TECHNICAL COOPERATION (TC) DOCUMENT

I. BASIC INFORMATION FOR TC

▪ Country/Region:	BRASIL
▪ TC Name:	Energy Transition Program - Brazil
▪ TC Number:	BR-T1432
▪ Team Leader/Members:	Alarcon, Arturo (INE/ENE) Team Leader; Balza Angulo, Lenin Humberto (INE/INE); Barbosa Taves De Gouvea, Heleno (ORP/REM); Carpizo Riva Palacio, Carlos Ignacio (VPC/FMP); Carvalho Metanias Hallack, Michelle (INE/ENE); Correa Poseiro, Cecilia (INE/ENE); Hennig, Betina Tirelli (LEG/CLA); Isabel Williamson, David Alejandro (ORP/GCM); Madrigal Martínez, Marcelino (INE/ENE); Marquez Barroeta, Fidel (INE/ENE); Salazar, David Agustin (VPC/FMP); Verissimo Da Silva, Carolina (LEG/SGO)
▪ Taxonomy:	Client Support
▪ Operation Supported by the TC:	.
▪ Date of TC Abstract authorization:	30 Dec 2019.
▪ Beneficiary:	*Empresa de Pesquisa Energética* (EPE)
▪ Executing Agency and contact name:	Centro Brasileiro De Relacoes Internacionais (CEBRI)
▪ Donors providing funding:	OC Strategic Development Program for Infrastructure(INF)
▪ IDB Funding Requested:	Total: US$100,000.00
▪ Local counterpart funding, if any:	US$52,136.00 (In-Kind)
▪ Disbursement period (which includes Execution period):	36 months
▪ Required start date:	June 1st, 2020
▪ Types of consultants:	Firms, individuals
▪ Prepared by Unit:	INE/ENE-Energy
▪ Unit of Disbursement Responsibility:	CSC/CBR-Country Office Brazil
▪ TC included in Country Strategy (y/n):	Yes
▪ TC included in CPD (y/n):	No
▪ Alignment to the Update to the Institutional Strategy 2010-2020:	Productivity and innovation; Environmental sustainability

II. OBJECTIVES AND JUSTIFICATION OF THE TC

2.1 **Objective.** The objective of this Technical Cooperation (TC) is to support the development of long-term scenarios for the energy transition in Brazil. The specific objectives of the TC are to: (i) create a stakeholder forum to disseminate and discuss long-term energy transition scenarios in Brazil, through: (a) assumptions validation; (b) reduction of uncertainties; and (c) promotion of consensus on macrotrends; and (ii) develop long-term energy scenarios based on an independent and neutral stakeholder forum. These scenarios will contribute with suggestions for the design of more effective and efficient public policies, for the development of a more diverse energy matrix, which guarantees a more sustainable and reliable energy supply.

2.2 **Justification.** Energy is present in all human activities and can be considered one of the main indicators when assessing the stage of development of a society, by signaling its levels of production, wealth and well-being. Historically, energy demand growth has been coupled with economic development. Even with gains in Energy Efficiency (EE),

economic growth normally requires the development, construction and maintenance of energy infrastructure to secure energy supply, both in terms of quantity and quality.

2.3 The global energy sector is experiencing transformations that will impact in different dimensions the way society produces and consumes energy. These transformations are being boosted by climate change, new consumption patterns and technological development. Different scenarios indicate that the transition to renewable sources is taking place at a faster rate than originally expected.1

2.4 In addition, the power sector is being shaped by digitalization, decarbonization and distributed energy sources.[2] New technologies promote the utilization of renewable sources in an effective and competitive way while, at the same time, changing the role of consumers in the energy system. Consumers are expected to assume a central position in the supply and demand dynamics, as well as create new business models opportunities.

2.5 Other segments, such as the transport sector, are also being influenced by new technologies and consumer behavior, changing significantly the energy demand profile. New mobility patterns are being driven by sharing and autonomous technologies, as well as the growing role of electric vehicles. This last one is marked by its disruptive potential and fast technological development.[3]

2.6 Brazil is characterized by a high degree of availability and diversity of energy sources. In this sense, the country's energy transition points to a diversified energy mix, based on efficient and competitive energy sources. Therefore, it is relevant to analyze different scenarios regarding the Brazilian energy transition, in order to support decision makers in the direction of a competitive and sustainable energy future.[4]

2.7 In this context of transformation, the complexity of energy planning is increasing exponentially, given the degree of uncertainties that currently exists in key variables, such as: technological change related to adoptions curves and costs, regulatory frameworks, carbon pricing, stakeholder engagement, and others. Each of these variables can have many future outcomes, creating different possible futures. One of the methodologies to conduct energy planning with uncertainty in key variables is to construct different scenarios that enable discussion among stakeholders, aiming for a more informed and transparent decision-making process.

2.8 **Empresa de Pesquisa Energética (EPE).** The Energy Research Office (EPE by its acronym in Portuguese) is a public governmental entity linked to the Brazilian Ministry of Mines and Energy (MME), established by Law No 10.847 in 2004. The role of EPE is to provide energy information, studies and research that support the planning of the national energy sector. EPE is committed to the sustainable development of Brazil's energy infrastructure, and its activities play a fundamental role in a cycle that begins with the policies and guidelines set forth by the National Energy Policy Council and MME. The policies and guidelines are the key input for the studies and researches that guide the development of the Brazilian energy sector. EPE takes part in major discussions concerning the Brazilian energy sector. The studies and researches

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1 CEBRI. *O setor de energia 2022*. 2018.
2 WEF. The Future of Electricity – New Technologies transforming the grid Edge. 2019.
3 *Catavento. Revolução elétrica: um cenário possível para a mobilidade no Brasil? 2018; CEBRI. Catavento. Mobilidade elétrica: perspectivas e desafios*. 2018.
4 CEBRI. *O setor de energia 2022*. 2018.

developed by EPE support the energy sector's planning and lead to the accomplishment of a secure and sustainable energy supply.

2.9 **Centro Brasileiro de Relações Internacionais (CEBRI).** It is a private non-profit organization, founded 21 years ago by a group of businessmen, diplomats and academics. The institution acts to positively influence the construction of the country's international agenda, promoting engagement between knowledge production and political action. CEBRI has a curating council (*conselho curador*) composed by 41 prominent people, appointed by two years, with possibility of renewal. This council oversees planning, supervising and executing of CEBRI's strategies and activities. CEBRI also has associated companies and individuals, constituting a consulting council (*conselho consultivo*) appointed on a yearly basis, which can propose and participate in CEBRI's activities without any decision-making role. Both the council and the associated members are subject to an ethic code to guarantee CEBRI's independence, integrity and transparency. Some of the main energy companies present in Brazil are part of CEBRI's membership, as part of the *conselho consultivo*: Eletrobras, Petrobras, Siemens, Shell, Total, Repsol, Eneva, Equinor, Exxon, Neoenergia, among others. CEBRI's dialogue with several companies in the sector reflects the transparency, plurality of dialogue and the institution's independence in conducting discussion, producing content and proposals for both public policy and opinion makers. Recognition of CEBRI's work is notorious in the main global think tank ranking, coordinated by the University of Pennsylvania, which in 2018 elected the institution as the second best think tank in Brazil and the third best in Latin America.

2.10 This TC will be funded by the Ordinary Capital Strategic Development program for Infrastructure (INF). The beneficiary of the TC will be the Empresa de Pesquisa Energética - EPE, which requested the TC, and the Executing Agency (EA) will be CEBRI. The TC will finance the development of scenario analyses and stakeholder discussions, aimed at ensuring that Brazil is one of the leading countries in the future of the energy sector in the world. To this end, a series of technical dialogues will be held between institutions, experts, academics and public policymakers with a view to contributing to the modeling of scenarios for the energy transition in Brazil. The diversity of actors included in the CEBRI network and the convening power that the institution presents in Brazil, ensures that the views of multiple actors capable of enriching the debates are inserted. On the other hand, the assumptions behind a scenario analysis can be carried out in a neutral and independent manner, considering the different perspectives on the future of energy in Brazil. Finally, EPE will contribute to the TC's technical dialogue with its expertise in conducting technical analysis, studies and research aimed at guiding the development of the Brazilian energy sector, from the construction of short, medium- and long-term scenarios. Being a governmental entity and having strong dialogue with the private sector, EPE will also contribute to the project with an endogenous vision so that the propositions of strategies and public policies could meet the needs of Brazilian development.

2.11 The IDB has extensive experience in conducting projects in partnership with Brazilian public institutions, with a view to contributing to the development of the country and expanding its institutional capacity. The IDB's dialogue with the Brazilian government, particularly EPE and the MME, will certainly contribute to broaden the impact of the project and the insertion of public policy propositions in Brazil's national development strategies. Moreover, the Bank is already supporting the development of sustainable energy interventions in Brazil, by means of the following TCs: (i) ATN/JF-16881-BR to support municipalities in Brazil for developing studies, tools and financing mechanisms

to implement distributed generation (DG) and EE projects (including public lighting), approved in 2018; (ii) ATN/JF-16079-BR, which main objective is to support the development of sustainable energy measures in the state of São Paulo (particularly DG with solar energy and waste to-energy generation), approved in 2016; and (iii) ATN/OC17479-BR, which will support innovation in the energy sector, particularly to improve quality of electricity service and implemented electric vehicles, approved in 2019. These three TCs already provide a basis for the IDB team in the evaluation of energy transition scenarios, as they are focused in areas of innovation and technologies that will be applied in the coming years in the sector. Moreover, the implementation of these TCs permit the IDB team to interact with different institutions in the sector, as well as to get an understanding of the market and its complexities. The Bank is also supporting electromobility initiatives in Latin America and the Caribbean (ATN/OC-17390-RG), recently approved. In addition, the Bank is supporting regional integration studies, such as the interconnection between Brazil and Bolivia (ATN/OC-16652-RG), and the Arco Norte initiative. The lessons learned in the development and implementation of the TCs and initiatives mentioned in the previous paragraphs, as well as the relevant products and studies, were considered in the design of this TC, and will be considered during its execution TC. These lessons learnt include, for example: (i) the identification of key players in the discussion of energy transition scenarios in the sector; and (ii) a better understanding of the different local and regional perspectives that exists in Brazil regarding possible energy transitions.

2.12 This TC is consistent with the Bank's Country Strategy for Brazil 2019-2022 (GN2973) which aims to promote policies and investments to diversify the matrix and increase the role of renewable energy sources, encourage the use of innovative solutions, and promote regional energy integration. The TC will enable key discussions to inform planners, regulators and policymakers regarding the energy transition. This TC is aligned with the Innovation, Science and Technology Sector Framework (GN-2791-8), consistent with the Update to the Institutional Strategy 2010-2020 (AB-3008) and is strategically aligned with the development challenge of productivity and innovation, by studying and promoting the implementation of innovative technologies that, amongst other benefits, will improve quality and EE provision and therefore positively impact on the country's productivity. The TC is also aligned with the cross-cutting issues of climate change and environmental sustainability and with the Climate Change Sector Framework (GN-2835-8), by promoting the implementation of efficiency measures as well as supporting the deployment of electric vehicles that will displace the use of combustion engine cars, and hence, the reduction of Greenhouse Gas (GHG) emissions. This TC is also consistent with the Energy Sector Framework Document (GN-2830-8), as it will support the development of alternative energies, and the strengthening of the sector's institutions. This TC will be aligned with the IDB Group Corporate Results Framework 2016-2019 (GN-2727-12), by contributing to the global innovation index and with the GHG emission index. Additionally, this TC is aligned with the objectives and expected results of the Ordinary Capital Strategic Development program for Infrastructure (INF) as it supports the increase and exchange of knowledge to analyze and propose innovative development solutions, considering energy transition scenarios.

III. DESCRIPTION OF ACTIVITIES/COMPONENTS AND BUDGET

3.1 To achieve its objectives, the TC contemplates three components:

3.2 **Component I: Energy Transition Scenarios (US$78,183).** This component will finance studies to develop energy transitions scenarios for Brazil. The result of this component is the creation of at least three (3) scenarios[5] that will provide inputs to EPE, and other public and private agents of the sector, for their medium- and long-term energy planning efforts. These scenarios will include the analysis and study of:

3.3 **COVID-19 and the Energy Sector.** The pandemic has created a global crisis with severe economic consequences. The collapse in economic activity has implicated in a major shock for energy demand. At the same time, the energy sector has a relevant role for global recovery efforts. The crisis highlights the critical value of energy security and electricity to society. In this sense, it is relevant to analyze to consequences of the COVID-19 to the energy sector, globally and in Brazil, as well as its implications to energy transition.

3.4 **Brazilian Energy Transition - Challenges and Opportunities.** The existence of an energy and power matrix with a high share of renewable sources, 46% and 81% respectively, as well as diversity and availability of other sources, indicates different challenges from those of other countries in the world, particularly because of the high reliance of the electricity sector in hydropower. While in the global scenario the energy transition implies a greater penetration of renewable sources, in Brazil, this transition goes towards a more diversified mix of sources to contribute towards a more secure a sustainable and reliable energy supply. In this sense, projections point to an energy matrix with 48% (renewables), 32% (oil) and 13% (natural gas) in 2027. Therefore, it is necessary to identify the particularities that characterize the context of energy transition in Brazil, the competitiveness of the various sources available, as well as their prospects for long-term evolution.

3.5 **Transformations in the Energy Sector. Vision of Different Actors.** The energy sector transformation is being driven by climate change, new consumption patterns and technological development. The existence of a multiplicity of actors, members of the public, private and academic sectors, with different characteristics, objectives and interests, tends to influence the emergence of different views on the energy transition in Brazil. Given this context, it is necessary to understand how these actors are positioning themselves in the face of these transformations in order to capture opportunities and mitigate the main risks**.**

3.6 **Technology and Innovation.** Technological innovations are expected to play a central role in the global ambitions of transition to a low carbon economy, as they increase the competitiveness of renewable sources, promote efficiency gains and the development of new business models. In this sense, it is relevant to analyze the current stage of technological development in Brazil, as well as to understand the critical elements that influence the possible scenarios of evolution.

3.7 **Energy Demand - Role of Cities and New Consumers.** By concentrating a large part of the population, economic activities and infrastructure, cities tend to significantly

[5] EPE participation in the ETP execution includes providing its technical inputs within the technical dialogue. If EPE is unable to contribute to the TC's technical dialogue by means of the analysis of specific energy transition scenarios based on the TC discussions, for this purpose the TC can finance the hiring of consulting services.

influence the new landscape of the energy sector. The application of new technologies promotes greater connectivity between the different segments of the urban system - residence, transportation, industry - enabling a more efficient management of energy demand. At the same time, cities become the locus of a new consumer profile, more aware and concerned of the social and environmental impacts of their activities. In this sense, it is necessary to understand how the new demand profiles tend to influence the energy sector in Brazil.

3.8 **Disruptions and Risks for the Energy Transition.** Society experiences a moment of greater volatility, uncertainty, complexity and ambiguity, where change tends to occur at a faster rate than previously observed. In this direction, different trends signal multiple possible scenarios for the energy sector. Therefore, it is necessary to map other elements, whether technological, behavioral or political, capable of promoting disruptive changes in the scenarios previously established for the energy sector in Brazil.

3.9 **Component II: Dissemination Workshops and Capacity Building (US$43,183).** This component will support the implementation of at least three workshops organized by CEBRI, in which key stakeholders of the energy sector will be invited to discuss and disseminate the studies financed by Component I. Also, this component will fund one capacity building event for EPE in key aspects related to energy transition modelling, with focus on Brazil. The result of this component will be the participation of key stakeholders in the scenario development process of Component I, as well as the creation of new capacities within EPE for energy transition analyses.

3.10 **Component III: Administration (US$25,770).** This component includes the funding of project coordinator during the duration of the TC, as well as an accountant and other costs related the coordination of the program.

3.11 **Audit (US$5,000).** The program contemplates an audit at the end of its execution.

3.12 The total amount of this TC is US$ 152,136, US$100,000 will be funded by the Ordinary Capital Strategic Development Program for Infrastructure; US$32,163 will be in-kind counterpart financed by CEBRI; and US$20,000 will be in-kind counterpart financed by EPE. The table below summarizes the allocation of funding per component and source.

Indicative Budget (US$)*

Component/ Description	IDB/ Fund (US$)	Counterpart (CEBRI)		Counterpart (EPE)		Total Funding
		R$	US$	R$	US$	US$
I. Energy Transition Scenarios	60,000	40,915	8,183	50,000	10,000	78,183
II. Dissemination Workshops and Capacity Building	25,000	40,915	8,183	50,000	10,000	43,183
III. Admin	10,000	78,850	15,770	-	-	25,770
Audit	5,000	-	-	-	-	5,000
TOTAL	**100,000**	**160,680**	**32,136**	**100,000**	**20,000**	**152,136**

* All amounts rounded due to currency exchange from R$ to US$ (5.00 R$/US$ as of March 17th, 2020).

3.13 Once the TC is in execution, the project team will seek alliances and contributions from other private partners interested in contributing to the initiative, through Project Specific Grants (PSG). To the extent that a new donor is willing to make contributions to the project, the donation will have to take the form of a PSG and the IDB will establish a specific agreement with each donor through an administrative agreement, without the requirement to prepare a new TC. Under this arrangement, each PSG agreed with the donors will increase the activities and budget of the operation, and this process will have to be approved by the Bank authority delegated for this purpose. At least four initial donors should be identified for the increase in funding of this TC to take place and for the PSGs with the donors to be implemented. In case the PSGs are implemented, the proportionality between the amounts of the donor's contributions must be maintained.

IV. EXECUTING AGENCY AND EXECUTION STRUCTURE

4.1 **Executing Agency (EA).** The TC will be executed by CEBRI, which will hire consulting services, organization of workshops and capacity building events, and a project coordinator. To guarantee a smooth execution of the project, CEBRI will be completely responsible for the technical, fiduciary and financial execution and management of the project, as well as the coordination of TC's activities, such as: knowledge production, content development and selection of speakers for events and workshops etc. CEBRI will use its systems for procurement, financial management and reporting, project management, and monitoring and evaluation of the project effectiveness. CEBRI has worked with the IDB, implementing workshops in international commerce and energy (2017-2019); however, it is not familiarized with IDBs financial procedures; therefore, a training regarding IDBs financial procedures will be scheduled after the approval of the TC and before starting the execution of the TC. Given the size of the TC and the reduced number of processes, the training will be performed by videoconference between CEBRI and the IDB team, and no additional costs are expected. Moreover, the IDB team will be available for consultations from CEBRI during the execution, through the country office support teams.

4.2 CEBRI will be responsible for procuring consulting and non-consulting services in accordance with established private sector and commercial practices acceptable to the IDB, as per the terms of the IDB Procurement Policies (documents GN-2349---15 and GN-2350-15, Appendix 4). Disbursements of project's resources will be subject to ex post supervision by the Bank and by external auditors. Project's financial statements will be subject to an external audit at the end of the Program execution, to be conducted by an independent auditing firm contracted by CEBRI, as per IDB's applicable policies and procedures. In addition, the Financial Management Guide OP-273-12 (GN-2811-1) will be applied. The initial procurement plan provides information on the contracts foreseen and their applicable monitoring and contracting methods.

4.3 Project Monitoring and Evaluation (M&E) will be conducted as following: (i) project outcomes as stated in the project's results framework; and (ii) monitoring of project implementation and performance through semimanual project progress reports, which will include the physical and financial progress of each component, the monitoring of results, with the indicators listed in the results matrix, and the identification of problems in the execution of the TC, with a mitigation plan.

4.4 **Program Coordination.** To monitor the Program activities, IDB, CEBRI and EPE will establish a high-level strategic committee. This committee will consist of six persons nominated by IDB, CEBRI and EPE (two per institution), and will be presided by one institution with a rotative mandate of eight months. The committee will oversee the advance of the Program, propose and approve activities to be executed by CEBRI, and review the products. However, as mentioned in paragraphs 4.1 and 4.2 CEBRI will act as the Program's EA and will be responsible for the technical, fiduciary and financial execution of the Program. The strategic committee will hold meetings every two months, attended by at least one person per institution, to discuss the Program's strategic matters and follow up the activities. The strategic matters to be discussed and decided by this committee will be approved by simple majority (2/3), with one vote by each institution. An agreement will be signed between CEBRI, EPE and IDB for the purposes of Program financing and execution. Each institution will act independently of each other, all being considered equal regarding the decision-making process regarding the strategic committee of the Program.

4.5 EPE will contribute to the technical dialogue with its expertise in performing technical analysis, studies and research with the objective of supporting the development of the Brazilian energy sector, from the construction of short, medium- and long-term scenarios. EPE will also contribute to the project with an endogenous vision so that the proposition of strategies and public policies meets the needs of Brazilian development.

4.6 **Executing Period.** The TC is expected to be executed in 36 months. At the beginning of the execution CEBRI will present to the high-level strategic committee an execution plan, including an annual program for the activities and consultancies of each of the components.

4.7 **Local Counterpart.** The local counterpart contribution by CEBRI (US$32,136) and EPE (US$20,000) will be in kind and will include the necessary technical and logistical support for the implementation of the operation[6]. The beneficiaries will elaborate a spreadsheet that will specify the counterpart composition and will be used to report the compliance of the agreed reporting terms to the Bank.

4.8 The technical responsibility at the IDB will be of the Energy Division (INE/ENE), which will receive support from the Bank's Country Office in Brazil (CBR). The focal point designated and responsible for this TC will be the Energy Specialist based in Brazil.

4.9 Results of this TC are expected to be sustainable, as all the activities performed within the TC will be coordinated with EPE, government institution in charge of giving technical support on the medium- and long-term energy planning for the MME in Brazil. Particularly, all the result from this TC will benefit EPE, as a source of information for their planning activities. This TC will produce useful inputs for the development of policies, plans and regulation in the energy sector in Brazil. In terms of dissemination, it is expected that at least two technical notes will be produced, regarding Energy Transition in Brazil. Moreover, capacity building will be conducted with EPE in order to generate sustainable and long-term results regarding scenario modelling and analysis.

[6] The counterpart committed by CEBRI is R$160,680, and the counterpart committed by EPE is R$100,000. All amounts were converted using a currency exchange from R$ to US$ (5.00 R$/US$ as of March 17th, 2020).

V. MAJOR ISSUES

5.1 The main risk of this TC is the lack of coordination of the beneficiaries and other stakeholders, and to maintain the interest of all parties during the TC execution. Nonetheless, CEBRI has done extensive work with the IDB in energy and other areas recently, having implemented successfully two seminars regarding energy transition in 2019. Likewise, EPE's commitment has been reinforced by the participation of their high management in the TC discussions. A key mitigation action is to have a project coordinator from CEBRI appointed from the start of the project execution, to ensure that activities are performed as planned. CEBRI is not familiarized with IDBs procurement and financial procedures; therefore, a training regarding IDBs procurement and financial procedures will be scheduled before starting the execution of the TC. The exchange risk is mitigated as the contributions from the IDB contribution is in US dollars (US$).

VI. EXCEPTIONS TO BANK POLICY

6.1 No exception to Bank's policy is requested.

VII. ENVIRONMENTAL AND SOCIAL STRATEGY

7.1 This TC will finance consulting services, studies and workshops, and does not require implementation of specific environmental or social safeguard policies; therefore, it has been classified as "C" (See Safeguard Policy Filter Report and Safeguard Screening Form).

` **Required Annexes:**

Request from the Client_57492.pdf

Results Matrix_41980.pdf

Terms of Reference_39327.pdf

Procurement Plan_61104.pdf