ADAPTATION FUND BOARD SECRETARIAT TECHNICAL REVIEW OF PROJECT/PROGRAMME PROPOSAL

PROJECT/PROGRAMME CATEGORY: Innovation Small Grant

Country/Region: Chile
Project Title: Sustainable Corridors. Adapting electricity transmission infrastructure to the climate crisis through nature-based solutions in the Antofagasta Region
Thematic Focal Area: Innovation/Nature-based solutions
Implementing Entity: Agencia Chilena de Cooperación Internacional para el Desarrollo (AGCID)
AF Project ID:
IE Project ID: **Requested Financing from Adaptation Fund (US Dollars): 250,000**
Reviewer and contact person: Ho-Sik Chon **Co-reviewer(s):** Alyssa Gomes
IE Contact Person:

Technical Summary:	The project "Sustainable Corridors. Adapting electricity transmission infrastructure to the climate crisis through nature-based solutions in the Antofagasta Region" aims to implement a sustainable transmission pilot in the Antofagasta Region, which has been declared a "transmission development pole" according to the country's Long-Term Energy Planning. This will be done through the four components below: Component 1: Contributing to the development of an energy transition that is just, secure and resilient (USD 71,400); Component 2: Driving innovation in sustainable electricity transmission in Chile (USD 70,800); Component 3: Promoting local energy development (USD 20,000); Component 4: Empowering communities, with a focus on women, in energy management (USD 11,500). Requested financing overview: Project/Programme Execution Cost: USD 63,800 Total Project/Programme Cost: USD 237,500 Implementing Fee: USD 12,500

	Financing Requested: USD 250,000 The initial technical review raises some issues, such as clarification of the climate change adaptation rationale, benefit of sustainable corridor for enhancement of climate resilience, climate change vulnerability and risk in the target area and the vulnerable communities, as is discussed in the number of Clarification Requests (CRs) and Corrective Action Requests (CARs) raised in the review.
Date:	26 August 2022

Review Criteria	Questions	Comments
Country Eligibility	1. Is the country party to the Kyoto Protocol?	**Yes**
Project Eligibility	1. Has the designated government authority for the Adaptation Fund endorsed the project/programme?	**Yes** As per the Endorsement letter dated 1 August 2022
	2. Does the project / programme support concrete adaptation actions to assist the country in addressing adaptive capacity to the adverse effects of climate change and build in climate resilience?[1]	**Not cleared** The project aims to reduce climate risk of electrical infrastructure by adopting the concept of sustainable corridor (nature-based solutions). The sustainable corridor is an infrastructure with a significant presence of vegetation that connects natural areas of a certain zone or area and electricity transmission system. **CR1:** Please clarify the climate change adaptation rationale for the chosen approach. For example, what are the climate change impacts on the energy sector transmission lines and how are climate change

[1] *A concrete adaptation project/programme is defined as a set of activities aimed at addressing the adverse impacts of and risks posed by climate change. The activities shall aim at producing visible and tangible results on the ground by reducing vulnerability and increasing the adaptive capacity of human and natural systems to respond to the impacts of climate change, including climate variability. Adaptation projects/programmes can be implemented at the community, national, regional and transboundary level. Projects/programmes concern activities with a specific objective(s) and concrete outcome(s) and output(s) that are measurable, monitorable, and verifiable.* (Source: Operational Policies and Guidelines, amended October 2017)

		adaptation solutions aiming to build resilience or climate proof the transmission lines. **CR2:** Please clarify the exact location for the piloting the intervention and include details of the current and projected climate impacts in the specific target areas. **CR3:** Please clarify more the concept of sustainable corridor and how it is beneficial for enhancing climate resilience of electricity transmission system (in particular, transmission lines).
	3. Does the project encourage or accelerate development of innovative adaptation practices, tools and technologies?	**Not cleared** The implementation of sustainable corridor as the first pilot case in Chile may provide an innovative adaptation measure to reduce climate change impacts in electricity transmission sector. However additional clarifications are requested with regards to innovation potential. The proposal is “implementing a sustainable corridor in Chile […] a nature-based solution to mitigate GHGs in the energy sector through the contribution to decarbonization, while increasing the adaptive capacity of the sector.” While the project may have mitigation co-benefits, the climate change adaptation solution and its impact in building resilience and adaptive capacity should be strengthened. **CR4:** Please clarify the CCA innovation potential of the project in terms of developing “a new way of thinking about the transmission systems in the energy sector”.

		CR5: Please clarify a type of nature-based solutions that considers to be adopted to develop sustainable corridor in the target area. **CR6:** Please share a case study that implements sustainable corridor with nature-based solutions for enhancing climate resilience of electricity transmission system.
	4. Does the project help generate evidence base of effective, efficient adaptation practices, products or technologies, as a basis for potential scaling up?	**Not cleared.** Findings from the project, which will be generated in the target area, can be replicated or scaled up at a national level as well as at regional (Latin America) and international levels for a safe and resilient energy transition. However, the adaptation rationale mentioned under questions 2 and 3 above should be clarified. **CR7:** Please justify the adaptation rationale for the output focused on promoting local energy development.
	5. Does the project engage, empower and/or benefit the most vulnerable communities and social groups?	**Not cleared** There is not clear demonstration regarding climate impacts and risk in the target area (Antofagasta Region). **CR8:** Please clarify climate change vulnerability and risk in the target area. **CR9:** Please clarify the economic, social and environmental benefits of the chosen solutions in the target areas from a resilience and climate change adaptation perspective.

		CR10: Please clarify the target vulnerable population, disaggregated by gender. **CR11:** Please clarify the focus of the training and capacity building activities and clarify how they will help building resilience of the communities, ecosystem and the target sector.
	6. Does the project advance gender equality and the empowerment of women and girls?	**Yes** According to the proposal, the project will result in higher employment of women in the energy sector of Chile and encourage higher engagement of women living in the target area for the implementation of the project. **CR12:** Please clarify how women living in the target area will benefit from the project.
Resource Availability	1. Is the requested project funding within the parameters for small grants set by the Board?	**Yes** (USD 250,000)
	2. Is the Implementing Entity Management Fee at or below 8.5 per cent of the total project budget before the fee?	**Yes** (USD 12,500 equivalent to 5.26% of the total project budget (USD 237,500))
Implementation Arrangements	1. Is the project submitted through a National Implementing Entity accredited by the Board?	**Yes**
	2. Is the timeframe for the proposed activities adequate?	**Not cleared** **CR13:** Please provide expected timeline for the proposed activities in each component of the proposal.
	3. Is a summary breakdown of the budget for the proposed activities included?	**Yes** **CR14:** Please justify cost in the detailed budget for journalist and clarify what is meant by CE

		implementation. In this respect, please include some budget notes to clarify the budget items.

Review from Ministry of Energy, Chile

CR1: Please clarify the climate change adaptation rationale for the chosen approach. For example, what are the climate change impacts on the energy sector transmission lines and how are climate change adaptation solutions aiming to build resilience or climate proof the transmission lines.

Temperature: Internationally, it is estimated that the increase in temperatures will directly affect the transmission infrastructure, as stated in a study conducted by the state of California, which estimates that the projected increase in temperatures could decrease the capacity of fully loaded transmission lines (Ebinger & Vergara, 2011); (Schaeffer, et al., 2012). In general terms, network losses may increase by 1% if the temperature increases by 3°C in a network possessing initial losses of 8% (Asian Development Bank, 2012). No specific studies are found regarding the impact of temperature variations on power distribution.

Extreme Events: It is internationally recognized that power grids, including transformers and switching stations can be affected by excessive frost and humidity (Asian Development Bank, 2012). Additionally, the extension of transmission grids exposes them to a series of climatic events, such as extreme wind and ice loads, avalanches, floods and fires.

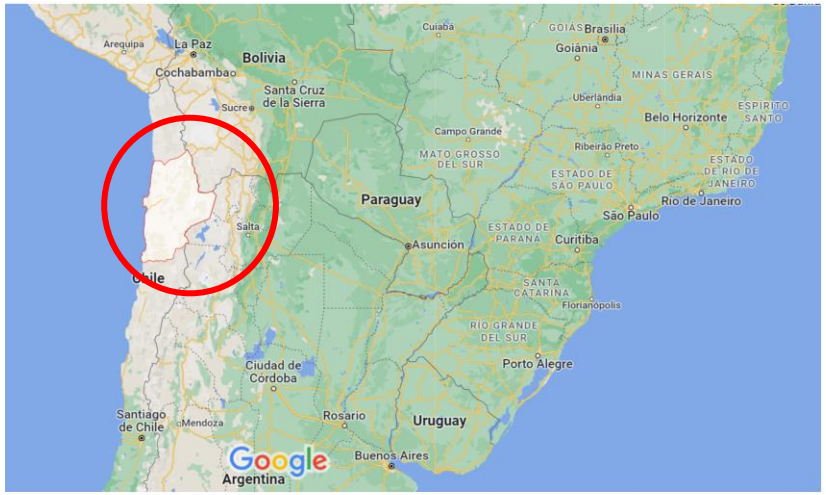
On the other hand, at the international level, it is noted that distribution networks will have similar problems to transmission lines, although with a lesser degree of impacts due to their smaller extension. In general, it is expected that extreme events such as strong winds and extreme temperatures will damage or decrease the capacity of the distribution network, causing interruptions or decreases in the supply of electric power (Schaeffer, et al., 2012).

At the national level, there are no studies available that establish this relationship. However, the experience of the last time, which is widely supported by expert opinion, has made evident the high vulnerability of the country's electrical transmission and distribution system and the urgency of addressing it adequately. Among them:

- Alluviums in the northern part of the country that have affected the transmission and distribution of energy.
- Heat waves: generate an increase in buckling of cables and dilatation of conductors, implying a restriction of transmission and possibly meaning the withdrawal of service of such facilities.
- Occurrence of winds and other extreme events (e.g. snow) that in a short period of time have knocked down distribution poles and cables, leaving large areas of the central zone of the country without supply for long periods of time, evidencing the low capacity of the distribution system to deal with these events.

CR2: Please clarify the exact location for the piloting the intervention and include details of the current and projected climate impacts in the specific target areas.

The project will be developed in the Antofagasta Region, in the north of the country, while the specific location of the pilot to be developed will be determined based on the initial study, which will allow choosing the space based on technical, economic and social analysis, but it must be located in the areas where there are transmission lines in the region (which are the green and orange lines in Figure XX).



CR3: Please clarify more the concept of sustainable corridor and how it is beneficial for enhancing climate resilience of electricity transmission system (in particular, transmission lines).

Sustainable corridors are the space beneath overhead power lines that, with proper management, the land under powerlines can enable and support greater biodiversity. Such management, known as Integrated Vegetation Management (IVM), can be used to create green corridors which are a type of green infrastructure or nature base solutions (NBS). These are strategically-planned networks of natural and semi-natural areas designed and managed to improve biodiversity, protect vulnerable species and provide a wide range of ecosystem services. IVM can benefit multiple habitats and species by increasing plant diversity, which acts as important habitat for multiple bird, pollinator and small mammal species, among others (Ecofirst & RGI, 2019).

https://renewables-grid.eu/fileadmin/user_upload/FINAL_Green-electricity-corridors_Report_2019_web.pdf

CR4: Please clarify the CCA innovation potential of the project in terms of developing “a new way of thinking about the transmission systems in the energy sector”.

Since 2016, the Chilean Ministry of Energy has been carrying out "Strip Studies" that seek to plan the spaces of territory in which the main transmission projects that the country needs will be built. Currently, the criteria incorporated in the process involve an economic, social and environmental analysis; however, the need to develop transmission systems from a safe, sustainable and resilient perspective has been identified, which is currently not addressed, so the development of sustainable corridors has been proposed. The objective is to consider Integrated Vegetation Management alternatives in existing and to be constructed transmission lines, replacing the traditional management of easement strips, which includes clearing and cutting of vegetation. This approach is a new way of developing electricity transmission, which consists of planting and maintaining low vegetation that reduces the impacts of transmission lines on the environment, improving biodiversity and the social acceptability of transmission projects, without interfering with the safety and continuity of electricity supply.

CR5: Please clarify a type of nature-based solutions that considers to be adopted to develop sustainable corridor in the target area.

The particular type of solution to be chosen to develop the pilot will depend on a previous study that provides a solid technical basis and within the social context. However, among the options that could currently be applied are international experiences such as community gardens (Peru), biological corridors (France-Belgium), easements used for grazing or ecosystem restoration (Spain).

CR6: Please share a case study that implements sustainable corridor with nature-based solutions for enhancing climate resilience of electricity transmission system.

Life-ELIA (France and Belgium): A pilot conducted in Europe from 2011 to 2017 that applied IVM principles to the vegetation management of 221 kilometers of transmission lines in France and Belgium, proves that IVM practices are less costly than traditional vegetation management techniques, enhance biodiversity, improve the social acceptance of transmission lines, and can help with permitting, as authorities are more willing to award those permits when they see the benefits of the new practices.

Naturaleza en Red (Spain): a pilot project of the Autonomous University of Barcelona in collaboration with the Red Eléctrica Group (Transmission Company in Spain) to analyze the role played by the areas under power transmission lines. The initiative includes the creation of a protocol for the evaluation of these microhabitats through a general analysis of the ecosystem. Currently, in most of the territory, there is intensive agriculture and the forest is closing, aging, and homogenizing, there is a lack of natural open spaces and this results in the loss of biodiversity. The forest management that is carried out periodically in the safety lanes of the power lines to avoid electrical risks and fires generates two types of areas: open spaces (when forest management has been recent) and closed spaces (when the habitat has evolved and grown again). Thus, the roads that run under the power lines provide islands of open spaces in forested areas and islands of closed spaces in open areas. The first results of the study indicate a significant increase in floral density, pollinator abundance, abundance and diversity of diurnal butterflies and show that power lines act as a reservoir of biodiversity when the environment is forested and as a refuge for fauna when the adjacent habitat is open and has been impacted by human intervention.

Biotransporte (Spain): Analysis of transmission line supports as biodiversity islands in the province of Córdoba, Spain during 2002-2008. The analysis of the use of a certain number of pylons as biodiversity islands showed very satisfactory results: increase in abundance and biodiversity in birds and in abundance in micromammals and invertebrates (mainly pollinators). In a subsequent internal analysis, it was assessed that this type of actions could involve the connection of around 60% of the Natura 2020 Network areas, benefiting a multitude of species both directly and indirectly.

Pastoreo en Red (Spain): The objective was to maintain, with extensive livestock farming, the vegetation under the high-voltage power lines. Project developed by Red Eléctrica in La Rioja and León (Spain) between 2019 and 2022, considered a nature-based solution that protects, sustainably manages and restores ecosystems, according to the International Union for Conservation of Nature (IUCN). Red Eléctrica and the University of Alcalá promote the practice of grazing among energy companies through a guide that documents its benefits for the welfare of society. According to the IUCN, the project contributes to disaster risk reduction and supports the economic and social development of the area, avoiding abandonment and rural depopulation as well as the loss of traditional knowledge behind extensive livestock farming. It also slows biodiversity loss and ecosystem degradation by improving soil fertility and increasing the richness and abundance of herbaceous plants and other species.

Huertos en Línea (Perú): Project developed by Red de Energía del Perú (ISA REP) since 2004 in the districts of Villa María del Triunfo and San Juan de Miraflores (Peru). Its main objective is to strengthen the socioeconomic resilience of people living in poverty and extreme poverty, especially women and the elderly, through sustainable urban agriculture in the soils of ISA REP's electricity easement strips. The first garden opened with no more than 10 families, and today, 17 years later, 150 families are directly benefiting from it. This initiative involves the participation of 780 people in 13 community gardens, which benefit families with profits ranging from US$50-80 per person.

CR7: Please justify the adaptation rationale for the output focused on promoting local energy development.

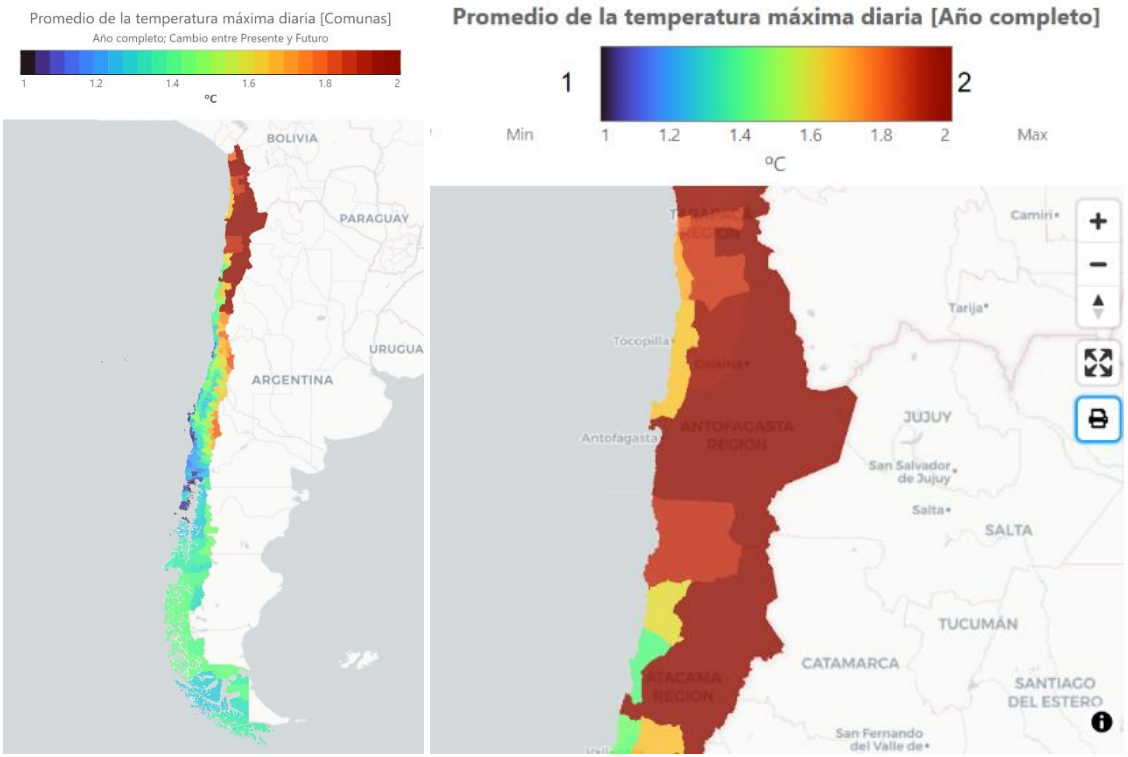
Finally, the project will increase the resilience of the transmission lines to the effects of the climate crisis (temperature increases, system failures, power outages, etc.) in a particular area (Antofagasta Region). This, when developed together with the communities, professionals and authorities of the region, will allow advancing in the local management of energy in a decentralized manner, providing the governments, institutions and citizens of the region with the tools to address climate change in the electricity sector.

CR8: Please clarify climate change vulnerability and risk in the target area.

Chile has a climate risk map (ARClim, for its acronym in Spanish), developed by the Ministry of the Environment, where risks are shown as the impacts of the increase of extreme heat events on the transmission system of the electric grid. This map attempts to represent the effects on the average marginal costs of the substations that feed one of the communes associated with the effect that the increase in temperatures has on the power transmission lines and the operation of the electrical system. Cities will be affected more as their electricity consumption increases in

conjunction with the criticality and sensitivity of the transmission lines that connect to the city and the frequency in which high-temperature days are expected on the lines. Along these lines, the Antofagasta region, as well as most of the northern part of the country, will be strongly affected by the effects of climate change, as shown in the map in Figure XX, which shows a greater increase in the average annual temperature between the future scenario and the present (in most of the region it reaches 2°C).

Figure XX. Average daily maximum temperature increases in Chile (left) and the Antofagasta Region (right) in a present and future scenario. Source: Ministry of Environment, 2021. More information at: https://arclim.mma.gob.cl/features/explorador_amenazas_v2/



As noted above, the temperature increase has direct negative impacts on transmission lines. The ARClim results for the electricity sector show the impact chain of the change in the marginal costs of the electricity system associated with the increase in temperatures on electricity transmission lines due to the effect of climate change. The index takes high values in communities with high electricity consumption connected to lines where the variation of the flow capacity limits the operation of the system. These results are detailed in the following table.

Table X. Impact of Temperature Rise on Transmission Lines - Antofagasta Region (Ministry of Environment, 2021)

City	Threat Index	Exposure Index	Risk Index	Sensitivity Index	Frequency of heat waves (%)	Average marginal cost (USD/MWh)
CALAMA	1.00	0.17	1.00	0.13	50.96%	4.52
MEJILLONES	0.40	0.02	0.05	0.14	20.32%	4.86
MARÍA ELENA	0.40	0.00	0	0.12	20.32%	4.40
SIERRA GORDA	0.40	0.00	0	0.15	20.26%	5.28
TALTAL	0.23	0.02	0.02	0.11	11.73%	4.06
TOCOPILLA	0.05	0.02	0.01	0.12	2.76%	4.21
ANTOFAGASTA	0	0.43	0	0.14	0%	4.85
OLLAGÜE	0	0.00	0	0.12	0%	4.40
SAN PEDRO DE ATACAMA	0	0	0	0.14	0%	5.01

Threat: This value represents the incidence of relative change in days with high temperatures between the historical climate (1980-2010) and the future climate (2035-2065 under the RCP8.5 scenario). The index takes higher values in places where there is a greater increase in the number of days where 30°C is exceeded in one of the transmission lines connecting each of the country's communes.
Exposure: This value represents the concentration of electricity demand with respect to the maximum consumption in the different communes of the country in 2018. For this purpose, the consumption of each of the substations is associated to its percentage of participation in the demand of each commune. Darker colors indicate higher energy consumption in the commune.
Sensitivity: This value represents the susceptibility of the commune to suffer adverse impacts due to the increase of temperatures on the transmission lines to which it is connected. The index takes on larger values the higher the average marginal cost variation.
Risk: This value represents the inclination of the communes to register systematic changes in the electric network (mainly reflected by the variations of the average marginal costs) as a consequence of the perceived increase of temperatures over the transmission lines.

CR9: Please clarify the economic, social and environmental benefits of the chosen solutions in the target areas from a resilience and climate change adaptation perspective.

Economic

The experience of the LIFE-Elia project made it possible to develop a cost-benefit analysis with a financial comparison between traditional management and LIFE management in transmission lines. The comparison of costs shows that the LIFE actions break even in 3 to 12 years, depending on the actions. After 30 years, these actions will have become 1.4 to 3.9 times cheaper for Elia than the traditional rotary milling carried out at present. This demonstrates, through experience, the economic benefit of sustainable corridors such as the one proposed in this project. This is in addition to other analyses carried out in international experiences, which show a decrease in the maintenance costs of the lines.

Social

From the social perspective, sustainable corridors have increased social acceptance of transmission lines, allowing an improvement in the relationship with communities and territories, as well as with local authorities, which brings benefits from both public and private perspectives. In this same perspective, sustainable transmission has shown to increase the involvement of local actors in energy management through greater participation and knowledge of the transmission systems.

Environmental

This shows, through experience, the economic benefit of sustainable corridors such as the one proposed in the project. As already mentioned, the environmental contributions of a sustainable management of electricity transmission allow reducing the impacts of transmission lines (edge effect, degradation, destruction of flora and fauna, etc.) while replacing them with positive impacts, such as increased biodiversity, ecosystem restoration, promotion of biodiversity, improvement of landscaping around the lines, among others.

CR10: Please clarify the target vulnerable population, disaggregated by gender.

The development of the pilot is aimed at the vulnerable population living in the areas of the transmission lines (in situations of poverty and precarious housing, such as illegal camps). The exact number of beneficiaries will be determined once the area where the project will be implemented is determined, but it is expected that, given the conditions of this type of area, women will represent about 55% of that population.

CR11: Please clarify the focus of the training and capacity building activities and clarify how they will help building resilience of the communities, ecosystem and the target sector.

Training and capacity-building activities will consist of theoretical and practical work sessions aimed at different sectors and, therefore, with different approaches. The objective of these activities will be to involve the population of the region in energy issues and the need to adapt to climate change. Three types of activities are identified at this point:

- Workshops aimed at energy workers in the region: of a technical nature to train them on climate change impacts of the energy sector, with a focus on the region; the importance of adaptation to the climate crisis, with a focus on the region; and resilience opportunities to ensure a just and safe transition.
- Outreach activities with the region's civil society: outreach activities on energy, adaptation, and climate change issues in order to raise awareness among citizens, bring them closer to sustainable energy management, generate capacities that allow for a resilient population and disseminate the progress and achievements of the project.
- Training for the vulnerable population living in the area where the pilot will be located: the objective is for them to acquire specific knowledge to make use of the sustainable corridor to obtain economic and social benefits (e.g., learning to maintain community gardens and develop economic activities based on them that allow families to obtain extra income, as in the case of the project in Peru).

CR12: Please clarify how women living in the target area will benefit from the project.

The project activities will seek to have a gender focus. For example, training will seek to comply with specific indicators in terms of women's participation, or activities related to working with communities will seek to work directly with women in vulnerable situations.

CR13: Please provide expected timeline for the proposed activities in each component of the proposal.

Component	2023			2024				2025	
	Mar Apr May	Jun Jul Ago	Sep Oct Nov Dec	Jan Feb	Mar Apr May	Jun Jul Ago	Sep Oct Nov Dec	Jan Feb	Mar Apr May
Component 1 Contributing to the development of an energy transition that is just, secure and resilient								X	X
Component 2 Driving innovation in sustainable electricity transmission in Chile				X	X	X	X		
Component 3		X	X	X	X	X	X	X	

Promoting local energy development									
Component 4 Empowering communities, with a focus on women, in energy management.		X	X	X	X	X	X	X	

CR14: Please justify cost in the detailed budget for journalist and clarify what is meant by CE implementation. In this respect, please include some budget notes to clarify the budget items

December 2018

PROGRAMME ON INNOVATION: SMALL GRANTS PROJECTS THROUGH DIRECT ACCESS MODALITY

REQUEST FOR PROJECT FUNDING FROM THE ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project must be fully prepared when the request is submitted.

Complete documentation should be sent to:

The Adaptation Fund Board Secretariat
1818 H Street NW
MSN P4-400
Washington, D.C., 20433
U.S.A
Fax: +1 (202) 522-3240/5
Email: afbsec@adaptation-fund.org

ADAPTATION FUND

PROGRAMME ON INNOVATION: SMALL GRANT PROJECT PROPOSAL

PART I: PROJECT INFORMATION

Country:	Chile
Title of Project:	Sustainable Corridors. Adapting electricity transmission infrastructure to the climate crisis through nature-based solutions in the Antofagasta Region.
National Implementing Entity:	Agencia Chilena de Cooperación Internacional para el Desarrollo (AGCID)
Executing Entity/ies:	Ministry of Energy; Regional Ministerial Secretariat - Energy, Antofagasta; Antofagasta Regional Government.
Amount of Financing Requested:	250,000 (in U.S Dollars Equivalent)

Project Background and Context:

Chile is highly exposed and vulnerable to the effects of the climate crisis. Its geographic diversity, moreover, projects a significant variation among consequences from north to south. At a general level, science projects warmer days and higher average temperatures, less rainfall, more frequent droughts, and more frequent and intense extreme events.

The energy sector is affected by the impacts of climate change which has direct effects on the resilience, reliability, and proper functioning of the national energy system. The sector's main concerns at a national level are the low availability of water resources or prolonged droughts, rising temperatures and more frequent heatwaves, and the increase in the frequency and intensity of extreme events (Ministry of Energy, 2018).
In addition, national and international experience shows that climate change will affect the availability of energy resources, generation infrastructure and the transportation of both electricity and fuels and their end use, including, for instance, increased variability in the availability of water for hydroelectric generation, effects on transmission lines and fuel logistics systems due to phenomena such as storm surges, floods and fires, among others.

The energy sector in Chile is the largest emitter of greenhouse gases (77% of total GHG), so the decarbonization of this sector has special preponderance in meeting the carbon neutrality goal by 2050, mandated by the Framework Law on Climate Change, and other climate commitments, such as:

- Long-Term Climate Strategy (LTCS): By 2050, 100% of the energy produced for electricity generation in the country comes from zero-emission energy sources. By 2030, 80% of the energy produced for the country's electricity generation comes from renewable energy generation, emphasizing that the electrical systems must be prepared to achieve this.
- Nationally Determined Contribution (NDC): Retirement of 5,500 MW by 2040 from thermal power plants.
- National Energy Policy (NEP): 60% less annual GHG emissions in the energy sector by 2050, compared to 2018, which will allow reaching carbon neutrality before 2050.

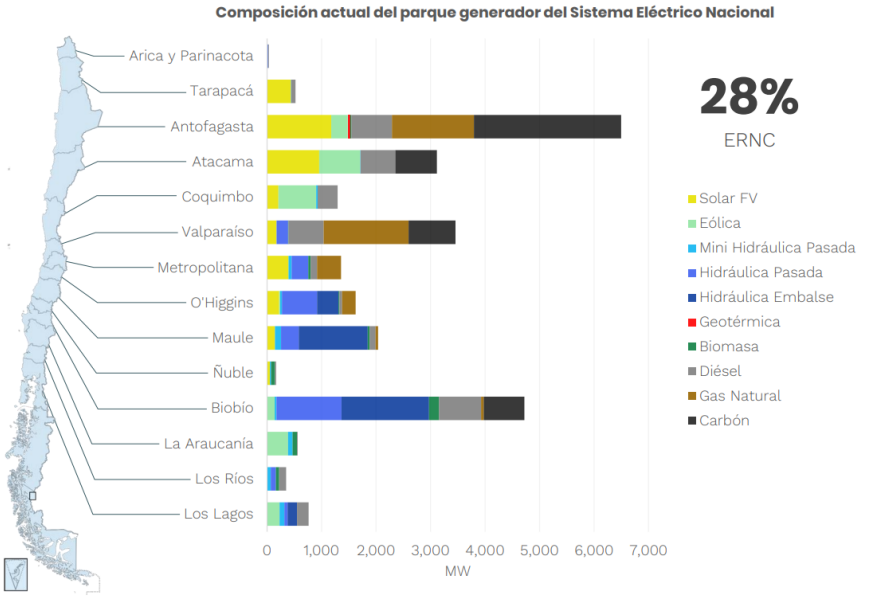


Figure 1. Current composition of the National Electric System's generating park (28% NCRE)

This vulnerability and responsibility are combined, in addition, with the fact that currently and worldwide, there is a paradox regarding the energy transition, since the greater the impulse and growth of renewable energies -necessary for the decarbonization of the matrices- the greater the requirement for the expansion of the transmission system. Chile has more than 35,000 km of transmission lines (as of March 31, 2020)[1] and, as of 2021, 44 transmission expansion works have been identified.[2]

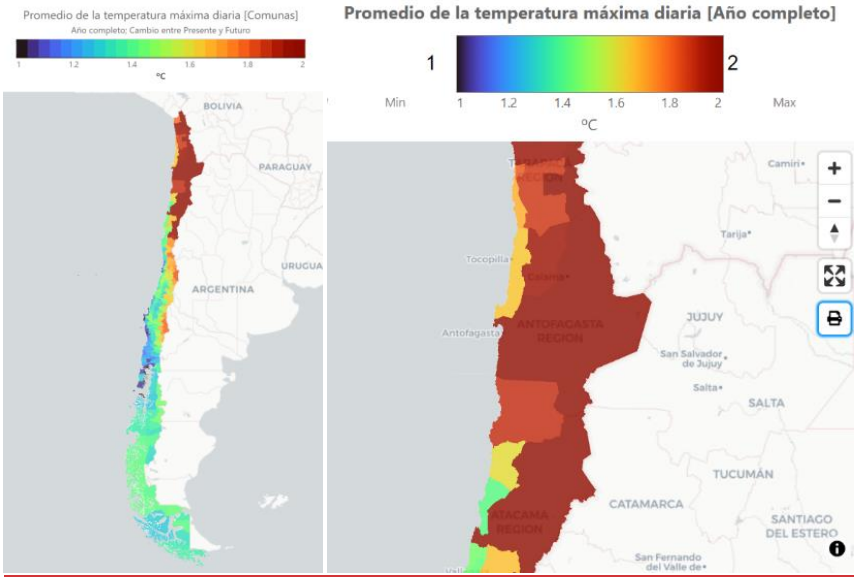
[1] 2020 Yearbook, National Energy Commission
[2] Final technical report. Annual Transmission Expansion Plan 2021, National Energy Commission.

However, the construction and operation of transmission lines are not exempt from impacts and potential conflicts. Some of the impacts of the lines include landscape disturbance; negative effects on agriculture; archaeological damage and losses at historical sites; cultural conflicts; impact on native or protected species of flora and fauna, as well as water resources; noise; problems with landowners (individuals or communities); fragmentation and edge effect; risk of fires, among others.

In Chile, an energy planning process is being developed that provides the possibility of identifying in advance those territories that will have an important development of renewable projects over time, known as "Development Poles", where -through a Strategic Environmental Assessment- the best sustainable solutions for the connection of these projects to the National Electric System are defined. To identify these zones, criteria are used that respond to social, environmental, technological and territorial criteria, as well as economic and technological ones. Through the 2023-2027 planning process, carried out by the Ministry of Energy, the provinces of Antofagasta and Tocopilla, located in the north of the country in the Antofagasta region, were identified.

Chile has a climate risk map (ARClim, for its acronym in Spanish), developed by the Ministry of the Environment, where risks are shown as the impacts of the increase of extreme heat events on the transmission system of the electric grid. This map attempts to represent the effects on the average marginal costs of the substations that feed one of the communes associated with the effect that the increase in temperatures has on the power transmission lines and the operation of the electrical system. Cities will be affected more as their electricity consumption increases in conjunction with the criticality and sensitivity of the transmission lines that connect to the city and the frequency in which high-temperature days are expected on the lines. Along these lines, the Antofagasta region, as well as most of the northern part of the country, will be strongly affected by the effects of climate change, as shown in the map in Figure 2, which shows a greater increase in the average annual temperature between the future scenario and the present (in most of the region it reaches 2°C).

Figure 2. Average daily maximum temperature increases in Chile (left) and the Antofagasta Region (right) in a present and future scenario. Source: Ministry of Environment, 2021. More information at: https://arclim.mma.gob.cl/features/explorador_amenazas_v2/



As noted above, the temperature increase has direct negative impacts on transmission lines. The ARClim results for the electricity sector show the impact chain of the change in the marginal costs of the electricity system associated with the increase in temperatures on electricity transmission lines due to the effect of climate change. The index takes high values in communities with high electricity consumption connected to lines where the variation of the flow capacity limits the operation of the system. These results are detailed in the following table.

Table X. Impact of Temperature Rise on Transmission Lines - Antofagasta Region (Ministry of Environment, 2021)

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MARÍA ELENA	0.40	0.00	0	0.12	20.32%	4.40
SIERRA GORDA	0.40	0.00	0	0.15	20.26%	5.28
TALTAL	0.23	0.02	0.02	0.11	11.73%	4.06

TOCOPILLA	0.05	0.02	0.01	0.12	2.76%	4.21
ANTOFAGASTA	0	0.43	0	0.14	0%	4.85
OLLAGÜE	0	0.00	0	0.12	0%	4.40
SAN PEDRO DE ATACAMA	0	0	0	0.14	0%	5.01

Threat: This value represents the incidence of relative change in days with high temperatures between the historical climate (1980-2010) and the future climate (2035-2065 under the RCP8.5 scenario). The index takes higher values in places where there is a greater increase in the number of days where 30°C is exceeded in one of the transmission lines connecting each of the country's communes.

Exposure: This value represents the concentration of electricity demand with respect to the maximum consumption in the different communes of the country in 2018. For this purpose, the consumption of each of the substations is associated to its percentage of participation in the demand of each commune. Darker colors indicate higher energy consumption in the commune.

Sensitivity: This value represents the susceptibility of the commune to suffer adverse impacts due to the increase of temperatures on the transmission lines to which it is connected. The index takes on larger values the higher the average marginal cost variation.

Risk: This value represents the inclination of the communes to register systematic changes in the electric network (mainly reflected by the variations of the average marginal costs) as a consequence of the perceived increase of temperatures over the transmission lines.

Given all this, it is relevant to move towards sustainable management of electricity transmission, which allows compliance with carbon neutrality, decarbonization, and renewable electricity matrix, while increasing the social legitimacy currently enjoyed by the transmission lines, necessary for this change, and building relationships of trust between the communities or inhabitants of the territories of the lines with companies, local governments, and central government through participatory processes around sustainable management.

Project Objectives:

The main objective of the project is to implement a sustainable transmission pilot in the Antofagasta Region, which has been declared a “transmission development pole” according to the country's Long-Term Energy Planning. This sustainable transmission pilot will consist of a small-scale sustainable corridor that allows evaluation of this solution, with a focus on adapting it to the long-term and national scale.

The specific location of the pilot to be developed will be determined based on the initial study, which will allow choosing the space based on technical, economic and social

analysis, but it must be located in the areas where there are transmission lines in the region (which are the green and orange lines in Figure 4).

To achieve this, the following components are proposed to be developed during the execution of the fund:

- Contributing to the development of an energy transition that is just, secure, and resilient
- Driving innovation in sustainable electricity transmission in Chile
- Promoting local energy development

- Empowering communities, with a focus on women, in energy management

Project Components and Financing:

Project Components	Expected Concrete Outputs	Expected Outcomes	Amount (US$)
1. Contributing to the development of an energy transition that is just, secure, and resilient	Implement a solution for better management of transmission lines	Increase resilience and adaptive capacity of transmission systems	71,400
2. Driving innovation in sustainable electricity transmission in Chile	Develop an innovative sustainable corridor pilot	Decrease the negative impacts of transmission lines once the innovation is scaled up nationally	70,800
3. Promoting local energy development	Develop localized information on the transmission sector in the region (Antofagasta)	Increase participation of local governments and entities in the public policy-making process	20,000
4. Empowering communities, with a focus on women, in energy management	Involve communities living in the area of the transmission lines in the pilot project	Advance community participation in the energy projects	11,500
6. Project Execution cost			63,800
7. Total Project Cost			237,500
8. Project Cycle Management Fee charged by the Implementing Entity (if applicable)			12,500
Amount of Financing Requested			250,000

Projected Calendar:

Milestones	Expected Dates
Start of Project Implementation	02 May 2023
Project Closing	01 March 2025
Terminal Evaluation	02 May 2025

PART II: PROJECT JUSTIFICATION

A. Describe the project components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience.

The components of the project are:

- Contributing to the development of an energy transition that is just, secure, and resilient.

Through the design, development, and implementation of sustainable transmission systems, it is possible to advance in the challenge of ensuring a reliable electricity supply that is one of the pillars of a 100% renewable electricity matrix, this being one of the commitments of Chile in this area.

The reliability of the electricity system is based on the resilience of the systems in the face of disasters or events that may be natural or exacerbated by the effects of the climate crisis, such as heat waves, storms, and wildfires, among others, which put at risk the proper operation of the electrical infrastructure, such as transmission lines that enable carrying the supply from the generation plants to the points of consumption (households, public buildings, services, industries, etc.). Specific impacts on transmission lines include:

Temperature: Internationally, it is estimated that the increase in temperatures will directly affect the transmission infrastructure, as stated in a study conducted by the state of California, which estimates that the projected increase in temperatures could decrease the capacity of fully loaded transmission lines (Ebinger & Vergara, 2011); (Schaeffer, et al., 2012). In general terms, network losses may increase by 1% if the temperature increases by 3°C in a network possessing initial losses of 8% (Asian Development Bank, 2012). No specific studies are found regarding the impact of temperature variations on power distribution.

Extreme Events: It is internationally recognized that power grids, including transformers and switching stations can be affected by excessive frost and humidity (Asian Development Bank, 2012). Additionally, the extension of transmission grids exposes them to a series of climatic events, such as extreme wind and ice loads, avalanches, floods and fires.

On the other hand, at the international level, it is noted that distribution networks will have similar problems to transmission lines, although with a lesser degree of impacts due to their smaller extension. In general, it is expected that extreme events such as strong winds and extreme temperatures will damage or decrease the capacity of the distribution network, causing interruptions or decreases in the supply of electric power (Schaeffer, et al., 2012).

At the national level, there are no studies available that establish this relationship. However, the experience of the last time, which is widely supported by expert opinion, has made evident the high vulnerability of the country's electrical transmission and distribution system and the urgency of addressing it adequately. Among them:

- Alluviums in the northern part of the country that have affected the transmission and distribution of energy.
- Heat waves: generate an increase in buckling of cables and dilatation of conductors, implying a restriction of transmission and possibly meaning the withdrawal of service of such facilities.
- Occurrence of winds and other extreme events (e.g. snow) that in a short period of time have knocked down distribution poles and cables, leaving large areas of the central zone of the country without supply for long periods of time, evidencing the low capacity of the distribution system to deal with these events.

- Driving innovation in sustainable electricity transmission in Chile.

At the international level, advances in sustainable transmission are becoming more and more relevant, as they allow addressing a wide range of problems from an innovative perspective. Sustainable corridors are the space beneath overhead power lines that, with proper management, the land under powerlines can enable and support greater biodiversity. Such management, known as Integrated Vegetation Management (IVM), can be used to create green corridors which are a type of green infrastructure or nature base solutions (NBS). These are strategically-planned networks of natural and semi-natural areas designed and managed to improve biodiversity, protect vulnerable species and provide a wide range of ecosystem services. IVM can benefit multiple habitats and species by increasing plant diversity, which acts as important habitat for multiple bird, pollinator and small mammal species, among others (Ecofirst & RGI, 2019).~~A sustainable corridor is an infrastructure with a significant presence of vegetation that connects natural areas of a certain zone or area and, in the particular case of electricity transmission, it can help reduce the fragmentation of ecosystems where a line is located, as well as reduce the edge effect on forests, recover native flora and fauna, promote ecosystem conservation, among other more specific issues depending on the territory where they are implemented.~~

This is a highly innovative solution because it presents a new way of thinking about the transmission system in the energy sector. Since 2016, the Chilean Ministry of Energy has been carrying out "Strip Studies" that seek to plan the spaces of territory in which the main transmission projects that the country needs will be built. Currently, the criteria incorporated in the process involve an economic, social and environmental analysis; however, the need to develop transmission systems from a safe, sustainable and

resilient perspective has been identified, which is currently not addressed, so the development of sustainable corridors has been proposed. The objective is to consider Integrated Vegetation Management alternatives in existing and to be constructed transmission lines, replacing the traditional management of easement strips, which includes clearing and cutting of vegetation. This approach is a new way of developing electricity transmission, which consists of planting and maintaining low vegetation that reduces the impacts of transmission lines on the environment, improving biodiversity and the social acceptability of transmission projects, without interfering with the safety and continuity of electricity supply.

In particular, at the national level, a sustainable corridor has never been implemented and transmission lines have been historically opposed by communities, civil society, and academia. Thus, implementing a sustainable corridor in Chile will be understood as a nature-based solution to mitigate GHGs in the energy sector through the contribution to decarbonization, while increasing the adaptive capacity of the sector. The particular type of solution to be chosen to develop the pilot will depend on a previous study that provides a solid technical basis and within the social context. However, among the options that could currently be applied are international experiences such as community gardens (Peru), biological corridors (France-Belgium), easements used for grazing or ecosystem restoration (Spain).

On the other hand, more sustainable management of transmission makes it possible to promote productive uses that are relevant to local stakeholders, as well as to protect biodiversity and promote the conservation of ecosystems in the territories. It will also contribute to the biodiversity gain in the areas where it is located, contributing to the food sovereignty of the communities and the promotion of wildlife. International experiences that could be developed or serve as a basis for the Chilean pilot include:

Life-ELIA (France and Belgium): A pilot conducted in Europe from 2011 to 2017 that applied IVM principles to the vegetation management of 221 kilometers of transmission lines in France and Belgium, proves that IVM practices are less costly than traditional vegetation management techniques, enhance biodiversity, improve the social acceptance of transmission lines, and can help with permitting, as authorities are more willing to award those permits when they see the benefits of the new practices.

Naturaleza en Red (Spain): a pilot project of the Autonomous University of Barcelona in collaboration with the Red Eléctrica Group (Transmission Company in Spain) to analyze the role played by the areas under power transmission lines. The initiative includes the creation of a protocol for the evaluation of these microhabitats through a general analysis of the ecosystem. Currently, in most of the territory, there is intensive agriculture and the forest is closing, aging, and homogenizing, there is a lack of natural open spaces and this results in the loss of biodiversity. The forest management that is carried out periodically in the safety lanes of the power lines to avoid electrical risks and fires generates two types of areas: open spaces (when forest management has been recent) and closed spaces (when the habitat has evolved and grown again). Thus, the roads that run under the power lines provide islands of open spaces in forested areas

and islands of closed spaces in open areas. The first results of the study indicate a significant increase in floral density, pollinator abundance, abundance and diversity of diurnal butterflies and show that power lines act as a reservoir of biodiversity when the environment is forested and as a refuge for fauna when the adjacent habitat is open and has been impacted by human intervention.

Biotransporte (Spain): Analysis of transmission line supports as biodiversity islands in the province of Córdoba, Spain during 2002-2008. The analysis of the use of a certain number of pylons as biodiversity islands showed very satisfactory results: increase in abundance and biodiversity in birds and in abundance in micromammals and invertebrates (mainly pollinators). In a subsequent internal analysis, it was assessed that this type of actions could involve the connection of around 60% of the Natura 2020 Network areas, benefiting a multitude of species both directly and indirectly.

Pastoreo en Red (Spain): The objective was to maintain, with extensive livestock farming, the vegetation under the high-voltage power lines. Project developed by Red Eléctrica in La Rioja and León (Spain) between 2019 and 2022, considered a nature-based solution that protects, sustainably manages and restores ecosystems, according to the International Union for Conservation of Nature (IUCN). Red Eléctrica and the University of Alcalá promote the practice of grazing among energy companies through a guide that documents its benefits for the welfare of society. According to the IUCN, the project contributes to disaster risk reduction and supports the economic and social development of the area, avoiding abandonment and rural depopulation as well as the loss of traditional knowledge behind extensive livestock farming. It also slows biodiversity loss and ecosystem degradation by improving soil fertility and increasing the richness and abundance of herbaceous plants and other species.

Huertos en Línea (Perú): Project developed by Red de Energía del Perú (ISA REP) since 2004 in the districts of Villa María del Triunfo and San Juan de Miraflores (Peru). Its main objective is to strengthen the socioeconomic resilience of people living in poverty and extreme poverty, especially women and the elderly, through sustainable urban agriculture in the soils of ISA REP's electricity easement strips. The first garden opened with no more than 10 families, and today, 17 years later, 150 families are directly benefiting from it. This initiative involves the participation of 780 people in 13 community gardens, which benefit families with profits ranging from US$50-80 per person.

~~It will also contribute to the biodiversity gain in the areas where it is located, contributing to the food sovereignty of the communities and the promotion of wildlife.~~

- Promoting local energy development.

This proposal is focused on the direct participation of local stakeholders (from the Antofagasta region) in the execution of the project, which allows the development of capacities and technical knowledge in professionals working in different sectors linked to energy issues (public, private, academia, civil society, etc.).

Commented [IV1]: CR7: Por favor, justifique la justificación de la adaptación del resultado centrado en la promoción del desarrollo energético local.

This allows the implementation of a bottom-up approach to energy management in the region, where those directly involved will participate in the different processes and developments of the project. The success of the project may set a precedent on the importance of addressing the challenges of the electricity sector from a local perspective, which will allow institutions, such as the executing institutions, to advance in these solutions and scale up the project to the national level.

Finally, the project will increase the resilience of the transmission lines to the effects of the climate crisis (temperature increases, system failures, power outages, etc.) in a particular area (Antofagasta Region). This, when developed together with the communities, professionals and authorities of the region, will allow advancing in the local management of energy in a decentralized manner, providing the governments, institutions and citizens of the region with the tools to address climate change in the electricity sector.

- Empowering communities, with a focus on women, in energy management.

The project strengthens its social and environmental legitimacy mechanisms, where citizens can participate in decision-making processes by considering early transparent information on projects that will be key to the country's energy transition.

This is achieved through the development of training and education instances, participatory workshops to learn the opinions and proposals, and the inclusion of the communities that live and develop in the chosen territory in the design and implementation of the pilot, with a special focus on vulnerable sectors (homeless people living in illegal camps near the transmission lines) and women.

Finally, adaptation to climate change is addressed by the project through risk management on transmission lines, while climate resilience is achieved through the following points:

- Capacity-building in communities and local governments to increase adaptation to undesired events, especially linked to climate crisis effects
- Gathering information on climate risks in the energy sector, focusing on the Antofagasta region, to provide inputs to local decision makers for better management
- Manage risks associated with transmission lines, such as fires, through preparation and work with the communities living around this infrastructure

B. Describe how the project provides economic, social, and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project will avoid or mitigate negative impacts, in line with the Environmental and Social Policy of the Adaptation Fund.

Economic benefits: more sustainable management of the ecosystems where transmission lines are located could translate into a reduction of maintenance costs in the transmission companies' easements, as well as a reduction of inaction costs for public entities (related to adaptation and risk management). In this line, the experience of the LIFE-Elia project made it possible to develop a cost-benefit analysis with a financial comparison between traditional management and LIFE management in transmission lines. The comparison of costs shows that the LIFE actions break even in 3 to 12 years, depending on the actions. After 30 years, these actions will have become 1.4 to 3.9 times cheaper for Elia than the traditional rotary milling carried out at present. This demonstrates, through experience, the economic benefit of sustainable corridors such as the one proposed in this project. This is in addition to other analyses carried out in international experiences, which show a decrease in the maintenance costs of the lines.

Social benefits: empowerment of communities, capacity building around the energy sector and with a focus on women, employment insertion of marginalized groups through work or obtaining benefits from sustainable corridors (for example, through work and generation of economic activity from community gardens that function as sustainable corridors). Also, from the social perspective, sustainable corridors have increased social acceptance of transmission lines, allowing an improvement in the relationship with communities and territories, as well as with local authorities, which brings benefits from both public and private perspectives. In this same perspective, sustainable transmission has been shown to increase the involvement of local actors in energy management through greater participation and knowledge of the transmission systems.

Environmental benefits: This shows, through experience, the economic benefit of sustainable corridors such as the one proposed in the project. As already mentioned, the environmental contributions of a sustainable management of electricity transmission allow reducing the impacts of transmission lines (edge effect, degradation, destruction of flora and fauna, etc.) while replacing them with positive impacts, such as increased biodiversity, ecosystem restoration, promotion of biodiversity, improvement of landscaping around the lines, among others.~~reduction of the impacts presented by the construction and operation of transmission lines, such as fragmentation, edge effect, loss of ecosystems and biodiversity, deterioration, and change of land use, among others~~.

In addition, both the positive impacts/results and the lessons learned from the project will be shared through a nurturing exchange of knowledge and best practices with CPDAE. It may be of special interest for international cooperation that the Chilean pilot will seek to have multisectoral participation, including not only the public sector and communities but also the private sector, through companies and associations related to the subject and with whom the Ministry of Energy has previously worked in this line.

C. Describe how the project encourages or accelerates the development of innovative adaptation practices, tools or technologies and/or describe how the project helps generate evidence base of effective, efficient adaptation practices, products or technologies, as a basis for potential scaling up.

The implementation of the first sustainable corridor pilot in Chile means a concrete innovative adaptation measure to address the challenge of climate change impacts in the electricity transmission sector. This, being a nature-based solution, is an existing development to solve a different problem, focused on increasing the resilience of the energy sector and promoting local energy development through capacity building and knowledge in professionals in the field, and communities, with a focus on the most vulnerable and women living in the territories where the transmission lines are located.

The objective of this being a sustainable corridor pilot is to test on a small scale whether this solution will open the possibility and public discussion on sustainable corridors at a national level and as a state policy, promoted by public entities linked to energy. Thus, one of the long-term objectives of the project is to lay the foundations (technical inputs, studies, concrete results, good practices, lessons learned, etc.), systematized in the different products that will emerge from the process to deliver a sustainable solution to electricity transmission that can be led and promoted by Chilean institutions related to energy and climate change, being also an example at regional (Latin America) and international level in the field, in terms of the safe and resilient energy transition.

D. Please confirm whether the project meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and is in line with the Environmental and Social Policy of the Adaptation Fund.

Yes, the project is aligned with the following regional, national, and international plans, policies or laws:

- (Regional) Regional Climate Change Action Plan, Antofagasta: Under development, and where the Ministry of Energy is actively participating.

- (National) Climate Change Framework Law: The Law mandates the elaboration of Sectoral Mitigation and Adaptation Plans by 2024. The Ministry of Energy is initiating these processes for the energy sector; therefore, this pilot will be aligned with them and will contribute to the measures included in them. In addition, this

project would contribute to the Law's goal of achieving carbon neutrality by 2050 at the latest and increase the country's adaptive capacity and resilience.

- (National) Nationally Determined Contribution and Long-Term Climate Strategy: Through the contribution to the fulfilment of Chile's international commitments regarding GHG reduction, decarbonization, and carbon neutrality.

- (National) National Energy Policy 2050: The project contributes to the fulfilment of the goals of the guiding policy of the energy sector, which seeks to make it a resilient and efficient sector, as well as a protagonist of climate ambition.

- (International) Escazu Agreement: The project implementation processes will be governed by the guidelines of the Regional Agreement on Access to Information, Public Participation, and Access to Justice in Environmental Matters in Latin America and the Caribbean, which was signed in March 2022 by Chilean Government.

- (International) Environmental and Social Policy, Adaptation Fund: as detailed in section F, the project is aligned with different components of the ESP.

E. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

Knowledge management will be carried out from different aspects:

- Systematization of the progress of the project, with special focus on lessons learned, to be incorporated in the final report that will be publicly available.
- Dedicated workshops and other capacity-building activities with interested stakeholders.
- Elaboration of a guide for the development of sustainable transmission projects with a clear focus on climate resilient and adapted transmission infrastructure, together with the Chilean Environmental Assessment Service, which will be made public for the correct development of future projects such as the proposed pilot project.
- Incorporation of international knowledge and experiences in the development of the project, which will be collected from the CPDAE based on other energy projects or nature-based solutions that have been implemented under the Adaptation Fund.
- Along the same lines, all information, progress, lessons learned, and best practices will be presented to the CPDAE community through reports, guidelines, presentations, webinars, and other products or formats. Also, all the material will

be available for use by other members of the groups, their teams and any other person who may be interested.

F. Provide an overview of the environmental and social impacts and risks identified as being relevant to the project. Describe how the project will engage, empower and/or benefit the most vulnerable communities and social groups, including gender considerations, in line with the Environmental and Social Policy of the Adaptation Fund.

Checklist	Assessment carried out	Potential impacts and risks
Compliance with the Law	The project complies with and is under the eaves of the laws, norms, regulations, and policies, both subnational, national, and international. It will comply, at all times, with Chile's legal framework, making correct and efficient use of natural resources, environment and people protection, as well as local development from different perspectives	**Risk: Low** **Potential Impact: High** There are no identified risks to legal compliance during project implementation. We will work with the Superintendence of Electricity and Fuels, which is the entity in charge of regulating the spaces for transmission lines.
Human Rights	The project will have unrestricted respect for the fundamental rights of the people living in the area where the pilot project will be located and of any other person in general who may be involved. Through the participatory processes of the project and the joint work with the Gender and Human Rights Office of the Ministry of Energy, the protection and avoidance of any impact on the basic rights of people will be ensured.	**Risk: Very low** **Potential Impact: Very high** The project is aligned with national, regional, and international human rights standards, and will be advised by professional experts.
Marginalized and Vulnerable Groups	The program seeks to work with marginalized and vulnerable groups (for example, illegal camps in the areas where the transmission lines are located) and aims to contribute to improving their conditions in two ways: - Safety: currently the communities put their safety at risk by living around high voltage pylons. This project will also work with them to educate, raise awareness and improve their quality of life. - Local community development: The pilot corridor will allow the	**Risk: Very low** **Potential impact: High** The project's participatory process will focus on implementing socio-environmental safeguards, as well as identifying risks, needs, and potential conflicts, among others. The participatory process will be governed by the highest national, regional, and international standards. The project will consider a

	development of economic activities around an area that currently lacks them, for example, through small-scale agriculture, food cultivation, seed preservation, local trade, etc. The program will have no negative impacts on these groups.	contingency plan, if necessary, after the process.
Gender Equity and Women's Empowerment[3]	The project seeks to have a positive impact on gender equity and empowerment by working with women during its execution. This will be done from two perspectives: - Women in the energy sector: currently only 23% of the sector's workforce at the national level are women. For this reason, the project will seek that the teams are formed by +50% of women in the different stages and processes. The professional teams of the participating institutions must also include women, and gender criteria will be used for team selection. - Women in the beneficiaries: in the work carried out with the communities through the participatory process or the insertion of the groups in the project, there will be a special focus on incorporating women and gender criteria in the process, contributing to the development of capacities in the women of the communities, contributing to their economic development and empowering them as fundamental actors in the adaptation to climate change. All of the above will be designed and implemented together with the Gender and Human Rights Office of the Ministry of Energy	**Risk: Very low** **Potential impact: Very high** The project will have gender equity and women's empowerment as a fundamental pillar, ensuring it from project design to implementation, and with the professional support of experts in the field.
Protection of Natural Habitats	One component of the project aims to protect ecosystems, biodiversity, and natural habitats through conservation and the implementation of a nature-based solution.	**Risk: Very low** **Potential impact: Very high** The project team will include professionals dedicated to this issue, as well as previous studies to ensure the

[3] The development of the pilot is aimed at the vulnerable population living in the areas of the transmission lines (in situations of poverty and precarious housing, such as illegal camps). The exact number of beneficiaries will be determined once the area where the project will be implemented is determined, but it is expected that, given the conditions of this type of area, women will represent about 55% of that population.

		protection of ecosystems and, as mentioned in previous items, a large part of the efforts will be made to meet the objective of sustainable management of electricity transmission to reduce the negative impacts of this activity on the natural environment.
Climate Change	The project will not mean, in any case, and under any circumstances, an increase in greenhouse gas emissions. On the contrary, one of the consequences of the development of the project will be an increase in native flora and fauna, which in turn will create the conditions to become a carbon sink. This, added to the intrinsic component of adaptation to climate change, transforms the project into a multidimensional solution to the problem of the climate crisis.	**Risk: Very low** **Potential impact: Very high** The project, being a nature-based solution, combines the absorption of GHG emissions with adaptation to the climate crisis, in line with the objectives of the Paris Agreement.

G. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

The effects of the climate crisis jeopardize the decarbonization of the energy matrix and climate commitments, the security of supply and the resilience of the sector to different types of negative impacts. Currently, the preparedness of the energy sector is not sufficient in a country like Chile, which meets 7 of the 9 UNFCCC criteria of vulnerability to climate change. Thus, advancing concrete solutions to increase the adaptive capacity, while reducing vulnerability and strengthening resilience of the energy systems is urgent and imperative for the sector to be properly prepared for the challenge of facing the adverse and undesired effects presented by climate change and which are of special interest for energy (heat waves, drought, extreme hydrometeorological events, sea level rise, changes in seasonal patterns, increased demand, among others). This will allow the sector to adapt to the climate crisis, while at the same time achieving a low-emission, fair, safe and responsible energy transition.

In this line, the project proposes the implementation of a sustainable corridor in an area of special relevance for electricity transmission, which would allow testing of long-term solutions to adapt the infrastructure to the impacts of the climate crisis, while obtaining other positive results, such as an improvement in local energy management, incident participation, and empowerment of local communities along with the development of information and capacities of the territory from an energy perspective. This pilot will also

have the ultimate goal of evaluating the scaling up of the project too, in case of success, scale it up to regional, macro zonal and, eventually, national levels.

A project of this type requires that the Ministry of Energy and other public institutions can articulate the different actors (local governments, private sector, academia, communities, etc.) and the funding needed to develop a first pilot of these characteristics, which is currently unavailable. So, the Adaptation Fund solves this funding need by allowing the development of a nature-based solution to address the impacts of climate change in the energy sector and increase resilience to adverse effects that the country or the energy sector would be unable to address in the short term. Particular benefits of the fund include:

- Information gathering and capacity building around sustainable transmission at a multi-sectoral level.
- Reducing public investment costs in adaptation measures for the transmission sector
- Promote new nature-based solutions to increase the adaptive capacity of the energy sector and the country through tangible pilots.
- Develop participation, empowerment, and capacity-building programs for the most vulnerable communities that inhabit the territories where transmission lines are located, as well as for energy professionals in the region.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project/programme implementation.

The project will be implemented over 24 months, starting in 2023. The National Implementing Entity (NIE) will be the Chilean Agency for International Development Cooperation (AGCID, for its acronym in Spanish).

AGCID will work in conjunction with the Ministry of Energy (central level and Antofagasta Ministerial Secretariat) and the Regional Government of Antofagasta. AGCID's role under the project is fully in line with its institutional leadership role as a National Cooperation Agency, supporting the implementation of development programs at the national and international levels.

The Project Coordinator will be responsible for the coordination and monitoring of the project and will report to the Climate Change Unit of the Energy and Environmental Policies and Studies Division. Among the tasks led by the coordinator are:

- Articulation of the different actors involved in the project
- Monitoring and follow-up of the development of the project, its components, and activities
- Technical counterpart, together with the Ministry of Energy, of studies and other consultancies derived from the project
- Coordination with the external audit unit

AGCID will ensure performance improvement; and together with the Ministry of Energy, will approve the work plan and the procurement plan. In addition, both entities will closely monitor the work plan execution, led by the coordinator.

In addition, project implementation will occur in harmony with the private sector (companies and transmission guilds) and academia/education sector (higher education institutions and schools) with a participatory process involving the communities and civil society of the territory.

AGCID will provide the following implementation services for the project:

- Portfolio implementation monitoring and reporting on budget execution
- Quality assurance and accountability for results and outputs in the development phase of the project, during implementation, and at the completion
- Receipt, management, and disbursement of AF funds by financial rules and regulations
- Oversight and quality assurance of project results evaluation processes and assurance that lessons learned/best practices are incorporated to improve future projects

B. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

The project contemplates the development of a monitoring plan, which will include evaluation and will allow for monitoring compliance and success throughout the implementation period and -with special emphasis- at project closure to be incorporated into the final evaluation along with good practices and lessons learned from the final report.

The monitoring plan will incorporate indicators to quantify progress as implementation progresses, as well as its success. It will be prepared by an external consultant and approved by AGCID and the Ministry of Energy, while monitoring and evaluation will be carried out by the project coordinator.

Upon completion of project implementation, an external audit will be developed to assess the proper functioning, as well as to incorporate transparency as a fundamental principle of project implementation.

The following reports derived from the monitoring plan will be considered and all must be approved by the NIE and the Ministry of Energy:

- Monitoring plan: a strategy for follow-up that will be available before the execution of activities.
- Bimonthly reports: progress reports on compliance with the indicators identified in the monitoring plan for each of the component activities.
- Final report: consolidated report on the follow-up of the process, with special focus on the closure of activities, lessons learned, and recommendations for future implementation of similar projects.
- External audit report: based on the periodic financial statements, an external audit report will be prepared by the regulations established by the executing agency.

C. Include a simple results framework for the project proposal, including milestones, targets, and indicators.

Outcome	Indicator	Baseline	Milestone	Means of verification
Component 1: Contributing to the development of an energy transition that is just, secure and resilient				
Outcome 1.1: Increase the resilience of electricity transmission	Number of risks mitigated or eliminated with pilot implementation	Project pre-study will concretely identify and quantify baseline risks	2	Pre-study conducted along with a final report with results comparing final and baseline scenarios
Component 2: Driving innovation in sustainable electricity transmission in Chile				
Outcome 2.1: Build a sustainable corridor pilot	Number of pilots built	No sustainable corridors exist in Chile	1	Built infrastructure Intermediate and final reports with results
	Number of people benefiting from new infrastructure	0	1,000	
Component 3: Promoting local energy development				
Outcome 3.1: Increase the capacities of the energy sector in the Antofagasta region	Number of trainings to professionals of the energy sector in the region	0	5 (+30% women)	Participatory activities carried out Photographs and videos Attendance lists
Outcome 3.2.: Increase the knowledge of the region's citizens on energy issues	Number of communication campaigns focused on the region	0	1	Number of campaigns launched Graphic and audio-visual records A document containing the communication strategy
Component 4: Empowering communities, with a focus on women, in energy management				
Outcome 4.1: Increase instances of participation and advocacy on energy	Number of participatory activities carried out	0	5 (50% of beneficiaries must be	Participatory activities carried out

issues with the communities in the project area	(with +50% participation of women)		women)	Photographs and videos Attendance lists
Outcome 4.2: Increase the involvement of women from vulnerable and marginalized social groups in energy and climate change issues	Number of trainings, focused on women, climate change, and energy	0	5	Participatory activities conducted Photographs and videos Attendance lists

Training and capacity-building activities will consist of theoretical and practical work sessions aimed at different sectors and, therefore, with different approaches. The objective of these activities will be to involve the population of the region in energy issues and the need to adapt to climate change. Three types of activities are identified at this point:
1. Workshops aimed at energy workers in the region: of a technical nature to train them on climate change impacts of the energy sector, with a focus on the region; the importance of adaptation to the climate crisis, with a focus on the region; and resilience opportunities to ensure a just and safe transition.
2. Outreach activities with the region's civil society: outreach activities on energy, adaptation, and climate change issues in order to raise awareness among citizens, bring them closer to sustainable energy management, generate capacities that allow for a resilient population and disseminate the progress and achievements of the project.
3. Training for the vulnerable population living in the area where the pilot will be located: the objective is for them to acquire specific knowledge to make use of the sustainable corridor to obtain economic and social benefits (e.g., learning to maintain community gardens and develop economic activities based on them that allow families to obtain extra income, as in the case of the project in Peru).

D. Demonstrate how the project / programme aligns with the Results Framework of the Adaptation Fund

Project Objective(s)	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
1. Contributing to the development of an energy transition that is just, secure and resilient	Number of risks mitigated or eliminated with pilot implementation	Outcome 1: Reduced exposure to climate-related hazards and threats	1. Relevant threat and hazard information generated and disseminated to stakeholders on a timely basis	34,000
2. Driving innovation in sustainable electricity transmission in Chile	Number of people benefiting from the new infrastructure	Outcome 4: Increased adaptive capacity within relevant development sector services and infrastructure assets	4.2. Physical infrastructure improved to withstand climate change and variability-induced	50,000

			stress	
3. Promoting local energy development	Number of trainings for energy professionals in the region	Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses Outcome 8: Support the development and diffusion of innovative adaptation practices, tools, and technologies	2.1. Capacity of staff to respond to, and mitigate impacts of, climate-related events from targeted institutions increased 8. Innovative adaptation practices are rolled out, scaled up, encouraged, and/or accelerated at regional, national and/or subnational levels.	10,600
4. Empowering communities, focusing on women, in energy management[4]	Number of participatory activities carried out (With +50% participation of women)	Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at a local level	3.1. Percentage of the targeted population aware of predicted adverse impacts of climate change, and of appropriate responses	11,300
Project Outcome(s)	**Project Outcome Indicator (s)**	**Fund Output**	**Fund Output Indicator**	**Grant Amount (USD)**
Outcome 1.1: Increase the resilience of electricity transmission	Number of risks mitigated or eliminated with the implementation of the pilot.	Output 1.1: Risk and vulnerability assessments conducted and updated	1.1. No. of projects or programmes that conduct and update risk and vulnerability assessments (by sector and scale)	34,000
Outcome 3.1: Increase the capacities of the energy sector of the Antofagasta region	Number of trainings for professionals of the energy sector of the region	Output 2.1: Strengthened capacity of national and sub-national centres and networks to respond rapidly to extreme weather events	2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events (by gender)	10,600
Outcome 3.2: Increase the knowledge of the	Number of communication campaigns focused on	Output 3.2: Strengthened capacity of national and subnational stakeholders	3.2.2 No. of tools and guidelines developed (thematic,	

[4] The project activities will seek to have a gender focus. For example, training will seek to comply with specific indicators in terms of women's participation, or activities related to working with communities will seek to work directly with women in vulnerable situations.

region's citizens on energy issues	the region	and entities to capture and disseminate knowledge and learning	sectoral, institutional) and shared with relevant stakeholders	
Outcome 2.1: Construct a sustainable corridor	Number of pilots constructed	Output 8: Viable innovations are rolled out, scaled up, encouraged, and/or accelerated	8.2. No. of key findings on effective, efficient adaptation practices, products and technologies generated	50,000

E. Include a budget, including a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

Category	Item	Unit price	Quantity	Total USD	Total USD
IE FEE	AGCID	$ 12,500	1	$ 12,500	$ 12,500
Execution	Project Coordinator	$ 2,500	18 M	$ 45,000	$ 63,800
	SCL-Antofagasta team trips	$ 950	4 trips x 12 months	$ 3,800	
	Follow-up plan. External consultancy	$ 5,000	1	$ 5,000	
	External audit	$ 10,000	1	$ 10,000	
Component 1 Contributing to the development of an energy transition that is just, secure and resilient	Survey of information on sustainable corridors in Chile	$ 30,000	1	$ 30,000	$ 71,400
	Communication strategy[5]	$ 3,000	1	$ 3,000	
	Comunication strategy~~CE~~ implementation[6]	$ 500	18 M	$ 9,000	
	Journalist (Communications Manager)[7]	$ 800	18 M	$ 14,400	
	Final analysis/report	$ 15,000	1	$ 15,000	
Component 2 Driving innovation in sustainable electricity transmission in Chile	Support Ecologist	$ 1,100	8 M	$ 8,800	$ 70,800
	Support Engineer or Architect	$ 1,500	8 M	$ 12,000	
	Construction of 10 km corridor	$ 50,000	1	$ 50,000	
Component 3 Promoting local energy development	Sustainable Corridors Guide Antofagasta	$ 20,000	1	$ 20,000	$ 20,000
Component 4 Empowering communities, with a focus on women, in energy management.	Participatory workshops with the community	$ 500	15	$ 7,500	$ 11,500
	Workshops	$ 800	5	$ 4,000	
TOTAL				**$**	**250,000**

F. Include a disbursement schedule with time-bound milestones.

Schedule disbursement	Upon signing agreement	Inception workshop:	1 year after projects start	Grand Total (USD)
Schedule date	March 2023	May 2023	May 2024	
Project funds (Components 1-4)	57,900	57,900	57,900	173,700

[5] Planning tool that allows the project to define the message to be conveyed to beneficiaries, inhabitants of the area, and key stakeholders in the energy sector, as well as the stages to meet the objectives of raising awareness on climate change adaptation, the effects on the energy sector (especially electricity transmission) and the benefits of sustainable energy management.
[6] Implementation of the communication strategy developed. These expenses may include: purchase of licenses, graphic design (posters, dissemination elements, invitations, among others), advertising in social networks or media (announcements, dissemination, awareness campaign, among others).
[7] In charge of the implementation of the communications strategy developed and the public relations of the project during its implementation phase.

Project Implementing Entity Fee			12,500	12,500
Project Execution Cost	20,000	20,000	23.800	63,800

Component	2023			2024				2025	
	Mar Apr May	Jun Jul Ago	Sep Oct Nov Dec	Jan Feb	Mar Apr May	Jun Jul Ago	Sep Oct Nov Dec	Jan Feb	Mar Apr May
Component 1 Contributing to the development of an energy transition that is just, secure and resilient								X	X
Component 2 Driving innovation in sustainable electricity transmission in Chile				X	X	X	X		
Component 3 Promoting local energy development		X	X	X	X	X	X	X	
Component 4 Empowering communities, with a focus on women, in energy management.		X	X	X	X	X	X	X	

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government[8] *Provide the name and position of the government official and indicate the date of endorsement. If this is a regional project/programme, list the endorsing officials of all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

Jenny Mager Santos	Date*: August, ~~05~~01, 2022*

6. Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

Head of Climate Change Office, Designated Authority, Ministry of Environment	

B. Implementing Entity certification *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number, and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans in accordance with Chile's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by Climate Change and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
~~ENRIQUE O'FARRILL JULIEN~~CARLA GUAZZINI GALDAMES Acting Executive Director Chilean International Cooperation Agency for Development (AGCID) Implementing Entity Coordinator	
Date: ~~*August*~~*September, 05, 2022*	Tel. and email:+56228275754 / cguazzini@agci.gob.cl~~eofarrill@agci.gob.cl~~
Project Contact Person: Marco Ibarra, Policy Analyst.	
Tel. And Email: +56228275759 / mibarra@agci.gob.cl	

Letter of Endorsement by Government

Letter N°223003/

Santiago, 01-08-2022

To: The Adaptation Fund Boardc/o
Adaptation Fund Board
SecretariatEmail:
afbsec@adaptation-fund.org Fax:
202 522 3240/5

In my capacity as designated authority for the Adaptation Fund in Chile, I confirm that the projectproposal: "Sustainable lines. Adapting electricity transmission infrastructure to the climate crisis through nature-based solutions in Antofagasta Region" is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in Chile.

Accordingly, I am pleased to endorse the above project proposal with support from the AdaptationFund. If approved, the project will be implemented by AGCID and executed by the Ministry of Energy.

Sincerely,

Jenny Mager Santos
Head Climate Change Division
Ministry of Environment of Chile
Designated Authority of Chile

MJG/GSG/mrs
cc;
- AGCID
- International Affairs Office
- Archivo División de Cambio Climático
- Oficina de Partes