CARBON MANAGEMENT FOR MARINAS AND BOAT HARBOURS

PROPOSED TECHNICAL WORKING GROUP

TERMS OF REFERENCE

1. Historical Background Definition of the problem

As outlined in the PIANC Declaration of Climate Change, it is recognised that the climate is changing, and the evidence is now unequivocal.

The Paris Agreement [UNFCCC, 2015] is an international agreement among parties in the United Nations Framework Convention on Climate Change (UNFCCC). The central aim of the Paris Agreement is to maintain the global temperature rise in the 21st century below 2 degrees Celsius above pre-industrial levels. Furthermore, the Paris Agreement demands increased transparency, requires all Parties to maintain and communicate 'nationally determined contributions' that they intend to achieve, and aims to erect financial and technology frameworks for reaching the climate goals it puts forth. The agreement addresses a range of areas necessary to combat climate change, including a long-term temperature goal, global peaking of GHG emissions, mitigation, and a 'global stocktake' every five years.

Gases being the principal source of all GHG emissions:

Gas name	Chemical formula	Lifetime (years)[23]	Global warming 20-yr[23]	
Carbon dioxide	CO_2	(A)	1	
Methane	CH_4	12	84	
Nitrous oxide	N_2O	121	264	
CFC-12	CCl_2F_2	100	10 800	Freon 12
HCFC-22	$CHClF_2$	12	5 280	Freon 22
Tetrafluoromethane	CF_4	50 000	4 880	
Hexafluoroethane	C_2F_6	10 000	8 210	
Sulfur hexafluoride	SF_6	3 200	17 500	
Nitrogen trifluoride	NF_3	500	12 800	

CO2-eq.

A carbon dioxide equivalent or CO2 equivalent, abbreviated as CO2-eq is a metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming

Effective carbon management involves steps to reduce and offset GHG emissions and sequester carbon. While the International Maritime Organization (IMO) under the UNFCCC reached agreement on a global set of initial short-, medium-, and long-term strategies to reduce international shipping GHG emissions [IMO, 2018], there has been much less focus on the infrastructure that supports waterborne transport.

To help fill this gap, PIANC recently developed important guidance on carbon management and decarbonisation through EnviCom 188: Carbon Management for Port and Navigation Infrastructure (2019). While the focus of the WG 188 document is on larger transport facilities such as ports and inland shipping infrastructure, taking similar proactive steps to effectively manage carbon is also required by marina and boat harbours.
The need for and drivers for decarbonisation has also been highlighted globally by the most recent meeting of parties for the UN Climate Convention (COP26) in November 2021. With more aggressive emission reduction targets (e.g. net zero) being set by participating nations in order to keep a 1.5 C° temperature increase in reach, all industries (including the maritime sector) will be encouraged to account for and reduce their carbon emissions.
Marina owners and operators need specific guidance to:

- how to account for different GHG emissions associated with marina infrastructure and operations across scope 1, 2 and 3
- understand options and undertake feasibility studies to implement best practices and plan for infrastructure
- improvement stake and demonstrate action in carbon management practices to users and stakeholders
- comply with emerging regulatory requirements and prepare for potential future requirements

In reviewing the WG 188 guidance, there is a gap that could be filled to provide more targeted and sector-specific guidance for marinas and boat harbours, that are focussed on more practical, on-ground and scalable carbon solutions.

More targeted guidance could focus on the following issues:

- carbon accounting practices for marinas and boat harbours (sources, guidance, standards) including a framework for typical scope 1 (direct fuel consumption), scope 2 (energy sources and consumption) and scope 3 (ancillary activities not under the direct control of the marina that produce carbon emissions such as supply chains and the operation of customer vessels) that are relevant to marina infrastructure and operations
- energy conservation and efficiency opportunities
- alternative energy generation and self-generation
- infrastructure and equipment to support alternative fuels for recreational vessels
- building and material specifications
- transport, transit, access and vehicle fleets
- blue carbon capture and building ecosystem services
- requirements for maintenance and operation of machinery and vessels (including vessel speeds)
- water accounting, efficiency and re-use
- compensation of carbon generation through approved projects by the Kyoto protocol.

Leading practice can also be documented and supported by representative worldwide examples and case studies.

2. Objectives

PIANC's objective under its Declaration of Climate Change is to seek to continue to support ports, harbours, marinas and inland waterways by facilitating knowledge sharing and preparing practical technical guidance to help them manage the climate change challenge through effective risk management.

This working group report will target specific guidance and requirements for marinas and boat harbours related to climate change mitigation (carbon management and decarbonisation).

3. Earlier reports to be reviewed

The existing PIANC report that is relevant to decarbonisation is WG 188. The WG188 guidance document was prepared to describe the important considerations when developing a carbon management framework and describes how carbon can be managed, influenced and reported for a navigation infrastructure project or a port with both land-side and water-side considerations.

This document covers aspects of the whole lifecycle of the navigation infrastructure for completeness: from design to construction to operations/maintenance and end-of-life considerations.

RecCom WG 217 in progress deals specifically with marina facilities adaptations to new propulsion systems for recreational boats. The proposed working group will include vessel propulsion issues in a way that complements, supports and provides additional framework to WG 217.

In addition to the review of these documents, the proposed guidance will also draw from collection of best practices, industry interviews, grey literature by other organisations and other sources.

In addition to the broader literature available on decarbonisation methods, accounting and approaches[1], this could include additional sources being developed for maritime industries, such as for example:

- the Port of San Diego Climate Action Plan - https://pantheonstorage.blob.core.windows.net/environment/Port-of-San-Diego-Climate-Action-Plan.pdf
- Various documents produced by local authorities for marina infrastructure such as the City of Hornsby in the Australian State of New South Wales - https://www.hornsby.nsw.gov.au/__data/assets/pdf_file/0019/125380/Environmental-Action-for-Marinas-Boatsheds-and-Slipways.pdf

[1] See World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD). 2015. The GHG Protocol: A Corporate Accounting and Reporting Standard, Revised Edition. https://ghgprotocol.org/corporate-standard

4. Scope of work

The proposed scope of works is to:

- Review existing PIANC literature and external sources of information related to decarbonisation and carbon management, with emphasis on applications for marinas and recreational navigation infrastructure
- Engage with RecCom members, sister associations and other recreational boating industry organisations to identify challenges/opportunities, emerging trends, and best practices of decarbonisation in the marina and recreational boating industry
- Collect case studies of marina industry practices that achieve carbon reduction
- Develop guidance for the assessment and implementation of carbon reduction measures that are relevant and specific to infrastructure of marinas, small craft harbours and nautical tourism
- Identify key drivers of change, financial evaluation considerations and feasibility
- Recommend marina design and planning innovative approaches for the evaluation and design of new and renovation projects, to achieve decarbonization

5. Intended product

The objective of the guidance is to provide information and recommendations on best practices to achieve decarbonization.

6. Working Group membership

Membership proposed to include:

- Marina design and engineering professionals
- Marina equipment suppliers, including power and electric supply equipment and services for marinas
- Marina and boat harbour owners and operators
- Manufacturers and designers of vessels
- Climate change mitigation specialists, including policy makers and regulators
- Sustainability and environmental specialist
- PTGCC representative, to ensure consistency with other related PIANC documents and initiatives

7. Target audience

The type of readers the proposed WG guidance is intended to help would be:

- Marina and boat harbour owners and operators
- Marina design and engineering professionals
- Climate change mitigation specialists, including policy makers and regulators

- Utility authorities and other entities that provide power, water and other services
- Environment and sustainability specialists involved in marina projects
- Legal, financial and economic professionals involved in marina projects
- Insurers, investors, lenders, and funding/investment organisations involved in marina projects

8. Relevance

8.1. Relevance to countries in transition

The proposed guidance can assist countries in transition to implement practical strategies for growth of marina and boat harbour facilities that reduce carbon emissions.

8.2. Climate Change

This proposed guidance will support the implementation of low-carbon solutions. It can be a key element to achieve effective carbon emissions mitigation, thus ensuring long-term sustainability of marina businesses and recreational boating and associated industries.

8.3. Working with Nature

The report shall be compatible with PIANC's Working with Nature philosophy and build upon WG 148. Recommendations should consider blue carbon capture and building ecosystem services.

8.4. UN Sustainable Development Goals

This proposed guidance is intended to directly contribute to the following SDG's:

- Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 13: Climate Action
- Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

8.5. Relevance to UN Small Island Development States (SIDS)

SIDS are especially vulnerable to climate risks, but are very small contributors to carbon emissions. They will benefit indirectly in the long term by the mitigation measures of other countries.

9. References

- EnviCom 188: Carbon Management for Port and Navigation Infrastructure (2019)
- RecCom WG 217 (unpublished)