



MARKET CONSULTATION

INNOVATION PARTNERSHIP DENSE PHASE CO₂ PUMPS – DELTA RHINE CORRIDOR

For the benefit of N.V Nederlandse Gasunie

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1. GENERAL INFORMATION

1.1 Introduction

This guide provides information on the market consultation for CO₂ pumps for the Delta Rhine Corridor (hereafter: DRC) project for N.V. Nederlandse Gasunie (hereafter: Gasunie).

Gasunie is currently in the process of preparing a European tender for an innovation partnership concerning the development, manufacturing and delivery of CO₂ pumps for the DRC project.

As a part of this process Gasunie is conducting this market consultation to gain insight into the extent of possibilities and interest in the market, as well as to determine how a potential tender could best be structured. Your response is greatly appreciated and will serve as one of the sources of information on which the follow-up strategy will be based.

The announcement of this market consultation was sent to TenderNed / TED for publication on Thursday 15 January, 2026.

Gasunie is an energy network operator. In the Netherlands and the northern part of Germany, we manage and maintain the infrastructure for large-scale transport and storage of gas. At the moment, this is mainly natural gas, but the energy transition will increasingly bring about a shift towards green gas and hydrogen. We also collaborate in the construction and management of heat and CO₂ grids. We ensure that this part of the energy supply is safe, reliable and as sustainable as possible, ensuring that everyone has access to energy, always.

More information is available at www.gasunie.nl.

1.2 About the DRC project

The DRC is a strategic infrastructure project that facilitates the development of an integrated network for the transportation of hydrogen (H₂) and carbon dioxide (CO₂). Laying pipelines for both hydrogen and carbon dioxide (CO₂) within a single corridor will enable heavy industry in the Netherlands and Germany to become more sustainable and significantly reduce carbon emissions. This strengthens the strategic and economic position of the industrial areas in north-western Europe and will also contribute significantly to achieving the national and European sustainability goals.

The ambition of the DRC project is to transport CO₂ from Germany and the Netherlands to CO₂ storage facilities in the North Sea and possible CO₂ users. In addition, low-carbon hydrogen will be made available to industry in the Netherlands and Germany via the Rotterdam import point.

Pipelines for transporting hydrogen and CO₂

Hydrogen

The hydrogen pipeline will be constructed between Rotterdam and Boxtel, where it will connect to another part of the national hydrogen network, which also creates a connection to Germany and Limburg. This hydrogen pipeline, which is part of the national hydrogen network, is a key east-west connection that will make the hydrogen network an end-to-end, integrated network. You can read more about the hydrogen network on the [Hynetwork website](#).

CO₂

The [CO₂ pipeline in the Delta Rhine Corridor](#) is being installed between Rotterdam (the Maasvlakte industrial area) and Venlo, where the pipeline will connect to pipelines in Germany and this way also reach industry there. Another CO₂ pipeline will be constructed from Rotterdam to Antwerp via the Dutch province of Zeeland, the [Delta Schelde CO₂ connection](#).

2. CONTENT MARKET CONSULTATION

2.1 Purpose and goal

With this market consultation Gasunie wants to obtain input from the market on several questions and refine the scope and process for the planned European tender for an innovation partnership concerning the development, manufacturing and delivery of dense phase CO₂ pumps for the DRC project. The aim is to gain a comprehensive understanding of the technological possibilities, market interest and development potential related to dense phase CO₂ pumps. This understanding will enable Gasunie to shape a well-structured, realistic European tender for an innovation partnership. Additionally, Gasunie wants to reach potential participants in order to interest them for the upcoming tender and provide Gasunie with valuable input.

Ultimately, the goal of this market consultation is to prepare and publish a tender that:

- Is aligned with market capabilities in respect to technological solutions;
- Provides sufficient clarity and structure to enable meaningful participation by suppliers;
- Encourages market parties to engage in the innovation partnership and subsequent development trajectory.

Therefore, this market consultation has the following specific objectives:

1. **Validate initial technical and operational assumptions**

- Assess the feasibility of the intended CO₂ pumping requirements.
- Ascertain market availability of pumps^{1,2} for the intended CO₂ pumping requirement.
- Understand availability of supplier's proposed pump(s) for the operating conditions and technical specifications set out by Gasunie.
- Gain insight into the required balance of plant and plant control to ensure successful integration of the pump in a fully functional pumping station (normal and off-normal duty).

2. **Assess the current state of technology readiness (TRL)**

- Identify suppliers' self-assessed current TRL levels³ for proposed pump concepts with respect to envisaged operating conditions.
- Understand supplier's ongoing innovation and development in the field of dense phase CO₂ pumping to further increase TRL.

3. **Gather insights into required R&D activities**

- Understand what additional research, engineering, development and testing is required to bring supplier's proposed pump to the required level of technology readiness⁴, with respect to both:
 1. the pump itself,
 2. the integration of the pump into a fully functional pumping station.

¹ The term "pump" denotes the core pump and driver, inclusive of its required ancillary systems such as lube oil system, seal system, etc.

² Gasunie considers an API 610 BB5-pump to best fit the envisaged operating conditions.

³ Gasunie uses the technology readiness levels as defined in API RP 17Q. Where Supplier uses different definitions of levels of technology readiness, Supplier shall detail this in his response.

⁴ Gasunie aims for the highest level of technology readiness within the stipulated timeframe, not lower than TRL-4 as defined in API RP 17Q.

4. **Understand supplier capabilities and willingness to participate**

- Understand supplier experience with comparable innovation and R&D trajectories.
- Gauge supplier's interest in an innovation partnership and capability of bringing its proposed pump (system) to the required level of technology readiness in a close cooperation with Gasunie within the operational requirements and stipulated timeframe.

5. **Validate scope, process phasing and planning of the innovation partnership**

- Collect input on phasing of development, testing and validation activities.
- Test proposed timelines, planning assumptions and preconditions.

6. **Discuss and verify preconditions**

- Validate assumptions and expectations regarding intellectual property arrangements.
- Identify potential procedural or technical constraints that may influence the tender.

Insights and information gained from the market consultation will be used by Gasunie (where relevant) in the preparation of the European tender and the tender documents. Gasunie reserves the right not to use these insights and information, or not to use them in full. Gasunie aims to be as transparent as possible by using the results of the market consultation to shape the tender and the accompanying requirements. Gasunie expects to publish the tender in March/April 2026.

2.2 **Scope**

General

The Delta Rhine Corridor (DRC) is a strategic infrastructure project from Gasunie that contributes to the development of a network for transporting hydrogen (H₂) and carbon dioxide (CO₂). The first part of the project, DRC-West, involves the construction of pipelines for transporting H₂ and dense phase CO₂ between Rotterdam (Maasvlakte) and Bostel. The second part, DRC-East, focuses on transporting dense phase CO₂ from the German border near Venlo to Bostel.

Within this network, CO₂ pumping stations are critical components. A pumping station is planned at Maasvlakte to increase the operational pressure of DRC to offshore storage facilities.

Gasunie earlier on established that no operationally proven pumps exist for the operating conditions and technical specifications set out by Gasunie. Furthermore, the current level of technology readiness and additionally required research, development and testing (innovation) to achieve the required level of technology readiness are unclear.

Therefore, the goal is to engage a supplier, working in close cooperation with Sweco and Gasunie, to develop and validate scalable pumps that meet the desired requirements for dense phase CO₂ application. Following successful validation and TRL assessment, Gasunie intends to procure these pumps for the Maasvlakte station, with delivery scheduled for 2029.

It is envisaged that following the market consultation, a tender will be issued for an innovation partnership comprising of the (remaining) technology development as well as supply of subject pumps to the DRC project for pumping CO₂ at the operating conditions and technical specifications as set out by Gasunie.

2.3 Duration

The intended innovation partnership will start as soon as possible after completion of the European tender with intended pump delivery in 2029.

2.4 Indicative Technical Specifications

- **Technical specifications** – As initial guidance, the following is provided:
 - Pump design specification / pump type – API 610 / type BB5
 - Complete pullout design;
 - Mechanical seals. Double, balanced, cartridge type according to the guidelines and intensions in ISO 21049 / API 682 4th.
 - Drive: Electrical motor + VFD;
 - Design life: 25 years.
- **Design conditions and operating conditions** – Design and operating conditions have not yet been fully established, as they can only be optimized once pump feasibility and characteristics are known. The following however is provided to give initial guidance to the supplier to establish feasibility and offer an initial pump proposal as basis for further development:

Design

- Maximum allowable working pressure: minimal 280 bar(g);
 - To ensure intrinsic safety in maximum suction pressure scenarios;
 - Incidental pressures in case of water hammer shall be included in the design of the pump.
- Maximum suction pressure: 160 bar(g);
Nom. suction pressure:
 - @ begin phase : 100-110 bar(g);
 - @ end phase 95-100 bar(g);
- Differential pressure range⁵: 40-100 bar(g), Nominal 90 bar(g) (@ 20 degC suction temperature);
- Design temperature: -20 / +50 degC.
- Maximum discharge temperature: 40 degC; Suction temperature range: 5 - 30 DegC. 20 degC as nominal temperature.

Operating

- Pumped liquid: CO₂ >= 95 mol%;
- Station capacity: 2500 tons/h (max capacity)⁶
- Station capacity range: 33-100 % of max capacity:
 - Capacity control via recycling shall be minimized. Recycling only for start-up;
 - Number of pumps⁷: N+1 configuration with N as a trade-off between TCO, feasible capacities and recycling requirement. To be determined in conjunction with Vendor.

⁵ Actual operational pressure range is not available at this moment. Shown values are therefore to allow Supplier's to make an initial selection to determine maximum pump power requirements for normal duty.

⁶ Denotes maximum capacity when station is fully on-line. It is expected that station flow will build up to maximum capacity over a period of several years.

⁷ It is acknowledged that this ultimately is a TCO-influenced decision and will require further iteration in development phase.

- Specified indicative operating points:

OPERATING CONDITIONS (6.1.2)						
		Maximum	Rated ¹	Nominal	Minimum	Max start-up ²
Pumping temperature (suction side)	°C	25		20	5	30
Flow ⁴	t/h	850 ⁴		850 ⁴	500	850
Discharge pressure	bar(g)	180		180	180	180
Suction pressure	bar(g)	90 ³		100	140	95
Differential pressure	bar(g)	90		80	40	85
Differential head	m	1333		967	446	1379
NPSHa	m					
Hydraulic Power	kW	MP		MP	MP	MP
1: Rated point to be specified by Supplier. 2: Worst case transient condition. High suction temperature start-up. Allowable max. suction temperature and min. suction pressure for start-up to be determined in conjunction with Supplier. 3: Minimum allowable suction pressure to be determined in conjunction with Supplier to avoid cavitation area. 4: Flow based on an initial N+1 pump configuration with N=3. Vendor is free to optimize this configuration based on technical feasibility, TCO estimates and turn down capabilities.						

- **Operating requirements** – As for the above, these cannot be fully detailed yet. The following is provided to give initial guidance to Supplier to establish additional innovation requirements:
 - The pump(s) shall maintain various flow and pump head (operational conditions) in various periods over different length of time;
 - Individual pumps can individually be taken off-line and brought back on-line without having to take other pumps or whole pumping station off-line;
 - Stepless station capacity range with minimum recycle;
 - Starting up against closed valve without recycling is preferred;
 - Pumped medium shall not be contaminated with external fluids (oil or flush water).

2.5 Tender process

Gasunie intends to make use of the European procurement procedure *Innovation Partnership* (in accordance with Article 3.35b of the Dutch Public Procurement Act 2012). This procedure combines development and eventually acquisition. The development phase and the commercial phase are integrated into a single procedure, so no separate European tender is required for the final purchase of the CO₂ pumps.

Within this procedure, dialogue, development, and collaboration with a supplier are essential to achieve a result that truly provides a solution to the identified need.

It is important to note that, through the intended procurement procedure, Gasunie aims to select the most suitable partner with whom to enter an innovation partnership. After the award phase, this partner will work with Gasunie through the research and development phase — which includes

several go/no-go decision points — ultimately leading, hopefully, to the ability to procure CO₂ pumps that meet the defined requirements.

Below is a schematic overview of the process steps in the Innovation Partnership:



2.6 Market consultation questions

1. Technical and operational assumptions	
1.1	Are the described intended scope and indicative (technical) specifications clear? Do you have any comments and/or points of attention?
1.2	Are you as supplier considering it feasible for you to offer a pump that satisfies Gasunie's intended CO ₂ pumping requirement? If so, what would be your initially proposed pump selection for this application?
1.3	What actual experience (ideally in form of reference list) do you already have with pumping of CO ₂ under conditions that approach Gasunie's intended process parameters?
1.4	How would the supplier make available essential technical information for the design of balance of plant and by this assures that equipment is successfully integrated in overall plant design?
2. Current state of technology readiness (TRL)	
2.1	What is the supplier's self-assessed current TRL for the proposed pump concept(s) under the given CO ₂ pressure, temperature and operating conditions?
2.2	Which challenges does the supplier anticipate in achieving the required TRL in terms of: – technical challenges (e.g. sealing concepts, materials, acid-dropout behaviour, transient behaviour). – procedural challenges (e.g. test facilities, certification, availability of specialised staff). – other challenges (e.g. financial or supply chain).
2.3	Is the supplier willing to participate in an independent TRL-assessment, and what conditions or prerequisites does the supplier associate with such participation?
3. R&D activities	
3.1	Which R&D, engineering and testing activities do you as Supplier consider as required to mature the proposed pump system to the TRL needed for commercial deployment?
3.2	Which knowledge gaps or critical uncertainties must be addressed during the R&D trajectory, for both: • the pump itself, and • its integration into a complete pumping station including auxiliaries and process control?
3.3	Which facilities, tools, methods and external partners does the supplier expect to use for prototype development, performance testing, durability testing, and system level validation?
4. Supplier capabilities and willingness to participate	
4.1	Which internal processes and standards are applied by the supplier in an innovation or R&D project? How is proper documentation of design choices, changes, and design iterations ensured by the supplier?
4.2	How does the supplier organise an innovation or R&D process (in terms of systems, methods, test facilities and competencies), and how are information and dependencies from subcontractors managed?
4.3	Is the supplier willing to participate in a joint development process in the form of an innovation partnership?
5. Scope, process phasing and planning of the innovation partnership	
5.1	How does the supplier assess the feasibility of a phased development approach with clear go/no go moments and what is the suggestion regarding e.g. TRL reviews, prototype validation, integration testing, etc.?
5.2	Which dependencies, prerequisites or sequencing considerations does the supplier view as critical for timely development (e.g., required data from Gasunie, interface definition with the system integrator, availability of test facilities)?
6. Preconditions	
6.1	What intellectual property arrangements (background/foreground IP, access rights, licensing options) does the supplier consider acceptable or required for participation in an innovation partnership?
6.2	Are there any procedural and/or contractual constraints that could influence the supplier's ability and willingness to participate in a possible tender?

6.3	What, if any, specific commercial approaches to this innovation partnership - and the phasing it contains - would you suggest for Gasunie to consider?
7. General questions	
7.1	What question(s) did you miss and what would be your answer?
7.2	Do you have any points of attention, recommendations, or tips for Gasunie regarding the tender process?
7.3	Would you be willing to engage in a follow-up conversation with Gasunie — either via Microsoft Teams or at one of our Gasunie locations — to discuss your submitted response and any clarifications arising from this market consultation?

3. PROCEDURE, PLANNING & CONDITIONS

3.1 Structure & format

This market consultation has been published on TenderNed and the EU official journal TED. The market consultation document is digitally available at www.tenderned.nl. Based on this document, market parties can gain an understanding of the potential scope of the European tender. To gain insight into the market, Gasunie has formulated a number of questions (paragraph 2.6), which are repeated in Annex A. This annex serves as the response form for market parties to answer the questions.

3.2 Questions or clarifications regarding this market consultation

If you have any questions about this consultation document, please use the form provided in Annex B, Template for submitting questions. The completed document can be sent via email to the contact person listed below. Paragraph 3.7 specifies the deadline for submitting questions.

The Note of Information containing the answers to the submitted questions will be published on TenderNed on the date mentioned in paragraph 3.7. All submitted questions will be anonymized by Gasunie before being included in the Note of Information.

3.3 Submitting responses to the market consultation

To respond to the market consultation, please use the response form provided in Annex A. We kindly ask you to provide well-reasoned and clear explanations with your answers. Once completed, the document can be sent via email to the contact person listed below. We kindly request that your responses be submitted no later than the date and time specified in paragraph 3.7.

3.4 Clarification

If desired, Gasunie has the option to initiate a dialogue with one or more participants based on the submitted information. If Gasunie wishes to use this option, you will be contacted to schedule a meeting within the timeframe as listed in paragraph 3.7.

Gasunie may choose to make use of this option but is not obligated to do so.

3.5 Contact

The contact person for this market consultation is Ida Consenheim, Senior Buyer. She can be reached at i.f.consenheim@gasunie.nl.

It is not permitted to contact any person other than the person mentioned above in connection with this market consultation.

3.6 Conclusion of the market consultation

Responses to the questions will be considered, where relevant, in the preparation of the European tender. A summary of the market consultation can be included as an annex to the European tender. This summary – if included – will provide an abstracted overview of the insights and information obtained. Sensitive or confidential business information will not be published. By participating, parties grant permission for the provided information and/or data to be used, in accordance with the confidentiality provisions outlined in paragraph 3.8. The contents of the summary will not be shared in draft form with participating parties prior to publication.

3.7 Planning

No rights can be derived from the planning below. Dates in bold font are final deadlines unless otherwise communicated by Gasunie.

Activity	Date / Period
Publication market consultation	Thursday 15 January 2026
Deadline for submitting questions (Annex B)	Monday 2 February 2026
Publication note of information	Thursday 5 February 2026
Deadline for submitting responses (Annex A)	Monday 16 February 2026, 4 PM CET
Clarification meetings (optional)	Tuesday 3 March/Wednesday 4 March 2026

3.8 General conditions

By participating in the market consultation, the market party agrees to the following conditions:

- Communication will take place in English;
- All communication will be exclusively with the contact person mentioned in paragraph 3.1;
- Your responses are confidential and will only be shared within Gasunie;
- The provided information will be used solely for further research and advice regarding the European tender;
- The scope and requirements may change based on the information provided;
- Gasunie is not bound by the results of the market consultation;
- Participants cannot derive any rights from this market consultation;
- If necessary or considered useful, Gasunie may contact market parties to gather additional information;
- Gasunie reserves the right to modify the planning if needed.

3.9 Nature of market consultation and reimbursement of costs

Gasunie stresses that the market consultation is of a non-binding nature for both Gasunie and participants. Gasunie does not, through this market consultation, incur any obligation in respect of Gasunie's marketing of a service, the procurement or the purchase of products. Participants cannot derive any right from this market consultation.

Participation in this market consultation by participants does not lead to any advantage or disadvantage in any (future) acquisition path or tender procedure to be started by Gasunie.

The costs of participating in this market consultation shall be borne entirely by the participant. Gasunie reserves the right to suspend and/or terminate all or part of the market consultation. Participant(s) shall not be entitled to any form of compensation in such a situation.

3.10 Intellectual property

All intellectual property rights, including copyright, which are based on documents and information provided by Gasunie in the context of this market consultation, including in any case the market consultation document (this document) and explanations provided, both oral and written, are vested in Gasunie.

Except as provided for by the Copyright Act ('Wet Auteursrecht'), no reproduction of the documents and their attachments may be made by printing, photocopying, scanning, microfilm or otherwise

without the written consent of Gasunie, except if and to the extent reasonably necessary for the correct and complete answer to the questions.

3.11 Terms of agreement

Dutch law applies to this market consultation.

By accepting this request or submitting your reply, you indicate your unconditional agreement to the terms and conditions contained in this market consultation document.

3.12 Errors and contradictions

All documents, including any accompanying annexes following the present market consultation, have been compiled and prepared by Gasunie with the utmost care. In the event that a participating party finds errors, irregularities, inconsistencies or ambiguities, we kindly but urgently ask you to inform Gasunie.