Interreg
North-West Europe
H2SHIPS

EUROPEAN UNION

Hydrogen fuelled port vessel in Amsterdam

Public procurement report

Document Control Sheet

Work package Number	WP I1.1.2
Work package Title	Hydrogen fuelled port vessel in Amsterdam
Activity Number	I1.1
Activity Title	Public Procurement Hydrogen fuelled vessel in Amsterdam
Deliverable Number	WP I1.1.2
Deliverable Title	Public procurement report
Dissemination level	Public
Main author	J. Egbertsen
Contributors	D. Lensing P. Haks
Quality Assurance	Christian Frederic Berthon

Project co-funded by European Regional Development Funds (ERDF)
Project webpage: http://www.nweurope.eu/h2ships

Version Control and Contribution History

Version	Date	Author/Editor /Reviewer	Description/Comments
V01	10.12.2021	J. Egbertsen	First draft
_v02	04.01.2022	J. Egbertsen	Second draft
_v03	31.05.2022	J. Egbertsen / P. Haks	Third draft
_v04	07.06.2022	J. Egbertsen	Final document

Interreg North-West Europe H2SHIPS

Project co-funded by European Regional Development Funds (ERDF)
Project webpage: http://www.nweurope.eu/h2ships

Table of Content

Interreg North-West Europe H2SHIPS
Project co-funded by European Regional Development Funds (ERDF)
Project webpage: http://www.nweurope.eu/h2ships

1 Executive Summary

This is Deliverable I1.1.2: *Public procurement pilot ship Port of Amsterdam.* This deliverable is part of the H2SHIPS project's investment in the hydrogen pilot vessel Neo Orbis to be developed by the Port of Amsterdam.

After finalizing the design phase and the relevant underlying studies f.i. Hazard study in the first half of 2021 the focus on the second half of 2021 and first halve of 2022 was on the preparation of the public bidding documentation. Because of the amount of the investment in the pilot ship a EU public bidding process was needed. Relevant documents are included in the relevant half year report of Port of Amsterdam. For some aspects concerning the investment of the ship it has been decided not to use a public bidding procedure because there was only one suitable supplier relevant (f.i. for the NaBH4 system and the fuel cell).

In this report detailed information is given about the public procurement process. The relevant documents for the public procurement will be included in the half year report of Port of Amsterdam.

The start of the building of the Neo Orbis is expected in the summer of 2022 and the first sailing of the ship is expected in first half year of 2023.

Interreg North-West Europe H2SHIPS

Project co-funded by European Regional Development Funds (ERDF)
Project webpage: http://www.nweurope.eu/h2ships

2 Introduction

The deliverable I1.1.2 is based on the documents concerning deliverable I1.1.1 (design phase). Second half year 2021 and first half year 2022 the relevant documents for the public bidding phase have been developed and were published. For some elements of the ship it has been decided not to use a public bidding process because there was only one supplier acceptable. With the finalization of the bidding documents the public bidding process has started in February 2022 with the European wide publication. In chapter 3 the public procurement process will be elaborated (concerning the three items: fuel cell, NaBH4 energy unit and the selection of the wharf). In chapter 4 conclusions and lessons learned are given.

3 Public procurement process

The design phase was ended as soon as Lloyd's register gave the "in principal" approval of the design of the Neo Orbis. The following phase of the project: the public procurement phase started after that. The three main components that need to be procured are the fuel cell system, the NaBH4 energy system and most importantly the construction and building of the pilot ship at the selected shipyard. This chapter will elaborate further on the decisions being made for this procurement process.

3.1. Fuel cell and NaBH4 system

Early in the project the Port of Amsterdam contacted several fuel cell suppliers for advice in the design and HAZID procedure. One company that resulted from this market consultation was selected at first. They had a fuel cell of suitable size and price and were therefore a potential provider. They assisted the project in the beginning but after some time the support started to fade. Critical information on the fuel cell system that is required for further development and integration was not shared and relations deteriorated, notwithstanding a Non Disclosure Agreement with the proposed fuel cell company.

From the experience with this company that would provide the fuel cell it also became apparent that many present fuel cell suppliers are just that, suppliers. The responsibility often stops at the delivery of the product and does not include the elaborate integration of the fuel cell into a wider system, let alone being a partner in developing a new system for a ship. The integration however, is crucial for the success of the system and a process that is also unknown to many shipyards. There seems to be a difference between a fuel cell supplier and a party that is also willing

Interreg North-West Europe H2SHIPS
Project co-funded by European Regional Development Funds (ERDF)
Project webpage: http://www.nweurope.eu/h2ships

to work together in the integration of the system in a turn key ship design and building process.

The original plan was to start an international public procurement process for the fuel cell system taking into account the insights as described above. However, the costs for a 90 kW fuel cell are estimated at around 100-150k Euro and do therefore not warrant an elaborate international tender process. It also became clear that most fuel cell companies lack the knowledge of the use of fuel cells in a maritime environment.

In the end, the Port of Amsterdam decided that they would prefer not to be liable for the risk of purchasing a fuel cell themselves (since they have no experience on this matter). Instead, it seemed logical to shift the responsibility of purchasing a fuel cell from the port company to the technology provider. After all, the technology provider will be responsible for the application room and the hydrogen generation systems (NaBH4) placed in that space on board of the ship, including the fuel cell. Furthermore, there are many technical interfaces between the hydrogen generation system and the fuel cell. Connecting these responsibilities under one partner seemed to be the best option from a project management point of view and therefore the most logical step. The Procurement Board from Port of Amsterdam agreed formally with this option.

For the NaBH4 system we totally depend on the patents and development of H2Fuels as a system provider. For this system there is no other technology provider in the world. For that reason it has also been decided by the Procurement Board of Port of Amsterdam to exclude the purchase of the NaBH4 energy system from the public tender process.

3.2. Boat House

Boat House: we are at the moment in the design phase of the boat house. This boat house will have room for the Neo Orbis when on the quay side and on land the equipment for the on shore power supply (i.e. electricity for the battery pack) and the NaBH4 preparation unit. The construction and design company has started with the design of the boathouse on shore. This part of the boat house is necessary for the on shore power system (connecting the ship to the electricity grid for charging of the batteries) and for the storage and preparation of the NaBH4 and for the storage of the spent fuel (NaBO2).

Interreg North-West Europe H2SHIPS

Project co-funded by European Regional Development Funds (ERDF)
Project webpage: http://www.nweurope.eu/h2ships

3.3. Shipyard

At this stage the procurement of the shipyard is the most critical step. The documents for the procurement process have been finalized. And we are close to the final selection of the wharf.

Planning public procurement process (EU public procedure)

22 February 2022	Send announcement public procurement. Publish documentation set on procurement platform
9 March 2022 10:00 hours	*Closing first Term, interested parties can send questions based on documentation (total of 92 questions received)*
16 march 2022	Publication First Information Document based on received questions
23 March 2022 10:00 hours	*Closing second term, interested parties can send additional questions depending on above publication (no additional questions received)*
28 March 2022	Publication Second Information Document based on questions second term
8 April *2022 10:00 hours*	*Close of public procurement*
Week 15	Evaluation registration and received biddings from ship wharves
11-19 April 2022 (intern)	Individual meetings ship wharves
20 April 2022 (intern)	Consensus meeting, writing selection document
21 April 2021	Final date publication invite wharves for presentation
4 May 2022	Presentation

Interreg North-West Europe H2SHIPS
Project co-funded by European Regional Development Funds (ERDF)
Project webpage: http://www.nweurope.eu/h2ships

9 May 2022	Final date information publication procurement procurement decision Possibility for questions Objections as soon as possible after publication, at least 70 calendar days after date publication procurement decision
Week 20	Visit selected wharf
1 June 2022	Planned start date procurement agreement

For the selection process of the received biddings Port of Amsterdam has used a selection committee consisting of a.o. from Port of Amsterdam the project manager Neo Orbis and representatives of the purchasing department, nautical department and technical department. Also included in this committee were external members like: representative Dutch Bureau of Purchasing and Procurement (external advise on EU procurement process), H2Circulair Fuels (advise for the NaBH4 unit) and the original ship design agency (that designed the Neo Orbis).

The following documents where published for the public procurement:

- Public Procurement Procedure Neo Orbis
- 1.A Uniform EU procurement document
- 1.B Reference assignment
- 2. Declaration on registration
- 3. Pricing information registration form
- 4.A Contracting agreement
- 4.B Maintenance agreement
- 4.C General procurement regulations Port of Amsterdam
- 5. Building specifications Neo Orbis
- 6. General planning
- 7. Neo orbis brochure

In the report of Port of Amsterdam for the first half of 2022 copies of these documents are included. In the report for the second half of 2022 more details will be provided concerning the final selection of the wharf and the final budget information concerning the costs of the building of the Neo Orbis.

Interreg North-West Europe H2SHIPS
Project co-funded by European Regional Development Funds (ERDF)
Project webpage: http://www.nweurope.eu/h2ships

4. Conclusions and lessons learned

The H2 Ships project initially had a different pilot/demonstrator project (i.e. a barge for Tata Steelmills). When PoA stepped into the project the planning of the project and the estimated costs were roughly predicted. But the reality is different and not always foreseeable or predictable with the development of a first of its kind ship sailing on NaBH4. The planning of a project should either be expanded automatically if a new technology is involved and during the process delay is relevant, or should not be the (sole) basis for the granting of a subsidy. Planning of these kinds of projects need to be regularly revised and if needed altered. The same remarks are relevant for the first costs estimates in an original budget (in this case the budget estimates were made in March 2019).

Because of a safety analysis Lloyds was contracted in a much earlier phase in the process than normally applicable. This should become a standard procedure if new technology for the shipping industry is concerned. It is very important to involve safety authorities as early as possible in this process. We have to realise that this takes extra time in the planning and changes in the costs budget. For instance: the HAZID for this installation took 6 months (which is actually relatively quick: the HAZID for LNG bunkering took over three years!). By integrating this aspect in an early stage of the design phase in the end the total time needed for design and building of the ship can be improved.

The procurement process of a very innovative ship placed us for some mayor challenges. Normally the total procurement process would have been done in a public tender (as for instance a turn key project), but some strategic elements of the new ship could not be done by public tender. For the fuel cell and for the NaBH4 energy unit only one relevant supplier was available. Through organizing the public tender procedure and the procurement procedure for the suppliers of the fuel cell, and the NaBH4 unit in a parallel way we were able to speed up the total process of the design and the building of the ship. The knowledge of these preselected suppliers has proven important input for the design and the building of the ship by the to be selected wharf.

Based on the input of the costs of the building of the ship by the to be selected wharf and the other mentioned suppliers a final cost budget for the H2SHIPS pilot Neo Orbis of relevant investment costs and the on shore power system will be made. Including an updated time planning for building phase of the pilot ship and the sail testing period.

Interreg North-West Europe H2SHIPS

Project co-funded by European Regional Development Funds (ERDF)
Project webpage: http://www.nweurope.eu/h2ships