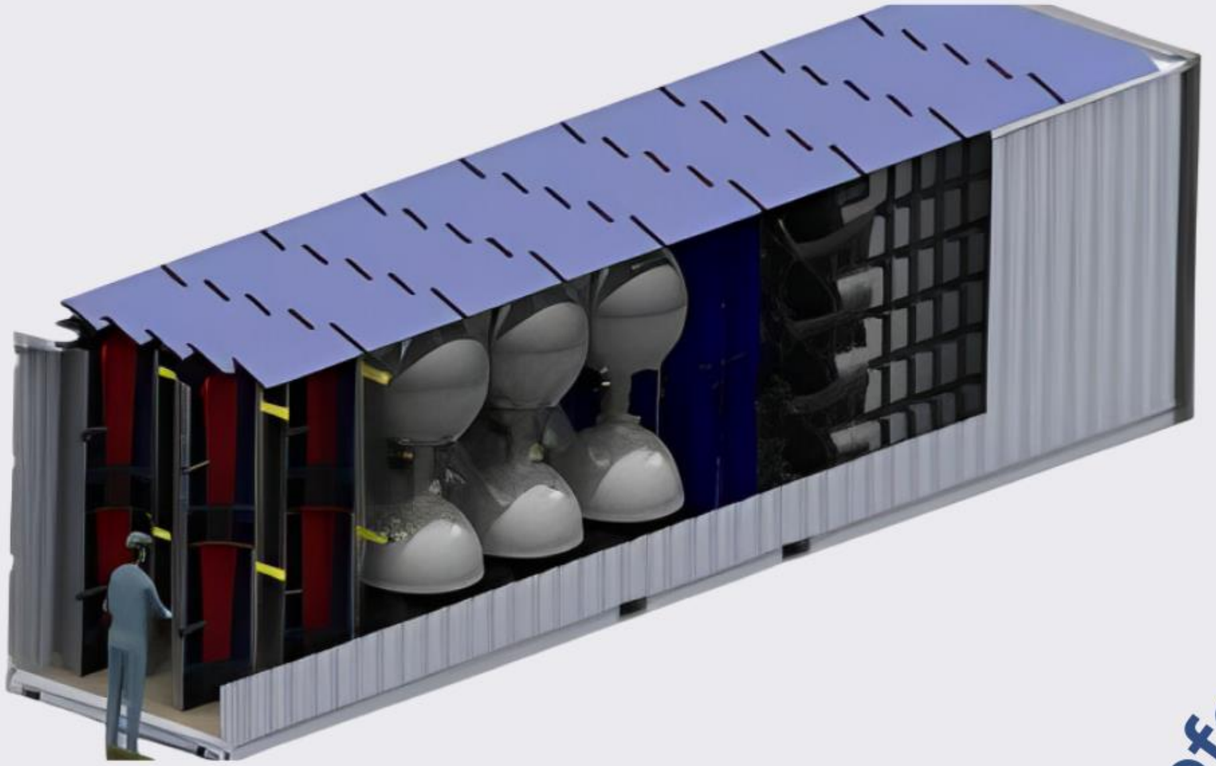
Pelletizer

Gasification

Reforming

Fuel cell

Anaerobic Digestion



Project Objective

The primary aim of this project is to utilise municipal solid waste (MSW) as a resource to eliminate CO2 and other greenhouse gases (GHGs) produced by the Port of Port Louis. By leveraging circular bio-derived fuels and hydrogen technologies the project seeks to decarbonise port operations, support maritime activities, and contribute to the broader environmental and economic goals of Mauritius.

Key Goals

Powering the Port

- Utilise advanced technologies to convert MSW into clean energy.
- Implement "cold ironing" to supply power to ships at berth.
- Ultimately, provide power to ships at sea.

Technological and Economic Development

- Develop and deploy advanced waste-to-energy technologies.
- Build local skills and manufacturing capabilities.
- Create economic benefits and support national sustainability objectives.

Environmental and Economic Impact

01 Emission Reduction

- GHG Reduction:
  - The 100-kWh system is expected to reduce overall greenhouse gases by eliminating approximately 1 ton of CO2 per day.
- Cost Efficiency:
  - The system will lower electricity costs and generate a revenue stream from bi-products, contributing to the economic sustainability of the port operations.

02 Future Technological Integration

- As the project progresses, other technologies such as anaerobic digestion and fermentation will be integrated to enhance waste processing and energy production capabilities.

Implementation Strategy

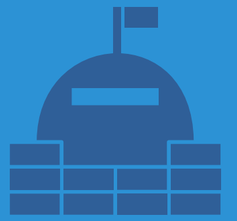
A 100kW BioH2Energy system will be installed at the port of Port Louis, with plans to expand to multiple megawatts systems

Phase 1: Initial System Establishment

Phase 2: Scaling and Expansion

Phase 3: Maritime Integration

Phase 4: Strategic Fuel Bunkering and Maintenance



Implementation Process


Implementation Initial Facility
	• Initial Production Capacity:
	  ◦ The first facility will have an initial production capacity of 100 kW per hour, translating to 2.4 MW per day.
	• Growth Timeline:
	  ◦ Expansion of the facility will commence in the second year, with growth continuing as required to meet increasing demand and project milestones.


Purpose and Objectives
	• Technology Trial:
	  ◦ The primary objective of the initial 100 kW facility is to trial the technology. This includes assessing its technical performance, economic sustainability and effectiveness in emission reduction.
	• Skill Development:
	  ◦ The facility will serve as a training ground, building the necessary skills among local personnel to operate and expand the technology.

First Steps in Implementation

1 System Overview

- Generation System Configuration:
  - The initial 100 kW generation system will be housed in a 40-foot shipping container, strategically located near the port's electrical distribution facility. This container will include:
    - Thermal gasifier
    - Gas conversion reactor
    - Gas separator
    - Aluminium hydrogen reactor
    - Fuel cell system
    - CO2 compressor
    - DC/AC electricity conversion inverter

2 Fuel Supply and Location

- Fuel Supply Chain:
  - Fuel for the generation system will be provided from a 20-foot container located at the waste collection site. This container will house a macerator and pelletiser to process the waste.
  - The main system components (gasifier, gas separator, fuel cell, and ancillary equipment) will be contained in the 40-foot container situated at the port.

3 Construction and Skill Transfer

- Construction Timeline:
  - The system will be constructed over an 18-month period.
- Skill Development:
  - During the construction phase, skills will be transferred to system operators and next-stage constructors to ensure local expertise in managing and expanding the technology.

4 Operational Readiness

- System Completion:
  - The system will be fully integrated, covering all processes from fuel production to energy output.
- Testing Phase:
  - A 12-month period will be dedicated to testing and skill development. During this time, additional systems will be planned for deployment, based on the initial system's performance and outcomes.

Deliverables for 100 kW Pilot Project

Electricity

- Annual Production: 876 MWh
- Total Lifetime: 10 years.

Water

- Annual Production: 12,264 m^3.

Bio Char

- Annual Production: 292 tons.

CO2 Reduction

- Annual Reduction: 72 tons through reformation of MSW compared to incineration.

Landfill Displacement

- Annual Displacement: 730 tons of MSW diverted from landfill.

Refrigerant Dry Ice

- Annual Production: 1,634 kg.

Expected outcomes with

CMS' TECHNOLOGY

Cost Reduction: Operational cost reductions through fuel savings and waste management efficiencies

Environmental Benefits: The system reduces emissions and decrease the volume of waste sent to landfills

Job Creation and Skill Development: The construction and operation of the BioH2Energy facilities will create jobs, reducing local unemployment rates and boosting the economy.

Revenue Generation: Projected to generate revenue from Electricity, water, bio char and dry ice

Thank You

For watching

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SYG
STRATEJİK & YENİLİKÇİ & GİRİŞİMLER

IMO CARES

ST KITTS BASSETERRE SEAPORT DECARBONISATION PROJECT

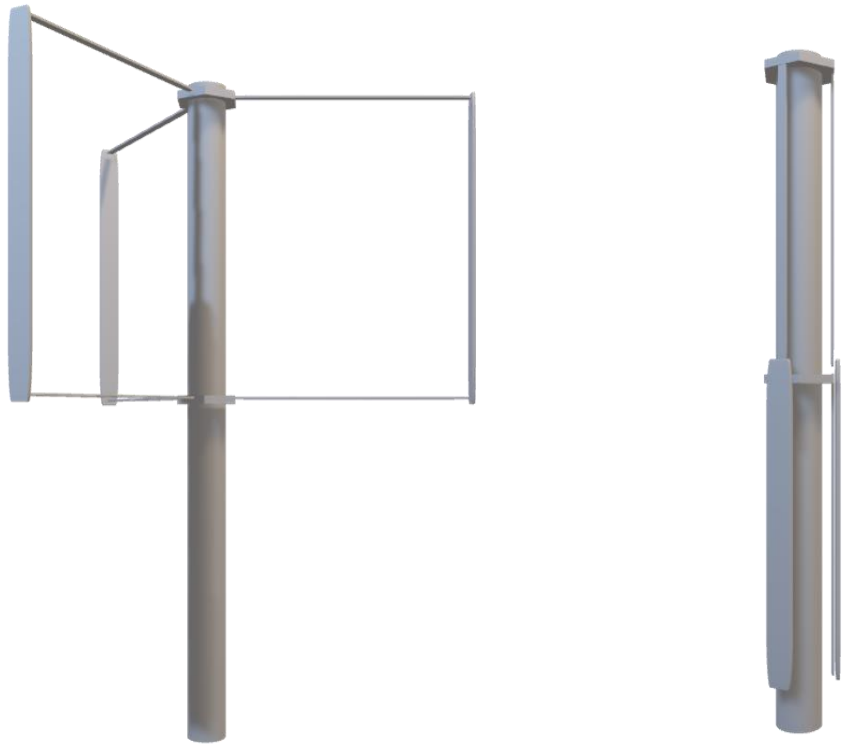
Prof. Dr. Tarik Ozkul

SYG TECH CEO

What is SYG TECH technology?

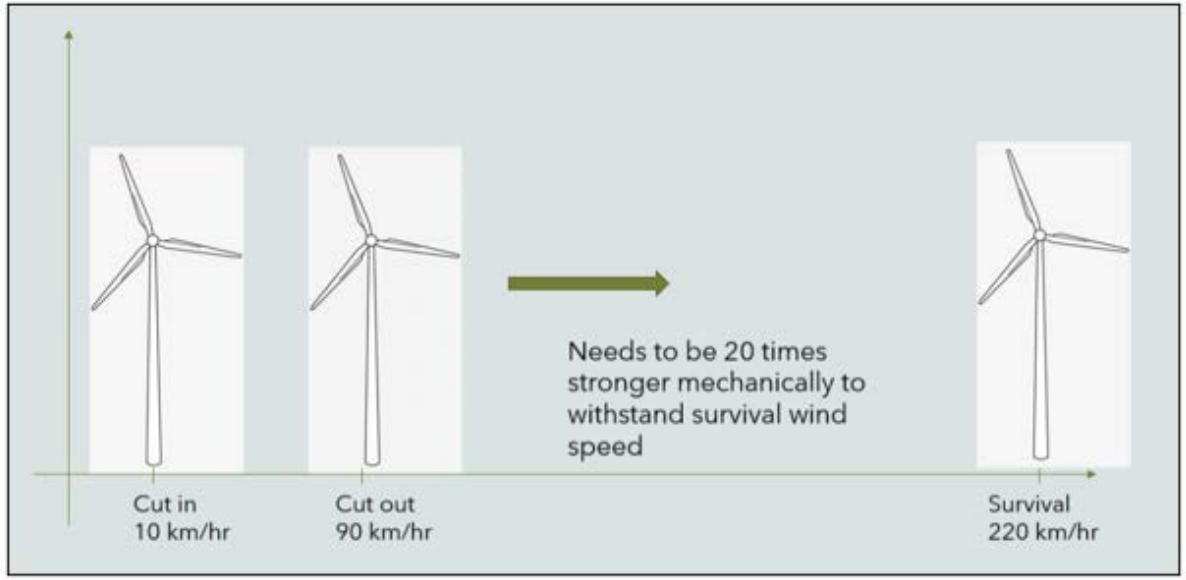
It is a VAWT type wind turbine with “storm protection” feature,

It closes the wings in such a way that the turbine turns into a “pole”.



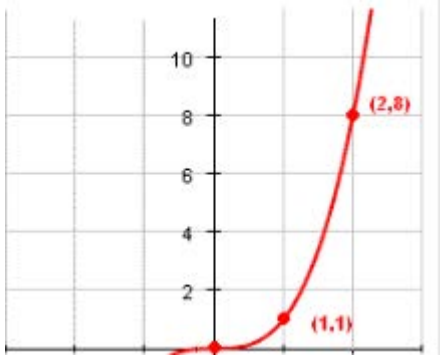
Wind turbines need storm protection!

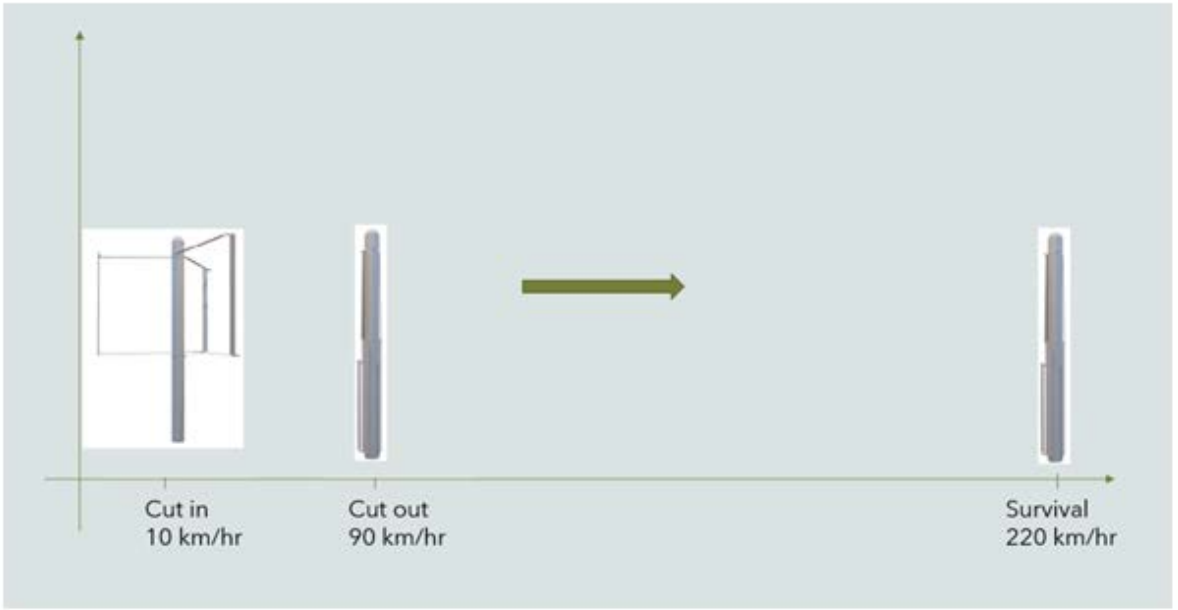
Why is it important?



Classical HAWT technology turbine wind profile can not be reduced even if the propellers are feathered for minimum drag. Due to this, the components and foundation has to be built strongly.

WIND POWER= K * V^3





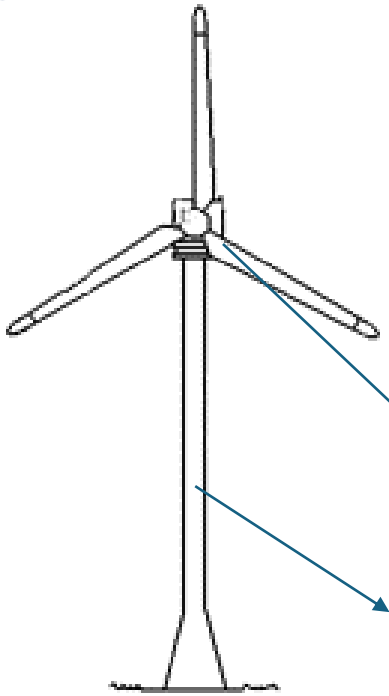
New vertical axis turbine with storm protection can fold the turbine like an umbrella during storms. This reduces the profile of the turbine to a "pole". This reduces the structural strength requirements, weight and the cost.

Translates into Reduced Weight

50 KW

10:1 weight

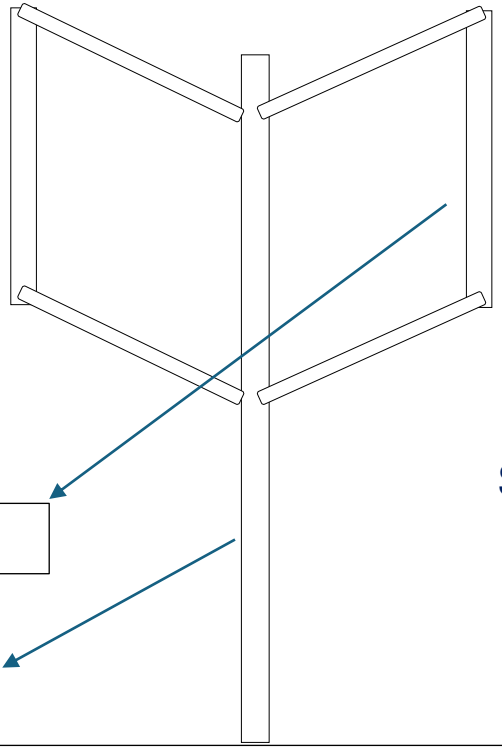
CLASSICAL



3.7 ton

7.8 ton

Total weight with alternator: **11.5 tons**

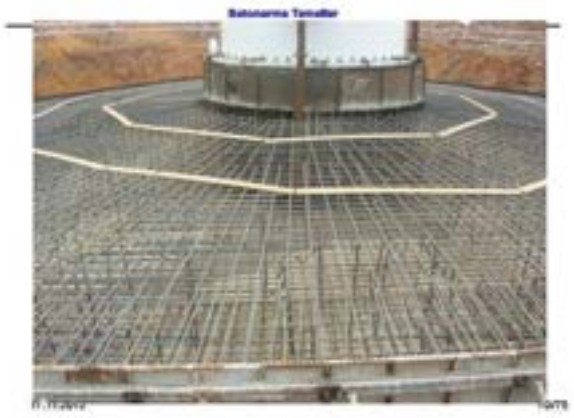


SYG TECH

0.5 ton

0.9 ton

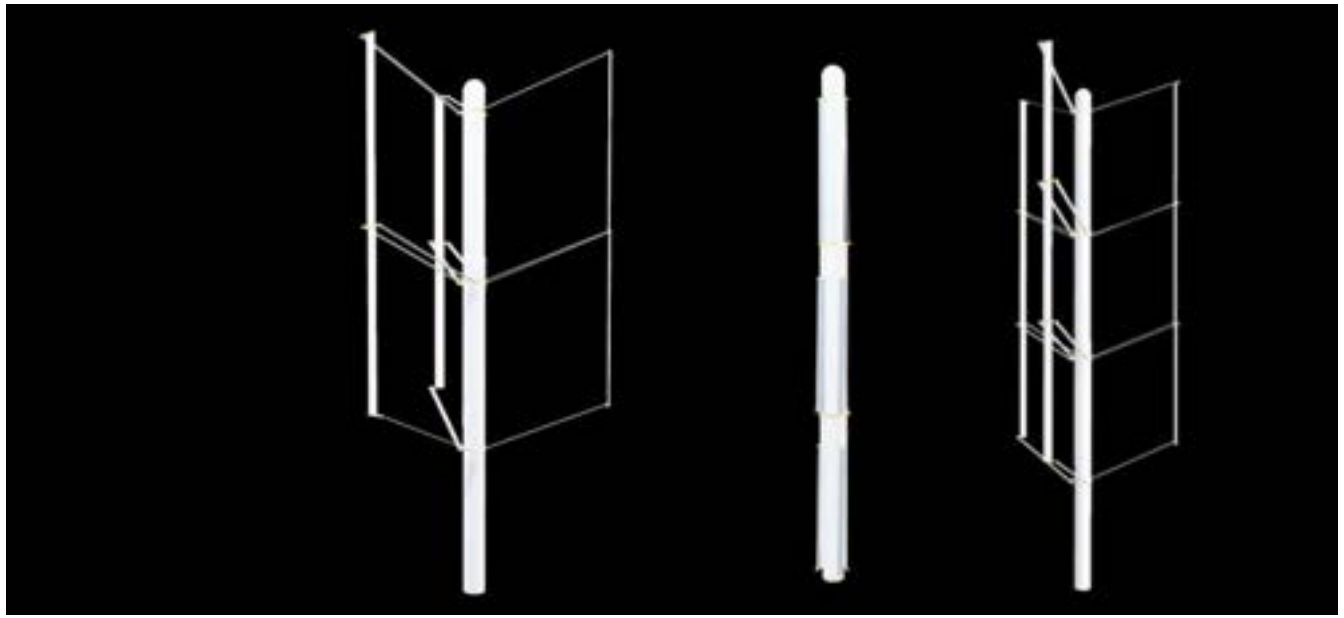
Total weight with alternator : **1.6 tons**



FLAT FOOTED FOUNDATION

SCREW PILE FOUNDATION

What else?



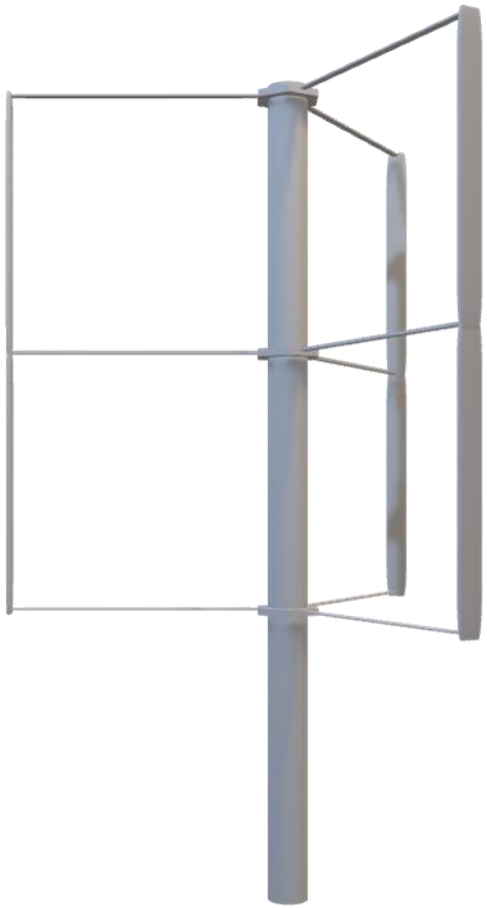
- MODULAR
- SCALABLE
- BIRD FRIENDLY
- QUIET

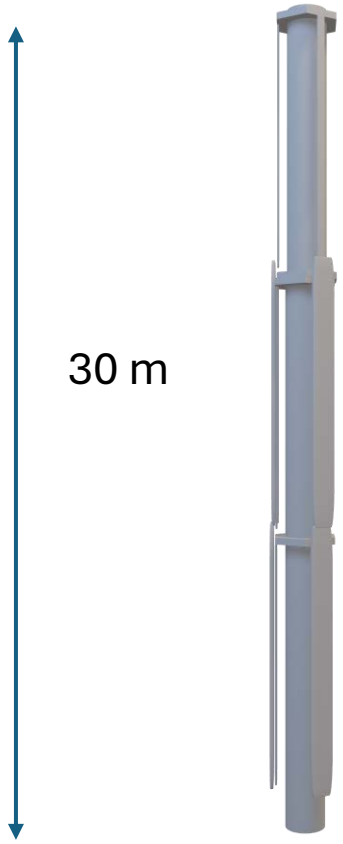
- Easy to transport
- Easy to install
- Neighborhood friendly

How do we use it in St. Kitts Basseterre Harbor project?

- Decarbonizing electrical power use of port facilities,
- Install SYG TECH Wind turbine + Storage near the SACASPA Sea Port HQ

The model and size





14 m

Folded mode

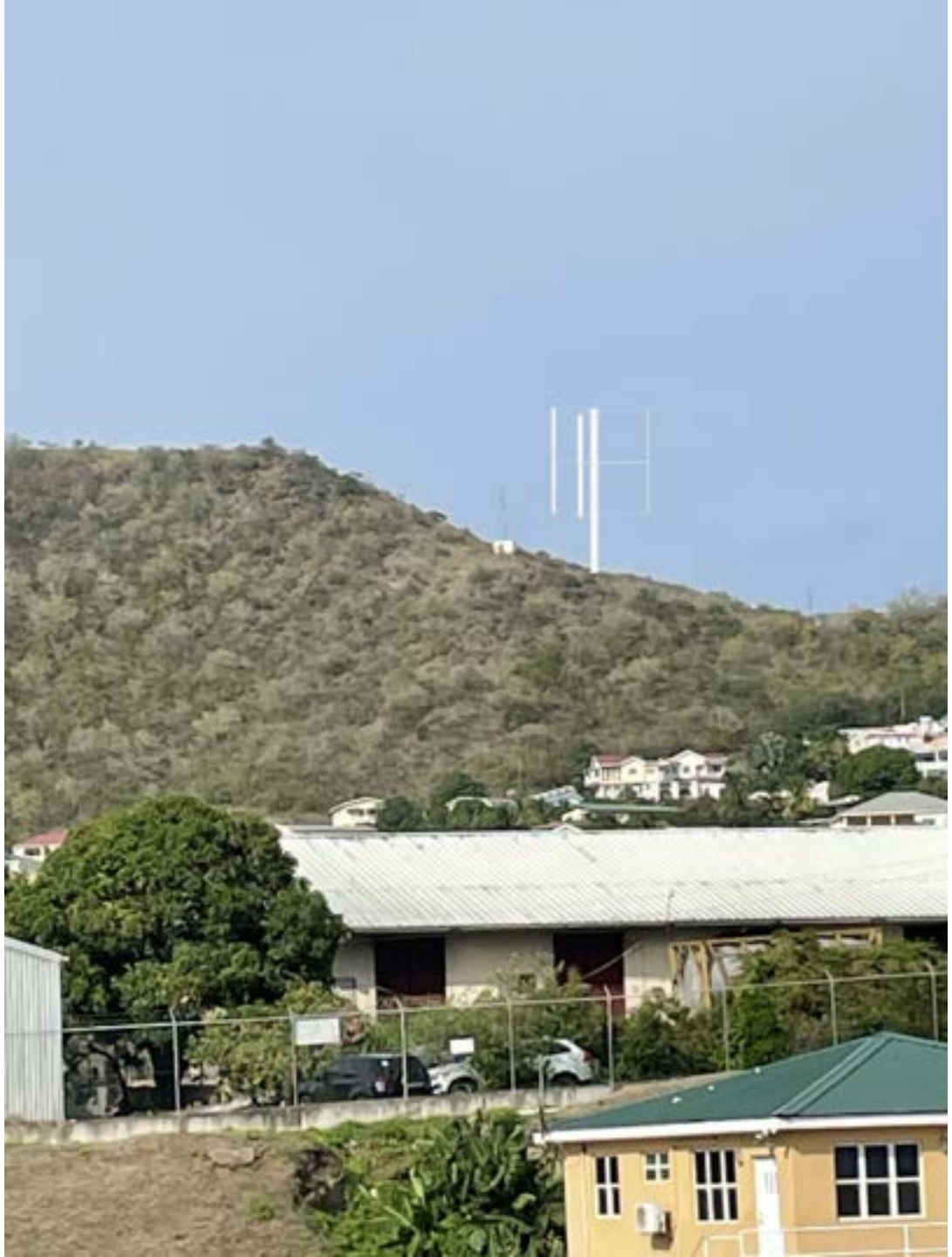
Tilt-down mode

OPERATIONAL

FOLDED MODE

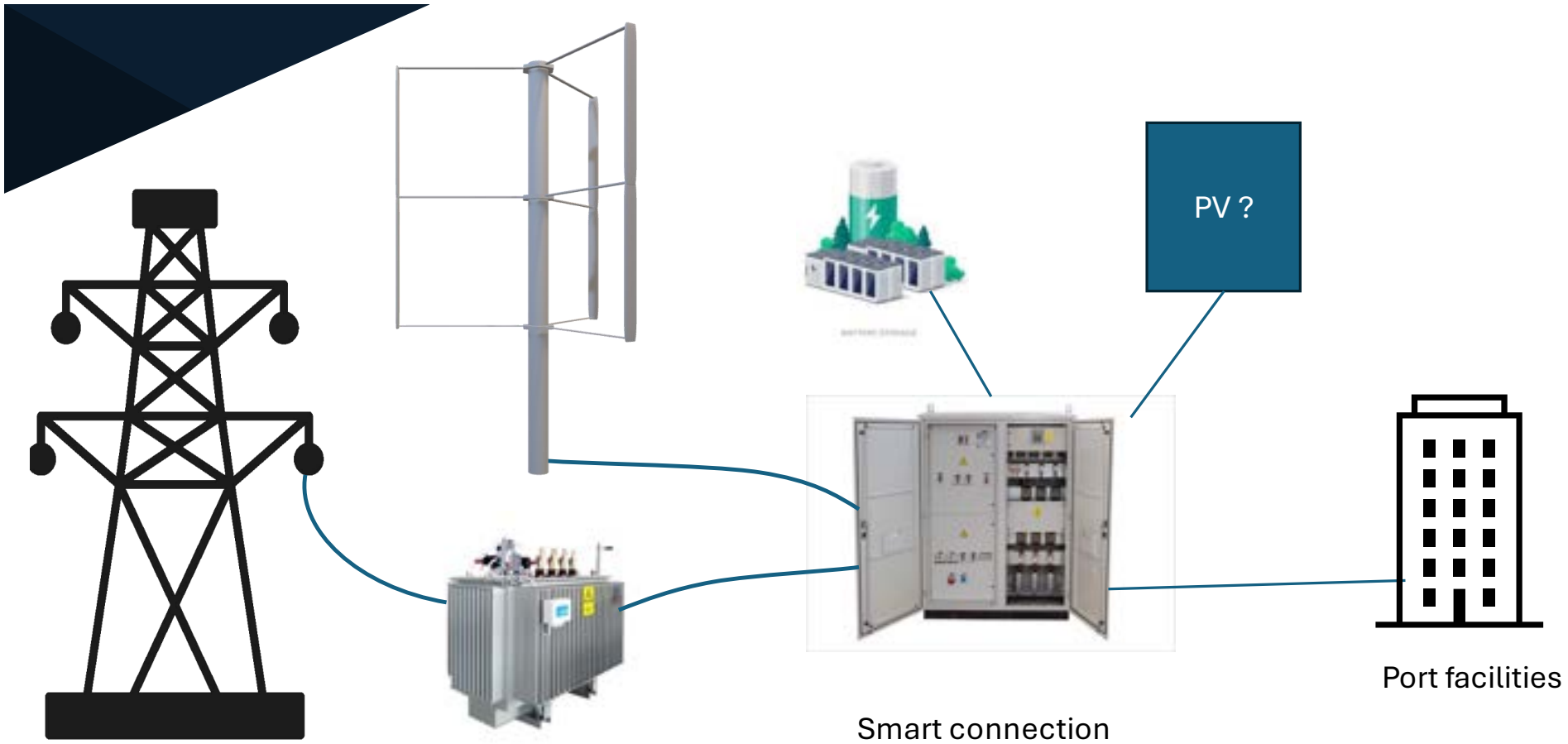
TILT DOWN MODE

3D VIEW IN THE PORT



ALTERNATIVE HILL SITE NEAR PORT

Connection and Monitoring



Decarbonization potential

Option A

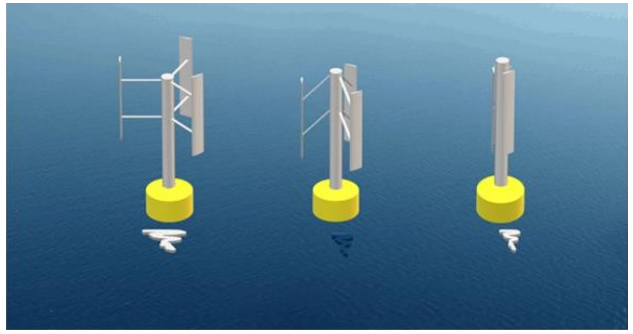
- Wind turbine + storage
- Meet 46% of the power needs of the SCASPA port
- Saves 141 tons of CO2e annually

Option B

- Wind turbine + PV + storage
- Meet 100% need
- Save 307 tons of CO2e
- CARBON NEUTRAL

SCALE-UP POTENTIAL - OFFSHORE

- MW-level Offshore Wind farms on a very innovative stable floating platform,



SCALE-UP POTENTIAL - DISTRICT HEATING/COOLING

- Direct wind-to-heat technology for climatization,
- 200 kW to district h/c for 2000 people
- Lower LCOE than Natural gas with a capacity factor 0.26

SCALE-UP POTENTIAL - ON-BOARD POWER GENERATION

- Modern sail,

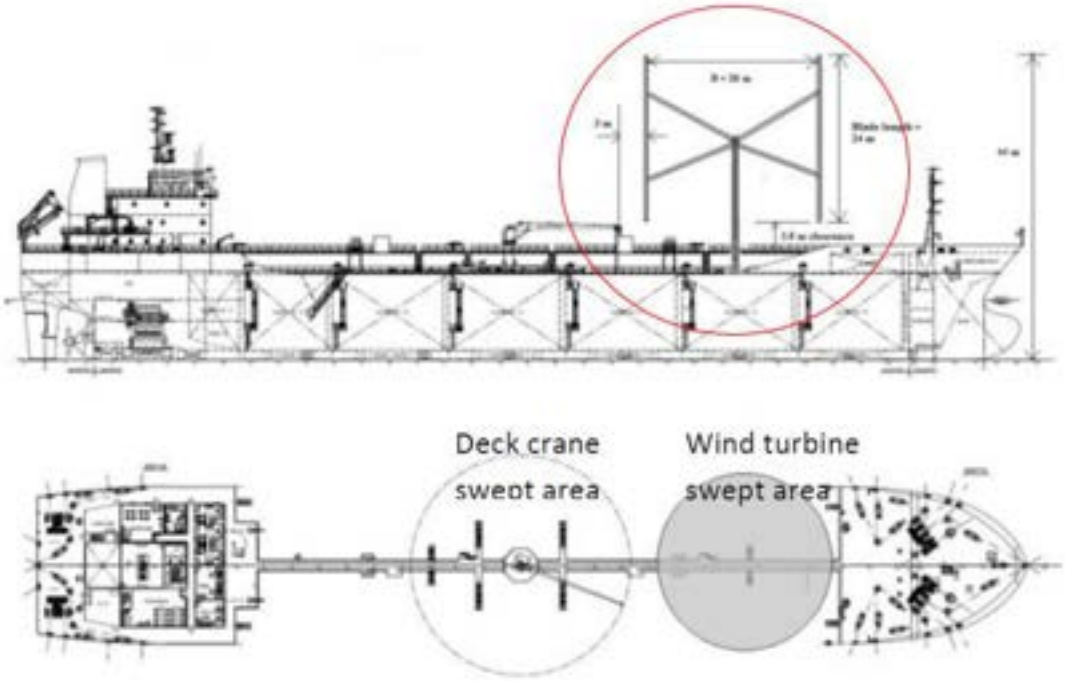


Figure 1: *LOA 144 meter tanker equipped with 200 KW VerticalWind wind turbine resulted in 38.69% savings of 38.69% in fuel oil and a reduction of CO2 emissions under normal seagoing conditions in a one-year study.*

We believe we can make a change

Thank You

tozkul@sygtech.org