Country	**Chile**
Request ID#	**2025000015**
Title	**Artificial Intelligence Pilot for Non-Revenue Water Reduction in Tocopilla, Chile**
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Proponent	*Jorge Rivas Chaparro* *Superintendent* *Superintendency of Sanitary Services (SISS)* *jrivas@siss.gob.cl* *Lillo S. Christian* *Head of Standards Unit* *Superintendency of Sanitary Services (SISS)* *clillo@siss.gob.cl* *Pedro Andrés Fuentes Fica* *Studies and Standards Engineer* *Superintendency of Sanitary Services (SISS)* *pfuentes@siss.gob.cl* *Rodrigo Farías Flores* *Studies and Standards Engineer* *Superintendency of Sanitary Services (SISS)* *Moneda N°673 floor 1, Santiago, Chile.* *rfarias@siss.gob.cl* *Claudio Cortes Henriquez* *Reliability Engineer* *Aguas Antofagasta* *ccortes@aguasantofagasta.cl* *Avenida Grecia N° 1882 local 1* *Antofagasta, Chile.* *Ximena Ruz Espejo* *Executive Director* *Agency for Sustainability and Climate Change (ASCC)* *ximena.ruz@ascc.cl* *Agustinas 853, Of. 1201 floor 12* *Santiago, Chile*

Summary of the CTCN technical assistance

Machine Learning (ML)[1] is the process of optimizing model parameters through computational techniques, such that the model's behaviour reflects the data or experience. ML algorithms can be applied in various use cases and domains thanks to their capacity for pattern recognition. However, effective application depends on the size, quality, and representativeness of the available data, as well as the appropriateness of the ML algorithm selected for the problem, which often requires testing multiple models to achieve the best predictions. A training-validation split is typically used when the dataset is sufficiently large and robust. In this approach, the training set helps the algorithm learn patterns from features and labels, whereas the test or validation set measures accuracy and generalization. After testing, model parameters are adjusted to address errors and enhance performance.

Regarding its application in water distribution networks, this technology is based on the collection of data that enables the creation of models for predicting or classifying leaks through the application of a learning algorithm. According to a University of Chile study, detecting leaks in distribution networks is a problem that can be solved through supervised learning, in which the input data is the pressure at the network nodes, and the expected result is the location of leaks in the network.

In view of the above, the implementation of machine learning-based technologies for leak detection would enable the objectives and challenges set out in Chile´s NDCs and in the National Water Resources Strategy of the Ministry of Public Works (MOP) and the 2020 report of the National Water Board, to be effectively achieved, contributing in both cases to strengthening water resource management in the territory.

The main objective of this Technical Assistance is to advance the implementation of the technology action plan (TAP) for reducing non-revenue water in urban drinking water systems by supporting an Artificial Intelligence technology pilot in the locality of Tocopilla, Chile, together with training to increase local capacities from users, administrators, and the regulator on data management, modeling, analysis, and updating the dashboard developed within the scope of this TA. Also, this TA aims to develop a roadmap for scaling up implementation and resolving detected non-revenue water issues.

Agreement:

(If possible, please use electronic signatures in Microsoft Word file format)

1 https://unfccc.int/ttclear/misc_/StaticFiles/gnwoerk_static/AI4climateaction/f2922b97c4cf431996c468e622127eb5/112f8be560ea447dab5ff2e53ab3f6e4.pdf

National Designated Entity to the UNFCCC Technology Mechanism
Name: Ximena Ruz
Title: Executive Director of the Agency for Sustainability and Climate Change

Date: 2/12/25

Signature:

AGENCIA DE SUSTENTABILIDAD Y CAMBIO CLIMÁTICO
DIRECTORA EJECUTIVA

Proponent (signature of the Proponent is optional)
Name: Jorge Rivas
Title: Superintendent of the Superintendency of Sanitary Services

Date:

Signature:

Jorge Rivas Chaparro
Superintendente de Servicios Sanitarios
SUPERINTENDENCIA DE SERVICIOS SANITARIOS
FIRMA ELECTRÓNICA Gob
2025.12.01 03:52

UNFCCC Climate Technology Centre and Network (CTCN)
Name: Ariesta Ningrum
Title: Director

Date: 03.12.2025

Signature:

[2] The signature of Jorge Rivas was made in accordance with law N°19.799. Jorge's electronic signature verification can be accessed through the QR code. Ximena Ruz signature was made by hand over a print versión that contained Jorge's electronic signature.

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1. Background and context

Chile is among the countries most vulnerable to the negative impacts from climate change. One of the most critical issues is severe drought, which is caused by the decrease in rainfall and, therefore, the reduction of river flows and access to water. According to the Water Resource Institute, Chile faces “high water stress”, and is the country most affected by this condition in Latin America. The reduction in rainfall and increase in hydrological droughts determine a greater potential risk to urban water security, especially in the geographical area between the south of the Northern Macrozone and the northern part of the Southern Macrozone (regions from Coquimbo to Biobío), where most of the population is located (MMA, 2020a; Billi et al., 2021; Fragkou et al., 2022). The National Water Resources Strategy of the Ministry of Public Works (MOP) and the report of the National Water Roundtable 2020 mention that one of the priority challenges for the sector is the minimization of drinking water losses due to leaks, breaks, and other technical deficiencies occurring in drinking water supply networks.

Chile has decided to prioritize water for human consumption and particularly the reduction of its losses, including two related commitments in contribution A7 of its NDC 2020-2030:
* By 2030, 100% of the goals of the 2030 Agenda for the water sector[3] will have been completed.
* By 2030, water losses represented by the volume of non-revenue water from water systems will be reduced by at least 25%. The new NDC for 2025-2035 under commitment A2 has continued to put emphasis on the matter:
* By 2030, the level of non-revenue water in the licensed sanitation sector will not exceed 30%.
* By 2030, 100% of the goals of the 2030 Agenda for the sanitation sector will have been completed.
The long-term climate strategy reiterated the commitment contained in the NDC, adding a resilience goal related to losses:
* Goal 5.1: By 2030, 90% of the population will have continuity of service during disruptive events.
* Goal 5.3: By 2030, the volume of non-revenue water will be reduced by at least 25%.

Aguas Antofagasta already possesses a significant level of instrumentation—including residential smart water meters and acoustic sensors for leak detection— therefore it is expected that the project leverages and enhances the platforms and data already available locally.

[3] The 2030 Water Sector Agenda is organized into projects. Within its Project 2, it establishes that a national program for water loss reduction will be carried out, in a participatory manner and with an active role for water utilities. Legal reforms that promote this objective will be studied and proposed. Innovation projects incorporating smart technologies that allow for network monitoring will be encouraged, aiming for an Industry 4.0 approach and increasing the replacement of obsolete infrastructure.

2. Problem statement

The structural problem of water management and the impact of climate change are the main causes of the growing water scarcity in a large part of the Chilean territory.
The study "Water Transition: The Future of Water in Chile", presented by Fundación Chile, identifies the main problems related to water resources: 44 percent are due to failures in water management and governance; 17 percent are caused by the growth of productive activities and the over-granting of water use rights; and 14 percent are due to water pollution caused by the use of chemical products in agro-industry. Eminently natural causes, such as the decrease in water and snow precipitation, snow melting and the retreat of glaciers due to rising temperatures, appear in fourth place, with 12 percent. The effect is not balanced across regions as later studies had noted that most basins in semi-arid regions experienced high to extreme water stress (WSI > 40 % and WSI > 70 %, respectively) during the megadrought, mainly due to reduced water availability, but worsened by high water demand[4].

In certain parts of the country, the reduction in surface water availability has led to conflicts between human consumption and productive sectors such as irrigation and mining, as well as the search for alternative water provision methods to address water insecurity, such as supply via water trucks (Bauer, 2015; Budds, 2020; Prieto et al., 2019; Donoso, 2021; Barría et al., 2021).

The urgency of addressing water losses is intensified in the locality of Tocopilla. Historically designated as a "sacrifice zone" due to the high concentration of heavy industry, including multiple thermoelectric power plants (although several are in the process of closing as part of Chile's energy transition), the commune faces legacies of environmental vulnerability and public health challenges. In this context of water stress exacerbated by climate change and critical dependence on desalinated water (with high energy and economic costs), optimizing water resource management is fundamental. Reducing the current 39% Non-Revenue Water (NRW) in Tocopilla is not only key for water security (adaptation) and energy efficiency (mitigation), but also for strengthening the overall resilience of a community facing multiple socio-environmental pressures.

The main limitation for the application of machine learning methodologies in the detection and location of leaks in water networks is the lack of information regarding leaks detected in the field. This is because records are required on the materiality of pipes, dimensions, estimated sector demand, and the location of network elements (valves, tanks, and their characteristics). The lack of information also affects data calibration processes, since some studies have determined that, without data on the actual behavior of hydraulic networks, artificial results could be generated (Lobos J., 2022).

In the case of Chile, the SISS keeps records of water utility infrastructure information in accordance with information protocol PR012001, which includes a section on cartographic files that water utilities have been sending since 2012 in shapefile format. Unbilled water production is also collected to generate an annual record. However, these amounts could be underestimated because the information is obtained by request from distribution companies, which sometimes do not submit their reports (SISS, 2022).

[4] Boisier, J. P., Alvarez-Garreton, C., Marinao, R., and Galleguillos, M.: Increasing water stress in Chile evidenced by novel datasets of water availability, land use and water use, EGUsphere, https://egusphere.copernicus.org/preprints/2024/egusphere-2024-2695/

3. Logical Framework for the CTCN Technical Assistance:

(Guidance: Please note that multiple activities lead to one Output, and multiple Outputs lead to one Outcome. There can be several Outputs, but only one Outcome description capturing the CTCN technical assistance. Deliverables are the products or services to be delivered to the NDE/Proponent/CTCN based on the Activities and the Outputs.)

	Month														
	1	2	3	4	5	6	7	8	9	10	11	12			
***Objective**:* Advance the implementation of the technology action plan (TAP) for reducing non-revenue water in urban drinking water systems by supporting an Artificial Intelligence technology pilot in the locality of Tocopilla, generating evidence and capacities to overcome key barriers identified in the TAP for the Water sector, and to identify a local champion to test and showcase the climate technology solution.															
Outcome: *(Guidance: The Outcome articulates changes in the institutional and behavioural capacities for climate technology development or deployment. Activities and Outputs contribute to the Outcome, but the Outcome is not within the direct control of the CTCN activities). (maximum 400 characters including spaces)* Capacities strengthened and currently high non-revenue water in urban drinking water systems is effectively reduced in Tocopilla, Chile as a pilot for replication in the country.															
Mandatory Output: Project management *All implementers must undertake the following project management activities at the beginning of, during and at the end of the CTCN technical assistance.*															
Activity A: Beginning of implementation A detailed work plan of all activities, deliveries, outputs, deadlines and responsible persons/organisations and detailed budget to implement the Response Plan. The detailed work plan and budget must be based directly on this Response Plan.															

Based on the work plan, a monitoring and evaluation (M&E) plan with specific, measurable, achievable, relevant, and time-bound indicators used to monitor and evaluate the timeliness and appropriateness of the implementation. The monitoring and evaluation plan should apply selected indicators from the Closure and Data Collection report template and enable the lead implementer to complete the CTCN Closure and Data collection report at the end of the assignment (please refer to item iv below and section 14 in the Response Plan). This M&E plan also includes a CTCN Impact Description formulated in the beginning of the technical assistance which will be revised in the Closure and Data Collection report once the technical assistance is fully delivered (templates will be provided). Other additional monitoring and evaluation indicators or templates may be required depending on the donor that is funding the technical assistance. Furthermore, a gender evaluation and gender action plan (GAP) will be prepared and followed throughout the technical assistance (a template will be provided).[5]														
Activity B: Implementation A project steering committee will be formed, consisting of the implementing team (international and local consultants), the NDE, the project proponent(s), beneficiary(ies), and CTCN. The objective of this steering committee is for the implementing partner to report on progress, and to guide the implementation of the project at a high level. It is recommended that this steering committee is virtually meeting every two months, or on a monthly basis, to be agreed with the NDE and Proponent.														
Activity C: End of implementation A Closure and Data Collection report completed at the end of the technical assistance (a template will be provided).														

[5] Additional information is available under Section 10 of the response plan.

Potential project-end communication and dissemination activities (such as knowledge sharing webinar, dialogue with financial institutions, press release) may be conducted in collaboration with the CTCN Secretariat, subject to appropriateness.														
Mandatory deliverables: Deliverable A: Detailed work plan integrating a GAAP (gender plan and analysis); M&E plan; Deliverable B: Project Steering Committee meeting reports. Deliverable C: Closure and Data Collection report; press release, webinar, dialogue with financial institutions.	X	X		X		X	X	X		X		X X X		
Output 1: Support a pilot of a system to identify NRW														
Activity 1.1: Baseline Assessment and initial data collection and preparation Conduct meetings with the company Aguas de Antofagasta and Superintendency of Sanitary Services (SISS), and, as relevant, with stakeholders identified in the request such as the National Association of Water Utilities (ANDESS), CAPTA University of Chile, Global Change UC, University of Antofagasta, Inter-American Association of Sanitary and Environmental Engineering (AIDIS) and other local stakeholders such as water utilities, regulators and local partners if needed; with the objective of identifying: 1. Priority zones with high NRW in Tocopilla; 2. Type of non-revenue water; 3. Impacts of NRW on the community (i.e service interruptions) and if such impacts disproportionately affect women and girls; 4. ML training algorithms suitable for the pilot; 5. Data availability and quality regarding NRW for ML models, considering the preexisting data collected by the existing instrumentation (including residential smart water meters and acoustic sensors for leak detection), historical consumption, pressure, flow, maintenance data, data from SCADA, GIS and customer billing systems where available and relevant for NRW detection; 6. Data infrastructure regarding NRW; 7. Digital readiness; 8. Objectives and requirements for the system expressed by stakeholders; and	X	X												

9. Gaps preventing identification of content in items 1 to 8. Initial data collection should be carried out as part of this activity.														
Deliverable 1: D1. Report with identification of 1. Priority zones with high NRW in Tocopilla; 2. Type of non-revenue water; 3. Impacts of NRW on the community (i.e service interruptions) and if such impacts disproportionately affect women and girls; 4. ML training algorithms suitable for the pilot; 5. Data availability and quality regarding NRW for ML models, considering the preexisting data collected by the existing instrumentation (including residential smart water meters and acoustic sensors for leak detection), such as historical consumption, pressure, flow, pipe length, velocity, headloss, ageing factor, diameter, maintenance data, data from SCADA, GIS, customer billing systems where available and relevant for NRW detection 6. Suitability of existing instrumentation; 7. Data infrastructure regarding NRW; 8. Digital readiness; 9. Objectives and requirements for the system expressed by stakeholders and 10. Gaps preventing identification of content in items 1 to 8.		X												
Output 2: AI model design, development, verification, validation and deployment														

Activity 2.1: Design, development, verification, validation The AI system is created to the point that is ready for verification and validation. As part of this activity it is expected that consideration is given to hardware and software needs. The architecture of the system and the training algorithms are determined alongside the training data needed and the data that later will be used for verification and CANNOT be used for training. Before the conclusion of this activity Aguas de Antofagasta and Superintendency of Sanitary Services (SISS) shall be consulted to ensure the AI system fulfils the original objectives, requirements and other targets identified such as gender responsiveness.		X	X	X	X	X	X	X						
Activity 2.2: verification, validation The software is tested for functionality and bugs, performance, for assurance that it works as designed using verification data that was not used for training and that is representative of input data that the AI system is expected to process. An initial version of a user-friendly interface for utility staff. Graphical interface (Dashboard) is prepared to facilitate the visualization and identification of where Non-Revenue Water occurs, as well as the generation of water balances by sectors, facilitating visualization and analysis to overcome barriers in interpreting results and decision-making. Before the conclusion of this activity Aguas de Antofagasta and Superintendency of Sanitary Services (SISS), and other relevant stakeholders with expertise (i.e. universities) shall be consulted to ensure the AI system fulfils the original objectives, requirements and other targets identified such as gender responsiveness.						X	X	X						
Activity 2.3: System integration (Deployment) The system is installed and configured for operation and target environment and the final adjustments to the dashboard are made in consultation with users. Before the conclusion of this activity Aguas de Antofagasta and Superintendency of Sanitary Services (SISS), and other relevant stakeholders shall be consulted to ensure the AI system fulfils the original objectives, requirements and other targets identified such as gender responsiveness.							X	X	X					

Deliverables 2: D2.1 Pilot results report (technical elements) that builds upon D1 and includes the assessment of data availability, quality gender responsiveness, as well as an analysis of scalability and applicability to different realities. D2.2 Non-Revenue Water dashboard to facilitate the visualization and identification of where non-revenue water occurs, and water balances by sector (District Meter Areas (DMA), Tank Zones, Booster Zones, etc. as relevant).									X					
Output 3: Delivery of Training														
Activity 3.1: Conduct training sessions Deliver a capacity building package for the company´s users, administrators, and regulator, in the management, modeling, analysis of their data, and updating the dashboard and associated systems, addressing the technical and capacity barriers identified in the utility and the regulator, and ensuring equitable participation of women and men. Training on AI tools, data interpretation, and response protocols. Develop manuals and training materials. The training will be delivered in different sessions in agreement with the NDE and Proponent. The training will be gender responsive.									X					
Deliverables 3: D3. Training report for users, administrators, and the regulator on data management, modeling, analysis, and updating the dashboard and associated systems.									X					
Output 4: Scale-Up Strategy														

Activity 4.1: Development of a roadmap to scale up implementation Develop a roadmap to scale up implementation and resolve the detected non-revenue water issues, including relevant gender aspects and proposing solutions to institutional, financial, and regulatory barriers for scaling up in consultation with Aguas de Antofagasta and Superintendency of Sanitary Services (SISS), and, as relevant, with stakeholders identified in the request such as the National Association of Water Utilities (ANDESS), CAPTA University of Chile, Global Change UC, University of Antofagasta, Inter-American Association of Sanitary and Environmental Engineering (AIDIS) and other local stakeholders such as water utilities, regulators and local partners if needed									X	X	X			
Activity 4.2: Conduct a dissemination workshop Conduct a dissemination workshop for the roadmap and the pilot results with representatives from the Tocopilla community, Aguas de Antofagasta Superintendency of Sanitary Services (SISS), the National Association of Water Utilities (ANDESS), CAPTA University of Chile, Global Change UC, University of Antofagasta, Inter-American Association of Sanitary and Environmental Engineering (AIDIS) and other local stakeholders such as water utilities, regulators and local partners as relevant, contributing to overcoming information barriers and fostering collaboration and demonstration of this climate technology through Aguas de Antofagasta as local champion. The workshop will be gender responsive.											X			
Deliverables 4: D4.1: Roadmap for scaling up implementation and resolving detected non-revenue water issues. D4.2: Workshop dissemination report.											X			

4. **Resources required and itemized budget:** *Please provide an indicative overview of the resources required and itemized budget required to implement the CTCN technical assistance, including for M&E-related activities, using the table below. Important to note that minimum 5% of the budget should explicitly target gender specific activities related to the technical assistance (please see section 10 for further information on gender). A maximum of 20% of the budget can be allocated to procurement (e.g. infrastructure purchase, technology piloting), Once the Response Plan is completed, a Response Implementation partner(s) will be selected by the Climate Technology Centre (CTC). A detailed activity-based budget for the CTCN assistance will be finalized by the CTCN and selected Implementer.*

Activities and Outputs	**Input: Human Resources** *(Title, role, estimated number of days)*	**Input: Travel**[6] *(Purpose, national vs. international, number of days)*	**Inputs: Meetings/events**[7] *(Meeting title, number of participants, number of days)*	**Input: Equipment/Material** *(Item, purpose, buy/rent, quantity)*	**Estimated cost** *Please accumulate the costing (USD) at Activity and Output level and provide an estimated costing range for each activity and the total Response Plan*	
					Minimum	**Maximum**
Mandatory Output: Project Management						
Mandatory Activities: A: Beginning of implementation B: Implementation C : End of implementation	Please allocate 1-5 working days for each of the mandatory reports under Activities A-C.				*5,000*	*7,000*
Output 1: Support a pilot of a system to identify NRW. (Activity 1.1)		*Site visits, assessment of existing water infrastructure, and data as described in A1.1.*			*40,000*	*50,000*

[6] All budget values related to Daily Subsistence Allowance or logistical support for local participants shall remain as indicated.
[7] All budget values related to the organization of meetings and events shall remain as indicated.

Output 2: AI model design, development, verification, validation and deployment. (Activities 2.1-2.3)		*Design and programming, testing, integration. On-site pilot deployment.*		*Sensors, AI license.*	*115,000*	*125,000*
Output 3: Delivery of Training (Activity 3.1)		*In-person training sessions*	*Capacity-building for 20 participants. 2-3 days*		*20,000*	*25,000*
Output 4: Scale-Up Strategy (Activities 4.1-4.2)	*Technical, financial, policy assessment*		*Organization of a national workshop for dissemination of the roadmap and pilot results. 1 day (50 participants)*		*25,000*	*30,000*
Estimated range of costing for the entire Response Plan					*205,000*	*237,000*

5. Profile and experience of experts

Based on the required Human Resources identified in section 4 (Resources required and itemized budget) please provide a description of the required profile of all involved experts for the implementation of the CTCN Response Plan.

Experts required	Brief description of required profile
Please use the same titles for all experts as applied in section 4.	*Please provide a short description of expertise and experience needed (education, sectors of expertise, years of experience, country experience, language requirements, etc.).*
Team Leader	● Master´s degree in water management or similar. ● Minimum 10 years of relevant expertise; expertise in climate change adaptation work with a focus on project management. ● Experience of working on international development projects. ● Previous experience in the development of policies or projects to address water scarcity in urban environments. ● Language skills: excellent command of oral and written English and Spanish is required.

Local Expert – Water Engineer	● Master´s degree in civil engineering, water resources engineering, environmental engineering, natural resources management, or other relevant fields. ● 10 years' experience in water supply systems, Non-Revenue Water (NRW) management, and hydraulic modelling, highly desirable that at least part of that experience is in Chile. ● Proven track record in implementing smart water technologies, including AI, IoT, and data analytics. Familiarity with AI applications in leak detection, predictive maintenance, and network optimization. ● Proven experience of providing technical consultancy services within a developing country, especially within LAC. ● Experience of working on international development projects. ● Language skills: excellent command of oral and written English and Spanish is required. Highly Desirable: Understanding wider policy measures and drivers to overcome barriers to the deployment of technologies within the water sector.
Expert – Machine Learning (ML) engineer	● Bachelor´s degree or higher degree in computer science, systems engineering, or other relevant fields. ● Experience developing AI-based pilot solutions for leak detection and water loss reduction. ● Strong knowledge of algorithms, programming, along with skills to design, develop and deploy Machine Learning (ML) models. ● Expertise in large datasets analysis, statistics, and ability to work with teams to integrate the system for validation. ● Fluency in Spanish is required. Fluency in English is highly preferred. Highly desirable: ● A formal academic qualification in engineering, water resources engineering. ● Experience in technical assessment of existing water infrastructure and NRW levels.
Gender and Facilitation Specialist	● Master's degree in gender studies or other discipline with focus on the field of gender issues in a developing country context ● Knowledge and experience of gender mainstreaming in climate change adaptation. ● Experience of engaging with multiple actors in the development of initiatives aimed at building national capacity within the region. ● Facilitation skills in delivering dedicated training workshops. ● Excellent command of oral and written Spanish is required. ● Fluency in English is highly preferred. ● Being part of the Gender and Climate Technology Expert Roster https://www.ctc-n.org/networking-and-collaboration/gender-and-climate-technology-expert-roster as gender and technology expert is highly preferred

6. Intended contribution to impact over time

Please provide a brief description of the intended contribution to impact over time of the outcome and outputs provided by this technical assistance on resilience to climate change and/or carbon abatement. To the extent possible, please quantify the intended impact contribution, for example by indicated estimated number of people potentially impacted over time, GDP contribution of the focus sector, carbon emissions by the focus sector, etc. This intended contribution to impact is what will happen if the objective (as articulated in section 3) is met. Please ensure relevant complementarity with text in sections 7 to 12. (maximum 1250 characters including spaces)

The implementation of machine learning-based technologies for leak detection would enable the objectives and challenges set out in Chile´s NDC and in the National Water Resources Strategy to be effectively achieved, contributing in both cases to strengthening water resource management in the territory.

In addition to contributing to water resource management, the implementation of this technology would contribute in other ways:

- Water resource conservation: Implementing this technology to help reduce leaks would promote the establishment of more efficient drinking water distribution systems, which in turn would help reduce pressure on water resources and contribute to their conservation.
- Reduction in energy consumption: Reducing leaks in distribution networks has a direct impact on energy consumption and associated costs, and therefore on GHG emissions. This is due to the reduction in the energy required to pump and distribute water through the networks.

7. Relevance to NDCs and other national priorities

Please identify relevance and contribution from the technical assistance to the Nationally Intended Contributions (NDC) and other relevant national prioritized efforts (TNAs, TAPs, NAPs, NAMAs, etc.). (maximum 2500 characters including spaces)

According to one of the contributions planned in Chile´s NDC (2020) in relation to water management, a specific climate action is established: by 2030, work will be done to reduce water losses by at least 25%, including leaks in distribution networks that are not reflected in billing.

Also the new NDC for 2025-2035 under commitment A2 has continued to put emphasis on the matter:
* By 2030, the level of non-revenue water in the licensed sanitation sector will not exceed 30%.
* By 2030, 100% of the goals of the 2030 Agenda for the sanitation sector will have been completed.

Further, the National Water Resources Strategy of the Ministry of Public Works (MOP) and the 2020 National Water Board report mention that one of the priority challenges for the sector is to minimize drinking water losses due to leaks, breaks, and other technical deficiencies that occur in drinking water supply networks.

8. Linkages to relevant parallel on-going activities:

Please identify relevant previous and ongoing public and private sector initiatives, projects or programmes that the CTCN assistance will specifically build on and contribute to. To the extent possible, please add practical and operational details on the linkages between existing activities and the CTCN assistance. (maximum 2500 characters including spaces)

In the Metropolitan Region, a hydraulic model of the drinking water network was developed using EPANET software, which generated training and validation datasets corresponding to network pressures for different operating states and leak locations, allowing the classifier to be adjusted for leak detection in the network.

9. Anticipated follow up activities after this technical assistance is completed:

Please describe the expected future use of the outputs and deliveries produced by this technical assistance, after the CTCN implementation is completed, towards contributing to the anticipated impacts over time articulated in section 6. For example, what organizations or stakeholders will use the outputs of the technical assistance after it is completed, for what purpose, at what scale and scope the outputs and deliveries will be applied, when and what will be the next steps undertaken, etc. Please also describe the role of the NDE and project proponent(s) in post-implementation monitoring and reporting. (maximum 2500 characters including spaces)

We expect that this delivery will reduce water losses in Tocopilla, the cost of water to its vulnerable population, and the emissions related to desalination of such water. We also expect it to create knowledge that can be disseminated to the rest of the nation and the region through the involved stakeholders and in particular the national and regional associations. National Association of Water Utilities (ANDESS) and Inter-American Association of Sanitary and Environmental Engineering (AIDIS)

10. Gender and co-benefits:

Each technical assistance must integrate gender mainstreaming activities and lead to gender and other co-benefits. At least 5% of the technical assistance budget need to be allocated to gender mainstreaming activities.

Gender benefits embedded in the implementation and as a result of activities:	*A gender mainstreaming analysis is mandatory to include for all technical assistances. A gender expert will be assigned to carry out an assessment and evaluation regarding gender mainstreaming and will develop the gender assessment action plan (GAAP) (a template will be provided). The GAAP will be followed throughout the implementation of the TA.* *The GAAP will include but not limited to the following components:* ● *Analysis of gender disparities (assess the situation of gender disparities in the context of the project, including socio-economic, cultural and institutional factors. Identify areas where inequalities exist, etc.).* ● *A monitoring tool to ensure 5 percent of the TA budget is allocated and used on gender mainstreaming activities.* ● *Data collection (collect and analyze gender-disaggregated data to understand the specific needs and preferences of different genders).* ● *Adaptive and gender-responsive design (evaluate the project design to ensure that it takes into account the different roles, responsibilities and interests of all genders. Analyze how the project can empower women and all other marginalized gender groups while promoting gender equality).* ● *Gender and innovation ecosystem (evaluate how the proposed technologies could promote women as entrepreneurs).* ● *Gender budgeting (budget allocation to guide gender mainstreaming activities. Also ensure that gender-specific needs are adequately funded).* *In addition, please describe all support to gender aspects and women's equality embedded into the Response Plan (please include a reference to the actual gender mainstreaming-related activities and outputs as described in section 3).*
Other co-benefits embedded in the implementation and intended as result of the activities:	*Please describe any other co-benefits embedded in the implementation and as a result of the CTCN technical assistance (please include a reference to the actual activities and outputs as described in section 3).* In addition to contributing to water resource management, the implementation of elements of the technology action plan for identifying and reducing non-revenue water in Tocopilla would contribute to other aspects: Water resource conservation. Implementing technology to help reduce non-revenue uses promotes the establishment of more efficient drinking water distribution systems, contributing in turn to reducing the pressure and costs associated with desalination capacity.

11. Main in-country stakeholders in implementation of the technical assistance activities:

Using the table below, please list and describe the role of in-country stakeholders, participants and beneficiaries who will be involved in or directly consulted during implementation of the assistance.

In country stakeholder	Role in implementation of the technical assistance
Agency for Sustainability and Climate Change National Designated Entity (NDE)	Primary contact for request information and stakeholder coordination, providing technical inputs, information sharing, and consultation process. Overview of the execution of activities and approval of deliverables. Key decision maker regarding the scaling up implementation.
Superintendency of Sanitary Services (SISS) Technical Assistance Proponent	Primary beneficiary. Contact for request information and stakeholder coordination, providing technical inputs, information sharing, and consultation process. Overview of the execution of activities and approval of deliverables. Key decision maker regarding the scaling up implementation.
Aguas Antofagasta	Counterpart for the Pilot and local champion for the technology. (Private)
National Association of Water Utilities (ANDESS)	Dissemination of results. (Private)
Academia: ● CAPTA Center, Advanced Center for Water Technologies – University of Chile ● UC Global Change Center ● University of Antofagasta	Dissemination of results, providing inputs and feedback into the roadmap for scaling up implementation.
NGOs and Civil Society: Tocopilla Community	Dissemination of results, providing inputs and feedback into the roadmap for scaling up implementation.
International Organizations: Inter-American Association of Sanitary and Environmental Engineering (AIDIS)	Dissemination of results internationally.

12. SDG Contributions:

*Instructions: Please complete the grey section below for **a maximum of three SDGs** that will be advanced through this TA. A complete list of SDGs and their targets is available here: https://sustainabledevelopment.un.org/partnership/register/.*

Goal	Sustainable Development Goal	Direct contribution from CTCN TA (1 sentence for top 1-3 SDGs)
1	End poverty in all its forms everywhere	
2	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	
3	Ensure healthy lives and promote well-being for all at all ages	
4	Ensure inclusive and equitable quality education and promote life-long learning opportunities for all	
5	Achieve gender equality and empower all women and girls	
6	Ensure availability and sustainable management of water and sanitation for all	Promoting the establishment of more efficient drinking water distribution systems.

7	Ensure access to affordable, reliable, sustainable, and modern energy for all (consider adding targets for 7)	
	7.1 - By 2030, ensure universal access to affordable, reliable and modern energy services	
	7.2 - By 2030, increase substantially the share of renewable energy in the global energy mix	
	7.3 - By 2030, double the global rate of improvement in energy efficiency	
	7.a - By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology	
	7.b - By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support	
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	
9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	
10	Reduce inequality within and among countries	
11	Make cities and human settlements inclusive, safe, resilient and sustainable	Reducing non-revenue water in the Tocopilla Community.
12	Ensure sustainable consumption and production patterns	
13	Take urgent action to combat climate change and its impacts	*All TAs should indicate relevance to Goal 13 and at least one target below (13.1 to 13.b).*
	13.1 - Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	Reducing the pressure and costs associated with desalination capacity.
	13.2 - Integrate climate change measures into national policies, strategies and planning	
	13.3 - Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	
	13.a - Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible	
	13.b - Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities	
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	
15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	
17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	

13. Classification of technical assistance:

Please indicate primary type of technical assistance. Optional: If desired, indicate secondary type of technical assistance.

Please tick off the relevant boxes below	*Primary*	*Secondary*
☐ 1. Decision-making tools and/or information provision	☐	X
☐ 2. Sectoral roadmaps and strategies	☐	☐
☐ 3. Recommendations for law, policy and regulations	☐	☐

☐ 4. Financing facilitation	☐	☐
☐ 5. Private sector engagement and market creation	☐	☐
☐ 6. Research and development of technologies	☐	X
☐ 7. Feasibility of technology options	☐	☐
☐ 8. Piloting and deployment of technologies in local conditions	X	☐
☐ 9. Technology identification and prioritisation	☐	☐

Please note that all CTCN technical assistance contributes to strengthening the capacity of in country actors.

14. Monitoring and Evaluation process

Upon contracting of the implementing partners to implement this Response Plan, the lead implementer will produce a monitoring and evaluation plan for the technical assistance. The monitoring and evaluation plan must include specific, measurable, achievable, relevant, and time-bound indicators that will be used to monitor and evaluate the timeliness and appropriateness of the implementation. The CTCN Technology Manager responsible for the technical assistance will monitor the timeliness and appropriateness of the Response Plan implementation. Upon completion of all activities and outputs, evaluation forms will be completed by the (i) NDE about overall satisfaction level with the technical assistance service provided; and (ii) the Lead Implementer about the knowledge and learning gained through delivery of technical assistance. Furthermore, the NDE together with the project proponent(s) will complete a periodic post-implementation form to track the impact of the activities beyond the technical assistance end date.

Annex 1:

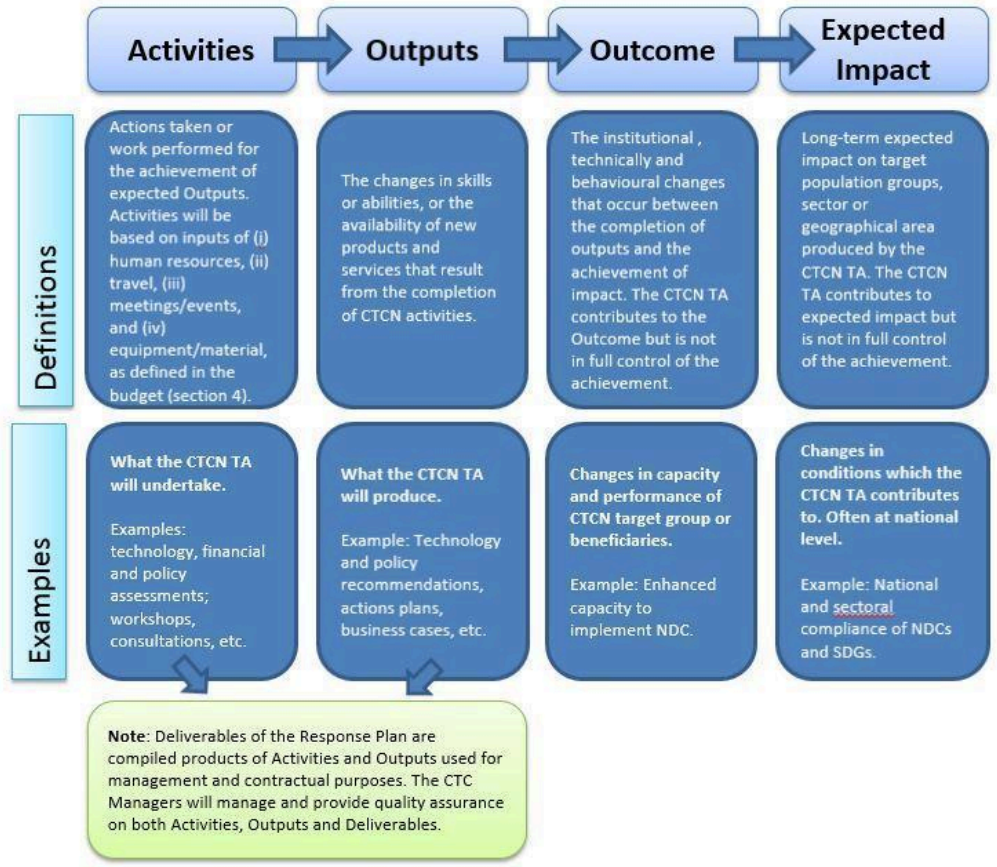
Guidance note for designing a Response Plan (to be deleted when submitting the Response Plan)

1. Objective of the Response Plan

The Response Plan is developed by CTCN specialists in response to a country request for technical assistance. It constitutes the Terms of Reference of the CTCN technical assistance that will be provided to the country and it provides the formulation of and subsequent basis for the monitoring and evaluation of the Response Plan implementation, as well as its expected outcomes and anticipated impacts.

2. Results chain and Logical Framework Approach to be defined in the CTCN Response Plan

The result chain is the causal sequence that stipulates the necessary flow of actions and processes to achieve desired objectives and results – beginning with inputs, moving through activities and outputs, and culminating in individual outcomes. The outcome will contribute to the desired impact in the society. The Logical Framework Approach is an analytical process used to support objectives-oriented project planning and management. It provides a set of pre-defined concepts which are used as part of an iterative process to aid structured and systematic analysis and management of the CTCN technical assistance.



3. Process for designing the Response Plan

The Response Planning process should be completed over a period of up to 60 working days (12 weeks). Indicative steps and related timelines are laid out below:

4. Design Considerations

In order to maximize the impact of the technical assistance provided by the CTCN and provide an effective M&E process, the Response Plan should integrate as much as possible the considerations below:

Climate Technology focus: The Response Plan should have a clear focus on climate technologies, and identify activities that enable the identification, development, deployment or diffusion of one or several specific technologies (including equipment, techniques, knowledge and skills).

Barrier removal / Problem solving: The activities should contribute to address the specific problem statement identified in the Request. The barriers identified should be those hampering the identification, development, deployment or diffusion of one or several climate technologies or climate actions. Therefore, it may be necessary to limit the CTCN Response Plan to a set of activities for technical assistance commonly agreed with the NDE (and Proponent when needed) compared to the original request submitted. The CTCN will liaise with NDEs and Proponent in case the scope of the technical assistance deviates from the original request.

Use of the CTCN assistance by stakeholders: The Response Plan should identify clearly how the products of the CTCN assistance will be used in the short term once support is delivered, by who and when, to ensure it will lead to specific impacts in the country. The activities should engage the stakeholders that will use the concrete results of the assistance to deploy the technologies, including from the private sector, the public sector, research institutions, etc.

Within the scope of CTCN resources: The cost of the technical assistance provided by the CTCN cannot exceed USD 250,000 per Response Plan. Therefore, it may be necessary to prioritize activities and limit the CTCN Response Plan to a set of priority activities commonly agreed with the Proponent and the NDE to remain under this value. Under section 4 of the Response Plan template, an indicative activity based budget should be presented. The proposed budget is indicative and should present an estimated costing range per activity, output as well as a total costing range for the delivery of the

Response Plan. Once the Response Plan is finalised and published for tendering, interested parties will provide competitive offer against the indicative budget.

CTCN activities and outputs should be linkable to monitoring and evaluation indicators: All proposed activities and outputs must be linkable to monitoring and evaluation indicators that are specific, measurable, achievable, relevant, and time-bound. The monitoring and evaluation process and corresponding indicators will be developed by the Lead Implementer as part of the work plan and will allow the CTCN technology Manager to monitor the timeliness and appropriateness of the implementation.

Synergies with existing efforts: The Response Plan should focus on activities that are not already being fully supported or that are in the process of being fully supported by another national, regional or international organization. Synergies and complementarity also require that the CTCN assistance is not duplicating past activities. It is possible in the Response Plan to indicate co-financing from the government, the Proponent or another stakeholder, that will maximize the effectiveness of the CTCN assistance.

Gender mainstreaming: The CTCN mission is to build or strengthen developing countries' capacities to identify technology needs, to facilitate the preparation and implementation of technology projects and strategies taking into account gender considerations. The Response Plan must therefore describe how gender considerations will be included and monitored within the proposed activities, and any gender co-benefits that will be gained as a result of implementing the CTCN technical assistance. For that purpose, a Gender Assessment and Action Plan (GAAP) template has been designed to be followed by the implementation partner.