PRELIMINARY MARKET CONSULTATION

INTRODUCTION

The Contracting Body promoting this consultation is the Instituto Tecnológico de Canarias, S.A. (Canary Islands Institute of Technology, hereinafter referred to as "ITC").

This consultation has a legal basis on Article 115 of Decree 9/2017, of 8 November, on public sector procurement, which transposes into the Spanish legal system the Directives of the European Parliament and of Council 2014/23/EU and 2014/24/EU, of 26 February 2014.

The ITC is a publicly owned company of private Law and a multidisciplinary technology centre of the Canary Islands Regional Government, with over twenty-five years' activity, that, has been supporting science and technology as essential parts of the process of social and economic transformation and sustainable development in the Canary Islands, contributing to the competitiveness of the businesses in the Canary Islands and opening new paths towards new technological and industrial fields.

As an instrumental entity of the Canary Islands Government, ITC's activities cover the implementation of regional policies intended to promote research and innovation applicable to the productive industry, as well as the implementation of inter-regional and international collaborative and cooperative projects.

ITC is launching a call for tender for the incorporation of disruptive technology in the experimental or commercial phase for the recovery of brine from seawater desalination plants, within the framework of the funding granted by the Cabildo of Gran Canaria entitled "INVESTMENT IN INFRASTRUCTURE AND EQUIPMENT IN TECHNOLOGICAL ENTITIES THAT CONTRIBUTE TO THE DEVELOPMENT OF R&D+I ACTIVITIES LINKED TO THE EXPLOITATION OF ISLAND MARINE RESOURCES (AND SPECIFICALLY FOR THE IMPLEMENTATION OF THE HIGH-TECH INCUBATOR PROJECT IN THE ECONOMIC AREA OF THE SOUTHEAST OF GRAN CANARIA)" IN POZO IZQUIERDO. (SEIDI II_I2)."

This consultation is addressed to all economic operators, associations and other market participants with a legitimate interest in the tender.

Participation in the Preliminary Market Consultation does not imply any obligation, nor does it confer any rights or preference with respect to the award of the contract that may subsequently be concluded. The use of the content of the proposals is limited exclusively to its use in the definition of the specifications of the eventual procurement following the Preliminary Market Consultation.

PURPOSE

The purpose of this preliminary consultation is to inform the economic operators of the ITC's plans and gather information from them in order to be able to correctly prepare and adapt to the market the specifications of a tender, consisting of the following:

"Implementation and validation of brine recovery solutions from seawater desalination plants within the framework of the circular economy strategy, through the generation of chemical by-products of interest, energy or CO2 capture".

All proposals submitted by the parties wishing to participate must include an indicative quotation, setting out at least maximum prices and, optionally, also minimum prices, depending on the variables considered, detailing in any case the IGIC (VAT applied in the Canary Islands) as a separate item. Furthermore, it would be desirable to respond to all the questions raised.

Interested parties must fill in and provide the information requested in the Participation Form annexed to this document.

DEADLINE

The deadline for submitting the completed Participation Form in response to the Preliminary Market Consultation will be over on 31th May 2022 at 14:30h (GMT).

PROPOSAL SUBMISSION PROCESS

Participants must prepare their proposals by completing the Participation Form annexed to this document, digitally sign it and submit it by email to compras@itccanarias.org.

In addition to the Public Procurement Platform, the Preliminary Market Consultation can also be found on the valorisation inquiry within DESAL+ LIVING LAB website.

Any written enquiry necessary to specify the terms of the offer will be sent to the above mentioned e-mail address.

If you wish, in relation to technical aspects, you may contact the Water Department between 08:00 and 13:30 hours (GMT) on the telephone number (+34) 928 72 75 11 or by e-mail to baltasarp@itccanarias.org.

Administrative queries can be addressed to the Purchasing Unit of the ITC's Economic-Administrative Department by calling the following telephone number: (+34) 928 379900, between 09:00 and 14:30 hours (GMT), or by e-mail to compras@itccanarias.org.

TECHNICAL SPECIFICATIONS

The following specifications are indicative only. These specifications may be adapted or modified in the annex to be submitted by each interested entity.

Background

The Canary Islands are known for being pioneers in desalination. The first desalination plant in Europe was installed in Lanzarote in 1964. Since then, the number of desalination plants on the

archipelago has dramatically increased. The desalination capacity exceeds 600,000 m^3/d (DGA, 2019), a figure that reflects the high volume of brine that is being discharged into the sea.

Desalination is a key instrument for the cycle of water on the islands. Only in the island of Gran Canaria, desalination accounts for 50 % of the total offer (PHI Gran Canaria, 3rd cycle, 2020) and a high percentage of Gran Canaria's GDP depends on the availability of this water, which not only supplies most of the inhabitants in Gran Canaria, but also the tourism industry and almost the entire secondary sector on the island.

Every desalination plant, regardless of the technology used, creates a by-product known as brine, with a concentration of salts higher than the feed water, in proportion to the plant's recovery rate. Currently, a daily brine discharge close to 296,000 m^3 per day is estimated, only on the island of Gran Canaria, (PHI Gran Canaria, 3rd cycle, 2020).

Therefore, processes and technologies intended to increase the value of brine and to turn brine into a raw material must be encouraged, not only because it is necessary to incorporate concepts of circular economy into the industries, but also because of the need to reduce the environmental impact that brine causes on the marine environment.

State-of-the-art

Technologies and processes intended to treat seawater desalination brine have gained the attention of a large number of scientific/technological centres and companies over the last years, resulting in a considerable number of pilot plants aimed to valorise the brine obtaining added-value by-products.

Several emerging valorisation initiatives are currently at a development stage. Some of these initiatives aim to extract chemicals from brine and use them on site within the desalination plant or as a raw material for other industries. This action is definitely in consonance with the circular economy strategy, highly relevant in the European Union's policies.

The relative stability of the seawater chemical composition means that projects for recovering chemicals from brine can be easily extrapolated to other plants, depending mainly on the recovery rate. Pre-treatment is a key phase, where the main divalent cations and anions in brine (especially Mg^{2+}, Ca^{2+} y SO_4^{2-}) are the target to obtain chemical by-products on one hand, and to optimise the subsequent conversion phase on the other hand, in which mainly Na^+ and Cl^-, present in a high proportion in the brine, can be converted into valuable and necessary chemicals in the industry, even within the desalination plant itself. Besides, due to the presence of several high-value metals in brine, such as lithium, the extraction of metals has become of great interest, as long as this can be carried out in a sustainable and economically feasible way.

Likewise, another key research are regarding to desalination brine valorisation is the exploitation of the potential energy of brine, using technologies that take advantage of the osmotic gradient between brine and a low-saline solution in order to produce energy. This approach would also help to dilute the brine discharged into the sea, minimising its adverse effect on the marine environment.

Carbon Capture and Utilisation (CCU) is combination with brine treatment technologies, is another interesting approach that may take advantage of significant synergies.

Unmet need

It is necessary to find solutions, processes or technologies that increase the value of the brine produced in seawater desalination plants and minimise the environmental impact of its discharge back to the sea. These initiatives must be technologically feasible, robust and applicable at a large scale. Besides, they must be economically feasible and, at the same time, environmentally friendly.

In the area of Circular Economy, the European Commission adopted a Circular Economy Action Plan in 2015, with an investment exceeding 10 billion euros of public funding for circular-economy-related projects. A part of the funding comes from the Research & Innovation Plan Horizon 2020, implemented by the European Union to boost breakthroughs, discoveries and world-firsts, by taking great ideas from the labs to the market. The European Commission suggested this programme had continuation with the new Horizon Europe programme, with a funding of 100 billion euros from 1st January 2021. This funding is aimed at research and development projects that include, in particular, projects for the promotion of Circular Economy and Blue Economy. The European Commission published a New Circular Economy Action Plan in March 2020, which comprises the new strategy to continue to develop the Circular Economy concept in Europe, transforming waste into a resource, as in the specific case of brine valorisation.

The Government of the Canary Islands is firmly committed to this European Action Plan and have approved the "Ley de Economía Circular de Canarias 2021-2030", where the valorisation of brine is a cornerstone of this strategy.

ITC is developing an area for testing and verification of brine valorisation technologies at its facilities in Pozo Izquierdo (Gran Canaria), linked to the DESAL+ LIVING LAB platform. This area offers the possibility of treating real brines produced in situ, with different characteristics (DESAL+ single-stage RO pilot plant, Sureste desalination plant with double-stage RO). In addition, a Nanofiltration pilot plant is in the process of being acquired, increasing the number of possible brines to work with to four, as well as possible mixtures between them. Likewise, there is also a specific area available for demonstrations and ITC already has authorisations to discharge brine during the optimisation stage and to carry out experimental projects.

This line of work will be aimed to make progress in the following strategic activities:

- Feasibility, market and business mentoring studies.
- Development and validation of the innovative solution at pilot scale. These developments may include the purchase and construction of equipment, the creation of prototypes and pilots to be initially validated in a simulated environment of real brines. This testing environment will be provided by members of the DESAL+ Living Lab platform, making available technical and human resources besides the desalination infrastructure available.

- Validation of the solution at pilot scale in a real environment through the DESAL+ Living Lab, since the platform and its network of partners in the Canary Islands will provide their facilities, capabilities and skills for such purpose.
- Hiring of any studies required to boost and accelerate the subsequent commercialisation of the brine valorisation application or it adaptation to the specific conditions of the Canary Islands.

This consultation aims to identify applications with a minimum of Technology Readiness Level 6 (TRL6), in order to be included in the DESAL+ LIVING LAB platform as a testing and experimentation infrastructure, generating knowledge to be able to anticipate possible future market needs related to brine valorisation in the Canary Islands. These applications must be either in their final verification phase or recently put on the market.

Thus, this initiative seeks an innovative solution with non-commercial technologies or processes for the valorisation of seawater desalination brine that could be acquired through a call for tender, in order to be installed, tested and extrapolated to the possible needs of the Canary Islands.

Innovative aspects of the project

The goal of the project must be the partial valorisation of brine, of added-value products coming from or generated from brine.

The maturity of the technology solution to be presented must be at least TRL 6. An innovative approach towards emerging, disruptive technologies will be certainly valued. ITC must be able to validate and certificate its potential, scalability and feasibility in operational environment.

The following innovative aspects of the technology solution will be positively assessed:

- Circular economy. Promotion of circular economy, not only by reducing the brine discharge volume/concentration and the formation of by-products from brine (to be used directly at the plant or indirectly as a raw material for other industries), but also by using waste from another industry as a raw material in order to generate synergies in a sustainable manner, minimising the generation of waste.
- On site solutions in desalination plants. Direct brine valorisation within the desalination plant, providing by-products to be used in these facilities. Increase of the plant water recovery rate. Any process that directly or indirectly involves an increase in the recovery rate of the plant in comparison to the initial feed, whether generating desalinated water with the required quality or brine with favourable conditions to be redirected to the feed flow of the reverse osmosis plant. Implementation of a technology capable of recovering energy through brine treatment, thus reducing the specific energy consumption (SEC) of the desalination plant and, therefore, CO_2 emissions to the atmosphere.
- Valuable products and diversification of the industrial activity. The generation of one or several by-products linked to specific local needs, e.g., a product that largely depends on foreign market or widely used in the Canary Islands, such as sodium hypochlorite (NaClO).

- Green chemistry. Minimisation of the use of harmful chemicals in the technology solution, by employing sustainable "greener" products.
- Industry 4.0. Digitalisation of the processes, fostering a higher automatisation, connectivity and globalisation of the system.
- Renewable energies. Reduction of the carbon footprint of the technological solution by coupling renewable energies.
- Technological solutions involving regulatory gaps or without a clear regulatory framework will not be positively considered.

General objectives

Via this procurement process, ITC aims to:

- Identify technological solutions and processes of desalination brine valorisation towards minimum liquid discharge.
- Test and validate brine valorisation technologies adapted to the Canary Islands, within the circular economy framework.

Specific objectives

Specific objectives of this acquisition include the following:

- Generation of one or more valuable chemical by-products, with the sufficient purity to enter the market or to be used on site within the desalination plant.
- Reduction of the environmental impact that brine discharge causes on marine environment, either by decreasing its volume, its concentration or both.
- Definition of technically feasible proposals, considering energy or raw materials needed in the industry, economically of interest to existing desalination plants.
- Prospective of coupling renewable energies to the technological solution (it will not be object of the future tender to incorporate renewable energies in the process, only to explore their potential use).
- Accomplishment of the diversification of the industrial sector in the Canary Islands.

Expected outcomes

The acquisition of disruptive or highly innovative technology, so that ITC can validate it and adapt it to the particularities of the Canary Islands. Bidders could directly purchase brine valorisation technology, to be fully installed in the experimental brine valorisation area in Pozo Izquierdo, with

performance tests carried out by the bidder. The estimation is that one to two technological solutions will be tendered with a maximum total value of 225,000 € each (maximum contract time of 15 months).

Specifically, the technological solutions are expected to provide a real, tested attractive solution adapted to desalination brines generated in the Canary Islands, to be implemented and even exported to other plants located in the rest of Spain and abroad. Therefore, the technological solution must be technically and financially feasible and adaptable to other desalination plants or related industries.

It is expected to implement a pilot plant resulting from the technological solution proposed, which must be versatile and scalable, with the capability to deal with small unexpected changes in flow or feed conditions, and also adaptable to any improvement/change that may be implemented afterwards.

The technological solution should take into consideration different parameters such as the lifetime of the plant and its components, operational and maintenance procedures, spare parts required, realisation of performance tests on site (1-3 months), analysis and characterisation of the by-products obtained, and a health and safety assessment.

Impact indicators to be considered

The technological solutions submitted are expected to meet the majority of the following indicators:

- Economic profit generated from the desalination brine.
- Cost reduction as a result of reducing the purchase of chemical products.
- Reduction of the flow/concentration of the brine disposal.
- Reduction of the carbon footprint of the desalination plant, when energy solutions are involved.
- Employment growth.

PARTICIPATION FORM

This participation form is available on the "Plataforma de Contratación del Sector Público (Public Sector Procurement Platform"), under "Consultas Preliminares" (Preliminary consultations), and must be completed and submitted with additional documentation to the email address: compras@itccanarias.org within the time period specified in the "Deadline" section.

All the sections of this participation form must be fully completed, in order to be assessed.

BASIC DETAILS			
Name of the proposing entity			
Name of the proposal			
Acronym			
DETAILS OF THE CONTACT PERSON/REPRESENTATIVE			
Contact person (or representative in case of joint proposal)			
Telephone number			
Email address			
DETAILS OF THE PROPOSING ENTITY/INDIVIDUAL			
Natural person	☐		
Legal person	☐		
Industry or field of business (CNAE[1] code):			
Type of entity (self-employed, private company, public company, research centre, university, technological centre, other):			
Joint proposal submitted by several natural or legal persons Please, tick YES or NO	YES ☐	NO ☐	
Current size of the entity (no. of staff members)			
Sites and main R&D resources (human and technical) in the EU, Spain and the rest of the world			
Total turnover of the entity for the last 3 years (€)	2021	2020	2019
ADDITIONAL INFORMATION			
For the last 3 years, does a part of the turnover of your entity come from technologies similar to the one included in this proposal? Please, answer YES or NO	YES ☐	NO ☐	

1 CNAE: Spanish Business Activity Classification code.

If you have answered YES in the previous question, please state the approximate turnover for the last 3 years coming from technologies similar to the one included in this proposal (total amount in the 3 years)		
Has your entity received public funding from a competitive tender for R&D projects over the last 3 years? Please, answer YES or NO	YES ☐	NO ☐
If you have answered YES in the previous question, state the amount of funding received over the last 3 years (total amount in the 3 years)		
Provide a report annexed to this participation form (max. 2 pages) with detailed information regarding research and development, publications, etc., completed and ongoing, on a similar subject to the technological solution presented	Report: R&D carried out regarding to the technological solution presented (max. 2 pages)	
Experience related to the entire or a part of the consultation *(this is not binding)*		
Do you have experience in desalination? If so, please state the main projects you have participated in.	YES ☐	NO ☐
Do you have experience in industrial and process design? If so, please state the main projects you have participated in.	YES ☐	NO ☐
Do you have experience in brine valorisation? If so, please state the main projects you have participated in.	YES ☐	NO ☐
Do you have experience in the study and testing of emerging desalination solutions? If so, please state the main projects you have participated in.	YES ☐	NO ☐
Statutory statements		
I hereby authorise ITC to use the contents of the proposals. Such use will be exclusively limited to the potential inclusion of the contents thereof in the process to define the lines of action, to be specified in the potential terms and conditions of prospective tenders to be arranged later on as a Pre-commercial Public Procurement process.	☐	
The proposal submitted is free from commercial patents, copyrights or any other author's or business' rights that may prevent its free use by ITC or any other entity collaborating in the development of prospective projects.	☐	

Authorisation to use the data provided (please tick YES or NO)
Warning: I hereby authorise ITC to incorporate this information into a file for the purposes of managing the details of the participants in the market consultation, subject to the responsibility of ITC, provided that the users do not state otherwise. The rights of access, rectification, cancellation and objection can be exercised by sending a notice to the following email address: lpd@itccanarias.org. YES ☐ NO ☐

This information, or a part of it, will be published in the conclusions of the Preliminary Market Consultation in order to facilitate the collaboration between the participants, as well as with stakeholders that have not participated in the consultation.

(In order to keep the technical aspects of the proposals confidential, this second part of the questionnaire will be provided by a report named "Technological solution description" attached to the participation form)

Description of the proposal of technological solution	
Brief summary of the proposal: functional specification (max. 1,250 characters) *Description of the potential solution that may fulfil the need presented. Please, describe it from a functional approach.*	
Expected duration for the implementation of the proposal put forward (max. 15 months).	
Estimated cost of the development of the solution put forward (€) (máx. 225.000€), including delivery, installation, commissioning, initial performance tests (from 1-3 months) and by-products analysis and characterisation.	
Phases comprising the proposal, specifying the expected results at the end of each phase and the validation method proposed to assess such results.	
Is your entity experienced in developments related to the technological solution put forward? (Please, provide details for each project: year of implementation, cost, brief description of the results).	
Innovation elements (new technologies and innovative solutions) or expected R&D results. Please, specify the distinguishing elements of your proposal in comparison to the processes and technologies available in the market (max. 850 characters).	
Technological needs, laboratory, testing space, etc. to verify your proposal (please, state an example).	

Level of current maturity of your technological solution and/or global process (TRL[2])) of your proposal, please state). *This information is mandatory*	
Please, list the regulations and laws associated with the technological solution presented.	
In your opinion, is there any specific barrier or limitation for the deployment of the technological solution in the market? Which one?	
State the services provided by third parties that may be required for fabrication, installation, commissioning and performance tests of your technological solution.	
In your opinion, what are the main risks of your proposal?	

List of documents/attachments provided

Please state the document accompanying your proposal, which provides further information about the technological solution.

File name:	Brief description:	Confidential*
	Technological solution description (part 2 of the participation form – mandatory; A detailed specification of the TRL of the technological solution and/or the global process are mandatory)	☐
	Brief report (max. 2 pages) with detailed information regarding R&D, publications, etc., completed and ongoing, on a similar subject to the technological solution presented.	☐
		☐
		☐
		☐
		☐

*Please, tick the box if the corresponding document is confidential.

PERSONAL DATA PROTECTION

In accordance with Personal Data Protection regulations, ITC will keep the contact details of the participants in this preliminary market consultation, in a file owned by ITC.

If any of the participants would like to request their contact details deleted, simply send an email stating so to compras@itccanarias.org.

2 TRL codes can be checked on: "HORIZON 2020 – WORK PROGRAMME 2016-2017 General Annexes: G. TRL

COMPLIANCE WITH THE PARTICIPATION

By participating to this preliminary market consultation, the participants give their consent to ITC to evaluate the proposals provided, and to disseminate the incoming responses and to present its conclusions drawn from the analysis of the responses received, in a consultation final report, which will be issued at the end of this preliminary market consultation process.

SIGNATURE OF THE PRELIMINARY MARKET CONSULTATION

Digital signature from the Head of Department of the requesting unit within ITC

PEÑATE SUAREZ BALTASAR - 52835258A

Firmado digitalmente por PEÑATE SUAREZ BALTASAR - 52835258A
Nombre de reconocimiento (DN): c=ES, serialNumber=IDCES-52835258A, givenName=BALTASAR, sn=PEÑATE SUAREZ, cn=PEÑATE SUAREZ BALTASAR - 52835258A
Fecha: 2022.05.05 17:43:32 +01'00'

Baltasar Peñate Suárez
Head of Water Department (ITC)

Digital signature from the contracting body

42815882W GABRIEL ANDRES MEGIAS (R: A35313170)

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Nombre de reconocimiento (DN): 2.5.4.13=Ref:AEAT/AEAT0397/PUESTO 1/55682/22032021102955, serialNumber=IDCES-42815882W, givenName=GABRIEL ANDRES, sn=MEGIAS MARTINEZ, cn=42815882W GABRIEL ANDRES MEGIAS (R: A35313170), 2.5.4.97=VATES-A35313170, o=INSTITUTO TECNOLOGICO DE CANARIAS SA, c=ES
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Gabriel Andrés Megías Martínez
Managing Director
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