Capture technology & volumes

Answers to the questions below shall provide Northern Lights an understanding of the technical details related to CO_2 capture technology and volumes.

No	Question	Answer
A1	**CO2 volumes**	
A11	**CO_2 volumes** Please provide "production profile" of CO_2 you aim to capture and export to Northern Lights (tons per year). If available, please provide a monthly breakdown of the annual volumes or provide additional information about seasonability of the production as well as potential shutdown periods (planned or unplanned shutdown estimate).	
A12	**Operations start-up** Please provide the year of start-up, according to project plan. If available, please also provide the quarter of the year. Please summarize start-up / ramp-up assumptions	
A13	**Potential expansion** Please provide plans for potential phased upscaling of CO_2 volume, and when this increase in captured volume is planned.	
A2	**Capture**	
A21	**Location** Please provide the location of your capture site and the location of your offloading to Northern Lights ships (port/quay). Pllease provide address and satellite image.	Location for capture site: Location for offloading to ship:
A22	**Capture technology and technology provider** Have you already selected your capture technology provider? Please specify. Please summarize main rational for capture technology selection and identified residual technological risks	
A23	**Process conditions** Is your design based on loading to Northern Lights ship at medium pressure (liquified CO2 at 15 bar equilibrium)? Please provide details on your design.	
A24	**Intermediate storage capacity** Please provide details on the capacity of your intermediate storage, and the planned loading frequency to the Northern Lights ships, assuming a capacity of 7500 m3 ships.	

CO2 specification

Answers to the questions below shall provide Northern Lights some understanding about the alignment between potential Client CO2 and NL CO2 specifications and about which key NL specifications requirements would be difficult to achieved (unreasonable costs / schedule, physical impossibility).

No	Question	Answer
B1	**Emitter CO2 specification** LCO2 Cargo shall consist overwhelmingly of Carbon Dioxide with CO2 minimum content as specified in the table below. Unless otherwise agreed by the Parties, LCO2 Cargo shall not contain any impurities other than those specified in the below table. For the avoidance of doubt, LCO2 Cargo shall not contain any solid or particles or such other contaminants. Please provide your expected CO2 specification. To ease the identification of potential gaps with Northern lights transport & storage specification, please find below NL CO2 specification.	
B2	**CO2 specs challenges** Please identify components contents limits that would represent a challenge (cost, schedule…) to achieve. Can you specify with more details what is the impact if CO2 spec is not met?	

Key Logistics constraints

Answers to the questions below shall provide Northern Lights an understanding of the key logistics constraints associated with the logistics of CO2 transfer and transport. Objective is to anticipate vessel times approach / berthing / loading.

No	Question	Answer
C1	**Port and quay facilities**	
C11	Please provide details on your planned location for loading to Northern Lights' ships including max. draught and available quay capacity (weight / ship dimensions) Please provide the name and contact info of the Port Authority which regulates the Shore Terminal.	
C12	Are there any physical navigation restrictions for bringing the proposed CO2 ship into the Port and approaching the Shore Terminal? E.g. draught, air draught, narrow channels, tight turns, manoeuvring issues, mooring issues, height under bridges, etc.	
C13	Has the Port or Shore Terminal restricted access due to adverse weather conditions (e.g. snow, wind, wave, ice etc.) in the last 3 years? Please explain the type of restriction and provide dates and durations. Alternatively, what are the weather and conditions restrictions and occurences for wind, wave, temperature and tides.	
C14	Please advise if the ships calling at this port need to build to an ice class; and if so, please elaborate on ice class requirements.	
C15	Please provide vessel limitations (maximum vessel dimensions) at berth: •LOA: [X] m •Beam: [X] m •Draught: [X] m •Air draught (@MHWS): [X] m •Gross tonnage: [X] t •Deadweight: [X] t •Displacement: [X] t	
C16	Is (will) there (be) pilot and/ or tug requirements for CO2 ship(s) calling at the onshore terminal? Please elaborate on requirements. Is there a customary waiting area (fairway or pilot boarding station) at the Port? If there is, please indicate sailing distance from customary waiting area to Shore Terminal and provide satellite image	
C17	Please provide port cost information. e.g. Is there a booklet or table that shows current port costs and/or port costs applicable to future CO2 ships?	
C18	Is (will) the Port and Shore Terminal (be) operational 24x7? Is (will) night-time berthing (be) allowed?	
C19	Will the chosen berth be dedicated to CO2 trade? If the berth will be shared with other ships, please estimate the expected berth utilization rate (%) [before or after] CO2 trade commences	
C2	**Utilities**	
C21	Is (will) LNG and/or Diesel bunkering (be) available/allowed at the Shore Terminal or the Port at large? Please provide information on local bunker suppliers, available bunkering methods and bunkering locations	
C22	Is there power from shore available for berthing vessel? If yes please provide technical details on the potential configuration (power, voltage, type of connection…)	
C3	**Operations personnel**	
C31	Which company owns/ controls the existing Shore Terminal?	
C32	Which company operates the existing Shore Terminal?	
C4	**Existing shore terminal (if applicable)**	
C41	Please describe the current operations at the existing Shore Terminal. Please describe the current operations at the existing berth which is planned to be used for CO2 operations	
C42	Please describe the current facilities (storage tanks, buildings, berth facilities, etc.) at the existing Shore Terminal	
C43	Please provide the Terminal Information Booklet as attachment	

C5	New built shore terminal (if applicable)	
C51	Which company currently owns the land where the Shore Terminal will be built on? Which company will own the Shore Terminal?	
C52	Have the (CO2-aspects of the) Shore Terminal and the berth been designed? If designed, please provide high level design schematics as attachment.	
C53	If there is an existing Shore Terminal, please describe the modifications needed to enable CO2 trade.	
C54	Which company(s) will be the main EPC contractor(s) of the Shore terminal? If no company selected, please provide a shortlist for main scope of work	
C55	Which main industry/international standards will be adhered to during the construction of the Shore Terminal?	
C56	Which main permits/authorisations are required for the construction and operation of the CO2 Shore Terminal?	
C57	Which of the above main permits/authorisations have already been secured?	
C58	How much CO2 storage capacity (m3) is envisaged at the Shore Terminal?	
C59	How will CO2 be transported from the Capture Site to the Shore Terminal? (e.g. pipeline, trucks, etc.)	

Project Execution Status

Answers to the questions below shall provide Northern Lights an understanding of the Client readiness to deliver CO2 "on Time" for NL transport & Storage.

No	Question	Answer
D1	**Design Maturity**	
D11	**Current capture project state** Please provide current state of the project (Conceptual, pre-FEED, FEED, Execution). Please also summarise key dates and milestones associated with the upcoming project phases.	
D12	**Pilot project** Please specify if you have already developed/ implemented, within the proposed capture Site, a CO2 Capture Pilot.	
D2	**Maturity of internal & external validations**	
D21	**Internal validations / approvals** Please summarize current state of internal validation for your CO2 capture Project.	
D22	**External validations / approvals** Please summarize key external validations / approvals required to start & execute your project. Please also provide current status of these approvals.	
D3	**Subsidies**	
D31	**Need for subsidies** Please advise minimal level of subsidies required for your Project to be sanctioned (internally & externally)**.**	
D32	**Subsidies program** Please advise what are the current supporting programs (subsidies) being chased for your capture project. Please provide details of key milestones associated with these subsidies program.	
D4	**Key execution risks**	
D41	**Local specificities** Please provide a high level summary of specific local constraints on capture project.	
D42	**Technical risks** Please provide current assessment of highest technical risks for the execution of the Project.	
D43	**Commercial risks** Please provide details on your JV arrangement if any and summarize risks associated with your commercial structure.	
D44	**Dependencies to other projects** Please explain if your capture project will suffice to cover CO2 capture up to NL CO2 ship or if it is link to other infrastructure projects (port upgrade, pipeline project, liquefaction plant...)	

HSEQ

Answers to the questions below shall provide Northern Lights an understanding of HSEQ framework and performances.

No	Question	Answer
E1	**Management Systems**	
E11	Is the Business Management System certified by a recognised third-party agency?	
E12	Is the HSE Management System certified by a recognised third-party agency?	
E13	When are the latest audits dates ? Please specify the type of audits ?	
E14	Is there a Quality plan available ?	
E15	Is there a HSE plan available ?	
E16	How are managed the risks ?	
E2	**Human Rights / Compliance / Ethics**	
E21	Is there a Human Rights policy available ? Does it follow recognised international standards (i.e UN conventions, ILO and national labour legislation…)?	
E22	Is there a regulatory requirements, compliance and follow-up process or procedure in place ?	
E23	Any Code of Conduct available ? What are its contents ?	
E3	**HSEQ performances**	
E31	HSE performances over the last three years: TRIR, LTIR, HIPO rates, Process Safety events, Spills ? Significant HSE events and types over the 3 aost years ?	
E32	What are the HSEQ objectives ? How often are they set-up ?	
E33	Any information relating any adverse reaction from Authorities / Media / NGO / public ?	
E4	**Training and Skills of personel operating at quay / loading facilities**	
E41	How is ensured that the trainings/certification of the operations involved in the loading operations are adapted?	
E42	Describe how emergency situations are managed: Organization in place, Plan, Available means on site, Tests/exercises scenarios and frequency?	
E5	**Quay and Loading facilities : Interface management**	
E51	Will it be a bridging document in place describing the communication protocols and the logic sequence to follow in case of emergency ?	
E52	What are the inspection, maintenance and tests policy and plans for the loading and quay facilities including Fire and Gas and Fire-Fighting Systems ?	
E53	Are (will) the facilities (be) designed and operating (operated) according to international standards and guidelines (i.e: OCIMF, SIGTTO, IGC Code …)?	
E54	Is the quay / loading facilities correctly secured/protected from any intrusion?	
E55	Is the quay / loading facilities correctly protected from fire / explosion if relevant ?	
E56	Is (will) the Shore Terminal (be) close to residential or other sensitive areas? Please indicate distance and provide satellite image.	
E57	Is (will) there (be) noise pollution or other restrictions stricter than what could be expected from international ship/shore operations? Please elaborate on all identified sensitive areas and restrictions.	
E6	**Modification management and communication**	
E61	Is there a reliable system in place to take into account modification which can appear on the quay side/loading facilities and to communicate them to different stakeholders (us in particular)?	
E7	**Work organization**	
E71	Is there a permit-to-work system in place ? How will be considered the ship arrival at quay and CO2 loading activities ? Will it be a co-activity matrix set-up including it?	