Country:	*Chile*	**Request identification number:**	

Title:	**Introduction of zero or low global warming potential refrigerants in food processing production and exports (fruits and vegetables)**

1. Project Summary

Provide a brief description of the assistance that will be provided by the CTCN, including its main outcome, outputs, and expected impacts in the national context. The summary should also include an indication of the assistance duration, as well as the main country partners who will be directly involved in project implementation.

The Chilean agroindustry of fruits and vegetables has experienced an important development in recent years and there are currently around 250 industrial facilities in the country. Exports by this sector in the last ten years have tripled, attaining more than USD 1,500 million in 2012 and making Chile one of the main suppliers of raisins, dried apples, dried plums, frozen raspberries, dried pepper, grape and apple juice, tomato sauce and tinned peaches.

The use of refrigeration systems in the value chain of these and other products in the fruits and vegetables processing sector is generally extended, and the annual impact of refrigerants currently used in these systems is equivalent to 330,683 tons of CO_2 approximately, whereas the national annual greenhouse (GHG) emissions are 519,286 kilo-tons of CO_2-eq.

The refrigerants used nowadays in these facilities are hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs), which have a very high global warming potential (GWP) while their use implies as well a high level of energy consumption. HCFC-based refrigeration systems are to be progressively replaced under the framework of the HCFC Phase-out Management Plan (HPMP), given their impact on the ozone layer. As per HFCs, whose GWP can reach values of up to 4,000 times more than CO_2, its production and consumption may be subject to control measures under the Montreal Protocol during the implementation of Stage II of the HPMP, based on Decision XIX/6[1]. However, this progressive phase-down (whose detailed schedule is yet to be determined) would imply the need for policy incentives to support the development of zero- or low-GWP alternatives, incentives that can accelerate the sustainable replacement of both HCFC- and HFC-based systems.

The development of refrigerants with zero or low GWP has indeed been initiated in recent years and some of these new substances are already available in the market. Natural refrigerants, such as ammonia, hydrocarbons or CO_2, are already mainstreamed in some industrial processes, and other options like hydrofluoroolefins (HFOs), have also been identified by the multilateral legal framework

[1] This decision states that alternatives to HCFCs must have a zero or low GWP. Besides this decision, at the 27th Meeting of the Parties (MOP) of the Montreal Protocol, held in November 2015 in Dubai, the 197 Parties agreed to begin work on an amendment to explicitly reduce the global production and consumption of HFCs given its impact on climate change. The amendment, deemed the "Dubai Pathway," is expected to be completed in 2016.

as appropriate alternatives to prevent further increase of HFC-based systems and, therefore, reduce the impact of the refrigeration technologies on climate change.

In this context, the proposed project seeks to demonstrate not only the effectiveness but also the higher energy efficiency ratios of these alternatives, for the production of processed fruits and vegetables in Chile.

In order for this outcome to be achieved, the project will coordinate its activities with and will be embedded in the next Cleaning Production Agreement (*Acuerdo de Producción Limpia*, APL3) the Chilean government is currently negotiating with the sectoral association Chile Alimentos. These activities would focus on the technical assistance for end users, the awareness raising and the policies related to the necessary replacement of high-GWP refrigerants by zero- or low-GWP alternatives. Considering this scope, three main outputs are expected to be developed:

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. 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. Training and advisory service to governmental bodies on the best practices to incentivize the adoption of climate-sound alternatives among end users of refrigeration systems in this and other similar sectors.
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 programme 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 future conduction of training and capacity building activities, and for the publicity of all the information related to the introduction of new alternatives.

The implementation of the pilot conversion programme will be a post-CTCN project activity consisting of the conversion of the refrigeration systems of around five companies, to demonstrate, as above mentioned, the effectiveness and higher energy efficiency rates of zero- and low-GWP refrigerants compared to the performance of high-GWP refrigerants. The introduction of those low GWP refrigerants in five companies would avoid the consumption of substances with an impact on climate of some 6,500 tons of CO_2-eq.

By demonstrating the feasibility, profitability and environmental benefits of such a conversion, along with the awareness activities and the capacity building here proposed, the project aims at promoting the use of zero- and low-GWP refrigerants in the industry of food processing in the country.

In this sense, considering a baseline scenario of up to 469,122 tons of CO_2-eq in 2030, the current project could lead to greenhouse gases emissions reductions estimated at 25% to 60% against the

baseline. Further benefits on climate change related to this industry could be achieved given the energy efficiency gains obtained with the new substances.

Among the main country partners, the project seeks to count on the collaboration of the the Ministry of Economy, Development and Tourism through the Chilean Clean Production Council (CPL, in Spanish), the National Ozone Unit of the Ministry of Environment (NOU), the Ministry of Energy and the sectoral association Chile Alimentos.

The CTCN assistance will take 15 months and is expected to start in the third quarter of 2016.

2. Overview of the assistance

2.1 Outcome (objective of the assistance)

Describe the expected outcome (likely short term effects) of the CTCN assistance in the country and/or sector. This outcome should be directly attributed to the activities of CTCN technical assistance.

The objective of the proposed project, focused on the food processing in Chile and, more specifically, in the fruits and vegetables sector, is to demonstrate the effectiveness and higher energy efficiency of units using refrigerants with zero or low GWP, as well as to promote their use in the entire value chain in this and other similar sectors. This is expected to be achieved through the CTCN technical assistance and the follow-up activity for the implementation of a pilot conversion programme. The technical assistance funded by the CTCN will focus mainly on end users of refrigeration systems and also on technicians of the servicing sector, so as to inform them and train them on the use of zero- or low-GWP alternatives. Furthermore, the methodology and foreseen results of the assistance are expected to be easily replicated in other sectors in Chile and other countries in the region, considerably reducing its impact on climate change.

2.2 Outputs (results of the assistance)

Describe the expected outputs (services or products) of the CTCN technical assistance in the country and/or sector. These outputs should be directly attributed to the activities of CTCN technical assistance.

Output 1. – Awareness campaign

Under this CTCN technical assistance an awareness campaign will be carried out, with the following outputs:

- A survey on the current use of refrigerants by facilities, mainly the small and medium ones, processing fruits and vegetables in Chile.
- An assessment on technology options (including best practice examples from other countries) and potential for replication of refrigeration systems in food processing production in Chile.

- End users and other relevant stakeholders in the fruits and vegetables processing sector, informed on the possibilities regarding the conversion away from refrigerants with a high impact on climate change. They will also receive information on the pilot conversion programme, as well as on the APL3.

Output 2. – Capacity building

As a result of the second group of activities, decision makers in the Government of Chile will have a comprehensive knowledge on the legal and policy instruments required, as well as the technical aspects to be considered for promoting the conversion away from high GWP refrigerants in the fruits and vegetables processing sector and other similar sectors in the country.

This output will take into consideration potential similar instruments agreed in the context of APL3, in order to complement it and strengthen it.

Output 3. – Technology transfer and technical assistance

A third step will be the preparation of a pilot conversion programme along with the technical assistance provided to technicians, in order to demonstrate the feasibility and effectiveness of conversion projects in the fruits and vegetables processing sector for the replacement of refrigerants with high GWP by alternatives with low or no GWP and better energy efficiency ratios.

This preparatory exercise for the pilot conversion programme will provide the following outputs:

- Facilities within the fruits and vegetables processing sector, selected for the conversion projects. An agreement with each of the companies will be reached for the replacement of refrigerants.
- The conversion process in each of these facilities will be designed, including selection of the most appropriate alternative and the corresponding technology, technical design of conversion and subsequent trials, as well as the preparation of monitoring systems and the necessary financial assistance.
- Local technicians of the refrigeration servicing sector trained on the appropriate handling of old and new refrigerants.
- A knowledge base, composed by trained technicians, created for the conduction of subsequent training and capacity building activities. It will also be used as a long-term platform for accessing to all the information related to the introduction of alternatives with zero or low GWP and higher energy efficiency ratios.

The implementation of the pilot conversion programme will be a follow-up activity after the completion of this project. However, the activities related to the technical assistance for technicians will be implemented under the scope of this project.

2.3 Technological focus

Provide a brief description of the climate technology(ies) promoted through the CTCN technical assistance, and explain how it will assist in identifying, adapting, developing, transferring and/or deploying the specific adaptation or mitigation technology(ies).

The different cooling technologies considered in this project, which are, as above mentioned, alternatives to those based on the use of refrigerants with high GWP, are conceived as mitigation technologies, since they all have zero or low GWP.

Thus, the alternative technologies to be taken into consideration are those currently being considered for the industrial systems worldwide. These are mainly natural refrigerants, like hydrocarbons, ammonia and CO_2, and some fluorinated gases, like HFOs. However, the specific alternatives to be considered in the current project, with their corresponding equipment and technical adaptations and safety measures, are to be defined in the assessment exercise included in the first output above described.

These various alternatives with zero or low GWP are expected to demonstrate their effectiveness in the cooling performance, as well as the energy efficiency gains obtained with their use.

The introduction of these technologies will be guided by all the outputs explained in chapter 2.2.

3. Description of the Assistance

3.1 Activities

Define in Annex 1 the planned activities and sub-activities to be conducted, as well as their corresponding deliverables for the respective outputs.
For each activity, provide below a brief description, also indicating how it will contribute to the output and overarching objective.

Use the following format:

Cross-cutting activities. – Selection of experts.

A team of experts must be formed, in order to carry out the different activities as explained in this section.

The selection of experts will be done through both international and national tender procedures, and will be based on professional profile and experience on refrigeration systems for the food processing sector in Chile or abroad, as described in paragraph 3.2 and also in the terms of reference attached to this Response Plan.

Selection will be done by the Implementing Institution in cooperation with a Steering Committee composed by representatives of the Clean Production Council (CPL, in Spanish), the National Ozone Unit (NOU) and Chile Alimentos Association.

Key stakeholders: Steering Committee

Activities linked to output 1. – Awareness campaign

An awareness campaign, addressed to end users and other relevant stakeholders will be organized as a first step in the transferring of technologies for the introduction of zero- and low-GWP refrigerants in the Chilean fruits and vegetables processing sector.

Timeline: first two quarters (Q1-Q2; Section 3.5)

Key stakeholders: Steering Committee.

Activity 1.1 – Survey and assessment on technology options

Before the organization of information sessions for different relevant stakeholders, a survey will be undertaken with the purpose of having a clear picture on the use of those refrigerants that are intended to be replaced in the fruits and vegetables processing sector in the country. The survey will also focus on the general needs of this sector regarding the use of refrigeration systems.

The results of the last Clean Production Agreement (APL2) between this sector and the government, where the companies were required to register all inputs, including refrigerants for air-conditioners and refrigeration systems, will be taken as a basis in this exercise.

However, the survey will be completed with fieldwork to update current figures, and will focus mainly in the small and medium size facilities throughout the country, which are more likely to use high-GWP refrigerants, like HFCs.

Besides this survey, an assessment on the alternatives to refrigerants with high GWP and its availability in the market will be also carried out in order to give a precise content to the information sessions. As in the case of the survey, this assessment may be based on similar exercises made under the framework of the APLs or that of the HPMP.

The results of both the survey on current refrigerants in the country and the assessment on alternatives will be contained in a report that will be shared with and presented to stakeholders during the information sessions. This report will also include some conclusions on the feasibility of conversion processes in the Chilean facilities here considered.

Both the survey and the assessment will be undertaken by the team of experts.

Activity 1.2 – Information sessions for end users

Based on the results of the survey and the assessment, information sessions for end users of refrigerants with high GWP and other relevant stakeholders within the fruits and vegetables sector will be organized in order to raise awareness on the following aspects:

- Refrigerants' impacts on climate change.
- Available alternatives and technologies with low or no GWP, including their main physical properties, the technical and economic characteristics.
- Benefits and co-benefits of switching to new refrigerants and increasing energy efficiency.
- Safety standards for the use of flammable or toxic refrigerants. Information on potential financing mechanisms and other incentive instruments to invest in the replacement of high GWP refrigerants.

Information on the pilot conversion programme will also be provided, and companies will be asked to express their interest in being part of such a programme. Selection of beneficiaries will be made out of this first group of companies having expressed their interest, considering also the opinion of relevant stakeholders, like Chile Alimentos Association.

Activities linked to output 2. – Capacity building

Based on both Decision XIX/6 of the Montreal Protocol and the agreement reached in the 27th MOP last year, the production and consumption of HFCs globally may be subject to control and limits for its phase-down in the near future. This would be then the basis for the introduction of zero- and low-GWP refrigerants in all industrial sectors. In order for this future framework to be effective in the Chilean fruits and vegetables processing sector, and also in other similar sectors, it is essential that decision makers have precise information on the best policy and regulatory instruments to incentivize the adoption of appropriate alternatives by companies.

Timeline: third quarter (Q3; Section 3.5)

Key stakeholders: Steering Committee.

Activity 2.1 – Training and advisory service

The current project will provide training and advisory service to the Executive and other relevant governmental bodies, such us the Ministry of Environment, the Ministry of Energy and the Ministry of Economy, Development and Tourism, on the technical aspects to be considered, as well as on the regulations and policy measures required to incentivize the adoption of climate-sound alternatives in the fruits and vegetables processing sector and other similar sectors.

Training will be organized through different sessions in order to brief decision makers on the following issues:

- Current refrigerants' consumption in Chile, and more precisely in the value chain of the fruits and vegetables processing sector.
- Climate and environmental impacts of current refrigerants.

- Available alternatives and technologies with low or no GWP for the replacement of these gases, including its main physical properties, the technical and economic characteristics and the required skills of technicians for their proper use.
- Benefit and co-benefit of switching to new refrigerants and increasing energy efficiency.
- Policies and regulatory instruments applied abroad for the phase-down of refrigerants with high GWP, identifying best practices among them, such as: special financing instruments, technical assistance supported by the Government or tax reduction, among others..

On its turn, advice will be provided to tailor these potential policy and regulatory instruments to the specific case of Chile, considering the results of the survey defined above. However, the implementation of an incentive scheme or any legal framework related to this issue is out of the scope of the current proposal and, therefore, this is not included among the expected outputs.

The training and advisory service will be provided by the team of experts in coordination with the provisions of the next APL.

Activities linked to output 3. – Technology transfer and technical assistance

The information gathered and shared with relevant stakeholders will find in a pilot conversion programme the best channel to demonstrate the benefits and co-benefits of the refrigerants to be promoted in the fruits and vegetables processing sector in Chile.

Besides the preparation of this pilot conversion programme focusing on technology transfer, technical assistance will be also provided to technicians on good practices for dealing with alternatives.

The implementation of the pilot conversion programme will be a follow-up activity of the CTCN technical assistance here requested. The corresponding activities here described refer only to the preparatory stage of that programme.

Timeline: last two quarters (Q4-Q5; Section 2.5)

Key stakeholders: Steering Committee.

Activity 3.1 – Selection of beneficiaries and design of conversion processes

The pilot conversion programme will focus on some 5 beneficiaries, which will be selected by the expert team and Chile Alimentos Association out of the list of companies having expressed an interest in the initiative, and always applying a criterion of representativeness, i. e. considering mainly their size/production (small and medium size companies are likely to be the main beneficiaries in this programme, since most of bigger facilities have already switched to climate neutral alternatives), the current refrigeration technology being used and their geographical distribution. More detailed criteria will be defined during project preparation for an objective assessment of potential beneficiaries.

Once these beneficiaries have been selected, the expert team will design and submit a proposal for the replacement of refrigerants in each of these facilities.

This proposal should contain the technical aspects, referring to the most appropriate alternative refrigerant to be applied, the details of conversion of facilities and cooling equipment, and the safety measures required in each case. It should also specify the capital and operating costs related to this conversion, as well as an estimation of the energy efficiency gains, in order to calculate the return on investment and profitability. A programme of trials and the necessary monitoring system will be also designed and included in the proposal together with the funding mechanisms to apply in each case. These mechanisms may be supported by sources such as the Stage II of the HPMP, the Global Environment Facility (GEF) or others.

Upon completion of the proposal, an agreement with each of the beneficiary companies must be signed for the replacement of refrigerants. This agreement will focus on the technical and economic details of conversion, as well as on the roles and responsibilities of each party. The deadline for starting the conversion process once the agreements are signed will be scheduled during preparatory stage of the project.

The different stakeholders of the project will be informed in this respect.

Activity 3.2 – Training of local technicians

Training sessions will be organized for technicians of the servicing sector, focusing on the installation and maintenance of refrigeration equipment applied to the fruits and vegetables processing sector, as well as the handling of flammable and toxic alternatives. Between 40 and 50 technicians will receive this training which, also in this case, will be carried out by the expert team in coordination with the training activities of the HPMP.

Training programmes will be duly revised ex ante by the expert team, experts of the ministries involved and associations like the Refrigeration and Air Conditioning Chamber or the Professional Association on Refrigeration and Air Conditioning, in order to guarantee that its content is in line with the sectorial needs.

At a later stage, these technicians would also participate in the pilot conversion activity, and they will be qualified to train other servicing technicians.

The final purpose of these activities is to provide the country with the technical skills to support the complete replacement of high-GWP refrigerants in this and other relevant sectors.

Activity 3.3 – Knowledge base

A knowledge base will be established with the support of the Clean Production Council, the National Ozone Unit and Chile Alimentos Association. The knowledge base is understood as a long-term online platform, which will count on the inputs of the technicians and end users having received training or information sessions as above described.

Thus, the knowledge base will have two main purposes:

- The organization of subsequent training and capacity building activities for other technicians and end users of both the fruits and vegetables processing sector and other relevant industrial

sectors, in coordination with activities of the HPMP and linked to the APL3 and other potential APLs.
- The publicity of all the information related to the introduction of alternatives with low or no GWP and higher energy efficiency ratios.

This online platform will be hosted in the website of the Ministry of Economy, Development and Tourism, and the corresponding links will be mentioned in the websites of Chile Alimentos and other relevant stakeholders.

Required post-CTCN project activities

Implementation of the pilot conversion programme

The planned post-CTCN project activities are related to the implementation of the pilot conversion programme, which will consist, as already stated, of the full conversion of refrigeration systems for the replacement of high-GWP refrigerants by zero- and low-GWP alternatives in five companies. The purpose of this pilot conversion programme is to demonstrate their effectiveness and their higher ratios of energy efficiency.

The conversion programme will be conducted following the proposal made by the expert team, will be guided by the latter and will be undertaken by professionals of the refrigeration servicing sector having participated in the training sessions above described.

Once the replacement has been completed, a test period of three months will be launched in order to confirm the effectiveness and efficiency of the alternatives introduced in the cooling system of fruits and vegetables processing facilities. During this period, necessary data will be collected for the preparation of the corresponding reports, whose main results will be shared with the different stakeholders of the project. A national public entity, which will be selected during the design of the pilot programme, is expected to be in charge of the monitoring, reporting and verification.

Finally, technical assistance will be given to these end users, mainly related to the handling of equipment using flammable refrigerants like hydrocarbons and ammonia.

3.2 Expertise required

List the expertise required to successfully implement the assistance and reach the expected objectives.

The project will be implemented through an international institution with a proven track record in the implementation of activities related to industrial refrigeration systems. At national level, a Steering Committee composed by representatives of the CPL, the NOU and Chile Alimentos Association will monitor the project in all its phases.

The Implementing Institution and the Steering Committee will rely on both national and international experts for undertaking specific tasks required for the implementation of the project, namely:

- 1 National project coordinator with experience of more than 7 years in the coordination of different stakeholders within the food industry sector;
- 2 International experts on industrial refrigeration systems in the food processing sector with experience of more than 12 years in the food processing sector;
- 2 International experts on capacity building with experience of more than 12 years in assessing governments on aspects related to refrigerant use, energy efficiency standards, safety standards and labelling;
- 1 National expert on industrial refrigeration systems in the food processing sector with experience of more than 7 years;
- 5 National data collectors at industry level with experience of more than 2 years in undertaken sector specific technical survey in the food industry;

Terms of reference (ToR) for service providers containing a more detailed description can be found in Annex 3.

3.3 Main partners

List and describe the role of in-country partners who will be involved in the implementation of the assistance in the country.

Stakeholder	**Role**
Clean Production Council (CPL) of the Ministry Economy, Development and Tourism.	Leading, coordinating and monitoring the different activities and the implementation of APL 3 with ChileAlimentos, through its participation in the Steering Committe.
National Ozone Unit (NOU) of the Ministry of Environment.	Co-leading and main support on the organization of expert selection, training for technicians and design of the pilot programme. Support on the implementation of other activities through its participation in the Steering Committee.
Chile Alimentos	Support on the organization of assessment and survey on refrigerant's consumption, and awareness campaign. Support on the implementation of other activities through its participation in the Steering Committee.
Ministry of Energy (to be confirmed).	Support in project implementation
The Refrigeration and Air Conditioning Chamber and the Professional Association on Refrigeration and Air Conditioning (DITAR) (to be confirmed).	Support in project implementation

3.4 Synergies

Identify past and ongoing public and private sector initiatives at the local, national or regional level that the response will specifically build on and/or link to.

3.4.1. Activities implemented under the Montreal Protocol in the refrigeration and air-conditioning sector

In the context of the Montreal Protocol for Substances that Deplete the Ozone Layer, Chile is currently implementing the HCFC Phase-out Management Plan (HPMP), under the coordination of the National Ozone Unit. Thus relevant synergies can be built between this framework and the activities proposed in this project.

This would be the case, for example, of the training activities planned under the CTCN technical assistance described in this Response Plan, which will be implemented in coordination with the HPMP training activities and with the equipment and tools procured under the HPMP.

Besides, Stage II of the HPMP in Chile, which may be submitted in 2016, includes the conversion of cold-storage facilities and, consequently, the follow-up activity of the current proposal could be coordinated with those conversions to build potential synergies.

Finally, as previously mentioned, Decision XIX/6 of the Montreal Protocol to leapfrog the use of high-GWP refrigerants for replacing HCFCs, as well as the agreement in the 27th MOP regarding the possibility to amend the protocol in order to include HFCs, will be an appropriate framework for the enforcement of the outcome here proposed.

3.4.2. The Chilean Fund for the Promotion of Clean Production

The so-called *Fondo de Promoción de Producción Limpia* (Fund for the Promotion of Clean Production) is an initiative of the National Council on Clean Production whose objective is to support companies, through its sectoral associations, for the implementation of clean production.

The fund offers four different co-financing modalities for four different initiatives, these are:

- Preparation and evaluation of APL projects.
- Training and improvement of professional skills.
- Public-private partnership for clean production.
- Publicizing of benefits linked to clean production.

In this regard, since the activities described so far correspond directly to the these initiatives, this project for the introduction of zero- and low-GWP refrigerants in the fruits and vegetables processing sector would be in a position to receive the support of this fund, in line with the provisions and objectives of the National Council on Clean Production.

As far as this proposal will be coordinated in its content and also in its timeline with APL3, which is currently being negotiated between the Government and Chile Alimentos Association, access to this co-financing source will be facilitated, if necessary.

3.4.3. National initiatives on climate change

Climate change has been a topic of national development priorities in Chile and the government has demonstrated its commitment to contribute to national and global solutions to stop climate change. Chile ensures that its policies provide strategic directions on mitigation actions while accessing low carbon pathways that are sustainable and ensure energy efficiency for all sectors of the economy.

In this regard, national initiatives as the so-called *Plan de Acción Nacional de Cambio Climático 2016-2020* (National Climate Change Action Plan 2016-2020) established by the Ministry of Environment, is focused on the fight against climate change and, therefore, synergies can be built with them for the implementation of the current project.

3.5 Timeline

Provide a timeline for the CTCN technical assistance and list specific milestones for each activity. The timeline show the roll out of the activities and sub-activities to be conducted, throughout the whole duration of the assistance. Please adapt the size of the table to the duration of the assistance.

Activity	**Timeframe**				
	Q1	**Q2**	**Q3**	**Q4**	**Q5**
Output 1: Awareness campaign					
Activity 1.1: *Survey on refrigerants' consumption and Assessment on technology options*					
Activity 1.2: *Information sessions for end users*					
Output 2: Capacity building					
Activity 2.1: *Training and advisory service for decision makers*					
Output 3: Technology transfer and technical assistance					
Activity 3.1: *Selection of beneficiaries and design of conversion processes*					
Activity 3.2: *Training of local technicians*					
Activity 3.3: *Knowledge base*					

3.6 Indicative budget

Provide an indication on the maximum amount of resources required to implement the assistance.

Outputs	Total (USD)
Output 1: Awareness campaign	**84,919**
Output 2: Policy and regulatory support	**40,368**
Output 3: Technology transfer and technical assistance	**49,669**
Selection of beneficiaries and design of conversion processes	*33,819*
Training of local technicians	*14,900*
Knowledge base	*950*
Project management	**20,000**
TOTAL	**194,956**

The overall budget for the implementation of the CTCN technical assistance described in this Response Plan is USD 194,956.

3.7 Risk assessment

Identify risks that could jeopardize the realization of project outcomes and expected impacts, their probability and how the assistance will mitigate these perceived risks.

Risks	Consequence	Probability	Mitigation
Difficulties in contacting companies in the fruits and vegetables processing sector through private associations.	*Limited access to companies.*	*Low*	*- Request support to ministries.*
Insufficient number of companies interested in participating in the information sessions.	*Limited awareness on the issue and the state of the art refrigeration technology in the food processing sector.*	*Medium*	*- Delivery of emails and letters to companies, informing on the project, including a form to express their interest.*
Insufficient number of technicians of the servicing sector interested in participating in the training sessions.	*Limited technical capacity in the country to support implementation of the new technologies.*	*Low*	*- Additional communication efforts with the direct support of ministries.*

Insufficient number of companies interested in participating in the pilot project.	*Limited demonstration value of the follow-up activities.*	*Low*	*- Additional communication efforts with the direct support of ministries and Chile Alimentos Association.*
No agreement reached with the selected beneficiaries for completion of the pilot project.	*No possibilities to test the different alternatives.*	*Low*	*- Additional negotiation efforts with the direct support of ministries and Chile Alimentos Association.*

3.8 Monitoring and Reporting

Provide information on how the monitoring and reporting for the project will be carried out.

Monitoring will be undertaken by the Steering Committee with the support of the implementing institution and the national project coordinator. Respective reports presenting achievements and results as listed in the project document during the specified test time period will be provided to them. Further, they will collate and coordinate reports obtained from the involved stakeholders and will report back to the CTCN.

4. Long-term impacts of the assistance

4.1 Expected climate benefits

Describe the long-term results (impacts) produced by CTCN assistance, including its contribution in mitigating and adapting to climate change. If possible, insert specific targets.

The direct climate benefits of this project will be linked to the reduction of greenhouse gases emissions, as well as the improvement of energy efficiency rates in the facilities for the processing of fruits and vegetables.

The CTCN technical assistance would demonstrate the possibilities and advantages of investing in the introduction of zero- and low-GWP refrigerants, not only in terms of climate impact, but also in terms of profitability, which could incentivize the whole sector to switch to appropriate substances.

As it is shown in the table below, the estimated current annual climate impact of refrigerants used in the fruits and vegetables processing sector in Chile is equivalent to 330,683 tons of CO_2, approximately.

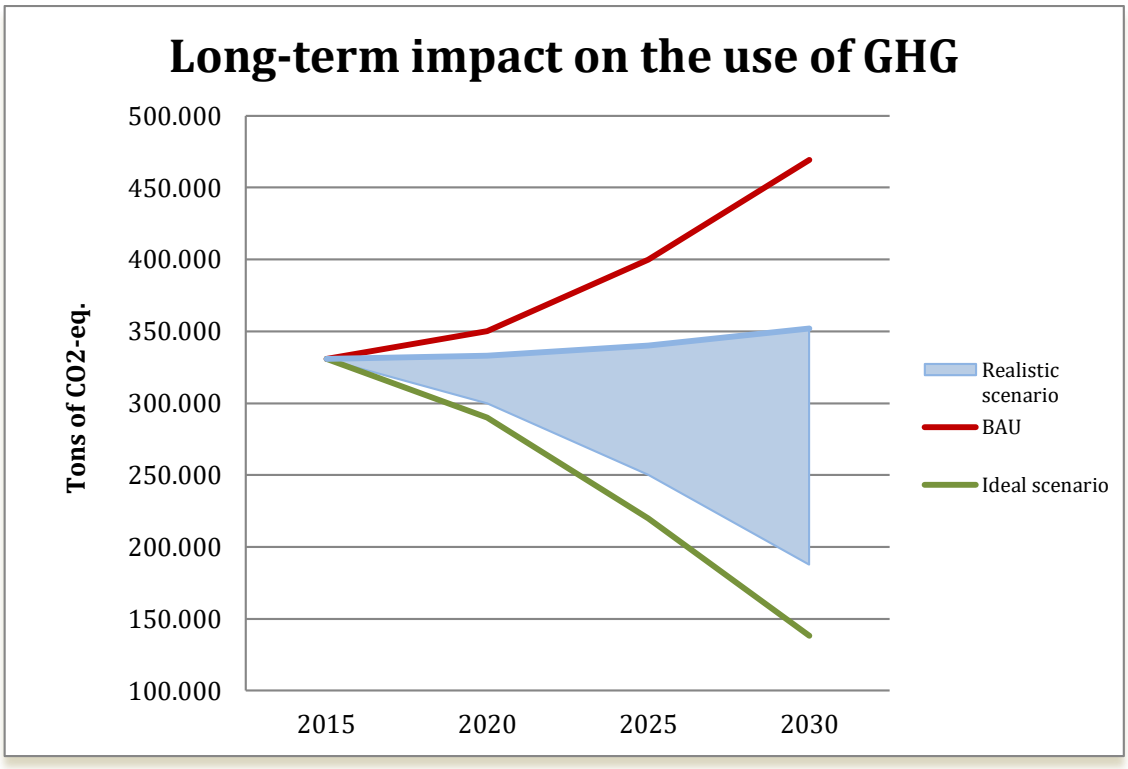
Estimate of refrigerants used in the fruits and vegetables processing sector in Chile - 2015			
Refrigerant	**GWP**	**Consumption (metric tons)**	**Total impact (tons of CO_2-eq)**
HCFC-22	1,810	104.1	188,466
HCFC-141b	725	5.8	4,168
HFC-134a	1,430	6.2	8,933
HFC-404A	3,900	12.5	48,730
HFC-507	4,000	13.5	54,145
HFC-410A	2,100	6.2	13,119
HFC-407C	1,800	7.3	13,119
TOTAL		155.7	330,683

Source: estimations based on the information obtained during the preparatory stage of the HCFC Phase-out Management Plan, Phase II for Chile.

Nevertheless, HCFC-based refrigeration systems are soon to be replaced and, in the case no action is undertaken, replacement may rely exclusively on HFC-based solutions. Consequently, the climate impact of this sector could be even higher by 2030, due to the higher GWP of the HFCs.

Therefore, in order to estimate the real impact of this proposal along with the implementation of HPMP Stage II and the future APL3 in the long-term, we should consider a baseline scenario of up to 469,122 tons of CO_2-eq until 2030, assuming a business-as-usual trend by which all HCFC technologies are replaced by HFC alternatives.

As reflected in the chart below, the ideal scenario of this project in the long term would be then to reduce the total GWP contained in the refrigeration system of fruits and vegetables processing facilities, from the above mentioned baseline to around 138,050 tons of CO_2-eq (71% reduction). This would be the impact considering, first, that only zero- or low-GWP refrigerants are used by companies to replace HCFCs in the coming years and, secondly, that no conversion is undertaken for the replacement of the HFCs currently used.



However, a more realistic approach would suggest that in the short term, HFCs will still be the alternative chosen by a significant number of facilities. Therefore, the realistic scenario suggests a more moderate impact, for which the refrigerants' consumption by this sector in 2030 would have a minimum impact of 187,648 tons of CO_2-eq and a maximum of 351,841 tons of CO_2-eq. This would represent between a 25% and a 60% reduction in terms of GWP, compared to the baseline scenario.

These benefits on climate would be enlarged in the long-term if we take into account the energy efficiency gains obtained through the conversion of the whole sector. An important amount of greenhouse gases emissions in this sector are caused by the electricity consumed for the refrigeration of processed fruits and vegetables. Out of the almost 20,000 MW of installed capacity in the country, 60.5% corresponds to thermal power plants based on coal and oil systems [2]. Therefore, the replacements of old refrigerants and the energy efficiency gains obtained from that in such an important economic sector would reduce the consumption of electricity generated from that type of plants, consequently reducing their impact on climate change.

4.2 Co-benefits

Describe the anticipated economic, social, and environmental co-benefits of the assistance.

- Energy efficiency gains: economic co-benefits can be obtained through the reduction of energy consumption linked to the use of alternative refrigerants. This could directly lead to a return on the investment undertaken.

[2] The rest of installed capacity is composed by 32.3% of hydroelectric plants, 4.5% wind energy and 2.7% solar energy. For more information, please refer to: http://generadoras.cl/prensa/noticias/boletin-mercado-electrico-sector-generacion-enero-2016/ (in Spanish).

- Mobilization of funds: the technical assistance provided by the project will also focus on the access to funds in the post-CTCN related activities, such as the Stage II of the HPMP or the GEF Funding. The possibility to access other funds will be explored during project preparation.
- Income and employment generation: new employments would be created with new zero- and low-GWP cooling technologies for the installation, planning, construction, maintenance and servicing of the technologies. Innovative technologies contribute to the economic development and the local economies of the countries.

4.3. Post-assistance plans and actions

If possible, provide indications on specific actions and plans that the country can implement, to make use of the assistance outputs, and to ensure that it will create the expected climate benefits described above.

As already stated, both the CTCN technical assistance here proposed and the follow-up pilot conversion programme will be coordinated with and embedded in the next APL, which is being negotiated at this moment.

The APLs are voluntary agreements between a given industrial sector and the government to apply strategies of clean production through the fulfilment of well-defined actions and objectives. These APLs are recognized by United Nations as National Appropriate Mitigation Actions (NAMAs), and two of them, in 2005 and 2012, respectively, were signed with the fruits and vegetables processing sector.

Therefore, the outputs linked to the CTCN technical assistance here proposed will be duly used and the expected climate benefits described above will be ensured by the implementation of the next APL, in which this assistance is integrated.

Besides, Chile will be also encouraged to undertake other pilot conversion programmes to foster the adoption of alternatives with zero or low GWP in other sectors. This should count on the support of the most relevant stakeholders within the public and the private sector, i. e. the respective ministries, industry associations, funds, etc.

5. Formal agreement and signatures

Signatures of the requesting country

NDE	**Request Proponent (Optional)**
Name: James A. Robinson	Name:
Title: Climate Change Advisor, CTCN Chilean Focal Point	Title:
Date: May 12, 2016	Date:
Signature:	Signature:

Signatures of the CTCN

For the CTCN Director	**For the Climate Technology Manager**
Name:	Name: Patrick Nussbaumer
Title:	Title:
Date:	Date: 13 May 2016
Signature:	Signature:

Annex 1: Request Response Logical Framework

Output	Indicator	Activity	Sub-activity	Deliverables	Expected delivery date	Responsibility
All	Sufficient number of qualified experts.	- Selection of experts for the development of the activities here included.	- International tender procedure for the selection of the experts. - Agreement with the expert team on the activities they will be involved in.	Creation of the team of experts; Agreement on the activities to carry out and the methodology to apply in each of them.	N/A	Steering Committee
1. Awareness campaign.	Refrigerants currently used in the fruits and vegetables processing sector are identified; technology options to introduce zero- or low-GWP refrigerants are identified; and information sessions are attended by relevant stakeholders.	1.1 Survey on the current consumption of refrigerants in the sector and assessment on technology alternatives.	1.1.1 Execution of the survey and the assessment. 1.1.3 Preparation of the corresponding report.	Survey: a sample of facilities selected; questionnaires prepared; work coordinated between the expert and the survey team. Report on the results of the survey. Assessment: desk study undertaken on the current alternatives. Report on the results of the assessment.	Q1	Steering Committee
		1.2 Information sessions for end users.	1.2.1 Selection of participants. 1.2.2 Information sessions on the results of the survey/assessment and related issues, and also on the pilot conversion programme planned in this project. 1.2.3 Pre-selection of beneficiaries of the follow-up pilot conversion	A representative list of participants of the Chilean sector of processed fruits and vegetables. Facility owners informed about the possibilities to introduce	Q2	Steering Commitee.

			activity.	zero- or low-GWP refrigerants in this sector. A list of companies interested in participating in the follow-up pilot conversion programme as beneficiaries.		
2. Capacity building.	Decision makers trained and advised on the best practices to incentivize the adoption of zero- and low-GWP refrigerants in this and other similar sectors.	2.1 Training and advisory service to the Government for the promotion of climate-sound alternatives.	2.1.1. Training sessions and advisory service based on the results of the survey and the assessment of output 1, and also on the policy and regulatory instruments currently applied in other countries.	Members of the Government, including the most relevant ministries, duly trained and advised.	Q3	Steering Committee.
3. Technology transfer and technical assistance.	A programme agreed with beneficiaries for the conversion of refrigeration systems in about 5 facilities.	3.1 Selection of beneficiaries and design of conversion processes.	3.1.1 Selection of beneficiaries out of the list of interested companies delivered in sub-activity 1.3.3. 3.1.2 Preparation of a proposal of conversion by the team of experts to the selected beneficiaries. 3.1.3 Agreement with beneficiaries to carry out the conversion, based on the proposal.	A list of around 5 potential beneficiaries, representative of Chilean sector of processed fruits and vegetables. A proposal of conversion, including technical and economic requirements, expected performance of the new refrigerant, financing mechanisms and expected return of investment. Agreement between the implementing partners	Q4	Steering Committee

				and beneficiaries to carry out conversion.		
	40 to 50 technicians trained.	3.2 Training sessions	3.2.1 Selection of participants. 3.2.2 Training sessions. 3.2.3 Pre-selection of technicians to carry out the pilot conversion activity.	A representative list of participants of the most important servicing companies in the country. Technicians trained on the installation and maintenance of refrigeration systems based on zero- and low-GWP substances, used in this sector. A list of technicians interested in participating in the follow-up pilot conversion programme.	Q5	Steering Committee.
	Knowledge base established.	3.3 Establishment of the knowledge base.	---	Knowledge base prepared for the organization of trainings, capacity building and publicity.	Q5	Steering Committee.

Annex 2: Indicative budget

The budget template is based on the format required for legal agreements with the CTCN. It is indicative in nature as the services are to be sub-contracted on a competitive basis.
It should be prepared in excel and inserted in Annex 2 when finalized.

Budget					
Activity	**Notes**	**Quantity**	**Unit**	**Unit Cost ($)**	**Total Cost ($)**
Output 1 : Awareness campaign.					
Consultant					
National project coordinator	Coordination of the survey, the assessment and the information sessions.	21	Days	190	3,990
International experts on refrigeration systems for the food processing industry	Preparation of the survey on the current use of refrigerants and the assessment on alternatives; delivery of information sessions for end users. Two experts will be assigned for this task. 31 working days per expert.	62	Days	500	31,000
National survey team	Data collection for the sector-wide survey. 13 working days per data collector.	65	Days	120	7,800
Travel					
International travel	Travel of international experts to/from Chile.	3	Round trip tickets	4,000	12,000
National travel	Travel to different parts of the country to carry out the survey; calculated for a 5-people survey team.	1	Lump-sum	5,000	5,000
National travel	Travel cost for end users attending the information sessions from different parts of the country.	1	Lump-sum	5,000	5,000
DSA for international experts	Hotel, meals.	31	Days	239	7,409
DSA for national experts	Hotel and meals of national survey team	40	Days	163	6,520
DSA for participants in the information sessions	Hotel, meals. 1 day per participant.	35	Days	120	4,200

Workshop					
Information sessions for facility owners	Logistics	2	Workshop	1,000	2,000
				Sub-total activities linked to output 1	***84,919***
Output 2 : Capacity building					
Consultant					
National project coordinator	General coordination	7	Days	190	1,330
International experts on policy and regulation.	Capacity building activities; two experts will be assigned for this task; 21 working days per expert.	42	Days	500	21,000
Travel					
International travel	Travel of international experts to/from Chile.	2	Round trip ticket	4,000	8,000
DSA for international experts	Hotel, meals	42	Days	239	10,038
				Sub-total activities linked to output 2	***40,368***
Output 3: Technology transfer and technical assistance					
Activity 3.1 Selection of beneficiaries and design of conversion processes					
Consultant					
National project coordinator	General coordination in the selection of beneficiaries and design of conversion processes.	10	Days	190	1,900
National expert on industrial refrigeration systems	Support to the international expert on the design of conversion processes.	10	Days	190	1,900
International expert on refrigeration systems for the dairy industry	Design of conversion processes.	42	Days	500	21,000
Travel					
International travel	Travel of international expert to/from Chile.	1	Round trip ticket	4,000	4,000
DSA for international experts	Hotel, meals	21	Days	239	5,019
				Sub-total activity 3.1	*33,819*

Activity 3.2 Training sessions for technicians of the refrigeration servicing sector					
Consultant					
National project coordinator	General coordination for carrying out the training sessions.	5	Days	190	950
National expert on industrial refrigeration systems	Training sessions for technicians.	5	Days	190	950
Travel					
National travel	Travel cost for technicians attending the information sessions from different parts of the country.	1	Lump-sum	5,000	5,000
DSA for participants	Hotel, meals. 1 day per participant.	50	Days	120	6,000
Workshop					
Training sessions for technicians	Logistics	**2**	Workshop	1,000	2,000
				Sub-total activity 3.2	*14,900*
Activity 3.3 Knowledge base					
Consultant					
National project coordinator	Assisting web designer on the design of the online platform	5	Days	190	950
				Sub-total activity 3.4	*950*
				Sub-total activities linked to output 3	***49,669***
Cross output activity					
Project manager	Project management.	1	Lump-sum	20,000	20,000
				Total Indicative Budget	***194,956***

Annex 3: Terms of Reference for service provider(s) *(in case of tendering process, and in line with UNOPS template/requirements TBD)*

TERMS OF REFERENCE (TOR)
for the Supply of Services for Project
"Introduction of zero or low global warming potential refrigerants in food processing production and exports (fruits and vegetables)"

1. Background information

The Climate Technology Centre and Network (CTCN) promotes the accelerated transfer of environmentally sound technologies for low carbon and climate resilient development at the request of developing countries. CTCN provides technology solutions, capacity building and advice on policy, legal and regulatory frameworks tailored to the needs of individual countries.

The project "Introduction of zero or low global warming potential refrigerants in food processing production and exports (fruits and vegetables)" is conceived as a proposal to the CTCN to provide assistance for the introduction of low global warming potential refrigerants in the fruits and vegetables processing sector in Chile.

The Chilean agroindustry of fruits and vegetables has recently experienced an important development and there are currently around 250 industrial facilities in the country. Chile is one of the main international suppliers of raisins, dried apples, dried plums, frozen raspberries, dried pepper, grape and apple juice, tomato sauce and tinned peaches. The use of refrigeration systems in the value chain of these and other products in the fruits and vegetables processing sector is generally extended.

The refrigerants used nowadays in these facilities are hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs), which have a very high global warming potential (GWP) while their use implies as well a high level of energy consumption. . HCFC-based refrigeration systems are to be progressively replaced under the framework of the HCFC Phase-out Management Plan (HPMP), given their impact on the ozone layer. As per HFCs, whose GWP can reach values of up to 4,000 times more than CO_2, its production and consumption may be subject to control measures under the Montreal Protocol during the implementation of Stage II of the HPMP, based on Decision XIX/6[3]. However, this progressive phase-down (whose detailed schedule is yet to be determined) would imply the need for policy incentives to support the development of zero- or low-GWP alternatives, incentives that can accelerate the sustainable replacement of both HCFC- and HFC-based systems.

Among those zero- or low-GWP refrigerants, which have been developed in recent years and are already available in the market, we can identify natural refrigerants, as ammonia, hydrocarbons or CO_2, and other solutions like hydrofluoroolefins (HFOs). Its use would prevent further increase of HFC-based systems and, therefore, reduce the impact of this sector on climate change.

[3] This decision states that alternatives to HCFCs must have a zero or low GWP. Besides this decision, at the 27th Meeting of the Parties (MOP) of the Montreal Protocol, held in November 2015 in Dubai, the 197 Parties agreed to begin work on an amendment to explicitly reduce the global production and consumption of HFCs given its impact on climate change. The amendment, deemed the "Dubai Pathway," is expected to be completed in 2016.

2. Aim of the project

The objective of the current project, focused on the fruits and vegetables processing sector in Chile, is to demonstrate the effectiveness and higher energy efficiency in the cooling performance of refrigerants with zero or low GWP, and incentivize their use among the facilities using refrigeration systems in this sector.

In order for this outcome to be achieved, the project will coordinate its activities with the next Cleaning Production Agreement (*Acuerdo de Producción Limpia*, APL3) the Chilean government is currently negotiating with the sectoral association Chile Alimentos. These activities would focus on the technical assistance for end users, the awareness raising and the policies related to the necessary replacement of high-GWP refrigerants by zero- or low-GWP alternatives. Considering this scope, three main outputs are expected to be developed:

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. 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. Training and advisory service to governmental bodies on the best practices to incentivize the adoption of climate-sound alternatives among end users of refrigeration systems in this and other similar sectors.
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 programme 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 future conduction of training and capacity building activities, and for the publicity of all the information related to the introduction of new alternatives.

3. Implementation modality

The project will be implemented through an international institution with a proven track record in the implementation of activities related to industrial refrigeration systems. At national level, a Steering Committee composed by representatives of the CPL, the NOU and Chile Alimentos will monitor the project in all its phases.

The Implementing Institution and the Steering Committee will rely on both national and international experts for undertaking specific tasks required for implementation of the project, namely:

- 1 National project coordinator with experience of more than 7 years in the coordination of different stakeholders within the food industry sector;
- 2 International experts on industrial refrigeration systems in the food processing sector with experience of more than 12 years in the food processing sector;

- 2 International experts on capacity building with experience of more than 12 years in assessing governments on aspects related to refrigerant use, energy efficiency standards, safety standards and labelling;
- 1 National expert on industrial refrigeration systems in the food processing sector, with experience of more than 7 years;
- 5 National data collectors at industry level with experience of more than 2 years in undertaken sector specific technical survey in the food industry;

4. Role and responsibilities of the Implementing Institution

The Implementing Institution will support the National Designated Entity in the implementation of the CTCN technical assistance, undertaking the following roles:

- Define a Work Plan for implementation of the project in cooperation with the responsible National Project Coordinator and the Steering Committee.

- Selection, in cooperation with the Steering Committee, of national and international experts participating in the implementation of the project, and establishment of the corresponding contractual arrangements.

- Ensure provision of project-related deliverables in due time as per the timeline of activities defined in the Response Plan approved by the CTCN.

- Provide feedback to all documents generated during implementation of the project.

- Participate in project implementation meetings with the corresponding stakeholders.

- Monitor, along with the Steering Committee, the implementation of the project.

- Financial controlling, and any other project management task.

4. Job Descriptions of experts required for implementation of the project

4.1. National Project Coordinator

Post title:	National Project Coordinator.
Duration:	48 w/days over a period of 15 months.
Beginning Date:	tbc
Duty Station:	Home-based, with project meetings to be held in Santiago de Chile and travel to other locations in Chile as needed.
Duties:	The National Project Coordinator will facilitate the implementation of all project-related activities as defined in the Response Plan approved by the CTCN by performing the following duties:

- Define a Work Plan for implementation of the project in cooperation with the responsible Project Manager at the Implementing Institution and the Steering Committee.

- Coordinate the work of national and international experts involved in the implementation of the project.

- Coordinate with relevant Government departments to ensure participation of all relevant stakeholders from the public sector.

- Liaise with owners of fruits and vegetables processing facilities and other relevant stakeholders in the sector (Chile Alimentos Association, and others).

- Ensure provision of project-related deliverables in due time as per the timeline of activities defined in the Response Plan approved by the CTCN.

- Monitor the implementation of the project.

Qualification / Experience Required:

- Advanced university degree (Masters level) in Engineering, Environmental Science or Public Administration.

- At least 7 years of working experience related to the food industry in Chile (preferably with some of the experience related to the fruits and vegetables processing industry).

- Past or current experience as a Government Official will be an asset. However, this person must not have been staff and/or coordinator of the National Ozone Unit.

Language:

- Mother tongue: Spanish.
- Fluency in English (working knowledge).

4.2. International expert on industrial refrigeration systems

Post title:	International expert - Industrial refrigeration systems.
Duration:	5 w/months (2 w/months for one expert; 3w/months for second expert) over a period of 15 months.
Beginning Date:	tbc
Duty Station:	Home-based, with multiple travels to Santiago de Chile and other locations in Chile.
Duties:	The consultant shall report to the National Project Coordinator and the responsible Project Manager at the Implementing Institution and is expected to perform the following duties:

Main Duties	Expected Duration (in w/months)	Location	Expected Results
1. Desk study on zero or low GWP refrigerants available for industrial refrigeration, with a focus on fruits and vegetables processing facilities	1.25 w/months	Home-based	Desk study report
2. Survey among Chilean facilities within the fruits and vegetables processing sector on the refrigerants used.	1 w/months	Home-based + Santiago de Chile, Chile	Report on the results of the survey
3. Information sessions for legislators, regulators and the Executive.	0.25 w/months	Santiago de Chile, Chile.	
4. Information sessions for end users.	0.25 w/months	Santiago de Chile, Chile.	
5. Design and submit a proposal for the replacement of refrigerants in facilities selected for the pilot conversion programme.	2 w/months	Multiple locations in Chile + Home-based.	An agreement signed with the beneficiaries on the proposal.
6. Coordination meetings with the National Project Coordinator, the responsible Project Manager, the International Expert on Policies, etc.	0.25 w/months	Santiago de Chile, Chile.	

Qualification / Experience Required:

- University degree in Industrial Engineering or a related field.
- At least 12 years of working experience on industrial refrigeration systems; proven track record of experience in the food industry sector (preferably fruits and vegetables processing industry) is an asset.

Language:

- Language: fluency in Spanish and English; proven track record of reporting skills.

4.3. International expert on capacity building

Post title: International expert - Capacity building

Duration: 2 w/months (1 month per expert).

Beginning Date: tbc

Duty Station: Santiago de Chile, Chile.

Duties: The consultant shall report to the National Project Coordinator and the responsible Project Manager at the Implementing Institution and is expected to perform the following duties:

- Define a Work Plan to provide training and advisory service to the Executive and other governmental bodies on the best practices to incentivize the adoption of climate-sound refrigerants, in cooperation with the responsible Project Manager at the Implementing Institution and the Steering Committee.

- Provide corresponding training and advisory service as defined in the Work Plan.

Qualification / Experience Required:

- University Degree in Economics, Law, Public Administration or related fields.
- At least 12 years in assessing governments on aspects related to refrigerant use, energy efficiency standards, safety standards and labelling.
- Knowledge on policy instruments applied to this domain in the European Union.

Language:

- Language: fluency in Spanish and English; proven track record of reporting skills.

4.4. National expert on industrial refrigeration systems

Post title: National expert - Industrial refrigeration systems

Duration: 1 w/month over a period of 15 months

Beginning Date: tbc

Duty Station: Home-based, with multiple travels to Santiago de Chile and other locations in Chile.

Duties: The consultant shall report to the National Project Coordinator and the responsible Project Manager at the Implementing Institution and is expected to perform the following duties:

Main Duties	Expected Duration (in w/days)	Location	Expected Results
1. Support to the international expert on the design and submission of a proposal for the replacement of refrigerants in facilities selected for the pilot conversion programme.	10 w/days	Multiple locations in Chile + Home-based.	An agreement signed with the beneficiaries on the proposal.

Main Duties	Expected Duration (in w/days)	Location	Expected Results
2. Delivery of training sessions for technicians on installation and maintenance of refrigeration systems based on zero or low GWP refrigerants.	5 w/days	Santiago de Chile, Chile.	
3. Support on the design of the online platform for the Knowledge base.	5 w/days	Santiago de Chile, Chile.	

Qualification / Experience Required:

- University degree in Industrial Engineering or a related field.
- At least 7 years of working experience on industrial refrigeration systems; proven track record of experience in the food industry sector (preferably fruits and vegetables processing industry) is an asset.

Language:

- Mother tongue: Spanish.
- Fluency in English (working knowledge).

4.5. National data collector at industry level

Post title: National Data Collector – Industry Specialist

Duration: 65 w/days (13 days per expert).

Beginning Date: tbc

Duty Station: Multiple travels to various locations in Chile.

Duties: The consultant shall report to the National Project Coordinator and the responsible Project Manager at the Implementing Institution and is expected to perform the following duties:

Main Duties	Expected Duration (in w/days)	Location	Expected Results
1. Desk study to identify, classify and group existing facilities.	10 w/days	Home-based	Facilities classified and grouped.
2. Preparation of survey forms and questionnaires	2 w/days	Home-based	Survey forms and questionnaires ready for use.

Main Duties	Expected Duration (in w/days)	Location	Expected Results
3. Preparation meeting with the national survey team	1 w/days	Santiago de Chile, Chile.	Survey work plan
4. Visits to milk producing facilities to conduct the survey	40 w/days	Multiple locations in Chile.	Primary data collected
5. Wrap-up meeting with the national survey team, the National Project Coordinator and the responsible Project Manager	2 w/days	Santiago de Chile, Chile.	Survey results presented
6. Assess the information obtained.	5 w/days	Home-based	Information from the various members of the national survey team assessed
7. Prepare a report presenting the methodology for the survey, actions taken on the field, processed data and conclusions.	5 w/days	Home-based	Survey report finalized

University degree in Industrial Engineering or a related field, with at least 2 years of working experience as a researcher focused on industrial refrigeration systems.

Language:

- Mother tongue: Spanish.
- Fluency in English (working knowledge).