



D1.3: Data Management Plan

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Project data

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Acronyms and Abbreviations	
Acronym/Abbreviation	Meaning
ABS	American Bureau of Shipping
ASCII	American Standard Code for Information Interchange
CA	Consortium Agreement
CC	Creative Commons
CINEA	European Climate, Infrastructure and Environment Executive Agency
D	Deliverable
DECP	Dissemination, Exploitation and Communication Plan
DMP	Data Management Plan
DOI	Digital Object Identifier
EC	European Commission
FAIR	Findable, Accessible, Interoperable, Reusable
GA	Grant Agreement
GDPR	General Data Protection Regulation
hESCs	Human Embryonic Stem Cells
NORD	NTNU Open Data Repository
NTNU	Norwegian University of Science and Technology
NTUA	National Technical University of Athens
PC	Project Coordinator
PU	Public
R	Report
T	Task
TL	Task Leader
WP	Work Package
WPL	Work Package Leader
UiT	The Arctic University of Norway

Disclaimer

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1 - Executive Summary

The enclosed Data Management Plan (DMP) serves as the foundational framework for the Blue Bunkering of Anchored ships with Renewable Generated Electricity (BlueBARGE) initiative. Presented herein is the initial iteration of the DMP, which will undergo regular updates to remain in sync with the project's evolving dissemination, exploitation, and communication strategies, as outlined in the Dissemination Exploitation and Communication Plan (DECP).

Crafted in accordance with the OpenAIRE Guides for Researchers and the Horizon Europe template [4], [5], this DMP adheres to the FAIR (Findable, Accessible, Interoperable, and Reusable) data principles. It outlines the strategies implemented to ensure the findability, accessibility, interoperability, and reusability of the data produced during the BlueBARGE project and beyond its conclusion.

The DMP is in harmony with the stipulations of the executed Grant Agreement (GA) [1] and Consortium Agreement (CA) [2], governing data management and safeguarding. It serves to enhance the GA and CA by offering further insights and elucidations. Should any inconsistencies arise, the provisions of the GA and CA will take precedence.

2 - Introduction

The BlueBARGE open access strategy is dedicated to advancing Open Science, with a commitment to making research outputs readily and broadly accessible. The strategy is designed to honour the scientific and legal rights of researchers, safeguard personal information, and fulfil duties to third parties, including customers and partners. Within the BlueBARGE project Consortium, the approach encompasses the prompt and transparent dissemination of preliminary research findings.

Externally, BlueBARGE's commitment to Open Science is manifested through several key initiatives: the direct publication of research findings in open access journals, the utilization of open for disseminating results, the adoption of open peer review processes, the provision of open access to various research outputs, and the unrestricted sharing of datasets and raw data via open data publications.

These measures are strategically implemented to accelerate the assimilation of BlueBARGE's findings by the academic community and other interested parties. This facilitates the expansion of subsequent research based on BlueBARGE's work, fortifies the scientific knowledge base, and catalyses innovation in the field. By enabling peer review and replication of data and results, the research's reliability and credibility are enhanced. Moreover, stakeholders gain seamless access to BlueBARGE's findings, fostering potential collaborations and actions aligned with the project. Ultimately, this strategy underscores the profound economic, social, and educational advantages of removing financial, legal, and technical obstacles to accessing research outputs.

A comprehensive data management policy ensures that all data-related activities, including collection, access, sharing, processing, and storage, adhere to consistent standards throughout the project's duration.

The BlueBARGE Data Management Plan (DMP) is designed to meet the European Commission's standards and has set the following goals:

- To offer guidance on producing data that adheres to the FAIR (Findable, Accessible, Interoperable, and Reusable) principles.

- To detail the attributes of the datasets generated by the project, such as format, size, naming conventions, and accompanying metadata.
- To identify suitable open-access repositories for the submission of BlueBARGE data.
- To dedicate resources towards the preparation, storage, and long-term preservation of data.
- To ensure the security and protection of data through the establishment of comprehensive guidelines.

3 - Data Summary

3.1 – Project datasets

The BlueBARGE project aims to design, develop, and demonstrate a fully integrated and sustainable power barge solution, primarily for offshore power supply to moored and anchored vessels. The project will generate and reuse various types of data, including (but not limited to) data related to power generation, energy storage, environmental and operational aspects, safety and compliance, connectivity, and financial aspects. The BlueBARGE project's data has utility beyond its immediate scope, benefiting various stakeholders in the maritime industry and renewable energy sector, as well as sustainability efforts.

Table 1 provides a preliminary overview of the project data types, origin and accessibility. Further details on the types, formats, and provenance of project data will be provided during the project execution and described in the next versions of the DMP. As far as possible, file formats will be chosen to support long-term readability of data published to open access repositories, i.e. file formats that are non-proprietary, open, use standard character encoding and uncompressed (space permitting).

The expected size of the data to be generated or re-used is roughly estimated to be 5000 GB.

Table 1 - Project data types, origin, and accessibility specifications

Data Type	Origin	Accessibility
Simulation results files	Simulation software output files	Consortium members
Simulation models	Software modelling and simulation	Consortium members
Performance and aging data	Own database, characterization data during the project development	Consortium members
Performance results of the modules	Assessment from experimental tests and measurements	Consortium members access all data and results; public access to results deposited in open repositories
Numerical model of the barge's power system and optimization results	Technical specifications developed during the project	Consortium members
Stakeholders contact, legal, financial and market data from end users and partners	From databases, literature and Consortium partner documentation specifically generated for the maritime sector	Consortium members access all data and results; public access to results deposited in open repositories
Testing, characterisation data and results on performance	Consortium members during the project development	Consortium members

The Consortium will create synergies with other research and innovation activities, aiming at re-use of 'know-how' and data, where appropriate. Reference is made to Annex 1 of the BlueBARGE Grant Agreement, [1], for further details on the relation of BlueBARGE to other research and innovation activities.

3.2 - Data storage infrastructure

BlueBARGE's data storage infrastructure should facilitate data exchange among Project partners throughout the project execution, and enable open data sharing and long-term preservation.

3.2.1 – Data exchange among Project partners (internal data storage)

The Project SharePoint in Microsoft Teams has been established to streamline the internal accessibility and data exchange throughout the project lifecycle among Consortium members. As a proprietary business communication platform within the Microsoft 365 suite, Microsoft Teams has been instrumental for the consortium, facilitating video conferencing and the secure storage of critical project documents.

The SharePoint was configured by ABS, the Project Coordinator (PC), who sent invitation links via email to all project members. This enabled them to register and gain access to the shared files. All consortium members have unrestricted access to the data within the SharePoint directories.

The organizational (file) structure of the BlueBARGE SharePoint is shown in Figure 1.

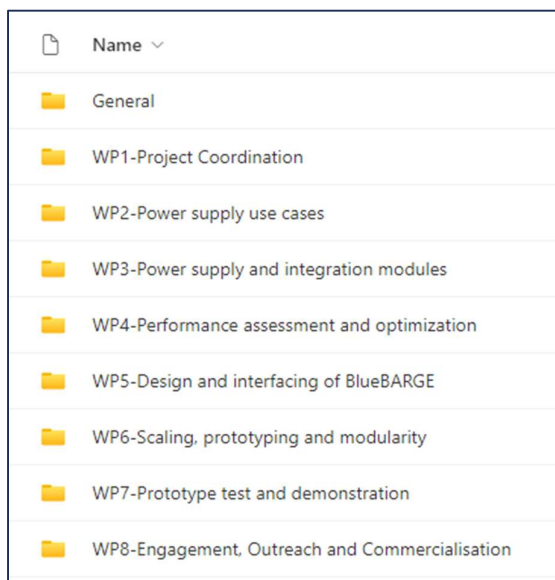


Figure 1 – Organizational (file) structure of BlueBARGE SharePoint on Microsoft Teams

3.2.2 – Enabling open data sharing and preservation (external data storage)

The open access repository DataverseNO will facilitate the sharing of project data with external entities for future research and commercial endeavours, as well as ensure the preservation of data after the project's completion. The incorporation of data into this repository requires the collective agreement of all Consortium members, ensuring that every stakeholder's interests are considered and protected.

DataverseNO is a national, generic repository for open research data, owned and operated by The Arctic University of Norway (UiT). DataverseNO is aligned with the FAIR Guiding Principles for scientific data management and stewardship. The technical infrastructure of the repository is based on the open-source application Dataverse, which is developed by an international developer and user community led by Harvard University. DataverseNO is CoreTrustSeal certified.

The Norwegian University of Science and Technology (NTNU) is a current DataverseNO partner institution with an institutional collection for publishing data from affiliated researchers and will facilitate the depositing of project data to the repository.

4 - FAIR data

The FAIR data policy principles are a set of guidelines that aim to enhance the management and stewardship of scientific data. They focus on four key aspects: Findability, Accessibility, Interoperability, and Reusability.

- Findability refers to the ease with which data can be discovered, often facilitated by the assignment of unique identifiers and rich metadata.
- Accessibility ensures that once found, data can be retrieved using standardized protocols and that metadata remain available even if the data are not.
- Interoperability allows data to be integrated with other datasets and to work seamlessly with various applications and workflows.
- Reusability is about maximizing data utility over time, requiring comprehensive description with attributes, clear licensing, and adherence to community standards.

These principles collectively support the idea that data should be easily handled by both humans and computational systems, promoting efficiency and innovation in research.

The BlueBARGE project will adhere to FAIR principles, as further described in the following sections.

4.1 - Making data findable

The BlueBARGE project data uploaded to the DataverseNO repository will be identified by a persistent identifier and metadata will be created.

Metadata serves as a detailed directory, offering insights about data without revealing the data itself, like a catalogue describing the contents of a book without displaying its pages. For the creation of FAIR digital resources, it is imperative that metadata is both abundant and comprehensive. It should encapsulate details regarding the data's context, quality, condition, and attributes. This enriched metadata facilitates the efficient indexing of folder contents by file managers, enabling swift retrieval of desired files through search functionalities.

Project partners will be required to generate or update a ReadMe file within each directory, encompassing, where feasible, the following elements: Title, Creator, Description, Publisher, Contributors, Date, Type, Format, Required Software for Execution, Required Software for Access, Language, Archive Status (Yes/No), and Public Access Status (Yes/No). A ReadMe file template produced by DataverseNO is provided as an example in Figure 2.

BlueBARGE metadata will be made openly available and licenced under a public domain dedication CC0, as per the Grant Agreement [1].

```

<Help text is included in angle brackets and should be deleted before saving. We recommend you to add "00_" in front of
the ReadMe file name (e.g. "00_README.txt"), which will make the file appear on the top of the file overview.>

<DataverseNO README File Template --- General --- Version: 2.4 (2024-03-21)>

This README file was generated on [YYYY-MM-DD] (YYYY-MM-DD) by [NAME].
Last updated: [YYYY-MM-DD].

-----
GENERAL INFORMATION
-----
// Title of Dataset:
// DOI:
// Contact Information
<The person to be contacted for questions about the dataset>
// Name:
// Institution:
// Email:
// ORCID:

<Whenever applicable, the following information should be registered in the metadata schema of DataverseNO. In the text
below, remove fields/lines that are not applicable, and leave the rest unchanged. >
// Contributors: See metadata field Contributor.
// Data Type: See metadata field Data Type.
// Date of Collection: See metadata field Date of Collection.
// Geographic location: See metadata section Geospatial Metadata.
// Funding sources: See metadata section Funding Information.

// Description of dataset:
<(Short) description of what the dataset is about, including reference to related project(s) and publication(s), if
applicable. Should correspond to the information entered in the metadata fields Description and Related Publication.>

```

Figure 2 – DataverseNO ReadMe file template

Furthermore, data uploaded to the central database will follow a standardized naming convention, previously agreed between project partners. For example, project deliverables will be named in accordance with the following convention, based on the deliverable number and version: “BlueBARGE_DX.Y_vX.Y”.

4.2 - Making data accessible

Section 3.2 of this document describes the data storage infrastructure utilised by the project. The following sections cover internal and external data accessibility.

4.2.1 – Internal accessibility

Consortium members have unrestricted access to all data stored within Project SharePoint files, facilitating internal data re-use between work packages. If there are any issues with data re-use among Consortium members, these will be discussed in the respective work package meetings. Since the interchange of commercial and/or research outputs between Consortium members may be confidential during the project, related data (e.g., meeting minutes, periodic reporting documents, etc.) will not be visible or accessible by external entities.

4.2.2 – External accessibility

Scientific peer-reviewed publications produced during the project will be open access under open licenses. Upon the project's conclusion, a curated selection of datasets—which have not been previously published to bolster scientific papers and have received unanimous consent from the consortium—will be preserved and made publicly available in the DataverseNO repository.

The DataverseNO open access repository selected for longer-term storage of the data is aligned with the FAIR principles for scientific data management and stewardship. DataverseNO is a Core Trust Certified repository and assigns DOIs (Digital Object Identifiers) to datasets, ensuring the datasets can be distinctly

located and referenced online. The standard license is CC0 (Creative Commons Zero), but other open licenses can be considered if needed.

Datasets published in DataverseNO are discoverable and openly available to anyone with access to the Internet. DataverseNO is responsible for secure archiving and data availability for at least 10 years after assigned DOI [6]. However, the intent for DataverseNO is to ensure access to archived data in a long-term perspective. Whenever possible and feasible, items are archived in formats that can be opened and read using freely available software. Additionally, items may also be archived in their original format.

4.3 - Making data interoperable

Interoperability essentially implies that each computing system is aware of the data exchange protocols of others. For datasets to be automatically discoverable and interoperable, employing widely recognized controlled vocabularies and uniform file formats is essential.

Consequently, Consortium members will be requested, where feasible and irrespective of file type, to submit files in ASCII format.

This standardization allows every member to access the files using basic text-editing software, facilitating the use of shared work without needing additional software. Should there be a necessity to store a file not in ASCII format, it is mandatory to detail the file's operability and the necessary software tools in the designated metadata ReadMe file.

4.4 - Increase data re-use

Horizon Europe mandates that research data be deposited in a trusted repository, with accompanying details on any outputs, tools, or instruments necessary for their reuse or validation. These elements include, but are not limited to, data, software, algorithms, protocols, models, workflows, and electronic notebooks.

BlueBARGE partners producing data to be deposited in DataverseNO repository will accompany the data with instructions for access, information on dependencies, and details on versions, types, and parameters. While open access to these materials is encouraged, exceptions are allowed for legitimate reasons.

Data made available on the public domain (open access repository) will be documented with descriptive metadata to facilitate re-use and licensed under the latest version of CC BY (attribution required) or CC 0 (public domain), or equivalent.

5 - Allocation of resources

No additional financial costs (in excess of the grant amount) are expected to be required to facilitate data management and storage for the BlueBARGE project in line with EC standards.

The following individuals will act as contact persons for data management aspects of the BlueBARGE project:

Ms. Venetia Lazaratou, Project Manager – Europe Contracted R&D, ABS

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- Responsible for initial draft and continuous update of DMP
- Administration of Microsoft Teams
- Project coordination

Dr. Dong Trong Nguyen, Professor, Department of Marine Technology, NTNU
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- Administration of NTNU Open Data Repository (NORD), DataverseNO

Mr. Marios Koimtoglou, Research Engineer, National Technical University of Athens (NTUA)
marioskoim@mail.ntua.gr

- Technical project coordination

6 - Data security

Microsoft Teams is integrated with SharePoint, ensuring that any modifications in Teams are instantly reflected in SharePoint, and the reverse is equally true. This synergy is backed by Microsoft's comprehensive security measures, which include mandatory two-factor authentication for both team and organizational access, single sign-on via Active Directory, and rigorous encryption protocols safeguarding data during transfer and while stored. Additionally, files housed in SharePoint benefit from its advanced encryption, providing an extra layer of security.

DataverseNO is responsible for secure archiving and data availability for at least 10 years after assigned DOI, with the intent to ensure access to archived data in a long-term perspective [6].

7 - Ethics

BlueBARGE project members will adhere to ethical practices throughout the execution and following the completion of the project. Reference is made to the relevant project deliverable “D1.6 Ethics Compliance” and to the ethics chapters in Annex 1 of the Grant Agreement [1].

Additionally, the following key points are noted with respect to ethical data management:

- The BlueBARGE project does not involve activities and data exchange or data collection involving Human Embryonic Stem Cells (hESCs), use of human cells or tissues, human participants as experiment subjects, animals, endangered fauna and/or flora.
- Since non-EU countries are involved in the project as Associated Partners, Chapter V of the General Data Protection Regulation (GDPR) will be applied, which aims to protect personal data transferred to third countries or international organizations.
- No personal data is processed or intended to be stored within the selected data storage infrastructures. Consortium members are advised against uploading/storing any personal information on common storage.

8 - References

- [1] BlueBARGE Grant Agreement, Project 101138694, 2023-11-21
- [2] BlueBARGE Consortium Agreement, V1.0, 2023-12-22
- [3] BlueBARGE “D1.1: BlueBARGE Project Administrative and Financial Management”, V1.0, 2024-04-26
- [4] OpenAIRE. (n.d.). How to comply with Horizon Europe mandate for RDM. Retrieved from <https://www.openaire.eu/how-to-comply-with-horizon-europe-mandate-for-rdm>
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- [6] DataverseNO access and use policy. info DataverseNO. (n.d.-b).
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