



Retrofitting towards climate neutrality

D5.6 Instructions Handbook

Programme: HORIZON EUROPE

Grant agreement number: 101096522

Project acronym: Green Marine

Project title: Retrofitting towards climate neutrality

Prepared by: CMMI and PDMFC

Date: 31/08/2026

Report version: v1.0



Funded by the
European Union

Funding acknowledgement

Green Marine is funded by the European Union funding from the European Union's Horizon Europe research and innovation program under grant agreement No. 101096522. UK participants in Horizon Europe Project Green Marine are supported by UKRI grant numbers 10064539 (University of Strathclyde), 10068477 (CalMac Ltd) and 10064666 (CCM).

Disclaimer: The views expressed in this deliverable are those of the authors and are disclosed in a non-reliance basis and for information purposes only. The authors, the **Green Marine** consortium and partner employees and directors do not express or implied representation and/or warranty as to the accuracy and completion of the information set out in this report (including in any opinion, estimate, forecast and/or projection disclosed herein) and shall have no liability to the readers for any reliance placed on this report. The readers will rely solely upon their own independent investigation and evaluation of the information provided herein. Finally, this deliverable is based in information, legislation and data available as at the date of its creation and the authors shall have no responsibility for updating the information contained in this report and for correcting any inaccuracies in it, which may become apparent. The content of this deliverable does not reflect the official opinion of the European Union.

HISTORY OF CHANGES

Version	Publication Date	Changes
0.8	[01/08/2026]	First draft
1.0	[20-27/08/2026]	Review
1.0	[31/08/2026]	Submission to the EC Portal

DETAILS	
Grant Agreement No.	101096522
Project acronym	Green Marine
Project full title	Retrofitting towards climate neutrality
Dissemination level	Public
Due date of deliverable	M43
Actual submission date	M43
Deliverable name	Instruction Handbook
Type	Report
Status	Final version
WP contributing to the deliverable	WP5
Author(s)	Nuno Pedrosa (PDM), Ashok Kumar (CMMI),
Other Contributor(s)	
Reviewer(s)	Giovanni Mazzuto (UPM)
Keywords	Green Marine, Instruction Handbook, Software, Portal

Table of Contents

Acronyms and abbreviations	7
Executive Summary	8
1. Introduction.....	9
1.1 Purpose.....	9
1.2 Intended users	9
1.3 What this handbook does not cover	10
2. Accessing the Green Marine portal.....	10
2.1 Opening the Portal	10
2.2 Main navigation	10
2.3 Public and restricted functions.....	11
3 Browsing the Retrofit Catalogue	12
3.1 Opening the Catalogue.....	12
3.2 Understanding a solution page.....	12
4 Carbon-capture solutions.....	13
4.1 SINTEF membrane solution	13
4.2 CCM chemical-precipitation solution.....	13
4.3 Comparing the two options	13
5 Using the assistant.....	14
5.1 Opening the assistant	14
5.2 Asking effective questions.....	15
5.3 Checking the assistant's understanding.....	15
6 Requesting a simulation	16
6.1 Overview	16
6.2 Step-by-step procedure	16
6.3 Example conversation with the assistant	16
6.4 Choosing the correct provider.....	16
7 Receiving and managing the results	17
7.1 Successful completion	17
7.2 Reviewing results.....	17
8 Techno-economic analysis	18

9	Viewing vessel, assessment, and sensor information	19
9.1	Vessel information	19
9.2	Assessment runs.....	19
9.3	Sensor information.....	19
10	Troubleshooting	20
10.1	The required page or tool is not visible	20
10.2	The assistant does not understand the request	20
10.3	A service is temporarily unavailable.....	20
10.4	The simulation fails.....	20
10.5	The result cannot be downloaded	20
11	Privacy and safe use.....	21
12	Support and Resources.....	21
13	Quick-Reference Checklist.....	21
14	Conclusion	22

ACRONYMS AND ABBREVIATIONS

Acronym / short name	Expansion / full name
API	Application Program Interface
CalMac	CalMac Ferries Ltd
CCM	Carbon Capture Machine (UK) Ltd
CMMI	Cyprus Marine and Maritime Institute
EC	European Commission
FAQ	Frequently Asked Questions
GHG	Greenhouse Gas(es)
Green Marine	Retrofitting towards climate neutrality
PDM/PDMFC	PDM e FC Projecto Desenvolvimento Manutencao Formacao e Consultadoria Lda
SINTEF	SINTEF AS
UK	United Kingdom
UKRI	UK Research and Innovation
UPM	Università Politecnica delle Marche
WP	Work Package

EXECUTIVE SUMMARY

This public handbook explains how to use the Green Marine portal and its main features and tools. D5.6 is intended for users and readers who want to learn about the project, explore retrofit solutions, use the assistant, request an assessment or simulation, and understand the information that the platform returns.

This deliverable details the software portal that brings together public Green Marine information, project results, publications, news, a retrofit catalogue, and specialist tools. Some functions are public, and others require a user account and an appropriate role. The assistant, as a chatbot, is the main interactive guide: it can help users browse vessels and retrofit solutions, identify suitable carbon-capture options, collect the information needed for a request, and provide access to results.

Two carbon-capture solutions are central to the simulation journey. SINTEF provides a membrane-separation solution, identified as MEM-CAP-001. CCM provides a chemical-precipitation solution, identified as CHEM-PREC-001. Users do not need to understand or operate the technical services behind these tools. The assistant guides the user through the process and asks for confirmation of the selected solution and scenario before starting a simulation.

The handbook focuses on common user activities and on the safe, practical use of the Green Marine portal. It does not cover the platform's administration, service addresses, internal data formats, technical logs, or system configuration details. The handbook supports the wider Green Marine objective of providing software-based tools and knowledge to help stakeholders evaluate retrofit and GHG-emission reduction solutions for waterborne transport.

1. INTRODUCTION

Deliverable D5.6 – Instructions Handbook provides practical guidance for accessing and using the main user-facing functions of the Green Marine software platform. It is intended to support users in navigating the portal, exploring the Retrofit Catalogue, interacting with the Green Marine assistant, accessing available decision-support tools, requesting supported assessments and simulations, and reviewing the resulting information. The handbook outlines the principal activities users may perform on the platform and provides straightforward instructions to support consistent, informed, and appropriate use of the available functionalities.

D5.6 also provides guidance on public and restricted functions, confirmation of requested actions, handling and interpretation of results, privacy and safe use, and basic troubleshooting and support. The functions available to individual users may vary depending on their assigned roles and permissions, platform configuration, and the availability of integrated services. Detailed information on platform architecture, administration, configuration, APIs, security controls and technical integration is addressed separately in D5.5 – Second Report: Technical Operational & User Manual submitted in M43.

1.1 PURPOSE

The purpose of the handbook is to provide ready-made information and instructions to the users of the software on the following:

- Access and navigate the Green Marine portal;
- Understand which functions are public or restricted;
- Browse the Retrofit Catalogue;
- Find the SINTEF and CCM carbon-capture solutions;
- Use the assistant to ask questions and request a simulation;
- Receive and download results;
- Understand the purpose of techno-economic analysis;
- View permitted vessel, assessment, and sensor information; and
- Resolve common problems or contact support.

D5.6 and D5.5 complement each other: this handbook deals with end-user tasks and interactions, whilst D5.5 contains the technical and administrative documentation required for the deployment, configuration and maintenance of the platform.

1.2 INTENDED USERS

The handbook is intended for project stakeholders, vessel owners and operators, technology providers, researchers, academicians, decision-makers, and interested members of the public. The options visible to each reader depend on whether they are browsing anonymously or are signed in with an authorised role.

1.3 WHAT THIS HANDBOOK DOES NOT COVER

This is not an administrator or developer manual. It does not explain how to configure the portal, manage accounts, change permissions, create data structures, or connect external services. Those topics are covered by D5.5, the second Technical Operational & User Manual submitted in M43.

2. ACCESSING THE GREEN MARINE PORTAL

2.1 OPENING THE PORTAL

Open the Green Marine portal via <https://greenmarine.pdmfc.com/> (see Figure 1) using a latest web browser. The home page provides information on the portal's main navigation, current project details, recent news, search, and access to the assistant.

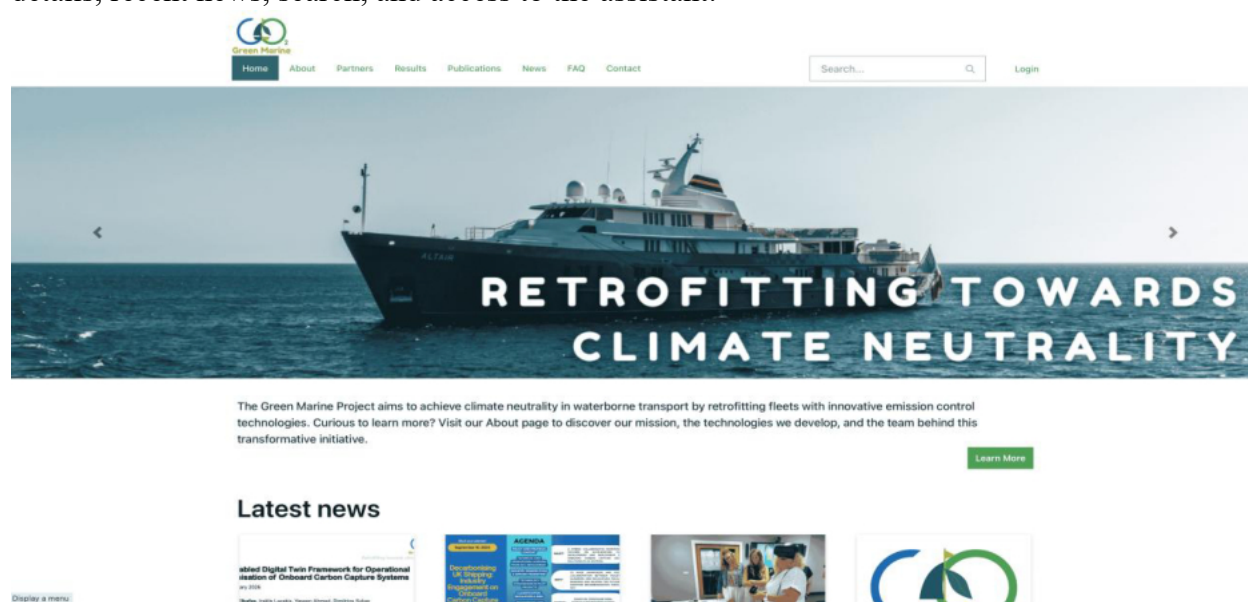


Figure 1 – Green Marine public homepage and main navigation

2.2 MAIN NAVIGATION

The navigation function includes the following:

- **Home** - Project introduction and latest updates.
- **About** - Project objectives and context.
- **Partners** - Participating organisations.
- **Results** - Available project outputs.
- **Publications** - Published project material.
- **News** - Project and partner updates.
- **FAQ** - Answers to common questions.
- **Contact** - Project contact information.
- **Toolbox** - Access to available project tools.
- **Catalogue** - Access to retrofit solutions.

Use the search field to find information available on the public website (Figure 2). Use the assistant when you need guidance, want to explore retrofit solutions, or need help accessing and using information available through the platform.

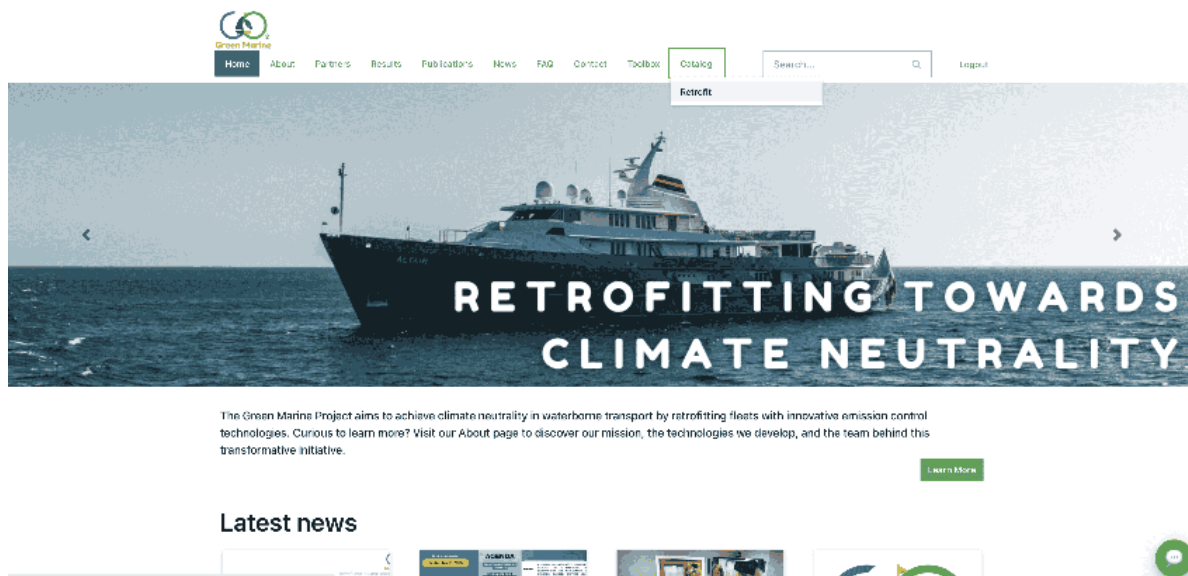


Figure 2 - Menu showing portal access to the Catalogue

2.3 PUBLIC AND RESTRICTED FUNCTIONS

Public pages and information can be accessed without any administrative permissions. However, some pages, tools, and functions require users to sign in to their Green Marine account, which can be accessed via <https://greenmarine.pdmfc.com/>. Access to these features depends on the role and permissions assigned to each account. If a user does not have the required permission, some features may be unavailable or invisible.

Users should not share accounts or credentials to obtain access to functions available to another user. Where access to a required function is unavailable, the user should contact Green Marine support to confirm whether the appropriate role or permission should be assigned to their account.

3 BROWSING THE RETROFIT CATALOGUE

3.1 OPENING THE CATALOGUE

1. Select the catalogue from the main navigation.
2. Open the retrofit section.
3. Review the available solution cards.
4. Use the search field to narrow the list by name, code, category, or technology.
5. Select a card to open the complete solution page.

Figure 3 provides the details regarding the carbon capture solution's methodology from the portal.

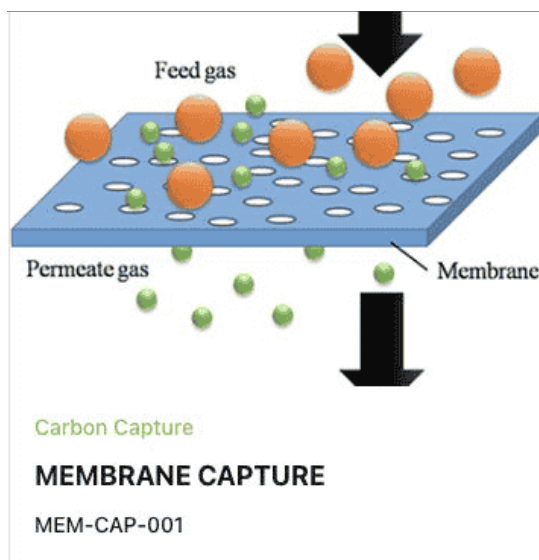


Figure 3 - SINTEF membrane solution card in the Retrofit Catalogue

3.2 UNDERSTANDING A SOLUTION PAGE

A solution page may display the following:

1. The solution name;
2. Category;
3. Solution code;
4. Technology type;
5. Provider;
6. A plain-language description; and
7. Selected technical characteristics.

Use the code when referring to a specific solution to the assistant or in any project communication. The code avoids confusion between technologies with similar names.

4 CARBON-CAPTURE SOLUTIONS

4.1 SINTEF MEMBRANE SOLUTION

Code: MEM-CAP-001 **Provider:** SINTEF **Category:** Carbon Capture **Technology:** Membrane Separation

The SINTEF solution uses semi-permeable membranes to separate carbon dioxide from exhaust gases. A membrane approach can be attractive where compact equipment and high separation efficiency are important considerations. Figure 4 depicts the solution page from the portal, displaying various options related to the technology.

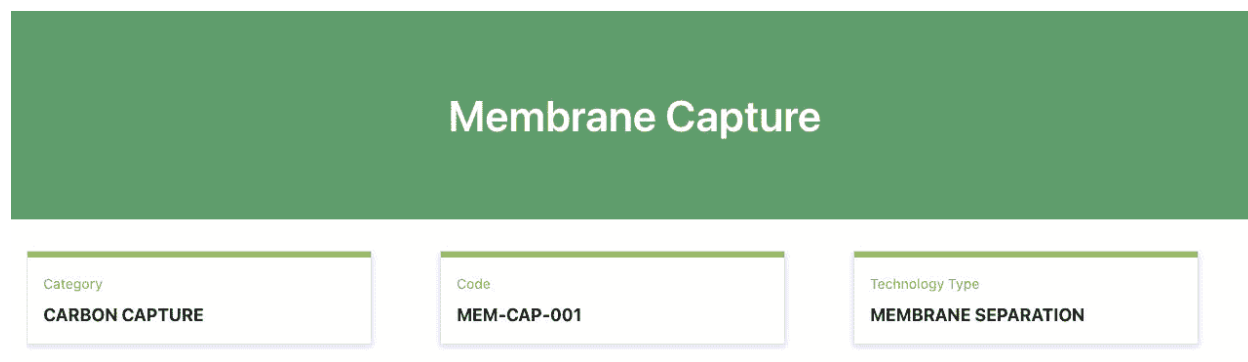


Figure 4 - Membrane solution page showing its category, code, and technology type

4.2 CCM CHEMICAL-PRECIPITATION SOLUTION

Code: CHEM-PREC-001 **Provider:** CCM **Category:** Carbon Capture **Technology:** Chemical Precipitation

The CCM solution captures carbon dioxide through a chemical-precipitation process. It is intended for assessment in maritime operating scenarios where the process and its supporting systems can be evaluated together.

4.3 COMPARING THE TWO OPTIONS

The assistant can help you compare the two options. A useful question is:

What carbon capture solutions are available, and what information should I consider when choosing between them?

The assistant may ask about the vessel, operating profile, available space, energy requirements, route, or assessment objective. Its purpose is to collect enough context for a meaningful comparison; it does not replace engineering judgement or project approval.

5 USING THE ASSISTANT

5.1 OPENING THE ASSISTANT

1. Select the chat button (green speech-bubble icon, shown on the Figure 5) in the lower right corner of the portal
2. Wait for the welcome message (Figure 6).
3. Type a question in the message field.
4. Click enter to send the message.
5. Answer any follow-up questions.

The assistant can help the users to browse vessel details, discover retrofit solutions, understand available tools, and request supported assessments or simulations.



Figure 5: Chat Assistant Icon

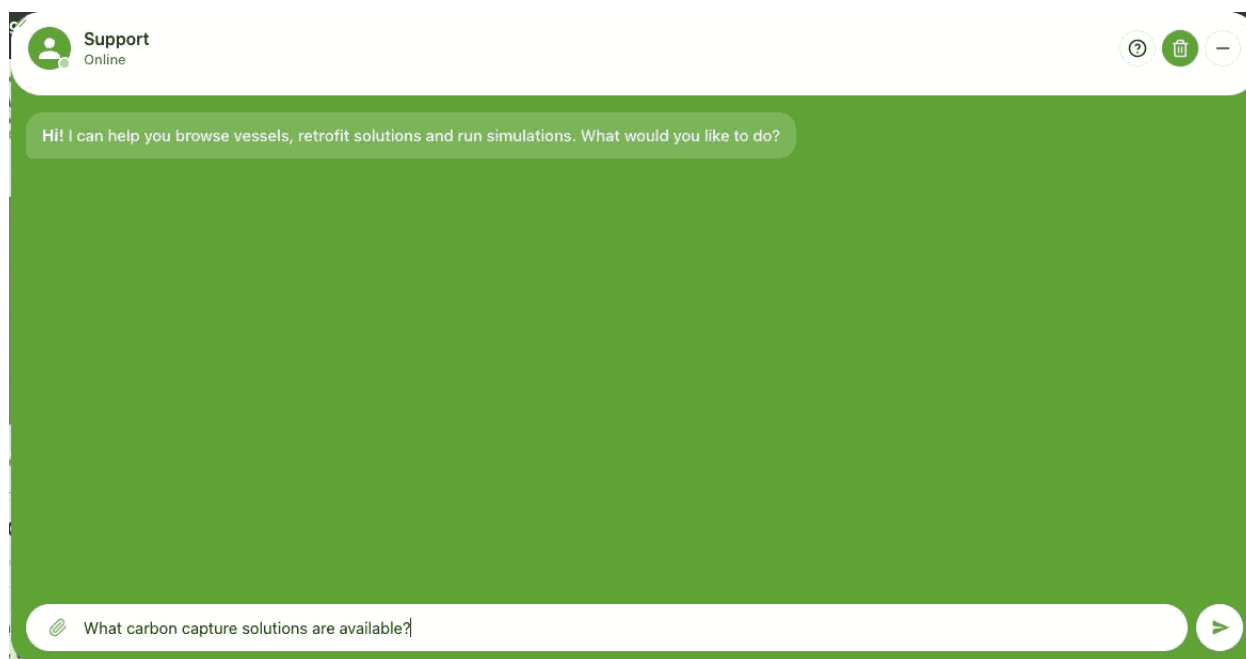


Figure 6 - Chatbot welcome screen with an example carbon-capture question ready to send

5.2 ASKING EFFECTIVE QUESTIONS

To get a quick and effective response, always ask short and specific questions. Some examples include below:

- “What carbon capture solutions are available?”
- “Show me the SINTEF membrane solution.”
- “Tell me about CHEM-PREC-001 from CCM.”
- “Which vessels can I view?”
- “What information do you need before running an assessment?”
- “Show me the status of my recent assessment runs.”

Include the solution code or vessel name when you know it. Do not paste passwords, access tokens, personal data, or confidential technical information unless the approved workflow specifically requires that information and you are authorised to provide it.

5.3 CHECKING THE ASSISTANT'S UNDERSTANDING

Before confirming any action, users should review the summary provided by the assistant to ensure that the selected retrofit solution, vessel or assessment scenario, and requested operation are correctly identified. If any information is incomplete or incorrect, it should be corrected before confirmation is given and the action is executed.

A clear correction is:

Use MEM-CAP-001 from SINTEF, not the CCM solution. Do not start until I confirm.

The assistant is intended to support navigation, information retrieval, and guided portal workflows, providing an easier path to the available solutions and applications.

It may, however, misunderstand ambiguous questions or provide information based on platform content that has not yet been updated or may feel incomplete. It may also not select the best solution, provider, vessel, or action if the request does not contain enough context.

The assistant does not replace engineering judgement, safety or regulatory assessment, professional advice, or formal project approval. If a response appears inconsistent or uncertain, restate the request or contact GreenMarine support.

6 REQUESTING A SIMULATION

6.1 OVERVIEW

Where simulation functionality is available for the user's assigned role, simulation requests are initiated through the assistant. It will guide the user through the required inputs and manage the preparation and submission of the request to the selected simulation service. Users are therefore not required to access or operate a separate technical interface to execute the simulation.

6.2 STEP-BY-STEP PROCEDURE

1. **Open the assistant.** Start from any portal page where the chat button is available.
2. **State your objective.** Explain that you want to assess a carbon-capture solution.
3. **Select a solution.** Choose MEM-CAP-001 from SINTEF or CHEM-PREC-001 from CCM.
4. **Identify the vessel or scenario.** Select an available vessel or provide the scenario information requested by the assistant.
5. **Answer follow-up questions.** Provide only information you are authorised to use.
6. **Review the summary.** Check the solution, vessel, scenario, and purpose.
7. **Confirm execution.** Start only when the summary is correct.
8. **Wait for the result.** Keep the conversation available while the request is processed.
9. **Download the results package.** Use the download action provided by the assistant.
10. **Record the context.** Keep the run name, date, selected solution, vessel/scenario, and result package together.

6.3 EXAMPLE CONVERSATION WITH THE ASSISTANT

User: I want to assess a carbon-capture solution for a vessel. What options are available?

Assistant: The available options are the SINTEF membrane solution and the CCM chemical-precipitation solution. Which would you like to assess?

User: Use MEM-CAP-001 from SINTEF.

Assistant: Please select the vessel and provide the operating scenario.

User: [Selects an authorised vessel and describes the scenario.]

Assistant: Here is the request summary. Would you like me to start?

User: Yes, start the simulation.

Assistant: The request is being processed. I will provide the results package when it is ready.

6.4 CHOOSING THE CORRECT PROVIDER

Use the mapping below whenever the assistant asks which service to use:

Solution	Provider
MEM-CAP-001 - Membrane Capture	SINTEF
CHEM-PREC-001 - Chemical Precipitation Capture	CCM

If the assistant proposes a different provider or category, stop and restate the code and provider before continuing.

7 RECEIVING AND MANAGING THE RESULTS

7.1 SUCCESSFUL COMPLETION

When a simulation is completed successfully, the assistant provides the resulting output package for retrieval. The results should be stored in an approved project location and associated with sufficient contextual information, such as the run name, execution date, vessel or scenario, and selected retrofit solution, to support identification and future reference.

The original results package should be retained in the form in which it was received before individual files are renamed, extracted, or otherwise modified. Preserving the original package supports traceability, reproducibility, and subsequent review of the simulation results.

7.2 REVIEWING RESULTS

Results should be interpreted/reviewed by an appropriately qualified user. Check some of the key results:

- The selected vessel or scenario;
- The chosen solution and provider;
- The assumptions used;
- Units and time periods;
- Warnings or limitations; and
- Whether the result is suitable for comparison, engineering review, or project decision-making.

Simulation results are intended to support informed decision-making and should not be considered, on their own, as approval of a retrofit solution or certification of its performance.

8 TECHNO-ECONOMIC ANALYSIS

Techno-economic analysis helps users explore the financial implications of a technology or operating scenario. Depending on the available model, it may consider investment, operating assumptions, time horizon, repeated scenarios, and indicators such as profitability or net present value.

Open the TEA tool (see Figure 7) from Toolbox > TEA in the Green Marine portal. Here you can run simulations and see previous results.

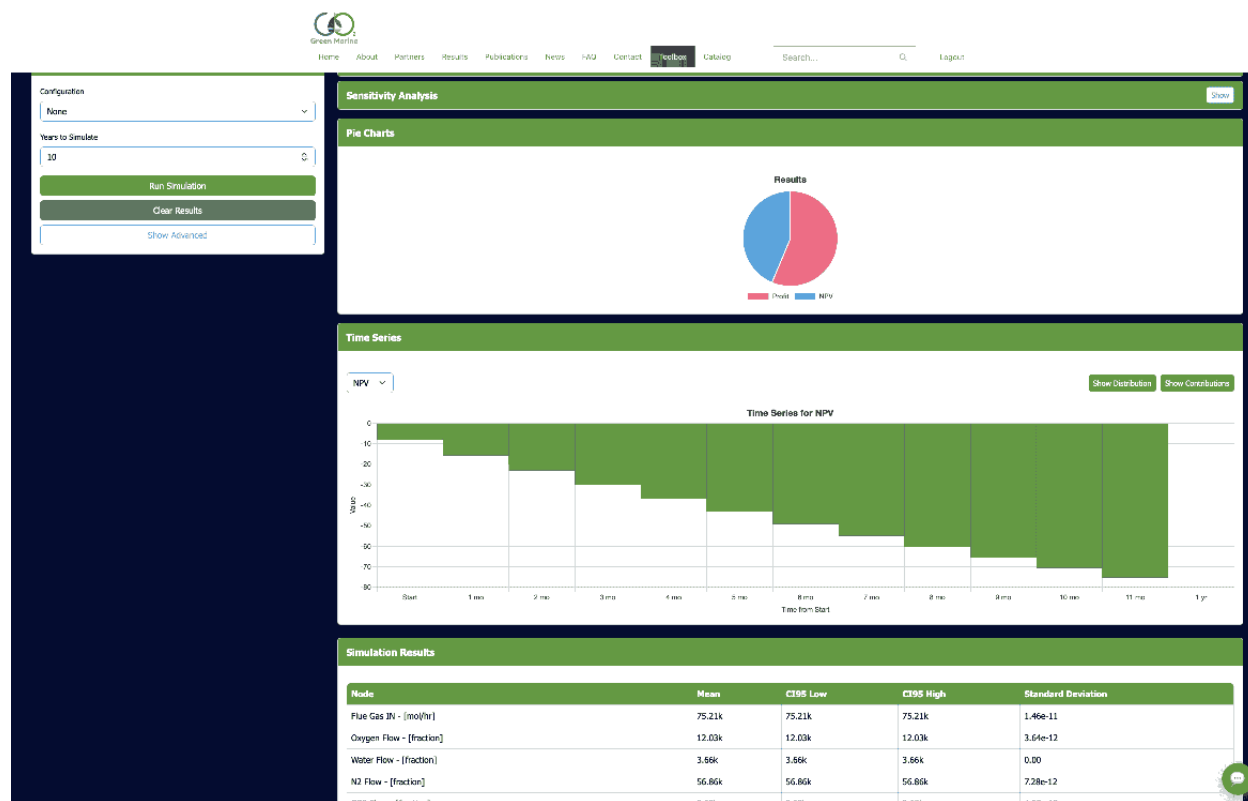


Figure 7 - TEA dashboard opened from Toolbox > TEA

To request guidance:

1. Ask the assistant which analysis models are available.
2. Select the model relevant to your question.
3. Choose or provide an approved input set.
4. Confirm the time horizon and any optional assumptions requested.
5. Review the summary before starting.
6. Interpret the results together with their assumptions and uncertainty.

If the simulation or analysis service is temporarily unavailable, users should retain the relevant input information and attempt the request again later or contact Green Marine support for assistance. Repeated submission of the same request should be avoided while the status of an earlier request remains incorrect.

9 VIEWING VESSEL, ASSESSMENT, AND SENSOR INFORMATION

9.1 VESSEL INFORMATION

Authorised users may access vessel information, including vessel type, engine characteristics, fuel type, dimensions, and other available technical details. The information displayed may vary depending on the user's assigned role, permissions, and the purpose of the relevant portal function.

Before using vessel information in an assessment or simulation, users should ensure that the correct vessel has been selected and that the relevant information is appropriate for the intended analysis. Any identified data-quality issues, missing information, or apparent inconsistencies should be reported through the appropriate support channel rather than modified through an unrelated workflow.

9.2 ASSESSMENT RUNS

An assessment run links a vessel, a retrofit solution, a scenario, and an execution status. Common states are Pending, Running, Completed, and Failed.

- **Pending:** the request has been recorded, but processing has not been completed.
- **Running:** the request is being processed.
- **Completed:** a result is available.
- **Failed:** the request did not complete successfully; review the user message or contact support.

9.3 SENSOR INFORMATION

Where permitted, users may view sensor measurements associated with vessel equipment and operating conditions. Values should be interpreted together with their timestamp, unit, equipment reference, and data-quality status. Do not assume that a zero value always means a physical measurement of zero. A zero value may indicate either a valid measurement or unavailable/incomplete data; where uncertain, users should consult the responsible technical partner.

10 TROUBLESHOOTING

10.1 THE REQUIRED PAGE OR TOOL IS NOT VISIBLE

- Confirm that you are signed in.
- Confirm that you are using the correct account.
- Ask support whether your role should include the function.
- Do not use another person's account.

10.2 THE ASSISTANT DOES NOT UNDERSTAND THE REQUEST

- Use the exact solution code.
- State the provider explicitly.
- Ask one task at a time.
- Correct the summary before confirming.
- Example: I mean CHEM-PREC-001, the CCM chemical-precipitation carbon-capture solution. Do not start yet.

10.3 A SERVICE IS TEMPORARILY UNAVAILABLE

- Keep the details of your intended request.
- Avoid repeated submissions while the status is uncertain.
- Try again later.
- Contact support with the time, tool name, action attempted, and a screenshot that contains no confidential information.

10.4 THE SIMULATION FAILS

- Read the user-friendly explanation shown by the assistant.
- Correct missing or invalid information if the message tells you how.
- Keep the run name or reference displayed by the platform.
- Contact support if the same request fails again.

10.5 THE RESULT CANNOT BE DOWNLOADED

- Check that your session is still active.
- Confirm that your browser allows downloads from the portal.
- Try the provided download action once more.
- If the problem continues, contact support without forwarding confidential result data through an unapproved channel.

11 PRIVACY AND SAFE USE

- Use only information you are authorised to access.
- Do not place passwords or account secrets in assistant messages.
- Avoid entering personal or commercially sensitive information unless required by an approved task.
- Store downloaded results in an approved project location.
- Do not publish vessel, sensor, assessment, or result information without permission.
- Use screenshots carefully; remove names, identifiers, and private information before sharing.
- Sign out when using a shared computer.

12 SUPPORT AND RESOURCES

For portal or tool support, use the Contact page on the project website. Provide:

1. The affected page or tool;
2. The approximate time;
3. The action attempted;
4. Your user role;
5. The solution code or run reference, when relevant; and
6. A sanitized screenshot or user-facing message.

Do not send passwords, account secrets, or unapproved operational data in a support request.

13 QUICK-REFERENCE CHECKLIST

Before starting a simulation:

- ☐ I am signed in with the correct account.
- ☐ I have selected the correct vessel or scenario.
- ☐ I have selected MEM-CAP-001/SINTEF or CHEM-PREC-001/CCM.
- ☐ The assistant summary matches my intended request.
- ☐ I am authorised to use the information supplied.
- ☐ I have explicitly confirmed execution.

After completion:

- ☐ I downloaded the original results package.
- ☐ I recorded the run name, date, solution, and vessel/scenario.
- ☐ I stored the result in an approved location.
- ☐ I will interpret the result together with its assumptions and limitations.

14 CONCLUSION

Deliverable D5.6 provides a practical reference handbook for users to access and effectively utilise the main user-facing functions of the Green Marine software platform. Through the portal, retrofit catalogue, Green Marine assistant, decision-support tools, and supported assessment and simulation functions, users are guided from the identification of relevant retrofit solutions through the preparation of requests and review of resulting information. The handbook also emphasises the importance of using appropriate access permissions, confirming information before initiating actions, protecting sensitive data, preserving the context and traceability of results, and ensuring that simulation and analytical outputs are reviewed by appropriately qualified users. These outputs are intended to support informed decision-making and do not replace the engineering, safety, regulatory, environmental, operational, or commercial assessments required for implementation of a retrofit solution. Overall, D5.6 provides users with clear, easy-to-understand guidance on how to use the Green Marine platform properly and responsibly. It also works alongside D5.5, which provides more detailed technical and practical information about the portal.