About the Report

This is our first annual report prepared based on the methodology of the Global Reporting Initiative (GRI), one of the most renowned and respected organizations of its kind in the world. The document provides information on our performance in economic, environmental, and social topics for the period from January 1 to December 31, 2020, and was evaluated and approved by the Executive Board. Starting with this first edition, we will publish reports based on the GRI methodology on an annual basis. GRI 102-32, 102-50, 102-51, 102-52

Relevant and strategic topics

The most prominent topics addressed were defined based on the review of the 2019 materiality matrix of Eletrobras, our Founding Associate and main sponsor (page 4 of this company’s 2019 Annual Report). The matrix was developed from a broad stakeholder consultation process and the prioritization of issues by professionals from the companies. To reflect the 2020 context, the Covid-19 Pandemic theme has been added to our matrix. The matrix for this cycle has been approved by our Executive Board. GRI 102-32, 102-43, 102-46

For questions or suggestions about the Cepel 2020 Annual Report, contact us: comunicacao@cepel.br GRI 102-53
### Cepel 2020 material topics

#### GRI 102-40, 102-42

<table>
<thead>
<tr>
<th>Workforce/family</th>
<th>Communities</th>
<th>Society</th>
<th>Press/opinion leaders</th>
<th>Partners/associates/service providers</th>
<th>Government entities/regulatory bodies and sectorial agents</th>
<th>Clients/universities/research centers</th>
</tr>
</thead>
</table>

#### GRI 102-44, 102-46, 102-47

<table>
<thead>
<tr>
<th>Material topics</th>
<th>Sub-topics (as per GRI standard)</th>
<th>Disclosures</th>
<th>Boundaries (audiences where impacts occur) within Cepel</th>
<th>Boundaries (audiences where impacts occur) outside Cepel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research and development + innovation</td>
<td>Research and Development Sector Disclosure</td>
<td>EUB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategy and outlook</td>
<td>There are no topical or sector-specific disclosures for this topic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socio-environmental aspects in decision making</td>
<td>Corporate Governance</td>
<td>102-31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital transformation</td>
<td>There are no topical or sector-specific disclosures for this topic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cybersecurity</td>
<td>There are no topical or sector-specific disclosures for this topic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk and crisis management</td>
<td>Strategy</td>
<td>102-15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material topics</td>
<td>Sub-topics (as per GRI standard)</td>
<td>Disclosures</td>
<td>Boundaries (audiences where impacts occur) within Cepel</td>
<td>Boundaries (audiences where impacts occur) outside Cepel</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------------------------------</td>
<td>-------------</td>
<td>----------------------------------------------------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td><strong>People development management</strong></td>
<td>Employment</td>
<td>401-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Occupational health and safety</td>
<td>403-6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Training and education</td>
<td>404-1 a 404-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Employment sector disclosure</td>
<td>EU14</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Diversity and equal opportunities</strong></td>
<td>Diversity and equal opportunities</td>
<td>405-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Corruption and ethics management</strong></td>
<td>Corporate governance</td>
<td>102-25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anti-corruption</td>
<td>205-1 a 205-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Corporate governance</strong></td>
<td>Corporate governance</td>
<td>102-20, 102-22, 102-28, 102-31, 102-32</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Financial income</strong></td>
<td>Economic performance</td>
<td>201-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Indirect economic impacts</td>
<td>203-2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Material topics

**GRI 102-44, 102-46, 102-47**

<table>
<thead>
<tr>
<th>Material topics</th>
<th>Sub-topics (as per GRI standard)</th>
<th>Disclosures</th>
<th>Boundaries (audiences where impacts occur) within Cepel</th>
<th>Boundaries (audiences where impacts occur) outside Cepel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covid-19 pandemic</td>
<td>There are no topical or sector-specific disclosures for this topic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effluents and waste</td>
<td>Water</td>
<td>303-4</td>
<td>![Icon]</td>
<td>![Icon]</td>
</tr>
<tr>
<td></td>
<td>Waste</td>
<td>306-1, 306-2, 306-5</td>
<td>![Icon]</td>
<td>![Icon]</td>
</tr>
<tr>
<td>Water consumed and water disposed of</td>
<td>Water</td>
<td>303-1, 303-2, 303-5</td>
<td>![Icon]</td>
<td>![Icon]</td>
</tr>
<tr>
<td>Energy consumed</td>
<td>Energy</td>
<td>302-1, 302-4</td>
<td>![Icon]</td>
<td>![Icon]</td>
</tr>
</tbody>
</table>
**2020 Highlights**

**Organizational profile and infrastructure**

- **Largest research center** in electric energy in Latin America, with 34 laboratories
- **Implementation of the Smart Grid Laboratory**, with unique features and testing capacity in the power levels between 0.5 kW and 300 kW

**Corporate governance and ethics**

- **Launch of web series** for the information and awareness of employees about the Integrity Program (Compliance)
- **97% of the employees** participated in the Eletrobras Companies’ Integrity and Ethical Culture online course
- **Joining the “Na Mão Certa” Program**, an initiative of Childhood Brasil

**Research, Development and Innovation**

- **R$ 193.3 million** directed to the development of R&D projects, technological services, licensing programs, testing and management
- **Idealization and start of operations of the Technical Project Management Office**, to, among other functions, ensure the smooth development of the projects developed and the strategic alignment between our interests and those of our Associates, enhancing the positive impacts
- **Participation in testing** a mechanical pulmonary ventilator developed to help combat Covid-19
- **Several launches** of solutions and products for the Brazilian electrical sector
- **Innovation in environmentally sustainable studies**

**Pages** 19 to 30 and 60 to 66

**Pages** 68 to 77

**Pages** 16 and 31 to 58
Staff profile

Employees

- Women: 65
- Men: 209
- Total: 274

Diversity indicators:

- 16% of the workforce is made up of minority groups (black, Asian, mixed-race and indigenous people)
- 24% women on staff
- 32% women at management level
- 74.23% Climate Survey Favorability Index
- 47% of employees over 50

Training hours

- Average training hours per employee:
  - Women: 15.16
  - Men: 18.12
  - Total: 17.42
  - Women: 985
  - Men: 3,788
  - Total: 4,773
Cultural transformation project development

- Definition of economic indicators Múltiplo Ce-pel and Múltiplo Global Cepel, to identify competitive advantages, define which products are unique in the market and adjust the pricing policy
- Forming partnerships with foreign companies for commercialization of solutions and research development

Financial indicators

- 225% increase in the result for the year, which reached R$30.8 million in surplus
- Reduction of Operating Expenses by 24.2%
- Net Operating Income of R$ 227,102 thousand in 2020, stable compared to 2019

Environmental indicators

- 18.5 thousand cubic meters of water consumed
- 19.68 thousand Gj of energy consumed, including electric and fuel
- 9.96 thousand cubic meters of effluents disposed of
- 526.4 ton CO₂ equivalent total emissions
- 188.90 ton of waste generated

About the Report

2020 Highlights

Message from the CEO
Covid-19 Pandemic
Cepel
Research, Development and Innovation
Laboratory Infrastructure
Strategy Management
Strategy and Outlook
People management
Environmental management
Economic-financial management
GRI Indicators
Annex
Message from the CEO

The major challenge we had in 2020 was to face the Covid-19 pandemic and the related uncertainties, whether economic, social, or political.

To meet the social isolation guidelines of the World Health Organization and governmental and health authorities, we immediately put our employees on home-working, which mainly affected our laboratory activities, since these require presence and adequate infrastructure. We adopted a rigid protocol while preparing a cautious and rational return to face-to-face work, in which essential activities and emergency services were privileged, including supporting the fight against Covid, as in the case of the tests performed on the Coppe/UFRJ equipment “Exception Pulmonary Ventilator”.

Now that the year has ended and our results have been compiled, it is clear that we have managed to overcome the obstacles, by means of our human and technological capital, including the investments made in systems, such as SAP, the creation of the Information Technology and Artificial Intelligence Center, as well as the modernization of our entire computer system. We have grown in productivity and experienced that the work in our institution may not need to be 100% face-to-face. It is true that we need to evolve our processes, but the evidence remains that an important set of our activities can perhaps be, at least in part, performed from home. In this sense, new investments will be made to ensure even more efficiency for remote work.

Despite the pandemic and its constraints, we can say that we have made significant progress in our research and development activities. Our solutions for predictive maintenance of assets, of great value to ensure the availability and reliability of equipment used in electrical systems, are noteworthy. These solutions have brought tangible benefits to our Founding Associates, who are primarily responsible for supporting such developments. But they

Now that the year has ended and our results have been compiled, it is clear that we have managed to overcome the obstacles, by means of our human and technological capital

Amilcar Guerreiro
CEO of Cepel
have also called the interest of other agents and are already being used by other associates and even by clients from outside the electric sector and even outside the country.

Our performance has been essential for the Brazilian National Interconnected System, either in the automation of its operation, based on a solution developed by us (SAGE System), or in the implementation, as of January 2020, of the hourly dispatch (through the chain of mathematical optimization models known as Newave, DECOMP, and DESSEM).

The automation of supervision and control systems has wide application among our associates and has led to strategic partnerships that include offering these solutions abroad.

The success of the system’s operation on an hourly basis, much more adherent to the characteristics of an electric system transformed by the introduction of new sources of energy production, has guaranteed that, as of January 2021, the settlement of commercial operations in the short-term energy market is also done on an hourly basis. It is noteworthy that this evolution places the Brazilian system in line with what occurs in other energy markets on a global level.

The National Electric System Operator (ONS) and the Electric Energy Trading Chamber (CCEE), both our associates, are the main users of these solutions, which have all the sectorial agents as beneficiaries.

Despite of the difficulties already mentioned, we have evolved with the project for the installation of the Smart Grid Laboratory, which includes a partnership with Petrobras, one of our associates, and should be inaugurated in 2021. This laboratory will make it possible to carry out tests and simulations for distributed generation systems operation in low voltage grids, allowing to evaluate how these systems and their equipment behave and to understand the new grids and their impacts on the electrical system as a whole.
Our solutions also have important contributions to the sustainable development of the country, either in the area of energy efficiency, with the performance of a wide range of tests in technical support to programs such as Procel (National Program for Conservation of Electrical Energy), or in actions aimed at renewable energy and energy storage, and accurate measurements of consumption and performance. All the technology developed by us and at the service of the electric sector can be checked out on pages 21 to 30 and 36 to 56.

All these activities are naturally developed with the due environmental care and respect. We manage effluents and waste effectively and rigorously, and track our water and energy consumption. We adopted as a reference the Sustainable Development Goals that are a priority for the electricity sector and promoted a series of actions to meet them. All of our performance in this regard, as well as in economics, technology, and corporate governance, can be seen in the following pages.

The success achieved in 2020 reveals the broad commitment of our staff to Cepel, as well as an important resilience capacity to deal with reality as it is. A harbiner of the cultural transformation we are experiencing today.

Cultural transformation, by the way, is our current motto. Due to the fact that we have Eletrobras and its main subsidiaries as founding associates and main maintainers, we have always been seen as part of the company and, because of this, as a state entity. This does not match the legal nature with which we were constituted, that is, with the way we were thought of and created back in the 1970s.

So, besides facing the transformation that electrical systems are undergoing worldwide, the institutional transformation that the Brazilian electrical sector is still undergoing requires us to show ourselves to the market as we really are: a private non-profit association, with administrative and financial autonomy.

Today, about 80% of our funds still come from our founding associates, a proportion that was much higher in the past. But we should also point out that we also provide services to several government and regulatory entities and other companies in the Brazilian electricity sector. We want to intensify these activities, many of them adaptable to other productive sectors, and expand our financial autonomy. We also want, with the support of our Advisory Board, to improve and modernize the governance of the Center. This includes the revi-
sion of our Bylaws, an action for which we will have the support of a renowned corporate law firm.

In this sense, we not only contract consultants to help us understand how to better exploit our commercial potential (see page 85 and 86), but we also set up commercial and research partnerships with very relevant international organizations (page 87 and 88). We are also preparing our first Strategic Planning, which will guide us in a ten-year horizon. And we launched an initiative called “Múltiplo Cepel”, which, with support from Unicamp, will make it possible to quantify the value of the contributions of Cepel’s developments to its associates, to the Brazilian electrical system, and to society in general.

We need to make our cultural transformation happen, always in a transparent and ethical way, in attention to our Code of Ethics and Conduct and our Integrity Program (Compliance), implemented since 2019, always with the support of our Advisory Board.

Finally, we cannot miss the opportunity to emphasize that this is our first annual report produced in accordance with the guidelines of the Global Reporting Initiative, the organization that developed the world’s most renowned methodology for collecting and disclosing sustainability performance indicators. This movement is also part of our cultural transformation. We want to show everyone our ability to innovate through research and development.

We wish you a good reading!
Covid-19 Pandemic
GRI 103-1, 103-2, 103-3

As soon as the first cases of Covid-19 were detected in the country, the Eletrobras Companies defined the measures to be adopted for the protection of employees and the maintenance of operations, considering international standards and supported by a specialist from the Oswaldo Cruz Foundation. At Cepel, we immediately adhered to the determinations of our Founding Associate.

On March 18, 2020, all employees and other collaborators were put into remote work, with our support for the technological and routine adaptation. Our latest investments in corporate digital transformation have enabled this movement. Technological innovations have allowed online integration, without compromising administrative and research activities (more on page 58). The laboratory activities, which require appropriate infrastructure, were the most impacted on the occasion.

During the social isolation time, we started to hold daily meetings with the participation of the Executive Board and employees from relevant
areas for the moment, such as health. These meetings are still held, but on a weekly basis, to discuss the actions in progress and their results and thus improve them.

With the advancement of knowledge about Covid-19 and the protocols necessary for prevention, we put together our Plan for Return to Face-to-Face Activities, which, although not subject to Joint Ordinance #20/2020, followed all its determinations. We also comply with international standards for fighting the disease.

To make the return possible, we have allocated resources for the purchase of rapid test kits for Covid-19 IgG/IgM (Antibody Test), hand sanitizer, lancets, gloves, personal protective equipment (PPE), infrared and digital thermometers, masks, face shields, hand sanitizer containers, garbage cans, among others, and for hiring rapid test application services. It was also necessary to adapt the facilities of Cepel’s two units - Fundão and Adrianópolis - regarding restaurants and employee transportation, in order to maintain the appropriate distance between them, as well as other preventive protocols.

From March to December 2020, the informative and educational campaign “Together against the Coronavirus” was conducted, focused on supporting employees in facing the pandemic.

An important measure was the installation of cameras in the testing areas to provide remote monitoring of the activities by the customers. The experiment was successful, and for this reason we intend to adopt the cameras in other laboratory facilities.

From March to December 2020, the informative and educational campaign “Together against the Coronavirus”

---

was conducted, focused on supporting employees in facing the pandemic. Marketing e-mails, cards with tips and orientation about the disease, the need for social isolation, health care, including mental health, and hygiene, among other relevant topics for the moment, have been published. Also noteworthy are the podcasts, livestreams and lectures held in conjunction with Eletrobras and the Group companies, with specialists from various areas, as well as the work of the psychosocial support networks, to help the journey in such a delicate and restrictive period.

Throughout 2020, we issued a weekly epidemiological newsletter, informing about the work during the pandemic, the monitoring of the occurrence of Covid-19 cases in permanent staff, fellows, and interns, and the testing of permanent staff and contractors. The health of these audiences has been, and continues to be, monitored via app and the medical field.

As a science and technology entity, we have made an important contribution to the fight against the Covid-19 pandemic. Our technical team performed, in the laboratory infrastructure of the Fundão unit, between April and September 2020, tests to evaluate the electromagnetic compatibility and current harmonics of the mechanical pulmonary ventilator prototype developed by the Alberto Luiz Coimbra Institute of Graduate Studies and Research in Engineering (Coppe/UFRJ), in partnership with several institutions. The objective of the device, named VExCO, is to meet the growing demand in hospitals due to the pandemic, on an emergency basis.

The electromagnetic compatibility check was performed to assess whether the system or equipment is a source or focus of harmful electromagnetic interference. We also assessed electrical safety, to ensure that the patient and equipment operator are protected from electrical hazards. The tests are necessary because hospital environments have various life-support equipment and systems, as well as monitoring and information processing equipment for medical applications, machinery that cannot be interfered with and fail, which can cost patients their lives.

With the completion of the tests and the improvements implemented in the equipment during the development phase, including those guided by the results of the tests performed by us, VExCO met the electromagnetic compatibility standards of the Brazilian Association of Technical Standards (ABNT).
Mission
To act and contribute at all levels of Brazil’s electricity sector, maximizing the return to Brazilian society from the results of the research and technological services performed by the Center.

Vision
To be a leader in research, development, and innovation in Latin America and to be among the five largest research centers in electric energy in the world, constituting a reference for the scientific community.

Values
Ethics, technical exemption and transparency
We base our actions on integrity, impartiality, and communication with society.

Commitment
We act clearly and responsibly in our relationships with our member supporters, customers, and government agencies.

Focus on technological innovation
We develop state-of-the-art technology, with an emphasis on continuous improvement, and in accordance with the world’s best practices.

Dissemination of knowledge
We act as a technological hub, contributing to the sharing of technical and scientific experiences.

Social and Environmental Responsibility
We seek technological solutions committed to the well-being of society and sustainability.

Encouraging multidisciplinary and collaborative work
We value teamwork, and we encourage the professional growth and creativity of our collaborators.
The electricity sector is an intensive user of new technologies, and this characteristic is accentuated with the transformations resulting from innovations, such as the advent of smarter electrical grids and distributed generation, among others.

The scientific and technological evolution of the Brazilian electricity sector, based on continuous Research, Development and Innovation (R&D+I) activities, and considering the unique characteristics of the country, is essential for the objectives of efficiency and sustainability to be achieved in an optimized and lasting way.

We have a unique position in the industry’s innovation system. Although established in 1974 as a private, autonomous and non-profit entity, and funded primarily with resources from Eletrobras and other utilities of the Brazilian Electric System (SEB), we play a role of public interest in providing technological support and knowledge for the performance of government agencies and sector entities, in their activities of design and implementation of policies, operation, monitoring and security assurance of the National Interconnected System (SIN) and planning its expansion.

We are the technological pillar of the planning and execution of the Brazilian energy policy, as well as of the support to the integrity of the operation and planning of electric energy generation and transmission of the SIN. Our R&D+I lines strategically impact the SEB and Brazilian society as a whole.

Our R&D+I activities, developed with strong support from Eletrobras Companies and partnerships with the academic community, are consolidated into six major areas of activity: Energy Optimization and Environment; Electrical Grids; System Automation; Transmission Lines and Electrical Equipment; Materials, Energy Efficiency and Complementary Generation; and Laboratory and Experimental Research Infrastructure.

We develop and maintain our own state-of-the-art set of methodologies and computational model chain, essential for the management of the interconnected electro-energetic system within strict safety criteria. This chain of computational models contributes to the reduction of financial and environmental costs, optimiza-
tion of natural resources, diversification of the energy matrix, minimization of carbon emissions, reliability in energy supply and tariff moderation, and national energy security, being at the base of all planning and operation activities of the national electricity system. It also represents an unparalleled effort in developing countries.

In terms of laboratory infrastructure, Cepel is the largest in electric energy in Latin America, with 34 laboratories equipped for experimental research and standardized and special tests, some of which are unique in the country. The Fundão Unit, located in Cidade Universitária, on Ilha do Fundão (RJ), houses 24 of these laboratories; the others are at the Adrianópolis Unit, in Nova Iguaçu (RJ).

For more than 40 years, our laboratory infrastructure has played a strategic role in supporting the development of the national industry and the reliability of the Brazilian electricity sector. Our laboratory tests are prepared and executed with promptness, impartiality, and high technical accuracy, following the procedures of national and international standards, and our own or our customers’ technical specifications. Moreover, they are not limited to the simple approval or disapproval of a equipment. The qualification of our technical staff allows us to contribute to the improvement of the technical performance of the equipment under test.

At Cepel’s Fundão Unit, there are laboratories for low and medium voltage equipment, phasor measurement units (PMU), energy meters, lighting, refrigeration, corrosion, chemical analysis, metallography, structure mechanics and dynamics, equipment and installation monitoring and diagnosis, and photovoltaic panel evaluation. The large-scale laboratory complex, in the High and Ultra High Voltage and Power areas, is located in Adrianópolis, occupying an area of about 230 thousand square meters.

**Founding Associates**
- *Centrais Elétricas Brasileiras S.A. - Eletrobras*
- *FURNAS Centrais Elétricas S.A.*
- *Centrais Elétricas do Norte do Brasil S.A. - Eletronorte*
- *Companhia de Geração e Transmissão de Energia Elétrica do Sul do Brasil - Eletrobras CGT Eletrosul*
- *Companhia Hidro Elétrica do São Francisco - Chesf*

**Special Associates**
- *Petróleo Brasileiro S.A. - Petrobras*
- *LIGHT Serviços de Eletricidade S.A.*
- *Operador Nacional do Sistema Elétrico - ONS*
- *Eletrobras Eletronuclear - Eletronuclear*
- *Itaipu Binacional*
- *Eletrobras Amazonas GT*
- *Companhia Estadual de Geração e Transmissão de Energia Elétrica - CEEE*
- *Companhia de Transmissão de Energia Elétrica Paulista - CTEEP*
- *Centrais Elétricas de Santa Catarina S.A. - CELESC*
- *ENGIE BRASIL ENERGIA S.A.*
- *Eletrobras Distribuição Ronaldina (Roraima Energia)*
- *CEB Distribuição S.A.*
- *Câmara de Comercialização de Energia Elétrica - CCEE*
- *Companhia Energética de Minas Gerais S.A. – CEMIG*

**Founding Associates**
- *Companhia Energética de Minas Gerais S.A. – CEMIG*
Our main products and solutions

Some of the main products and solutions finalized or under development by Cepel are described below.

**ANAFIN**

Aimed to determining and monitoring the economic viability of power generation and transmission projects, the ANAFIN model has been developed by Cepel since the early 2000s, providing adequate support to the investment decision maker. In 2020, the system was consolidated as the official tool employed by the Eletrobras group in its Prioritization and Selection processes for Generation Projects for the composition of its portfolio of new assets. Integrated to the chain of optimization models in official use in the Brazilian electricity sector, the ANAFIN model also performs risk and sensitivity analyses of the main impact factors on project viability.

**ANAHVDC**

ANAHVDC is a solution under-development to evaluate the dynamic behavior of large power systems with multiple DC links in a multi-infeed situation (where multiple DC links deliver power at close electrical points in a power system), with a focus on verifying the occurrence of switching failures. The software has potential for numerous applications in operation planning and power generation expansion planning.

**ANAREDE**

ANAREDE is the most widely used software in Brazil for steady state network analysis. In addition to its many features, ANAREDE also provides the initial solution for other programs, such as ANATEM, ANAFAS, and PacDyn, among others. The software is used by professionals from the Eletrobras System companies, the Ministry of Mines and Energy, sector entities such as the National System Operator (ONS) and the Energy Research Company (EPE) as well as public and private generation, transmission, and distribution companies, consultants and universities.
ANATEM

ANATEM is the main software used by the Brazilian electrical sector to evaluate the electromechanical stability of the Brazilian National Inter-connected System (SIN). Like ANAREDE, the software is used by all electricity sector agents, which have access to the dynamic data model bases maintained by ONS and EPE, respectively, for operation and expansion planning studies for the SIN. The software has a wide range of built-in dynamic models and allows the creation of other dynamic models using the user-defined controller (CDU) functionality. In its latest version, ANATEM makes use of parallel processing to increase the computational efficiency of simulation methods in the time domain.
CAMPEM

A system aimed to simulate and measure the effect of electromagnetic fields on the surroundings of electrical power installations, with the goal of optimizing the performance of these installations and reducing their impact on the environment, while ensuring the safety of living beings. Our performance in this area was recognized with the Center’s nomination to represent Brazil in the Advisory Board of the Project “Electromagnetic Fields”, conducted by the World Health Organization (WHO).

Integrated to the Elektra System, CAMPEM is also able to propose unconventional and low-cost solutions to increase the capacity of existing transmission lines, avoiding the costs and environmental impacts associated with the construction of new lines.

BDMotor

Focused on the diagnosis and calculation of energy efficiency investments in three-phase induction motors. Recently updated, since its creation in the 2000s, it is indicated by the Brazilian Electricity Regulatory Agency (Aneel) for use in energy efficiency projects in industry, providing savings for the sector.
DECOMP

DECOMP is an optimization model dedicated to the short term operation planning of electrical system, officially used in the Brazilian electricity sector by both the National System Operator and the Electric Energy Trading Chamber. Its use helps the institutions in the definition of the Monthly Operation Planning and in the definition of the Settlement Price of Differences (PLD) that will manage the entire dispatch and short-term commercialization of energy in the country. In 2020, the DECOMP model started using the modules of the new LIBS system in C++ language, containing advances in methodology and modernization of the user interface in several of its functionalities.
The DESSEM model is used for the daily operation scheduling - dispatch of the power plants, justification for the use of the thermoelectric plants and the remuneration of the agents - since January 2020 by the National System Operator (ONS). It operates in an integrated way with the DECOMP and Newave models, also developed by Cepel and already in use since 2000 for operation planning and price formation in the Brazilian National Interconnected System (SIN). In January 2021 the Electricity Trading Chamber (CCEE) started to use the model to determine the Price for Settlement of Differences (PLD) with a higher degree of accuracy. The PLD, which is the reference for energy purchase and sale contracts in the free market, had been calculated on a weekly basis until December 2020. With the adoption of DESSEM, the PLD started being computed on an hourly basis, yielding more adherence between price and operation, as well as more security from the electrical and energy point of view.

DianE

Focused on transmission and generation equipment management, it presents a modular and evolving architecture, consolidation of historical data from periodic tests and online monitoring data, integrating distinct analysis and diagnosis techniques in a single environment. In addition, it can interact with other systems, such as SAP and SAGE. Currently, the system is adopted by the maintenance engineers at Eletronorte, Eletronuclear, and Furnas. In 2020, it started a test phase at Amazonas GT and was implemented at Eletrobras.
Elektra

Computational system for the calculation, sizing, costing, and techno-economic optimization of grounding system designs, direct current (DC) and alternating current (AC) transmission lines with generic conductor bundles. With a unique conception, it has several calculation modules integrated among themselves and databases of materials and prices of line components, calculation criteria and methodologies, and meteorological data throughout the Brazilian territory, conferring great practicality of use and precision in the results. Currently, the system is used by professionals from Eletrobras Companies and other companies and entities in the electric sector, such as EPE, ONS, ISA CTEEP, NeoEnergia, TSE, KGF etc.
FidCorr
Computational tool to automate the diagnosis of corrosion in transmission line tower foundations, without the need for excavation or de-energizing the line.

IGS
A management tool that collects, monitors and analyses key sustainability indicators, used to manage corporate sustainability, Sustainable Development Goals (SDG), prepare the Annual Sustainability Reports in the GRI Standard format and the greenhouse gas emission inventory of Eletrobras Companies. The collected data also helps the responses to the sustainability indexes of the São Paulo and New York stock exchanges (ISE/B3 and Dow Jones, respectively) and other investor-oriented reports. Currently, the IGS System allows data collection and analysis related to the Environment, Social and Governance (ESG) criteria, helping to monitor goals and the decision making processes of Eletrobras Companies, aligned with the Business and Management Master Plan (PDNG). In 2020, a validation of the Analytical IGS methodology took place, using operations research techniques to analyze historical data and suggest performance improvement targets.

IMA-DP (Instrumentation for Partial Discharge Monitoring and Analysis)
A system that serves all types of high-voltage electrical equipment, allowing the monitoring of insulation in its aging and degradation process, detecting incipient defects, preventing failures, and thus increasing the reliability of this equipment. IMA-DP has already received two international awards for its innovative character for the electricity sector.
Newave

A system used to calculate the operating policy of interconnected hydrothermal systems, using advanced stochastic optimization techniques and statistical modeling for the uncertainties related to the inflows of hydroelectric power plants. This operating policy is officially used by the institutions of the electricity sector in the main processes associated with energy planning: for the evaluation of the ten-year expansion plans (PDE) and the calculation of the assured energy of hydroelectric plants by the Energy Research Company (EPE); for the energy planning of the system (PEN) by the Brazilian National Electric System Operator (ONS); and for the calculation of the monthly operation program (PMO) by ONS and the price for settling of differences (PLD) by the Electric Energy Trading Chamber (CCEE), together with the DE-COMP and DESSEM models. In addition, Newave is the main tool used for price assessment by the companies in the Eletrobras System and the agents in the Brazilian electricity sector.

In 2020, a model called Par(p)-A was developed, implemented in the generation module of energy inflow scenarios (Gevazp) with the objective of better representing long duration drought periods, such as those recently observed in the Northeast region.
PLD-Pro

PLD-Pro is a system for conducting studies to assess the Electricity Price in the spot market (PLD). The program compiles and manages all the models involved in obtaining the spot price and generates consolidated results in spreadsheets for statistical treatment. It has a web interface and allows remote execution of the models.

The implantation of the PLD-Pro modules at Eletronorte, Furnas and Chesf and the development of new versions of the program have already been started, with adjustments and new developments requested by the companies.

SAGE

The SCADA/EMS (Supervisory Control and Data Acquisition/Energy Management System) platform is the most widely used in Brazil, with more than 1.4 thousand installations throughout the country and applied in the real-time operation of the largest companies’ electricity grids and the entire national grid through ONS’ control centers (REGER system). The platform includes, besides the typical energy management functionalities, a system for simulations and operator training that exactly replicates the operating environment for training purposes.

SCAn

Frequency response measurement system with unique features on the market, such as noise mitigation, compensation of measurement setup effects, and modular hardware.

SINAPE

A system for automatic disturbance analysis that enables the detailed online study of occurrences in the electrical system from oscillographs. SINAPE is used by large companies and entities in the sector, especially ONS, which concentrates the analysis of main occurrences throughout the Brazilian electrical grid. In its online version, called SINAPE.net, it presents as its main feature the treatment, with a high degree of automation, of digital oscillographs, allowing the analysis of disturbances focused on the problem.

SMARTe

Transient overvoltage monitoring system under development. With no equivalent on the market, it will be able to measure, record, and perform grid disturbances analysis without interrupting the operation. It will thus make it possible to obtain information about the transient stresses that the equipment undergoes during its operation.
Our products and solutions generate several positive impacts, among them the economic ones, in the form of avoided costs, postponed investments, and generated revenue for the beneficiaries. As examples from 2020, we highlight:

**DianE**: R$ 40 million in avoided costs for Eletronorte with the detection of four failures in power transformers by the new Bushing Monitoring functionality.

**FidCorr**: identified correctly the corrosion state of 90% of the inspected transmission line towers foundations in the field tests carried out on Furnas and CGT Eletrosul transmission lines. With FidCorr, the analysis time takes about 40 minutes per each foot tower. In the previous way this time was, on average, 3 to 4 hours.

**IMA-DP**: technical support in the replacement of 12 new current transformers from Amazonas GT for which we verified problems. With this, the company recovered more than R$3 million. IMA-DP also helped Eletronorte to intervene in the generating unit 05 of the Tucurui Hydroelectric Power Plant. The intervention avoided the failure and the associated costs, estimated at around R$10 million. IE Madeira (Interligação Elétrica do Madeira SA) has removed three surge arresters from operation as of our evaluation at the Araraquara 2 and Coleto-ra de Porto Velho substations, saving R$2 million.

**ANAREDE**: the transmission margin automatic calculation module allows the systematic evaluation of the feasible solutions space for the dispatch of candidate generation, ensuring the maximum usage of the remaining transmission capacity of the Brazilian National Interconnected System and producing a positive indirect economic impact in that it allows the postponement of investments in the construction of new transmission lines.

---

**Economic impacts**

**GRI 203-2**

Asset monitoring web platform that applies Industry 4.0 technologies, such as the Internet of Things, Artificial Intelligence, and Digital Twins to the electrical sector, aiming to translate monitoring data into useful information for decision making by maintenance managers.

**UVCorona**

Guide for conducting inspections of transmission lines and high-voltage equipment using the UV camera also presenting unified maintenance criterias.
Innovation for the electricity sector
GRI 102-2, 103-1, 103-2, 103-3, EU8

Cepel, as the main agent of innovation in the Brazilian electricity sector, develops the main computational tools for operation planning studies and for the expansion of the Brazilian National Interconnected System (SIN), as well as operation supervision and control. Constantly evolving and maintained in the state of the art through research, master’s dissertations and doctoral theses, developed by researchers, this set of solutions is available to our funding and associate members and to other generation, transmission, and distribution companies, public and private, as well as consulting firms and universities. For the latter, we offer free academic versions, which allow their use in engineering graduation courses throughout the country, training future engineers in the electricity sector.

For years we have also developed products related to asset management that are applied by Eletrobras Companies and other generation and transmission utilities, having recently evolved to the use of Internet of Things at the Industrial level (IoT) for asset monitoring; of Digital Twins for the structural and behavioral simulation of the monitored assets; and of Artificial Intelligence for the Diagnosis and Prognosis of these assets.

Moreover, industrial technological progress takes multiple paths and relies on several types of conceptual and experimental contributions. The outcome of a given equipment project used in power electrical systems has the laboratory tests as an important ally.
In this aspect, one can say that Brazil is well supported. Cepel has a complex laboratory facility for experimental research, testing, and technological services, covering a wide range of equipment and components for alternating current (AC) and direct current (DC) electric power transmission and distribution systems, as well as equipment used in electric power generation.

For more than 40 years, our laboratory infrastructure has played a strategic role in supporting the development of the national industry and the reliability of the Brazilian electricity sector. Our laboratory tests are prepared and executed with promptness, impartiality, and high technical accuracy, following the procedures of national and international standards, and our own or our customers’ technical specifications. Moreover, they are not limited to the simple approval or disapproval of a certain equipment. The qualification of our technical staff allows to contribute to the improvement of the technical performance of the equipment under test.

Our main set of R&D+I projects is the Portfolio of Institutional Projects (IP Portfolio) for Eletrobras Companies, which consists of a set of strategic projects, of corporate scope, with medium and long-term vision and horizon, aligned with the themes and lines of action contained in the Technology and R&D+I Action Program of Eletrobras Companies 2019-2022. The results are shared among the Eletrobras Companies.

It is noteworthy that the annual planning of activities and investments are derived from strategic guidance by Cepel and the Eletrobras Companies as a function of prioritizing which products and/or re-
Results must be delivered in the following year. Based on the current discussions within the CPT’s (Commission on Technology Policy) Technical Groups and on the synthesis of the IP Portfolio, the CPT expresses its opinion and recommends its submission to our General Assembly for approval.

Besides the IP Portfolio, we have developed R&D+I projects on demand for other companies, Special Associates and other companies. In 2020, R$ 193.3 million were spent for the development of R&D projects, technological services, licensing of programs, testing and management. The table presents the values listed by area in which Cepel operates.

The expenses related the META Project - Technical Assistance Project for the Energy and Mineral Sectors, represented, for the year 2020, R$2.7 million, which were not considered in the entries above. The META Project, the object of World Bank Loan Agreement No. 8,095/BR, was an initiative of the Ministry of Mines and Energy (MME), whose main goal was to contribute to broadening and consolidating the advances in the Brazilian energy and mineral sectors, supporting the country’s competitiveness and sustainable economic growth.

### Investment in R&D+I

<table>
<thead>
<tr>
<th>Areas of operation</th>
<th>R$ million</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Automation</td>
<td>27.5</td>
</tr>
<tr>
<td>Energy Optimization and Environment</td>
<td>32.8</td>
</tr>
<tr>
<td>Lines and Stations</td>
<td>30.0</td>
</tr>
<tr>
<td>Electrical Grids</td>
<td>20.5</td>
</tr>
<tr>
<td>Materials, Energy Efficiency and Generation</td>
<td>18.4</td>
</tr>
<tr>
<td>Experimental Research</td>
<td>64.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>193.3</strong></td>
</tr>
</tbody>
</table>
Two of our projects were selected in the first Innovation Olympics of Eletrobras Companies. The project “Methodology of Acceleration and Monetization of Technological Products Developed within Eletrobras Companies” was awarded the first place. The idea of the project is to accelerate already developed technological products (software, hardware, systems and websites) so that they can be monetized externally to Eletrobras, generating revenues for the inventor institution through royalty payments, with great potential to increase our own revenues. It also aims to promote an increase in scale and visibility within the Eletrobras group of products created by us, increasing the results of the research teams without requiring direct financial investments. In a quick survey, the team checked more than 50 technology products to be accelerated and monetized.

The project “Business Analytics System to support management and decision making” was awarded the fourth place. This initiative proposes the use of an Enterprise Data Hub to connect the different data sources of the Eletrobras Companies, redefine the data for analytical use, and format them for presentation on dashboards. With this data, it will be possible to identify patterns, points outside the curve, and make correlations between variables, providing a descriptive analysis, helping managers in their decisions and in the definition of action plans.

The Olympics result was announced on October 20th, when the projects were reevaluated by a new panel of judges, after adjustments were made to enable the implementation of the Minimum Viable Product (MVP - a simplified version of a product) during the six-week prototyping workshop.
Idealization and creation of the Technical Project Management Office

In 2020, our Technical Project Management Office was created and started to operate. Its main objectives involve disseminating a management culture through the adoption of methodologies, best practices, and tools; assisting in the standardization and guidance of practices and procedures to create and manage projects; and monitoring and evaluating each one of them by means of indicators and reports, in order to ensure their good evolution and strategic alignment with our interests and those of Eletrobras, enhancing the positive impacts.
Enabling the calculation of the energy price on an hourly basis

Methodological improvements incorporated into the DESSEM program have allowed Brazil, following the example of other countries, to calculate the price of energy on an hourly basis as of January 1, 2021. Until the end of 2020, the PLD (Difference Settlement Price), the reference for energy purchase and sale contracts in the free market, was calculated on a weekly basis. The change was only possible with the official implementation, by the Electric Energy Trading Chamber (CCEE), of the DESSEM computational model, developed by Cepel. With this, the Brazilian system gains greater adherence between price and operation and more security from the electrical and energy point of view. The new form of pricing was fundamental in view of the change in the profile of the Brazilian electricity matrix in the last decades.

With DESSEM, the Brazilian system gains greater adherence between price and operation and more security from the electrical and energy point of view

The DESSEM model has already been officially used by the Brazilian National Electric System Operator (ONS) since January 2020 for the daily operation programming. The official introduction of DESSEM in 2020 by ONS and in 2021 by CCEE was only feasible due to the intense work of several institutions involved in the process, notably ONS and CCEE, in the careful and exhaustive analysis of the methodologies and results, and contributing with proposals for improvements, besides the active participation of the agents. Through a task force, FT-DESSEM, more than 1,200 unit and systemic tests of the model were performed, and the agents were able to participate in the process, identifying additional requirements for adequate representation of the constraints. Complex features with a large impact on the results have been incorporated in recent years - such as thermal unit commitment constraints and power grid security constraints - and required an intensive validation process, which began in October 2017.
System development with Industry 4.0 technologies

The Integrated System for Monitoring and Diagnosis/Computational Diagnosis of the Operational Condition of Electrical Generation Equipment (SOMA) is a disruptive project, as it applies Industry 4.0 technologies to the management and monitoring of assets in the electrical sector.

SOMA is a unique, integrated tool that incorporates other products previously developed for the monitoring, analysis and diagnosis of electrical equipment to provide increased power availability and reduced maintenance costs. Its functionalities range from online monitoring of the equipment’s operational status by a maintenance technician to diagnosis of its condition by a specialist engineer.

The system architecture is based on the application of three Industry 4.0 pillars:

• Internet Industrial of Things (IIoT) - a technique that allows connecting general information to devices in an industrial network applied to asset condition monitoring;
• Digital twins - a digital copy of a physical product, service, or process applied to real-time simulation of assets for diagnostic and simulation purposes; and
• Artificial intelligence (grouping of technologies, such as expert systems and machine learning, among others, that can simulate human capabilities linked to intelligence) - applied to the diagnosis and prognosis of assets.

This range of technologies helps companies face the big challenge in the management of their assets, which is to translate monitoring data into really useful information for decision making by maintenance managers. Since the beginning of the pilot use of SOMA at the Itaipu Hydroelectric Power
Plant, the company has been able to optimize the processes in monitoring its machines, saving man-hours and obtaining more reliable data. In parallel, the IHM-3D (three-dimensional visualization of the generator) has provided engineers with a better knowledge of the equipment’s structure and helped in the planning of eventual interventions.

With the success of SOMA at Itaipu, other companies have adhered to the use of the tool, which is being implemented at Furnas, Eletronuclear, CGT Eletrosul and Amazonas GT plants. SOMA is the product of decades of development in partnership with the Eletrobras Companies. In a debate during the 2019 International Colloquium on Rotating Electrical Machines, promoted by the International Committee on Electric Power Generation and Transmission (Cigré), in New Delhi (India), it became evident that its pilot implementation at Itaipu had no parallel in the globe among generation companies, manufacturers, universities, and research centers.

The solution is in the final stages of commissioning for use in transmission assets as well. In October, SOMA was the highlight of the 35th Brazilian Maintenance and Asset Management Congress, held as a webinar by the Brazilian Maintenance Association (Abra-man). The event was attended by a large audience, including representatives from various productive sectors. Among them is the oil and gas sector, where we see great potential for the system’s application.
Energy company modernization with SAGE

In February 2020 we signed a contract with Cemig GT for the complete modernization of the System Operation Center (COS) and the backup center of the company, one of the most important transmission and generation utility in Brazil. The partnership aimed at implementing the SAGE platform to support, in real time, the operation of the entire transmission network and generation plants. The solution was chosen by Cemig GT, among other reasons, because of its maturity, along with the policy of constant technological evolution and our expertise in implementing large-scale supervisory and control systems, such as those conducted for the National Operator of the Electric System - ONS, Chesf, CGT Eletrosul, Eletronorte, and ISA CTEEP, among others. To make the project possible, our technical team assembled the company’s team in conducting a detailed analysis of possible integration architectures, in order to design a solution that would allow a smooth migration between platforms and ensure the continuity of the operation during the transition. Due to the modularity characteristic of the SAGE platform, essential solutions were added for Cemig GT operation, such as the Automatic Voltage Control and the substation recomposition preparation system. These solutions are now available for all SAGE platform users. The implementation of SAGE in Cemig GT will have its first operational stage in 2021. The second stage will be the implementation of the real-time network analysis functions and the platform for simulations and operator training.
SAGE Platform completes 15 years of operation at ISA CTEEP

The SAGE platform, completed 15 years of uninterrupted operation in 2020 in the Transmission Operation Center and in the Backup Operation Center of ISA CTEEP, one of the main private transmission utilities in Brazil, responsible for the transmission of about 60% of the energy consumed in the Southeast region and 94% of the energy of the state of São Paulo. This milestone proves that the scalable, expandable, and modular architecture of SAGE allows it to smoothly follow the demand growth for data processing and storage, which is inherent to the evolution and expansion of the automation of electrical systems operation. In 2020, new functionalities were added to the ISA CTEEP platform, such as the automatic maneuver manager and tests with the TopSim operator training simulator.
Partnership with State Grid Brazil Holding (SGBH)

Throughout 2020, we worked together with SGBH on a research and development project to meet the regulatory measures of the National Electric Energy Agency (Aneel) through the customization of a predictive monitoring system for Current Transformers (CTs), important assets of the electricity sector. Failures and accidents in current transformers cause a significant impact on operations, causing the loss of the equipment or other adjacent equipment in case of explosions, which can degrade the system's reliability and lead to financial penalties for unavailability of assets, in addition to inherent risks to the safety of the professionals who work in the power substations.

The objective is that the system can measure and evaluate transient phenomena, such as those originated by switch disconnections and partial discharges, among other techniques, to indicate the operating conditions of the equipment. Its use will bring significant gains for substation operation and maintenance managers throughout the Brazilian National Interconnected System.

In addition to laboratory researches, the project covers field measurement and evaluation of CT operating conditions, simulation and modeling studies, and the definition of technical monitoring criteria, the latter three activities envisaged in a technical cooperation agreement between Cepel and the China Electric Power Research Institute (Cepri).

We also have a major partnership with SGBH in the development of energised-line maintenance technology in Ultra-High Voltage Direct Current (UHVDC) since 2018. The Adrianópolis unit has a laboratory infrastructure for research and development trials in the UAT class, which allows the development of methodologies previously only possible in the field. In 2020, under the ANEEL R&D project “Development of Live Line Maintenance Methodology and Reliability Assessment under Pollution of Insulator Chains with Broken Units for UHVDC Transmission Lines,” a theoretical analysis with mathematical modeling was developed on the performance of DC system insulator chains with broken units, to subsidize the experimental analysis previously performed. In addition, the technical reports regarding the activities performed in 2019 in this R&D project were compiled.
The new BDMotor makes it possible to evaluate whether or not a replacement is advantageous by means of assessment of motor and economic parameters.

New version of BDMotor

Launched in April 2020, the new version was developed in partnership with the Petrobras Research Center (Cenpes) as a support tool for energy efficiency projects involving three-phase induction motor installations. Since its creation, in the 2000s, the BDMotor is a national reference, being indicated by Aneel for use in energy efficiency projects in industry.

The system update is available as free software on a web platform on the website of the National Electrical Energy Conservation Program (Procel). Its proposal is to expand the database of engines, as well as to revise all the load analysis methodologies and add more accurate economic analysis.

The new BDMotor makes it possible to evaluate whether or not a replacement is advantageous by means of assessment of motor and economic parameters such as interest rate, analysis horizon, and average electricity tariff. The candidate engines are sorted out by the Net Present Value (NPV) of the investment result, providing a full cash flow report of the savings realized and the payback period of the investment in the engine replacement.

For new projects, the BDMotor is able to sort the available alternatives by their total Life Cycle Cost, indicating which are the most advantageous for the project. In both cases, the CO₂ Emission Factor was incorporated as a reference variable for decision making in the current context of decarbonization of the electricity sector and industry in general.

Since 95% of the lifetime cost of a three-phase induction motor corresponds to its electrical energy consumption, the system has great potential to provide savings for the industrial sector and a consequent optimization of resources in the electrical sector.
Cooperation for the development of a new computational environment for the Brazilian electrical system

At the end of April, our top management team joined the top leaders of the Brazilian National Electric System Operator (ONS) and of the Electric Energy Trading Chamber (CCEE) to sign an agreement for the provision by Cepel of a new computational environment for the models officially used in the studies for planning the expansion and operation of the Brazilian electrical energy system, contemplating a unification of the databases and input and output files for the models.

The cooperation is part of the Libs Project, created in 2017, which aims to develop a more flexible architecture to integrate these energy models into a single system. Libs is expected to be launched by the end of 2022.

The platform will integrate into a single environment the computer models already used by CCEE in a more user-friendly format, which will make it easier to use and allow the optimization of the institution’s processes, as well as those of other sector entities and the electric energy market agents themselves. This modular platform will speed up the implementation of new functionalities improving the mathematical representation of the planning, operation, and pricing problem.

The system interface, called XLibs, is being developed in a web environment for use not only on desktops but also on mobile devices, such as tablets and cell phones.
Acoustic emission analysis in power transformers

In April, we performed acoustic emission analysis on the three single-phase power transformers of the Eletronuclear Angra 2 Nuclear Power Plant, located in Angra dos Reis (RJ). The transformers raise the electrical voltage from 25 kV to 500 kV, and are responsible to supply to the system the plant’s production. Each of the transformers has a nominal power of 490 MVA, one of the largest in Brazil. It was the first time that this type of test was conducted on this equipment.

Acoustic emission analysis is a non-invasive technique that seeks to detect and locate possible sources of internal noise, indicative of anomalies in the equipment, without interrupting the availability of the asset, and therefore not impacting the supply of electricity.

The analysis allowed Eletronuclear to have a better knowledge about the dielectric conditions of three of its most important assets, and the periodic evaluation in Angra I and Angra II will allow the follow-up of the operational status of this equipment, allowing the detection of incipient defects and the consequent increase of reliability in the energy supply by both nuclear plants.
of analysis, both for operational and managerial activities of the companies. In an evolutionary manner in relation to previous versions, the IGS 2.0 System is totally customizable, with greater flexibility in data storage, in the frequency of variable and indicator collection, in homologation processes, and in the types of variables to be registered in the system. The reliability of the information made available is ensured by an approval chain, which facilitates the identification of its origin and the taking of corrective actions, allowing the reliability of the data. As the system is all encrypted, the security of the information is also guaranteed.

New version of IGS 2.0

In May, we deployed a new version of IGS 2.0 - a management system for sustainability indicators, which collects data via internet and relates the stored information, producing summaries and reports, allowing several types of analysis, both for operational and managerial activities of the companies. In an evolutionary manner in relation to previous versions, the IGS 2.0 System is totally customizable, with greater flexibility in data storage, in the frequency of variable and indicator collection, in homologation processes, and in the types of variables to be registered in the system. The reliability of the information made available is ensured by an approval chain, which facilitates the identification of its origin and the taking of corrective actions, allowing the reliability of the data. As the system is all encrypted, the security of the information is also guaranteed.
NZEB Cepel House - Winning project of public call

The New NZEB (Nearly Zero Energy Building) Cepel House project was classified as the first candidate in the public call Procel Edifica - NZEB Brazil, which aims, among other objectives, to contribute to the construction of up to four such buildings in strategic locations in Brazil. This is the construction of a highly energy efficient building, with associated distributed renewable generation and an annual energy balance close to zero. The project budget is at R$2.5 million, of which R$1.0 million will come from Procel and the rest from external sponsors and from Cepel itself.

The House was projected, in partnership with the School of Architecture and Urbanism of the Federal University of Rio de Janeiro, to be a multi-use space, constituting an attractive environment for research, visits, meetings, technical meetings, training, and professional formation. It will also promote the national integration among the scientific community, society, governmental and private agents, with the forecast of construction during 2022 at Cepel's Fundão Unit.

The project was conceived to be, besides architecturally attractive, an excellent example of interdisciplinary unifying concepts of bioclimatic architecture, distributed generation, and energy efficiency. It is a technological, innovative, and educational project. The building will have two main blocks, joined by a roof and a visitors’ circulation area.

According to the National Program for Conservation of Electrical Energy (Procel), buildings are responsible for approximately 50% of the country’s total consumption of electrical energy. The promotion of NZEBs, therefore, meets public policy studies for their implementation on a larger scale, bringing social benefits, reducing carbon emissions, and contributing to the transition to an even more renewable energy matrix.

The New NZEB (Nearly Zero Energy Building) Cepel House project was classified as the first candidate in the public call Procel Edifica - NZEB Brazil
Online monitoring system completes one year at Balbina HPP

In June, the pioneering system of continuous online monitoring of partial discharges, implemented by us in the generating units of the Balbina Hydroelectric Power Plant (HPP), belonging to Amazonas GT, completed one year of uninterrupted monitoring of the equipment’s condition. Result of the integration of IMA-DP and SOMA (see page 27 and 38), the system has enabled the company to optimize maintenance time and costs by reducing the risks of insulation failure in generators.

The Balbina HPP intends to further optimize the predictive maintenance plan, with the acquisition and analysis of other parameters in SOMA, such as the vibration of the hydraulic turbines and temperatures. This plant is responsible for supplying a good part of the city of Manaus and the state of Amazonas.

New tool for integration of the models used by SIN

In July 2020, we launched the first version of the pyencad tool, a programmable interface for treatment, data analysis and integrated execution of some of the energy optimization models developed by us and used in the planning of the operation of the Brazilian National Interconnected System. One of the advantages of the new tool is that it allows users of these models to customize their applications by means of programmable commands or scripts, molding them to their needs.

The new product meets the users’ demand for more autonomy to perform customized studies involving several models. It is planned that the pyencad tool will be coupled, in the near future, with the new Libs computing environment (see page 44).
Cooperation with ONS for using AnaHVDC and ANAFAS

In July 2020, we signed a technical cooperation contract with the Brazilian Electric System National Operator (ONS) to, among other topics, develop computational modeling and perform dynamic simulations on the Brazilian electric system, according to ONS’ own criteria and assumptions, in operation planning studies (off-line application). The goal is a future application of AnaHVDC (see page 21) integrated with operator tools for real time scale studies.

With AnaHVDC, the ONS analyst will be able to study the dynamic behavior of the system due to electromechanical and electromagnetic transients, and the interaction between the DC links and between these and the AC grid, including the detection of switching faults. Direct current transmission represents a relevant part of the transmission grid of the Brazilian National Interconnected System (SIN), with a total capacity of more than 20 GW, delivering power generated in hydroelectric plants located in the North (Madeira and Belo Monte) and South (Itaipu) regions, to substations in the Southeast region. ONS does not currently have an off-line tool that includes both the accurate representation of the switching fault and the electromechanical dynamics of SIN, which requires the complete modeling of the power system.

AnaHVDC is therefore an innovative solution, and was presented in a webinar held in September to hear the views of its future users. Among other professionals, took part: our general director, the Eletrobras Transmission director, the ONS Planning director, and a representative from the Transmission Superintendence of the Energy Research Company (EPE).
Collaboration with the Italian company Terna

We carried out a collaborative work with Terna, the Italian National Electric System Operator, to validate the methodology for calculating predictive indices of performance in electric systems with high level of direct current feeds (DC Multi-Infeed) in the European transmission system. This methodology is implemented in the ANATEM program, which is the most widely used program for analyzing electromechanical transients in large systems in the Brazilian Electrical System.

Results in the wind energy area

In the wind generation area, a significant result was the conclusion of the development of the methodology for calculating the uncertainty for obtaining the P90 parameter, necessary for calculating the physical guarantee of wind farms. Additionally, the development and implementation of a monitoring platform for the Artilleros wind farm, belonging to the UTE (Usinas Y Transmisiones Electricas) consortium of Uruguay and Eletrobras, was completed.
Training for the external public
GRI EU14

The novel coronavirus pandemic, and the resulting social isolation, have imposed the challenge of conducting training, meetings, and virtual events. We were able to adapt to the new reality and fulfill our commitment to the electricity sector and society, presenting them with the results of our research and services. We held 48 events aimed at the external public, mostly online, totaling more than 3.6 thousand participants and 768 certificates issued.

These events included webinars, courses, report presentations, lectures, livestreams, and workshops. We highlight the first SAGE configuration module and the tutorial for using DianE; the on-the-job training on SAGE’s automatic maneuver management module for Chesf and Eletronorte; and the workshops on IGS 2.0 for Furnas, Eletronorte, Amazonas GT, Chesf, Eletronuclear, CGT Eletrosul, Itaipu, Eletrobras Holding and also Cepel.

Through the Directorate of Laboratories and Experimental Research, we have held a series of technical lectures open to the technical-scientific community, which are available as playlists on our YouTube channel. There were 11 lectures on the subject of Corrosion, two on the subject of Lighting Technology, and one on the subject of Metallography.

We also held, on August 21, 2020, the online workshop “Best practices in the use of the UV camera in the electricity sector”, an event that promoted intense sharing of experiences on this theme. To debate it, the workshop included technical presentations by Cepel researchers, who reported on our laboratory and regulatory experience in the subject. Engineers from outside companies shared their practical experience in the field. The workshop was attended by more than 85 participants and was marked by the exchange of experiences.

We also contributed to the education and qualification of the academic community by means of master’s and doctoral scholarship programs. Among master’s and doctoral dissertations and thesis there were a total of twelve that were presented in 2020. Student visits to the Center were impacted in 2020 by the pandemic of the new coronavirus.
Innovation in Sustainability

Petrolina Solar Platform

Chesf, in partnership with the Federal University of Pernambuco (UFPE), the Federal University of Vale do São Francisco (Univasf), the University of Pernambuco (UPE), and the FITEC foundation, is implementing in Petrolina (PE) a 0.5 MWp solar plant, with several technologies of photovoltaic modules and different arrangements, to carry out studies and research. The project has our technical support and aims to contribute scientifically to the survey of technical coefficients, enabling national qualification both for the operation of infrastructure of the type, and for the manufacture of components and complete generation systems. The goal is to promote in Brazil the adoption of photovoltaic systems and plants with higher efficiency and lower costs and environmental impacts.

Although the implementation tends to change the configuration of land use and occupation, since it demands the suppression of caatinga vegetation, the Environmental Impacts Analysis process demonstrates that the plant presents low potential for environmental impact. Chesf, however, has assumed a plan that incorporates measures associated with the maintenance and improvement of the quality of the environment locally and regionally into its administrative structure and construction process.
Support to the Brazilian Navy in renewable generation and energy efficiency projects in oceanic islands

The Brazilian Navy has requested a technical cooperation agreement with the objective of developing solutions for the supply of electric energy to the country’s oceanic islands based on renewable sources. The starting point is the archipelago of São Pedro e São Paulo, where, more than a decade ago, we conceived and installed the only local source of electric energy, formed exclusively by photovoltaic panels and batteries. The agreement is expected to be signed in early 2021.

The source is used to supply electricity to the scientific station existing in the archipelago, considered fundamental to Brazil, as it ensures the permanent occupation of the site, thus guaranteeing an addition of about 450 thousand square kilometers to the national Exclusive Economic Zone.

Our interest in the agreement is also to obtain data from the use of the panels and other power generation devices to support, for example, research related to the aging and wear of this equipment. We can even perform tests in our Photovoltaic Systems Laboratory (LabSol), inaugurated in 2019 and which supports research and development projects for these systems, such as the evaluation of specific solutions for use in serving isolated communities by the Luz para Todos (LpT - “Light for All”) Program. Among LabSol’s main clients are the Ministry of Mines and Energy, Eletrobras companies, and energy concessionaires.

Our interest in the agreement is also to obtain data from the use of the panels and other power generation devices
New studies related to the electrification of isolated homes

Ensuring the basic needs for lighting, communication, and refrigeration for isolated homes, without access to conventional distribution networks, has been the target of different Federal Government programs over the years. This is the case, for example, with the Program Luz para Todos (LpT - “Light for All”) and the recently launched Mais Luz para a Amazônia (“More Light for the Amazon”). To support the Ministry of Mines and Energy (MME) regarding the most feasible Individual System of Electricity Generation by Intermittent Energy Sources (SIGFI), Eletrobras has relied, for nearly two decades, on our technical expertise in the area.

Based on the studies and tests that we carried out, simulating real operational conditions, that the MME and Eletrobras established as a criterion of the LpT Program that each consumer unit of individual residential use should have a guaranteed monthly availability of 45 kWh/month. The system that meets this criterion is called SIGFI 45, according to Aneel Resolution No. 493/2012. More recently, with the reduction in the price of photovoltaic panels, we have been engaged in new studies, this time involving the evaluation of SIGFI type systems with higher PV module power and smaller battery bank size compared to SIGFI 45 systems.

We have already evaluated, through simulations, that SIGFI 60 systems (60 kWh/month generation) with enough batteries for one day of autonomy (as opposed to SIGFI 45 systems with batteries for two days of autonomy) have a lower cost and higher availability for the customer. We are currently conducting long-term trials to experimentally prove whether the SIGFI 60 system with a smaller battery bank is actually superior to the conventional SIGFI 45 system, as demonstrated by simulations.
Sustainable development and expansion planning + water resources

In 2020, we developed a series of solutions for planning the expansion of the Brazilian electricity system with respect to socio-environmental aspects and the good use of water resources:

• implementation of an interactive process between the Melp, Newave and DESSEM models with a new methodology for the long term generation expansion planning, considering hourly operation evaluations and wind generation scenarios;

• completion of the first report on the Development of Socio-environmental Impact Metrics in Energy Systems in the project Strategic Environmental Assessment for Generation Expansion Planning (AAEXP), consolidating the stage of valuation of greenhouse gas emissions and freshwater consumption, and the insertion of related costs in the Matrix model (models for generation expansion);

• implementation, in the Confiability in Interconnected Hydrothermal
Systems), of metrics associated with the new general criterion of guarantee of supply to measure the SIN’s peak supply, with representation of the interconnections;

- evaluation study for considering synthetic critical periods in the Sinv (Hydroelectric Power Plant Inventory System) model, used in the calculation of firm energy in Inventory Studies for hydroelectric power plants and small hydroelectric power plants; and

- first stage of the evaluation of the current methodology for revising the waiting volume of the reservoir at the Boa Esperança hydroelectric plant, owned by Chesf, with the purpose of anticipating the refilling of the waiting volume in years with a drier rainy season (Cheias project).

Green Hydrogen

Green hydrogen is produced from the electrolysis of water using electricity from renewable sources, reason why its use to decarbonize the economy is becoming an irreversible trend. In this context, Eletrobras demanded that Cepel, in 2020, developed a conceptual project for a production plant for this source. The goal was to master the project cycle of this type of infrastructure, providing the company with a methodology to address issues such as location, costs, power supply strategies for the electrolyzer, and technology selection, among others. The project is scheduled to end in February 2022.
Digital transformation of the electricity sector

Cepel’s main impacts on digital transformation are taking place in the electrical energy sector. On pages 21 to 30, we report what are our main products today and, in the digital automation line, we highlight the SAGE system, which, through the analysis of digitalized measurements, generates information for operators, both preventive and remedial, and indications that optimize the efficiency or potential use of electrical system resources.

SAGE monitors thousands of measurements and, through logical and algorithmic analysis, can trigger alarms and generate graphical information that provides the operator with information to avoid, mitigate, or remediate situations that could lead the electrical system to critical conditions. To give an idea of its relevance, several of the largest companies in the electric sector use the SAGE platform in their control centers, operating uninterrupted for decades. Here it should be noted that companies such as Chefe and Eletronorte are relying on the synchronization and redundancy capacity between control centers supported by the system to redefine the architectures of their supervisory networks and the operation policies that meet the standards dictated by the ONS Network Procedure.

With the various solutions we develop, we not only influence the way companies in the electric sector operate, but also reduce the effort of their expansion and operation planning study teams. We seek to understand our performance in this transformative process through the degree of market penetration of SAGE and SINAPE (see page 29) and the feedback given by the users themselves, in specific forums, such as working groups, and in broader forums, such as seminars and congresses. We also consulted the institutions that use the products in official activities in the electric sector about improvements to be made and checked reports on the experiences of partners and equipment manufacturers, in addition to the results of audits carried out at the various customer organizations, verifying the improvements in the processes.

We also highlight the SOMA system, whose details can be checked on page 38.

With the various solutions we develop, we not only influence the way companies in the electric sector operate, but also reduce the effort of their expansion and operation planning study teams.
Internal Digital Transformation
GRI 103-1, 103-2, 103-3

To stay at the forefront of technology, we must also promote an internal digital transformation. We created an Information Technology and Artificial Intelligence Center (NTEC) to study and develop the application of tools such as artificial intelligence, learning machine and deep learning (technologies with which software gains the ability to learn according to expected answers through associations of different data), blockchain (shared and immutable ledger for recording transactions and tracking assets), geographic information system, and high performance computers.

We are using Zabbix software for monitoring critical ICT assets. The switch to the Microsoft Office365 platform has been contributing to productivity, integration, mobility, and security for all employees and customers in administrative processes. We modernized hardware and software for firewalls (security devices) and access points (devices that bring Internet access to unreachable points). We also hired support links to Adrianópolis and rationalized the printing resources.

By adopting these facilities and applying digital signatures, we were able to maintain the flow of signed proof documents for our customers during the remote work phase and keep the teams connected.
Laboratory Infrastructure
We have a broad laboratory infrastructure, capable of researching, developing and innovating in the various trends associated with the electric power sector in Brazil and worldwide (learn more on page 19 and 20). Next, we present our main labs.

Smart Grid Laboratory GRI 102-10

The implementation of the laboratory is being carried out with our own and from one of our Special Associates resources, Petrobras. Between 2020 and 2021, a total of R$8 million is planned to be invested.

Smart electrical grids make extensive use of digital technologies and advanced computing and communications capabilities for monitoring and managing electricity throughout the transmission and distribution structure to end consumers. According to specialists, they are related, in particular, to the implementation of advanced metering infrastructures (smart metering), a technology that has proven to be adequate in the fight against energy losses, a subject of great interest for distributors. Smart electricity grids are also associated with the integration of distributed energy resources (DER), such as photovoltaic and wind generation, and energy storage.

Our Smart Grid Lab will meet, in its the first phase of implementation, the needs for specialized labsto cover power levels between 0.5 kW and 300 kW. The laboratory project has modularity characteristics and foresees the possibility of expanding its installed capacity up to 2 MVA.

The component test area, focused on conformity assessment of inverters according to national and international technical standards, started operating in December 2020. The main differential of the space is its power capacity, currently 300 kVA, which represents a substantial increase in laboratory capacity in the area for the Brazilian electrical sector. The first service contract...
ed was for a Uruguayan client, who could not find the same power capacity in his country.

The experimental research area Power Hardware in the Loop (Phil) which combines the benefits of purely computational simulations with those of laboratory testing, allowing unwanted behavior of real hardware devices to be anticipated in a controlled environment, thus generating enormous added value, is scheduled to go into operation in the second half of 2021. This installation designed for the laboratory is the first of its kind in Brazil.

In September, our CEO and one of our researchers participated in the webinar “Laboratory requirements for smart grids - integration of distributed energy resources and cyber security” as part of the 13th Latin American Smart Grid Forum.

Our professionals presented studies and activities in the field of smart electricity grids and gave the lecture “The role of the Smart Grid Laboratory for the integration of distributed energy resources”, which addressed how our new laboratory can contribute to the definition and experimental evaluation of new connection requirements.
New Technology Development Laboratories

The Fuel Cell Laboratory aims at characterizing components and conducting studies of fuel cell applications, including the development of energy management systems (optimization of distributed generation and energy storage). Click on the name of the laboratory to learn more.

• Fuel Cell Laboratory
System Development Labs

We have important computer systems development laboratories, in which simulations of operational environments are made by means of computer, communication and software equipment, and programs and systems applicable to the planning, generation, transmission, distribution and use of electric energy are developed. Click on the name of the laboratory to learn more.

• Advanced Supervision and Control Laboratory
• Synchrophasor Measurement Laboratory
• Intensive Computing Lab
• Laboratory for the Development of Diagnostic Systems for Transmission Equipment
• Diagnostic Systems Laboratory for Generating Equipment
• Geographic Information Systems, Water Resources and Environment Laboratory
• Laboratory for the Development of Diagnostic Systems for Transmission Equipment
Energy Efficiency Labs

Laboratories that allow the testing of equipment with different end-objectives, such as: electromagnetic compatibility, energy efficiency, end-user energy measurement, and distributed supply. Click on the name of the laboratory to learn more.

- Electrical Machines and Transformers Efficiency Test Laboratory
- Lighting Laboratory
- Electrical Energy Measurement Laboratory
- Refrigeration Laboratory
- Photovoltaic Systems Laboratory
- Laboratory for Performance Evaluation of Washing Machines
Materials and Mechanics Labs

Laboratories that allow research and testing involving a range of physical and chemical properties of materials used in electrical system equipment. Click on the name of the laboratory to learn more.

• Chemical Analysis Laboratory
• Corrosion Laboratory
• Mechanics and Dynamics of Structures Laboratory
• Metallography Laboratory
• Transmission Microscopy Laboratory
• Electrical and Magnetic Properties Laboratory
Electrical Equipment Testing and Experimental Research Laboratories

The characteristics of the Brazilian National Interconnected System (SIN) generate the need for tests, evaluations, and diagnostics of operation in large equipment, involving high voltages and currents. To meet this demand, we implanted the largest set of laboratories for the evaluation of electrical equipment in the Southern Hemisphere. Click on the name of the laboratory to learn more.

- High Current Laboratory
- High Power Laboratory
- High Voltage Laboratory
- Calibration Laboratory
- Corona Testing Laboratory
- Pollution Test Laboratory
- Current Impulse Laboratory
- High Voltage Measurement Reference Laboratory
- Partial Discharge Research Laboratory
- Ultra-High Voltage Laboratory
- Electrical Equipment and Installations Diagnostic Laboratory
Corporate Governance
GRI 102-5, 103-1, 103-2, 103-3

Cepel is a legal entity governed by private law, constituted as a non-profit association, with administrative and financial autonomy, governed by its By-laws and applicable legislation. The current bylaws were approved by our General Meeting in November 2017, upon a favorable pronouncement by the Advisory Board.

According to this document, Cepel must be managed by the following corporate governance structure: GRI 102-18, 102-22, 102-31

- **General Meeting**
  - Audit: André Luis Moraes Arruda
  - Ombudsman: Mérica Surene de Lima Fernandes

- **Advisory Board**
  - DG Assistant: Luis Marcello B. Chipp

- **Supervisory Board**
  - Integrity and Compliance Activity | ATIC: Luis Marcello B. Chipp
  - Communication and Events Activity | COEV: Mérica Surene de Lima Fernandes
  - Legal Activity | JURI: Fernanda Ayoub de L. Freire
  - Information Technology and Artificial Intelligence Center | NTEC: Rubens Passos Junior

---

**Strategic Management**

- About the Report
- 2020 Highlights
- Message from the CEO
- Covid-19 Pandemic
- Cepel Research, Development and Innovation
- Laboratory Infrastructure
- Strategy and Outlook
- People management
- Environmental management
- Economic-financial management
- GRI Indicators
- Annex
**General Assembly**
Highest corporate governance body, is composed of the Founding Associates. Among other attributions, it elects and dismisses members of the Executive Board; promotes changes in the Bylaws; approves Cepel’s accounts; deliberates on the admission or exclusion of associates; approves the Center’s Internal Rules; and approves the annual contributions related to the rights and obligations of the associates.

**Supervisory Board**
Composed of a member indicated by Eletrobras, plus one indicated by the other Founding Associates, and another chosen by the Special Associates. The Supervisory Board is a statutory support body, whose main attribution is to supervise the management’s acts, mainly in what concerns the financial and accounting management, through the follow-up of our activities. It may issue opinions, recommendations, and advisory reports, its mission being to ensure, in light of the interests expressed in the Bylaws, the promotion of our object and corporate purposes, and the protection and enhancement of our assets through the implementation of an active policy of good corporate governance practices and value addition. The Board meets once every four months.

**Executive Board**
Consisting of a CEO and up to three officers, is our executive management body, responsible for administration, and in charge of proposing initiatives, business plans and policies to the Board, as well as implementing the strategy defined by the Advisory Board and conducting our daily operations.

**Advisory Board**
Is made up of Founding and Special Associates up to a limit of 20 members, six of whom are nominated by Eletrobras; four by Furnas, Eletronorte, Chesf and CGT Eletrosul; eight by the Special Associates; one permanent employee chosen by the other employees; and the CEO. The Advisory Board is a collegiate body for deliberation, consultation, and collective manifestation of the associates, whose mission is to watch over, in light of the interests expressed in the Bylaws, the promotion of our objective and social purposes, as well as the protection and valuation of our assets, setting business guidelines, ensuring their sustainable development, and watching over the interests of the associates and other interested parties. With the exception of the issue concerning the elected employee, whose term of office is one year, with one reappointment allowed, the terms of office of the board members are two years, with three consecutive reappointments allowed.
Advisory Committees

The Advisory Board is currently assisted by a Committee of Advisors, formed by the CEO of Cepel; the Chairman of the Advisory Board; representatives of the Founding Associates Chesf and Eletronorte; representatives of the ONS Special Associates, Eletronuclear and Light S.A.; and the permanent employee member of the Advisory Board.

In 2020, the Ethics Committee, the Gender and Race Committee, the Sustainability Committee, the Environmental Management Committee, and the Cyber and Information Security Committee were also active.

There is also an Internal Audit area, currently made up of two permanent employees, who advise the High Management and assess the effectiveness of the Center’s operations, proposing the adoption of measures to improve the way the activities are carried out, as well as attending to external inspection agencies.
The Advisory Board, the Supervisory Board, and the Executive Board went through their first performance evaluation in 2020, referring to the previous cycle. The process, conducted independently by a contracted consulting firm, will be conducted annually. The main objective is to enable the improvement of the activities of these bodies, combining the suggestions for improvement sent by the board members themselves with the external view of the consulting firm.

The methodology employed includes both self-evaluation and evaluation by the Collegiate Body Chairman. The result is presented to the Advisory Board.

Regarding the 2019 cycle, the consultancy recommended the revision of processes with the competent secretariat to ensure that the agenda and documents related to the meeting are received in a more timely and complete manner; the increase in the frequency of the Advisory Board meetings; and the dissociation of the meeting for the presentation of projects from the ordinary meetings of the Board.

As for the collegiate relationship with the other governance bodies, the following were identified as opportunities for improvement: reserving part of the Board meetings for Board members only, without the presence of the Executive Board; increasing the interaction between the General Assembly and the Advisory Board; greater involvement of the Founding Associates in our projects, identifying specific demands; and improving communication about the practical application of the projects.

In relation to the fulfillment of the attributions, the following improvements were indicated: carrying out training related to risk management; carrying out strategic planning aligned to Eletrobras’ Business Master Plan and contemplating our particularities; greater detailing of the budget; and updating governance protocols. As an improvement to meet our key issues, a reevaluation of the onboarding process for new Board Members was pointed out.

All these points are detailed and unfolded in a Work Plan for execution between 2020 and 2021. There was or will be no evaluation of the General Assembly due to the nature of its composition (see page 70).
Ethical and Anti-Corruption management
GRI 102-16, 103-1, 103-2, 103-3

Issues of ethics and corporate integrity play a key role in value creation. Developing initiatives that regulate and combat corruption creates an environment of transparency and safeguards not only our operations and employees, but also business partners, building a positive reputation and enhancing the brand in the marketplace. With this purpose in mind, we run the Compliance Program, based on the guidelines and directives of our Founding Associate and main sponsor, Eletrobras. Through it, we adopt good corporate governance and management practices, adjusted to the particularities of our legal nature.

The program comprises mechanisms to detect and correct misconduct and illicit acts, in addition to the adoption of preventive measures, capable of avoiding that such misconducts happen, following five dimensions:

1) Development of a compliance-focused business management environment;
2) Periodic risk assessment;
3) Structuring and implementing policies and procedures;
4) Internal promotion of communication and training activities; and
5) Ongoing monitoring of the program, as well as remediation measures and enforcement of penalties.

In line with these dimensions, several of our official documents now provide corporate integrity criteria so that our activities are free from fraud or corruption. Our main documents in this regard are listed below. All are approved by the Executive Board and the Advisory Board, and follow the guidelines of Law 12,846/2013 (Brazilian Anti-Corruption Law).

- Cepel’s Code of Ethical Conduct and Integrity: the main document that guides our actions. It defines the set of values expressed in our ethical principles and our commitments to conduct and responsibility;
• Cepel’s Anti-corruption Policy: reinforces our commitment to ethics and integrity in internal and external relations. Its guidelines ensure that members of our governance bodies, employees, representatives, and third parties observe the requirements of applicable anti-corruption laws, and that the highest standards of legality and transparency are adopted during the conduct of business.

• Policy for Handling Conflicts of Interest: see highlight on page 75.

• Cepel’s Consequences Policy: aims to establish guidelines for the monitoring and remediation of fraud and corruption conducts.

• Other documents: Cepel’s Bidding and Contract Regulation, Integrity Evaluation Guide, etc.

To prevent fraud and corruption, we promote measures such as mapping the risk factors to which we are exposed, proposing the appropriate treatment; carrying out appropriate diligence for contracting and supervising third parties, such as suppliers, service providers and associates; and communication and training actions aimed at specific audiences, including suppliers and partners. In 2020, we did not register any cases of corruption. GRI 205-1, 205-3

In October this year, we created the Integrity and Compliance Activity (ATIC), linked to the Board of Directors, to manage the Integrity Program (Compliance) and our regulatory documentation. ATIC reviewed and obtained the approval, by the competent bodies, of the normative instruments: Conflict of Interest Management Policy, Integrity Assessment Guide for Suppliers, Personal Data Protection and Privacy Policy, Privacy Governance and Personal Data Protection Regulation, and Procurement Logistics Policy.

For ethics and anti-corruption management, we allocate financial and technological resources in the use of the Background Check tool, developed by a third-party company for background research. The tool is applied to critical suppliers. We also rely on the Reporting Channel of Eletrobras Com-
panies, based on an external and independent platform, with guaranteed anonymity. Through this channel, all the procedures of receipt, appropriate forwarding and monitoring of deadlines are carried out, to ensure that all allegations of fraud, corruption, violations of the Integrity Program (Compliance), ethical deviations and disrespect for the Code of Ethical Conduct and Integrity are attended to. **GRI 102-17**

**Ethics and anti-corruption disclosure and training**

The members of the governance bodies and employees receive, periodically, training on the principles, norms and standards of behavior of the Code of Ethical Conduct and Integrity, the Integrity Program (Compliance) and other norms. Documents about these values, principles, norms, and standards of behavior need to be read and signed by both audiences on a regular basis.

In 2020, a web series was launched to raise employee awareness, consisting of short animated videos, with the main guidelines of the compliance program, including information such as gifts and presents, information security, and the structure and guidelines of the Code of Ethics.

Another disclosure tool was the Eletrobras Companies’ “Integrity and Ethical Culture” online course, launched in late 2019 for all employees to address anti-corruption legislation and integrity program guidelines and procedures related to the topic. Delivered on two occasions in 2020, the training course covered 97% of our employees. Whenever there are updates to the program, new editions are made.

**Conflict of Interest**

**GRI 102-25**

The Policy for Handling Conflicts of Interest establishes guidelines for members of corporate governance collegiate bodies, employees, representatives, and third parties, in the prevention, identification, and declaration of situations that may constitute such conflicts, in addition to providing guidance on how to proceed, so that conduct is always guided by our ethical principles of integrity and transparency. Should a situation appear to be a conflict of interest, it is up to the Executive Board to act in coordination with the Founding Associates.

To prevent such occurrences, nominees for senior management positions are submitted to an integrity analysis, through which, among other aspects, the existence of potential or actual conflicts is verified. This information is sent to the Eletrobras Management, People and Eligibility Committee, which is responsible for verifying the conformity of the nomination process for members of top management in which Eletrobras Companies have an equity interest, even a minority one.
### Employees by occupational category

<table>
<thead>
<tr>
<th>Employees by occupational category</th>
<th>Total number of employees</th>
<th>Total members of the corporate governance bodies</th>
<th>Total to which the policies and procedures of the Integrity Program were communicated</th>
<th>Total that received training on the policies and procedures of the Integrity Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managerial Level</td>
<td>25</td>
<td>25</td>
<td>100</td>
<td>24</td>
</tr>
<tr>
<td>Higher Education Level</td>
<td>183</td>
<td>183</td>
<td>100</td>
<td>180</td>
</tr>
<tr>
<td>Without Higher Education Level</td>
<td>66</td>
<td>66</td>
<td>100</td>
<td>62</td>
</tr>
</tbody>
</table>

### Communication and training on the 2020 Integrity Program (Compliance) | GRI 205-2

<table>
<thead>
<tr>
<th>Corporate governance bodies</th>
<th>Total members of the corporate governance bodies</th>
<th>Total to which the policies and procedures of the Integrity Program were communicated</th>
<th>Total that received training on the policies and procedures of the Integrity Program</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30</td>
<td>30</td>
<td>13</td>
</tr>
</tbody>
</table>

**Communication and training on the 2020 Integrity Program (Compliance) | GRI 205-2**

**Message from the CEO**

**Covid-19 Pandemic**

**Research, Development and Innovation**

**Laboratory Infrastructure**

**Strategic Management**

**Strategy and Outlook**

**People management**

**Environmental management**

**Economic-financial management**

**GRI Indicators**

**Annex**
External Initiatives
GRI 102-12

In 2020, we joined the Na Mão Certa (In the Right Track) Program, an initiative by Childhood Brasil that aims to join efforts to end the sexual exploitation of children and adolescents on Brazilian highways and in several links of the country’s production chains, including companies in the electrical sector.

We also adhered to Eletrobras’ Declaration of Commitment on Climate Change in a board resolution dated March 2013. With the document, we commit to reducing fossil fuel and electricity consumption.

Membership in Associations
GRI 102-13

We participate in associations of the electricity sector, taking part in their corporate governance bodies or in projects and commissions.

<table>
<thead>
<tr>
<th>Association</th>
<th>Level of Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Memory</td>
<td>Board of Directors and General Assembly</td>
</tr>
<tr>
<td>International Center for Renewable Energies (Cibiogas)</td>
<td>Board of Directors and Supervisory Board</td>
</tr>
<tr>
<td>Committee of the Commission for Regional Energy Integration (Bracier)</td>
<td>Executive Office</td>
</tr>
<tr>
<td>Alberto Luiz Coimbra Institute of Graduate Studies and Engineering Research – unit of the Federal University of Rio de Janeiro (Coppe / UFRJ)</td>
<td>Directing Council</td>
</tr>
<tr>
<td>Brazilian Commission for Electric Power Generation and Transmission (Cigré)</td>
<td>Board of Directors, Technical Committees and Working Groups</td>
</tr>
<tr>
<td>Brazilian Association of Technical Standards (ABNT)</td>
<td>Projects and committees</td>
</tr>
<tr>
<td>Getúlio Vargas Foundation</td>
<td>Consulting Board</td>
</tr>
</tbody>
</table>
We are gradually implementing risk and crisis management processes, based on general guidelines from our Founding Associates, which are evaluated and approved by the Executive Board and the Advisory Board. The main objective is to identify, analyze, and plan actions to avoid unwanted situations.

In 2021, we will study the creation of a risk committee to enable and unify management.

Although there is no formal risk treatment area, some risks have already been mapped, and mitigation actions are already underway:

• **Risks in corporate governance**: we believe that for a better governance, we need a new Bylaws and, therefore, we are in the process of revising the document, with respect to the best corporate practices.

• **Image and reputation risks**: trust-related risks regarding the impartiality of results and the confidentiality of disclosure of services provided.

• **Risks associated with legislation and standards**: risks related to changes in the regulatory environment (federal legislation) and in the political, economic, and social scenarios that impact our activities.

• **Risks associated with business**: risks related to the acceleration of technological changes and to our consolidation and repositioning in the market. We need to secure the intellectual property of our software.

• **Financial risks (investments, taxes, budget, etc.)**: risks related to the reduction of resources due to the exit of members.

• **Socio-environmental risks**: risks associated with non-compliance with environmental legislation.

• **Risks in procurement**: we evaluate the risks of contracting suppliers and partners, as well as the risks associated with fluctuations in exchange rates, taxes, and interest rates.

• **Legal risks**: those arise when we do not protect our assets, when contracts are not well written, and when the legal requirements and legislations applicable to the activity are not followed.

• **Risks in people management**: qualification-related risks, i.e., when professionals are not able to perform their tasks correctly due to a lack of ability or skill.

• **Risks in information technology**: risks associated with network intermittency, serv-
er crashes, physical damage to data storage components, system obsolescence, inadequate maintenance, power outages due to internal causes, system slowdowns, and security breaches.

The Anti-corruption Policy, already implemented, provides for periodic analysis to identify, assess, treat, and monitor vulnerabilities and the dangers of fraud and corruption.

The Annual Internal Audit Plan (PAINT) is approved by the Advisory Board, and is executed throughout the year by the Internal Audit, with the Annual Internal Audit Report (RAINT) submitted to the same body, as well as being made available to the permanent Supervisory Board.

Another important practice already adopted is the Due Diligence Form, filled out by suppliers, enabling the automatic classification of their integrity risk through parameterized metrics (see section Supplier Management).

Furthermore, some of our employees participate in Eletrobras initiatives that address the theme, such as the Parliamentary Articulation Committee; Compliance Management Committee (CDC); and Information Security Committee, a body that was replicated in our corporate structure in 2020.

Representatives appointed by the Energy Optimization and Environment Department were actively involved in the Eletrobras Environment Committee’s risk task force, where they had the opportunity to learn about the methodology for socio-environmental risk analysis and management.
**Supplier management**

Our supply chain had 221 companies in 2020, mostly equipment suppliers, 27 of which were contracted that same year. The total value contracted through bidding, dispensation (above R$35,200.00), non-requisite, and additives was R$50,461,218.00. **GRI 102-9**

All companies fill out a due diligence form, through which we evaluate possible conflicts of interest and the risks for a safe contracting and in compliance with Cepel’s Bidding and Contracting Regulation. For suppliers whose forms indicate high or very high risk, a background check is performed on the suppliers and their partners, from which a monitoring action plan is put together.

In 2020, 100% of the suppliers considered critical in corruption and integrity aspects were evaluated, totaling 26 companies. **GRI 205-1**

We promote awareness-raising actions for this public, with the distribution of a booklet, videos, meetings, and the adoption of integrity clauses in all critical contracts, in accordance with the Regulation.

**Human Rights**

We take care so that the contracted companies act with social and human rights respect by means of Cepel’s Supply Logistics Policy, whose guidelines orient to:

- respect human rights throughout the supply chain;
- reduce the occurrence of accidents;
- maintain an employee-friendly environment and working conditions;
- promote gender and race equity and respect for diversity; and
- include micro and small local companies aiming at generating jobs and promoting local development.

**Human Rights**

- respect human rights throughout the supply chain;
- reduce the occurrence of accidents;
- maintain an employee-friendly environment and working conditions;
- promote gender and race equity and respect for diversity; and
- include micro and small local companies aiming at generating jobs and promoting local development.
Cybersecurity
GRI 103-1, 103-2, 103-3

We receive and digitally generate a large volume of research and trial data, which means that cybersecurity is critical to our operations and to the preservation of customers.

Formal cybersecurity management is still under development in our activities. We have, since 2017, a Committee on Cyber and Information Security, responsible for actions in this regard, and we are structuring a policy on the topic. In 2020, we have already advanced with the adoption of the Personal Data Privacy Policy, the active participation in the Eletrobras Companies’ Information Security meetings and committees, and the adoption of the Eletrobras Companies’ Information Security Incident Handling Regulations – Version 1.0 – which is currently being disclosed.

We are involved in working groups at Eletrobras Companies, which, in 2020, discussed the topics of vulnerability analysis and PenTest (simulation of malicious attack to assess the security of computers or networks); requirements and specifications for the Security Operation Center (SOC); security incident management; VPN (virtual private network) review; LGPD; and information security planning. As a result of these discussions, we have a new Virtual Private Network Management Regulation, still pending approval, and we are updating the Information Security Planning. The calls for tender for the contracting of the Security Operation Center (SOC) and PenTest are in the final stages of preparation.

We currently protect our operations with technological systems and event monitoring. The identified occurrences - avoided incidents, vulnerabilities and assets, and responsible parties - are treated and communicated quarterly to the Audit and Statutory Risk Committee. The goal is to prevent threats and remediate possible losses. Evaluating our effectiveness in managing cybersecurity is in our planning, as well as setting a specific budget to improve it.
Strategy and Outlook
The elaboration of our strategic plan is scheduled for 2021. Currently, we base our actions on the guidelines that come from the Founding Associates and are validated by the Executive Board and the Advisory Board. Eletrobras, within its long-term strategic planning and definition of the Business and Management Master Plan, has been diagnosing in which technological knowledge it should invest to improve the results of its business, signaling to us which ones are strategic. We support the company in this regard, as well as our other customers, by forecasting, monitoring, and analyzing trends to develop products in line with the modernization of the market, regulation, and technology in the electricity sector.

Our researchers are oriented to develop research for master’s and doctoral degrees. In addition, researchers and technicians keep up to date by participating in congresses, workshops, training sessions, technical visits, and various national and international forums, in companies, associations, normative or academic committees.

It is also strategic to serve the customers well and improve the capture of suggestions and demands from them. In this sense, in 2020, the new methodology for evaluating and monitoring the IP (Institutional Projects) Portfolio effectively began within the scope of the Technical Groups of the CPT (Eletrobras Companies’ Technological Policy Commission), composed of technical representatives from the Eletrobras Companies. The 73 projects proposed for the 2021 IP Portfolio were presented, discussed, and evaluated by the corresponding WGs (Generation, Transmission, Commercialization, and Laboratories) in meetings that took place from November 13 to December 1, 2020. The projects were evaluated according to three criteria: interest, applicability and benefits to Eletrobras.

As additional strategies for the improvement of the relationship with the clients, other guidelines are being oriented to the technical staff: permanent contact with the project requesters; attention to the concerns of associates and clients.
ents; delivery and presentation of intermediate results; periodic reevaluation, together with the client, of the strategy and results to align expectations and, if necessary, correct steps; periodic presentation of results in the meetings of the WGs of the Technological Policy Committee for the projects of the IP Portfolio; and incentive to the active participation of technical representatives of the companies in the projects.

Also, with regard to good customer service, we maintain ongoing quantitative research with our customers for standardized services, always looking for feedback to promote incremental improvements and a closer relationship. Today, our index in standardized service delivery is at 4.6 against a ceiling of 5.

The Executive Board and the area managers are responsible for our strategy management, with support from the technicians who keep up with market news. Internally, administrative strategies adopted by the Founding Associates are also followed, in order to keep us at the same management level. Examples are the digital transformation initiatives (page 58), cost efficiency (page 86), increasing revenue with private entities; obtaining revenue from products developed for government entities; among others.
Cultural transformation

Due to the essence of our activities, of technological and knowledge support for the performance of government agencies and sectorial entities, and to the contributions received mainly from our Founding Associate, Eletrobras, we play a typically public interest role. We are, however, a private entity and are strategically seeking to position ourselves as such.

In 2020 we revised all our processes, including the systemic ones, which are on the SAP platform - we use this software in an integrated way with the single instance SAP part of the Eletrobras Companies. This was an important step, because the platform was designed for large mixed-economy companies, governed by a series of state-owned company laws, with processes adjusted to this characteristic. The revision aimed to give more fluidity and agility to our management.

In November, we started a cultural transformation project, by means of a diagnosis carried out through interviews with managers and employees, about what they want for Cepel, what impacts they expect, and which areas will require more effort to adapt to this change, among other topics. The result was presented to the Advisory Board in December and is being broken down into actions.

To help us in this cultural transformation, a team from the Technology and Innovation Management Laboratory (Lab-GETI), at Unicamp, was hired to develop, together with us, a project to improve and consolidate qualitative indicators of strategic impact and quantitative indicators of economic impact. The economic indicators will be synthesized in the indicator called Múltiplo Cepel, designed for individual R&D+I lines and projects, and in the Múltiplo Global Cepel, conceived for our own portfolio of lines and projects. The idea is that we can identify our competitive advantages, which of our products are unique in the market, and adjust our pricing policy.
Our repositioning also covers cost efficiency. Many actions are being taken in this direction. In the logistics area, for example, we readjusted several supply and service contracts, a process that is continuing in the search for synergy between these commercial agreements and possible scope reductions. Furthermore, a detailed analysis of the laboratory activities has been allowing the restructuring of processes, activities (including physical ones), with potential gains in scale and consequent cost reduction, as well as improvement in the service to our associates and customers. In alignment with the ongoing rationalization process, we sought more speed in closing the exchange transactions for importing equipment, which also resulted in cash. We have also prepared a more refined budget for 2021, which will allow us a more detailed follow-up of its scope.

With all these actions, we aim to access the market in a more efficient and effective way, generating value for our customers and the revenues necessary for our perpetuity.
Strategic Partnerships

Contract for the commercialization of solutions

In November we signed an agreement with the American company Cutsforth, a provider of technology and services to support the power generation industry. The contract will be valid for six years, which can be extended for another four. We will provide application programming interface (API) license for partial discharge monitoring for integration with software developed by the American company. Cutsforth has committed to purchase 20 API licenses and to market the integrated solutions. The success of the partnership with the Minnesota-based company, with major customers in the United States, Canada, and other countries, could mean the sale of dozens of API licenses each year. A business with the potential to generate, annually, a revenue of between R$340,000 and R$700,000, at the current exchange rate.

The integration of the API with Cutsforth’s software can result, for example, in an “embedded solution” in National Instruments’ systems for the predictive monitoring and diagnosis of insulating systems in generators and large industrial motors. Thus, the solution can strongly impact the market of monitoring systems, as it has an effectiveness proven time and time again by companies in the Brazilian electrical sector - especially Eletrobras Companies, such as Furnas, Eletro-norte, Eletronuclear, and, more recently, Itaipu Binacional -, in addition to a significantly reduced cost compared to the systems traditionally employed. We estimate that the project and the actions adopted from its use have generated direct savings, considering the avoided costs when a failure occurs, of approximately R$ 50 million reais in the last ten years.

We developed the API as part of the IMA-DP (Instrumentation for Monitoring and Analysis of Partial Discharges) system. This is innovative technology to monitor the performance of high-voltage equipment operating in an electrical system, awarded in the technological innovation competition Global Engineering Impact Awards, promoted by National Instruments, a major global provider of test, automation, and condition monitoring systems. The awards took place in 2018 in Austin, Texas.
The agreement foresees the implementation of smart energy projects and technological cooperation in research and development projects involving photovoltaic generation, energy efficiency and green hydrogen production (for re-electrification, urban mobility and use in applications where it can replace gray or blue hydrogen). The projects should involve energy storage, consumption management, and the use of efficient equipment, all to maximize energy, economic, and environmental results.

The agreement also aims to promote cooperation between universities and research centers on energy storage. It also foresees the exchange of our researchers with those of SNPDRI, in order to evaluate the experiences that could be applied in Brazil and what kind of projects to implement based on them. The duration of the agreement, in principle, will be two years, but the partnership can be renewed according to the interest of both parties.

Contract for research development with China
In late November, we signed a Memorandum of Understanding (MOU) with SPIC Brazil, a subsidiary of State Power Investment Corporation of China (SPIC), and SPIC’s smart energy research institute in China, SNPDRI. The objective of the partnership, the first involving the Chinese research institute in Latin America, is to develop a program to exchange experiences and technologies in the creation of energy projects, and to strengthen cooperation between Brazil and China. The forecast is that SPIC Brazil and its parent company will invest about R$20 million, to start the projects.
People management
Internal public profile

We ended 2020 with 274 employees, all working in the Brazilian Southeast region. During the year, 22 employees were dismissed as a result of the Consensual Dismissal Plan (PDC) implemented in the second half of the previous year, including 21 employees and 1 officer, as well as two employees who resigned. One hundred percent of the workforce is covered by collective bargaining agreements.

GRI 102-41

We promote internship and apprenticeship programs. The monitoring is done daily, and the evaluation is done every six months, both by the supervisor personally. The Young Apprentice Program is carried out with indirect hiring, through the NGO National Institute of Assistance, Work, Opportunities and Health, which focuses on children and teenagers in situations of social vulnerability. As an insertion and permanence requirement for the project, it is indispensable that the young people are enrolled and attending regular school. We promote the development of the potential of these people by performing administrative activities such as filing, protocol, reception, document delivery, and customer service by phone or in person. The employees who supervise these young people also act as facilitators, educators, and mentors, encouraging them to pursue professional and personal development. GRI EU14

Total employees by employment type and gender | GRI 102-8

<table>
<thead>
<tr>
<th>Employment Type</th>
<th>Full time</th>
<th>Part time</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent Contract</td>
<td>64</td>
<td>1</td>
<td>65</td>
</tr>
<tr>
<td>Temporary Contract</td>
<td>209</td>
<td>0</td>
<td>209</td>
</tr>
<tr>
<td>Total by Gender</td>
<td>65</td>
<td>0</td>
<td>65</td>
</tr>
</tbody>
</table>

Remark:
1. Cepel does not employ its own employees on temporary contracts.
2. The company’s own staff is made up of employees with the following connections: own employees at the Center, requisitioned employees, amnestied/reintegrated employees, and commissioned positions. This staff does not include assigned employees, employees on leave without pay, and amnestied/reintegrated employees assigned to Government Agencies.
### Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Admissions</th>
<th>Dismissals</th>
<th>Admission rate (%)</th>
<th>Turnover rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>1</td>
<td>17</td>
<td>0.47</td>
<td>8.06</td>
</tr>
<tr>
<td>Women</td>
<td>2</td>
<td>6</td>
<td>2.99</td>
<td>8.96</td>
</tr>
</tbody>
</table>

### Age Group

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Admissions</th>
<th>Dismissals</th>
<th>Admission rate (%)</th>
<th>Turnover rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 30 years old</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Between 30 and 50 years old</td>
<td>2</td>
<td>2</td>
<td>1.41</td>
<td>1.41</td>
</tr>
<tr>
<td>Over 50 years old</td>
<td>1</td>
<td>21</td>
<td>0.76</td>
<td>15.91</td>
</tr>
</tbody>
</table>

### Total

<table>
<thead>
<tr>
<th></th>
<th>Admissions</th>
<th>Dismissals</th>
<th>Admission rate (%)</th>
<th>Turnover rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>3</td>
<td>23</td>
<td>1.08</td>
<td>8.27</td>
</tr>
</tbody>
</table>

Remark:
1. Admission rates were calculated using the following formula: (employees hired by gender or age group / total employees by gender or age group)*100.
2. Turnover rates were calculated using the following formula: (employees dismissed by gender or age group / total employees by gender or age group)*100.
3. We recorded 278 own employees for the calculation of the hiring and dismissal rates. The total is higher than the one presented in the table “Total number of own employees by employment contract and gender in 2020” because the assigned employees were also considered.
4. Twenty-two employees were dismissed by the PDC, of which 21 were own employees and 1 officer, in addition to 2 resignations. The officer is not counted as staff for the purposes of calculating hiring and turnover rates.
5. The table above considers only own employees.
As we are no longer subject to the management of the Secretariat for Coordination and Governance of State Companies, we are no longer signatories to the Collective Bargaining Agreement (ACT) signed by Eletrobras, the Founding Associate and our main sponsor. Understood as a risk of total disassociation from the ACT signed by this company, this fact required articulation with the unions representing our employees in order to sign a specific term of agreement, which was done through discussions and argumentation around the proper understanding of the need for change.

We then assumed the commitment to participate in Eletrobras’ negotiation process to establish the ACT 2020/2022, adhering to the conditions agreed upon in our specific term of agreement. The negotiations started in March and lasted until December 2020. An important issue brought about in the ACT was the adaptation to CGPAR Resolution 23/2018, which expresses, among other guidelines, that the federal state-owned company’s contribution to fund the health care benefit cannot exceed the employees’ contribution. Although we are not within the reach of this legislation, we believe it is appropriate to follow the same orientation as our Founding Associates.

Throughout the negotiation process, our Executive Board was attentive to the requests made by the representations, meeting what was possible and achieving the 2020-2022 Cycle. For the Cycle that will begin in May 2022, and with a view to starting discussion tables that are different from those at Eletrobras Companies, it was agreed with the Association of Employees (ASEC) to schedule monthly meetings throughout 2021, in order to bring management closer to the employees’ concerns.

The Executive Board also holds meetings with the unions in order to provide transparency to the actions undertaken in personnel management.
We consider our workforce to be an important factor in business success. As a research center, our greatest asset is the knowledge management developed by our staff of researchers, technicians and fellows.

The people management policy acts as an agent for organizational strengthening, contributing to the competitiveness, profitability, and sustainability of the business. Aiming to increase employee satisfaction and improve the quality of life, people management is directed to solutions that provide adequate conditions for the development, appreciation, and retention of our staff.

Since 2010, we have adopted the Career and Remuneration Plan (PCR) of the Eletrobras Companies, our Founding Associates, which is based on the concept of competencies as the main reference for people management. The career model used aims to align people management policies and practices with the corporate strategic direction, as well as to integrate people management processes in the search for improved organizational performance.

The PCR is based on job descriptions, separated by nature and complexity. For the remuneration, the positions, the complexity ranges in which the employee fits into, and the criteria for horizontal and vertical progressions, granted in accordance with performance, are considered.

Through the People Management Department (PMD), we have developed work aimed at the continuous improvement of the service provided to employees, seeking to guide the actions on motivation, incorporating values for achieving excellence and a harmonious coexistence among all. We encourage teamwork and the pursuit of knowledge and competence development. To this end, we are expanding the space for feedback to happen more frequently. To this end, we are improving our Performance Management System (PMS).

People management
Benefits

Besides the benefits and advantages to which we are bound by law and under the Collective Bargaining Agreement, we spontaneously add others as part of our policy of valuing and retaining our employees. The initiative is based on our human resources policy premises, highlighting health and dental plans, food or meal assistance, daycare assistance, educational assistance, funeral assistance, and life insurance, among others.

Aiming at Maternity and Infant assistance, we granted all our employees a maternity leave extension of 180 days, as well as a two-hour workday reduction after returning from leave to continue breastfeeding for 120 days. And all employees are granted the 20-day paternity leave extension. Still with the same concern, we grant equally to men and women employees of Cepel, Day Care Aid or Babysitting Aid, with partial reimbursement. And in the same vein, we provide continuity in schooling, through partial reimbursement of tuition expenses at elementary and high school institutions for their underage children.

In respect to diversity, we have the Program of Assistance to Dependents with Disabilities, aimed at employees and their dependents with disabilities, which includes reimbursement of part of the expenses with pedagogical teaching, therapeutic sessions, and extracurricular activities.

In line with the protection of victims of domestic violence, we also grant leave to employees who are victims of domestic violence for a period of up to three days, extendable for two more days at the discretion of the occupational physician, upon presentation of a police report.

All employees can request, via the Social Service, an accompanying/social leave in cases of hospitalization due to illness, surgery, home recuperation and/or emergency situations for their spouse or partner, as-
cendants and first-degree de-
sendants, and dependents of
the Health Plan.

In case of an occupational ac-
cident, employees are enti-
tled to full coverage of medi-
cal expenses, as established in
the ACT. The ACT also rules on
salary supplementation of the
INSS benefit during the period
of absence from work due to ill-
ness or occupational accident.

Regarding the 13th salary,
which is guaranteed by law, we
allow the advance payment of
50%, which can be requested in
the annual vacation schedule
and must be received togeth-
er with the vacation payment.
If you do not make this choice,
this amount can be paid until
July, as long as there is budget
availability.

Through Fundação Eletros, a
complementary pension fund is
offered, created to ensure the fi-
ancial security and quality of life
of its participants and assisted
ones (retirees and pensioners). In
addition, all the employees who
need to access any social securi-
ty benefits from the INSS can do
so via the Fundação Eletros / Ce-
pel / INSS agreement.

We have the “Jerzy Lepecki” li-
brary, which has a large collec-
tion and has been investing in
subscription services on the
internet, which make access
to standards, documents, and
electronic publications more
agile, besides making a larger
volume of information avail-
able to users.

Transportation is available
(chartered bus and van) to
ensure the displacement of
our employees, with strategic
routes, passing through main
roads near their homes.
People Development Management
GRI 103-1, 103-2, 103-3

Personal development management is a process of enhancing skills and competencies so that employees can achieve goals and create conditions for a successful life in all its instances. To this end, it is necessary to enhance specific qualities and skills, which allow the improvement of performance at work and, consequently, career advancement.

We are still structuring the mechanisms for this management, as well as a policy to guide it. However, some commitments have already been defined by us and will be shared with our employees:

• to develop specific qualities and skills;
• to improve job performance;
• to make career advancement; and
• to reach full potential as a person.

We carried out the necessary training throughout 2020, totaling 4.7 thousand hours of training - an average of 17.42 hours per employee. Two of these events were face-to-face, focused on training in web technologies and on building applications. The others occurred in digital platforms due to the pandemic: presentation of the 1889 project report - comparative analysis of the zinc content of anticorrosive coatings obtained by different experimental techniques; and training on the use of the database contracted by Cepel on standards and materials (Total Matéria); use of the IEEE Explore database, of the Institute of Electrical and Electronic Engineers (IEEE Brasil Organiza-
In 2020, the article “Three-Phase Equivalents Using Rational Models and Symmetric Component Data in ATP – Results from Networks with Concentrated Parameters”, authored by one of our Ph.D. fellows and their advisors, received the best paper award in the “SBSE 1.4 - Modeling, Analysis and Simulation of Electric Systems” Session of the VIII SBSE - Brazilian Electrical Systems Symposium. The event took place online between August 25th and 28th.

We presented four other articles at the event, which was also attended by researchers and another of our fellows. Around 700 articles were presented at the event, and 65 of them were awarded as best submissions. Its authors were invited to submit an extended version, with new analyses and results, to the Journal of Control, Automation and Electrical Systems, of the Brazilian Society of Automatics.
## Total and average training hours in 2020 | GRI 404-1

### Gender

<table>
<thead>
<tr>
<th>Number of employees</th>
<th>Training hours</th>
<th>Average training hours per employee</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>985</td>
<td>15.16</td>
</tr>
<tr>
<td>209</td>
<td>3,788</td>
<td>18.12</td>
</tr>
<tr>
<td>274</td>
<td>4,773</td>
<td>17.42</td>
</tr>
</tbody>
</table>

### Higher Education Level

<table>
<thead>
<tr>
<th>Number of employees</th>
<th>Training hours</th>
<th>Average training hours per employee</th>
</tr>
</thead>
<tbody>
<tr>
<td>44</td>
<td>591</td>
<td>13.43</td>
</tr>
<tr>
<td>139</td>
<td>3,004</td>
<td>21.61</td>
</tr>
<tr>
<td>183</td>
<td>3,595</td>
<td>19.64</td>
</tr>
</tbody>
</table>

### Managerial Level

<table>
<thead>
<tr>
<th>Number of employees</th>
<th>Training hours</th>
<th>Average training hours per employee</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>120</td>
<td>15.00</td>
</tr>
<tr>
<td>17</td>
<td>213</td>
<td>12.53</td>
</tr>
<tr>
<td>25</td>
<td>333</td>
<td>13.32</td>
</tr>
</tbody>
</table>

### Without Higher Education Level

<table>
<thead>
<tr>
<th>Number of employees</th>
<th>Training hours</th>
<th>Average training hours per employee</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>274</td>
<td>21.11</td>
</tr>
<tr>
<td>53</td>
<td>571</td>
<td>10.77</td>
</tr>
<tr>
<td>66</td>
<td>845</td>
<td>12.81</td>
</tr>
</tbody>
</table>

**Remark:** the average training hours were calculated as follows: training hours / number of employees by gender and occupational category. Employees with the following employment relationships were considered: own employees at the Center, requisitioned, amnestied/reintegrated, and commissioned positions. This staff does not include assigned employees, employees on leave without pay, and amnestied/reintegrated employees assigned to Government Agencies.
Diversity and equal opportunities  
GRI 103-1, 103-2, 103-3

To evaluate our employees’ performance, we use the Performance Management System (PMS), the same one adopted by Eletrobras Companies. Currently, we are looking for a more complete system that is more adequate to our activities and that allows the development of competencies adherent to the new Career and Compensation Plan, which is currently being prepared. This plan will allow, in addition to professional development, the monitoring of goals to achieve organizational results, aligned to the Strategic Planning guidelines.

The performance evaluation for 2019, which was supposed to be held in 2020, did not take place due to the difficulties imposed by the pandemic.

We strive for a healthy work environment, adopting a mature attitude in face of the plurality of our society, in order to welcome our employees in their differences and support inclusion and tolerance to cultural multiplicities.

We follow the guidelines of the Eletrobras Companies’ People Management Policy and Cepel’s Code of Ethical Conduct and Integrity, which guide to respecting diversity, promoting equity, equal opportunities and inclusion. In accordance with these documents, our employees must respect and value social and cultural diversities and individual differences, providing all people with equal treatment and opportunities and without prejudice on the basis of social, cultural, ethnic or gender identity, color/race, age, religion, political opinion, sexual orientation, physical condition or any other form of discrimination.

In line with these premises, since 2007 we have run the Choir Project, an initiative that gives employees the opportunity to experience and recognize the richness of living with diversity. Such a project seeks the improvement of interpersonal and intrapersonal relationships, the improvement of the cooperative environment, and appreciation for the values of the institution.

Other benefits can also be observed, such as the development of self-perception and improved self-esteem.
We have a seat in the Gender, Race and Diversity Committee of the Ministry of Mines and Energy and Related Entities, whose goal is to work on diversity and inclusion in public organizations, which includes us because of our relationship with Eletrobras, even though we are not a state-owned organization. We also maintain a committee with the same theme, but exclusive, composed of male and female employees from the most diverse areas.

In 2020, we promoted for our employees a series of webinars on the theme, with approaches on good business practices in diversity management in times of pandemic; engagement of men and women in the domestic and work context in times of home office; promotion of female participation in the Brazilian mining industry; promotion of racial equality in the public service context; among other subjects.

We also released on our website the series “More than workforce. Female force.”, with professional and personal profiles of several of our employees, from researchers to nurses, aiming to value the importance of these women to the Center.
<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
<th>Total</th>
<th>Men</th>
<th>Women</th>
<th>Total</th>
<th>Men</th>
<th>Women</th>
<th>Total</th>
<th>Men</th>
<th>Women</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total number of employees by occupational category</strong></td>
<td>17</td>
<td>8</td>
<td>25</td>
<td>139</td>
<td>44</td>
<td>183</td>
<td>53</td>
<td>13</td>
<td>66</td>
<td>209</td>
<td>65</td>
<td>274</td>
</tr>
<tr>
<td>% in relation to total employees</td>
<td>68</td>
<td>32</td>
<td></td>
<td>76</td>
<td>24</td>
<td></td>
<td>80</td>
<td>20</td>
<td></td>
<td>76</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td><strong>Up to 30 years old</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>% up to 30 years old</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>33</td>
<td>67</td>
<td>2</td>
<td>100</td>
<td>0</td>
<td>2</td>
<td>50</td>
<td>50</td>
<td>1</td>
</tr>
<tr>
<td><strong>Between 30 and 50 years old</strong></td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>75</td>
<td>30</td>
<td>105</td>
<td>23</td>
<td>6</td>
<td>29</td>
<td>101</td>
<td>40</td>
<td>141</td>
</tr>
<tr>
<td>% between 30 and 50 years old</td>
<td>43</td>
<td>57</td>
<td>28</td>
<td>71</td>
<td>29</td>
<td>57</td>
<td>79</td>
<td>21</td>
<td>44</td>
<td>72</td>
<td>28</td>
<td>51</td>
</tr>
<tr>
<td><strong>Over 50 years old</strong></td>
<td>14</td>
<td>4</td>
<td>18</td>
<td>63</td>
<td>12</td>
<td>75</td>
<td>29</td>
<td>7</td>
<td>36</td>
<td>106</td>
<td>23</td>
<td>129</td>
</tr>
<tr>
<td>% over 50 years old</td>
<td>78</td>
<td>22</td>
<td>72</td>
<td>84</td>
<td>16</td>
<td>100</td>
<td>19</td>
<td>55</td>
<td>82</td>
<td>18</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>% in relation to total employees</td>
<td>68</td>
<td>32</td>
<td>100</td>
<td>76</td>
<td>24</td>
<td>100</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>76</td>
<td>24</td>
<td>100</td>
</tr>
<tr>
<td><strong>Minority groups (black, Asian, mixed race, and indigenous people)</strong></td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>15</td>
<td>6</td>
<td>21</td>
<td>19</td>
<td>4</td>
<td>23</td>
<td>35</td>
<td>10</td>
<td>45</td>
</tr>
<tr>
<td>% in relation to total employees</td>
<td>6</td>
<td>0</td>
<td>4</td>
<td>11</td>
<td>14</td>
<td>11</td>
<td>36</td>
<td>31</td>
<td>35</td>
<td>17</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td><strong>Persons with Disabilities</strong></td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>% in relation to total employees</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>
Climate Survey

We evaluate the perception of our employees regarding the various factors that impact their activities, both internal and external, through the Climate Survey, carried out every two years. The results assist senior management in decision making, inspiring continuous improvement in business practices and positively influencing the organizational culture. The Climate Survey is part of the Contract of Corporate Performance Goals (CMDE), which we have entered into with Eletrobras.

Participation evolved, between 2018 and 2020, from 30.36% to 45.29%, demonstrating a greater interest of the staff in participating in the management, which may contribute to the improvement of business practices.

The organizational climate is an indicator of the degree of satisfaction of the internal stakeholders of a company regarding different aspects of the culture or apparent reality of the organization, such as professional appreciation and identification with the company, management mode, Human Resources policy, organizational mission, and communication process.

The result of the applied survey showed growth, reaching 74.23% in the Favorability index compared to the target established in the Contract of Corporate Performance Goals (CMDE), of 72%. We attribute this performance to the management’s efforts to maintain active communication with employees, seeking their engagement in the corporate purposes.
Taking care of employees’ health and safety is a commitment that Cepel has. Our occupational health and safety policies and practices have been improved to better protect the physical and mental integrity of employees and outsourced workers, reducing the risks of occupational accidents and diseases. In compliance with the pertinent legislation, we maintain Internal Commissions for Accident Prevention (CIPAS) in both units, which cover 100% of the staff. The members are own employees, elected and appointed annually. The CIPAS collaborate with the safety and occupational health sector, and organize the Annual Accident Prevention Week. In 2020, only one work-related injury was recorded.

We also maintain, in our two units, medical outpatient clinics for the monitoring of the worker’s health, which is done by means of annual check-up exams, in addition to the periodic medical exams. These structures are also available to provide first aid care during working hours. This healthcare provision was of utmost importance during the pandemic period, allowing for the monitoring of employees; the adoption of distinct policies for those with relevant comorbidities, including those who were telecommuting; guidance on appropriate procedures for the containment of the pandemic; as well as the monitoring of cases of coronavirus infection.

Our employees are covered by a health plan, which also provides access to virtual care (telemedicine). Everyone undergoes periodic medical evaluations regarding cardiovascular, nutritional, and psychological risks. The results base guidelines on these topics.
Environmental management
We use the licensing process and the environmental agency’s conditions as a guideline for our socio-environmental actions. In this sense, the most relevant topics related to laboratory activities, which are our operation, are related to energy consumption and effluent and waste generation.

We act according to Eletrobras corporate standards, especially the Environmental Policy, adopted by us since 2013. Among the general guidelines expressed in the document, which range from the duty to implement eco-efficiency actions as a strategy and business opportunity, prioritizing the reduction of environmental impacts, waste and effluent generation and operating costs, to expanding the use of environmental tools and indicators to measure results and improve management. We highlight the guidelines to promote technical cooperation and investment in studies and research related to the interactions between electric energy and the environment, which is directly linked to our activity. Our main contribution in this regard is reported on pages 52 to 56.

We monitor a number of indicators, among them water and energy consumption, and management of materials and special products and storage, including gases and chemicals. We also contribute to the preparation of Eletrobras’ annual report, using the IGS - a technological sustainability data collection system we developed - both for the inclusion of specific environmental data and for the calculation of Global Reporting Initiative indicators (see page 27). We do not have a specific structure to deal with environmental management - the socio-environmental aspects are worked on transversally, by several areas.
Water Consumption
GRI 103-1, 103-2, 103-3, 303-1

In 2020, we consumed 18.5 thousand cubic meters of water (18.6 megaliters), supplied by the public water supply network - Rio de Janeiro State Water and Sewage Company (Cedae). The data are obtained by means of monthly measurements of the existing water meters in the units by Cedae itself. The water is used, among other activities, for human consumption, distribution to the bathrooms and restaurants, irrigation, cleaning, and cooling. We do check drinking water consumption standards on a monthly basis, according to parameters established by Consolidation Ordinance No. 5 of September 28, 2017 - Annex XX - standard issued by the Ministry of Health. The report is issued based on the Standard Methods for the Examination of Water and Wastewater, 23rd Edition. Resources are also consumed in our laboratories for the use of the glasswasher, the water purifier, the analytical water product system, the rain simulation tests, among others.

The main goal of water management is to improve the control of the related indicators, in order to avoid unnecessary consumption and spending, to implement projects for the replacement of old pipes and the adoption of more efficient hydraulic equipment, and to perform inspections and monitoring of the devices to avoid negative impacts. The process is carried out by the building maintenance area, with the cost and investment resources required for the maintenance and improvement of the hydro sanitary system. The monitoring and control of the quality data is done by means of a system.

In 2020, projects were developed and some improvements were made to the facilities, such as:

- renovation of the septic tank in Block A of the Adrianópolis unit;
- replacement of several stretches of piping for drinking water and fire-fighting at the Adrianópolis unit, allowing the reduction of eventual leaks; and
- project to remodel the men’s bathroom of Block I of the Adrianópolis Unit, allowing for the replacement of the piping and the sanitary hydraulics equipment.
The main effluents we generate are laboratory effluents. The Fundão Unit’s laboratories handle organic solvents, vegetable oils, insulating minerals, organic and inorganic acids, and salt solutions of various types of chemicals. The chemical residues are carefully segregated at the source, observing their compositions, reactivities, and compatibilities with other substances, and are then adequately conditioned. Corrosive, highly reactive and/or concentrated products (acids or bases) are previously diluted or neutralized, and then packaged in drums and sent to licensed companies for the environmentally appropriate treatment for each type of waste, never being dumped into a sink.

All the glassware used in our laboratories is sterilized during washing in an industrial machine. The washing process uses only hot pressurized water and soap, eliminating the need for the use of chemicals such as organic solvents.

The effluents from the laboratory processes are routed through pipes to three tanks, installed outside on containment basins, in order to contain any leaks. There is no connection between this structure and the public sewage system, ensuring that the entire volume generated in the sinks is destined to a company duly licensed to treat industrial effluents.
and the industrial glass washing machine is stored until it is collected by a licensed contracted company, which occurs every two weeks. The collected effluent is destined to a company duly licensed to treat industrial effluents.

We continuously monitor, inspect, and raise environmental awareness of the employees involved in the laboratory processes. We also elaborate preventive and corrective actions to be carried out in situations of incorrect management or accidents, preventing pollution or other environmental damage.

In relation to sanitary effluents, those generated by the Fundão Unit are discharged directly into the public sewage network, which sends them for adequate treatment in a Sewage Treatment Station (ETE). We have not yet determined a periodicity for the analysis of the effluent samples from the pits, but we intend to implement this monitoring in 2022. In the water and oil separator, a monthly collection is made to identify if the destination of the liquid effluent is in accordance with the standards adopted by Cepel.

### Effluent discharge in 2020 (in megaliters) | GRI 303-4

<table>
<thead>
<tr>
<th></th>
<th>Fundão</th>
<th>Adrianópolis</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanitary effluents</td>
<td>9.48</td>
<td>0.44</td>
<td>9.93</td>
</tr>
<tr>
<td>Chemical effluents</td>
<td>0.03</td>
<td>-</td>
<td>0.03</td>
</tr>
<tr>
<td>Total per unit</td>
<td>9.51</td>
<td>0.44</td>
<td>9.96</td>
</tr>
</tbody>
</table>

Remark:
1. The values were converted from cubic meters to megaliters considering that each cubic meter corresponds to 0.001 megaliters. Fundão: 9,484.22 m³ of sanitary effluents and 27.78 m³ of chemical effluents. Adrianópolis: 443.93 m³ of sanitary effluents.
2. The data on the volume of water discharged from the Fundão and Adrianópolis units were generated using the Feves tool (Value Estimation Tool for Sanitary Effluent Variables), which considers that the volume of sanitary effluent corresponds to 80% of the portion of water consumed.
Waste

The inadequate waste management in our activities can lead to several environmental impacts, mainly resulting from leakage of hazardous waste stored or transported inadequately. The hazardous waste, as well as the liquids generated by the decomposition of organic matter or oxidation of metals, can infiltrate the soil, contaminating and damaging this resource, the fauna and the flora. Once infiltrated, the waste can reach the water table, changing the physical and chemical characteristics of the water and causing damage to human health and to the fauna and flora near the water bodies.

Internally, waste management can be dangerous if all processes are not monitored and carried out by companies licensed to do so. The inspection of environmental license documents and the certification of the correct destination prevent the residues from being disposed of without treatment, also protecting the workers involved in handling the hazardous waste. The labeling of these rejects, the use of safe, sealed and approved packaging, and the use of individual safety equipment by employees are preventive measures used to avoid any contact of the chemical products with the eyes and skin. Improperly disposed waste can also attract disease-causing vectors.

To prevent these problems, the process macro-flow for waste disposal, storage, and destination that we have adopted is divided into four steps, represented in the following infographic:
**Collection and Segregation**
For the collection and segregation, specific collectors are used, in accordance with the National Council of Environment (Conama) Resolution No. 257, of 2001. Solid waste is classified based on certain characteristics or properties, which aids in waste management and facilitates proper segregation and disposal.

**Packaging**
Stage in which the solid waste is stored in designated and appropriate containers, according to its characteristics and possibilities for reuse, treatment, or recycling. The waste is labeled and identified according to its emergency data sheets to avoid accidents or misclassification. After packaging, they are collected and transported with appropriate equipment to the temporary storage area.

**Storage**
We have a temporary storage tank for hazardous waste, with separate partitions for liquid and solid hazardous waste, as well as an area reserved only for recyclable waste from selective collection. The common and organic residues originated from administrative activities are stored in plastic bags, deposited in two buckets, and collected daily by a licensed company.

**Transportation, Treatment and Final Disposal**
We hire licensed companies for the provision of continuous services and sporadic services of transportation, treatment, and final disposal of waste. We request and analyze all the environmental license documentation from both the transportation company and the destination company, to guarantee that the whole process occurs in an environmentally adequate way. The destination company presents in its license the authorization for each specific treatment. Waste disposal data is included in IGS 2.0 on a monthly basis.
Our waste management follows the guidelines of the National Solid Waste Policy (Law 12,305/2010). We have as commitments:

• meet the legal requirements regarding environmental legislation and occupational health;
• adequately manage and control the waste generated;
• prioritize non-generation, reduction, reuse, recycling, solid waste treatment and environmentally adequate final disposal; and
• enable social inclusion by encouraging the development of recyclable material collectors’ cooperatives.

The responsibility lies with the Logistics and Operations Department, which has specific financial resources for waste management, such as contracts with licensed companies for the collection, transportation, and environmentally adequate disposal of effluents, common waste, organic waste, and hazards, as well as financial resources directed to the acquisition of specific materials for storage and accident prevention, such as approved packaging drums, spill containment pallets, emergency response kits, and the maintenance of waste garbage cans for selective collection, among others.

We comply with the pertinent legislation and we did not receive any type of fine in 2020. The improvement opportunities are identified systematically and implemented gradually, such as, for example, the replacement of disposable cups used for water and coffee consumption with polypropylene cups to reduce the generation of this waste, to be carried out in 2020.

**EcoCepel Project**

This project aims to encourage and expand the practice of selective collection among our employees for environmentally appropriate disposal, in order to preserve natural resources and reduce the volume of waste sent to landfills. Through the initiative, information is provided on conscious disposal and appropriate locations are made available for the collection of burned-out light bulbs and used batteries and cooking oil.

**Waste generation in 2020**

GRI 306-5

We generated 188.90 thousand tons of waste in 2020, excluding light bulbs, which, in the Fundão Unit, were counted in tons (0.10) and, in Adrianópolis, in units (1000).

**Total waste generated in 2020 (in tons)**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Waste Generation (in tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundão Unit</td>
<td>78.77</td>
</tr>
<tr>
<td>Adrianópolis Unit</td>
<td>110.13</td>
</tr>
</tbody>
</table>

We comply with the pertinent legislation and we did not receive any type of fine in 2020. The improvement opportunities are identified systematically and implemented gradually, such as, for example, the replacement of disposable cups used for water and coffee consumption with polypropylene cups to reduce the generation of this waste, to be carried out in 2020.

Note: the total does not include the 1,000 units of lamps dispensed by Adrianópolis, because the data could not be collected in tons by this unit.
### Hazardous waste | GRI 306-4, 306-5

<table>
<thead>
<tr>
<th>Destination</th>
<th>Fundão Unit</th>
<th>Adrianópolis Unit</th>
<th>Cepel Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Volume (t)</td>
<td>Waste</td>
<td>Volume (t)</td>
</tr>
<tr>
<td>Autoclave</td>
<td>0.11</td>
<td>Infectious waste</td>
<td>0.07</td>
</tr>
<tr>
<td>Co-processing</td>
<td>2.09</td>
<td>Industrial waste, contaminated miscellaneous (rags, PPE, threads, rubber); solvent residue; leftover chemical products; and oily water</td>
<td>2.29</td>
</tr>
<tr>
<td>Reverse Logistics</td>
<td>0.08</td>
<td>Batteries</td>
<td>-</td>
</tr>
<tr>
<td>Recycling</td>
<td>2.06</td>
<td>Electronic scrap</td>
<td>0.83</td>
</tr>
<tr>
<td>Re-refined oil</td>
<td>1.00</td>
<td>Oily waste (mineral oil + lubricating oil)</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5.35</strong></td>
<td></td>
<td><strong>4.19</strong></td>
</tr>
</tbody>
</table>

Note: the total for decontamination does not include the lamps collected by both units due to the fact that the control was made with different measurement units (0.10 tons of lamps dispensed by the Fundão Unit and 1,000 units of lamps dispensed by the Adrianópolis Unit).

### Non-hazardous waste | GRI 306-4, 306-5

<table>
<thead>
<tr>
<th>Destination</th>
<th>Fundão Unit</th>
<th>Adrianópolis Unit</th>
<th>Cepel Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Volume (t)</td>
<td>Waste</td>
<td>Volume (t)</td>
</tr>
<tr>
<td>Sanitary landfill</td>
<td>37.35</td>
<td>Organic waste; common waste; and rubble</td>
<td>92.89</td>
</tr>
<tr>
<td>Composting</td>
<td>21.36</td>
<td>Organic pruning</td>
<td>10.45</td>
</tr>
<tr>
<td>Co-processing</td>
<td>0.50</td>
<td>Tires</td>
<td>0.50</td>
</tr>
<tr>
<td>Recycling</td>
<td>14.62</td>
<td>Uncontaminated wood; recyclables; scrap metal; and vegetable oil</td>
<td>2.11</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>73.33</strong></td>
<td></td>
<td><strong>105.95</strong></td>
</tr>
</tbody>
</table>

Note: the total for decontamination does not include the lamps collected by both units due to the fact that the control was made with different measurement units (0.10 tons of lamps dispensed by the Fundão Unit and 1,000 units of lamps dispensed by the Adrianópolis Unit).
Energy GRI 103-1, 103-2, 103-3, 302-4

Our main objective when managing the use of energy is to guarantee the achievement of goals and indicators related to the topic, in order to avoid consumption and, consequently, unnecessary expenses. To this end, we follow the guidelines of several policies:

• energy conservation: consume only what is necessary;
• energy efficiency: prioritize solutions and the acquisition of equipment or systems that are more efficient in terms of energy consumption;
• life cost of assets: always evaluate the total life cost of the asset, which involves acquisition, installation, maintenance, operation (energy consumption) and disposal;
• sustainability: acquisition of equipment and solutions that do not harm the environment or that minimize any possible impact; and

• energy performance indicators: define and pursue the achievement of metrics to minimize the overall energy consumption in the company.

An action plan created from energy diagnostics conducted in the first half of 2018 is underway. In 2020, the actions we carried out resulted in the reduction of 15,170.6 GJ in energy consumption, including fuel and electricity. There was a reduction of 27 GJ and 755.9 GJ, respectively, in the use of energy from renewable and non-renewable fuels. The monitoring is done through the IGS 2.0 system and the Emisfera. The control is also done by means of energy bills and the analysis of the mass memory files made available by the electric power utility company. Management is the responsibility of the area responsible for building maintenance, with financial resources for costing and investment, as well as technological resources such as software, simulators, and energy consumption measurement systems such as multimeters and energy analyzers. The implementation of a proprietary system for energy management is underway, which will facilitate the operation and ensure the savings estimated in the feasibility studies.

In 2020, the actions we carried out resulted in the reduction of 15,170.6 GJ in energy consumption, including fuel and electricity.
The evaluation of energy-related indicators is done by the various areas that make up the Center. Each quarter, the data is forwarded and approved in the IGS System (see page 27) for global analysis and preparation of our annual report, which describes our social and environmental performance in 2020, and of Eletrobras’ annual report.

**Research for energy efficiency**

Several of our projects aim to promote energy efficiency and the reduction of energy consumption by society. We support Eletrobras in the development of tests, studies and certifications of electro-electronic equipment for the Brazilian Labeling Program (PBE), managed by Inmetro. These activities take place in the scope of the National Program for the Conservation of Electrical Energy (Procel), which encourages the reduction of energy consumption by means of programs to combat waste and efficient use. Equipment such as transformers, motors, refrigeration and air-conditioning systems, and lighting systems and their components, such as lamps and fixtures, are evaluated.

In 2020, we started the homologation process with Inmetro of the Photovoltaic Systems Laboratory - Solar Simulator, inaugurated in 2019, to enable it to certify photovoltaic modules for the PBE.

### Consumption of energy from non-renewable fuels (GJ)

<table>
<thead>
<tr>
<th>Type of fuel</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline</td>
<td>24.38</td>
</tr>
<tr>
<td>Diesel fuel</td>
<td>2,132.53</td>
</tr>
<tr>
<td>Liquefied petroleum gas</td>
<td>9.60</td>
</tr>
<tr>
<td>Natural gas</td>
<td>319.78</td>
</tr>
<tr>
<td>Lubricants (2-stroke oil)</td>
<td>5.76</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,166.51</strong></td>
</tr>
</tbody>
</table>

### Consumption of energy from renewable fuels (GJ)

<table>
<thead>
<tr>
<th>Type of fuel</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanol</td>
<td>101.63</td>
</tr>
<tr>
<td>Ethanol added to gasoline</td>
<td>6.25</td>
</tr>
<tr>
<td>Biodiesel added to diesel</td>
<td>261.47</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>369.35</strong></td>
</tr>
<tr>
<td>Electricity consumption (GJ)</td>
<td>17,148.38</td>
</tr>
<tr>
<td><strong>Total energy consumption (GJ)</strong></td>
<td><strong>19,684.24</strong></td>
</tr>
</tbody>
</table>
Emissions

Annually, we perform an inventory of greenhouse gas emissions (GHG) according to the guidelines of the GHG Protocol and the Intergovernmental Panel on Climate Change (IPCC). The calculations of GHG emissions and removals are performed by the Emisfera platform, developed by Cepel. The calculation is quarterly and annually, which provides us and Eletrobras Companies with the necessary information to define strategies related to SDG 13 (Climate Action).

In 2020, we registered total emissions of 526.4 tons of CO$_2$ equivalent, among which the most expressive were scope 2 (indirect emissions, from the acquisition of electricity), which totaled 312.0 tCO$_2$e. Scope 1 (direct emissions) and 3 (other indirect emissions) emissions were 34.8 and 179.6 tCO$_2$e, respectively. The monitoring of our GHG emissions and those of Eletrobras Companies, as well as the compilation and processing of inventory data, is carried out by means of the Emisfera platform, which is part of the Balcar project (see page 117). The platform has computational tools that calculate and track the historical evolution of variables related not only to GHG emissions, but also to fuel and electricity consumption, and the emission of air pollutants and gases controlled by the Montreal Protocol on Substances that Deplete the Ozone Layer, of which Brazil is a signatory.
It is one of the most modern solutions in the market, which follows internationally recognized methodologies for calculating emissions and has unique data validation mechanisms, providing security and accuracy of the emissions measured. For five consecutive years, the platform's tools have been audited by the largest international certification firms - PwC and KPMG. Both consultancies consider Emisfera to be very transparent and easy to audit.

The platform can be used by any company in the energy sector that wishes to inventory its emissions, and its integrated use with the IGS System, also developed by Cepel, is recommended.

**Emissões de GEE - total por escopo**

<table>
<thead>
<tr>
<th>GAS</th>
<th>Scope 1</th>
<th>Scope 2</th>
<th>Scope 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂ (t)</td>
<td>10.5</td>
<td>312.0</td>
<td>175.9</td>
<td>498.4</td>
</tr>
<tr>
<td>CH₄ (t)</td>
<td>0.0</td>
<td>n.a.</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>N₂O (t)</td>
<td>0.0</td>
<td>n.a.</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>SF₆ (t)</td>
<td>0.0</td>
<td>n.a.</td>
<td>n.a.</td>
<td>0.0</td>
</tr>
<tr>
<td>CO₂ (t CO₂)</td>
<td>10.5</td>
<td>312.0</td>
<td>175.9</td>
<td>498.4</td>
</tr>
<tr>
<td>CH₄ (t CO₂e)</td>
<td>0.4</td>
<td>n.a.</td>
<td>1.0</td>
<td>1.3</td>
</tr>
<tr>
<td>N₂O (t CO₂e)</td>
<td>0.1</td>
<td>n.a.</td>
<td>2.7</td>
<td>2.8</td>
</tr>
<tr>
<td>SF₆ (t CO₂e)</td>
<td>0.0</td>
<td>n.a.</td>
<td>n.a.</td>
<td>0.0</td>
</tr>
<tr>
<td>Gases refrigerantes (t CO₂e)</td>
<td>23.9</td>
<td>n.a.</td>
<td>n.a.</td>
<td>23.9</td>
</tr>
<tr>
<td><strong>Total (t CO₂e)</strong></td>
<td><strong>34.8</strong></td>
<td><strong>312.0</strong></td>
<td><strong>179.6</strong></td>
<td><strong>526.4</strong></td>
</tr>
</tbody>
</table>

* Market Base

**Carbon Capture**

In 2020, we captured carbon by planting, at the Adrianópolis Unit, 94 tree seedlings of the Atlantic Forest biome, equivalent to an area of 0.16 hectares. The action was taken as a compensatory measure for the suppression of vegetation carried out in this unit - 10 trees (0.02 hectares) - surpassing it. The measure was determined by the environmental agency.

<table>
<thead>
<tr>
<th>Year</th>
<th>Balance (t CO₂e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>Emissions 6.00</td>
</tr>
<tr>
<td></td>
<td>Removals 2.40</td>
</tr>
<tr>
<td></td>
<td>Balance (E-R) 3.60</td>
</tr>
</tbody>
</table>

Note: to calculate carbon capture, we used information collected through the quantitative variables of IGS 2.0 System (see page 22), which registers the biome and the delimitation of the area (ha) of suppressed vegetation or tree seedlings planted in reforestation activities. Then, emissions and removals are accounted for using average forest biomass carbon storage factors available in the technical literature. Finally, the biomass stores were transformed into values of tons of carbon dioxide (t CO₂), the unit of the forest carbon balance result.
Projects

Three projects are underway in which we help Eletrobras companies measure their emissions and seek compliance with SDG 13. The Carbon Balance in Hydroelectric Power Plants (Balcar) Project aims to increase scientific knowledge about GHG emissions in these structures and thus help companies in the accounting and monitoring processes. The publication of the main results in international high-profile scientific journals demonstrates that hydroelectricity is a low greenhouse gas emission generating source when compared to fossil fuel thermal generation.

In 2021, we will continue to develop, as part of Balcar, the Mo-HidroGEE, a model for hydrodynamic simulation of reservoirs with greenhouse gas flow balance; and to participate in IEA-HYDRO, coordination of the working group of international experts on greenhouse gas emissions in hydropower under the International Energy Agency.

Through the MudClima Project, we are investigating possible changes in the rainfall and flow regime in Brazilian river basins, and how these affects hydroelectric generation. We
are also developing methodologies to assess the resilience of hydropower plants to climate change, and studies on adaptation to these events for the Brazilian electricity sector. With the knowledge generated by the project, we help Eletrobras companies quantify and map the risks associated with this theme. We also contribute to the achievement of SDG 6 (Clean Water and Sanitation), since the alteration in the rainfall and flow regime of the watersheds is correlated to the problems faced in reaching the goal of ensuring availability and sustainable management of water and sanitation for all.

In 2020, MudClima gained a new functionality with the development of the model Multi-criteria Decision Support System for Long Term Generation Expansion Planning considering GHG Emissions (Sadplane). In 2021, we will launch a prototype of the model, in line with the strategies discussed within the Eletrobras Companies Generation Expansion Planning Subcommittee (SPEG/Eletrobras).

With the Carbon Footprint project, we are developing a reference methodology for the elaboration of carbon footprint studies for Eletrobras Companies. These studies help in the evaluation of GHG emissions within the phases of the life cycle of electricity generation and transmission projects, in the identification of the phases of the projects in which the greatest number of emissions occur, and in the adoption of management measures aimed at reduction. The disclosure of the carbon footprint influences the image and evaluation of companies by the market and society.
Economic-financial management

GRI 103-1, 103-2, 103-3
Outcome

2020 Outcome
GRI 201-1

In 2020, we had very expressive economic results when compared to the previous year, which shows the significant evolution of Cepel in the management of its resources, highlighting:

• the increase of 225% in the result for the year, which reached R$30.8 million in surplus; and
• the reduction of Operating Expenses by 24.2%.

Net Operating Income - NOI

It was a year marked by the global pandemic, with reflections on our members and customers, but even so our NOI remained stable, with a small reduction of 2.2% compared to the previous year - R$ 227,102 thousand in 2020 compared to R$ 232,130 thousand in 2019. GRI 102-7

Composition of the 2019 NOI (R$ thousand)

Composition of the 2020 NOI (R$ thousand)

The biggest impact came from the reduction in contributions from our largest Founding Associate, Eletrobras, by about 8.1% in relation to the previous year. But the 11.2% increase in service provision was the result of Cepel’s ability to restructure itself to serve its clients in times of social isolation.
Operating expenses

The operating expenses showed important decreases in the items personnel (24.2%), third-party services (9.0%) and general expenses (38.1%).

As for the evolution of personnel expenses, it is linked to the reduction in the number of employees, resulting from the Consensual Dismissal Plan (PDC). The PDC, implemented in the second half of the previous year, dismissed 15 employees during the first quarter of 2020. At the end of the year, it reached the mark of 22 dismissals in total.

The expenses with third-party services and general services had their reduction associated with the pandemic issues and internal efforts. Some of these expenses will not return to pre-pandemic levels due to the many actions that have been taken on processes and procedures, renegotiations of service and supply contracts, and reduced traveling. Other expenses that were suspended or reduced due to the health crisis may have a partial return, but it was evident that many of the actions carried out in this period can be continued.

It should also be noted that the Zero-Based Budgeting methodology applied brought the Center an expenditure reduction of around R$11 million.

<table>
<thead>
<tr>
<th>Operating Expenses</th>
<th>2019</th>
<th>2020</th>
<th>Variation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent Staff</td>
<td>177,787,284</td>
<td>134,725,641</td>
<td>(24.2)</td>
</tr>
<tr>
<td>Third-party services</td>
<td>22,367,498</td>
<td>20,343,354</td>
<td>(9.0)</td>
</tr>
<tr>
<td>Overhead</td>
<td>43,117,230</td>
<td>26,699,780</td>
<td>(38.1)</td>
</tr>
<tr>
<td>Tax Expenses</td>
<td>1,158,112</td>
<td>724,535</td>
<td>(37.4)</td>
</tr>
<tr>
<td>Depreciation and amortization</td>
<td>15,670,473</td>
<td>14,792,714</td>
<td>(5.6)</td>
</tr>
<tr>
<td>Total</td>
<td>260,100,599</td>
<td>197,286,024</td>
<td>(24.2)</td>
</tr>
</tbody>
</table>

Financial income

The financial income decreased from R$3.3 million to R$0.96 million due to the reduction in interest rates in Brazil. The financial investments are restricted to the Banco do Brasil Extramarket Fund, whose profitability is linked to the SELIC rate.
Income Management
GRI 103-1, 103-2, 103-3

Since Cepel is a non-profit association, it is important to manage the budget in a way to keep its expenses under control and limited to the resources it obtains, mostly through the contribution of its associates.

Thus, the elaboration of the annual budget gains relevance aiming at presenting in an unequivocal way the expenses to be incurred, be them Investments or Structural.

After the approval of the Annual Budget by the Advisory Board, its values are monitored in the SAP Integrated Management System, so that the spending limits per item and per area have budget restraints that prevent achievements above the planned ones.

It is also worth mentioning the follow-up of the contributions of resources from associates, done systematically, in order to maintain the cash flow consistent with the projections.

Financial management, therefore, focuses on the balance between sources of funds and expenditure planning, being closely monitored by the Executive Board and systematically presented to the Supervisory and Advisory Boards.
### Non-Profit Civil Association

**CNPJ 42.288.886/0001-60**

**BALANCE SHEET AS OF DECEMBER 31, 2020 AND 2019**

(Amounts expressed in reais)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASSETS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brands and Patents</td>
<td>15</td>
<td>2,386,076</td>
<td>0.8</td>
<td>2,235,168</td>
<td>1.1</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logos</td>
<td>16</td>
<td>88,011,776</td>
<td>3.0</td>
<td>91,813,517</td>
<td>3.7</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL CURRENT</strong></td>
<td></td>
<td>19,734,712</td>
<td>0.5</td>
<td>19,529,989</td>
<td>0.8</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LONG-TERM REACHABLE</strong></td>
<td></td>
<td>14,534,806</td>
<td>5.0</td>
<td>14,731,622</td>
<td>5.7</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Services</td>
<td>20</td>
<td>9,777,063</td>
<td>3.2</td>
<td>9,555,788</td>
<td>3.6</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taxes and Contributions to be Recovered</td>
<td>5</td>
<td>5,884,064</td>
<td>1.7</td>
<td>5,756,516</td>
<td>2.0</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL FIXED ASSETS</strong></td>
<td></td>
<td>105,367,836</td>
<td>35.8</td>
<td>105,786,264</td>
<td>41.9</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IN OPERATION</strong></td>
<td></td>
<td>184,900,543</td>
<td>59.9</td>
<td>176,502,257</td>
<td>69.6</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[1] Account Collections</td>
<td>21</td>
<td>182,839,899</td>
<td>60.3</td>
<td>166,851,933</td>
<td>65.0</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being Processed</td>
<td>19</td>
<td>19,864,640</td>
<td>6.5</td>
<td>11,986,700</td>
<td>4.7</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right Use - Lease - PPR18</td>
<td>17</td>
<td>2,668,587</td>
<td>0.9</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>INVENTORY ASSETS</strong></td>
<td></td>
<td>2,386,076</td>
<td>0.8</td>
<td>2,235,168</td>
<td>1.1</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NET WORTH</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIABILITIES AND NET WORTH</strong></td>
<td></td>
<td>299,199,823</td>
<td>100.0</td>
<td>230,618,326</td>
<td>100.0</td>
<td>18.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CURRENT</strong></td>
<td></td>
<td>67,204,100</td>
<td>22.5</td>
<td>43,612,257</td>
<td>18.6</td>
<td>51.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LONG-TERM LIABILITIES</strong></td>
<td></td>
<td>135,285,498</td>
<td>44.9</td>
<td>111,033,928</td>
<td>48.0</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[1] Prom. for Loss at Credit Receipt</td>
<td>11</td>
<td>23,805,885</td>
<td>8.0</td>
<td>4,434,417</td>
<td>1.8</td>
<td>535.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[2] Accrued Amortizations</td>
<td>12</td>
<td>1,930,475</td>
<td>0.6</td>
<td>962,630</td>
<td>0.4</td>
<td>105.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL LIABILITIES</strong></td>
<td></td>
<td>248,490,595</td>
<td>82.8</td>
<td>155,448,355</td>
<td>65.4</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SOARING EQUITY</strong></td>
<td></td>
<td>2,386,076</td>
<td>0.8</td>
<td>2,235,168</td>
<td>1.1</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NON-CURRENT</strong></td>
<td></td>
<td>163,050,679</td>
<td>54.6</td>
<td>198,516,958</td>
<td>81.6</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL ASSETS</strong></td>
<td></td>
<td>452,448,515</td>
<td>150.0</td>
<td>329,135,284</td>
<td>131.6</td>
<td>18.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Economic-financial management**

**GRI Indicators**

**Annex**

---

**NL Inc.**

**About the Report**

Message from the CEO

**Covid-19 Pandemic**

Laboratory Infrastructure

Strategic Management

Strategy and Outlook

People management

Environmental management
### Income Statement as of December 31, 2020 and 2019

(Amounts expressed in reais)

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>NOTES</th>
<th>2020</th>
<th>A. V. %</th>
<th>2019</th>
<th>A. V. %</th>
<th>A. H. %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NET OPERATING REVENUE</strong></td>
<td></td>
<td>227,101,824</td>
<td>100.0</td>
<td>232,129,519</td>
<td>99.6</td>
<td>(2.2)</td>
</tr>
<tr>
<td><strong>STATUTORY CONTRIBUTION</strong></td>
<td></td>
<td>193,713,488</td>
<td>85.3</td>
<td>197,392,470</td>
<td>84.6</td>
<td>(1.9)</td>
</tr>
<tr>
<td>ELETROBRÁS</td>
<td></td>
<td>89,358,120</td>
<td>39.3</td>
<td>97,074,885</td>
<td>41.8</td>
<td>(8.1)</td>
</tr>
<tr>
<td>ASSOCIATED</td>
<td></td>
<td>100,957,880</td>
<td>44.5</td>
<td>97,074,885</td>
<td>41.8</td>
<td>4.0</td>
</tr>
<tr>
<td><strong>SPECIAL PARTNERS</strong></td>
<td></td>
<td>3,497,488</td>
<td>1.5</td>
<td>3,242,700</td>
<td>1.4</td>
<td>7.9</td>
</tr>
<tr>
<td><strong>EXTRAORDINARY CONTRIBUTION</strong></td>
<td></td>
<td>3,100,000</td>
<td>1.4</td>
<td>7,500,000</td>
<td>3.2</td>
<td>(58.7)</td>
</tr>
<tr>
<td><strong>SERVICES RENDERED</strong></td>
<td>20</td>
<td>52,288,316</td>
<td>12.0</td>
<td>27,017,649</td>
<td>11.7</td>
<td>112.2</td>
</tr>
<tr>
<td><strong>OPERATING EXPENDITURES</strong></td>
<td></td>
<td>197,286,024</td>
<td>100.0</td>
<td>260,100,599</td>
<td>100.0</td>
<td>(24.2)</td>
</tr>
<tr>
<td><strong>PERMANENT STAFF</strong></td>
<td>21</td>
<td>158,721,651</td>
<td>68.3</td>
<td>177,997,284</td>
<td>68.4</td>
<td>(24.2)</td>
</tr>
<tr>
<td><strong>THIRD-PARTY SERVICES</strong></td>
<td>22</td>
<td>26,099,708</td>
<td>11.5</td>
<td>11,922,212</td>
<td>4.7</td>
<td>117.0</td>
</tr>
<tr>
<td><strong>GENERAL EXPENDITURES</strong></td>
<td>23</td>
<td>26,491,773</td>
<td>11.7</td>
<td>75,111,912</td>
<td>28.6</td>
<td>(64.4)</td>
</tr>
<tr>
<td><strong>TAX EXPENDITURES</strong></td>
<td>23</td>
<td>728,515</td>
<td>0.4</td>
<td>728,515</td>
<td>0.3</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>DEPRECIATIONS AND AMORTIZATIONS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OPERATING RESULT PRIOR TO FINANCIAL RESULT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FINANCIAL REVENUES</strong></td>
<td></td>
<td>5,269,284</td>
<td>2.3</td>
<td>4,571,310</td>
<td>1.7</td>
<td>(15.8)</td>
</tr>
<tr>
<td><strong>INTEREST EARNED</strong></td>
<td></td>
<td>20,239</td>
<td>0.1</td>
<td>30,043</td>
<td>0.1</td>
<td>(36.8)</td>
</tr>
<tr>
<td><strong>INCOME FROM FINANCIAL APPLICATIONS</strong></td>
<td></td>
<td>2,677,097</td>
<td>1.2</td>
<td>3,467,058</td>
<td>1.3</td>
<td>(24.2)</td>
</tr>
<tr>
<td><strong>EXCHANGE VARIATION</strong></td>
<td></td>
<td>103,319</td>
<td>0.5</td>
<td>169,979</td>
<td>1.0</td>
<td>(39.5)</td>
</tr>
<tr>
<td><strong>MONETARY VARIATION</strong></td>
<td></td>
<td>118,307</td>
<td>0.6</td>
<td>71,191</td>
<td>0.3</td>
<td>63.9</td>
</tr>
<tr>
<td><strong>OTHER FINANCIAL REVENUES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FINANCIAL EXPENDITURES</strong></td>
<td></td>
<td>2,308,315</td>
<td>1.1</td>
<td>1,215,198</td>
<td>0.5</td>
<td>87.3</td>
</tr>
<tr>
<td><strong>INTEREST PAID OR INCURRED</strong></td>
<td></td>
<td>77,843</td>
<td>0.4</td>
<td>350,813</td>
<td>1.3</td>
<td>(79.4)</td>
</tr>
<tr>
<td><strong>EXCHANGE VARIATION</strong></td>
<td></td>
<td>98,846</td>
<td>0.5</td>
<td>12,173</td>
<td>0.1</td>
<td>(96.9)</td>
</tr>
<tr>
<td><strong>TAX EXPENDITURES</strong></td>
<td></td>
<td>2,616,658</td>
<td>1.2</td>
<td>7,037,898</td>
<td>2.7</td>
<td>(64.0)</td>
</tr>
<tr>
<td><strong>BANK EXPENDITURES</strong></td>
<td></td>
<td>105,617</td>
<td>0.5</td>
<td>27,178</td>
<td>0.1</td>
<td>289.2</td>
</tr>
<tr>
<td><strong>OTHER FINANCIAL EXPENDITURES</strong></td>
<td></td>
<td>6,656</td>
<td>0.0</td>
<td>27,925</td>
<td>0.1</td>
<td>(76.2)</td>
</tr>
<tr>
<td><strong>FINANCIAL INCOME</strong></td>
<td></td>
<td>960,969</td>
<td>0.4</td>
<td>3,338,990</td>
<td>1.4</td>
<td>(71.2)</td>
</tr>
<tr>
<td><strong>FINANCIAL REVENUES</strong></td>
<td></td>
<td>4,215</td>
<td>0.2</td>
<td>7,410</td>
<td>0.3</td>
<td>(43.3)</td>
</tr>
<tr>
<td><strong>FINANCIAL EXPENDITURES</strong></td>
<td></td>
<td>728,515</td>
<td>3.4</td>
<td>3,308,315</td>
<td>12.9</td>
<td>(79.4)</td>
</tr>
<tr>
<td><strong>FINANCIAL INCOME</strong></td>
<td></td>
<td>3,485,747</td>
<td>15.8</td>
<td>1,030,080</td>
<td>4.0</td>
<td>(71.2)</td>
</tr>
<tr>
<td><strong>SURPLUS / DEFICIT FOR THE YEAR</strong></td>
<td></td>
<td>30,780,983</td>
<td>13.6</td>
<td>(24,624,660)</td>
<td>(10.6)</td>
<td>125.0</td>
</tr>
</tbody>
</table>
GRI Indicators
### ORGANIZATIONAL PROFILE

<table>
<thead>
<tr>
<th>GRI 102-1</th>
<th>Organization Name</th>
<th>Report cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRI 102-2</td>
<td>Activities, brands, products and services</td>
<td>19, 32</td>
</tr>
<tr>
<td>GRI 102-3</td>
<td>Location of the organization's headquarters</td>
<td></td>
</tr>
<tr>
<td>GRI 102-4</td>
<td>Location of the organization's operations</td>
<td>19</td>
</tr>
<tr>
<td>GRI 102-5</td>
<td>Nature of ownership and legal form of organization</td>
<td>68</td>
</tr>
<tr>
<td>GRI 102-6</td>
<td>Markets served</td>
<td>19</td>
</tr>
<tr>
<td>GRI 102-7</td>
<td>Size of the organization</td>
<td>19, 90, 120</td>
</tr>
<tr>
<td>GRI 102-8</td>
<td>Information about employees (own and third-party)</td>
<td>90</td>
</tr>
<tr>
<td>GRI 102-9</td>
<td>Supply Chain</td>
<td>80</td>
</tr>
<tr>
<td>GRI 102-10</td>
<td>Main changes regarding size, structure or shareholding</td>
<td>The only expansion that is being done in the facilities is related to the completion of the Smart Grid Lab.</td>
</tr>
<tr>
<td>GRI 102-11</td>
<td>Precautionary Principle</td>
<td>78</td>
</tr>
<tr>
<td>GRI 102-12</td>
<td>External Initiatives</td>
<td>77</td>
</tr>
<tr>
<td>GRI 102-13</td>
<td>Memberships in associations</td>
<td>77</td>
</tr>
</tbody>
</table>

**Fundão Unit:** Cidade Universitária, Ilha do Fundão, municipality of Rio de Janeiro (RJ), Avenida Horácio Macedo, 354 - Cidade Universitária, Ilha do Fundão - Rio de Janeiro - RJ - 21941-911

**Adrianópolis Unit (Laboratório George Zabludowski):** municipality of Nova Iguaçu (RJ), Avenida Olinda, 5,800 - Adrianópolis - Nova Iguaçu - RJ - 26053-121

The only expansion that is being done in the facilities is related to the completion of the Smart Grid Lab.
## GRI Standards

### STRATEGY
- **GRI 102-14** Message from the CEO
  - Remarks: 10 to 13
- **GRI 102-15** Description of key impacts, risks and opportunities
  - Remarks: 78

### ETHICS AND INTEGRITY
- **GRI 102-16** Values, principles, standards and norms of conduct
  - Remarks: 18, 73
- **GRI 102-17** Mechanisms for advice and ethical concerns
  - Remarks: 75

### GOVERNANCE
- **GRI 102-18** Governance structure
  - Remarks: 68
- **GRI 102-20** Executive-level responsibility for economic, environmental and social issues
  - Remarks: We have executive-level positions responsible for economic, social, and environmental topics that report directly to the highest corporate governance body.
- **GRI 102-22** Composition of the highest governance body and its committees
  - Remarks: 68
- **GRI 102-25** Conflicts of interest
  - Remarks: 75
- **GRI 102-28** Evaluation of the performance of the highest governance body
  - Remarks: 72
- **GRI 102-31** Identification and management of economic, environmental and social impacts
  - Remarks: 68
- **GRI 102-32** Evaluation of economic, environmental and social issues
  - Remarks: 3
<table>
<thead>
<tr>
<th>GRI Standards</th>
<th>Disclosure</th>
<th>Remarks</th>
<th>Report Page</th>
<th>Omission</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GRI 102: STANDARD CONTENT 2016</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>STAKEHOLDER ENGAGEMENT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-40</td>
<td>List of groups of stakeholders engaged by the organization</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-41</td>
<td>Collective bargaining agreements</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-42</td>
<td>Basis for identification and selection of stakeholders for engagement</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-43</td>
<td>Approach adopted for stakeholder engagement</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-44</td>
<td>Main topics and concerns raised with stakeholders</td>
<td>4 to 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>REPORTING PRACTICES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-45</td>
<td>Entities included in the consolidated financial statements</td>
<td>We have no controlled, affiliated or subsidiary companies.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-46</td>
<td>Definition of the report content and limits of each material topic</td>
<td>3 to 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-47</td>
<td>List of material topics</td>
<td>4 to 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-48</td>
<td>Reformulations of information</td>
<td>This is our first annual report, so there are no restatements of information previously provided.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-49</td>
<td>Changes in reporting</td>
<td>This is our first annual report, so there are no significant changes in the list of material topics or in the topic boundaries from previous reports.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-50</td>
<td>Reporting period</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-51</td>
<td>Date of previous report</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-52</td>
<td>Reporting Cycle</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-53</td>
<td>Contact data for questions regarding the report</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-54</td>
<td>&quot;Agreed upon&quot; option chosen by the organization</td>
<td>This report has been prepared in conformity with the GRI Norms in option &quot;Essential&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-55</td>
<td>GRI Content Summary</td>
<td>126 to 135</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 102-56</td>
<td>External Verification</td>
<td>This report has not undergone any external verification.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI Standards</td>
<td>Disclosure</td>
<td>Remarks</td>
<td>Report Page</td>
<td>Omission</td>
</tr>
<tr>
<td>---------------</td>
<td>------------</td>
<td>---------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td><strong>MATERIAL TOPICS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RESEARCH AND DEVELOPMENT + INNOVATION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 103: MANAGEMENT METHODS 2016</td>
<td>GRI 103-1</td>
<td>Explanation of the material topics and their boundaries</td>
<td>32 to 34</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GRI 103-2</td>
<td>Management approach and its components</td>
<td>32 to 34</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GRI 103-3</td>
<td>Evaluation of management approach</td>
<td>32 to 34</td>
<td></td>
</tr>
<tr>
<td><strong>ELECTRICITY SECTOR INDICATORS</strong></td>
<td><strong>RESEARCH AND DEVELOPMENT</strong></td>
<td>Activities and expenses related to research and development aimed at the reliability of the electricity supply and the promotion of sustainable development</td>
<td>362 to 34</td>
<td></td>
</tr>
<tr>
<td><strong>STRATEGY AND OUTLOOK</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 103: MANAGEMENT METHODS 2016</td>
<td>GRI 103-1</td>
<td>Explanation of the material topics and their boundaries</td>
<td>82 to 88</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GRI 103-2</td>
<td>Management approach and its components</td>
<td>82 to 88</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GRI 103-3</td>
<td>Evaluation of management approach</td>
<td>82 to 88</td>
<td></td>
</tr>
<tr>
<td><strong>SOCIO-ENVIRONMENTAL ASPECTS IN DECISION MAKING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 103: MANAGEMENT METHODS 2016</td>
<td>GRI 103-1</td>
<td>Explanation of the material topics and their boundaries</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GRI 103-2</td>
<td>Management approach and its components</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GRI 103-3</td>
<td>Evaluation of management approach</td>
<td>Currently we do not make formal evaluations of our management of social and environmental aspects in decision making.</td>
<td></td>
</tr>
</tbody>
</table>

Currently we do not make formal evaluations of our management of social and environmental aspects in decision making.
### DIGITAL TRANSFORMATION

- **GRI 103-1**
  - Explanation of the material topics and their boundaries
  - For most of our products and services there is no exclusive contact channel, with the exception of:
    - SAGE customers who use the support services have a formal channel for complaints, reporting problems and clarifying doubts. In some of the more critical SAGE applications, such as the National System Operator, there are formal commitments to service times for occurrences in real-time operating systems.
    - Itaipu, which uses DianE, has an exclusive channel for registering demands and customer support.
    - The quality system has a specific channel that receives feedback from customers, regarding the work of the Laboratories.

### CYBERSECURITY

- **GRI 103-1**
  - Explanation of the material topics and their boundaries

- **GRI 103-2**
  - Management approach and its components

- **GRI 103-3**
  - Evaluation of management approach

### RISK AND CRISIS MANAGEMENT

- **GRI 103-1**
  - Explanation of the material topics and their boundaries

- **GRI 103-2**
  - Management approach and its components

- **GRI 103-3**
  - Evaluation of management approach
<table>
<thead>
<tr>
<th>GRI Standards</th>
<th>Disclosure</th>
<th>Remarks</th>
<th>Report Page</th>
<th>Omission</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PEOPLE DEVELOPMENT MANAGEMENT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 103: MANAGEMENT METHODS 2016</td>
<td></td>
<td>GRI 103-1 Explanation of the material topics and their boundaries</td>
<td>96 to 99</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GRI 103-2 Management approach and its components</td>
<td>96 to 99</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GRI 103-3 Evaluation of management approach</td>
<td>96 to 99</td>
<td></td>
</tr>
<tr>
<td>GRI 401: EMPLOYMENT 2016</td>
<td>GRI 401-1</td>
<td>New employee hires and turnover by age group, gender, and region</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>GRI 403: OCCUPATIONAL HEALTH AND SAFETY 2018</td>
<td>GRI 403-6</td>
<td>Worker Health Promotion</td>
<td>103</td>
<td></td>
</tr>
<tr>
<td>GRI 404: TRAINING AND EDUCATION 2016</td>
<td></td>
<td>GRI 404-1 Average number of training hours, by occupational category and gender</td>
<td>98</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GRI 404-2 Competence management and lifelong learning programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GRI 404-3 Percentage of employees who receive performance and career development reviews</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>ELECTRICITY SECTOR INDICATORS</td>
<td>EMPLOYMENT</td>
<td>EU14 Availability of skilled labor</td>
<td>51, 90, 97, 99</td>
<td></td>
</tr>
<tr>
<td>DIVERSITY AND EQUAL OPPORTUNITIES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 103: MANAGEMENT METHODS 2016</td>
<td></td>
<td>GRI 103-1 Explanation of the material topics and their boundaries</td>
<td>99 and 100</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GRI 103-2 Management approach and its components</td>
<td>99 and 100</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GRI 103-3 Evaluation of management approach</td>
<td>We currently do not conduct formal evaluations of our diversity and equal opportunity management.</td>
<td>99 and 100</td>
</tr>
<tr>
<td>GRI Standards</td>
<td>Disclosure</td>
<td>Remarks</td>
<td>Report Page</td>
<td>Omission</td>
</tr>
<tr>
<td>---------------</td>
<td>------------</td>
<td>---------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>GRI 405</td>
<td></td>
<td>DIVERSITY AND EQUAL OPPORTUNITIES 2016</td>
<td>GRI 405-1 Diversity in governance bodies and employees</td>
<td>101</td>
</tr>
</tbody>
</table>

### CORRUPTION AND ETHICS MANAGEMENT

| GRI 103: MANAGEMENT METHODS 2016 | GRI 103-1 Explanation of the material topics and their boundaries | 73 to 76 |
| GRI 103-2 Management approach and its components | 73 to 76 |
| GRI 103-3 Evaluation of management approach | The Compliance Program's actions are submitted to the Executive Board, which monitors the implementation and execution, recommending improvements. | 73 to 76 |

| GRI 205: ANTI-CORRUPTION 2016 | GRI 205-1 Operations assessed for risks related to corruption | 74, 80 |
| GRI 205-2 Communication and training on anti-corruption policies and procedures | 76 |
| GRI 205-3 Confirmed cases of corruption and actions taken | 74 |

### CORPORATE GOVERNANCE

| GRI 103: MANAGEMENT METHODS 2016 | GRI 103-1 Explanation of the material topics and their boundaries | 68 to 72 |
| GRI 103-2 Management approach and its components | 68 to 72 |
| GRI 103-3 Evaluation of management approach | 68 to 72 |
### GRI 103-1: Explanation of the material topics and their boundaries

The economic and financial management at Cepel has the following objectives: to avoid relevant and unforeseen increases in costs; to avoid a drop in the inflow of funds from associates; to potentialize gains with new clients and associates; to potentialize gains in resources with services rendered; to control and balance between the months of the year, periods that will require a greater financial sacrifice and to identify months with greater cash surpluses; and to analyze government policies that may affect cash (example: postponement and authorized tax installments); among others.

To make them feasible, we follow policies linked to cash management, accounts receivable, and accounts payable. The first rule is the application of the available resources and the daily follow-up of the cash flow, while the second one guides the negotiations with clients and the third one the constant follow-up of the accounts so that we do not overdue and receive the consequent fines.

Cash management is done by a digital system, as well as the budget and accounting control. Our technicians feed these tools and perform the necessary follow-ups, acting whenever necessary to maintain a good cash flow and budget control.

In addition to this careful management, during 2020 we sought to promote improvements in the interaction between the Economic-Financial Department and the other areas, with the objective of determining relevant information to the financial, accounting, and budgetary flow. We have also improved the monthly control of the members’ contributions and a more effective negotiation with defaulting customers. Furthermore, we have adjusted the schedules for the accounts payable and the billing and accounts receivable processes.

---

### GRI 103-2: Management approach and its components

The economic and financial management at Cepel has the following objectives: to avoid relevant and unforeseen increases in costs; to avoid a drop in the inflow of funds from associates; to potentialize gains with new clients and associates; to potentialize gains in resources with services rendered; to control and balance between the months of the year, periods that will require a greater financial sacrifice and to identify months with greater cash surpluses; and to analyze government policies that may affect cash (example: postponement and authorized tax installments); among others.

To make them feasible, we follow policies linked to cash management, accounts receivable, and accounts payable. The first rule is the application of the available resources and the daily follow-up of the cash flow, while the second one guides the negotiations with clients and the third one the constant follow-up of the accounts so that we do not overdue and receive the consequent fines.

Cash management is done by a digital system, as well as the budget and accounting control. Our technicians feed these tools and perform the necessary follow-ups, acting whenever necessary to maintain a good cash flow and budget control.

In addition to this careful management, during 2020 we sought to promote improvements in the interaction between the Economic-Financial Department and the other areas, with the objective of determining relevant information to the financial, accounting, and budgetary flow. We have also improved the monthly control of the members’ contributions and a more effective negotiation with defaulting customers. Furthermore, we have adjusted the schedules for the accounts payable and the billing and accounts receivable processes.

---

### GRI 103-3: Evaluation of management approach

The economic and financial management at Cepel has the following objectives: to avoid relevant and unforeseen increases in costs; to avoid a drop in the inflow of funds from associates; to potentialize gains with new clients and associates; to potentialize gains in resources with services rendered; to control and balance between the months of the year, periods that will require a greater financial sacrifice and to identify months with greater cash surpluses; and to analyze government policies that may affect cash (example: postponement and authorized tax installments); among others.

To make them feasible, we follow policies linked to cash management, accounts receivable, and accounts payable. The first rule is the application of the available resources and the daily follow-up of the cash flow, while the second one guides the negotiations with clients and the third one the constant follow-up of the accounts so that we do not overdue and receive the consequent fines.

Cash management is done by a digital system, as well as the budget and accounting control. Our technicians feed these tools and perform the necessary follow-ups, acting whenever necessary to maintain a good cash flow and budget control.

In addition to this careful management, during 2020 we sought to promote improvements in the interaction between the Economic-Financial Department and the other areas, with the objective of determining relevant information to the financial, accounting, and budgetary flow. We have also improved the monthly control of the members’ contributions and a more effective negotiation with defaulting customers. Furthermore, we have adjusted the schedules for the accounts payable and the billing and accounts receivable processes.
<table>
<thead>
<tr>
<th>GRI Standards</th>
<th>Disclosure</th>
<th>Remarks</th>
<th>Report Page</th>
<th>Omission</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRI 201: ECONOMIC PERFORMANCE 2016</td>
<td>GRI 201-1</td>
<td>Direct economic value generated and distributed</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>GRI 203: 2016 INDIRECT ECONOMIC IMPACT</td>
<td>GRI 203-2</td>
<td>Investments in infrastructure and support services</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>COVID-19 PANDEMIC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 103-1: MANAGEMENT METHODS 2016</td>
<td></td>
<td>Explanation of the material topics and their boundaries</td>
<td>14 to 16</td>
<td></td>
</tr>
<tr>
<td>GRI 103-2: MANAGEMENT METHODS 2016</td>
<td></td>
<td>Management approach and its components</td>
<td>14 to 16</td>
<td></td>
</tr>
<tr>
<td>GRI 103-3: MANAGEMENT METHODS 2016</td>
<td></td>
<td>Evaluation of management approach</td>
<td>14 to 16</td>
<td></td>
</tr>
<tr>
<td>EFFLUENTS AND WASTE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRI 103-1: MANAGEMENT METHODS 2016</td>
<td></td>
<td>Explanation of the material topics and their boundaries</td>
<td>107 to 112</td>
<td></td>
</tr>
<tr>
<td>GRI 103-2: MANAGEMENT METHODS 2016</td>
<td></td>
<td>Management approach and its components</td>
<td>107 to 112</td>
<td></td>
</tr>
<tr>
<td>GRI 103-3: MANAGEMENT METHODS 2016</td>
<td></td>
<td>Evaluation of management approach</td>
<td>107 to 112</td>
<td></td>
</tr>
<tr>
<td>GRI 306-1: 2020 WASTE</td>
<td>GRI 306-1</td>
<td>Waste generation and significant waste-related impacts</td>
<td>109</td>
<td></td>
</tr>
<tr>
<td>GRI 306-4: 2020 WASTE</td>
<td>GRI 306-4</td>
<td>Waste diverted from disposal</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>GRI 306-5: 2020 WASTE</td>
<td>GRI 306-5</td>
<td>Waste destined for final disposal</td>
<td>111 and 112</td>
<td></td>
</tr>
</tbody>
</table>
### WATER CONSUMED AND WATER DISPOSED OF

<table>
<thead>
<tr>
<th>GRI Standards</th>
<th>Disclosure</th>
<th>Remarks</th>
<th>Report Page</th>
<th>Omission</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRI 103: MANAGEMENT METHODS 2016</td>
<td>GRI 103-1</td>
<td>Explanation of the material topics and their boundaries</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GRI 103-2</td>
<td>Management approach and its components</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GRI 103-3</td>
<td>Evaluation of management approach</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td>GRI 303: WATER AND EFFLUENTS 2018</td>
<td>GRI 303-1</td>
<td>Interactions with water as a shared resource</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GRI 303-2</td>
<td>Management of impacts related to water disposal</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GRI 303-4</td>
<td>Water Disposal</td>
<td>108</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GRI 303-5</td>
<td>Water Consumption</td>
<td>Considering the total withdrawal (18.6 megaliters) minus the total disposed (9.96 megaliters), the total consumed was 8.64 megaliters.</td>
<td>108</td>
</tr>
</tbody>
</table>

### ENERGY CONSUMED

<table>
<thead>
<tr>
<th>GRI Standards</th>
<th>Disclosure</th>
<th>Remarks</th>
<th>Report Page</th>
<th>Omission</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRI 103: MANAGEMENT METHODS 2016</td>
<td>GRI 103-1</td>
<td>Explanation of the material topics and their boundaries</td>
<td>113 and 114</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GRI 103-2</td>
<td>Management approach and its components</td>
<td>113 and 114</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GRI 103-3</td>
<td>Evaluation of management approach</td>
<td>113 and 114</td>
<td></td>
</tr>
<tr>
<td>GRI 302: ENERGY 2016</td>
<td>GRI 302-1</td>
<td>Energy consumption within the organization</td>
<td>114</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GRI 302-4</td>
<td>Reduced energy consumption</td>
<td>113</td>
<td></td>
</tr>
</tbody>
</table>
Performance on SDGs

We prioritized the same Sustainable Development Goals (SDGs) prioritized by the Brazilian electricity sector. The following is our performance regarding each of them. We also contributed to the achievement of these goals by means of our innovations in sustainability, which can be checked on page 52 to 56.

Indicators
- Total GHG Emissions / Net Operating Income (annual)

2020 Outcome*
- 0.00000232 tCO₂eq/R$ Annual Goal
- 0.173 tCO₂eq/R$

*Results influenced by measures taken to deal with the Covid-19 pandemic, in particular the adoption of remote working for most of the staff.
Credits

Coordination
Mércia Surene de Lima Fernandes

Photos
Cepel’s and Eletrobras Companies’ Photo Collection

Redaction and editorial consultancy
Visão Sustentável

Graphic design
Juliana Fioroto

Diagramation
Visão Sustentável

Selection, Collection and Analysis of Disclosures
Visão Sustentável