CTCN
CLIMATE TECHNOLOGY CENTRE & NETWORK

Instructions to lead Implementers for drafting the Technical Assistance Closure and Data Collection Report

Objective of the technical assistance (TA) Closure Report and Data Collection Report:

- To communicate publicly in one synthesis document a summary of progress made and lessons learned under the technical assistance (TA) towards the anticipated impact (main template).
- Compile TA-specific information required for internal use in donor and UN reporting (annex 1).

Steps for completing the TA Closure report:

1. The lead TA implementer drafts the report at the end of the assignment as a final deliverable /product. The TA Closure report will capture all activities conducted under the TA hence it is expected that duplication of information will occur from earlier documents. Please copy and summarise relevant material from previous TA outputs/deliverables and the Response Plan, as relevant.
2. A CTCN Manager will review and revise the report before final approval by the CTCN Director.

Important note on public and internal use of the closure report:
Once approved by the CTCN Director, the TA Closure and Data Collection Report will be a public document available on the CTCN website. Annex 1 is for internal use only and will not be publicly available.

Closure and Data Collection Report for CTCN Technical Assistance

1. Basic information

Title of response plan	Introduction of zero or low global warming potential refrigerants in food processing production and exports (fruits and vegetables)
Country / countries	Chile
NDE focal point and organisation	Paulina Ulloa, Agencia de Sustentabilidad y Cambio Climático
Proponent focal point and organisation	Claudia Paratori, Departamento Cambio Climático Ministerio del Medio Ambiente. Programa Ozono.
Sector(s) addressed	Mitigation to Climate Change. Energy /Agricultural/ Food processing.
Technologies supported	Zero- and low-GWP refrigeration technologies for the industrial sector, in particular for the fruits and vegetables processing sector in Chile.
Implementation period and total duration	05/2016-05/2018
Total budget for implementation	USD 194,956
Designer of the response plan	UNIDO, GIZ and Fundación Bariloche
Implementer of response plan	UNIDO

2. Summary of all activities, outputs and products that contribute to the expected impact of the technical assistance.

Description of delivered outputs and products as well as the activities undertaken to achieve them. In doing so, review the log frame of the original response plan and refer to it as appropriate	**Activities**: 1. An **awareness campaign** with the following scope: a. A survey covering facilities processing fruits and vegetables, with the objective of collecting updated info on the refrigerant use profile in the sector. b. An assessment on technology options to identify appropriate alternatives available in the market. c. Six information sessions for end users and other relevant stakeholders in the sector, to publicize the results of the survey and the assessment and provide a first guidance on the introduction of zero- or low-GWP refrigerants. 2. **Capacity building:** a. Two workshops to governmental bodies and other relevant stakeholders on the best practices to incentivize the adoption of climate-sound alternatives among end users of refrigeration systems in this and other similar sectors. b. A report on the F-gas regulation in Europe. 3. **Technology transfer and technical assistance:** a. A pilot conversion programme, including only the selection of beneficiaries and the design of full conversion processes. b. A training for local technicians of the refrigeration servicing sector on the use of zero- and low-GWP refrigerants. c. Establishment of a knowledge base for the publicity of all the information related to the introduction of new alternatives. **Outputs:** - New and comprehensive data obtained on the use of refrigerants in the fruits and vegetables processing sector. - Information compiled and processed on technology alternatives for environmentally sound refrigeration systems in the industry. - Companies from the fruits and vegetables processing sector, public entities and associations informed on the results of the current use of refrigerants in that specific sector and also on the availability of zero- or low-GWP refrigeration technologies for the industry. - Governmental bodies assisted on the best practices to incentivize the adoption of climate-sound alternatives among end users of refrigeration systems in this and other similar sectors, through a report on the F-gas regulation in the European Union and two workshops. - Technicians and trainers of the refrigeration servicing sector trained on the use of CO2 refrigeration technologies. - A knowledge platform for the publicity of all the information related to the introduction of new alternatives created in the website of the Sustainability and Climate Change Agency (ASCC). - Four designs for the conversion into the CO2 technology and energy optimization of refrigeration systems in three representative

	companies of the fruits and vegetables processing sector. These designs will be used as a reference for the drafting of Terms of Reference for future bidding processes launched by the Ozono Programme for the effective conversion of industrial refrigeration systems into the CO2 technology. - A report on the replicability of this technology in other countries in the region was produced. - A closure event where the results of the conversion programme were presented and the possibilities to replicate this technology in other countries in the region were assessed. **Impacts:** The project has increased the awareness of companies in this relevant Chilean sector about the impact of the refrigeration systems on climate change and the current and upcoming regulation that will limit the use of HCFCs and HFCs as refrigerants. Consequently, the project has prepared the ground for an effective phase-out and phase-down of those substances in this sector in particular, but also in the entire Chilean industry. Besides, it has provided the Government and public entities with relevant information on the current use of refrigerants in this sector and also on the measures to increase the share of zero- and low-GWP alternatives in this and other industrial sectors. Therefore, the project will help the country in its future international commitments under the Paris Agreement and the Kigali Amendment to the Montreal Protocol. Locally, the project will contribute to the current Clean Production Agreement between the ASCC and the agro-industry (the so-called "APL III"). Finally, by assessing the opportunities to introduce the refrigeration technology based on CO2, Chile may be one of the first countries in the region to adopt such an state-of-the-art technology, which would be a good example for its neighboring countries. In this regard, we recommend to consult the report on the replicability of this technology produced under the third component of the project to better understand the impact of the project in the region.
Partners organisations	Implementers: UNIDO in collaboration with the ASCC and the Ozone Unit of the Ministry of Environment. In UNIDO the implementer was Andrés Celave under the supervision of Patrick Nussbaumer, Federico Villatico Campbell and Katarina Barunica. In the ASCC the implementer was Johanna Guzmán. In the Ozone Unit the implementer were Lorena Alarcón and Germán Fuentes, under the supervision of Claudia Paratori. The sectoral association Chilealimentos also collaborated with the implementation of the project, under a contractual agreement in component 1 and on a voluntary basis in component 3. The focal point in Chilealimentos was Carlos Descourvieres.
Beneficiaries	- Private sector: companies from the fruits and vegetables processing sector having participated in the information workshops. Besides, three companies have been subject to a design of conversion of their refrigeration systems into a CO2-based alternative. - Public sector: the Ministry of Environment, through its Ozone Unit,

	and the Ministry of Economy, through the ASCC, due to the inputs related to the Paris Agreement, the Kigali Amendment to the Montreal Protocol and the APL III. - Educational institutions and technicians: due to the workshop on F-gas regulation and the training on CO2 technology. - Other countries in the region: due to the report on the replicability of the CO2 refrigeration technology.
Methodologies applied to produce outputs and products	The following methodologies were applied to the different activities: - Survey: Chilealimentos was in charge of this activity and the survey tried to cover the entire population of companies within the fruits and vegetables processing sector. - Assessment on alternatives: a desk-study was conducted by Chilealimentos. - Workshops and trainings: all relevant stakeholders identified by the ASCC, the Ozone Unit and Chilealimentos were invited. - Report on F-gas regulation: a desk-study was conducted by the international expert Álvaro de Oña. - Designs of conversion in three companies: they were prepared by the international expert Albert Albert. - Report on replicability: it was prepared by Mr Albert. - Knowledge platform: different options were considered, based on a cost-benefit analysis.
Deviations	Two deviations can be identified: - Knowledge platform: the Response Plan proposed that this platform could be used for future trainings and capacity building activities. However, its main purpose will be in the end the sharing of relevant information on refrigeration applications among relevant stakeholder. Those other activities will then be promoted through other channels not covered by this project. - Time schedule: the project was planned to be finalized 18 months after its approval, however in the end it took 24 months to be completed from that date.
Achieved or anticipated gender benefits from the TA	No specific benefit can be identified from this project under the gender perspective. Nevertheless, it is meaningful to highlight the following: - The important role of women in the implementation of the project from the public Chilean entities: the ASCC and the Ozone Unit. Their essential role was mainly focused on the managerial aspects of the project. - The larger presence of men among the representatives of companies, the technicians, the trainers and the experts on refrigeration systems, including the international experts recruited under the project.
Achieved or anticipated co-benefits from the TA	- Energy efficiency: a reduction on the energy consumption of the companies subject to this project and other similar industries will be encouraged based on the designs of conversion produced under component 3. - Mobilization of funds: one of the companies subject to this design of conversion has already expressed its interest in investing in the CO2 technology. Besides, the Government is planning to undertake pilot projects for conversions into this technology under the frameworks of the HCFC Phase-out Management Plan and the future strategy for the phase-down of HFCs.

	- Employment: the trainings for technicians and trainers on the CO2 technology will contribute to the dissemination of knowledge on this area, which may match the future demand of technicians for the installation and maintenance of such systems by companies of the industrial sector.
Anticipated follow up activities and next steps	- The proponent of this project, the Ozone Unit, will use the outputs of this project for defining the strategy of the country under the Paris Agreement and the Kigali Amendment to the Montreal Protocol. This will have a clear impact on the mitigation strategies of the country. - The ASCC, will use these outputs for the accomplishment of the APL III with the agro-industry. This will also have an impact on the mitigation plan of the country. - The private sector will use these outputs as a relevant source of information and assistance to undertake investments for reducing the climate impact (direct and indirect emissions) of their refrigeration systems. This will also contribute to the mitigation objectives of the country.

3. Lessons learnt

	Lessons learnt	**Recommendations**
Lessons learnt for this TA. Describe essential factors contributing to successful implementation, as well as specific challenges. Recommendations include considerations on what would need to be in place for increasing success of similar efforts (i.e. regulatory, legal, stakeholders, communication, etc.)	The essential factor contributing to the success of this project was the synergies among all parties involved. The combination of the expertise of the Ozone Unit on refrigeration systems, the experience of ASCC with the agro-industry and the willingness of the target sector to learn about this topic channelled by Chilealimentos has been crucial for the implementation of all components and the achievement of the expected results.	There is still room for increasing the role of educational entities in projects like this one, where there is a component on training. In the case of the survey on the use of refrigerants by the companies of the target sector, there is still an important amount of information to be obtained about the small companies, which may consume higher ratios of HCFCs and HFCs than the medium and big ones.
Lessons learnt related to climate technology transfer Describe opportunities, challenges and barriers for the use and deployment of the technology or technologies supported by the TA. The objective is to identify specific success factors for technology transfer	Among the low-GWP refrigerants for industrial systems identified in the assessment of the first component, ammonia is already well known and largely used in the country. On its turn, the CO2 technology for industrial refrigeration is at an initial stage in developed countries, and almost unknown in Chile. The opportunities for this technology to be introduced in the country are	The establishment of a long-term training programme for technicians on the CO2 refrigeration technology is highly recommended. Considering the future phase-out of HCFCs and the phase-down of HFCs under the Montreal Protocol, it may be convenient to incentivize from the Government the conversion to zero- or low-GWP and highly energy

	linked to the upcoming regulation for the reduction of HCFCs and HFCs, the safety issues linked to the use of ammonia and the bigger energy efficiency gained with CO2 systems. The challenges are mainly related to the skills of technicians in Chile to install and maintain such systems. The barriers relate to the capital costs of the technology and the lack of incentives in the current regulations and policies.	efficient refrigeration technologies in the private sector.
Lessons learnt related the CTCN process for TA	The CTCN TA in Chile has proven to be an effective tool to build synergies among different entities that have a common goal. This has been the case during the inception phase and during the implementation.	There is still room to improve the distribution of roles and tasks within each of the entities involved.

4. Illustration of the TA and photos

For communication purposes, please provide 2-4 Power Point slides with illustrations or charts showing the TA process, applied methodology, activities, outputs and achieved results. The illustrations must be copied into the TA Closure report but must also be delivered as power point files. Also, please provide at least five high-resolution pictures in jpg format, capturing technical assistance. The pictures should illustrate how the TA has impacted the lives of the beneficiaries in particular and the communities in general.

Un proyecto para la mejora de la refrigeración industrial en Chile

- Importancia de la refrigeración en el sector
- Contexto: Protocolo de Montreal y APL III
- Uso de HCFCs y HFCs como refrigerantes + Consumo energético
- Necesidad de alternativas con bajo poder de calentamiento global y mayor eficiencia energética
- Presupuesto: 194.956 USD - Global Environment Facility

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Un proyecto para la mejora de la refrigeración industrial en Chile

- Promover la adopción de alternativas de bajo poder de calentamiento global y de mayor eficiencia energética
- ¿Cómo? Acciones de sensibilización, capacitación y asistencia técnica
- Partes: ASCC, UdO, ONUDI/CTCN

Componentes del proyecto y principales resultados

Encuesta sobre uso de sistemas de refrigeración:

- Amoniaco 86%, R22 8%, R507 3%
- Distribución similar en recarga
- Amoniaco mayoritario en todos los rubros
- Mayoritario en instalaciones de gran tamaño
- R507 en instalaciones de pequeño y mediano tamaño

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Componentes del proyecto y principales resultados

Estudio sobre tecnologías alternativas para el sector:

- El refrigerante ideal no existe: no inflamable, no tóxico, respetuoso con el medio ambiente, buenas propiedades termodinámicas, bajo costo de adquisición
- Los sistemas más recomendados:
  - NH3
  - NH3/CO2
  - CO2
- Caso a caso
- Buenas prácticas – reducción de fugas

Componentes del proyecto y principales resultados

Asesoramiento para la promoción de alternativas de bajo calentamiento global:

- Medidas legislativas destinadas a restringir los gases fluorados:
  - Restricción por valor de impacto climático
  - Tasas
  - Medidas adicionales de control
- Programas de formación, campañas de sensibilización y creación de redes entre las partes interesadas
- Proyectos demostrativos

Estudios y estadísticas

En esta sección se presentan publicaciones del CPL referidas a impactos económicos y ambientales de los Acuerdos de Producción Limpia, estudios de casos exitosos de empresas participantes en estos instrumentos y otros antecedentes que puedan ser de interés de los usuarios de este portal.

- **Implementación de Buenas Prácticas Agropecuarias en el Sector Producción de Huevos**
- **Casos de Empresas en Acuerdos de Producción Limpia**
- **La Experiencia de los APL: 1999-2005**
- **Uso de Tecnologías Limpias: Experiencias Prácticas en Chile**
- **Análisis ciclo de vida para incluir en programas de compras públicas y en los APL**
- **Estudio de Evaluación Económica - Social de 19 Acuerdos de Producción Limpia**
- **Estudio para el Cálculo de las Emisiones de Carbono Equivalente derivadas de la implementación de los APL realizados en Chile**
- **Estudio para la identificación de metas y acciones concretas a partir del Análisis de Ciclo de Vida a ser incorporadas en próximos APL**
- **Refrigeración sostenible en la industria de alimentos procesados**

La información contenida en esta sección se centra en la Meta 6 del Tercer APL para la Industria de Alimentos Procesados: la eliminación de refrigerantes agotadores de la capa de ozono y con alto poder de calentamiento global. Para ello, se compartirán a través de esta carpeta estudios, informes y demás documentos de carácter técnico, económico o legal sobre el uso de sistemas de refrigeración, sostenibles y eficientes.

La sección se concibe como una plataforma de conocimiento y está promovida por la ASCC, la Unidad Ozono del Ministerio del Medio Ambiente, la Organización de Naciones Unidas para el Desarrollo Industrial y el Clean Technology Center and Network. Su contenido es público y está abierto a la contribución de expertos, técnicos, profesionales y usuarios finales de sistemas de refrigeración de la industria chilena de alimentos procesados. Su objetivo último es la distribución de información relevante para este sector entre sus principales actores, promoviendo la introducción de tecnologías de refrigeración que no dañen la capa de ozono, con bajo o nulo poder de calentamiento global y alta eficiencia energética.

Se incluye en ella además un link a la Web de Ozono del Ministerio del Medio Ambiente, donde se publican eventos, proyectos y demás iniciativas relacionadas con la protección de la capa de ozono y la lucha contra el cambio climático.

- Uso actual y alternativas sostenibles de refrigeracion en la industria de alimentos procesados
- Uso actual y alternativas sostenibles de refrigeracion en la industria de alimentos procesados - Anexos
- Regulacion de gases refrigerantes en la Union Europea

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Los impactos en el sector de frutas y verduras procesadas

- Sensibilizar a un sector clave de la economía chilena
- Informar al sector sobre el marco regulatorio y las alternativas tecnológicas para la eliminación de HCFCs y HFCs
- Formar a técnicos sobre buenas prácticas con sistemas de refrigeración alternativos
- Informar al sector público sobre la situación en el sector y las vías para la futura regulación en este ámbito
- Estímulo para la aplicación de tecnologías y políticas para la protección de la capa de ozono y la lucha contra el cambio climático

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Lecciones aprendidas

- Las acciones de sensibilización e información son necesarias en el sector
- Necesidad de formar a los técnicos en la aplicación de nuevas tecnologías
- Colaboración entre el sector público y el privado
- Mayores esfuerzos para llegar a las pymes
- Necesidad de adaptación del marco regulatorio a la realidad Chilena
- Importancia de proyectos de conversión para su replicación en el sector

5. Information for TA impact description

The information in the table below will be used to produce the CTCN TA Impact Description. The TA Impact description is a 2-page summary document for communication purposes. Please copy information from sections above and technical delivery reports as required.

Challenge: Approx. 500 characters with spaces	The fruits and vegetables processing sector relies strongly on the use of refrigeration systems. However, up till now the companies of this sector in Chile have shown low awareness about the impact of these systems on climate change and the ozone layer, and on the possibilities to reduce it with sustainable alternatives. In such a context, the challenge of this technical assistance was to sensitize these companies on this issue, highlighting the most efficient alternatives in terms of energy consumption and investments, for the different types of facilities spread in the different regions and climates of the country. In parallel, the CTCN had to assist decision makers from various ministries of the Government on this topic, with the aim of strengthening their synergies under this framework. The TA also had to focus on the refrigeration servicing sector, a quite atomized one, to provide relevant information on the upcoming international commitments of the country for the replacement of certain refrigerants and the introduction of energy efficiency measures on these systems.
CTCN Assistance: 2 to 4 bullet points. Approximately 450 characters with spaces	The use of HCFCs and HFCs as refrigerants in the industry has a significant impact on climate change. The project seeks to demonstrate not only the effectiveness but also the higher energy efficiency ratios of alternatives to those substances, applied in the fruits and vegetables processing sector in Chile. Therefore, technical assistance is provided to public entities and end users of this sector, to raise awareness among these stakeholders, help the country to build the upcoming national strategy on this matter and incentivize the adoption of zero- or low-GWP alternatives with highly energy efficiency ratios.
Anticipated impact: 2 to 4 bullet points to summarise anticipated impact. Approximately 250 characters with spaces. As a minimum,	According to the survey produced under the first component of the project, the current direct emissions from the refrigeration systems

please include one of the following: i) Quantity of greenhouse gas emissions reduced, avoided or sequestered; or ii) Number of people with increased capacity to adapt to the impacts of climate variability and change.	of the companies that have responded to the survey (50% of the total population) amount to 21,200 tons of CO2e every year. The conversion of systems from HCFCs/HFCs to zero- or low-GWP refrigerants may avoid these direct emissions. Indirect emissions for the whole sector have not been calculated in the survey, however, according to the designs of conversion under the third component of the project, it can be considered that energy savings of approximately 7 to 20% can be obtained by new technologies or by optimizing the energy efficiency of the current ones. This would have a proportional impact in terms of indirect emissions if all refrigeration systems were converted or optimized. A knowledge platform for the sharing of information on low GWP and energy efficient alternatives settled.
Linkages and contribution to NDC: 2 to 4 bullet points. Approximately 350 characters with spaces	Chile is committed to reduce its CO2 emissions per GDP unit by 30% below their 2007 levels by 2030, considering a future economic growth which allows to implement adequate measures to reach this commitment. This TA is linked to one of the priority sectors for mitigation in Chile, as defined in the NDCs of the country: industrial processes, which accounted to more than 5,500 Gg of CO2eq in 2010. The information obtained through the survey on the use of refrigerants in this industrial sector, the knowledge shared with stakeholders on the technology alternatives, the research on the policies and regulations for the promotion of these technologies and the training of technicians on measures for efficiency have contributed to this specific NDC.
The narrative story: Approximately 1200 characters with spaces	The use of refrigerants can have a high impact on the ozone layer and on climate change when they are released into the atmosphere. The Montreal Protocol has been regulating the consumption of these gases in the last three decades, forcing the signatory countries to eliminate the use of chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs). In its latest amendment, agreed at Kigali in December 2016, the protocol adds the obligation to phase down the consumption of hydrofluorocarbons

	(HFCs), which do not affect the ozone layer but have high global warming potentials. In addition, the Paris Agreement for climate change, signed in December 2015, and the UN 2030 Agenda for Sustainable Development, also set international objectives for the promotion of measures that reduce global warming of the planet. Among these measures we can find the reduction of CO2 emissions from the use of refrigeration systems. One of the most intensive sectors in the use of these systems is the industrial sector and, particularly, that of the food industry. In Chile, the fruits and vegetables processing sector is one of the most important in the country. A total of 250 installations make up this sector, and its refrigeration systems contain refrigerant gases that accumulate a global warming power of 87,000 tons of CO2; which is equivalent to the emissions of 20,000 vehicles in a year. For this reason, the Chilean Agency for Sustainability and Climate Change (ASCC) and the Ozone Unit of the Ministry of the Environment, with the support of the Clean Technology Center and Network (CTCN) and the United Nations Industrial Development Organization (UNIDO), have worked jointly in the last two years, for the promotion of industrial refrigeration technologies with low global warming potential and zero impact on the ozone layer. The project, which has been included in the Third Clean Production Agreement between the ASCC and the food processing sector in the country, and has been financed by the Global Environment Facility (GEF), has included activities such as: - The production of informative reports and workshops with companies and institutions on sustainable refrigeration alternatives and policies to promote them, - A survey on the consumption of refrigerants in the sector, - Training for technicians in CO2 technology, - and the designs for the conversion to sustainable refrigeration systems in three representative companies of the sector. With all this, the CTCN, UNIDO and the Chilean institutions have managed to sensitize the sector on the impact of industrial refrigeration on climate change, and have demonstrated that there are low global warming and high energy efficiency technologies that can make Chilean agribusiness more competitive and even more

	responsible with the environment. The reports produced by the project (in Spanish) are available on the ASCC website.
Contribution to SDGs: Always include contribution to SDG 13, and to the extent possible, please include contribution to 2 other SDGs, describing the contribution with a few sentence for each SDGs concerned. A complete list of SDGs and their targets is available here: https://sustainabledevelopment.un.org/partnership/register/	7.3 By 2030, double the global rate of improvement in energy efficiency. Contribution: the TA has provided stakeholders with relevant information on energy efficiency gains with the alternative refrigeration technologies, particularly the one based on CO2 as refrigerant. 9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities. Contribution: the TA has provided information to all stakeholders on the current situation of the fruits and vegetables processing sector in terms of consumption of refrigerants, it has shown the sustainable alternatives that are currently available in the market and it has also provided options to incentivize their adoption by final users. 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning. Contribution: the TA has been mainly focused on capacity building for fighting against climate change.

Note: Please see example of a TA Impact Description at the following link: https://www.ctc-n.org/sites/www.ctc-n.org/files/benin_a_ag_forestry.final_.pdf

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Annex 1 (for internal use in donor and UN reporting)

A. Standardised CTCN performance indicators for donor and UN internal reporting

Please add quantitative values for indicators relevant to the particular TA in the list below. Non-relevant indicators should be left blank. Please only fill in the table for activities and outputs conducted or produced directly by the CTCN assistance.

CTCN standardised performance indicators	**Quantitative value**	**Qualitative description** *List the various elements corresponding to the quantitative value*
1. Overview		
Number of active person-days (not full duration) of technical assistance provided to counterparts or stakeholders by international experts and consultants	**200**	Coordination for project implementation. Technical assistance on legal frameworks and technologies.
Number of active person-days (not full duration) of technical assistance provided to counterparts or stakeholders by national experts and consultants	**100**	Survey and desk study on alternatives.
Number of for external communication and outreach activities conducted to showcase the assistance (news release, newsletters, articles on website, etc.)	**3**	Articles published by the Chilean Ozone Unit.
2. Events (other than trainings) held as part of the assistance		
Number of international and multi-country (at regional or sub-regional level) technology and knowledge sharing events		
Number of participants in the events above		
Number of national technology and knowledge sharing events	**9**	a) 6 workshops for end users of refrigeration systems. b) 2 workshops for relevant institutions and other entities on the F-gas regulation in the EU. c) 1 closure event for relevant institutions and other entities, informing on the results of the designs of conversion.
Number of participants in the events above	**230**	a) 150 b) 50 c) 30
Number of public-private events related to technologies	**7**	Items “a” and “c” above
Number of participants in the events above	**180**	
3. Training and capacity building activities conducted during the assistance		
Number of training sessions and capacity strengthening activities	**3**	a) One training on the CO2 refrigeration technology provided to technicians of the refrigeration servicing sector and trainers. b) Two workshops on the F-gas regulation in the EU, with the participation of public institutions.
Number of people who received the training	**10**	Considering only item “a” above
Number of men	**0**	

Number of women	**10**	
Total number of organisations trained		
Number of research organisations, laboratories and universities		
Number of private companies	**3**	Participation in the training on CO2 technology.
Number of cities and local government		
Number of communities		
Number of ministries		
Number of specialised governmental institutions		
Number of non-profit organisations		
Level of satisfaction of participants after the training (from training feedback form). Categories include: From very satisfied, satisfied, partly not satisfied, not satisfied at all		
Percentage of participants that increased their capacities thanks to the training (from training feedback form). Categories include: Significantly, very, moderately, to none.		
Percentage of men		
Percentage of women		
4. Tools, technical reports and information material supported by the assistance		
Total number of tools, technical reports and information material supported by the assistance (excluding mission, progress and internal reports)	**8**	- A survey on consumption of refrigerants. - A desk study on alternative refrigeration systems. - A desk study on the F-gas regulation in the EU. - Four designs for the conversion of refrigeration systems into the CO2 technology in four companies. - A report on the replicability of the technology in the region.
Number of tools strengthened, revised or developed		
Number of technical reports strengthened, revised or created	**8**	- A survey on consumption of refrigerants. - A desk study on alternative refrigeration systems. - A desk study on the F-gas regulation in the EU. - Four designs for the conversion of refrigeration systems into the CO2 technology in four companies. - A report on the replicability of the technology in the region.
Number of other information materials strengthened, revised or created	**1**	A knowledge platform for the sharing of information on alternative refrigeration systems.
5. Policies, laws and regulations supported by the assistance		
Number of policies, strategies, and plans drafted addressing climate change adaptation		

Comment [Office1]: Three companies received assistance, but one of them had two different designs considering different installed capacity.

Number of policies, strategies, and plans drafted addressing climate change mitigation		
Number of documents developed to inform other policies, strategies, and plans on climate change adaptation (sectoral strategies, national development plans, etc.)		
Number of documents developed to inform other policies, strategies, and plans on climate change mitigation (sectoral strategies, national development plans, etc.)	**1**	A desk study on the F-gas regulation in the EU.
Number of laws, agreements, or regulations drafted addressing climate change adaptation		
Number of laws, agreements, or regulations drafted addressing climate change mitigation		
Number of documents developed to inform laws, agreements, or regulations on climate change adaptation		
Number of documents developed to inform laws, agreements, or regulations on climate change mitigation	**1**	A desk study on the F-gas regulation in the EU.
6. Institutional strengthening supported by the assistance		
Number of institutional arrangements in place to coordinate near and long-term national adaptation plans (NAPs)		
Number of organisations with increased technical capacity to advance near and long term national adaptation plans (NAPs) which integrate EbA		
Number of organisations with increase awareness and knowledge among countries to better own and drive national adaptation planning processes		
7. Partnerships and cooperation		
Number of private companies directly engaged in the assistance (that partnered with the proponent, the beneficiaries or the CTCN to implement the assistance)	**3**	Three companies accepted to collaborate for the design of conversion of refrigeration systems into the CO2 technology
Number of South-South collaboration enabled during or through the assistance, when stakeholders from other countries were involved in the assistance	**1**	Fundación Bariloche (ARG) collaborated in the drafting of the Response Plan.
Number of North-South collaboration enabled during or through the assistance, when stakeholders from other countries were involved in the assistance		
Number of Triangular collaboration enabled during or through the assistance, when stakeholders from other countries were involved in the assistance		

B. Indicators of anticipated impacts that may occur after the TA is completed

CTCN standardised performance indicators	**Quantitative value** Insert the request value and unit	**Content** List the elements included in the number provided	**Expected timeline** Indicate when the indicator and value are	**Responsible institution** Indicate the institution(s) that will play leading role in enabling

			expected to be achieved	the indicators and anticipated values to be achieved
16. Anticipated finance mobilised				
a) Anticipated amount of public/donor investment mobilised (in USD) from the beneficiary country for climate change activities as a result of the TA				
b) Anticipated amount of public/donor investment mobilized (in USD) from international and regional sources for climate change activities as a result of the TA				
c) Anticipated amount of private investment mobilised (in USD) from the beneficiary country for climate change activities as a result of the TA	1,3 Million USD	One of the companies subject to the design of conversion expressed interest in investing on this technology.	Unkown	Entrerios Farms (considering the agreement we reached with the company, please do not make public its identity).
d) Anticipated amount of private investment mobilised (in USD) from international and regional sources for climate change activities as a result of the TA				
17. Policies				
a) Anticipated number of policies, strategies, plans, addressing climate change mitigation officially proposed, adopted, or implemented as a result of the TA	1	A strategy for the phase-down of HFCs.	2019	Ministry of Environment
Anticipated number of policies, strategies, plans, addressing climate change adaptation officially proposed, adopted, or implemented as a result of the TA.				
b) Anticipated number of laws, agreements, or regulations addressing climate change mitigation officially proposed, adopted, or implemented as a result of the TA.	1	A regulation for the phase-down of HFCs.	2019	Ministry of Environment
Anticipated number of laws, agreements, or regulations				

addressing climate change adaptation officially proposed, adopted, or implemented as a result of the TA.				
c) Anticipated laws, policies, regulations, strategies and plans where climate change mitigation will be mainstreamed as a result of the TA				
Anticipated laws, policies, regulations, strategies and plans where climate change adaptation will be mainstreamed as a result of the TA				
18. Anticipated number of public-private partnerships created				
19. Anticipated twinning arrangements created as a result of the TA				
20. Anticipated number of technology projects prepared and implemented to support action on low emission and climate-resilient development	3	Conversion of refrigeration systems in 3 facilities	2 years	The respective companies subject to TA under this project
21. Anticipated number of strengthened National Systems of Innovation and technology innovation centres in recipient country				
22. Anticipated Clean Energy Generation Capacity Clean supported by the TA that has achieved financial closure				
23. Anticipated and projected GHG reductions. Quantity of greenhouse gas (GHG) emissions, measured in metric tons of CO_{2-e}, anticipated to be reduced or sequestered as a result of projects supported by the TA	21,200	Considering only the companies that provided information for the survey included in component 1.		
24. Anticipated clean energy generation capacity supported by the TA that has achieved financial closure				
25. Anticipated and projected greenhouse gas emissions reduced or avoided through 2030, in metric tons of CO_{2-e}, from adopted laws, policies, regulations, or technologies related to clean energy/sustainable landscapes as a result of the TA				

26. Anticipated number of people improving their livelihood as co-benefits as a result of the TA				This would be extremely difficult to calculate. The first and second component of the project, and the designs included in the third component have a very indirect impact on the livelihood of people. Only the training of technicians has a more direct one, since those technicians will be more skilful and will adapt better to the upcoming changes in regulation and market. In this respect, we could say that the TA contributed to the improvement of the livelihood of around 40 families
27. Anticipated technology types effectively deployed in the country	1	The refrigeration technology based on CO2 as refrigerant, for its use by the industry.		
28. Anticipated UNFCCC processes implemented as a result of the TA (NAMA, NAPA, NDC, etc.)				
29. Anticipated Technology Needs Assessments (TNA) and technology Action Plans (TAP) as a result of the TA				

30. Anticipated cooperative research, development and demonstration programmes within and between developed and developing country Parties facilitated as a result of the TA				
31. Anticipated improved climate change observation systems and related information management in developing country Parties.				

Annex 2 (for internal use – to be filled in by the CTCN)

CTCN evaluation

This section will be completed by the relevant CTCN Technology Manager.

- Evaluation of the timeliness of the TA implementation as measured against the timeline included in the response plan;
- Evaluation of TA quality as defined in the response plan;
- Overall performance of the Implementers;
- Overall engagement of the NDE and Proponent;
- Lessons learned on the CTCN process and steps taken by the CTCN to improve.