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Atlantic Area



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Boosting the hydrogen transition  
in the Atlantic Area ports

Deliverable D 3.3.1  
**Guidelines for Preparing Hydrogen Action  
Plan for Ports**



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## EXECUTIVE SUMMARY

This document provides a structured approach for HYDEA partners to create Hydrogen Action Plans to their ports. Recognising that ports typically respond to external policies and market demands rather than initiate major energy transitions, the focus is placed on enabling port users to adopt hydrogen-based solutions.

The guidelines begin with identifying and engaging key port users, understanding their energy use, operational needs, and decarbonisation pressures. The next step is to determine where hydrogen can be effectively applied by evaluating technical feasibility, cost, and stakeholder interest. These findings are used to define clear, practical actions supported by appropriate infrastructure, partnerships, and timelines. The final step outlines how to monitor implementation through key performance indicators, and regular reporting.

By following this method, HYDEA partners can create realistic, time-bound, and user-oriented action plans that support investment, align with policy signals, and accelerate the decarbonisation of port ecosystems across the Atlantic Area.

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## ABBREVIATIONS AND ACRONYMS

**CAPEX** – Capital Expenditure

**ETS** – Emissions Trading System

**GHG** – Greenhouse Gas

**H<sub>2</sub>** – Hydrogen

**KPI** – Key Performance Indicator

**LNG** – Liquefied Natural Gas

**OPEX** – Operational Expenditure

**TCO** – Total Cost of Ownership

**tCO<sub>2</sub>/year** – Tonnes of Carbon Dioxide per Year

# 1 Introduction

The purpose of this document is to provide a structured methodology to support HYDEA project partners in developing Hydrogen Action Plans tailored to their respective ports. It is essential to note that ports often act as market reactors, responding to both policy direction and commercial demand rather than initiating disruptive transitions on their own. The port operator manages land and leases space to port tenants/users, who are responsible for building and operating their own infrastructure (e.g., terminals, warehouses, equipment). As such, the hydrogen action plan must focus on enabling port users to decarbonise their operations, not just the port operator itself. A successful plan must align with user needs, respond to regulatory and funding signals, and create the right enabling environment for investment.

Based on this background, an action plan should outline a clear set of user-focused hydrogen initiatives that are realistic, time-bound, and aligned with both external policy drivers and the operational needs of port users, supported by enabling infrastructure, partnerships, and monitoring mechanisms to ensure effective implementation. The following section provides a step-by-step guideline to support HYDEA partners to develop hydrogen action plans.

## 2 Step-by-step guideline

### 2.1 Step 1: Understand and engage port operators and port users

Identify who the key port users are, how they use energy, what decarbonisation pressures they face, and their openness to hydrogen-based solutions.

1. Identify and categorise major port users:
  - a. List of users by type.
  - b. Identify the general scale of operations and energy use.
2. Estimate energy and fuel use:
  - a. Identify fuels in use.
  - b. Highlight energy users unsuited to electrification, and therefore potentially suited to hydrogen.
3. Conduct interviews with users:
  - a. Determine their plans, interest, and barriers related to hydrogen.
4. Review user-specific decarbonisation pressures:
  - a. Examine and list regulatory drivers.
  - b. Identify early movers already considering hydrogen.
5. Assess readiness and enabling role of the port:
  - a. Identify users ready to act, those needing support.
  - b. Determine how the port can enable adoption.

Outputs:

- Categorised user list with decarbonisation relevance and estimated energy/fuel use.
- Key insights from interviews (interest, barriers, needs).
- Summary of regulatory and corporate pressures.
- Readiness and port's enabling role.

## 2.2 Step 2: Identify and screen hydrogen use cases among port users

Determine where and how hydrogen can support the decarbonisation of port users' operations, based on their fuel use, operational needs, and readiness.

1. Analyse user-specific activities and energy use for each key user group (e.g., logistics firms, terminal operators, industrial tenants):
  - a. Identify the type of energy-intensive operations.
  - b. Estimate scale and frequency of fuel/energy consumption.
  - c. Evaluate emissions footprint.
2. Match hydrogen solutions to user needs.
3. Conduct a use case screening/analysis:
  - a. Conduct preliminary market readiness screening (availability of suppliers and equipment).
  - b. Conduct preliminary economic and environmental feasibility study (vs. diesel, electricity, LNG).
    - i. Compare CAPEX to alternatives.
    - ii. Compare OPEX to alternatives.
    - iii. Compare GHG emissions to alternatives.
    - iv. Compare infrastructure requirements to alternatives.
4. Conduct TCO analysis (*Optional*).
5. Identify national or European funding opportunities.

Outputs:

- Shortlist of feasible hydrogen use cases and users.
- Initial concepts for shared or scalable infrastructure.
- Use case screening/analysis.

## 2.3 Step 3: Define and deliver hydrogen actions for port users

Translate prioritised use cases into implementable hydrogen actions that support port users, and develop a time-phased roadmap for their coordinated delivery.

1. Define user-focused actions:
  - a. Develop specific, practical actions (e.g., deployment of a shared hydrogen refuelling station, deployment of pilot trials of hydrogen forklifts).
  - b. Ensure each action supports an identified user or group of users.
  - c. Develop a user-action matrix (Who / What / When / How / Enablers).
2. Outline technical and operational requirements:
  - a. Identify annual H<sub>2</sub> capacity, safety, equipment, site needs.
  - b. Agree with users and list how will they access or operate infrastructure.
3. Assign roles and resources:
  - a. Define responsibilities across port operator, users, public agencies, and developers.
  - b. Identify and list required permits.
  - c. Estimate the CAPEX and OPEX requirements for the actions.
  - d. Align actions with suitable funding opportunity windows identified in step 2.
4. Identify and list supporting policies, partnerships, and risks.
5. Phase and sequence actions:
  - a. Group into short (0–2 yrs), medium (2–5 yrs), and long-term (5+ yrs).
  - b. Prioritise based on readiness, funding cycles, and dependencies (e.g., refuelling before fleet).

6. Develop an implementation roadmap
  - a. Create a timeline (ganttt or table format) showing key actions, actors, and milestones.

## 2.4 Step 4: Monitoring and evaluation implementation

Implement a plan to track the progress and impact of hydrogen actions supporting port users, ensuring timely delivery, measurable outcomes, and continuous improvement.

1. Define key performance indicators (KPIs) such as:
  - a. Hydrogen dispensed (kg/year).
  - b. Number of users adopting H<sub>2</sub> solutions.
  - c. Emissions reduced (tCO<sub>2</sub>/year).
  - d. Investment or number of jobs created.
2. Set targets and baselines (use baseline data from step 1):
  - a. Set realistic, time-bound targets per KPI.
3. Establish a reporting process:
  - a. Set a reporting frequency.
  - b. Build feedback loops to adjust actions if needed.

## 3 Conclusion

This document provides a structured guide for HYDEA partners in developing hydrogen action plans for ports. By identifying and engaging key port authorities and users, assessing their energy use and decarbonisation pressures, and screening feasible hydrogen use cases, partners can ensure that hydrogen solutions are aligned with user requirements. The guidelines support the translation of these use cases into specific, practical actions, clearly defining roles, responsibilities, funding opportunities, and operational needs. Incorporating monitoring and evaluation with measurable KPIs enables continuous tracking of progress and adjustment of actions as needed.

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