CIF CLIMATE INVESTMENT FUNDS

Meeting of the Global Climate Action Programs (GCAP) Sub-Committee

Washington DC, (Hybrid)

Thursday, November 9, 2023

COSTA RICA (REI) INVESTMENT PLAN

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GCAP/TFC.5/04.Rev01
November 3, 2023

MINISTERIO DE AMBIENTE Y ENERGÍA

GOBIERNO DE COSTA RICA

San José, october 05, 2023
DVME-138-2023

To Luis Tineo
Interim Chief Executive Officer
Climate Investment Funds - Administrative Unit
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Washington D.C. 20433, USA

Dear Mr. Tineo,

It is with great pleasure that I submit Costa Rica's Investment Plan (IP) to support decarbonization by accelerating its clean and inclusive energy transition. The Government of Costa Rica appreciates all the support that the Climate Investment Funds (CIF), the Inter-American Development Bank (IADB), and the World Bank (WB) have provided to develop this IP.

The Ministry of Environment and Energy led this Plan. As a result, this IP is conceived as a tool to move towards a productive economy, accelerating the shift towards clean energy use and the democratization of electricity production.

CIF-REI concessional resources will catalyze financing from multilateral development bank partners (i.e., IADB and WB), private investment, and other co-financing in technologies/projects needed to meet the country's National decarbonization Plan 2018-2050 (NDP).

Costa Rica’s IP objective, aligned with the objectives of the CIF-REI Program, is to transform its national energy matrix to achieve the decarbonization of the economy as part of a climate change-ready sustainable and inclusive development. This objective is consistent with its National decarbonization Plan 2018-2050 (NDP), which includes the country’s aspirational long-term objective of a net-zero emission economy by 2050.

To make this vision a reality, the country looks to build upon groundbreaking achievements, such as an electricity generation matrix that is 98,58% based on renewable sources (hydroelectric, geothermal, wind, solar and biomass), to promote the transition towards a greater participation of renewable electricity in the overall national energy matrix.

This requires the electrification of the transport sector, which accounts for 69% of the GHG emissions, the electrification of industrial processes, and the adoption of enabling technologies that will allow a greater participation of new renewable generation sources to absorb the additional electricity demand. These aims are directly related to REI program by contributing to its goal of harnessing the potential for electrifying end-use sectors, such as buildings, transport, and industry.

The Government of Costa Rica appreciates the opportunity to participate in the Renewable Energy Integration Program. We look forward to working with CIF, the IADB, the World Bank, and our local partners to implement the project's portfolio successfully.

Yours sincerely,

Ronny Rodríguez Chaves
Viceminister
ViceMinistry of Energy

CLIMATE INVESTMENT FUNDS
RENEWABLE ENERGY INTEGRATION PROGRAM
INVESTMENT PLAN FOR COSTA RICA

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October 2023

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ACRONYMS AND ABBREVIATIONS

AMI:	Advanced Metering Infrastructure
ARESEP:	Public Services Regulatory Authority (*Autoridad Reguladora de los Servicios Públicos*)
BNCR:	Costa Rican National Bank (*Banco Nacional de Costa Rica*)
BP:	Popular Bank (*Banco Popular*)
CCLIP:	Conditional Credit Line for Investment Projects
CIF Secretariat	Secretariat of the Climate Investment Funds
CIF:	Climate Investment Funds
CNFL:	National Power and Light Company (*Compañía Nacional de Fuerza y Luz*)
CONELÉCTRICAS:	National Consortium of Electrification Companies of Costa Rica (*Consorcio Nacional de Empresas de Electrificación de Costa Rica*)
COOPEALFARORUIZ:	Alfaro Ruiz Rural Electrification Cooperative (*Cooperativa de Electrificación Rural de Alfaro Ruiz*)
COOPEGUANACASTE:	Guanacaste Rural Electrification Cooperative (*Cooperativa de Electrificación Rural de Guanacaste*)
COOPELESCA:	San Carlos Rural Electrification Cooperative (*Cooperativa de Electrificación Rural de San Carlos*)
COOPESANTOS:	Los Santos Rural Electrification Cooperative (*Cooperativa de Electrificación Rural Los Santos*)
DER:	Distributed Energy Resources
DMS:	Distribution Management Systems
ENREI:	National Strategy for Smart Electric Grids (*Estrategia Nacional de Redes Eléctricas Inteligentes*)
EOR:	Regional Operating Agency (*Ente Operador de Regional*)
ESPH:	Heredia's Public Services Company (*Empresa de Servicios Públicos de Heredia*)
EV:	Electric Vehicle
FMO:	Dutch Entrepreneurial Development Bank
GCF:	Green Climate Fund
GDP:	Gross Domestic Product
GgCO2e:	Giga grams of de carbon dioxide equivalent tons
GHG:	Greenhouse Gases
GIS:	Geographic Identification System
GMA:	Greater Metropolitan Area
GoCR:	Government of Costa Rica
HEV:	Hybrid Electric Vehicle
ICE:	Costa Rican Electricity Institute (*Instituto Costarricense de Electricidad*)
IDB:	Inter-American Development Bank
IDBG:	Inter-American Development Bank Group
IFC:	International Finance Corporation
IP:	Investment Plan
IRF:	Integrated Results Framework
JASEC:	Cartago Electric Service Management Board (*Junta Admnistradora del Servicio Eléctrico de Cartago*)
M&R:	Monitoring and Reporting
MDB:	Multilateral Development Banks

MDM:	Meter Data Management
MER:	Regional Electricity Market (*Mercado Eléctrico Regional*)
MINAE:	Ministry of Environment and Energy (*Ministerio de Ambiente y Energía*)
MtCO2e:	Millions of carbon dioxide equivalent tons
NAMA:	Nationally Appropriate Mitigation Actions
NDC:	Nationally Determined Contributions
Norfund:	Norwegian Investment Fund
NRES:	New Renewable Energy Sources
NTA:	Non-Reimbursable Technical Assistance
OECD:	Organization for Economic Cooperation and Development
OMS:	Outage Management System
PEG:	Generation Expansion Plan (*Plan de Expansión de la Generación*)
PEN:	National Strategic Plan 2050 (*Plan Estratégico Nacional*).
PES:	Payment for Environmental Services
PGCC:	National Action Plan on Gender Equality in Climate Action (*Plan de Acción Nacional sobre Igualdad de Género en la Acción Climática*)
PNACC:	Costa Rica's National Policy on Climate Change Adaptation (*Plan Nacional de Adaptación al Cambio Climático*)
PNdD:	National Decarbonization Plan (*Plan Nacional de Descarbonización*)
PNDIP:	National Development and Public Investment Plan (*Plan Nacional de Desarrollo e Inversión Pública*)
PNE:	National Energy Plan (*Plan Nacional de Energía*)
PNT:	National Transport Plan (*Plan Nacional de Transporte*)
PNTE:	National Electric Transport Plan (*Plan Nacional de Transporte Eléctrico*)
PPPs:	Public Private Partnerships
REI M&R Toolkit:	Monitoring and Reporting Toolkit of the REI program
REI:	Renewable Energy Integration
SBD:	Development Banking System (*Sistema Banca para el Desarrollo*).
SCADA:	Supervisory Control and Data Acquisition
SDG:	Sustainable Development Goals
SEN:	National Electric System (*Sistema Eléctrico Nacional*)
SEPSE:	Energy Sector Planning Secretariat (*Secretaría de Planificación del Subsector Energía*)
SIEPAC:	Central American Electrical Interconnection System (*Sistema de Interconexión Eléctrica de los Países de América Central*)
SMES:	Small and Medium Enterprises
STEM:	Science, Technology, Engineering and Mathematics
SUGEF:	General Superintendency of Financial Institutions (*Superintendencia General de Entidades Financieras*)
UNEP:	United Nations Environment Program
WB:	World Bank
WBG:	World Bank Group

1. PROPOSAL SUMMARY

1.1. Introduction

Costa Rica's Investment Plan (IP) for the Climate Investment Funds (CIF) Renewable Energy Integration Program (REI) was prepared by the Ministry of Environment and Energy (MINAE) with the support of the Inter-American Development Bank (IDB), IDB Invest, the World Bank (WB) and the International Finance Corporation (IFC). The IP presents a series of interventions, leveraged with concessional funds that will assist the Government of Costa Rica (GoCR) in the ambitious transformation of its development model towards an economy with zero net greenhouse gas (GHG) emissions by 2050; prepared for climate change; inclusive, resilient, and just where the private sector is a key player. The IP is aligned with the country's national Policies and Plans, such as the National Strategic Plan 2050 (PEN) and the National Decarbonization Plan 2018 – 2050 (PNdD), as detailed in section 2.4, and aims to leverage GoCR initiatives to achieve a holistic vision at the national level. The IP will build on an almost 100% renewable electricity generation, leaving behind the dependence on fossil energy sources in transportation and industry and meeting the new demand with smart and flexible grids that allow a greater integration of new renewable energy sources (NRES) in the energy matrix.

1.2. Objectives

The objective of Costa Rica's IP is to support the decarbonization of the economy by accelerating the just energy transition, through greater private sector participation, in order to: (i) reduce financial and technical barriers for the incorporation of innovative technologies in the development and digitalization of electricity grids that enable the integration of NRES to the National Electric System (SEN); (ii) reduce financial and technical barriers for the electrification of energy uses in transport and industry; and (iii) strengthen the relationship between the user and the grid through the provision of value-added services, savings and equitable efficiency to promote a just transition that efficiently upholds the sustainability of the system, therefore leading to a reduction in the cost of the service.

The IP will support investments in: (i) the installation of smart meters, which improve network efficiency and reduce costs; (ii) the deployment of information systems, communication networks and licensing, which will accelerate network digitalization of the through real-time network monitoring and management systems, preparing them to absorb NRES and applications to enhance the relationship between the network and users; (iii) the installation of charging stations for electric buses, which will enable the acceleration of the electrification of public transportation and reduce fossil fuels dependence ; and (iv) the replacement of industrial combustion equipment (boilers and heat pumps, among others) with electric equipment, both in the public and private sectors, through financing schemes that facilitate the adoption of technologies for the electrification of energy uses.

1.3. Expected results

The CIF-REI financing and technical assistance will provide concessional financing to encourage a just and inclusive energy transition with greater integration of NRES through the adoption of new technologies and the enabling of new business models, with private sector participation. It is thus expected that CIF-REI resources will accelerate Costa Rica's economy decarbonization process. The CIF-REI resources will be channeled through the participating Multilateral Development Banks (MDBs): IDB, IDB Invest, WB and IFC in the areas prioritized by the GoCR, through which the following results are expected:

- Reach 67% (1,295,571 users) of smart meter coverage with the installation of 724,000 advanced metering system units.

- Mainstreaming of time-of-use and prepaid tariff schemes that provide economic signals to users for a better energy management[1] due to smart meters installation.

- Reduce the cost of electricity service operation by USD 1.2 million annually through improved grid management resulting from advanced metering systems.

- Develop an application that enable and empower consumers to manage energy consumption; allow the provision of value-added services, such as distributed generation, demand management services and prepaid tariffs, which improve access and affordability of the service to lower-income populations.

- Accelerate the electrification of transport by providing charging infrastructure for 185 electric buses in the Greater Metropolitan Area (GAM) between 2024 and 2030, representing an additional annual demand of 21.3 GWh to be supplied with 36 MW of incremental renewable generation capacity.

- Accelerate industry electrification through the replacement of combustion industrial equipment (boilers and heat pumps, among others) for electric ones with an annual demand of 19.2 GWh, requiring the addition of 35 MW in renewable generation capacity[2].

- Generate enabling conditions for the incorporation of 71 MW of NRES to meet incremental demand resulting from the electrification of energy uses and 2.036 GWh of additional capacity for the period 2022 - 2030, according to Costa Rica's Generation Expansion Plan (PEG) 2022 - 2040.

- Direct reduction of GHG emissions by avoiding the emission of 17,729 tons of carbon dioxide equivalent (tCO2e) per year due to the electrification of transport, electrification of industry and implementation of smart metering[3].

- Mainstream the just energy transition approach in all proposed interventions, in particular for women and minority groups, by strengthening their participation in the transformation of the energy sector and introducing targeted interventions to facilitate their access to electricity and economic opportunities in the sector.

- Strengthen the role of the private sector in the energy transition through public-private partnerships (PPPs) and working with banks to foster the financing and growth of a green portfolio that supports the decarbonization process.

[1] BID (2020). Costos y Beneficios de la descarbonización de la economía de Costa Rica. The study finds that the implementation of the PNdD would result in a reduction of the normalized cost of electricity and, with this, in a reduction on electricity rates.
[2] CNFL (2023). Caso de negocio – Calderas Eléctricas, 2023.
[3] CNFL (2023). Estimates based on the projects for the electrification of the public bus service, replacement of combustion boilers for electric ones and smart metering of CNFL: 17,581 tCO2e (transport electrification); 6,439 tCO2e (electrification of industrial equipment) and 148 tCO2 (smart metering)

- Mobilize at least USD 673.95 million of public, private and MDBs' capital for the development of initiatives covered by the CIF-REI.

- These expected results will contribute to meet the following SDGs: gender equality (5); access to affordable, clean energy (7); industry, innovation, and infrastructure (9); reducing inequalities (10); climate action (13); and partnerships for the goals (17).

1.4. Program criteria, priorities and budget

The IP will prioritize projects assessed and defined by the GoCR with the assistance of the MDBs, which fall into one or more of the categories determined by the CIF-REI Program[4], as detailed below:

- **Enhancing infrastructure to be renewable energy ready.** Accelerating the deployment of smart meters will advance the digitization, modernization, and automation of grids, monitoring, and management of electricity demand, and facilitate active grid management and NRES integration to meet the growing demand for electricity. This will enable the prompt identification and management of grid events, minimize energy losses, optimize grid capacity, and provide distribution companies and consumers with detailed information on their consumption. Additionally, the availability of data offered by smart meters provides opportunities to develop applications that empower consumers and promote more efficient energy use.

- **Enhancing system and market design and operation.** The digitization of grids through the implementation of outage control systems (OMS), distribution management systems (DMS), geographic identification systems (GIS), supervisory control and data acquisition (SCADA), and meter data management (MDM) systems will enable greater responsiveness and efficiency in the operation of electric grids, helping to optimize performance, improve quality of service, facilitate predictive maintenance, and enable the integration of NRES and storage. These systems play a crucial role in the transformation and modernization of power grids for the benefit of the general population.

- **Scaling up renewable energy enabling technologies.** Scaling up will take place through new business models that drive greater private participation in the electrification processes from key sectors such as transport and industry. The deployment of charging infrastructure for the public bus service and the replacement of industrial combustion equipment with electric ones will accelerate the adoption of innovative decarbonizing technologies in the sectors most dependent on fossil fuels and major GHG generators in Costa Rica. Given the country's electricity generation matrix, these technologies will result in a direct reduction in GHG emissions and additional electricity demand to be supplied by NRES, as presented in the PEG 2022-2040.

- **Promoting a just energy transition.** The proposed investments include inclusive gender and diversity actions, such as greater, more effective integration of women into the workforce in the energy and transportation sectors, which are at the core of Costa Rica's decarbonization strategy, and their access to electricity. Training will be provided on areas such as energy management, electric transport, and electric industrial equipment.

[4] CIF-REI Program Design Document, Table 2.

Eligible projects will need to: (i) justify the need for concessional resources; (ii) demonstrate contributions to the PNdD or other plans and national policies, GHG emission reductions. and to a just and inclusive energy transition; (iii) demonstrate the integration of climate risk assessment and ensure a resilient infrastructure; (iv) demonstrate the potential contribution to advance the integration of NRES into Costa Rica's electricity matrix; and (v) comply with the environmental and social standards of the MDBs.

Costa Rica's IP for the CIF-REI requires an indicative budget of USD 70 million (USD 67 million in concessional financing and USD 3 million in non-reimbursable technical assistance): The plan is expected to mobilize at least USD 673.95 million, representing a 1:9.6 ratio, from MDBs, private banks, Costa Rican National Bank (BNCR) and Popular Bank (BP) and other local public and private sources of funding and financing. The GoCR decided that, due to the current fiscal debt limits, the financing obtained for the IP will not be sovereign guaranteed. The plan is expected to be implemented over 6 years between 2024 and 2030. The IP has two components:

Component 1: Smart grids and flexibilization of the national electricity system. Aims to finance investments in projects to accelerate the process of digitalization, modernization, and automatization of electricity grids. This component seeks to mobilize USD 172.45 million as follows: USD 18.3 million from CIF-REI concessional financing, USD 62.7 million from MDBs, and USD 154.15 million from other public and private investment sources (electricity companies, local banks, and private investment).

Component 2: Electrification of energy uses. Seeks to finance investments for the electrification of energy uses in public transportation with the installation of charging stations and the replacement of industrial combustion equipment with electric alternatives. To achieve this, it intends to mobilize resources for USD 568.5 million through: USD 48.70 million in concessional financing from the CIF-REI, USD 57.30 million from the MDBs; USD 30 million from the Green Climate Fund (GCF)[5], and USD 432.5 million in public and private investment.

In addition to the investments under components 1 and 2, Costa Rica seeks USD 3.0 million in non-reimbursable technical assistance (NTA), distributed as follows: (i) USD 2 million for mainstreaming the gender perspective and social inclusion in all projects developed under both components; (ii) and USD 1 million for technical and financial feasibility studies for projects submitted for the replacement of combustion equipment, and for capacity building to engage and support the banking sector in the analysis and screening of projects. By adopting sustainable financing principles and practices, banks can play a critical role in financing the energy transition.

[5] The GCF for electromobility in Latin America and the Caribbean was approved on July 20, 2022.

2. COUNTRY CONTEXT

2.1. Social and economic context

Costa Rica is considered a small country with an area of 51,179 km^2 and a population of 5.15 million people. It is classified as an upper-middle income country and since 2021 it has been part of the Organization for Economic Cooperation and Development (OECD), which has prompted it to undertake reforms and adopt best practices that could favor its economic and political transformational capabilities[6].

The country has a long history of environmental protection and an intense agenda of promoting equitable sustainable development that places it at the global forefront in these matters. Actions in these areas have enabled it to reverse the rate of deforestation so that it now has more forest cover (59%)[7] than in the 1980s (21%)[8]. In the electricity sector, the country has reached groundbreaking milestones that include an extensive network coverage – 99.4% of the population has access to electricity service – and an electricity generation based on renewables which, in 2022, allowed it to meet 99% of the electricity demand with these sources.

However, the country faces significant energy, social, economic, and environmental challenges. In terms of energy, the total energy matrix maintains its dependence on fossil fuels, which contribute 65% to the national energy demand[9], mainly for automotive transportation, which demands 54% of energy and the industrial sector, which demands 21% of energy, generating 41.6 and 8.9% of total GHG, respectively[10].

Additionally, the country faces the complex task of integrating new renewable sources (wind and solar) into an electricity system that is already almost entirely renewable, while continuing to make progress on the accessibility and affordability of electricity service. Further integration of NRES will allow diversification of the electricity matrix, which is 75% dependent on hydroelectric generation. The system's reliance on renewable sources, particularly hydroelectric plants, makes energy security especially vulnerable to climate change.

Furthermore, the COVID-19 pandemic led to a deepening of economic and social challenges. Despite a rapid recovery in 2021, when economic growth reached 7.8%, driven mainly by exports generated by foreign direct investment, a poverty rate of 14.3% persists, higher than the pre-pandemic rate of 13.7%, and an unemployment rate of 10.6%[11]. There are also external pressures such as high international fuel prices and restrictive conditions for external financing, reflected in high costs and reduced availability of resources[12], which could jeopardize economic growth, climate actions and decarbonization efforts.

Public finances also suffered due to efforts to mitigate the impact of the pandemic. In 2021, Costa Rica faced fiscal challenges with high levels of public debt and the need to strengthen the country's finances.

[6] BTI Transformation Index 2022. Costa Rica Country Report
[7] Programa Estado de la Nación [PEN] (2021). Sexto Estado de la Región 2021, San José, Costa Rica.
[8] Sader, S. y A.T. Joyce (1988).
[9] Secretaría de Planificación del Sector Energía (SEPSE), 2022
[10] Ministerio de Ambiente y Energía [MINAE] (2021). Inventario de Gases Efecto Invernadero y Absorción de Carbono 1990-2017, San José, Costa Rica. pp 56
[11] Instituto Nacional de Estadística y Censos (INEC). Encuesta Continua de Empleo (ECE) para el I Trimestre 2023.
[12] https://www.bancomundial.org/es/country/costarica/overview#:~:text=Un%20s%C3%B3lido%20desempe%C3%B1o%20econ%C3%B3mico%20en,en%20cuatro%20d%C3%A9cadas%20en%202020.

However, the approval of fiscal reforms[13] and efforts to improve the efficiency of public spending resulted in a forecasted budget surplus of 1.5% of the gross domestic product (GDP) for 2023[14].

In February 2019, Costa Rica outlined the country's decarbonization path in the PNdD, which is based on the development of ten transformation pillars, of which the sustainable mobility and public transportation, low-emission industrial sector, and cost-competitive renewable electric energy pillars stand out the most.

In this context, access to concessional financing with favorable terms and costs for the adoption of technologies that allow a greater integration of renewable sources into the electricity matrix, the electrification of energy uses, as well as the adoption of innovative and decarbonizing technologies will allow the country to advance along the path of a just and inclusive energy transition.

2.2. Socioeconomic context of women and diverse groups[15]

The Latin America and the Caribbean region has made progress towards gender parity since 2017, where Costa Rica, Nicaragua and Jamaica register the highest parity scores in the region[16]. Despite the progress achieved, gender gaps persist in Costa Rica. In terms of education, women's education level was 12.3 years in 2019, higher than the 10.0 years recorded for men. In the same year, 51.8% of women had completed higher education studies compared to 28.4% of men. According to the State of Education Report (*Informe del Estado de la Educación*) published in 2019, based on data from public universities, gender gaps persist in some subject areas. In STEM degrees (science, technology, engineering, and mathematics) only 20% of those enrolled are women. In director and management positions, female representation, although growing, is relatively low (36.8%). Similarly, the presence of women in typically male positions is still very low. Women working as STEM professionals represent 29% versus 71% of men while those working as technicians represent 37% versus 63% of men. At the same time, 51% of women and 49% of men occupy administrative positions[17].

However, the fact that women are better educated has not translated into higher labor force participation. In April 2023, male labor participation was 68.9% compared to 43.5% for women[18]. When compared to other countries in the Latin America and the Caribbean region, the female labor participation in Costa Rica is much lower than the average for countries like Brazil, Chile, Colombia, Mexico, and Peru. The differences are particularly pronounced among professional and technical workers. Stagnating female labor force participation rates in Costa Rica over the past decade are more surprising given a pronounced increase elsewhere in Latin America during this period.

In the energy sector, only 12.2% of women work in electricity, gas, and water service companies in Costa Rica, well below the regional average of 20.9%[19]. On the other hand, although the wage gap between women and men has narrowed, women still receive 87.1% of men's salaries[20]. In terms of

[13] Among these actions the approval of Law 9635 de Fortalecimiento de las Finanzas Públicas del año 2018, stands out.
[14] Contraloría General de la República [CGR] (2022). Situación y perspectivas fiscales del Gobierno de la República para el 2023.
[15] It considers diverse groups: indigenous peoples, people of African descent, people with disabilities, LBGTQ+ population, as well as youth and migrants.
[16] Global Gender Gap Report 2023, Insight Report June 2023, World Economic Forum.
[17] National Household Survey, INEC, 2018.
[18] INEC (2023). Encuesta Continua de Empleo al tercer trimestre de 2020: Resultados Generales. Instituto Nacional de Estadística y Censos. San José, Costa Rica: INEC, 2020.
[19] Hub de Energía, IDB Junio 2023
[20] IICE (2023). Informe del mercado laboral IV 2022. Universidad de Costa Rica.

entrepreneurship, women are predominantly located in the micro and small business sector, and most are not legally incorporated, so they do not have access to credit.

Results from a survey conducted by the Public Services Regulatory Authority (ARESEP) in 2021[21], show that 95% of the women surveyed perform household chores while 44% perform caretaking tasks for people who depend on them. Almost 70% claimed to have little or no knowledge of how electricity tariffs are calculated.

One potential explanation for Costa Rica's relatively low female labor force participation rates is its status as a middle-income country. When a country is poor, women work out of necessity, mainly in subsistence agriculture or home-based production. As income rises, activity shifts from agriculture to industry, where jobs are further away from the home, which makes it is more difficult for women to juggle their responsibilities for home production and children with a market job.[22] Results from an analysis using microdata from a household survey[23] in the country shows that higher educational attainment, ownership of cell phones and computers, and living in an urban area are positively and significantly associated with higher female labor force participation. Being married has a negative and significant association with female labor force participation, as do the presence in the household of young children and the elderly.

In relation to STEM occupations, a study using data on occupations by gender for Costa Rica, El Salvador, and Mexico[24] in recent years shows significant gender gaps. Based on its results, both men and women without children are more likely to work in STEM occupations than those with young children, which suggests that young children represent a bigger barrier to enter STEM occupations for women than for men. One interpretation of this finding may be that STEM occupations are very demanding and time consuming and, given that women tend to be responsible of household chores, very few of them can afford to work in these occupations when they have young children at home.

Female lower labor force participation in STEM areas is not only explained because of women being mostly in charge of household chores but also because of existing conscious and unconscious biases about women's aptitude and ability in technical fields, prejudices and gender roles installed in society that make women opt for traditional female careers with less economic and social recognition with consequent lower quality and low paid jobs. These biases affect the entire career experience, from recruitment to performance evaluation, salary levels, mentoring and career development opportunities.

Higher female labor force participation could help raise productivity and spur growth in Costa Rica, given women's high levels of education. It could also help mitigate the impact of a shrinking workforce in the face of forthcoming demographic pressures. Indeed, Costa Rica has the highest life expectancy among Latin American and Caribbean countries (79 years versus 75 years for the region as a whole), and as a

[21] Survey carried out at the national level with cooperation from the World Bank to measure Access conditions, use and consumption of water and energy services.

[22] "The U-shaped Female Labor Force Function in Economic Development and Economic History." NBER Working Paper 270, Goldin, Claudia, 1994, National Bureau for Economic Research, Cambridge, Massachusetts.

[23] Drivers of female labor force participation in Costa Rica: microdata results from 2012. Women Work, and Economic Growth, Leveling the Playing field -Chapter10B Costa Rica", Anna Ivanova, Ryo Makioka and Joyce Wong, International Monetary Fund, 2017.

[24] Gender Gaps in STEM Occupations in Costa Rica, El Salvador and Mexico, David Cuberes, Florencia Saravia, Marc Teignier, InterAmerican Development Bank, November 2022.

result, the percentage of Costa Ricans ages 65 and above is expected to double from 6.5 percent in 2010 to 14.1 percent by 2030[25].

Among a total of 650,000 female-headed households in the country, more than 44% live in a quality deficit housing unit[26]. In terms of access and use of energy, Costa Rica lacks adequate information disaggregated by sex[27]. In a survey carried out in 2021, 100% of women declared to have access to electricity, 43.3% to fuels and 41.7% to gas[28].

In the transport sector: (i) 56.7% of women use public buses, 51.7% taxi service, 8.3% use trains, and 6.7% take ferries, mostly to go to work (66.7%)[29]; (ii) women represent only 29.3% of the total number of people with a driver's license in the country; (iii) a 87.9% of men use of private vehicles compared to 49.7% of women; (iv) in terms of public transport - bus mode - there are approximately a total of 8,000 drivers from whom only 10 are women; (v) there is no participation of women in governance or operational positions related to cargo transport; (vi) 28.6% of women feel unsafe in public transport, a higher percentage than men[30].

According to the United Nations, 36% of women in Costa Rica have experienced physical and/or sexual partner violence at least once in their lifetimes. In 2018, Costa Rica declared violence against women a "national emergency." From 2010 through 2020, the country averaged 133 daily requests for protection against a domestic abuser; the majority corresponded to women facing or fearing violence from a male partner, spouse, or family member.[31] Moreover, women experience non-inclusive behaviors at work and may are still not report them to their employers. According to a survey carried out by Deloitte in the country in 2023, 44% of participants reported experiencing harassment and/or microaggressions in the workplace over the past year.

Furthermore, 18% of Costa Ricans have some type of disability. By age group, of the total number of people with disabilities, 49.7% are between 36 and 64 years old, followed by the 65 and over age group with 32.3%, while 18% are people between 18 and 35 years old. Nearly 53% of the total number of people with disabilities are in quintiles I and II[32], that is, 40% of the households with the lowest incomes account for slightly more than half of the population with disabilities. Only 5.7% of people with disabilities aged 18 and over receive a formal education and 43.6% have a job or are looking for one[33].

Eight percent of the country's population is of African descent, and there are eight native or indigenous peoples that make up 2.4 percent of the population: *Bribris*, *Cabécares*, *Malekus*, *Chorotegas*, *Huetares*, *Ngabes*, *Bruncas* and *Terrabas*. Moreover, due to the lack of statistical data, the LGTBQ+ population is estimated to be between 3 and 7%, which is the estimate for the Latin American and Caribbean region.

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[25] "Women Work, and Economic Growth, Leveling the Playing field -Chapter10B Costa Rica", Anna Ivanova, Ryo Makioka and Joyce Wong, International Monetary Fund, 2017.

[26] National Household Survey, 2022.

[27] Gender and Climate National Action Plan, Ministry of Environment and Energy, INAMU, PNUD, September 2023.

[28] Survey on the perception of public services carried out by ARESEP and the World Bank, 2021.

[29] Survey on the perception of public services carried out by ARESEP and the World Bank, 2021.

[30] My transport: gender analysis for the transport sector in Costa Rica, Gabriela Cob, 2018.

[31] Obervatorio de violencia de genero contra las mujeres y acceso a la justicia. Poder Judicial, Costa Rica https://observatoriodegenero.poder-judicial.go.cr/index.php/soy-especialista-y-busco/estadisticas/violencia-domestica

[32] Quintiles of household gross per capita income, considering that the first quintile is comprised by the 20% of households with the lowest income, and the last quintile is comprised by the 20% with the highest income.

[33] Instituto Nacional de Estadística y Censos de Costa Rica. https://inec.cr/multimedia/enadis-2018-la-discapacidad-costa-rica

To achieve a just and inclusive energy transition, it is necessary to strengthen and implement actions that allow the inclusion of more women and diverse groups in initiatives of the energy, transportation and industry sectors that consider training and creation of employment opportunities and that promote the development of productive activities associated with the process of electrification of energy uses, among others. To this effect, the IP includes an indicative budget of USD 3 million in non-reimbursable technical assistance for mainstreaming the gender perspective and social inclusion in all projects financed with CIF-REI resources.

2.3. Current state of energy generation, transmission, and distribution systems

Costa Rica's electricity sector stands out for its focus on generating electricity from renewable sources, making it an international benchmark in this area. In 2022, 99% of demand was met by these sources. Costa Rica has also achieved high rates of access to electricity throughout the country with a national electricity coverage rate of 99.4%.

2.3.1. Generation

The main sources of electricity generation in Costa Rica are hydroelectric, geothermal, wind, solar and biomass (Table 1). In 2022, the SEN had an installed capacity of 3,440 MW composed mainly of renewable generation sources with a production of 12,592 GWh. The national electricity demand was 11,855 GWh with the remaining energy exported to the Regional Electricity Market (MER).

Table 1. Installed Capacity of the National Electric System 2022

Source	MW	%
Hydroelectric	2330,5	67,7
Wind	390,2	11,3
Thermoelectric	380,9	11,1
Geothermal	262,66	7,6
Bagasse	71	2,1
Solar	5,4	0,2
Total	3440,7	100

Source: ICE (2022). Informe anual de generación y demanda, 2022

In power generation, the Costa Rican Electricity Institute (ICE), an autonomous state-owned company, is the dominant player. ICE is the main company of the ICE Group, which includes the National Power and Light Company (CNFL). In 2022, ICE Group accounted for 72% (2,318 MW) of the total installed generation capacity and provided an equal proportion of the total energy produced (9,069 GW).

The Law 7200 (1990), and its amendment, Law 7508 (1995), allow private generation for sale exclusively to ICE and as of 2022 it contributed 19.3% (2,434 GWh) of total generation and 18.8% of the system's capacity (647.9 MW). The legislation establishes that private electricity generation must come from renewable sources, limits the size of private generation plants to a maximum of 50 MW, and restricts the amount of energy sold to ICE to 30% of the installed capacity of the SEN. In addition, total equity of private generation companies must be at least 35% Costa Rican.

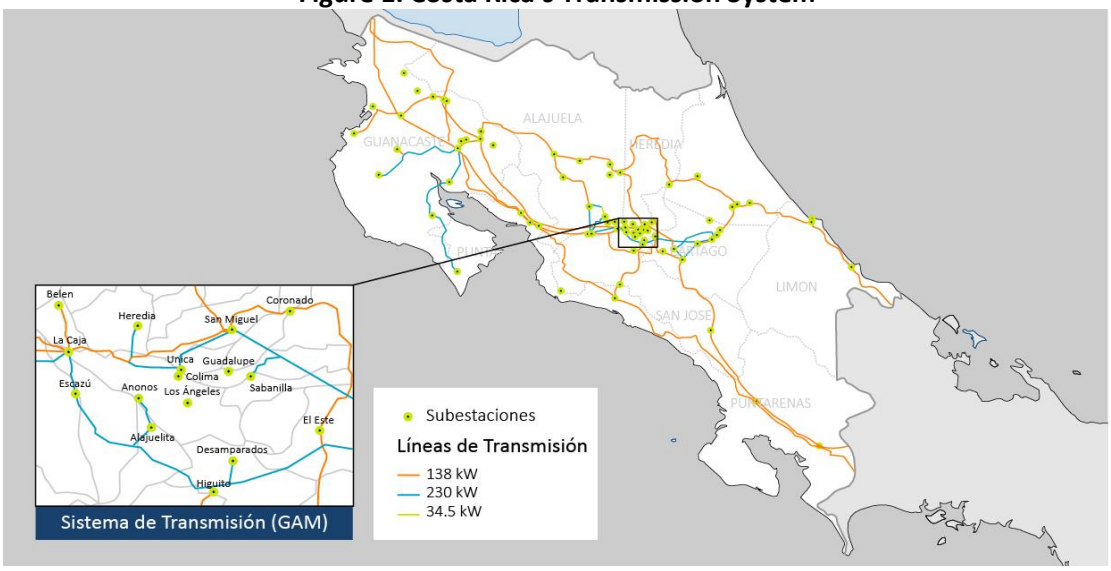
Similarly, Law 8345 (2003) authorized the participation of distribution agents in electricity generation, and by 2022 they contributed 8.7% (1,089 GWh) of total generation and 9.2% of the SEN's capacity (316.1

MW). The distribution companies must allocate the energy they produce to the users in their own distribution networks (according to their geographic areas of coverage), or they can sell the excess energy to ICE or among themselves.

2.3.2. Transmission

The transmission network is planned, expanded, and operated by ICE, which holds the monopoly for this activity. The transmission system consists of 2,986 km of high-voltage lines, 5,240 towers and 69 substations[34]. Private generators that sell energy to ICE do not pay for the use of the transmission system but must undertake the construction of the interconnection line to the access point. The Costa Rican system is integrated with the Central American Electrical Interconnection System (SIEPAC), which interconnects the electricity grids of six Central American countries. In 2022, the country exported 774 GWh through this system and imported 54 GWh[35] from the Regional Electricity Market.

Figure 1. Costa Rica's Transmission System



Source: ICE (2023). PEG 2022-2040

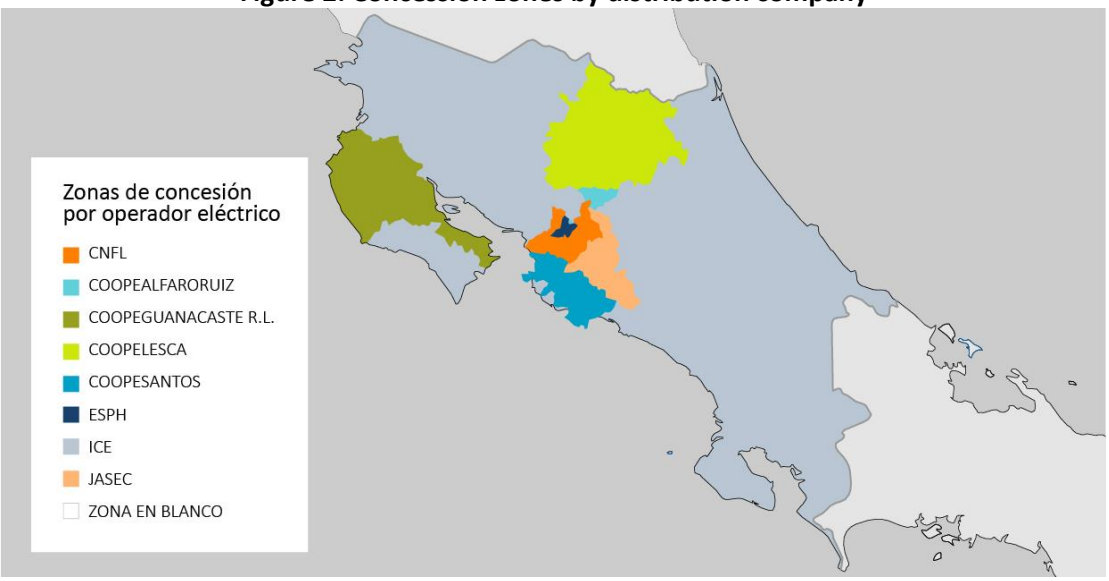
2.3.3. Distribution

The country has a total of 1,915,926 customers who are served by eight (8) distribution companies. Each distribution company has a specific geographic concession area (Figure 2) in which its customers are captive.

The distribution companies are: (i) ICE and CNFL (ICE Group) covering 76% of users; (ii) two municipal companies, Cartago Electric Service Management Board (JASEC) and Heredia's Public Services Company (ESPH), covering 11%; and (iii) four cooperatives, Alfaro Ruiz Rural Electrification Cooperative (COOPEALFARORUIZ), Guanacaste Rural Electrification Cooperative (COOPEGUANACASTE), San Carlos Rural Electrification Cooperative (COOPELESCA) and Los Santos Rural Electrification Cooperative (COOPESANTOS), which are grouped in the National Consortium of Electrification Companies of Costa Rica (CONELÉCTRICAS) and cover 13% of users. All distribution companies are not-for-profit entities which operate under the at-cost-service principle.

[34] ICE (2022). Plan Expansión de Transmisión, 2022 – 2040.
[35] ICE (2023). Informe Anual, Generación y Demanda 2022. División Operación y Control del Sistema Eléctrico, 2023.

Figure 2: Concession zones by distribution company



Source: ARESEP (2023). Atlas de servicios públicos regulados.

2.4. National and international climate strategies and plans, including status of NDCs

Costa Rica has a broad set of instruments that are coherently interconnected, shaping and strengthening the country's vision and commitments on climate action. Among these instruments are:

- **National Strategic Plan 2050 (PEN).** The PEN provides a guide for long term public policy planning that will be conducive to sustained and equitable growth, with equal opportunities, prepared for global changes, climate-resilient, decentralized, digitalized, and decarbonized. It is built upon three pillars: (i) social, aimed at reducing poverty and increasing inclusion; (ii) economic, seeks economic growth through diversification, decentralization, productivity, and innovation; (iii) environment, it looks to reduce carbon emission in high emitting sector, such as, transport, and CO2 absorption. Three major engines of change for decarbonization are considered in the PEN: (i) increased production of renewable energy to meet future demand; (ii) reduced fossil fuel dependency in transport; and (iii) expand and preserve carbon sinks through management of forests, mangroves, and farmlands.

- **National Decarbonization Plan 2018 - 2050 (PNdD).** The PNdD is a comprehensive strategy designed to drive the transition to a zero net carbon, climate change resilient and just economy. The plan commits the country to becoming a decarbonized economy with zero net emissions by 2050, a goal that is aligned with the objective of limiting global warming to 1.5°C. The PNdD includes actions in 10 areas, which include, notably: (i) promoting the electrification of public and private transportation; (ii) consolidating a national electricity system capable of supplying and managing renewable energy at a competitive cost for users; and (iii) modernizing the industrial sector through the application of sustainable and more efficient electrical processes. Beyond concrete goals and actions to combat climate change, the PNdD proposes a new model of equitable development based on the production of goods and services: decarbonized, digitalized and decentralized through the production of electricity. The PNdD was submitted to the United

Nations Framework Convention on Climate Change (UNFCCC) as the country's Long-Term Strategy under the Paris Agreement.

- **The Nationally Determined Contribution 2020 (NDC).** The country commits to an absolute maximum net emissions by 2030 of 9.11 million CO2 equivalent (MtCO2e) including all emissions and all sectors covered by the National Emissions Inventory. The largest contribution is expected to come from transportation, which accounts for 54% of energy consumption, through improved infrastructure, increased efficiency, and electrification. The transport sector should contribute up to 7.4 MtCO2e (39.3% of the GHG reduction), while the industrial sector could contribute up to 2.6 MtCO2e (13.8% of the GHG reduction) [36]. Consequently, the decarbonization of energy uses, particularly in transportation and industry, as well as technologies that allow a greater integration of renewables in the country's energy matrix, that will allow it to meet the additional demand arising from this electrification with renewable sources, is essential.

  Additionally, the country commits to a net emissions budget in the period 2021 to 2030 of 111.34 MtCO2e including all emissions and all sectors covered by the National Emissions Inventory[37].

- **Costa Rica's National Policy on Climate Change Adaptation, 2018 - 2030 (PNACC).** The PNACC seeks a development model that guarantees the Costa Rican society's climate resilience. It includes a climate adaptation action plan built on four pillars: (i) knowledge management and strengthening of capacities and resilience conditions; (ii) adapted public services and resilient infrastructure; (iii) adapted and eco-competitive productive systems; and (iv) investment and financial security for climate action.

- **National Action Plan on Gender Equality in Climate Action (PGCC).** The PGCC creates a governance and management mechanism for the promotion, implementation, monitoring, accountability, evaluation and updating of its work areas and actions. The coordination and supervision of the PGCC's progress and updates are assigned to the MINAE and the National Women's Institute (INAMU), together with the governing entities in the sectors prioritized in the PGCC, and with input from local governments and regional planning mechanisms.

- **National Development and Public Investment Plan, 2023 - 2026 (PNDIP).** The PNDIP's goals in the environment and energy sectors are to improve the country's energy intensity and the use of renewable energies through energy efficiency, the deployment of smart grids, the electrification of the energy matrix and bioenergy, as mechanisms to advance in the reduction of GHG emissions.

- **VII National Energy Plan, 2015 - 2030 (PNE).** The plan contemplates a strategic and unified perspective of the electricity and transportation sectors, as key sectors for the process of climate change mitigation and adaptation, as well as for the decarbonization of the economy. It provides guidelines regarding energy efficiency, electricity demand management, promoting the development of distributed energy resources (DER) and self-consumption of electricity, reducing polluting emissions in the transportation sector, and modernizing the vehicle fleet, among others. The PNE was updated in 2019[38] to respond to the guidelines of the PNdD and of the National Electric Transport Plan 2018 - 2030 (PNTE).

[36] BID (2020). Costos y beneficios de la descarbonización de la economía de Costa Rica.

[37] https://cambioclimatico.go.cr/contribucion-nacionalmente-determinada-ndc-de-costa-rica/principales-elementos-de-la-ndc-2020/

[38] MINAE (2019). Plan Nacional de Energía, 2015 – 2030 – Informe de cierre de periodo, 2015 – 2019

- **National Transport Plan 2011 - 2035 (PNT).** The plan arranges investments in the transportation sector in ports, airports, highways, railroads, and public transportation until 2035, and establishes guidelines to achieve a more efficient and lower cost transportation sector. The PNT includes concrete actions to advance in the sectorization of public bus transportation in the GMA that reorganize and rationalize the transportation network to reduce vehicle congestion, its cost, and GHG emissions.

- **The National Electric Transport Plan, 2018 - 2035 (PNTE).** This seeks to transform the sector's model by promoting its transition to sustainability through electrification based on the country's renewable electricity matrix. A zero-emission automotive transportation is a requirement for the decarbonization of the economy, as it is the main source of pollution in the country, producing 41.56% of GHGs. The PNTE sets ambitious goals for public transportation – by 2035, 70% of buses and taxis will be zero-emission, while 100% of light vehicles will be zero-emission by 2050. In addition, transport electrification will reduce noise and air pollution, particularly in urban areas where road congestion is the highest.

- **The National Strategy for Smart Electric Grids, 2021 - 2031 (ENREI).** This sets the goal of having a consolidated 100% digital electric grid by 2026 as a necessary complement to the country's transition to a decarbonized economy. Smart grids are the critical enabler for the adoption of new technologies and innovations in the electric grid, the incorporation of more NRES as a complement to a system that already operates from variable renewable sources, the fostering of efficiency and affordability of the service, the achievement of universality and the empowering of citizens through their proactive participation in the system.

- **Sustainable Development Goals (SDGs).** The SDGs are linked to the strategic areas and projects of the PNIDP. In relation to SDG 7 - Affordable and Clean Energy, Costa Rica has achieved 99.4% coverage of the population and 99.3% renewability of electricity generation. The PNIDP includes a description of PPPs in the country and a list of projects expected to be implemented under this modality and highlights the contribution of these projects to achieving certain SDGs[39].

2.5. Current status and expected contribution from the energy sector to the NDC target

The latest NDCs monitoring report, the fourth national communication issued in December 2021, reported emissions and removals for the year 2017[40]. According to the report, total net emissions in that year amounted to 11,509 MtCO2e[41], of which the energy sector in Costa Rica is responsible for 55.1%, mainly from transportation.

The country has set a goal of reaching a maximum of 9,110 MtCO2e emissions by 2030. By 2050, the transportation and industrial sectors are expected to contribute significantly to the transformations required for the decarbonization[42] as follows:

[39] CEPAL (2023). América Latina y el Caribe en la mitad del camino hacia 2030: avances y propuestas de aceleración.
[40] MINAE (2021). IV Cuarta Comunicación Nacional – CMNUCC.
[41] Without the contribution of the forestry and land use (FOLU), total emissions reach 14.407 MtCO2e.
[42] BID (2020). Costos y beneficios de la descarbonización de Costa Rica.

- Improved infrastructure, greater efficiency, and electrification of transportation. The transport sector is expected to make the largest contribution to GHG reduction with 39.3% of the GHG decrease.
- Transformation of the industrial sector through efficient and sustainable processes and technologies using energy from renewable or cleaner sources. It is projected that the industrial sector could contribute up to 13.8% of the GHG reduction.

2.6. Gap/barrier analysis

Costa Rica ranks 26th among the 115 countries considered in the World Economic Forum's Energy Transition Index. In Latin America, it is topped only by Uruguay[43]. Despite having achieved 99% renewable electricity generation, the country's total energy matrix relies heavily on fossil fuels, mainly for transportation and industry. The country must make investments to achieve the electrification of transportation (which contributes to about 54% of energy demand and depends on fossil energy sources), and in the electrification of the industry, particularly of equipment that uses combustion technologies. At the same time, to meet this new demand, the country needs to invest in renewable electricity generation infrastructure, equipment and smart grid systems that enable grid management, monitoring, and demand control to make the service more efficient and allow the addition of NRES.

In this context, the following challenges and gaps were identified:

- Digitalization of electricity grids. By 2022, 29.7% of users in Costa Rica had smart meters installed[44]. With support from the IDB, smart metering has allowed the collection of information on load curves to structure tariffs that assign the costs of service provision to the different electricity customer (residential, commercial, industrial) according to their use of the electricity system. This permitted the design of time-of-use tariffs that respond to the level of demand of the system, and prepaid tariff. Despite the progress made, companies in the sector need to make significant investments to reach the 100% goal of smart metering coverage by 2026 as established in the ENREI, which will allow further progress in the structural modernization of electric service rates and the implementation of the new tariffs in companies which are yet to implement them.

- Progress in the installation of smart meters must be complemented with monitoring, network management, demand control, and data analysis systems to enable distribution companies to make efficient use of electric grids and address the growth in demand generated by the electrification of energy uses. Currently, only the ICE Group has an advanced metering infrastructure (smart meters, communication equipment, among others) and information and network management systems (SCADA) that partially cover its concession area. Therefore, it is necessary to allocate resources to expand the deployment of systems to achieve the ambitious grid digitalization that the country has set out to achieve.

- New technologies for electrification of energy uses. The electrification of the country's private and public transportation is advancing. Pilot programs for electric buses have been conducted, and promotional electricity rates have been established to charge electric buses at the service provider's facilities. Although the operating and maintenance costs of electric buses are 5 times lower compared to diesel buses, the high cost of the units and of the investment needed for the construction and the

[43] World Economic Forum [WEF] (2021). Fostering Effective Energy Transition. Insight Report, April 2021.

[44] Meters with remote reading and disconnection capabilities. The total rises to 45.1% when automatic reading meters are considered. ARESEP (2023). Report on the Quality of Electricity Supply 2022.

adaptation of the necessary charging infrastructure[45] for their operation constitute a barrier to the adoption of the technology. It is necessary to provide enabling financing conditions to encourage private participation through the development of business models that promote a rapid transformation towards electric mobility in public transportation.

- With respect to the electrification of industrial processes, boilers that currently operate with bunker and other fuels that could be replaced by electric equipment, were identified in private and public entities. Currently a differentiated electricity tariffs was established for these replacements[46]. However, it is necessary to provide enabling financing conditions and support through financial and technical feasibility analyses to replace current equipment with electric ones, in which the banks could play a key role in facilitating private sector participation.

- Enabling financing. The increasing cost and limited availability of financing for energy transition initiatives, and the country's fiscal situation, curtail the possibilities of undertaking climate action measures, which slows down progress and may compromise the progress already achieved by the country[47]. In addition, the lack of in-depth knowledge and understanding of financial institutions regarding the financing of new business models for the energy transition reduces the availability of financing. Access to concessional financing and technical assistance can help overcome the barriers of cost, time, knowledge, and perceived risk that accompany the adoption of new technologies. Likewise, a greater participation of local private banks under conditions that facilitate private sector participation, adapting terms to the life cycle of new equipment (electric vehicles[48], charging stations, electric boilers, among others) and reducing financing costs, would eliminate barriers to business sector participation and facilitate its key role in the massification of the transformations required for the inclusive and just energy transition to which the country aspires. The inadequate structuring of financing projects for the adoption of new technologies can become a barrier to finance these initiatives. NTA funds assigned for the technical and financial validation of the projects can bridge this gap.

[45] GIZ (2021). Results of the electric bus pilot project in the GAM identified a barrier in the absence of electrical infrastructure for the installation of chargers on the bus operators' premises.

[46] The high-voltage direct customer tariff (T-UD) was enabled for the electrification of decarbonizing processes that provide incremental demand in accordance with Executive Order 43366-MINAE of January 2022.

[47] IRENA indicates that, challenges faced by developing countries in mobilizing capital existed before the pandemic, but have intensified due to problems accessing financing, limited public and private investments and meeting debt service obligations. In addition, high financing costs represent a major barrier to scaling up investments in the energy transition. Prime rate in the United States stands today at 8.50% compared to 5.25% in 2019. In Costa Rica the average interest rate offered by private banks to the electricity sector is currently 9.69%.

[48] GIZ (2021). Although electric buses proved to have an operating cost 5.1 times lower than internal combustion units, their adoption faces barriers such as a high initial investment, which is between two and three times the investment in internal combustion units, and a long payback period.

3. RENEWABLE ENERGY INTEGRATION CONTEXT

3.1. Electric sector overview

Public investment in energy infrastructure is currently limited by fiscal constraints. It is estimated that energy infrastructure requires an additional USD 5.8 billion in investment to meet the needs to achieve the goal of zero net carbon emissions, for which private investment is key.

Since 2013, electric power companies began investing in smart metering. According to ENREI, by the end of 2026, 100% of users should have smart meters installed. The major advances that electric companies have achieved in smart metering are mainly in the ability to remotely read data, integration with the distributor's GIS, disconnection and reconnection functions, and meter theft and tampering detection capabilities. Other functions, such as sending information to customers about their consumption patterns, fault notification, time-of-use rates, and the availability of prepaid billing show less progress.

The features that are lagging in Costa Rica are related to the use of meters to integrate user demand management. For example, facilitating demand participation to reduce peaks, taking advantage of time-of-use rates, direct control of flexible loads or connectivity of meters with building management systems, among others. It is estimated that the growth in demand for the coming years will be met mostly by NRES, but distributed energy resources will also be an important part of the energy transition.

In this context, it is essential to identify financing alternatives under concessional conditions to advance in the digitalization and transformation of electricity grids for greater efficiency of the system that will result in lower costs, and consequently, lower tariffs that will benefit consumers and the country's competitiveness, considering that all other components of the tariff remain unchanged.

3.2. Institutional framework

In Costa Rica there are several institutions dedicated to policy formulation, planning, regulation, and operation of the energy sector. The steering role of the energy sector falls on MINAE, which is responsible for the formulation of public policies, sector plans and other guidelines that lead the development of the sector and ensure alignment with national policies issued by the Executive Branch.

ICE is responsible by law for the national electricity supply in the short and long term. It is also responsible for preparing the sector's generation and transmission expansion plans. The generation expansion plan is the main planning instrument for investments in the national electricity system and is prepared every two years, favoring renewable energy sources. Currently electricity demand increased 3% in 2022 and the generation expansion plan 2022-2040 estimates a long-term energy demand growth of 1.6% per year. As a result, demand is expected to increase from 11,855 GWh in 2022 to 14,254 GWh in 2030[49]. As indicated, an additional demand of 40.5 GWH per year is expected to result from the implementation of this IP.

The Electric System Operations and Control Division (DOCSE) of ICE is responsible for coordinating the dispatch of SEN generation assets to meet the electricity demand throughout the national territory and for operating the transmission grid. ICE is currently the only national agent authorized to operate in the MER and for coordinating operations with the Regional Operating Agency (EOR).

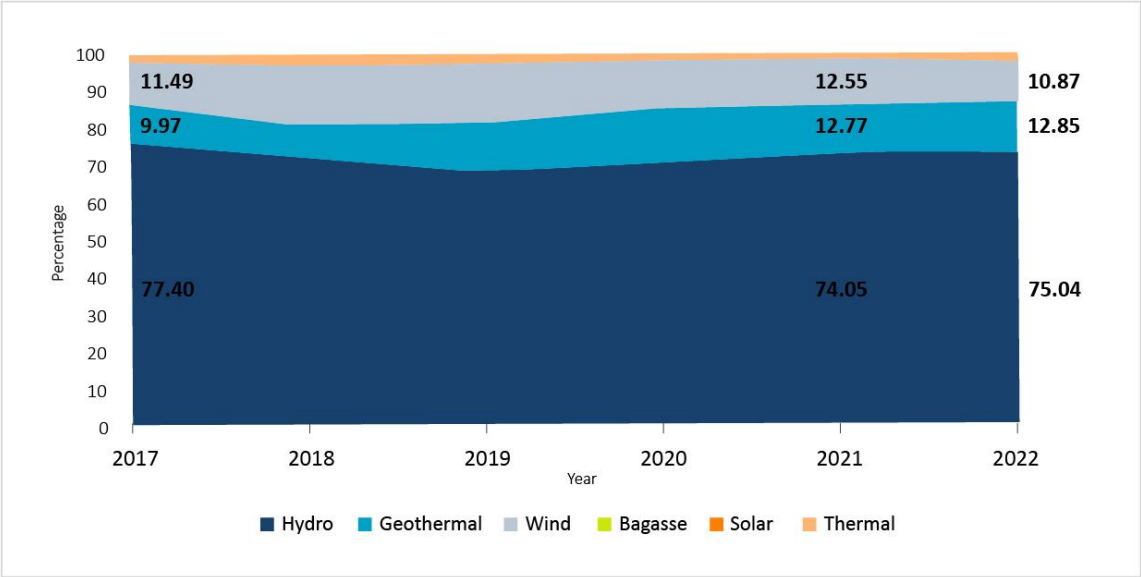
[49] ICE (2023). Plan de Expansión de la Generación 2022. Escenario base

ARESEP is the public entity in charge of regulating the electricity sector in Costa Rica. ARESEP sets generation, transmission and distribution tariffs and oversees the quality of service for the well-being of all citizens. Its objective is to guarantee efficiency, transparency, and sustainability of the electricity market.

3.3. In-depth analysis of country's renewable generation portfolio

In the last five years, Costa Rica exceeded 99% renewable electricity generation. Hydroelectric sources stand out among the energy sources. In 2022 they contributed 75.04% of the energy produced in the SEN, followed by geothermal (12.85%), wind (10.87%), bagasse (0.44%), solar (0.06%) and thermal (0.73%), which is used to back up the entire system[50].

Chart 1. Costa Rica: Gross electricity generation by source, 2017 – 2022 (percentages)



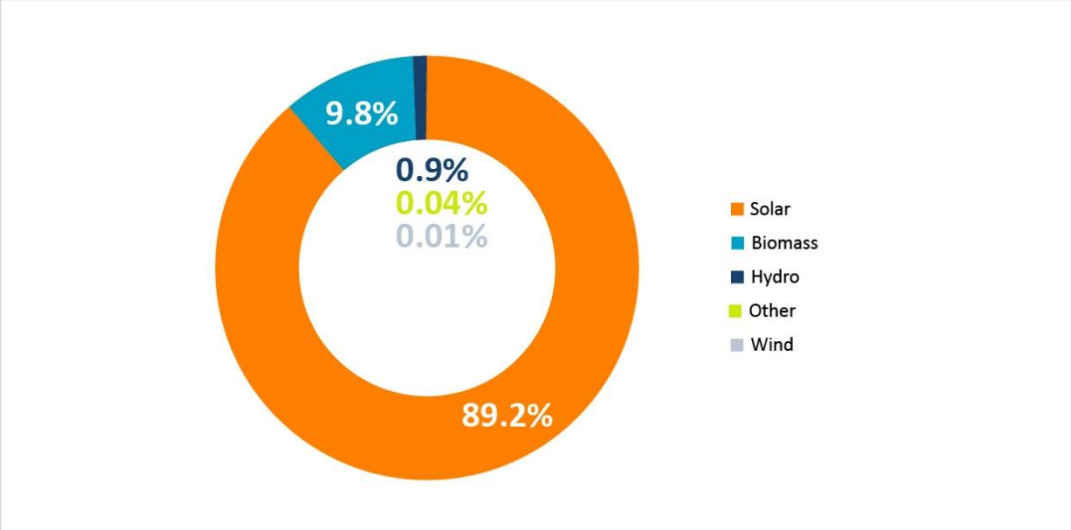
Source: Prepared with data from ICE

Given the prevalence of variable renewable sources in the SEN, particularly hydro and wind sources, electricity generation depends, to a large extent, on weather conditions that determine the rainfall and wind pattern. The growth in demand, both organic and that originating from the electrification of energy uses, must be satisfied with renewable generation to avoid resorting to thermal generation that would lead to regressions in the decarbonization path.

Moreover, although small-scale distributed energy resources still represent a small portion of the country's nominal installed capacity, they are experiencing rapid growth, so their impact on the SEN must be considered. As of July 2023, there is an installed distributed energy resources capacity of 95.6 MW. DER also have the potential to positively impact the SEN by providing energy at times of high demand during the day, as well as in the months of low rainfall, but of high solar radiation. In Costa Rica 89.2% of installed DER systems are solar of photovoltaic technology. Hence, it is important to have information systems that accompany the advanced metering infrastructure to enable the addition of these resources to the system in a way that strengthens it, making it more resilient, stable, and efficient.

[50] ICE (2023). Informe Anual, Generación y Demanda. División Operación y Control del Sistema Eléctrico 2022, 2023.

Chart 2. Costa Rica: Installed capacity of DER by type (in percentages), 2021



Source: Prepared with data from MINAE (2022).

The country has advanced in the adoption of legal and regulatory instruments, such as Law 10086 to Promote and Regulate Activities Related to Access, Installation, Connection, Interaction and Control of Distributed Energy Resources from Renewable Energy Sources (2022), and other legal and regulatory instruments explained in section 3.5, as well as with the deployment of smart metering infrastructure and grid reinforcement, which enable the incorporation of DER so that their potential benefits in support of the energy transition process can be reaped while reducing system costs.

3.4. National low or zero carbon energy strategies

As mentioned in section 2.4, the country's decarbonization and climate action efforts are interlinked by the PNdD's cohesive framework, which sets emission reduction targets, the NDCs, as well as the following complementary instruments:

- National Transport Plan, 2011 - 2035 (PNT).
- VII National Energy Plan, 2015 - 2030.
- Costa Rica's National Policy on Climate Change Adaptation, 2018 - 2030 (PNACC).
- National Electric Transport Plan, 2018 - 2035.
- National Strategy for Smart Electric Grids (ENREI), 2021 - 2031.
- National Development and Public Investment Plan (PNDIP), 2023 – 2026

3.5. Institutional and capacity, legal framework, and regulation

Costa Rica has a broad set of legal, policy and regulatory instruments related to its energy transition strategy, decarbonization and the incorporation of NRES to the SEN, including the following:

- **The Law for the Regulation of the Rational Use of Energy (Law 7447 of 1996) and its reform Law to Incentivize the Development and Use of Renewable Energy Sources (Law 8829 of 2010)** which establish tax incentives for the importation of solar heating and photovoltaic equipment.

- **The Law of the Regulatory Authority of Public Services (ARESEP) (Law 7593 of 1996) along with the reforms introduced by the Law for the Strengthening and Modernization of the Public Entities of the Telecommunications Sector (Law 8660 of 2008)** established criteria such as social equality, environmental sustainability, energy conservation and economic efficiency as elements to be considered in the setting of tariffs and prices for public services. Furthermore, they determine that ARESEP will be subject to the National Development Plan, the corresponding sector plans and policies issued by the Executive Branch.

- **The Law on Incentives and Promotion of Electric Transport (Law 9518 of 2018) and its amendment via Law 10209 (2019).** The law introduced economic and non-economic incentives to promote private electric mobility in the country; conditions to favor the acquisition of electric vehicles in the public sector; provisions to encourage the required investments, particularly in charging stations, to promote electric transportation; requirements for the replacement of the bus fleet with electric units and the financing of electric transportation within the framework of the Development Banking System (SBD).

- **Law 10086 to Promote and Regulate Activities Related to Access, Installation, Connection, Interaction and Control of Distributed Energy Resources from Renewable Energy Sources (2022).** This legal instrument provides a clear framework for the participation of distributed resources in the SEN so that they provide value in the form of efficiency, resilience, and reliability. Notably, it determines the mechanisms for the purchase and compensation of surplus energy that is produced by distributed resources and incorporated into the SEN.

  This law is complemented by a series of reforms and regulatory instruments issued to establish an enabling framework for the integration of distributed resources to the SEN, among these:

  - Technical Regulation of Ancillary Services in the National Electric System (AR-RT-SASEN)[51].
  - Tariff Methodology for the Remuneration of Ancillary Services in the National Electric System (SASEN)[52].
  - Tariff methodology for distribution grid access rates as an addition to the ordinary tariff methodology for the electric energy distribution service provided by public operators and electrification cooperatives.
  - Tariff methodology for setting interconnection, access and surplus purchase and sale charges for the integration of distributed energy resources[53].
  - Establishment of the prepaid tariff (T-RP) for electricity distribution companies[54].

3.6. Role of private sector, innovation, and leverage of resources

It is estimated that the implementation of the PNdD could bring net benefits of USD 41 billion to the country's economy by 2050. To achieve these benefits, investments of USD 10.3 billion in the public and private transport sector, USD 2.2 billion in the industrial sector and USD 700 million in the electricity

[51] Approved on November 26th, 2019, through resolution RE-0140-JD-2019.
[52] Approved by the Executive Board on August 17th, 2021, through resolution RE-0195-JD-2021. It replaces the methodology approved through RJD-119-2018.
[53] ARESEP (2023). RE-0076-JD-2023.
[54] ARESEP (2023). RE-0127-IE-2020, for ICE and RE-0046-IE-2023, for other distribution companies.

system[55] are needed. In the post-pandemic context with reduced availability and high financing costs, a concerted effort of the private and public sector is required to promote these investments.

The private sector must play an increasing role in the energy transition by incorporating new technologies and innovation in the formulation of enabling business models. Its participation is critical for the massification of decarbonizing technologies and to mobilize capital to complement the efforts of the GoCR and achieve national objectives in this area. In addition, national financial institutions and international development banks and agencies should support these efforts through financing structures adjusted to the investment needs, under favorable conditions and with technical assistance that boosts the mobilization of capital for the acquisition of the necessary technologies.

Electricity distribution companies have projects for the installation of advance metering infrastructure that would help create the conditions for the incorporation of NRES. Financing these projects, in times of high interest rates and scarce availability of resources, is a limiting factor for their success and underlines the role that climate funds, multilateral banks, international development agencies and national banks should play to facilitate access to resources under favorable conditions that allow the development of these projects.

Although some distribution companies have moved forward with advanced metering infrastructure projects with their own capital and financing from local banks, additional concessional resources are still required to accelerate the deployment of this technology, as well as to complement it with the acquisition and installation of information and dynamic network management systems to enable the introduction of additional NRES.

Furthermore, the business sector must also play a central role in the process of adopting new technologies, especially in areas such as electric mobility and the electrification of industry. In terms of electric mobility, the replacement of internal combustion units with electric ones has the potential to generate the greatest positive impacts in terms of GHG reduction with a total avoided emissions of 7.4 MtCO2e by 2050, more than the reductions estimated for any other sector[56]. To make these benefits a reality, the sector also requires the highest level of investment of all the actions contemplated for the decarbonization process.

In the case of public bus services, there are proposals that incorporate innovative business schemes through PPPs in which the joint efforts of the public sector (electricity supplier and charging services) and the private sector (bus service provider and capital) will allow, in a first stage, the introduction of an estimated 185 electric buses by 2030. Public bus service in Costa Rica is provided by private companies under a public service concession, so investments to transform bus fleets must come from the private sector that can receive a strong boost by the proposed charging infrastructure in this IP.
The electrification of energy uses in the industry is another area in which the participation of the private sector is fundamental. A total of 628 industrial combustion boilers have been identified that could be replaced by electric equipment through a scheme that integrates, under national energy and decarbonization plans[57], actions by the public sector, the private industrial sector, the national

[55] BID (2020). Costos y Beneficios de las Descarbonización de la Economía de Costa Rica.
[56] BID (2020). Costos y beneficios de la descarbonización de la Economía de Costa Rica.
[57] Guidelines from axis 6 of the PNdD for the transformation of the industrial sector through processes and technologies that use energy from renewable or other efficient and sustainable low- and zero-emission sources, as well as, among others, N°006-2019-MINAE, which calls on public institutions to replace combustion boilers with electric boilers.

commercial banking sector, and the regulatory agency[58] to promote the replacement. It is estimated that the first stage of the substitution process would increase annual electricity demand by 19,197 MWh in 2030, requiring an additional renewable generation capacity of 35 MW, as well as financing of USD 45 million, which could be channeled through commercial banks or through direct financing to companies under conditions that allow them to overcome the main barriers to the adoption of the new technology. CNFL estimates indicate that this process could attract complementary private capital in the amount of USD 200 million.

Private sector participation in energy transition initiatives, and the need to integrate NRES faces barriers such as: (i) reduced availability of financial resources for the purchase of equipment by private companies; (ii) high capital costs necessary to finance the acquisition of equipment, particularly for small and medium-sized companies with limited financial resources and knowledge; (iii) lack of technical knowledge for the preparation and formulation of projects; and (iv) the perception of greater business risk for the adoption of new technologies. Concessional financing, technical assistance, and appropriate financing timeframes for this type of investment may favor private sector investment in these initiatives.

3.7. Complementary activities with other development partners

Costa Rica is developing multiple initiatives for the promotion of renewable energies that have the support of international banks and development agencies. The most relevant initiatives in this area are summarized below. Annex 4 provides more details on the actions contemplated in these initiatives.

German Agency for International Cooperation (GIZ): III Climate Action Project. This program includes the implementation of the project "Electric Mobility in Special Sectors" which aims at developing roadmaps for the promotion of electric transport in the tourism, light-duty transport, student, and worker transport sectors. This program also includes a project to update, expand and improve Costa Rica's national energy policy indicators.

Inter-American Development Bank: The IDB and IDB Invest have been supporting Costa Rica's energy transition process through policy, investment, and technical assistance operations, including the following:

- Policy-Based Lending (PBL): Towards a Green Economy – Support for the National Decarbonization Plan I and II (CR-L1142 and CR-L1147): The project's objective is to support the country's gradual transition to net zero GHG emissions by 2050 through policies that support the implementation of reforms focused on strengthening the management and monitoring of climate action in Costa Rica, preserve and restore high carbon ecosystems, replace GHG emitting agricultural practices, and promote the use of electricity in transportation and industry, particularly electromobility and public transportation.
- Conditional Credit Line for Investment Projects (CCLIP) with ICE: First Renewable Energy, Electricity Transmission and Distribution Program (CR-L1070). The specific objective of the first loan under CCLIP is to increase the supply of electricity based on renewable energies through the construction of two geothermal plants, as well as the modernization and digitalization of the transmission and distribution network. This includes new resilient technologies and smart grids. The credit line contributes to sustaining the high share of renewable energies in the country's electricity generation matrix.

[58] Enabling the application of the tariff for direct high voltage customers (T-UD) to the electrification of decarbonizing processes that provide incremental demand in accordance with Executive Order 43366-MINAE of January 2022.

- Technical assistance to support ARESEP in the calculation of the technical reference tariff for generation, transmission, and distribution, as well as in the modernization of the tariff structures of the electricity distribution systems of Costa Rica's public, municipal and rural electrification cooperatives (CR-T1219).
- Technical assistance to support the development of the National Hydrogen Strategy towards a decarbonized economy (CR-T1239). The country already has a National Hydrogen Strategy, which will serve to position it at the international level on the issue of green hydrogen and will also serve to support the PNdD, reverse the growth of GHG emissions, and promote economic development and job creation.
- IDB Invest provides support for the country's energy transformation through funding for the financial sector to increase the number of green projects in its portfolio, complemented with technical assistance to the private sector. It also designs and implements innovative financing structures related to sustainability, such as the international bond linked to sustainability with Liberty Costa Rica[59].

World Bank Group: The WB and IFC have also supported Costa Rica's energy transition and decarbonization process. The main activities currently under implementation are:

- Third Development Policy Loan (DPL) - Fiscal and Decarbonization Management (P177029): Program objectives include laying the foundation for a post-COVID-19 recovery by promoting green growth and low-carbon development.
- Technical assistance aimed at greater energy sector efficiency (potential reforms of the SEN and fuel subsidies policies), greater electrification of the economy (CIF Technical Assistance Facility on electromobility), and greater integration of renewable energy (support in the design of the regulatory framework for optimizing the integration of distributed energy resources, including energy storage systems).
- IFC has supported the growth of financing portfolios for small and medium-sized enterprises (SMEs) seeking financing solutions for the acquisition of hybrid electric vehicles (HEVs) and/or electric vehicles (EVs). The objective is to provide companies with longer-term financing allowing sustained long-term supply of financing and leasing.
- IFC has supported the country's efforts to expand the transportation ecosystem based on green hydrogen technologies. Currently, IFC is part of an international consortium that was awarded Nationally Appropriate Mitigation Actions 2 (NAMA2) funding to conduct preliminary studies to validate green hydrogen technologies for transportation in Costa Rica.
- IFC, through its alliance with the Central American Council of Regulators of Banking, Central American Council of Financial Regulators (CCSBSO), the Dutch Entrepreneurial Development Bank (FMO) and the Norwegian Investment Fund (Norfund) supports Costa Rica in: (i) identification of benchmarks of best practices in green taxonomy, government initiatives, regulators, private institutions and international voluntary frameworks; (ii) defining the position of the General Superintendence of Financial Entities (SUGEF); (iii) development of a green finance taxonomy guide; (iv) internal and external review of the guide by priority stakeholders; and, (v) adapting the guide to three of the participating superintendencies. The development of green financial markets would require moving forward with the taxonomy and increased awareness of banks and investors.

U.S. Department of State: Technical Assistance for the Development of Clean Energy and Governance, Decarbonization, Reliability, Resilience, and Integration of the Electricity Sector in Central America. The

[59] Liberty is a Costa Rican telecommunications company, owned by Liberty Latin America.

project aims to develop national capacities on smart grids, as well as to improve the current regulations for awarding concessions for power generation projects.

4. PROGRAM DESCRIPTION

The concessional resources of the IP will enable a higher participation of the private sector and public companies in decarbonization initiatives by: (i) reducing financial and technical barriers for the development of infrastructure and adoption of systems that enable an effective and efficient integration of a growing volume of NRES; (ii) reducing financial and technical barriers for the electrification of energy uses in transportation and industry; and, (iii) fostering a greater interaction users-grid through the provision of value-added services, savings, and service efficiency with equity principles to promote a just transition while maintaining the sustainability of the system in a cost-efficient manner.

The CIF-REI concessional resources will complement investments made in the country through private and public investments and will help catalyze additional investments both with reimbursable and non-reimbursable financing, to support Costa Rica's transition to a decarbonized economy.

The CIF-REI resources will be executed through two components by the IDB Group and the World Bank Group, channeling resources directly to companies or via intermediation of private banks, as shown in the following section. It is estimated that the MDBs will contribute equally to each of the components.

4.1. Proposed interventions

Component 1: Smart grids and Flexibilization of the Electricity System (CIF-REI: USD 19.3M; MDBs: USD 62.7M; ICE GROUP: USD 53.5M; Banking and private investment: USD 38.0M). Costa Rica's SEN plays a fundamental role in the decarbonization process through the electrification of activities and meeting the additional demand that arises from this process with the addition of NRES. To this end, the grids must advance in the process of deploying advanced metering systems that allow dynamic management of the grid and provide flexibility to incorporate these NRES, also making the SEN more resilient and efficient by reducing operating costs and implementing time-of-use and prepaid tariffs that improve the use of the resource. See Annex 5.

The resources of this component will be used to digitalize the electric grids, enabling conditions for the introduction of additional generation from NRES in the SEN to attend the organic demand growth and the new demand for electricity from the electrification of the transport and industry. The investments in advanced metering infrastructure will help reduce service costs by improving efficiency and accelerating the economy decarbonization process.

The concessional resources of the CIF-REI, together with resources from the MDBs and the private sector, will be channeled via credit lines in private banks or directly financing companies for the installation of smart meters and systems. This will improve the effective and efficient management of the electricity grid to make it automatic and flexible to allow for the integration of additional electricity generation from NRES to meet the incremental demand for electricity from the electrification of energy uses and the development and implementation of applications that empower users in their interaction with the grid.

This component includes actions to ensure social and gender inclusion to foster the development of a just and inclusive energy transition process. As an incentive, in order to access concessional resources, priority will be given to public and private companies that: (i) promote social inclusion and women's participation in the labor force of non-traditional sectors such as energy; (ii) encourage professional training, the participation of women and diverse groups in leadership programs and in STEM technical careers; (iii)

include gender equality and social inclusion perspectives in their human resources policies; (iv) conduct courses or workshops on labor market inclusion of persons with disabilities; (v) conduct public consultations to increase women, diverse groups, and members of local communities participation in decision-making processes; and (vi) favor the formalization of the electricity service in informal settlements under the name of women to empower them and improve their access to the service.

Furthermore, the Non Reimbursable Technical Assistance resources from the CIF-REI will be used to promote gender equality and social inclusion, as well as empowering women and people from diverse groups by: (i) promoting the inclusion of gender and diversity perspective across the implemented projects; (ii) fostering small businesses and enterprises led by women and people from minority groups; (iii) strengthening women and minority groups capabilities in energy management; and, (iv) promoting women and minority groups participation in the labor force of companies in the sector and in the proposed initiatives. Capacity building activities for the use of AMIs will include training of trainers in the use of AMIs, and themes related to efficient household energy use, tariff structures, pre-paid tariffs, clear understanding of electricity bills and customers rights will also be included to promote women and people from diverse groups employment in activities such as customer service in operations centers and customer service to contribute to the efficient use of energy and reduction of service costs. These capacity building activities will guarantee that trainees understand topics such as consumer rights, knowledge on how to read an electric invoice, and activities to change habits and beliefs on electricity use. The trainees will teach on domestic use of AMIs to women and members of vulnerable group who use high consumption appliances, such as washing machines, and on how to better manage the electricity consumption. These actions will be developed in coordination with the implementing and financing entities and will incorporate the considerations of the entities specialized in the matter at the national level.

Expected results[60]:

- Accelerate the deployment of advanced metering infrastructure in electricity distribution[61] companies by installing724,000 additional smart meters by 2030 (37% of the total number of users), achieving 67% of coverage.

- Improve the use of grid resources through economic signals such as time-of-use tariffs, prepaid schemes, and promotion of electric mobility through time-of-use rates that facilitate the charging of electric vehicles in homes.

- Reduce service costs through the improvement of management efficiency, energy efficiency, losses reduction, and NRES incorporation. A reduction of USD 1.2 million per year[62] in service operation costs is expected upon completion of the program.

- Empower customers through applications that enable grid interaction and improved access to electricity and value-added services (e.g., prepaid and time-of-use tariffs) for vulnerable populations, including women, low income and diverse groups.

[60] Estimated outcomes are indicative, as final results will depend on the implementation of the specific projects.
[61] In line with the PNIP (2023 – 2026), the VII PNE 2015 – 2030 (PNE) and the ENREI.
[62] Reduction of costs due to avoided cost from manual readings manual reconnection and disconnection, the formalization of connections, and other cost savings and increase revenue.

- Accelerate the transition to a decarbonized, resilient, and inclusive development model through metering systems digitalization and smart grid management for the SEN to incorporate additional NRES to meet an incremental demand of 40.5 GWh per year and an additional generation capacity of 71 MW required for the interventions proposed in this component.

- Mobilize USD 172.45 million from a combination of private capital, concessional, and MDBs to boost the deployment of smart grids and flexibilization of the SEN.

- Advance in the fulfillment of the following SDGs: gender equality (5); access to affordable, clean energy (7); and reducing inequalities (10).

Component 2: Electrification of energy uses (CIF-REI: USD 50.70M; MDB: USD 57.30M; ICE GROUP: USD 33.00M; GCF: USD 30M; Private Investment: USD 399.50M[63]). The reduction of GHG emissions required to meet the NDC commitments, as well as the goal of a zero net emissions economy by 2050, requires the transformation of Costa Rica's energy sector. In particular, it requires the decarbonization of the transportation sector, the main contributor to GHG emissions, which is expected to contribute 54% of the GHG reductions contemplated in the NDC, as well as significant contributions from the industrial sector, which would contribute 14% of the reductions foreseen in that plan[64]. In the case of Costa Rica, the decarbonization of both activities will be based on their electrification to take advantage of the country's 99% renewable electricity generation. To achieve these goals, the country needs to make significant investments in both sectors. See Annex 5.

CIF-REI resources for this component will be executed through operations aimed at: (i) Installation of charging stations and network reinforcement for the provision of electric buses charging services, improving transport electrification; and (ii) replacement of combustion equipment by electric equipment, improving electrification of the industry. These actions support the decarbonization process of the transport and industry sectors, the main sources of GHG emissions in the country. Both initiatives are expected to combine private and public efforts through public-private partnerships.

The concessional financing from the CIF-REI, and the resources from the MDBs, will be channeled directly to companies through loans or through financial intermediaries to create credit lines for the private and public sector. The CIF concessional resources are expected to accelerate these investments.

In order to promote gender equity and social inclusion, priority will be given to those companies that: (i) have gender and social inclusion action plans and human resources policies that take into account the needs of women and diverse groups; (ii) adopt a gender and social inclusion criteria and include suppliers led by women and/or minority groups in their value chain; (iii) deliver targeted trainings on STEM areas and adopt policies (such as mentorship programs and internships) to attract and retain female and diverse talents; (iv) provide training to women and diverse groups on issues related to the use of renewable energy, construction, and transportation, among others. In addition, the following actions will be promoted: (i) training women and people diverse groups to develop technical and socio-emotional skills to obtain driver's licenses, especially in the case of public transportation; (ii) conducting a communication campaign and promoting employment for women and people from diverse groups as drivers of public transportation units, such as electric buses; (iii) provide training to drivers for the prevention and response to violence against women and diverse groups; and, (iv) provide services with a gender and social inclusion

[63] Estimated leverage in financing and private capital for the development of the projects.

[64] Besides GHG reduction, the electrification of energy uses in the industry has other benefits, including, facing-out bunker and imported fuel, lower fuel storage and transportation costs, lower fire risks, less maintenance.

approach such as electric charging stations in safe and well-lit areas, buses with cameras and facilities for universal access; among others. CIF-REI's non reimbursable technical assistance will support these actions to promote women and diverse group's participation in the decarbonization process.

The CIF-REI concessional funds will serve as a catalyst for private sector participation in the decarbonization process by reducing the perceived cost and risk of adopting new technologies. As a mechanism to support the process of replacing GHG-emitting equipment in the industrial sector, the CIF-REI is also expected to provide NTA funds to review feasibility studies for the replacement of combustion boilers and other industrial equipment and validate its replacement, as well as to prepare the banking system to take advantage of opportunities in financing these energy transition initiatives.

Expected results[65]:

- Accelerate the electrification of transport by providing charging infrastructure for 185 electric buses in the Greater Metropolitan Area (GAM) between 2024 and 2030, representing an additional annual demand of 21.3 GWh to be supplied with 36 MW of incremental renewable generation capacity.

- Accelerate industry electrification through the replacement of combustion industrial equipment (boilers and heat pumps, among others) for electric ones with an annual demand of 19.2 GWh, requiring the addition of 35 MW in renewable generation capacity[66].

- Advance NDCs and PNdD targets by avoiding emissions of 11,142 tCO2e and 6,439 tCO2e per year[67], resulting from the introduction of electric bus units and electric boilers and other industrial combustion equipment.

- Contribute to the massification of electromobility solutions through innovation in business models with the participation of private capital in the amount of USD 399.50 million.

- Provide capacity building and involve the banking system to address financing opportunities in the electrification of energy uses.

- Progress in meeting the following SDGs: affordable and clean energy (7), industry, innovation, and infrastructure (9); and climate action (13); and partnerships for the goals (17).

4.2. Supported activities

The CIF-REI funding will support the development of the following activities in Costa Rica. Details of expected results, indicators and relative targets are presented in Section 8, as part of the Integrated Results Framework (IRF):

4.2.1. Smart grids and flexibilization of the electricity system

The CIF-REI resources will be allocated to initiatives that complement national efforts for the deployment of infrastructure and equipment necessary to achieve the goals of digitalizing the networks through the

[65] Estimated outcomes are indicative, as final results will depend on the implementation of the specific projects.
[66] CNFL (2023). Caso de negocio – Calderas Eléctricas, 2023.
[67] CNFL estimates.

deployment of smart metering in the country, adoption of real-time network management systems, as well as the development of interfaces that facilitate the interaction of users with the network. These investments will increase the efficiency of the electricity system, its resilience, democratize generation by facilitating the incorporation of NRES and reduce the cost of service to promote a just energy transition.

In this Component 1 activity, the CIF-REI concessional financing will complement the ongoing and planned projects of the electricity distribution companies for the purchase and installation of 724,000 smart meters and complement these initiatives with the development of applications that enable users to interact with the network, empowering them to implement consumption efficiency measures through time-of-use rates, prepaid rate schemes, load management services, and utility metering. In particular, time-of-use tariffs for improved management of grid resources by providing economic signals to users that allow them to use electricity at hours of lower cost (e.g., nighttime due to lower demand), which in turn will reduce consumption peaks in the electricity system, delaying investments and the need to rely on fossil fuels generation. They also contribute to the adoption of electric mobility by providing reduced nighttime rates for residential vehicle charging. Prepaid rate schemes provide an additional mechanism to control consumption, reduce losses for electric companies, and improve access to service for low-income and vulnerable populations, including women.

Due to the high renewability of the SEN, which is based on variable sources subject to high variability and exposed to the risks associated with climate change, the concessional support of the CIF-REI is key to complement the initiatives currently being developed in the country, including the ongoing modernization of the of the hydrometeorological network to improve weather forecasts. This together with smart metering could be integrated into the digital system to allow for renewable energy production and demand side management making the SEN more flexible, resilient and efficient.

4.2.2. Transport electrification

Combustion vehicles contribute with 41. 6% of the country's GHG emissions. Therefore, in the context of an almost entirely renewable electricity system, its electrification has a great potential to reduce GHG emissions and is a central part of the decarbonization strategy. The transportation sector is also the sector that requires the greatest levels of investment to comply with the PNdD.

In this area, the CIF-REI concessional financing will promote transport decarbonization through the installation of charging stations for the introduction of around 185 electric buses in the first stage, which will avoid an estimated 11,142 tCO2 emissions per year by 2030.

For the electrification of public buses, the country aims to implement an innovative business model within the framework of a public-private partnership that will mobilize financing from the local private sector and the GCF (already approved for Costa Rica), to promote the transition to an electric bus service, thereby contributing to one of the most significant actions for decarbonization and the well-being of the population. The electricity distribution companies will build the necessary infrastructure to expand and strengthen the networks to provide the charging service. The private sector will manage the service, the procurement of the units and the recharging stations. To support these efforts, the GoCR is working on the establishing a fund to provide financing for the acquisition of public buses.

Health costs associated with heavy traffic, car accidents and motor vehicle pollution are estimated to impose an annual burden of USD 5 billion on Costa Rican society[68]. The electrification of transport will reduce emissions, associated costs of internal combustion vehicles and the Country's dependence on imported fossil fuels.

Investments under this component will support the provisions of the PNT regarding public bus transportation, which will initiate the process of redesigning the electric bus public transportation system in the GAM and promote a more efficient service in line with the PNdD. Also, as established in the PNACC, infrastructure needs to be climate resilient. The charging infrastructure will consider the flood risks around the metropolitan area and consider off-grid alternative electricity supply. Communities that are targeted for support under the program could include those that are particularly vulnerable to climate change impacts.

4.2.3. Industry electrification

Through this activity, equipment that runs on fossil fuels will be replaced with electric equipment. A total of 628 private and public industrial boilers, such as those in hospitals, among others, have been identified for replacement with electric units. The CIF resources will allow for the initiation of the first stage of the process (to 2030), which covers approximately 5% of the total equipment identified. The initiative can be scaled up to the rest of the identified market, as well as to other GHGs emitting equipment such as industrial furnaces, heat pumps, among others.

The substitution of these equipment will avoid 6,439 tCO2e emissions per year mainly in urban areas, with a high impact in improving the population's wellbeing due to the high concentration of pollution and the use of this equipment in those areas.

[68] BID (2020). Costos y beneficios de la descarbonización de la economía de Costa Rica.

5. FINANCING PLAN AND INSTRUMENTS

5.1. Requested budget envelope for investments

This section presents the financing plan, including costs and sources of funding, proposed for the implementation of the initiatives contemplated in Costa Rica's CIF-REI program. The requested indicative CIF-REI budget for Costa Rica is USD 70 million, corresponding to USD 67 million in concessional financing and USD 3 million in non-reimbursable technical assistance and it's expected to mobilize USD 673.95 in co-financing for a 1:9.6 leverage ratio. IDBG and WBG financing will be provided in equal parts for both components. At this moment, the financing operations to be carried out as part of the IP are expected to be managed through IDB Invest and IFC. The financing operations to be carried out as part of the IP will not be subject to the sovereign guarantee of the GoCR; therefore, the resources will be managed through IDB Invest and IFC.

The following table details the components, uses, and sources of financing for Costa Rica's IP for the CIF-REI program:

Table 2: Indicative financing plan for Costa Rica's IP for the CIF-REI program (USD million)

		FINANCIAL RESOURCES						
		CIF-REI (through MDBs)		Leverage				
Components		Private Banks or MDBs	NTA (MINAE)	MDBs	ICE Group	GCF	Private Investment, Private Banks, and other financial institutions	Component Subtotal
1	***Smart grids and flexibilization of the electricity system***	***18.30***	***1.00 (1)***	***62.70***	***53.45 (2)***	***-***	***38.00***	***173.45***
2	***Electrification of energy uses***	***48.70***	***2.00***	***57.30***	***33.00***	***30.00***	***399.50***	***570.50***
	i. Transport electrification	*23.70*	*1.00 (1)*	*37.30*	*33.00*	*30.00*	*399.50*	*524.50*
	ii. Industry electrification	*25.00*	*1.00 (3)*	*20.00*	*-*	*-*	*-*	*46.00*
Subtotal		*67.00*	*3.00*	*120.00*	*86.45*	*30.00*	*437.50*	
		70.00		**673.95**				
TOTAL		**USD 743.95M (USD 67M concessional + USD 3M NTA + USD 673.95M MDBs and others)**						

(1) NTA for mainstreaming the social inclusion and gender approach in all projects developed with CIF-REI financing.
(2) IDB loan (CR-L1070) for investments to strengthen the advanced metering network.
(3) NTA to review technical and financial feasibility studies to substantiate the change of equipment and educate the banking system to meet these financing opportunities.

5.2. Costs and sources of funding

The concessional resources of the CIF-REI, as well as the NTA, will be executed in equal parts by the IDB Group and the WB Group, through private financial intermediaries, the BNCR and the BP, or through direct loans to companies.

Component 1: Smart Grids and Flexibilization of the Electricity System (CIF-REI: USD 19.3M; MDBs: USD 62.7M; ICE GROUP: USD 53.5M; Private Banking and Private Investment: USD 38M). The CIF-REI financing will be equally executed by the MDBs, and it will serve to accelerate smart grid deployment projects, infrastructure, and smart metering systems, complementing the capital provided and the financing secured by those companies. BNCR and BP are currently supporting initiatives in this area with USD 38 million in financing. The CIF-REI financing executed by the MDBs will complement, reduce the cost of infrastructure deployment, and align repayment periods to accelerate the deployment of smart metering infrastructure and information systems for grid management and monitoring, as well as applications that provide an interface between users and the grid. The recipients of the funding available through this IP will be public entities or privately owned public utility entities that meet the eligibility criteria set forth in section 1.4.

ICE is currently executing a USD 134.5 million loan from the IDB that includes projects to strengthen and make the SEN more flexible, including the purchase and installation of smart metering equipment (USD 53.5 million), as well as network reinforcement, acquisition of network management systems, strengthening of the hydro-meteorological network and the dynamic capacity of the monitoring network.

Non-Reimbursable Technical Assistance resources in the amount of USD 1 million will be executed by the IDBG and WBG for mainstreaming the gender perspective and social inclusion in all projects developed under this component.

Component 2: Electrification of energy uses (CIF-REI: USD 50.7M; MDB: USD 57.3M; ICE GROUP: USD 33.0M; GCF: USD 30.0M; Private Investment: USD 399.5M). The resources from the CIF-REI for this component will be equally executed by the MDBs. The CIF-REI concessional financing will be the catalyst for the installation of charging stations and network reinforcements for the provision of charging services for electric vehicles and the replacement of combustion equipment, such as boilers, with electric ones.

Investments in charging stations for electric buses will mobilize private investment of USD 23.7 million, as well as MDBs' financing of USD 37.3 million. This initiative could be leveraged with resources from the GCF, already approved for Costa Rica, for up to USD 30 million for the acquisition of the buses. The electrification of transportation is expected to be accompanied by additional co-financing of USD 33 million from ICE Group and attract private investment of USD 399.5 million in other transportation projects (e.g., electric cargo train, electric passengers' train).

As part of this component, the MDBs will provide private banks with a platform to share best practices and develop the knowledge necessary to direct investments and loans to companies and projects that support decarbonization. In addition, financial sector resources will be mobilized to expand their sustainable portfolios and promote competitive sustainable growth solutions. Finally, the implementation of the green taxonomy, currently under development, will be supported, particularly in sectors relevant to the proposal such as energy, transportation, and manufacturing.

Non-Reimbursable Technical Assistance resources in the amount of USD 2 million, will be executed by the IDBG and WBG for mainstreaming gender and social inclusion in all projects developed under this component. This includes actions for the participation of women and diverse groups in the operation and maintenance of electric buses, the preparation of technical and financial feasibility studies to validate the change of equipment, and training the banking system to address financing opportunities in the

electrification of energy uses. This will allow the participation of women and diverse groups in the decarbonization process by promoting their inclusion in the sector's employment.

Costs, fees, and financial conditions applicable to CIF-REI resources upon disbursement will correspond to the Financial Terms and Conditions Policy published in July 2023[69], and complementing Operational Modalities for the Climate Investment Funds from April 2020[70], or those in place at the time of disbursement.

[69] In general terms, CIF uses the OECD classification to determine eligibility and loan conditions for countries. Costa Rica is classified by the ODA/OECD as a TIER 3 country. This implies that, for the public sector, the rates may vary between 1.11% for contracts of up to 20 years and 1.24% for contacts of up to 30 years. The grace period is in all cases 8 years and payment is made in equal semi-annual amounts after the grace period has elapsed. For the private sector, the degree of concessionality of CIF resources will be determined by the multilateral development banks (MDBs) on a case-by-case basis, applying the common guidelines of the Enhanced Principles for Blended Concessional Finance for Private Sector Operations agreed by the heads of the MDBs and the European Development Finance Institutions in October 2017, within their own processes and operational contexts. https://d2qx68gt0006nn.cloudfront.net/sites/cif_enc/files/meeting-documents/cif_financial_terms_and_conditions_policy_fy24.pdf

[70] https://d2qx68gt0006nn.cloudfront.net/sites/cif_enc/files/meeting-documents/joint_ctf_scf_22_4_cif_operational_modalities_new_programs_final_0.pdf

6. ADDITIONAL DEVELOPMENT ACTIVITIES

6.1. Parallel activities to be funded by other development partners

The main complementary and parallel activities to those of the Costa Rica CIF-REI program financed by other development agencies include the following:

- **Strategic Alliance to Strengthen the PNdD**. It allows Costa Rica to access the International Renewable Energy Agency's (IRENA) Energy Transition Accelerator Finance Facility (ETAF) to provide affordable financing for energy projects that further Costa Rica's decarbonization goals.

- **German Agency for International Cooperation (GIZ)**: The following projects are being implemented:
  - "Low Carbon and Climate Resilient Transforming Pathways (Transforma)" project. GIZ provides funding to Costa Rica for USD 12.5 million to change production systems of relevant sectors towards low carbon and climate resilient pathways, as support to Costa Rica's NDCs and the implementation of the PNdD.
  - Project "Climate Action - Electric vehicles for the tourism sector" through which an analysis of the supply and demand of services and equipment related to land transportation of domestic and foreign tourists is being carried out.

- **French Development Agency (AFD):** Provides budget support financing to the GoCR for the implementation of the PNdD. This funding is accompanied by technical cooperation activities in: (i) incentivizing the use of electricity, particularly in the transportation sector; (ii) climate-smart agriculture and nature-based solutions; (iv) climate governance; (v) integrated waste management; (vi) sustainable territorial planning; and (vii) just transition. Other cooperation initiatives include:
  - A partnership with the BNCR to finance projects that contribute to climate change mitigation or adaptation (electric mobility, renewable energy, solid waste, and housing). The credit line is accompanied by a technical assistance program financed by the European Union.
  - Financing of an exchange project between the Southern Region of France and Costa Rica ("Duo Diversité" project) to share experiences and operational solutions in the areas of ecotourism, biodiversity preservation, management of protected areas and water resources.

- **Global Environment Facility (GEF):** is implementing the project "Accelerating the transition to electric public transportation in the GAM of Costa Rica" which aims to reduce GHG emissions through the large-scale deployment of electric public transportation vehicles in the GAM.

- **GCF and the United Nations Development Program (UNDP):** are implementing the project "Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD+) – Payment for Results", which strengthens the Payment for Environmental Services program in indigenous and private territories, as a complement to the country's efforts for recovery and social protection that promotes low-emission, resilient, and gender-responsive growth.

7. IMPLEMENTATION POTENTIAL WITH RISK ASSESSMENT

7.1. Implementation and risk potential

The implementation of the program is of great interest to private and public sector entities, in particular, because of the boost it would provide to the process of decarbonization of the economy through enabling financing conditions that would make initiatives with private sector participation feasible. However, the development of these initiatives is subject to the usual implementation risks related to financial conditions, new technologies, recipients' creditworthiness, new regulations, social and environmental impacts, as well as general political stability.

7.1.1. Financing

Costa Rica's financial sector and implementing companies have extensive experience in financing and executing large initiatives for the modernization of the energy sector, the introduction of renewable sources and energy transition. In general, financing has come from local, multilateral, and international private banks. For this reason, the probability that borrowers will face insolvency situations that prevent them from meeting the requirements for accessing program resources or meeting their financial obligations under the program, is low. In addition, the public electricity service is subject to regulation based on the at-cost-service principle, which guarantees the financial equilibrium of the borrowing companies and the repayment of their obligations. Regulation is also mandated to respond to the guidelines provided by development plans, such as the PNdD, and the public policies issued by the GoCR, so that the investments made by the electric utilities to comply with these plans would be recognized in the service tariffs.

However, there is a risk that the demand for loans may be lower than expected due to: (i) inadequate terms and conditions offered by the banks through which the CIF-REI funds will be channeled; (ii) inadequately formulated projects submitted for financing; (iii) volatility of the Costa Rican Colón (CRC) against the USD, which may increase the cost and risk of foreign currency financing. At the same time, there are limited foreign exchange hedging options in the local market and their cost is high.

Financial risks can be mitigated by offering loans in local currency, as well as by securing them with specific financial or collateral guarantees. The formulation of projects can be strengthened through NTA to validate their technical and financial feasibility. This would change the perception of risk and bridge the knowledge gap for the adoption of new technology.

7.1.2. Technology

The technologies proposed in the IP present low levels of risk given their maturity. The country has successfully developed smart metering projects both in and outside the GAM that currently provide a smart metering coverage of 29%[71]. Additionally, ICE has carried out pilot electric mobility projects for public service buses, which has provided valuable information and lessons learned on technology performance in the local context and conditions. The information collected revealed that the operating cost of an electric bus is 5.1 times lower than that of an internal combustion bus. However, the studies

[71] Meters with reading and disconnection capabilities in the year 2022. Total deployment of smart meters reaches 45.1% when considering meters with automatic reading capabilities. ARESEP (2023). Informe de la Calidad del Suministro de Electricidad.

also revealed the need to invest in electrical infrastructure for the installation of chargers at bus operators' facilities to enable the adoption of the technology[72].

Similarly, the technology related to the replacement of industrial combustion equipment presents high levels of maturity, therefore the adoption risk is low. Despite this, support is required to validate the technical and financial studies for equipment replacement in public entities and private companies. This risk will be mitigated with the execution of ATN to support such studies.

7.1.3. Regulation

Costa Rica's institutionality and the legal framework that supports it have a long history of stability and strength which is recognized by international investors. This allowed the country to have the highest Inward FDI Performance Index the world in 2022[73] according to *Investment Monitor*[74]. In terms of regulation related to AMIs and its best use, the country has made progress in the modernization of the necessary regulation, particularly in the definition of time-of-use and prepaid rates based on international best practices, which will empower consumers. Similarly, progress has been made in regulations for the incorporation of NRES from distributed resources[75] [76].

Even though there could be risk of delays in the development and implementation of new and specific regulations related to distributed resources, electrification of energy uses, among others, the legal framework establishes a consolidated structure for their development. In general, as mentioned before, the regulatory agency, ARESEP, is mandated to respond to national plans and policies, including those developed and integrated under the PNdD, which guides Costa Rica's CIF-REI program. These provided the basis for ARESEP to establish tariffs for fast car charging stations, for bus charging at operators' facilities, as well as for the decarbonization of energy uses, including electric boilers[77].

7.1.4. Social and environmental impact

The main environmental risk comes from the improper handling and final disposal of batteries that are part of the electric mobility. However, the country has a "Roadmap for the Efficient and Environmental Management of Electric Vehicle Batteries in Costa Rica"[78]. This regulation establishes measures for batteries to be reused, recycled, or disposed of properly, thereby reducing the associated environmental risks.

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[72] GIZ (2021). Resultados del proyecto de buses eléctricos en el GAM.

[73] In 2022 Costa Rica led *Investment Monitor's* the foreign direct investment attraction index with a value 13,92. The index results from the proportion of foreign direct investment attracted by a country divided by the country's proportion of the global GDP.

[74] https://www.investmentmonitor.ai/fdi-data/2022-inward-fdi-performance-index-costa-rica/

[75] In this matter, stands out the definition of an enabling legal framework through the Law 10086 "Promotion and Regulation of Distributed Energy Resources from Renewable Sources" (December 2021), as well as its bylaw, Executive Order 43879-MINAE (January 2023) "Regulations to the Law on Promotion and Regulation of Distributed Energy Resources from Renewable Sources, approved in December 2021".

[76] With the resolution (RE-0075-JD-2023) of May 2023, ARESEP formalized the tariff methodologies for interconnection, network access, purchase, and sale of surpluses between companies and distributed generators, thus facilitating the deployment of these systems.

[77] In response to these plans, ARESEP established, through resolution RE-0056-IE-2019, promotional tariffs for the fast-charging network for electric cars (TVE), as well as for the supply of electricity to bus charging centers (resolution RE-0112-IE-2020).

[78] The French Development Agency (AFD) financed the initiative with the involvement of the Ministry of Health and MINAE and the implementation of Asociación Costa Rica por Siempre.

The disposal of equipment related to the deployment of infrastructure and smart metering systems presents a low environmental risk since it is a mature methodology for which the electricity distribution companies have reuse and recycling schemes already in operation[79]. With new technology such as massification of AMIs, people could lose their jobs associated with tasks as meter-reading and user disconnection and reconnection manual procedures. Staff training and new employment opportunities for AMI operation and maintenance could help mitigate this social impact.. These actions should be part of the programs for the cross-cutting application of the social inclusion and gender approach that should permeate all projects developed in Costa Rica's CIF-REI program.

7.1.5. Political stability

Costa Rica is a consolidated democracy that enjoys international recognition. According to *The Economist Intelligence Unit (EIU)*, in 2022 the country ranked first in Latin America in its democracy index, and in the American continent, it is only surpassed by Canada[80]. Moreover, the country's commitment to environmental protection and decarbonization objectives has been sustained throughout different administrations and is perfectly aligned with the Investment Plan of the CIF-REI program, so this risk is substantially reduced.

The following table summarizes the risks identified along with the proposed mitigation measures and a qualitative assessment of the expected remaining risk:

Table 3. Risks considered and mitigation measures

Risk	Description	Mitigation	Residual risk
Financing	Non-enabling financing conditions for funding offered by the financial intermediaries through which the resources are channeled.	Establish enabling conditions for the provision of resources to borrowers.	Low
	Exchange rate risk due to the high volatility of the value of the CRC against the USD.	Provide loans in local currency; if this is not possible, the residual risk should be considered high.	Moderate/High
	Borrowers' creditworthiness that prevents them from complying with the requirements established by MDBs or banking intermediaries to access CIF-REI resources.	Guarantee financial operations with specific real or financial collaterals.	Low
	Inadequate formulation of project proposals for financing.	Support with NTA for technical and financial feasibility validation.	Low
Technology	Adoption of new technologies for electric transport, metering, and information systems.	Support the deployment of new technologies based on accumulated experience and information, including pilot projects in bus service electrification.	Low
Regulation	Slow progress in regulatory development for NRES integration.	Maintain GoCR's commitment based on existing legislation, plans and sector policies.	Low
Environmental	Inadequate disposal and management of batteries needed for electric mobility.	Adhere to national and international regulations for proper reuse, recycling and disposal of these and other	Low

[79] In the case of CNFL, 65,668 meters were recuperated through the reutilization and recycling program between 2017 and 2022. The final disposal of the meters includes the separation of the components and their final disposal for recycling of waste materials to reduce their environmental impact.

[80] https://www.eiu.com/n/campaigns/democracy-index-2022/

Risk	Description	Mitigation	Residual risk
		elements. This includes following up on the Roadmap for the Efficient and Environmental Management of Electric Vehicle Batteries in Costa Rica.	
	Delays in obtaining environmental permits and licenses.	Incorporate the necessary procedures for their development in accordance with the relevant regulations in project planning.	Low
Social	Displacement of labor due to the automation of measurement, connection, and disconnection processes.	Include capacity building activities for employees who could be displaced to take on new opportunities or duties inside or outside the company.	Low
Political	Misalignment of GoCR priorities with the CIF-REI program.	The GoCR is already committed to the decarbonization process based on existing legislation framework, policies, plans and sector strategies.	Low

7.2. Absorptive capacity for REI Program and associated investments

As explained before, Costa Rica has a coherent set of policies, national plans, and legislation to accelerate decarbonization. In 2022, it was estimated that the implementation of the PNdD requires investments of USD 119 billion, in the different areas of the plan. In this regard, the country has already been working with private, national, and international public partners, as well as with the MDBs, to achieve the goals of the PNdD. It is estimated that the investment required in the transportation sector is USD 4.4 billion and in the industrial sector USD 176 million[81].

The planning of resources required for the implementation of the PNdD allows for the incorporation of the proposed CIF-REI Investment Plan for an indicative amount of USD 70 million, as well as the resources expected to be mobilized as a complement from the MDBs, local financing, and private investment for an amount of USD 673.95 million. The CIF-REI funds will reduce the costs of the projects under implementation and expand the impact of those proposed in the plan, which will serve as a showcase to scale them up based on the experience gained and the attraction of additional investment.

Costa Rica's financial system, as well as local companies, have demonstrated their capability to effectively finance and implement large-scale local projects related to the modernization of the energy sector, the introduction of renewable sources and the energy transition. The concessional funds made available through the CIF-REI program will help consolidate the country's vocation and accelerate its progress toward the just energy transition to which it aspires.

The ability to attract foreign direct investment, particularly in advanced manufacturing sectors (technology-intensive industries, mainly medical devices and information and communications technologies)[82] demonstrates the country's favorable conditions for foreign and local investment. These capabilities are confirmed by the country's position in the economic transformation index of the *BTI*

[81] Investment Plan for the execution of focus areas 1 to 10 of the PNdD. Present value as of 2022 with a discount rate of 5%. Considers the measures which are pending completion, the cost of investment in infrastructure and the needs of the 10 focus areas of the PNdD.

[82] Comisión Económica para América Latina y el Caribe (CEPAL), La Inversión Extranjera Directa en América Latina y el Caribe, 2022 (LC/PUB.2022/12-P), Santiago, 2022. p.69.

Transformation Index[83], in which it ranks 17th out of 137 nations considered and is consolidated by its position in the political transformation index (7th out of 137) and governance (5th out of 137).

The CIF-REI program will help catalyze and mobilize additional foreign and local investment to advance the decarbonization process in Costa Rica.

[83] https://bti-project.org/en/reports/country-report/CRI

8. INTEGRATED APPROACH FOR MONITORING, EVALUATION AND LEARNING

The Monitoring, Evaluation and Learning approach for Costa Rica's IP is based on the CIF-REI's Integrated Results Framework. It was prepared by the GoCR with support from the MDBs with the main purpose of tracking and reporting progress on outcomes and objectives and mirrors the chain of results from the support activities described in section 4. In this integrated approach, the impact of the program and its projects are measured multidimensionally through monitoring, evaluation learning and other cross-cutting approaches, such as social inclusion and gender. Its purpose is to get a holistic understanding of the program's progress, along with its thematic specificities to achieve a complex multidimensional objective.

8.1. Integrated Results Framework

In general terms, the IP aims to overcome specific obstacles and to create enabling conditions for the integration of additional renewable energy sources into the SEN as part of the country's decarbonization process. Concessional resources will enable development, accelerate implementation, and expand the scope and impact of these activities as shown in Table 4, which presents the application of the program's Theory of Change to Costa Rica's investment plan. In addition, specific indicators were developed in connection with the IP's IRF in Table 5 for effective monitoring and progress evaluation. It is worth noting that these indicators are indicative, and the final results will depend on the investments made and the decisions taken by the implementing entities, considering the assumptions made on the type of investments and borrowers, and the type of projects that would eventually meet the eligibility criteria.

Table 4. Theory of Change concept map

	Component 1	Component 2	
Barriers/Challenges	• Inflexible electrical grid with limited infrastructure, limiting NRES growth due to: (i) Insufficient smart metering coverage; (ii) lack of communication infrastructure in the electric grids enhancing smart metering systems; and (iii) Insufficient network management and monitoring systems. • High financing costs • Inadequate financing terms and conditions for the adoption of new technology.	• Prevalence of fossil fuel use in transportation. • High costs for the adoption of electric buses for public transportation. • Lack of public-private partnership business models for the financing of electric buses. • Lack of knowledge and perception of high risk in financial entities, hindering access to financing.	• Prevalence of the use of fossil fuels in the industry. • Inappropriate project financing structures to implement electric boiler and other industrial equipment adoption business models. • Lack of public-private partnership business models for the financing of electric boiler and other industrial equipment. • High risk market perceptions from financial entities hinders access to adequate financial terms. • High risk perception on technology adoption from the private sector.

	Component 1	Component 2	
	Installation of smart meters, network infrastructure, information, and communication systems	**Charging stations for electric buses**	**Replacement of combustion equipment for electric**
Supported activities	• Improve electrical grid management via installation of advanced metering equipment and infrastructure. • Implement monitoring, network management, and demand control systems for distribution companies. • Develop applications providing user experience interface between customers and electricity distribution companies. • Mainstreaming social inclusion and gender approach.	• Install electric buses charging infrastructure. • Network reinforcement to support electric buses charging stations. • Facilitate banks involvement and foster capacity building.	• Replace combustion industrial equipment for electric equipment. • Conduct financial and economic feasibility studies for the replacement of GHG emitting equipment with electric technology. • Facilitate public and private sector cooperation within PPPs for the replacement of industrial combustion equipment for electric.
Main expected outcomes	• Reach 67% of smart meter coverage with the installation of 724,000 units. • Increase electric grid flexibility to incorporate 71 MW of NRES to meet incremental demand. • Reduce the cost of electricity service operation by USD 1.2 million annually. • Implement time-of-use and prepaid tariffs that encourage the efficient use of energy and provide more accessible services for vulnerable groups. • Develop an inclusive application to empower customers to use grid services in a more efficient way considering women and diverse groups' participation.	• Accelerate compliance with PNTE goals by providing charging infrastructure for the integration of 185 electric buses into the public transport service. • Contribute to the advancement of the national decarbonization goals with the reduction of 11,142 tCO2e per year. • Facilitate the development of new business models through PPPs for the electrification of public bus transportation services.	• Replace combustion boilers, and other combustion equipment with electric equipment, requiring an additional installed capacity of 35MW of renewable energy by 2030. • Contribute to the advancement of decarbonization goals by reducing GHG emissions by 6,436 tCO2e per year. • Promote an innovative public-private business model for the electrification of energy uses in the industrial sector.
Transformational change	• Increases flexibility, resilience, and efficiency of the power grid, enhancing capacity for future NRES growth. • Improves grid management and optimizes the operating costs of distribution companies and the system. • Empowers users to actively manage their consumption.	• Promotes the electrification of public transport enabled by the installation of charging stations with concessional financing.	• Accelerates the process of electrification of the industry with the replacement of combustion equipment.

While the left-hand side columns of the IRF (see table 5 below) attempt to track project and program performance, through core indicators defined in the CIF-REI base IRF, in response to particular country objectives, the right-hand side columns focus on evaluation and learning approaches, including transformational signals of change across five dimensions: relevance, systemic change, scale, speed and adaptive sustainability.

Relevance: Costa Rica's IP is based on the consideration of the transformational changes that the country requires in the three areas considered for support. Although some activities could be considered a higher priority based on the associated social benefits or their impact on GHG emissions reduction, as the electrification of energy uses. Nevertheless, all three initiatives have equal opportunity to access program resources based on the proposals submitted by investors in alignment with the priorities and eligibility criteria of the IP.

Systemic change: by mainstreaming a gender, diversity and inclusion approach in the potential projects to be financed with CIF-REI resources, this IP expects to achieve a specific but progressive impact in terms of how it can be integrated into the development of different types of projects in the energy, transport, and industry sector with a just and inclusive energy transition approach.

Speed: the speed factor to be applied to a just transition implies that the introduction of new technologies, such as the deployment of AMI or the electrification of transport and industry, must be accompanied by the generation of new employment opportunities offered under equitable conditions and prioritizing those who could be displaced or negatively impacted. In this sense, the impact on the people involved, for example, the personnel responsible for recording measurements in analog meters or fuel based public transport drivers, must be appropriately considered in the initial stages of project funding and actions must be taken to mitigate these effects, especially in vulnerable communities. The pace at which these mitigation measures can be applied shall determine the speed at which the new projects should be developed.

Scale: Although the CIF-REI resources represent a small portion of the total investments required in the PNdD, the purpose of the IP is to support progress in the electricity system flexibility, transport and industry areas, its impact will be significant in terms of its replicability and scalability and will allow other actors and programs to build on these experiences and the results achieved through knowledge and lessons dissemination workshops.

Adaptive sustainability: the generation of knowledge and skills derived from the development of the initiatives contemplated in the IP, for new technologies in fields such as smart metering, electric vehicle charging, replacement of industrial combustion equipment with electric and innovative business models should contribute as catalysts for the progressive development of knowledge to achieve the scale of transformation required for the energy transition that the country is pursuing.

Transformational changes that may be generated throughout the program's implementation can be addressed and analyzed through impact assessments, energy transition studies, additional co-benefits, or social and gender inclusion analyses, as well as learning activities. This task should be undertaken through evaluations and studies promoted by the CIF, the country and the MDBs, as they deem appropriate, based on the program's activities that will eventually receive financial support. In short, the proposed approaches should allow for combining systematic monitoring with research and evaluation that complement each other through various tools and forms of evidence, to contribute to building a clear holistic view of what will be achieved and learned from program implementation.

Table 5. Integrated Results Framework of Costa Rica's Investment Plan[84]

CIF INTEGRATED RESULTS FRAMEWORK – RENEWABLE ENERGY PROGRAM COSTA RICA						
CIF IMPACT Accelerated transformational change toward net-zero emissions and inclusive, climate-resilient development pathways						
RESULT STATEMENT	**MONITORING APPROACH**					**EVALUATION AND LEARNING APPROACH**
	INDICATORS	**DESCRIPTION**	**BASELINE**	**MEANS OF VERIFICATION**	**TARGET (2030)**	**KEY AREAS**
CIF-LEVEL IMPACTS						
Accelerated transformational change toward net-zero emissions and inclusive, climate resilient development pathways	CIF 1. Mitigation: GHG emissions reduced or avoided (MtCO2e)	Direct GHG reduction due to the replacement of internal combustion buses with electric buses, the replacement of combustion boilers, and other GHG emitting equipment, with electric ones and the penetration of NRES in MW to meet organic growth in demand, as well as additional demand resulting from the electrification of energy uses.	0 as based on BAU assumed scenario (with no CIF-REI intervention) to capture CIF-REI contributions only.	Annual reports during implementation by projects and/or Country.	To reflect REI CORE 1 indicators target.	Transformational change: understood as a profound and fundamental change in the form, operation, or processes of the system in the context of the global climate change crisis. In the case of Costa Rica, it refers to the electrical grid transformation to one more flexible taking into consideration social inclusion and equitable green growth that allows progress towards the goal of zero net emissions by 2050. Signals of transformational change will be assessed through five dimensions (relevance, systemic change, scale, speed, and adaptive sustainability). Unlike to indicators, the signals mark multiple levels based on varied methods of collecting information and transforming the CIF's contributions to transformational change. Since these signals are context-specific, they will be defined, tracked, and analyzed according to the context applicable to each IP activity. It is proposed to collect disaggregated information related to women, indigenous people, people with disabilities and local communities. As programs progress, new signals can be identified through adaptive and learning approaches. This area of impact will be measured through CIF-driven evaluation and learning activities, the annual reporting of which will not be the direct responsibility of the MDBs.
	CIF 2. Adaptation: Strengthened climate resilience of land (ha), people (#), and physical assets (USD) through a CIF supported adaptation mechanism	Infrastructure adaptation (electricity, transportation, and industry) and new technological assets for the incorporation of NRES resilient to climate change.	Climate resilience measures already implemented, programmed, or financed and number of users benefiting from solutions similar to those to be financed with CIF-REI funds.	Project reporting on infrastructure and technological assets deployed, as well as on the number of beneficiaries by gender.	To be included in the targets set for REI CORE 2, REI CORE 4, and REI CORE 7, as well as in the OPTIONAL Indicator on increase in NRES interconnections (#) to cover increased demand.	
	CIF 3. Beneficiaries: Number of women and men benefiting from CIF investments	It considers users (men and women) benefited from the installation of AMI, electric transportation systems and other infrastructure developed under this program.	Users already benefiting or expected to benefit from solutions implemented, financed, or programmed similar to those funded by the CIF-REI.	Project reporting on users benefited by gender.	To be included in targets set for REI CORE 4, and REI PROGRAM LEVEL CO-BENEFITS and REI PROGRAM LEVEL OUTPUTS indicators.	Gender transformational impact: The CIF Gender Program outlines as key impact objectives in this area: (i) improved asset position; (ii) voice; and (iii) resilient livelihoods of women through gender-responsive institutions and markets. These aspects will be assessed through evaluative and learning approaches as relevant to the REI program and in combination with other monitoring information.
	CIF 4. Finance: Volume of co-finance leveraged (USD)	Actual leverage obtained for projects benefiting from the CIF-REI program.	Funding from CIF programs.	Actual final co-financing as reported by projects.	To be fed on target for REI CORE 6.	New and additional climate finance mobilized: Costa Rica's IP aims for CIF-REI financing to be a catalyst for attracting non-concessional resources from the private sector, multilateral development agencies and MDBs, among others, for infrastructure development, adoption of new technologies and innovation, including innovative forms of public-private partnerships that contribute to accelerating a just energy transition. Evaluative and/or learning approaches will be employed to better understand the contribution of the CIF in transforming market systems and generating follow-on green finance in CIF-supported markets. To this end monitoring should extend to national metrics beyond the leverage obtained for the direct beneficiary projects contemplated in this IP.

[84] Proposed targets are indicative, as final results will depend on final sub-borrowers' decisions.

RESULT STATEMENT	MONITORING APPROACH					EVALUATION AND LEARNING APPROACH
	INDICATORS	DESCRIPTION	BASELINE	MEANS OF VERIFICATION	TARGET (2030)	KEY AREAS
REI PROGRAM-LEVEL IMPACTS						
Flexibility of energy systems for smooth integration of higher shares of Variable renewable energy generation into the grid and increase in off grid access to renewable energy is enabled	REI Impact Proxy 1: NRES Country's installed capacity	Generation capacity from non-conventional renewable energies (solar, wind, geothermal, biomass and biogas).	1,1 GW (Installed capacity as of December 2022)	Reports from DOCSE (SEN operator)	1,3 GW (installed capacity)	**Signals of transformational change:** Signals at the program level will focus on transformational aspects of the energy system compared to the CIF level. The signals proposed for observation and analysis during the Costa Rica IP include those arising from the overall framework that foresees organic demand growth, as well as the additional annual demand of 40,475 MWh resulting from the electrification of energy uses to be accompanied by a 71 MW increase in generation capacity enabled by the deployment of AMI infrastructure and the incorporation of NRES, such as distributed resources. **Gender and just energy transition:** Program level impact allows for deeper evaluations, assessments and other approaches as the program evolves. These activities will be applied cross-cutting to the program and will be closely coordinated with the implementing entities.
	REI Impact Proxy 2: Country's NDC fulfillment	Achieve GHG reduction targets by 2030 in relation to the BAU scenario.	11.509 MtCO2 as of 2017.	Biannual NDC update report prepared by MINAE.	9.110 MtCO2.	
	REI Impact Proxy 3: Users with AMI connection	Users with AMI connection through the implementation of the CIF-REI program.	571.571 users as of December 2022 had AMI connections with remote disconnection capability (29% of total users).	Project reports on users benefited by gender and ARESEP reports.	1.295.571 users	

RESULT STATEMENT	MONITORING APPROACH					EVALUATION AND LEARNING APPROACH
	INDICATORS	DESCRIPTION	BASELINE	MEANS OF VERIFICATION	TARGET (2030)	KEY AREAS
REI PROGRAM-LEVEL OUTCOMES						
A. Increased penetration of variable renewable energy into power systems and maximized renewable energy potential of countries	REI CORE 1 (= CIF 1). Mitigation: GHG emissions reduced or avoided (t CO2 e) – direct/indirect	Direct GHG reduction due to the replacement of internal combustion buses with electric buses, the replacement of combustion boilers, and other GHG emitting equipment, with electric ones and the penetration of NRES in MW to meet organic growth in demand, as well as additional demand resulting from the electrification of energy uses.	0 from a BAU scenario (no CIF-REI intervention) to reflect only the CIF-REI contribution.	Annual reports and during project implementation	17 tCO2e annually upon completion of projects considered in the IP.	Projects and transformational activities/technologies eligible under the IP will be assessed and tracked using indicators based on **"whole energy systems"** analyses that will incorporate monitoring, evaluation and learning aspects. Based on these analyses, and the initial indicators of the investments proposed by the borrowers, such as the addition of NRES to the grid, reduction of GHG emissions and social empowerment through the democratization of energy use, management, and production, among others, estimated and actual data will be collected and consolidated for reporting on these metrics. As the results chain progresses, the monitoring function increases in importance for capturing impacts and outputs, while the evaluation and learning functions will complement the core indicators by filling knowledge gaps. Evaluation and learning activities will be selected according to stakeholder demand, evidence gaps and cross-learning opportunities.
	REI CORE 2. Installed Capacity: Installed capacity of variable renewable energy available to the grid (MW) – direct/indirect (CIF 2)	New installed capacity of NRES in the SEN to meet the growth in demand for projects considered in the IP of the CIF-REI.	0 from a BAU scenario (no CIF-REI intervention) to reflect only the CIF-REI contribution.	Annual reports and during project implementation	71 MW of additional installed capacity from renewable sources upon completion of the projects.	
	REI CORE 3. Renewable Energy Production: Annual renewable energy output (MWh)	Renewable energy production that is integrated into the SEN due to investments mobilized by the CIF-REI IP.	0 from a BAU scenario (no CIF-REI intervention) to reflect only the CIF-REI contribution.	Annual reports and during project implementation	40.5 GWh of annual production of renewable energy upon completion of the projects .	
	REI CORE 4. Grid Services: Increase in available grid services and improvements (#). (CIF3)	# of users with access to applications for consumption monitoring and management, time-of-use rates, and prepaid schemes by gender.	0 from a BAU scenario (no CIF-REI intervention) to reflect only the CIF-REI contribution.	Annual reports and during project implementation	724.000 users with access to applications, time-of-use, and pre-paid tariffs upon completion of the projects by gender	
B. Improved policies, plans, and institutional capabilities	REI CORE 5. Policies: Number of policies, regulations, codes, or standards related to renewable energy integration that have been amended or adopted (#)	# electricity distribution companies that implement new tariff regulation that includes time-of-use and pre-paid tariffs.	0 from a BAU scenario (no CIF-REI intervention) to reflect only the CIF-REI contribution.	Annual reports and during project implementation	2 electricity distribution companies with time-of-use and prepaid rates implemented	
C. Mobilized public and private capital	REI CORE 6. (= CIF 4) Co-Finance: Volume of co-finance leveraged (USD).	Actual leverage obtained for projects benefiting from the CIF-REI program.	0 from a BAU scenario (no CIF-REI intervention) to reflect only the CIF-REI contribution.	Annual reporting by projects	USD 673,95 M.	
D. Increased renewable energy access	REI CORE 7. Renewable Energy Access: Number of women and men, businesses, and community services benefiting from improved access to electricity and/or other modern energy	# users benefiting from AMI installation disaggregated by sex	0 from a BAU scenario (no CIF-REI intervention) to reflect only the CIF-REI contribution.	Annual reporting by projects	724.000 users with AMIs upon completion of the projects by gender	Gender-sensitive aspects of renewable energy access can be studied in more detail through targeted research, evaluations and/or case studies. Example of relevant issues include offering training activities to increase technical knowledge and skills in new technologies while promoting female participation in the workforce and women climate leadership, targeting women and diverse groups such as people with disabilities, afro descendants, indigenous people, members of local communities, elderly adults and the youth), selecting

		services – direct/indirect (# of people)					suppliers willing to promote gender equality and social inclusion, and increasing women's awareness and ability to use access to electricity for productive purposes.
E.	Reduced total system cost	REI CORE 8. System Costs: Reduced total energy system cost (USD)	Reduced cost of electricity distribution service based on the installation of AMI.	0 from a BAU scenario (no CIF-REI intervention) to reflect only the CIF-REI contribution.	Annual reporting by projects	USD 1.2 million annually upon completion of the projects.	
F.	Fostered renewable energy innovation	REI CORE 9 (=CCV 1). Innovation: Number of innovative businesses, entrepreneurs, technologies, and other ventures demonstrating a strengthened climate responsive business model	# of initiatives with new business models directly or indirectly supported by CIF-REI.	0 from a BAU scenario (no CIF-REI intervention) to reflect only the CIF-REI contribution.	Annual reporting by projects	2 new business models applied in the projects supported by CIF-REI program (one for electro mobility and one electric equipment on the industry).	Further support may be provided by MDBs and their innovation promoting platforms to conduct learning-based activities aiming to improve the understanding of REI's innovation and business models aspects related to this IP.
		OPCIONAL (=CVV 2): Number of innovative products, services, technologies, and processes that have entered a new market context	# of active applications for the interaction between users and the grid with direct or indirect support from CIF-REI.	0 from a BAU scenario (no CIF-REI intervention) to reflect only the CIF-REI contribution.	Annual reporting by projects	1 active application upon completion of the projects supported by the CIF-REI program.	

RESULTS STATEMENT	MONITORING APPROACH					EVALUATION AND LEARNING APPROACH
	INDICATORS	DESCRIPTION	BASELINE	MEANS OF VERIFICATION	TARGET (2030)	KEY AREAS
REI PROGRAM-LEVEL CO-BENEFITS						
Social and Economic Development Co-Benefits	CO-BENEFIT 1. Employment and Livelihoods: Jobs created – direct and indirect	# jobs permanently created directly or indirectly through the implementation of the supported projects disaggregated by sex # jobs temporarily created directly or indirectly through the implementation of the supported projects disaggregated by sex	0 from a BAU scenario (no CIF-REI intervention) to reflect only the CIF-REI contribution.	Annual reporting by projects	5 permanent and 40 temporary (of which 30% are covered by women)	**Quality and distribution of jobs**: An evaluative and learning oriented analysis could focused on the type of jobs created (and lost), which, in the case of the Costa Rican IP have been initially and indicatively identified, could be obtained from the deployment, operation and maintenance of AMI, new grid management systems, electric transportation, as well as the installation, operation and maintenance of electric industrial equipment. In general, given that the new technologies to be adopted would be more advanced and cleaner than those replaced, the jobs generated should be of higher quality, higher paying and will demand higher qualifications from employees, making training programs play a central role in this transformation.
	CO-BENEFIT 2. Just Transition: Social Inclusion and Distributional Impacts.	# people trained persons on energy management, electric transport, electric industrial equipment by gender.	0 from a BAU scenario (no CIF-REI intervention) to reflect only the CIF-REI contribution.	Annual reporting by projects	20 trained people (of which 30% are women)	**The just transition analysis framework** in the case of the Costa Rica IP should analyze the extent to which diverse social inclusion is possible in the supported activities, including how to conduct the selection process of suppliers, how to enable the integration of local and national stakeholders in each activity, and to what extent vulnerable groups in impacted areas can access employment opportunities or other benefits derived from the implemented solutions. Distributional impact, which is a central part of Co-Benefit 2, can also be examined in greater depth along its evaluative lines or with additional focus on specific populations, such as ethnic, religious, and racial minorities, women-headed households, indigenous populations, local communities, migrants, youth, and people with disabilities. Given the impact of this co-benefit in the fulfillment of SDGs 5, 7 and 10 the progress towards these goals should be monitored.

RESULTS STATEMENT	MONITORING APPROACH					EVALUATION AND LEARNING APPROACH
	INDICATORS	DESCRIPTION	BASELINE	MEANS OF VERIFICATION	TARGET (2030)	KEY AREAS
REI PROGRAM-LEVEL OUTPUTS						
A. Improved market design and systems	OPTIONAL. Number of technical/financial analyses completed to enhance the enabling environment for RE uptake (#)	Technical or financial feasibility studies supported under Component 2.	0 from a BAU scenario (no CIF-REI intervention) to reflect only the CIF-REI contribution.	Annual reporting by projects	2	
B. Improved demand-supply management	OPTIONAL. Number of supply management technologies, infrastructure, or other solutions deployed	OMS, DMS, GIS, SCADA, MDM or other technologies implemented to improve management and flexibility of the SEN in operation through projects supported by CIF-REI.	0 from a BAU scenario (no CIF-REI intervention) to reflect only the CIF-REI contribution.	Annual reporting by projects	2	

8.2. Power System Analysis

The investments proposed in this IP are expected to have a positive transformational impact on the Costa Rican energy sector as shown below:

- Accelerate the process of digitization and modernization of the electricity grids which will provide them with more flexibility, improve their real-time management capacity, efficiency, reduce emissions and operating costs.

- Enable real-time management and monitoring of electricity grids to facilitate the introduction of NRES, as well as to make them more flexible, which will also make them more resilient to climate change.

- Democratize grids by empowering customers through applications that provide an interface to use grid services in a more efficient way, allowing them greater control of their consumption and introducing time-of-use and prepaid tariffs.

- Allow the integration of distributed energy resources to the SEN through AMI technology that enables the purchase and sale of energy between prosumers and electricity distribution companies.

- Advance the process of modernizing tariffs that provide economic signals to promote efficient energy use and encourage the charging of electric vehicles in residences, such as time-of-use tariffs, and prepayment schemes that facilitate the formalization of the connection of vulnerable people to the grid.

- Accelerate the electrification of the public bus service through the development of charging infrastructure.

- Promote the decarbonization of the industrial sector through the electrification of industrial combustion equipment.

- Increase the participation of the private sector in the process of decarbonization of transportation and industrial energy uses through innovative public-private partnership schemes.

The IRF for Costa Rica's IP serves as a fundamental instrument that underpins the country's high-level objectives with measurable national targets and indicators, and then links the theoretical objectives to anticipated levels of measurable results through its portfolio of projects.

Since the IP was developed collaboratively between different government institutions and the MDBs that supported the process, the definition of objectives at the project level, and definition of expected results through the IRF, has provided a consistent systemic approach that provides coherence of interventions, as well as accountability between stated goals and estimates of results in practice. The activities defined for support from the CIF-REI program objectives have been selected based on a rigorous examination of the country context in terms of the development of NRES and the barriers to achieving and advancing their addition to the system.

8.3. Anticipated impacts at the program level

The proposed IP for Costa Rica will directly reduce GHG emissions by 17,729 tCO2e annually resulting from the electrification of energy use in the public bus service and the replacement of combustion equipment with electric. In addition, the plan will support the GoCR in the following:

- Accelerate the installation process of advanced metering infrastructure to 724,000 SEN users by 2030 and, with this, move towards compliance with 100% AMI coverage established in the ENREI.

- Promote the electrification of industrial processes that add 19,197 MWh per year in incremental demand which will be supplied with 35 MW of additional capacity in renewable sources by 2030.

- Allow the introduction of around 185 electric buses for public service in the GAM, adding 21,278 MWh of additional demand generated with the incorporation of 36 MW of generation capacity by 2030.

8.4. Tracking protocols

Monitoring and reporting of results will be a collaborative process among all stakeholders. The national focal points and implementing agencies, in collaboration with the monitoring and reporting team of the CIF Secretariat, will lead the tracking of the country-level IP impact indicators established at the time of approval. The MDBs will monitor and report annually to the CIF Secretariat, all relevant outcome level indicators for each approved project, in accordance with the methodologies, reporting requirements and timelines established in the IRF and in accordance with the CIF's monitoring and reporting tools of the REI (REI M&R Toolkit).

As such, the MDBs will be responsible for incorporating these outcome indicators into the monitoring and reporting framework and mechanisms for each implemented project, along with any optional outcome indicators and at least one co-indicator per project, also in accordance with the REI IRF and REI M&R Toolkit. Country-level monitoring and reporting (M&R) workshops are foreseen, at IP inception, mid-term, and completion along with, as deemed necessary, any preliminary M&R workshops. This will allow for stakeholder's consensus on indicators, targets, methodologies and related gaps, lessons, or extensions.

Private banks or companies, as recipients of financing, as implementing agencies and as financial intermediaries for the appropriate allocation of CIF resources, will be responsible for reporting annually to the MDBs on the IRF indicators. Borrowers implementing projects associated with IP-supported activities will be responsible, together with the implementing entities, for providing the information required to comply with monitoring and reporting requirements, based on the commitments included in the borrower contracts.

It is important to note that, as part of the eligibility criteria, the borrower must be able to report periodically on the different indicators related to project performance, achievements, inclusion aspects, associated GHG reduction, benefited users including their gender distribution and the inclusion principles applied, also in relation to other related cross-cutting benefits which will apply according to the context of each project.

The program will be monitored overall through periodic monitoring reports that will be prepared based on information provided by the implementing entities and borrowers. The MDBs will carry out periodic evaluations to support and assess program implementation.

Program financial statements will be audited in accordance with procedures previously agreed by the MDBs. The implementing entities will submit, within 120 days after the end of the fiscal year of each project during the original disbursement period or extensions thereof, audited program financial statements duly signed and endorsed by an independent auditing firm acceptable to the MDBs.

8.5. Tracking and evaluating aspects of transformational change and aspects of social inclusion

The effects of transformational change and the just and inclusive transition arising from the implementation of the proposed IP should be evidenced in the creation, quality and distribution of jobs, approaches that are responsive to gender and social inclusion, and the achievement of impacts such as emissions and pollution reduction. Electrification of energy uses, including electrification of public bus service and industrial combustion equipment, are considered the program activities with the greatest potential to generate transformational social change through new opportunities to improve users' standard of living.

The program will monitor and evaluate just transition activities and, in particular, progress related to: (i) the number of individuals who lost employment and were trained to participate in economic diversification; (ii) training programs that enable the current and future workforce to improve skills that facilitate their access to new and green jobs, focusing on essential and job-specific skills, with a special focus on women and people from diverse groups; (iii) companies that promote actions to contribute to gender equality and social inclusion; and, (iv) the development of new productive activities related to the electrification of energy uses.

The extent to which social inclusion is achieved in terms of ethnicity, religion, racial minorities, female-headed households, indigenous people, Afro-descendants, people with disabilities, LGTBQ+, youth and migrants will depend on the projects that are finally supported, but will in any case, be an essential part of the monitoring of positive transformational change in this regard.

Reporting should help to verify which policies contribute to gender equality, for example, involving equal participation of women and men in activities such as the installation of AMI, operation, adaptation and maintenance of charging stations and electric buses, among others. Monitoring will include an ongoing assessment of the potential for sexual exploitation and gender-based violence.

The implementation of the IP should be made visible and communication channels should be provided to address questions and receive feedback from stakeholders. Other means or mechanisms will be explored to obtain information to measure the impacts of transformational change, just transition and inclusiveness aspects.

The IP will aim to create dialogue among different stakeholders and maintain socially inclusive and participatory mechanisms like communication channels to address questions and receive feedback from different actors including women representatives and members from vulnerable groups, especially on

their vision related to barriers, opportunities, impacts and risks during the design and implementation of investments in order to reach a transformational change, just transition and social inclusion.

ANNEXES

Annex 1
Assessment of country's absorptive capacity for integration activities

Macroeconomic context:

Costa Rica is considered an upper middle-income country with significant economic, social, and environmental achievements. The economy has experienced sustained economic growth over the last 25 years as a result of an outward-oriented growth strategy, through openness to foreign investment, as well as gradual trade liberalization[85].

The country is a world leader for its environmental policies and achievements which have helped it build its Green Brand. The pioneering Payments for Environmental Services (PES) program has been successful in promoting forest and biodiversity conservation, making Costa Rica the only tropical country in the world to have reversed deforestation.

The combination of political stability, social policies and stable growth has resulted in one of the lowest poverty rates in Latin America and the Caribbean, allowing it to reduce the proportion of the population living below the World Bank's upper middle-income line (USD6.85 per person per day in 2017 Purchasing Power Parity - PPP) from 15.6% to 13.7% between the years 2010 and 2019[86].

The country's social success is reflected in its strong human development indicators, which translate in a Human Development Index (HDI) (0.809) considered very high and which ranks third in Latin America. Nevertheless, the country faces fiscal and social challenges deepen by the COVID-19 pandemic.

Fiscal consolidation efforts, initiated in 2018, came to a halt as revenues collapsed amid increased spending needed to mitigate the impact of the pandemic. Unemployment rates nearly doubled, exceeding 20 percent by mid-2020, and household incomes declined despite the government's emergency response. As a result, the poverty rate (USD6.85, in 2017 PPP) increased to 19.9 percent in 2020.

Strong economic performance in 2021 and public expenditure discipline enabled faster-than-expected fiscal consolidation and improved social and labor market performance. GDP rebounded to 7.8 percent in 2021 after the largest drop in four decades the previous year. A strong recovery in manufacturing, particularly medical equipment, and a gradual recovery in services and agriculture lifted GDP above pre-crisis levels. The poverty rate (USD6.85, in 2017 PPP) fell rapidly to 14.3% in 2021 as the economy strengthen.

However, new external pressures, including high international fossil fuel and food prices, as well as tighter financing conditions, are beginning to slow economic activity.

[85] World Bank (2023). Costa Rica: Panorama General. https://www.bancomundial.org/es/country/costarica/overview
[86] World Bank (2023) World Development Indicators. https://databank.worldbank.org/source/world-development-indicators

In 2022, the country achieved higher-than-expected growth (4.3 percent). Although growth is projected to moderate to 2.7 percent in 2023, reflecting the challenging external environment, it is expected to rebound to 3.1 percent in 2024, supported by the dynamism of Costa Rica's export sectors.

Inflation is partially offsetting the effects of economic growth and putting the purchasing power of lower income groups under pressure. With compensatory social assistance measures, poverty (2017 PPP USD6.85 line) is estimated to decline modestly to 14.1% in 2022.

As inflation stabilizes and labor market conditions improve, driven by growth in the service sector, the poverty rate is expected to reach around 14.3 percent in 2024. Poverty could be further reduced with the implementation of targeted social assistance measures for historically disadvantaged groups and those living below the poverty line.

With a small and open economy, Costa Rica is highly vulnerable to external shocks, including global inflationary pressures and tighter financial conditions. This increases food and fuel costs and adds financial pressures, creating greater uncertainty in the economic outlook at both the macro and household levels.

Fiscal consolidation is expected to continue, anchored by the fiscal rule and the International Monetary Fund (IMF)-backed program. The GoCR proposes additional reforms, such as reduced government expenditure and less fragmentation of social programs, which will help strengthen fiscal consolidation and create buffers that protect the poor.

These challenges impact the basic pillars of the Costa Rican development model: inclusion, growth, and sustainability. The GoCR has worked to address these challenges and is committed to an inclusive society that ensures the well-being of its people based on sustainable and equitable development, with increasing private sector participation and supported by transparent and accountable public institutions.

Law, regulatory and institutional context:

Costa Rica has a robust legal and institutional governance system that provides the foundation for a solid democracy whose strength is internationally recognized. According to the Democracy Index of The Economist Intelligence Unit (EIU) for the year 2022 the country is part the group of countries considered to have a full democracy. That year it ranked first in Latin America, and in the American continent, it is only surpassed by Canada[87]. These conditions have generated confidence from national and international investors, particularly in high-tech sectors. In the year 2022 it topped *Investment Monitor's*[88] Inward Foreign Direct Investment Performance ranking.

The country has been a member of the World Trade Organization (WTO) since January 1, 1995, and of the OECD since May 25, 2021. Accession to the OECD required reforms that strengthened the regulatory framework for competition by reforming the Commission for the Promotion of Competition (COPROCOM), the financial system by providing greater independence to the Central Bank and establishing a deposit-guarantee scheme, as well as legislation to tackle tax fraud and corruption, among others. Participation in the organization will anchor progress and allow to continue improving the regulatory and institutional framework by exposing it to best practices and accountability measures.

[87] https://www.eiu.com/n/campaigns/democracy-index-2022/

[88] Investment Monitor (2023). The countries that punch above their weight when it comes to foreign direct investment. https://www.investmentmonitor.ai/fdi-data/2022-inward-fdi-performance-index-costa-rica/

Having abolished the army in 1949, the country is characterized by its social peace, respect for international law, as well as for the fundamental rights of its citizens as guaranteed in the Constitution, such as life, freedom of expression, freedom of transit, right to property, right to access to information, right to work, right to salary, freedom of association and unionization, right to education, among others. Likewise, the Constitution ensures equal treatment for nationals and foreigners.

Political parties, as well as civil society groups, can organize freely and these rights are respected. While institutionalized non-governmental organizations, with international ties, are more vocal, there are active local organizations, social movements, and informal platforms.

Freedom of access to public information is guaranteed at the constitutional level. This promotes governance based on transparency and citizen participation and subjects public institutions to performance evaluation and accountability procedures. The country is part of the multilateral initiative Open Government Partnership[89] and has in place mechanisms such as the Inter-Institutional Transparency Network, promoted by the Ombudsman's Office, to guarantee the right to information, promote citizen participation and oversight.

Recent legal reforms have contributed to improve the management of the State, among them, the Law for the Strengthening of Public Finances Law 9635 (2018), the Public Employment Framework Law 10159 (2022) and the Government Procurement Law 9986 (2021). These reforms helped control the fiscal deficit in the short term and lay the foundations for a more efficient public sector in the long term.

Technical and managerial context:

The Banco Nacional de Costa Rica (BNCR) is an autonomous institution under public law owned by Costa Rican State, with administrative independence and guaranteed by the State. It is the largest banking institution in the country, with assets of USD 6,661 million, which also places it in first place in Central America (excluding Panama), the Caribbean and the Dominican Republic. The bank was established in October 1914 and is part of the Banco Nacional conglomerate, which includes (BN Vital S.A. pension fund management), Fondos de Inversión BN SAFI, S.A. (investment funds management), Puesto de Bolsa BN Valores S.A. (stock exchange agency), and Corredora de Seguros S.A. (insurance agency).

In 2022 the BNCR outlined a sustainable business model based on support for sustainable finance, mitigation and adaptation to climate change, support for the decarbonization of the economy, and democratization of the economy based on financial inclusion and accountability.

It has extensive experience in climate finance and renewable energy, where it has built up a large portfolio in electricity generation with renewable sources (USD 440 million), commercial energy efficiency (USD 370 million) and energy efficiency in industry (USD 90 million). Renewable energy accounts for 8.9% of BNCR's total loan portfolio, with a value of USD 775 million. Despite its size, it also offers sustainable products for SMEs (BN PYME Verde) and individual clients for the purchase of EVs (BN Vehículos Eléctricos), eco-housing (BN Vivienda Ecoamigable), among others.

BNCR has participated in syndicated solutions with other national banks for the development of large-scale renewable projects such as the Reventazón Hydroelectric Plant (306 MW), together with BP and

[89] https://www.opengovpartnership.org/

other banks, deployment of AMI infrastructure for CONELÉCTRICAS, as well as with development and international cooperation agencies such as AFD and the European Union for the financing of projects that contribute to climate change mitigation and adaptation.

Similarly, **Popular Bank (BP)** is a non-state public law institution, with independent legal status and its own assets, with full administrative and functional autonomy. The bank is part of the Popular Bank Conglomerate comprising: Banco Popular (banking), Popular Pensiones (pension funds management), Popular Sociedad Administradora de Fondos de Inversión (investment fund management), Popular Valores (stock exchange agency) and Popular Seguros (insurance agency).

BP was established in 1969 with the objective of providing economic protection and welfare to workers by promoting savings and meeting their credit needs. The bank's vision is developed around three priority areas: economic-financial, social, and environmental, with cross-cutting actions in accessibility, gender equality and social responsibility.

The bank has a portfolio worth USD 382 million in renewable energy and environmental projects, including its syndicated participation in the Reventazón Hydroelectric Plant and in the development of AMI infrastructure with CONELÉCTRICAS, individual participation in the Los Negros II, Toro III and Jorge Manuel Dengo hydroelectric plants, and Los Santos wind farm, among others.

Annex 2
Stakeholder consultations

Costa Rica's CIF-REI Investment Plan is the result of a consultative process led by the GoCR under the coordination of MINAE with the support of the MDBs. The consultations allowed for the identification and prioritization of the lines of action in which financial support mechanisms are required to accelerate the decarbonization process of the economy through the integration of renewable energies and the participation of the private sector. This plan is an important instrument to advance in the energy transition and climate action that will lead the country towards inclusive sustainable growth in accordance with the policies and goals it has established for sustainable development, emissions reduction, and climate change mitigation for the period 2030 and 2050.

Throughout the IP preparation process, multiple meetings and dialogues were held with MDB representatives, potential implementing entities and other stakeholders to address relevant issues to the IP. Two major consultation processes were carried out for the preparation of the IP during the scoping and joint missions. In addition, a specific consultation process was conducted to understand the challenges, as well as opportunities, for gender and social inclusiveness in the energy sector and in the implementation of the IP to identify solutions that will have lasting effects. The results of this consultation are included later in this annex.

Finally, the draft IP was published on August 25, 2023, on MINAE's website, comments were received from relevant stakeholders, general public, associations and social organizations, which were considered in the last round of revision of the document resulting in this final version.

1. Scoping Mission

The Scoping Mission took place on August 25-26, 2022, and it initiated the process of dialogue with the government and other relevant stakeholders. These discussions identified the main needs of the GoCR and defined the areas of action potentially fundable through the CIF-REI program. The participants in this first process are listed in Table 2.1.

Table 2.1. Participants in the Scope Mission, August 25th and 26th, 2022

Full Name	Organization	Position
Adriana Maria Salas Leitón	Autoridad Reguladora de los Servicios Públicos (ARESEP)	Coordinadora Proceso de Asesoría Regulatoria
Floribeth Hernández Porras	Autoridad Reguladora de los Servicios Públicos (ARESEP)	Profesional en Regulación Centro de Desarrollo de la Regulación
Luis Miguel Alfaro Paniagua	Autoridad Reguladora de los Servicios Públicos (ARESEP)	Profesional en Regulación Intendencia de Energía
Víctor Valverde Espinoza	Autoridad Reguladora de los Servicios Públicos (ARESEP)	Ingeniero Asesor del Intendente de Energía
Álvaro Borbon	Banco Interamericano de Desarrollo (BID)	
Gisela Ferrari	Banco Interamericano de Desarrollo (BID)	Consultora de Genero y Cambio Climático
Gloriana Alvarado Blando	Banco Interamericano de Desarrollo (BID)	Portfolio Management Officer
Isabel Granada	Banco Interamericano de Desarrollo (BID)	Senior Transport Specialist
Ricardo Goncalves	Banco Interamericano de Desarrollo (BID)	CONSULTOR EN FINACIAMIENTO CLIMATICO
Sylvia Larrea	Banco Interamericano de Desarrollo (BID)	Lead Energy Specialist, Energy Division
Valentina Saavedra	Banco Interamericano de Desarrollo (BID)	Climate Change Specialist
Johanna Gomez Velásquez	Banco Interamericano de Desarrollo Invest	Investment Mgmt Lead Officer

Full Name	Organization	Position
Megan Meyer	Banco Mundial	-
Alicia Hernández Muñoz	Banco Mundial (BM)	E-Mobility Consultant
Huong Mai Nguyen	Banco Mundial (BM)	Energy Specialist
Peter Johansen	Banco Mundial (BM)	Senior Energy Specialist
Rafael Ben	Banco Mundial (BM)	Energy Specialist
Andrés García	Banco Mundial IFC	Principal Investment Officer
Mauricio Child Vargas	Banco Mundial IFC	Financial Analyst
Mauricio Villalobos Campos	Compañía Nacional de Fuerza y Luz, S.A. (CNFL)	Encargado Unidad Administración Financiera y Contable
Mauricio Moreno Paniagua	Compañía Nacional de Fuerza y Luz, S.A. (CNFL)	Asesor Gerencia General
Pedro Montero Sánchez	Compañía Nacional de Fuerza y Luz, S.A. (CNFL)	Encargado Unidad Desarrollo de Negocios
Javier Arrieta	Cooperativa de Electrificación Rural de Guanacaste, R.L. (COOPEGUANACASTE)	JEFATURA TARIFA Y PRESUPUESTO
Carlos Andres Salazar Lopez	Cooperativa de Electrificación Rural de Alfaro Ruíz, R.L. (COOPEALFARORUIZ)	Asistente Departamento de Ingeniería Eléctrica
Erick Herra Chacón	Cooperativa de Electrificación Rural de Guanacaste, R.L. (COOPEGUANACASTE)	Gerente de Generación de Energía
Mauren Rios Ledezma	Cooperativa de Electrificación Rural de Guanacaste, R.L. (COOPEGUANACASTE)	-
Bernal Cordero Fallas	Cooperativa de Electrificación Rural de los Santos, R.L. (COOPESANTOS)	Ingeniero Analista de Redes Eléctricas
Jeffrey Luna Galera	Cooperativa de Electrificación Rural de los Santos, R.L. (COOPESANTOS)	Jefatura Departamento de Planificación
Olger Robles Solano	Cooperativa de Electrificación Rural de los Santos, R.L. (COOPESANTOS)	-
Carlos Abarca Cascante	Cooperativa de Electrificación Rural de los Santos, R.L. (COOPESANTOS)	Coordinador de Smart Grid
Magdalena Solis Madrigal	Cooperativa de Electrificación Rural de los Santos, R.L. (COOPESANTOS)	Jefatura de Tesorería
Jose Gamboa Quesada	Cooperativa de Electrificación Rural de San Carlos, R.L. (COOPELESCA)	Líder Departamento Ingeniería de la Red Eléctrica
Gerardo Arce Arguello	Cooperativa de Electrificación Rural de San Carlos, R.L. (COOPELESCA)	Líder Equipo Atención de Servicios Empresariales-Gerencia de Servicio al Asociado
Bernardo Hernandez Barquero	Empresa de los Servicios Públicos de Heredia, S.A. (ESPH)	Líder Gestión Financiera
José Francisco Hidalgo Moreira	Empresa de los Servicios Públicos de Heredia, S.A. (ESPH)	Director Negocio de Energia Eléctrica y Alumbrado Público
	Energía (SEPSE)	
	Energía (SEPSE)	
	Energía (SEPSE)	
Armando Cruz White	Instituto Costarricense de Electricidad (ICE)	Asesor
Karla Solano Loaiza	Instituto Costarricense de Electricidad (ICE)	Desarrollo de Soluciones y Negocios
Silvia Mora Arias	Instituto Costarricense de Electricidad (ICE)	Asesora Presidencia Ejecutiva
Mario Arce Guillén	Instituto Costarricense de Ferrocarriles (INCOFER)	Presidente Ejecutivo
Pablo Mora Zahner	Instituto Costarricense de Ferrocarriles (INCOFER)	Asistente Gerencia de Operaciones
Karol Arroyo Hernandez	Instituto Costarricense de Ferrocarriles (INCOFER)	Gerente Administrativa
	Invest	
Esteban Barrantes Vásquez	Ministerio de Ambiente y Energía (MINAE)	Ingeniero Dirección de Energía
Ronny Rodríguez	Ministerio de Ambiente y Energía (MINAE)	Viceministro de Energía
Fabian Sanchez Dorado	Ministerio de Obras Públicas y Transportes (MOPT)	Asesor Unidad de Planificación Institucional

Full Name	Organization	Position
Marilyn Vargas Romero	Ministerio de Obras Públicas y Transportes (MOPT)	Subjefe Departamento de Contabilidad
Marcela Rojas Gómez	Ministerio de Planificación Nacional y Política Económica (MIDEPLAN)	Asesor en Inversiones Públicas
Malcon Corea Aguilar	Ministerio de Planificación Nacional y Política Económica (MIDEPLAN)	Analista Unidad de Inversiones Públicas
Alfonso Herrera Herrera	Secretaría de Planificación del Subsector	Asesor técnico
Daniela Flores	Secretaría de Planificación del Subsector Energía (SEPSE)	Asistente de Dirección
Laura Lizano (SEPSE)	Secretaría de Planificación del Subsector	Directora
Say-Lheng Solera Ching	Secretaría de Planificación del Subsector	Asesora técnica

2. Joint Mission

The second consultation process was carried out during the Joint Mission held on May 9th and 10th, 2023. Representatives from government entities, banks, academia, electricity distributors, private sector organizations and international development and cooperation agencies participated. The participants in these sessions are listed in Table 2.3.

Table 2.3. Participants in the Joint Mission, May 9th and 10th, 2023

Full Name	Organization	Position
Mario Alvarado Mora	ACOPE	Director Ejecutivo
Masaki Osawa	Agencia de Cooperación Internacional de Japón (JICA)	Asesor Formulación de Proyectos
Takeshi Takano	Agencia de Cooperación Internacional de Japón (JICA)	Representante Residente
Andrés Obando Chaves	ARESEP	Profesional 3, Área Regulación
Eddy Víquez Murillo	ARESEP	Profesional 4, Área de Regulación
Edward Araya Rodríguez	ARESEP	Intendente de Transporte
Jorge Emilio Espinoza Gutiérrez	ARESEP	Especialista en regulación
María Fernanda Chavarría Molina	ARESEP	Profesional 5 en Estrategia
Ricardo Matarrita Venegas	ARESEP	Director de Estrategia
Víctor Valverde Espinoza	ARESEP	Ingeniero Eléctrico
Silvia Elena Rojas Soto	Asociación Costarricense de Movilidad Eléctrica (ASOMOVE)	Directora ejecutiva
Bryan Molina	Banco Interamericano de Desarrollo (BID)	Consultor en Energía
Gisela Ferrari	Banco Interamericano de Desarrollo (BID)	Consultora en Cambio Climático y Genero
Gloria Visconti	Banco Interamericano de Desarrollo (BID)	Especialista Líder en Cambio Climático
Isabel Granada	Banco Interamericano de Desarrollo (BID)	Especialista Senior en Transporte
Javier Urra	Banco Interamericano de Desarrollo (BID)	Jefe de Operaciones, Costa Rica
Juan Carlos Martínez	Banco Interamericano de Desarrollo (BID)	Consultor
Luz Caballero	Banco Interamericano de Desarrollo (BID)	Consultora en Energía y Genero
Ricardo Goncalves	Banco Interamericano de Desarrollo (BID)	Consultor en Cambio Climático
Sylvia Larrea	Banco Interamericano de Desarrollo (BID)	Especialista Líder en Energía
Valentina Saavedra	Banco Interamericano de Desarrollo (BID)	Especialista en Cambio Climático
Gian Franco	Banco Interamericano de Desarrollo (BID) – BID Invest	Oficial Líder en Inversiones
Gloriana Alvarado	Banco Interamericano de Desarrollo (BID) – BID Invest	Oficial de Operaciones, administración de la cartera de operaciones
Johanna Gómez	Banco Interamericano de Desarrollo (BID) – BID Invest	Oficial Líder en Inversiones

Full Name	Organization	Position
David Vilar	Banco Mundial	Especialista Senior en Energía, Líder de Programa
Li Qu	Banco Mundial	Especialista Senior en Transporte
Peter Johansen	Banco Mundial	Especialista Senior en Energía
Rafael Ben	Banco Mundial	Especialista en Energía
Daniel Diez	Banco Mundial – CIF	Analista de Operaciones
Ken Ijichi	Banco Mundial – CIF	Official de inversion
Mauricio Child	Banco Mundial – CIF	Especialista en Finanzas
Mía Rodríguez	Banco Mundial – CIF	Oficial de Inversión
Norbert Schneider	Banco Mundial – CIF	Official de inversion
María Brenes Quesada	Banco Nacional de Costa Rica	Directora, Relaciones Institucionales y Sostenibilidad
Silvia Chaves Herra	Banco Nacional de Costa Rica	Relaciones Institucionales y Sostenibilidad
Silvia Chaves	Banco Nacional de Costa Rica (BNCR)	Directora de Relaciones Institucionales y Sostenibilidad
José Fabio Bolaños Alpízar	Banco Popular	División Banca Institucional Corporativa
Miguel Sánchez Chacón	Banco Popular	División Banca Institucional Corporativa
Jeffrey Carmona Zúñiga	BCIE	Ejecutivo Proyectos Sector Público Soberano
Debora Ley	CEPAL México	Oficial a Cargo, Unidad de Energía y Recursos Naturales
José Mario Jara Castro	Compañía Nacional de Fuerza y Luz	Gerente General
Mauricio Moreno Paniagua	Compañía Nacional de Fuerza y Luz	Asistente de Gerencia General
Natalia Alvarado Sanabria	Compañía Nacional de Fuerza y Luz	Asistente de Gerencia
Randall Zuñiga Madrigal	Compañía Nacional de Fuerza y Luz	Sub-Gerente
Rodrigo Espinoza Porras	Compañía Nacional de Fuerza y Luz	Jefe Unidad Transformación Digital del Negocio
José Mario Jara	Compañía Nacional de Fuerza y Luz (CNFL)	Gerente General
Mauricio Moreno	Compañía Nacional de Fuerza y Luz (CNFL)	Asistente de la Gerencia General
Randall Zúñiga	Compañía Nacional de Fuerza y Luz (CNFL)	Subgerente General
Rodrigo Espinoza	Compañía Nacional de Fuerza y Luz (CNFL)	Jefe Unidad de Transformación Digital del Negocio
Erick Rojas	CONELECTRICAS	Gerente General
Melvin Pacheco Vasquez	CONELECTRICAS	Subgerente de Operaciones, Director Proyecto AMI
Melvin Pacheco	CONELÉCTRICAS	Subgerente Técnico Operativo
Francinny María Rodríguez Villalobos	COOPEALFARORUIZ	Auxiliar de Pagaduría
Carlos Andres Salazar Lopez	COOPEALFARORUIZ R.L.	Jefatura de Ingeniería Eléctrica
José Ernesto Acosta Morales	Coopeguanacaste	Gerente administrativo financiero
Fresia Quirós Álvarez	Coopeguanacaste, R.L.	Jefe Servicios Técnicos
José Ernesto Acosta Morales	Coopeguanacaste, R.L.	Gerente Administrativo Financiero
Gerardo Arce Arguello	Coopelesca R.L.	Equipo de Ventas de Soluciones Empresariales
Marlon Vargas Mejías	Coopelesca R.L.	Gerente de Electricidad
Milton González Tenorio	Coopelesca R.L.	Departamento de Estudios Económicos y Presupuesto
José Francisco Hidalgo Moreira	Empresa de Servicios Publicos de heredia S.A. (ESPH S.A)	Director del Negocio de Energía Electrica y Alumbrado Público
Esteban Echeverría	Fundación CRUSA	Coordinador de Alianza por el Hidrógeno
Flora Montealegre Guillén	Fundación CRUSA	Directora Ejecutiva
Rosina Campos Torres	Fundación CRUSA	Oficial de Proyectos - Descarbonización
Andreas Villar	GIZ	Director

Full Name	Organization	Position
María Gabriela Vázquez Suárez	Instituto Nacional de Aprendizaje	Asesoría de Calidad y Ambiente Institucional
Cristian Acuña Brenes	JASEC	Director Operaciones
Deiber Arrieta Fonseca	JASEC	Jefe Departamento Contabilidad
Edwin Aguilar Vargas	JASEC	Jefe Departamento de Proyectos
Marco Centeno Masis	JASEC	Jefe Departamento Servicios Técnicos
Mario Jimenez Brenes	JASEC	Jefe Área Distribución
Christian Acuña	Junta Administradora del Servicio Eléctrico de Cartago (JASEC)	Coordinador Mantenimiento de Red
Francisco Tula Martinez	MIDEPLAN	Gerente de Área de Inversiones
Francisco Tula Martínez	MIDEPLAN, Costa Rica	Director Área de Inversiones
Alberto Antillón Arroyo	MINAE	Director de Energía
Carlos Cordero Vega	MINAE	Director SEPLASA
Raquel Díaz Peralta	MINAE	Asesora Viceministerio de Energía
Ronny Rodríguez Chaves	MINAE	Viceministro de Energía
Alberto Antillón	Ministerio de Ambiente y Energía (MINAE)	Director de Energía
Tatiana Abarca Rojas	Ministerio de Hacienda	Analista
Seidy Solís Hernández	Ministerio de Hacienda- UAPP	Profesional Egresos 1B
Carla Morales Rojas	Ministerio de Planificación Nacional y Política Económica	Directora del Área de Análisis del Desarrollo
Carlos Ávila Arquín	MOPT	Viceministro de Transportes y Seguridad Vial
Ignacio Romero	PNUMA	Gerente de Proyecto Iniciativa Generación SOLE
Gustavo Valverde Mora	Universidad de Costa Rica	Profesor Catedrático

3. Stakeholders Consultations on Gender and Social Inclusion Issues

As stated before, during the IP preparation, consultations with stakeholders from the public and private sectors and representatives from the civil society were carried out to understand existing gender and social inclusion gaps, barriers, and entry points in the context of Costa Rica, particularly in the energy sector. Throughout the IP implementation, additional possibilities for actively including women and diverse populations will be considered – depending on the areas of intervention – in line with the GoCR's priorities on gender equality and social inclusion, and following the MDBs gender policies, strategies, and gender action plans, as well as the CIF Gender's Policy and Gender Action Plan.

3.1 Consultations

During August and September 2023, virtual interviews were conducted with members from the GoCR, the private sector, and Civil Society Organizations (CSOs) representing women, people with disabilities, indigenous people, Afro-descendants, and young and elderly adults. Table 2.4 provides details on representatives from participating organizations.

Table 2.4. List of organizations and persons consulted through virtual meetings and interviews

Civil society organizations-non-governmental organizations, and others				
#	**Organization**	**Description**	**Contact Person**	**Role**
1	ASOMOVE (Asociación Costarricense de Movilidad Eléctrica)	Non-profit organization that promotes the use of electric mobility in Costa Rica. The association works to educate the public about the benefits of electric mobility, as well as to facilitate access to electric vehicles and their components.	Silvia Elena Rojas Soto	Executive Director
2	ACICAFOC (Organizaciones de Apoyo a Pueblos Indígenas y Comunidades en Centroamérica)	Network of organizations working to support indigenous peoples and communities in Central America. The network is dedicated to promoting the rights of indigenous peoples, the protection of natural resources and sustainable development.	Alberto Chinchilla	Executive Director
3	MATZU	Non-governmental organization that works on biodiversity, green jobs, community involvement and inclusion. The organization develops conservation, environmental education and sustainable development projects.	Rebeca Vaglio A.	Director
4	Fundación Mujer	Non-profit organization that works to promote women's rights in Costa Rica. The foundation provides support to women victims of violence, as well as to women entrepreneurs.	Zobeida Moya Lacayo	Executive Director
5	Fundación CRUSA	Non-profit organization that works to promote sustainable development in Costa Rica. The foundation funds projects in areas such as education, health, environment, and economy.	Esteban Echeverria	Coordinator of the Hydrogen alliance
6	Fundecooperación	Non-governmental organization which objectives are to manage financing oriented to sustainable development, through innovative, inclusive and tailor-made programs that meet the economic, social and environmental needs and opportunities of micro, small and medium-sized producers in Costa Rica.	Marianella Feoli	Executive Director
7	AED (Alianza Empresarial para el Desarrollo)	Non-profit organization that works to promote sustainable development in Costa Rica. The alliance brings together civil society organizations, businesses and local governments to work together on social responsibility and sustainable development projects.	Olga Sauma	Director
8	ALAS (Asociación para el Liderazgo y Ascenso Social)	Non-governmental, non-profit organization with experience in the personal, professional and business empowerment of women. Its mission is to be the leading organization in the empowerment, visibility and creation of support networks for women.	Nuria Marín Raventós	Chief Executive Officer

9	Organización de las Naciones Unidas en Costa Rica	Through the United Nations Development Assistance Framework (UNDAF), they support Costa Rica in identifying and addressing its challenges and gaps in achieving sustainable development.	Allegra Baiocchi	United Nations Resident Coordinator in Costa Rica
10	inclusión Isidreña (Asociación de Desarrollo Específica Inclusión Isidreña de Personas con Discapacidad	Association dedicated to promoting the inclusion and development of people with disabilities in the community of Isidro, offering support and programs designed to improve their quality of life and encourage their participation in society.	Ana Leal Gutierrez	Vicepresident

Energy Distribution Companies				
#	**Organization**	**Description**	**Contact Person**	**Role**
11	CNFL (Compañía Nacional Fuerza y Luz)	Costa Rican public company in charge of generating, distributing, and commercializing electric energy. The energy produced is mainly from renewable sources such as hydroelectric, geothermal, and solar.	Mauricio Moreno Paniagua	General Management Advisor
12			Randall Zuñiga Natalia Alvarado Say-Lheng Solera Ching	Assistant Manager General Management Advisors Technical
13	CONELÉCTRICAS (Consorcio Nacional de Cooperativas de Electrificación Rural)	*CONELÉCTRICAS*, is comprised by the four cooperatives of the electric sector. Its objectives are: joint representation and defense, energy production, joint acquisition of goods and services, and technology transfer.	Rebeca Valido A.	Director

Financial Sector				
#	**Organization**	**Description**	**Contact Person**	**Role**
14	Banco Nacional de Costa Rica	Costa Rica's state-owned bank that provides financial services	María Brenes Quesada	General Director of Institutional Relations and Sustainability

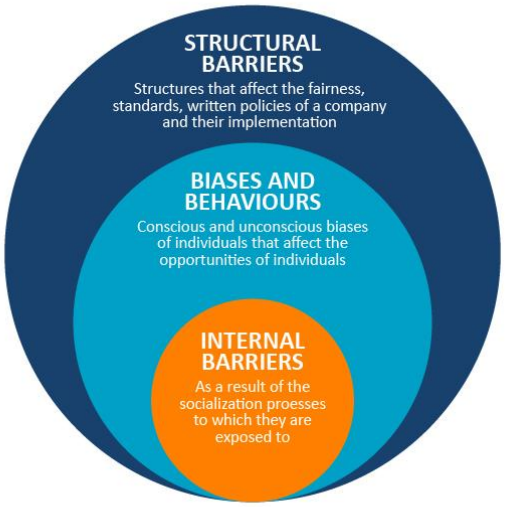
Public Sector				
#	**Organization**	**Description**	**Contact Person**	**Role**
15	INAMU (Instituto Nacional de las Mujeres)	Autonomous institution of the GoCR in charge of promoting and protecting the human rights of women, as well as their autonomy, inclusion, empowerment, and non-violence against gender-based violence, in coordination with the Costa Rican State and civil society.	Adilia Caravaca Zuniga Aimará Espinosa Olape	Executive President Advisor to the Office of the Executive President
16	Consejo Nacional de la Persona Adulta Mayor (CONAPAM)	Public institution of the Government of Costa Rica responsible for promoting the improvement of the quality of life of the elderly, through the formulation and implementation of comprehensive public policies that create conditions and opportunities for older adults to have a full and dignified life.	Emilia Mora Campos	Executive Director
17	Ministerio de Energía y Ambiente (MINAE) - SEPLASA (Secretaría de Planificación Sectorial de Ambiente, Energía, Mares y Ordenamiento Territorial)	Ministry responsible for environment, energy, and marine management.	Carlos Cordero Vega	Director SEPLASA
18	ARESEP (Autoridad Reguladora de los Servicios Públicos)	Autonomous institution of the GoCR in charge of regulating the public utilities of potable water, electricity, telecommunications, and public transportation.	María Fernanda Chavarria Molina	Strategy Professional
19			Edward Araya Rodríguez Sofía Arburola Briceño	Intendant of Transportation Engineer of Transportation Intendance

3.2 Methodology

Consultations were carried out applying a systemic methodology that integrates the different dimensions that affect gender and diversity equality, women's empowerment, and social inclusion: laws, social norms, biases, and behaviors, as well as internal barriers for women (Figure 2.1)[90]. Applying these concepts to the energy sector is crucial to understand: (i) the gaps and barriers women and diverse groups face in the sector; and (ii) the entry points and opportunities to address these gaps and barriers with practical solutions that can be implemented in the short, medium, or long term.

[90] Consultations were carried out by a consulting firm, CoreWoman, which uses the systemic approach methodology of Naila Kabeer (1999, 2008) and the adaptation made by Susana Martinez-Restrepo (Director of CoreWoman and founding partner) for Latin America and the Caribbean region.

Figure 2.1. Methodology with a systemic approach



1. The structural dimension can account, for example, for the role of care played by women, or for laws that affect women differently.

2. The biases and behaviors dimension address the fact that women are discriminated against, or sexually harassed or abused, and how this affects their opportunities and preferences.

3. Internal barriers resulting from gender socialization processes through which gender norms are internalized from an early age, such as lack of confidence, negotiation skills and risk aversion, among others.

3.3 Consultation results

A description of the main gaps, barriers and entry points identified during the interviews, as well as the main conclusions, are described below:

3.3.1 Existing barriers and gaps

3.3.1.1 Structural aspects

Under-representation of women as a workforce in the sector

Culturally in Costa Rica, as well as in most Latin American countries, deep-rooted gender roles have been established that assign women the primary responsibility for caring for the home and family. This often places women in a disadvantaged position compared to men when it comes to accessing leadership roles, supply chain employment opportunities, or even employment positions in general, and restricts their participation in industries, such as energy, which have traditionally been heavily dominated by men.

Only 8.1% of employed people in Costa Rica work in Science, Technology, Engineering, and Mathematics (STEM) areas, and among them, women only represent 34.4%.[91] Additionally, most men are employed mainly in STEM areas with high labor demand (86.1%), such as advanced manufacturing, life sciences, and business services. In contrast, women occupy a significantly higher proportion (63.5%) of positions in STEM areas that show lower demand, such as health sciences.[92]

[91] Programa Estado de la Nación, 2023
[92] Instituto Nacional de Estadística y Censos, 2022

Although women in Costa Rica have a higher graduation rate than their male peers, reaching 63.3%, this educational advantage is not reflected in the labor market as there is currently a female unemployment rate equivalent to 16.4%.[93]

Geographic and economic inequalities

Costa Rica presents different economic realities and conditions, especially in terms of poverty and access to services. According to data from the United Nations (UN, 2023), 46.9% of households living in poverty are headed by women. This number is even more relevant considering the increased number of women leaving the labor force, a trend driven by various factors, such as the unsuccessful search for decent employment, the burden of unpaid household chores, and unpaid care responsibilities.

Even though more than 60% of the population resides in metropolitan areas, indigenous and Afro-descendant communities, which face significant poverty rates, are located in remote areas of the country. According to the opinions gathered from some of the people interviewed, many socioeconomic development programs, promoted by both the public and the private organizations at the national level, tend to focus on urban areas given that these regions concentrate a greater number of consumers, businesses, and infrastructure. However, this approach has contributed to the lag of other areas, which tend to be marginalized and remain practically invisible in the processes of economic and social development. In addition, the dispersed geography of these communities makes it even more difficult for them to be identified and to participate effectively in development projects.

The lack of access to energy sources, such as electricity, gas, or cylinders, further aggravates this situation, which has significant impacts on the health and quality of life of these communities. In rural areas and among indigenous women, the practice of using firewood as the main source of energy for cooking is still common. In addition to being harmful to the environment, this practice impacts increased health risks for those who use it. Additionally, the lack of information and education on the use of clean and efficient energy limits women's ability to make informed decisions on the selection of energy-efficient products and services.

Lack of access to formal education

It is essential to address the lack of access to formal education, especially in rural areas, where most of the population has no access to tertiary education mostly due to inefficient coordination between educational institutions and rural high schools. Access to formal education plays a fundamental role in promoting STEM careers related to the energy sector. The lack of educational opportunities for women and individuals from diverse groups usually hinders the economic development of communities and limits employment opportunities for women.

Lack of access to land, assets, and financial credit

Women face significant challenges in terms of their access to land and assets, which impacts their ability to access financial credit. Unequal land and property tenure limits women's ability to offer collateral or guarantees in financial transactions, often resulting in more restricted access to credit and essential financial services. The disparity in access to tangible assets not only perpetuates gendered economic inequalities but also reinforces systemic biases that further hinder women's economic empowerment.

[93] Programa Estado de la Nación, 2023

Bureaucracy

Excessive bureaucracy and lack of adequate legal advice can discourage entrepreneurship and access to commercial opportunities in decarbonization projects, which becomes an obstacle, especially for people with limited resources or access to information. For example, peasant and indigenous communities have been engaged in local initiatives related to climate change, but existing legal procedures for accessing public aid are often too tedious and are not even available in the language of these communities.

This challenge also affects women and people belonging to diverse groups who own small and medium-sized enterprises (SMEs). In attempting to formalize their businesses, they need to complete registration forms of up to 18 pages, and usually need personalized support to be able to complete the application properly.

Inadequate transportation system

Limitations in mobility and access to public transportation pose obstacles for women and diverse groups in their daily lives. According to conversations held during the virtual interviews, some of the limitations are: (i) lack of flexible public transportation often limits women and diverse group's their ability to get to their jobs, schools, and care responsibilities on time; (ii) not counting with effective protocols and security measures on buses to address sexual harassment is a significant concern among women; (iii) need of real-time information on public transport schedules and routes to help women and people from diverse groups to plan their journey avoiding long waiting times and delays; (iv) inadequate access to public transportation stations and vehicles usually excludes people with disabilities and limits their mobility options; (v) inefficient integration among public transport options complicates the mobility of women who play various roles in their daily routine. The need to make multiple transfers using poorly coordinated services makes it difficult for them to arrive to their activities on time; (vi) insufficient safe spaces: the absence of safe and secure spaces in public transport facilities, such as waiting areas or shelters expose women to risky situations.

3.3.1.2 Social biases and behaviors

Conscious and unconscious biases in masculinized industries

Micromachismos, understood as manifestations of sexism and gender discrimination in the form of subtle but harmful behaviors, attitudes, or comments, are prevalent in the highly masculinized energy sector in Costa Rica, which sometimes create a work environment where women and people belonging to unrepresented diverse groups feel excluded or face obstacles in accessing leadership positions and participation in decision-making processes.

In the electrical sector, there is a misperception that technical skills are related to physical strength, leading to a preference for hiring men in roles related to electromechanical processes, thus limiting employment opportunities for women with technical skills in this field.

In addition, the dynamics of networking and collaboration in the sector are often biased towards interaction between men, excluding women from opportunities for collaboration and professional growth. This exclusion perpetuates stereotypes that link technical skills and leadership to physical strength, excluding women who do not fit these stereotypes.

Interviewees stated that there is usually resistance to accepting women in leadership roles and a perception that women are not as competent as men in certain fields and roles, especially in decision-making positions. In cases where women do occupy leadership roles in these sectors, they do not always have equal opportunities, especially young women who often face additional discrimination due to their age to start their career in the labor market once they complete their academic degree.

Bias and discrimination in STEM areas

The insufficient presence of women in technical fields, such as engineering and science discourages young women from entering these areas. In 2023, only 23,82% of those affiliated with the Federated College of Engineers and Architects were women (8,668 women) compared to 76,18% of men (equivalent to 27,770 men)[94]. Women often have a sense of not belonging to predominantly male environments which in turn make them feel isolated and unsupported, further exacerbating the gender gap and potentially influencing their choice of professional careers.

On the labor supply side, this often leads to discrimination against women in hiring and promotion processes. If companies believe that women do not have the necessary training in these fields, it is likely that they will not actively seek female candidates, which at the same time, results in limiting the availability of skilled labor in the labor market. This discrimination not only harms women by denying them opportunities for employment and career growth but also represents a loss to companies by depriving them of diverse and valuable talent that could contribute significantly to their success and development.

In addition, the industry often uses language that is primarily directed toward the male gender, which can be alienating for women who aspire to enter or advance in STEM areas. This discrepancy is not only reflected in industry communication and advertising but also in technical terminology and job titles, thus contributing to the promotion of a culture that excludes women.

People from diverse groups in small energy transition projects are generally welcome, but as project complexity and budgets increase, gender and diversity barriers become more relevant. There is a tendency to assign larger, more strategic projects to male-led teams, while women and other diverse groups may face challenges in accessing these opportunities. A common belief that women can only be entrepreneurs in SMEs rather than leaders in large companies limits their opportunities and participation in meaningful projects and restricts not only their professional development but also harms diversity and innovation in the energy transition sector.

Biases in access to credit

Gender biases (referring to prejudices or stereotypes embedded in society that influence people's decision-making) throughout the processes of accessing credit and other financial opportunities affect credit risk assessment, resulting in higher interest rates, lower loan amounts, or even denial of credit for credit applications from women entrepreneurs or businesswomen in energy transition projects, which in turn limits their ability to finance and grow their businesses.

Sexual harassment in public transportation

[94] CFIA 2023

Women often suffer sexual harassment in public transportation which not only has an immediate impact on the safety and well-being of people using public transport but also has consequences on their mobility and quality of life: (i) sexual harassment deters women and other vulnerable groups from using these services, limiting their mobility and access to educational, employment, and social opportunities; (ii) victims of sexual harassment in public transportation face barriers to report these incidents and obtain an adequate response. The lack of reporting protocols, the indifference of witnesses, and the impunity of harassers contribute to the persistence of this problem.

3.3.1.3 Internal barriers

Lack of self-confidence

Mandates and social norms affect women from their early childhood, making them feel less competent and capable than men in certain areas, including the field of energy. Consequently, many women avoid the risk of pursuing a STEM career or creating or managing their own businesses.

Women and people belonging to diverse groups in the energy sector often avoid expressing their opinions or defending their ideas in critical meetings or discussions. There is a persistent fear that their voices will not be taken seriously or that their proposals will be dismissed without due consideration.

Lack of confidence in their own ability to exercise effective authority limits their opportunities for professional development and participation in strategic decision-making. In an ever-evolving industry such as the energy sector, diversity in leadership roles is becoming an essential factor to effectively addressing current and future challenges.

Lack of effective negotiation skills

The lack of good negotiation skills affects the ability of women entrepreneurs to obtain favorable agreements, access adequate financing for projects or ventures, or participate in successful business transactions.

Negotiation also plays an important role in building professional networks and seeking strategic alliances. Women who are not effective at negotiation may find it difficult to establish solid business relationships and take advantage of collaboration opportunities that could be beneficial to their projects.

3.4 Entry points and suggested activities to promote gender and social inclusion:

- **Integrate women business owners into the Costa Rican energy sector value chain** by, as a starting point, identifying women suppliers and the products or services they offer, and setting goals such as achieving a certain percentage of women-led suppliers within a defined timeframe; defining specific targets for new contracts to be awarded to women-led suppliers in a specific year; including at least one women-led supplier in every bidding or purchasing process; or setting growth targets for women-led businesses like increasing their turnover by 30% over the year. Additionally, it is essential to provide these women-owned small businesses with technical assistance, and training in technology, sales, and business management, which are crucial to become competitive.

- **Encourage female leadership** by highlighting the presence of successful women leaders in STEM fields through awareness campaigns to encourage women's interest in STEM careers and promote their participation in the labor market.

- **Promote community collaboration** as a fundamental pillar to promote sustainable development involving diverse stakeholders. For example, partnerships can be established with local organizations, such as ACICAFOC to work with women, indigenous and rural communities and ensure that their needs are duly recognized and addressed.

  Nationwide awareness campaigns on education programs and dissemination of opportunities and benefits of renewable energy for both women and the community at large can promote their role as active agents of change in development projects. Particularly in rural areas, women and people from diverse groups often face displacement and seek employment opportunities in other regions. Infrastructure projects, such as the creation of schools or childcare facilities can ease the creation of women-led enterprises in indigenous or rural communities and enable their active participation, provided they have the necessary training or prior experience and education.

- **Strengthening of municipal plans and collaboration with local governments.** Initiatives such as the "gender equality seal" created by INAMU and other related strategies seek to generate normative transformations at the local level, consolidating equality mechanisms as an integral part of the institutional structure.

- **Reaching remote communities through technological innovations in electricity access.** There are communities in remote locations that have so far lacked access to electricity but can finally light their homes using renewable energy sources. On the border with Panama, for example, there are nomadic settlements provided with portable solar panels.

- **The creation of incentives**[95] **for green projects, such as reducing interest rates on access to credit or simplifying the requirements for accessing financing** is essential to stimulate the adoption of sustainable initiatives led by women and people from diverse groups in Costa Rica. It is also important to simplify administrative processes to make them accessible to all women and people from diverse groups, avoiding unnecessary bureaucratic barriers.

- **Offer flexibility at work.** Some women-led ventures in Costa Rica are very successful, with remarkably high credit compliance rates and strong commitment. There is a significant opportunity for women with education and socioeconomic opportunities to enter high-innovation sectors. However, it is essential support women to combine their home responsibilities with entrepreneurial projects. Offering flexible and alternative options for child and elder care is essential to facilitate women's participation in the labor market.

- **Strengthening educational programs that promote the participation of women and people from diverse groups** through the creation of opportunities and scholarships. A strategic allocation of resources would not only support the individual growth of female technicians but also strengthen the talent pool in this sector.

[95] Incentives include measures or incentives that can be implemented to encourage the adoption of green and sustainable projects.

- **Generating synergies in the industry value chain by strengthening women's and people from diverse groups' ventures.** Electric mobility encompasses much more than just commuting; it is a chain of interconnected opportunities and potential ventures. Important doors are opening in various fields related to sustainability, such as expanding access to renewable energy sources in rural communities and promoting electric mobility.

- **The implementation of innovative solutions to address access limitations to the transportation system faced by women and people from diverse groups.** One example is the development of dedicated mobile applications that provide real-time information on schedules, routes, and availability of public transportation. These apps could be especially useful for those with tight work schedules or caregiving and educational responsibilities, as they would allow them to plan their commutes more efficiently. These apps could also incorporate safety features such as an emergency button that allows passengers to report situations of sexual harassment or insecurity in real time. Also, an integrated public transport system would reduce the need for multiple transfers and make commuting smoother and more convenient.

- **Improve connectivity in rural and indigenous areas.** In rural and indigenous areas, the lack of connectivity and knowledge of digital tools prevents women and people from diverse groups from accessing the internet and limits their participation in economic and educational opportunities. To address this, it is critical to map women and people from diverse groups in these areas recognize them as economic actors and expand the internet access to empower these communities through flexible connectivity networks.

- **Encourage companies to adopt gender and social inclusion policies.** Companies aiming to access concessional funds should be required to set gender equality objectives and adopt policies and action plans to promote gender equality and social inclusion, including people from diverse ethnicity, gender, and people with disabilities.

- **Monitoring and evaluation systems:** establishing indicators that require compliance with specific objectives allows companies to focus their efforts on monitoring the progress of these indicators. This implies developing verification metrics with a gender perspective at all levels of the company, covering aspects such as training, profitability, hiring, and career development, among others.

- **Creating inclusive infrastructure for access to public transportation:** encourage companies to take special measures, such as accessibility features (e.g. elevators, ramps) to ensure universal accessibility.

Table 2.5. Actions that can benefit gender and diverse groups according to the Gender Equality Perspective (GLI)

Systemic approach	Type	Potential activities and impacts
Women entrepreneurs	Owned by women and/or with female representation in management.	Specific training and leadership development programs for women, as well as financial support to women-led businesses including actions such as facilitating access to credit and reducing the bureaucracy that often hinders the progress of women entrepreneurs in their businesses. Promote gender diversity requirements in companies. It is critical to

Systemic approach	Type	Potential activities and impacts
		address internal biases that lead to women being more risk-averse, which often results in women applying for smaller loans. Provide training in negotiation, leadership, and management skills, in addition to supporting women in making bolder financial decisions. Activities should have a comprehensive design for long-term development and transformation.
Contractors/ employees	Companies committed to an equitable and gender-diverse workforce.	Plan to have a diverse and gender-inclusive workforce and be committed to improving equality in the work environment. Ensure that a percentage of workers in all hierarchies and divisions are women, especially in traditionally male-dominated sectors.
Supply chain	Companies committed to a gender-inclusive value chain	Prioritize procurement of goods and services provided by women-led producers and suppliers, particularly in the more remote regions of the country, which include rural and indigenous communities. To achieve this, the creation of entrepreneurship platforms in these regions could be considered to formalize and support women-led business initiatives. Provide women-owned small businesses with technical assistance, technology, and business management training, which are crucial to successfully compete for contracts.
Products and services	Companies committed to offering and designing products or services that consider the specific needs of women as a consumer segment.	Support initiatives aimed at developing products and services that specifically address women's needs, such as clean energy technologies designed to meet their requirements. Eliminate unnecessary bureaucracy by simplifying the technical language and facilitating accessibility and understanding of information and procedures.
Community	Companies that are committed to ensuring that their operations do not affect women and girls in the community and that their operations or social projects promote equality and empowerment.	Work closely with NGOs to establish concrete and shared objectives addressing essential needs such as access to water and sanitation, education, access to internet services and energy, especially for women and people belonging to diverse group. Identify NGOs with experience and a consolidated presence in rural areas and indigenous communities in Costa Rica. An example of such organizations is ACICAFOC, which is dedicated to creating political spaces to recognize and support indigenous and peasant communities. They also seek to mobilize resources to strengthen local organizations in these areas. These strategic alliances play a crucial role in promoting gender equality and inclusion among these populations. They can also enable these communities to access and take advantage of the economic and technological opportunities provided by digital connectivity.

Annex 3
Development co-benefits

The main co-benefits to be obtained from the development of the projects to be financed with the IP are:

Employment and Livelihoods: Jobs created – direct and indirect

The deployment, operation and maintenance of advanced metering infrastructure, associated electric grid management systems, the development of interfaces between the grid and users, the replacement of industrial combustion equipment with electric, as well as charging infrastructure for electric transportation, among other activities that will be financed or co-financed through the IP, will generate temporary and long-term jobs that will be an important indicator to be assed and monitored through project reporting. The fast deployment of charging infrastructure, as well as the scaling up of the electrification of industrial equipment based on the experience and knowledge accumulated in the supported initiatives may become growing sources of employment in the sector.

Just Transition: Social inclusion and distributional impacts

As mentioned before, in order to make this co-benefit a reality, priority will be given to the participation of companies that: (i) promote social inclusion and participation of the female workforce in non-traditional sectors such as energy; (ii) encourage professional training, the participation of women and diverse groups in leadership programs and in STEM technical careers; (iii) have human resources policies that include a gender equality and social inclusion perspective; (iv) have courses or workshops on inclusion of people with disabilities in the labor market according to their competencies; and, (v) conduct public consultations to increase the participation of women, diverse groups and members of local communities in decision-making processes.

Likewise, in coordination with the implementing and financing entities, actions will be conducted to: (i) promote small businesses and businesses led by women and minority groups; (ii) strengthen the capacities of women and minority groups in energy management; and (iii) promote the labor participation of women and minority groups in companies in the sector and in the proposed initiatives. Training activities will also be conducted on the use of AMIs, the efficient use of domestic energy, tariff schemes, prepaid electricity schemes, reading electricity bills, and customers' rights, with the aim of promoting the employment of women and people from diverse groups in activities such as customer service in operations centers, customer service to contribute to the efficient use of energy, and reduction of service costs.

Capacity building activities will also include training for employees whose jobs may be replaced, for example, in the metering of analog meters that are changed for smart meters and/or in disconnection and reconnection tasks that will be performed remotely.

Policy and Planning: Coherence across sectors

The decarbonization of the economy requires the concerted action of the public and private sectors, civil society, and development partners. In this context, in order to achieve the desired results and maximize the positive effects of the interventions proposed in this IP, priority should be given to planning and coordinated work among the relevant parties. Thus, for example, the deployment of charging infrastructure for electric transportation involves civil works, permits and financing from different local

and international sources that must be properly managed among the different parties involved. Only the timely provision of this infrastructure will allow the substitution of combustion vehicles for electric ones. Similarly, the best use of AMI requires the design and implementation of tariff schemes, time-of-use and prepaid schemes, that respond to the changing needs of users and the system in a way that improves resource management and reduces the cost of the electricity system. In this regard, the execution of the activities contemplated in the IP will be supported by the policies and legal instruments that are coherently integrated in the PNdD and in the collaboration of the GoCR at its different organizational and territorial levels.

Reduction of air pollution

The elimination of fossil fuel consumption through the electrification of public transportation and the replacement of industrial combustion equipment with electric will have a direct reduction, not only in GHG emissions, but also in other harmful fine particulate matter and noise. Reduced air and noise pollution will benefit the general population, but especially people living in urban areas that are most affected by heavy traffic and the concentration of polluting industrial equipment. The electrification of energy uses supported by NRES will have positive effects, particularly, on the health of the young and the elderly. These benefits can be amplified by favoring the shift to EV fleets in high traffic areas and of industrial equipment in hospitals and densely populated urban areas.

Annex 4
Existing activities in the field of renewable energy, by other development partners

As indicated in Sections 3.7 and 6.1 of this IP, Costa Rica is developing multiple initiatives for the promotion of renewable energies which have the support of international banks, development, and cooperation agencies. The most relevant initiatives in this area are summarized below.

French Development Agency (AFD): Provides financial support for the budget of the Costa Rican government for the implementation of the PNdD. This funding is accompanied by technical cooperation activities in: (i) promoting the use of electricity, particularly in the transportation sector; (ii) climate-smart agriculture and nature-based solutions; (iv) climate governance; (v) integrated waste management; (vi) sustainable territorial planning; and (vii) just transition. Other initiatives include the following:

- A partnership with the BNCR to finance projects that contribute to climate change mitigation or adaptation (electric mobility, renewable energy, solid waste, and eco-housing). The credit line is accompanied by a technical assistance program financed by the European Union.
- Financing of an exchange project between the Southern Region of France and Costa Rica ("Duo Diversité" project) to share experiences and operational solutions in the areas of ecotourism, biodiversity preservation, management of protected areas and water resources.

German Agency for International Cooperation (GIZ): III Climate Action Project: Under this program, the "Electric Mobility in Special Sectors" project is implemented with the objective of developing roadmaps for the promotion of electric transport in the tourism, light-duty transport, student, and worker transport sectors. This program also includes a project to update, expand and improve Costa Rica's national energy policy indicators. Other programs in execution are:

- "Low Carbon and Climate Resilient Transformation Pathways (Transforma)" project, GIZ provides funding to Costa Rica for USD 12.5 million for the change of production systems of relevant sectors towards low carbon and climate resilient pathways, as support to Costa Rica's NDCs and the implementation of the PNdD.
- Project "Climate Action - Electric vehicles for the tourism sector" through which an analysis of the supply and demand of services and equipment related to land transportation of domestic and foreign tourists is being carried out.

Global Environment Facility (GEF)/CRUSA Foundation/UNEP: GEF is developing the project"Accelerating the transition to electric public transportation in the GAM of Costa Rica", which aims to reduce GHG emissions through the large-scale deployment of electric public transportation vehicles in the GAM. CRUSA Foundation acts as executing agency while United Nations Environment Program (UNEP) as implement entity.

Inter-American Development Bank: The IDB and IDB Invest have been supporting Costa Rica's energy transition process through policy, investment, and technical assistance operations, including the following:

- Policy-Based Lending (PBL): Towards a Green Economy – Support for the National Decarbonization Plan I and II (CR-L1142 and CR-L1147): The project's objective is to support the country's gradual

transition to zero net GHG emissions by 2050 through policies that support the implementation of reforms focused on strengthening the management and monitoring of climate action in Costa Rica, conserve and restore high carbon ecosystems, replace GHG emitting agricultural practices, and promote the use of electricity in transportation and industry, particularly electromobility and public transportation.

- Conditional Credit Line for Investment Projects (CCLIP) with ICE: First Renewable Energy, Electricity Transmission and Distribution Program (CR-L1070). The specific objective of the first loan under CCLIP is to increase the supply of electricity based on renewable energies through the construction of two geothermal plants, as well as the modernization and digitalization of the transmission and distribution network. This includes, among others, new resilient technologies, and smart grids. The credit line contributes to sustaining the high share of renewable energies in the country's electricity generation matrix.
- Technical cooperation to support ARESEP in the calculation of the technical reference tariff for generation, transmission, and distribution, as well as in the modernization of the tariff structures of the electricity distribution systems of Costa Rica's public, municipal and rural electrification cooperatives (CR-T1219).
- Technical cooperation to support the development of the National Hydrogen Strategy towards a decarbonized economy (CR-T1239). The country already has a National Hydrogen Strategy, which will serve to position it at the international level on the issue of green hydrogen and will also serve to support the PNdD, reverse the growth of GHG emissions, and promote economic development and job creation.
- IDB Invest provides support for the country's energy transformation through financing to the financial sector to increase the number of green projects in its portfolio, complemented with technical assistance to the private sector. It also designs and implements innovative financing structures related to sustainability, such as the international bond linked to sustainability with Liberty Costa Rica.

Strategic Partnership to Strengthen the PNdD: Enables Costa Rica to access IRENA's Energy Transition Accelerator Finance Facility (ETAF) to provide affordable financing for energy projects that advance Costa Rica's decarbonization goals.

United for Efficiency (U4E)/UNEP: The project aims at developing a market for energy efficiency in lighting, air conditioners and refrigerators in Costa Rica, which will conduct demonstration projects for energy efficiency solutions in public buildings, with a total of three demonstration projects.

U.S. Department of State: Technical Assistance for the Development of Clean Energy and Governance, Decarbonization, Reliability, Resilience, and Integration of the Electricity Sector in Central America. The project aims to develop national capacities on smart grids, as well as to improve the current regulations for awarding concessions for power generation projects.

World Bank Group: The WB and IFC have also supported Costa Rica's energy transition and decarbonization process. The main activities currently under implementation are the following:

- Third Development Policy Loan (DPL) - Fiscal and Decarbonization Management (P177029): Program objectives include laying the foundation for a post-COVID-19 recovery by promoting green growth and low-carbon development.
- Technical assistance aimed at greater energy sector efficiency (potential reforms of the SEN and fuel subsidies policies), greater electrification of the economy (CIF Technical Assistance Facility on

electromobility), and greater integration of renewable energy (support in the design of the regulatory framework for optimizing the integration of distributed energy resources, including energy storage systems).

- IFC has supported the growth of financing portfolios for small and medium-sized enterprises (SMEs) seeking financing solutions for the acquisition of hybrid electric vehicles (HEVs) and/or electric vehicles (EVs). The objective is to provide companies with longer-term financing allowing sustained long-term supply of financing and leasing.
- IFC has supported the country's efforts to expand the transportation ecosystem based on green hydrogen technologies. Currently, IFC is part of an international consortium that was awarded NAMA2 funding to conduct preliminary studies to validate green hydrogen technologies for transportation in Costa Rica.
- IFC, through its alliance with the Central American Council of Regulators of Banking, Insurance and Other Financial Institutions (CCSBSO), the Dutch Entrepreneurial Development Bank (FMO) and the Norfund supports Costa Rica in: (i) identification of benchmarks of best practices in green taxonomy, government initiatives, regulators, private institutions and international voluntary frameworks; (ii) definition of the position of SUGEF; (iii) development of a green finance taxonomy guide; (iv) internal and external review of the guide by priority stakeholders; and, (v) adapting the guide to three of the participating superintendencies. The development of green financial markets would require moving forward with the taxonomy and increased awareness of banks and investors.

Annex 5
Investment Plan Component Investment Concept Brief

Component 1: Smart grids and flexibilization of the electricity system

Problem statement

Costa Rica's electricity system is 99% decarbonized. Hence, the SEN plays a fundamental role in the decarbonization process through the electrification of activities and meeting the additional demand that arises from this process with the addition of NRES. To this end, the grids must advance in the process of deploying advanced metering systems that allow dynamic management of the grid and provide flexibility to incorporate these NRES, also making the SEN more efficient by reducing operating costs and implementing time-of-use and prepaid tariffs that improve the use of the resource.

Conversely, the installation of smart meters and communication systems that enable remote metering requires complementary information systems to take full advantage of the potential of technology by enabling monitoring, network management, demand control, data analysis and the implementation of applications that strengthen the relationship between users and the network.

The ENREI has established a roadmap for the digitization of 100% of the Country's electricity grid by 2026. Although 29.7% of users already had smart meters by 2022[96], to reach the national target, companies must make investments for which they face high costs and reduced availability of financing. In this context, funding from sources such as the CIF-REI program is necessary to accelerate the process of deploying advanced metering infrastructure and complementary information systems as key ingredients to achieve a zero net emissions economy by 2050, as Costa Rica aspires.

Proposed contribution to initiating transformation

Financing from the CIF-REI program is expected to generate a transformational change that accelerates the energy transition of Costa Rica through projects that become part of the portfolios of local banks in the following areas:

- Massive digitization of metering and smart grid management systems that generate enabling conditions and SEN resilience for the integration of additional NRES to cover the expected incremental demand of 71 MW per year required resulting from the interventions proposed in the IP and, thus, accelerate the transition to a decarbonization model that incorporates climate action, adaptation and resilience with inclusivity.
- Move towards a more efficient electricity service by reducing metering operational costs, better system management, less technical and non-technical system losses, and proper integration of NRES. Greater efficiency of the electricity system is necessary to achieve decarbonization without increasing the cost of service, which is a central element in the just energy transition the Country pursues.
- The application of time-of-use and prepaid electricity rates will improve the use of grid resources, reducing operating costs, promoting electric mobility through time-of-use tariffs that facilitate charging electric vehicles at homes and empowering users through applications that enable their interaction with the grid and access to value-added services.

[96] With remote reading and disconnection capability. The total rises to 45.1% when automatic reading meters are considered. ARESEP (2023). Informe sobre la calidad del suministro de electricidad.

- The AMI will allow the application of recently approved regulations for the effective incorporation of distributed resources to the SEN, which establishes rate methodologies for interconnection, access to the grid, purchase, and sale of excess energy between distributors and distributed generators.

Implementation readiness

The BNCR as well as the BP have been identified as potential entities responsible for the implementation of smart metering projects and, as such, are expected to appropriately allocate the resources received from the CIF through the MDBs. Both banks will be instrumental in identifying projects with the desired level of maturity and potential eligibility for funding under the program.

For the preparation of the IP, projects have been identified by CONELÉCTRICAS, CNFL and JASEC that could be part of a preliminary portfolio aligned with the eligibility criteria developed in this document, which should be evaluated individually to obtain financing from the program. MDBs could also allocate funding to initiatives they deemed suitable to fulfill the objectives of this program and that comply with their eligibility standards.

All distribution companies in the country have smart metering installation programs in different stages of implementation. The experience of these companies in the development of these initiatives has been supported by local financing from the BNCR and the BP, as well as financing from MDBs, particularly from the IDB. In this sense both, the implementing and executing entities, have experience in financing and executing infrastructure projects and advanced metering systems.

The progress of the distribution companies in the digitalization of the networks has been guided by the goals established in the ENREI. The need to meet these goals confirms the interest and commitment in the execution of these projects. Furthermore, in response to this national strategy, ARESEP has developed regulations that will allow realizing the potential of the AMI infrastructure for the incorporation of NRES and the efficiency of the system, particularly through tariff methodologies for interconnection, network access, purchase, and sale of excess energy between distributors and distributed generators, as well as new tariff schemes for time-of-use and prepaid rate schemes.

Rationale for REI financing

Concessional funding from the CIF-REI program will contribute to the deployment of smart grids and the flexibilization of the SEN for the introduction of NRES through actions in the following areas:

- Enhancing infrastructure to be renewable energy-ready: The AMI infrastructure and associated systems will allow progress in the digitization, modernization, automation and flexibilization of grids, monitoring and management of energy demand and will facilitate the integration of renewable energy sources to meet the growing demand for electricity.
- Enhancing system and market design and operation: The digitization of grids through the adoption of outage control systems (OMS), distribution management systems (DMS), geographic identification systems (GIS), supervisory control and data acquisition (SCADA) and meter data management (MDM) systems will allow for greater responsiveness and efficiency in grid operation, helping to optimize performance, improve quality of service, facilitate predictive maintenance and enable the integration of renewable energy sources and storage.
- Scaling up renewable energies enabling technologies. This will be promoted through time-of-use tariff schemes that facilitate the charging of private vehicles at home.

- Contribution to a just energy transition. Greater efficiency in service provision will prevent increases in the cost of electricity, while new time-of-use and prepayment tariff schemes will empower users in relation to the grid. Both elements are central to an inclusive and just transition.

These interventions will contribute to an enhanced capacity to integrate additional volumes of NFES, in particular, to satisfy with renewable sources the expected additional demand of 71 MW of electricity that will result from the initiatives contemplated in this IP, such as the electrification of transport and industrial energy uses.

Additionally, while electricity currently accounts for 22.3% of final energy consumption, both the GoCR and the CIF-REI program expect to increase this share through the electrification of energy uses.

Results indicators

The following are the results indicators to be monitored during the implementation of Component 1 of the Costa Rica IP for the CIF-REI program:

- Number of users by gender with advanced metering systems installed by the year 2030.
- Number of installed Outage Control Systems (OMS), Distribution Management System (DMS), Geographic Identification Systems (GIS), Supervisory Control and Data Acquisition (SCADA), and Meter Data Management (MDM) systems.
- Number of operational applications for interaction between users and the network.
- Implementation of new hourly and prepaid tariffs.
- Reduction in the operating cost of the electricity service (USD) through more efficient management, reduction of losses, and the incorporation of NFER.

Financing plan, including financial instruments

		FINANCIAL RESOURCES						
		CIF-REI (through MDBs)		Leverage				
Components		Private Banks or MDBs	NTA (MINAE)	MDBs	ICE Group	GCF	Private Investment, Private Banks, and other financial institutions	Component Subtotal
1	*Smart grids and flexibilizations of the electricity system*	18.30	1.00 (1)	62.70		53.45 (2)	- 38.00	173.45
Subtotal		19.30		154.15				
TOTAL		USD 173.45 M (USD18.30MM concessional + USD1M NTA + USD154.15 M MDBs and others)						

(1) NTA for mainstreaming the social inclusion and gender approach in all projects developed with CIF-REI financing.
(2) IDB loan (CR-L1070) for investments to strengthen the advanced metering network.

Project preparation timetable

Project phase	2023	2024				2025				2026				2027				2028				2029				2030			
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
IP endorsement																													
Preparation of operations: BID Invest																													
Official agreement																													
1st disbursement																													
Implementation																													

Non-reimbursable component funding

For the execution of the total of USD 19.30 million considered in this Component 1 of the IP, USD1 million is requested for actions to promote social and gender inclusion in all projects developed in the IP with CIF-REI financing. These activities will be carried out in coordination with the implementing and financing entities and may include:

- Raising awareness about the gender perspective in the execution of the projects developed.
- Promotion of women's employment participation in companies in the sector and in the proposed initiatives.
- Strengthening of women's capacities in energy management.
- Promoting employability, entrepreneurship and small businesses and companies led by women.

Component 2: Electrification of energy uses

Problem statement

The reduction of GHG emissions required to meet the NDC commitments, as well as the goal of a zero net emissions economy by 2050, requires the transformation of Costa Rica's energy sector. In particular, it requires the decarbonization of the transportation sector, the main contributor to GHG emissions, which is expected to contribute 54% of the GHG reductions contemplated in the NDC, as well as significant contributions from the industrial sector, which would contribute 14% of the reductions foreseen in that plan. In the case of Costa Rica, the decarbonization of both activities will be based on their electrification to take advantage of the country's 99% renewable electricity generation.

To achieve these goals, the country needs to make significant investments in both sectors. This component of the IP proposes investments for the development of electric bus charging infrastructure to contribute to the electrification of this service, as well as for the replacement of industrial combustion equipment for electric. However, the current fiscal situation, the availability and cost of financial resources are barriers to making available and accessing the necessary resources to achieve these transformations and may delay progress in this direction, as well as jeopardize the achievements already made.

In this sense, the resources from the CIF-REI program and the participation of local banks could help overcome cost and the timeframe of financing constrains as well as risk perception barriers that accompany the adoption of new technologies and, thus, facilitating private participation in the investment needed to achieve this transformation.

Additionally, the adoption of new technologies requires that the financing and new business models that will make it possible be properly structured and validated. The NTA available through the CIF-REI program for this component will technically and financially confirm the feasibility of the projects that may be presented.

Proposed contribution to initiating transformation

The projects financed through Costa Rica's CIF-REI program will contribute to the transformation process of the Country's energy sector in the following ways:

- Accelerate transport electrification of by deploying charging infrastructure for the introduction of an estimated 185 electric units in the GAM between 2024 and 2030 which will represent an additional demand of 21.3 GWh to supplied with an increase of 36 MW in renewable generation capacity.
- Accelerate industry electrification by replacing combustion industrial equipment with electric ones with an annual demand of 19.2 GWh for which it is required to add 35 MW in renewable generation capacity[97].
- Direct reduction of GHG emissions by avoiding the emission of 17,729 tCO2e per year[98] due to the electrification of public bus service and industry[99].
- Mainstreaming of the just energy transition approach in all proposed interventions, in particular women and their participation in the transformation of the energy sector.
- Strengthening the role of the private sector in fighting climate change through public-private partnerships.

Implementation readiness

As mentioned, initiatives were identified for the replacement of 185 internal combustion bus units that provide public bus service in the GAM with electric units. These initiatives would represent the electrification of 57% of the total of buses that has reached the age limit of 15 years to provide this service in the country. These projects have preliminary technical and financial studies carried out by the CNFL in association with public bus service concessionaires for the installation of charging infrastructure and network reinforcement.

BNCR began the process of structuring and obtaining financial resources for the creation of a fund that will channel private risk financing, as well as financing from multilateral sources, to facilitate the acquisition of electric buses. The concessionaires would lease the buses from the guaranty trust that will manage the fund and arrange the purchase and maintenance of the electric units with the manufacturer(s).

With the support of international cooperation, the country has completed pilot projects through which electric buses were introduced in several routes of the GAM and allowed collecting information on their performance in the local context and conditions. The projects also familiarized service providers and users with the operation of electric buses. The experience with the technology and the information gathered through these projects will facilitate the adoption of the technology.

In terms of electrification of combustion equipment operating in public and private entities, ICE and its subsidiary CNFL have experience in the development, through public-private partnerships, of large-scale complex projects for the replacement of this equipment for electric one[100]. The development of these

[97] CNFL (2023). Caso de negocio – Calderas Eléctricas, 2023.
[98] Estimates based on CNFL's the project for the electrification of public bus transport and replacement of combustion boilers.
[99] CNFL (2023). Ibidem.
[100] The developed projects provide energy solutions according to the needs of the private companies involved. These solutions would include the financial structuring of the projects, as well as the design and engineering works for the

projects was facilitated by public policies and regulations that allow access to reduced electricity rates for the electrification of industrial processes. The experience accumulated in this area and the financing of the CIF-REI program will serve as catalysts for the replacement of 628 boilers identified nationwide.

Costa Rica is committed to the electrification of its transport and industry as a requirement for the decarbonization of its economy. This commitment is reflected in the goals set in the PNdD, as well as in the PNTE, in the promotional electricity tariffs established for electric bus charging and the electrification of decarbonizing processes, as well as in the authorization of public-private partnerships between electricity distributors and bus service providers to facilitate the deployment of charging infrastructure and encourage the electrification of the service.

Rationale for REI financing

The concessional financing of the CIF-REI program will contribute to the direct electrification of the transportation and industrial sectors and, with this, to the transformation of the country's energy sector required to achieve the decarbonization of its economy.

Furthermore, these resources will facilitate the development of charging infrastructure and the necessary network reinforcements for its installation, which are an essential complement to the electrification of public bus transportation. Moreover, they will allow for better timeframes and reduce the financial cost of changing boiler and other industrial technology. In both cases, the CIF-REI resources will contribute to leverage national private efforts with resources from MDBs and other international agencies to promote the country's energy transition.

In addition, the resources available for NTA will help validate the technical and financial feasibility of combustion industrial equipment replacement projects and, thus, reduce the perceived risk of this change among private entrepreneurs, particularly among small and medium-sized companies whose resources are more limited.

Results indicators

The following are the results indicators that will be monitored during the implementation of Component 2 of the Costa Rica Investment Plan for the CIF-REI program:

- Number of electric bus chargers installed.
- Additional annual electricity demand (MWh) from electric bus charging.
- Number of combustion equipment replaced by electric.
- Additional annual electricity demand (MWh) from new electric boilers.
- Annual GHG emissions avoided (tCO2e) from operation of new electric public service buses and industrial equipment replacement.
- Mobilization of private capital (USD million) through new business models for the installation of chargers and electric boilers.

Financing plan, including financial instruments

installation of heat pumps, electric boilers, and other equipment, together with their peripheral equipment, the construction and reinforcement of the electric infrastructure, as well as the installation of electricity storage sources and photovoltaic generation that provide complementary energy and firmness to the installed systems.

		FINANCIAL RESOURCES						
		CIF-REI (through MDBs)		Leverage				
Components		Private Banks or MDBs	NTA (MINAE)	MDBs	ICE Group	GCF	Private Investment, Private Banks y other financial institutions	Component Subtotal
2	***Electrification of energy uses***	***48.70***	***2.00***	***57.30***	***33.00***	***30.00***	***399.50***	***570.50***
	i. Transport electrification	*23.70*	*-*	*37.30*	*33.00*	*30.00*	*399.50*	*523.50*
	ii. Industry electrification	*25.00*	*2.00 (1)*	*20.00*	*-*	*-*	*-*	*46.00*
Subtotal		*48.70*	*2.00*	*57.30*	*33.00*	*30.00*	*399.50*	
		50.70		**519.80**				
TOTAL		**USD 570.50 M (USD50.70 M concessional + USD 2M NTA + USD 519.80 MDBs and others)**						

(1) ATN for preparation of technical and financial feasibility studies to validate equipment replacement.

Project preparation timetable

Project phase	2023	2024				2025				2026				2027				2028				2029				2030			
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
IP endorsement																													
Preparation of operations: BID Invest																													
Official agreement																													
1st disbursement																													
Implementation																													

Non-reimbursable component funding

For the execution of the USD 50.70 million of Component 2 of the Investment Plan, non-reimbursable resources of USD 2 million are requested to carry out technical and financial feasibility studies for initiatives to replace combustion equipment with electric in public and private institutions.

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Title of the investment plan: **Renewable Energy Integration Program Investment Plan for Costa Rica**
Program under the GCAP: **Renewable Energy Integration Program (REI)**
Name of the reviewer: **Rolando Castro-Córdoba**
Date of submission: **October 6th, 2023**

Part I: General criteria

- **complies with the principles, objectives and criteria (with an emphasis on investment criteria) of the relevant program as specified in the design documents and programming modalities.**

Costa Rica's IP complies with the principles, objectives, and investment criteria of the relevant program, as it targets two of the main challenges of Costa Rica's energy transition and decarbonization: the electrification of transport and industry. In this regard, it has a great potential for transformational change, as it will take advantage of the technology for a more efficient energy use, will significantly reduce GHG emissions in the sectors most dependent on fossil fuels, has financial effectiveness as the funds will reduce the costs of the projects under implementation and expand the impact of those proposed in the plan, and finally the just energy transition, the gender equality and social inclusion is essential all along the proposal. It will also empower the user by providing value-added services, savings, and equitable efficiency to also reduce the cost of the service. The IP also targets key areas of this program such as enabling technologies, enabling infrastructure and electrification and demand management.

- **takes into account the country capacity to implement the plan**

The IP takes into consideration three of the strengths of the country: i) a coherent set of policies, national plans, and legislation to accelerate decarbonization, ii) the capability of the financial system and local companies to finance and implement large-scale local projects in the modernization of the energy sector, the introduction of renewable sources and the energy transition. iii) the country's favorable conditions to attract foreign and local investment and its excellent position in the economic transformation index, the political transformation index, and the governance index.

- **has been developed on the basis of sound technical assessments.**

The IP offers accurate technical information and analysis on Costa Rica's context, the energy sector overview, its challenges, a gap/barrier analysis, an in-depth analysis of country's renewable generation portfolio, to name a few. As a result, the technical assessment is very solid and well documented.

- **demonstrates how it will initiate transformative impact**

The IP expects that CIF-REI resources will accelerate Costa Rica's economy decarbonization process. It aims to overcome specific obstacles and to create enabling conditions for the integration of additional renewable energy sources into the SEN.

It also establishes clear goals and indicators to measure success in very key areas of the energy transition. Some of those impacts are the expected smart meter coverage (67%), the reduction in the cost of electricity service operation (USD 1.2 million annually), charging infrastructure (185 electric buses), replacement of combustion industrial equipment (annual demand of 19.2 GWh), incorporation of 71 MW of NRES to meet incremental demand, direct reduction of GHG emissions by avoiding the emission of 17,729 tons of carbon dioxide equivalent (tCO2e).

Also, the Monitoring, Evaluation and Learning approach for Costa Rica's IP is based on the CIF-REI's Integrated Results Framework. It contains a Theory of Change Map to Costa Rica's investment plan, where transformational change is one of the topics under analysis.

- **provides for prioritization of investments, stakeholder consultation and engagement, adequate capturing and dissemination of lessons learned, and monitoring and evaluation and links to the results framework**

According to the IP, "some activities could be considered a higher priority based on the associated social benefits or their impact on GHG emissions reduction, as the electrification of energy uses. Nevertheless, all three initiatives have equal opportunity to access program resources based on the proposals submitted by investors in alignment with the priorities and eligibility criteria of the IP". (Page 42).

As for consultation, the document states that IP is the result of a consultative process led by the GoCR with the support of the MDBs. These consultations shaped the "identification and prioritization of the lines of action in which financial support mechanisms are required". The consultation mechanisms included meetings and dialogues with relevant stake holders, including gender and social inclusiveness, and the publication of the IP on MINAE's website for comments. It is understood that such stakeholders will be also engaged in the implementation of the IP, but it is not that evident in the IP.

The means by which the lessons learned will be capture and disseminated are not that clear. It is mentioned that the "MDBs will provide private banks with a platform to share best practices", "the generation of knowledge and skills" is highlighted, and the "evaluative and/or learning approaches" are part of the monitoring process, but this is a project that could be replicated or escalated in other countries in the area so documenting lessons learned and best practices is strategic.

Finally, key importance is given to monitoring, evaluation and learning with the main purpose of tracking and reporting progress on outcomes and objectives and mirrors the chain of results from the support activities. According to the IP, "Its purpose is to get a holistic understanding of the program's progress, along with its thematic specificities to achieve a complex multidimensional objective". By reviewing the integrated results framework (8.1),

the theory of change concept map (table 4), the five dimensions of the transformational signals of change analysis and the Integrated Results Framework (table 5), one can conclude that monitoring and evaluation is one of the strengths of the IP.

- **adequately addresses social and environmental issues, including gender**

Social inclusion and gender perspective are very present and linked in the whole document, efforts were made to include women and diverse populations in the different lines of intervention. As an example, priority will be given to electric companies that promote social inclusion and participation of the female workforce, professional training, or have human resources policies that include a gender equality and social inclusion perspective. Actions are promoted not only for women and minority groups, as well as for employees whose jobs may be replaced by the introduction of technology. Also, non-Reimbursable Technical Assistance resources will be executed for mainstreaming gender and social inclusion in all projects developed under this component.

As for environmental issues, the main objective of the IP is to support the decarbonization of the Costa Rican economy, so it includes key issues of the environmental agenda such as climate change, energy transition, renewable energy, GHG emissions.

- **supports new investments or funding is additional to on-going/planned MDB investments**

The IP considers that the CIF-REI program will help catalyze and mobilize additional foreign and local investment to advance the decarbonization process in Costa Rica. The participation of the private sector, especially in investment of resources through public-private partnerships plus the experience of public utility companies and public banks in investment projects for the energy transition, are indicated as conditions that could in the near future attract more investments to match to on-going/planned MDB investments. Also, the multiple existing initiatives for the promotion of renewable energies that have the support of international banks and development agencies are also opportunities for additional funding.

- **takes into account institutional arrangements and coordination**

The IP highlights the importance of planning and coordination with relevant stakeholders "in order to achieve the desired results and maximize the positive effects of the interventions proposed". Such relevant actors in this proposal come from the public and private sectors, both national and international, public utilities, domestic and multilateral banks. So all the actions proposed in the IP are meant to be developed "in coordination with the implementing and financing entities", so a coordination mechanism could be further developed.

The IP also describes the legal and institutional framework. Institutional arrangements were already considered as the IP identifies potential entities responsible for the implementation of the project, such as local banks (BNCR and BP) and public utility companies such as CONELÉCTRICAS, CNFL and JASEC.

- **promotes poverty reduction**

The IP is not designed to reduce poverty as such, but emphasis is given to actions to ensure social and gender inclusion to foster the development of a just and inclusive energy transition process, including the "loosers" of the energy transition. Even though Costa Rica has one the lowest poverty rate in Latin America, still almost half of households living in poverty are headed by women. So, all the actions proposed to promote gender inclusion will have a direct impact on the reduction of poverty in such households.

Also, actions proposed by the IP, such as prepaid tariffs, which will be new in the country, will improve access and affordability of the service to lower-income families.

- **considers cost effectiveness of investments**.

The IP contemplates that the proposed investments are expected to have a positive transformational impact on the Costa Rican energy sector. Such investment will have impacts such as accelerate the process of digitization and modernization of the electricity grids, democratize grids by empowering customers, allow the integration of DER to the SEN, advance the process of modernizing tariffs that provide economic signals to promote efficient energy, accelerate the electrification of the public bus service, promote the decarbonization of the industrial sector through the electrification of industrial combustion equipment, and increase the participation of the private sector in the process of decarbonization of transportation and industrial energy uses through innovative public-private partnership schemes. If these results are implemented it will be game changer for Costa Rica, not only for the decarbonization process but also for the national economy as it will substitute imported fossil fuels for clean energy produced in Costa Rica. So, in that regard, the investment is cost effective in many ways.

Part II: compliance with the investment criteria or business model of the relevant program

The IP should broadly demonstrate the country's commitment to the following:

- **Reducing or avoiding energy-related greenhouse gas (GHG) emissions via deployment of Renewable Energy**

The IP will not only take advantage of the country's renewable grid but will also promote the deployment of more RE, mainly NRES and DER, to satisfy the increase in the demand that the electrification of the transport and industry will produce. By doing so, it estimates the reduction of GHG emissions of 17,729 tons of carbon dioxide equivalent (tCO2e).

- **Integrating large amounts of variable renewable energy generation into the power system**

One of the expected results of the IP is to incorporate additional NRES to meet an incremental demand of 40.5 GWh per year and an additional generation capacity of 71 MW required for the interventions proposed.

- **Grounding such commitments in official document(s) such as NDC, energy sector strategies, SDG-related plans, or other relevant low-emission and climate-resilient development plan or strategy referenced or annexed in the EoI**.

The IP builds on existing domestic policies and international commitments such as the NDC, the National Decarbonization Plan, the National Policy on Climate Change Adaptation, the National Action Plan on Gender Equality in Climate Action, The National Electric Transport Plan, and the National Strategy for Smart Electric Grids to name a few.

In addition, the IP should address the following areas:

- **Clear focus on RE integration:**

The proposed project and activities contribute directly to increase the flexibility of power grids by means of technology to enhance the penetration of DER into the energy mix and harnessing the potential for electrifying end-use sectors, such as transport, and industry sectors.

- **Catalyze increased investments in RE integration**:

Costa Rica's IP aims for CIF-REI financing to be a catalyst for attracting non-concessional resources from the private sector, multilateral development agencies and MDBs, among others, for infrastructure development, adoption of new technologies and innovation, including innovative forms of public-private partnerships that contribute to accelerating a just energy transition (Table 5)

- **Enabling environment:**

The IP highlights Costa Rica's historical environmental commitment, the country's institutional and legal framework that gives solid support to this proposal and the public policies that exist and that can be better implemented with this intervention. But the proposal is also clear in pointing out the challenges that the country faces in achieving these commitments and how the adequate injection of funds can accelerate the transition, but also Improve policies, plans, and institutional capabilities.

- **Implementation capacity:**

This IP is innovative in strengthening the role of the private sector in the energy transition through public-private partnerships (PPPs) and working with banks to foster the financing and growth of a green portfolio that supports the decarbonization process. The two components rely on public utilities companies and banks to foster change, as a result the role of the central government is not very active.

7. Part III. Recommendations

Please provide any recommendations that could enhance the quality of the investment plan.

This IP has the potential to transform and modernize the SEN, which, although it has been successful, is very vulnerable to climate change and requires significant investments to accelerate the transition to which the country committed. To contribute to improving or clarifying the proposal, the following recommendations are made to be evaluated by the drafting team:

- The electrification of industry and the substitution in the use of fossil fuels may seem unattractive for the industrialist if the cost of electricity is only compared with the cost of fuels, which are even subsidized. There are other added values in this transformation, in addition to the reduction of emissions, which, taken as a whole, can make electrification even more competitive: insurance, permits, emissions analysis, fuel storage and transportation, explosion hazards, less maintenance and downtime, etc.

- The electrification of the industry can represent for Costa Rica the elimination of the use of bunker, which is one of the dirtiest fuels, difficult to handle and which represents now a days no profits what so ever for the fuel importing company (RECOPE) .

- Add Objective 17.H of public-private partnerships to the SDGs to be impacted by the IP.

- This project has the potential to positively impact electrical companies so that they can develop the marketing component, to obtain new clients, new markets, sell value-added services to industries such as selling them heat units instead of just kilowatts in public-private partnerships with companies selling electrical equipment such as boilers, ovens, heaters.

- Having an electrical matrix based on renewable sources is a country brand name that must be exploited to attract green investments to Costa Rica. Companies that have set ambitious decarbonization goals may be interested in moving their operations to the country and being able to meet their corporate commitments sooner. This project is a step forward in that direction.

- It is not clear from the text that the public transportation service in Costa Rica is provided by private entrepreneurs under a public service concession, so investments to transform the bus fleet must come from the private sector but can receive a strong boost by this IP financing charging centers.

- It should be clarified in the proposal that the SEN is operated entirely by non-profit companies and its service is provided at cost, which is a very particular characteristic of the Costa Rican model.

- Costa Rica has tariff models that send the correct price signals for decarbonization, such as the off-peak rate, the decarbonization rate or the TMTB, but these do not exist in all the utility companies, so if we want to electrify the industry, we must universalize them throughout the country.

- I suggest analyzing the possibility of using the project funds not only to finance the purchase of electric chargers for buses but also to finance the purchase of more fast chargers for electric vehicles, since the current network is already being limited by the enormous growth of the EV fleet. In Costa Rica only electric companies can sell electricity through these chargers.

- One way in which the project could improve the condition of women and their access to electrical services is that, in the formalization processes of informal settlements, the meters are in the name of the women, so that they can guarantee through payment of the electric bill and the prepaid rates that are introduced, the family's access to electric service year around.

Renewable Energy Integration Program Investment Plan for Costa Rica
Program under the GCAP: **Renewable Energy Integration Program (REI)**
Name of the reviewer: **Rolando Castro-Córdoba**
Date of submission: **October 6th, 2023**

General Comments	**Response**
It is understood that such stakeholders will be also engaged in the implementation of the IP, but it is not that evident in the IP	As indicated in section 4.1 Proposed Interventions, to access concessional resources, priority will be given to public and private companies that, among others, conduct public consultations to increase women, diverse groups, and members of local communities participation in decision-making processes.
The means by which the lessons learned will be capture and disseminated are not that clear.	We added in 8.1 IRF. Scale: experiences and lessons learned will be disseminated through workshops. Also, see 8.4 Tracking protocols, which is strategic to capture results and lessons learned.
Recommendations:	
Bullets 1 and 2	Added footnote 64 to include other value-added benefits to GHG.
Bullet 3	Added in Section 1.3 Expected Results and 4.1 Proposed Interventions
Bullet 4 and 5	No comments
Bullet 6	We added in Section 3.6. Role of private sector, innovation, and leverage of resources: Public bus service in Costa Rica is provided by private companies under a public service concession, so investments to transform bus fleets must come from the private sector, which can receive a substantial boost by the proposed charging infrastructure in this IP.
Bullet 7	We added in Section 2.3.3. Distribution: All distribution companies are not-for-profit entities that operate under the at-cost-service principle.
Bullet 8	Agreed. One of the primary purposes of smart meters is to universalize time-of-use and prepaid tariffs.
Bullet 9	Although fast chargers for electric vehicles are important, it is also advancing in the country with private sector involvement. However, electric bus electrification is needed for Costa Rica, and the IP focuses on enabling conditions for their electrification.
Bullet 10	Agree. The development of projects will seek to include the recommendation, and it was added to Section 4.1 Proposed interventions.

The Climate Investment Funds

The Climate Investment Funds (CIF) were established in 2008 to mobilize resources and trigger investments for low carbon, climate resilient development in select middle and low income countries. To date, 14 contributor countries have pledged funds to CIF that have been channeled for mitigation and adaptation interventions at an unprecedented scale in 72 recipient countries. The CIF is the largest active climate finance mechanism in the world.

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