

New Guidance on Carbon Management for Port and Navigation Infrastructure

by
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Scope

PIANC's Work Group (WG) 188 on Carbon Management for Port and Navigation Infrastructure is tasked by PIANC² to investigate the carbon footprint of activities related to development, maintenance and operation of navigation channels and port infrastructure including the management of dredged material. Life-cycle analysis (LCA) and other assessment methods supported this investigation and provided insights into opportunities for improved carbon management. The group is tasked to highlight exemplary case studies, identify good practices in the management of navigation infrastructure, identify opportunities to engage in carbon-sequestering activities, and summarize means to reduce the carbon footprint of the industry.

Introduction

There is international scientific consensus that anthropogenic emissions of greenhouse gases (GHGs)³ have and will continue to contribute to changes in the global climate. Although there is uncertainty concerning the magnitude, rate, and ultimate effects of this change, it is generally accepted that climate change will result in a number of substantial adverse environmental impacts. In 2013, the Intergovernmental Panel on Climate Change (IPCC) began releasing components of its Fifth Assessment Report,⁴ providing a comprehensive assessment of climate change science. The Fifth Assessment Report states that there is a scientific consensus that the global increases in GHGs since 1750 are mainly due to human activities such as fossil fuel use, land use change (e.g., deforestation), and agriculture. In addition, the report states that it is likely that these changes in GHG concentrations have contributed to global warming.

The Paris Agreement⁵, developed at COP21 in December 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 provides for 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.

Given this context, there is growing regulatory interest globally in managing the GHG emissions, or "carbon footprint", of industrial activities to respond to climate change. Effective carbon management involves steps to reduce and offset GHG emissions and sequester carbon. While the International Maritime Organization (IMO) under the UNFCCC has recently spent efforts to reach agreement on a global approach to reduce international shipping GHG emissions, there has been much less focus on the infrastructure that supports waterborne transport. PIANC and its partners in the Think Climate coalition are working to fill this gap.⁶

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² PIANC. 2015. Terms of Reference for Work Group 188. July. Accessed December 29, 2016. <http://www.pianc.org/downloads/envicom/tor%20188%20final.pdf>

³ For the purposes of this presentation, the terms "GHGs" and "carbon" emissions refer to those gases regulated under the Kyoto Protocol of the UNFCCC: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride.

⁴ IPCC Fifth Assessment Report. Climate Change 2014: Working Groups I, II, and III Reports. Accessed July 14, 2016. <http://www.ipcc.ch/report/ar5/syr/>

⁵ Text of the Paris Agreement, accessed December 29, 2016. http://unfccc.int/paris_agreement/items/9485.php

⁶ Navigating a Changing Climate. 2016. Action Plan of the PIANC Think Climate Coalition. November. Accessed December 29, 2016. http://navclimate.pianc.org/about/action-plan/download/20_343c041d3eaefbfe8021913973f54ee7

Objective

The objective of WG188 is to review and report on the technical literature related to the carbon footprint of navigation infrastructure and supporting activities, provide guidance on applying life-cycle analysis and related assessment tools and techniques, and investigate opportunities for reducing atmospheric GHGs through operational practices, Working with Nature, land use management, blue carbon projects, and related environmental management.

When considering developing a carbon management framework for ports and navigation infrastructure, taking proactive steps to effectively manage carbon will help an entity:

- *comply with emerging regulatory requirements,*
- *respond to general stakeholder and public pressure to reduce environmental burdens,*
- *take a leadership role in carbon management practices,*
- *address UN Sustainable Development Goals,*
- *drive innovation and investment while influencing future practice and regulation, and*
- *cut costs; through efforts to reduce energy consumption.*

In addition, there are unique opportunities to reduce and offset emissions from waterways navigation infrastructure development, including dredging and the beneficial use of dredged sediments, which need to be considered in any carbon management framework for this sector.

The WG188 guidance document is being 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 will cover aspects of the whole lifecycle of the navigation infrastructure for completeness (as shown in Figure 1): from design to construction to operations/maintenance and end-of-life considerations. Owners of the navigation infrastructure must decide whether to include the entire lifecycle of a navigation infrastructure project or to only manage specific aspects of the life-cycle. It is noted that decisions and recommendations made early in the project lifecycle can heavily influence carbon emissions during the later stages of the infrastructure lifecycle.

Case studies will also be presented in this document to help broaden the navigation community's understanding of the carbon footprint and sequestration potential of port and navigation infrastructure and activities. These case studies also present best practices used to address the carbon footprint of navigation channel development and maintenance projects which can differ based on location and context-specific factors; for example, some strategies may rely more on operational changes while others may seek built or natural infrastructure solutions.

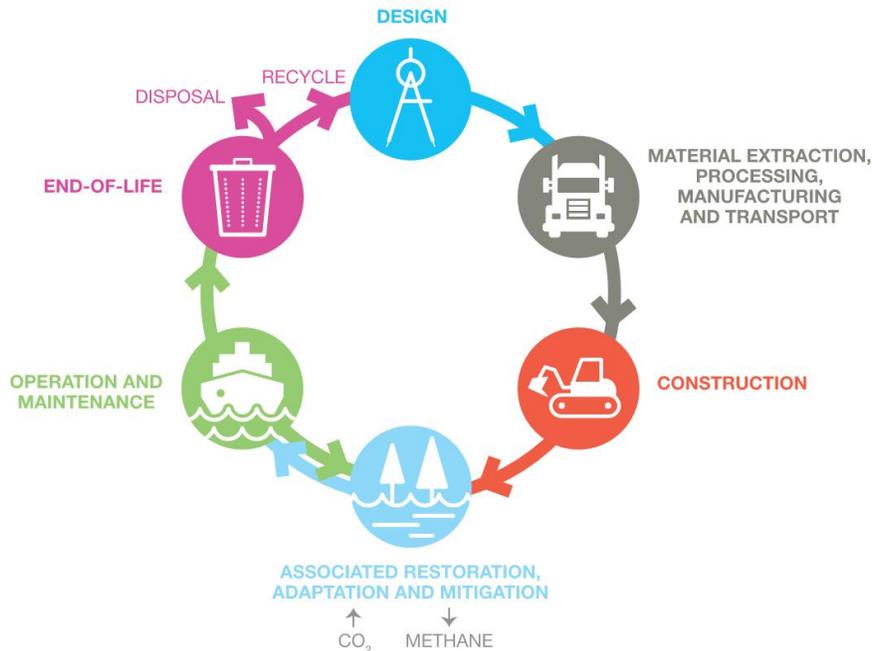


Figure 1: WG188 Carbon Management Life-cycle for Ports and Navigation Infrastructure and Projects

Content of Upcoming WG188 Report

The WG188 guidance document will present the information relevant when considering the development of a carbon management framework for navigation infrastructure including:

- *Section 1 - General Aspects* will provide an introduction and the background on the objectives of WG188 scope.
- *Section 2 – Carbon Management Framework* gives an overview of a carbon management framework for navigation infrastructure. It sets out existing methods used to implement a carbon management framework and discusses management considerations, decisions, and challenges in developing, and implementing, such a framework for ports and navigation infrastructure.
- *Section 3 - Existing Initiatives on Carbon Emission Quantification* discusses approaches for the quantification of carbon emissions from port and navigation infrastructure. The methodologies described allow for the calculation of emissions related to a proposed design, both in terms of construction and operation. This section comprises a summary discussion with signposts to other reference documents containing more details on emissions calculation.
- *Section 4 - Best Practices on Carbon Emission Reduction* discusses that different opportunities to control and reduce carbon exist throughout the lifecycle of port and navigation infrastructure for both construction and operation phases. Generally, the earlier on in the concept development, the greater the ability to select options that reduce carbon emissions from the siting, design, and implementation (construction and operation) of the project.
- *Section 5 - Financial Aspects Related to Carbon Reduction Measures* will focus on the cost impacts of the reduction program. Any carbon emission reduction program, either in construction or operation, will be financially limited. It needs, therefore, to be financially optimized to obtain maximum reduction at limited cost. This concept requires overall financial ranking of different technical options in a certain program.

Implemented frameworks at ports and navigational infrastructure are presented as case studies in an appendix to the report. The WG188 report is anticipated for release toward the end of 2018.