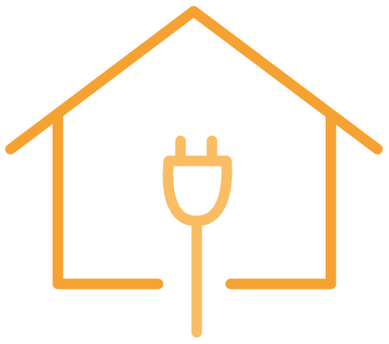
Reliable Power Transmission for our Customers and Society



What happens when there's no electrical energy? In addition to domestic problems, this generates safety and communication risks, among many others. Power transmission system reliability is essential and will be even more important for tomorrow's society that will go all in for this type of energy.

POWER TRANSMISSION SYSTEM RELIABILITY, FLEXIBILITY AND SUSTAINABILITY

Why is this important?

Electrical energy is presently the development and operation engine for industries, services and households in today's society. A guaranteed power supply is becoming more and more critical. There are consequently many stakeholders who must operate power generation, transmission and distribution systems in a reliable and efficient manner. Transelec plays a very important role in this chain: power transmission. We have had to adapt to more demanding consumers, end users and society in general over the last few years.

Regulatory context

In 2017, the Ministry of Energy, by means of the National Energy Commission (CNE), continued to formulate technical standards and regulations in accordance with the provisions of the new General Electricity Services Law (LGSE). Transelec actively participated in working tables and consultative committees created by the CNE in order to discuss and identify the best alternatives for this new regulation. Supply Unavailability Compensation Regulations were then published and submitted to the National Electricity System Operation and Coordination (SEN) Comptrollership and Complementary Services (CS) Regulations.

With regard to technical standards, in 2017 the NEC established Technical Service Quality Standards for Distribution Systems, which amended acceptable power supply quality standards for end customers due to power supply interruptions stemming from distribution facility outages or disconnections. New amendments were made for aspects such as facility design, complementary services according to the new law, Small Distributed Generation Facilities (PMGD) connections, Low-voltage Power Generation and Medium-sized Systems, among others in 2018.

Transelec is participating at working tables with the NEC and SEC to determine events classified as force majeure. The formulation and/or amendment process for new power supply quality standards at transmission/generation levels is expected to take place in 2018. This will be essential for the application of unavailable supply compensation determined by the new Law N° 20,936.

Editorial
ARTICLE

Rodrigo López, Vice-president of Operations

Digital Transformation For Power Transmission

The power industry is going through breakneck changes and our country is no exception to the rule. We must understand these changes as the result of different technologies coming together to make radical changes to the business model used by so-called utilities.

A good way to look at these changes is to use the three dimensions of energy, starting with the dimension of carbonization, which means the irruption of renewable energy for power production. Fossil fuels are on the way out and several countries and companies are making concrete commitments in this regard. Discussion regarding the contribution of fossil fuels specifically focuses on how long it will take us to complete the renewal process.

The second dimension refers to energy centralization, in which the model featuring dependent customers is becoming an increasingly more contestable market. Demand aggregators and block chain technology empower consumers, while DERs complete the equation.

Finally, these specific energy trends are accompanied by the dimension of digitalization, in which the Internet of Things (IoT) and big data analysis capacities applied to asset digitization enable companies to strengthen situational awareness of their status, thus enabling predictive maintenance and improved asset health.

TRANSELEC has addressed the challenge posed by these trends, aiming to provide increasingly more intelligent power transmission. The path toward asset digitization we have started along will be of crucial importance in terms of collaborating with the articulation of these markets and reaching service quality objectives required for this new scenario, in which improved systematic performance in recent years must be reproduced and surpassed.

How do we manage this?

Transelec believes that service quality is determined by continuous power supply without interruptions to end customers. The reliability model is based on three elements: facility design, asset management and emergency response plans (see page 54).

These aspects are considered during the preliminary stage of conceptual project design and are fundamental requirements for basic engineering, by specifying highly demanding equipment and systems in accordance with international standards and national regulations. We also conduct a very thorough technical evaluation of bids from different suppliers when it comes to awarding supply and service contracts at Transelec.

In order to operate and achieve our desired quality levels, we have developed several initiatives involving the adjustment of operational processes in keeping with the new energy scenario. We therefore wish to control risk associated to asset conditions or substandard actions. We consequently formulated an ambitious operation digitization plan for asset management and operational process management by means of continuous monitoring. In addition, we implemented and determined new "operating status" indicators in the power transmission system, which could mean a possible reformulation of service quality and facility availability indices.

Cable theft

Cable theft is a crime that seriously compromises power transmission infrastructure, transmission and distribution in several regions throughout Chile. It is also one of the most important factors that compromise service quality for communities. We therefore participated in the 2017 creation of a working table to prevent copper cable theft in La Araucanía Region. The table is comprised of power companies, local authorities and police departments and is coordinated by the Regional Government. Tables of this kind are already operating in the regions of Biobío, Maule and O'Higgins and these also promote coordination between public and private stakeholders.

Organization and reporting

Our responsibility in terms of power transmission reliability, flexibility and sustainability is to the Vice-presidencies of Operations and Engineering & Construction, which in turn report to the General Manager.

Results in terms of these issues are reported internally by means of the Operations Committee. In addition, these are reported to SEC, the institution that supervises our compliance in terms of these issues. The Transelec Disconnections Committee is responsible for inspecting forced disconnections and determining outages that can be managed by the Company in order to improve performance and minimize occurrence. The committee is comprised of the Operations, Sales, Legal Affairs and Finance vice-presidencies, which meet on a monthly basis to discuss opportunities for improvement.

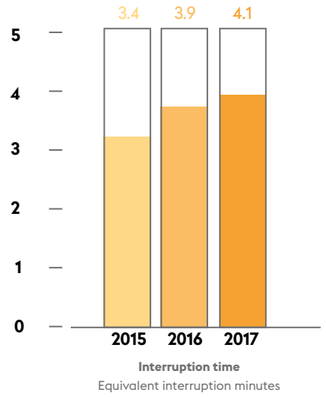
Monitoring and results

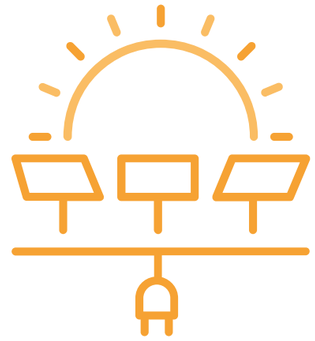
We have a service security measurement system, which is reflected in the EIT "Service Security Index" and encompasses overall power transmission performance. This indicator considers outages at Transelec facilities that can be attributed to our actions. Several improvement plans have been executed to keep these at low and stable levels. We wish to highlight the following: focus on end consumers, emergency management to improve response time to outages, mitigation works to ensure power supply continuity and to focus certain maintenance initiatives on critical points. Increased EIT in 2017 compared to 2016 is considered to be marginal. We have reported stable results that have been significantly low in recent years.

Moreover, in order to focus on service quality provided for end customers, we monitor the System Average Interruption Duration Index (SAIDI), which corresponds to average interruption time when end customers no longer receive electricity services, an indicator calculated by the Superintendence of Electricity and Fuel (SEC) in order to measure the performance and behavior of power supply interruptions in the three sectors of the Chilean power market (Generation, Transmission and Distribution). It is here that the power transmission sector contributes 3% in terms of total disconnection time for end customers.

In addition, the Disconnections Committee formulates an indicator known as the "disconnections rate", which relates the number of outages to the number of facilities.

Service quality and reliability figures





Flexibility for the transmission of clean energy

The irruption of renewable energy has changed the bases of Chile's power transmission system. This has migrated from large-scale production centers with ongoing power generation to atomized production generated intermittently. Chile has unlimited solar and wind energy resources, which it intends to make use of in order to reduce the carbon footprint of electrical energy generated, increasing our diversification and independence while cutting costs.

We are adjusting our facilities and promoting clean energy at Transelec, incorporating new designs, new lines and substations, which have enabled the company to improve its operational flexibility in order to increase the amount of renewable energy being injected into the system.

EMERGENCY PREPAREDNESS AND RESPONSE

Why is this important?

The geography of Chile poses risks for power transmission. This is exacerbated by the effects of climate change throughout the country, which have generated complex scenarios. We have witnessed more frequent intensive rainfall, mudslides, fires, blizzards and storm surges in recent years, among other events. In concrete terms, 2017 was marked by forest fires, floods and extreme winds. Three Transelec transmission lines were damaged by either fire, floods affecting power infrastructure throughout Chile's northern regions or by floods that damaged transmission lines in Santiago.

Regulatory context

Chilean power distribution standards were modified in 2017. These indicate in the event of an "abnormal situation" that a power distribution company is required to reconnect 80% of its customers without power within a maximum deadline of 12 hours. 100% of its customers must have electrical energy after 36 hours. In addition, the definition of "force majeure" was changed. This new regulatory context has occurred in a year that was specifically complicated in terms of service quality for power distribution companies (stemming from unusual weather conditions during the winter of 2017), which had a high public impact due to the number of customers affected.

How do we manage this?

Throughout its years of operation, Transelec has gained substantial preventive experience in order to face emergencies. We have an Operational Continuity Plan (OCP) that includes actions to be taken by each of the company's areas in the event of an emergency. The objective of this plan is to prevent and prepare appropriate and timely emergency response. Year after year we have been incorporating lessons learned from emergencies in the past, specifically from catastrophic forest fires in early 2017, which generated a series of lessons learned that we internalized in order to better respond to eventual emergencies (see highlighted section on page 55).

Organization and reporting

Those responsible for emergency preparedness and response report to the Vice-presidency of Operations, which in turn reports to Transelec's General Manager. We have a crisis committee presided by our General Manager and subrogated by the Vice-president of Operations in order to address emergency situations. Finally, the Disconnections Committee monitors outages attributable to Transelec in cases of emergency (see page 52).

Electricity risk training for fighting forest fires

We have executed different training sessions in central and southern Chile to educate different institutions regarding safety for forest firefighters in areas surrounding high-voltage transmission lines while ensuring power supply continuity. Transelec has hosted a total of eight electricity risk training workshops between the Metropolitan and Los Ríos regions for forest firefighters. This series of training sessions started in late 2016 and has brought together emergency brigade members from Conaf and forestry companies, fire departments, police officers and workers from different public agencies. We will continue to develop this initiative throughout 2018.

Coordination with other stakeholders

Emergencies require coordination between and response from several stakeholders and we therefore create spaces for dialogue or participate in existing spaces. One example is working tables coordinated by authorities and other public and private agencies, the Ministry of Economy Clean Production Council and companies belonging to the Power Companies Association AG (see highlighted section on page 57).

Monitoring and results

Audits and drills were conducted in order to evaluate emergency response capacity, together with reports about real emergency cases. Drills conducted by the National Center for Transmission Operations (CNOT)[15] were evaluated as outstanding. However, possible improvements for reducing response time have been proposed. In addition, we have a Disconnections Committee that supervises issues such as emergency disconnections and executes action plans in order to ensure that we are better prepared to respond to eventual emergencies in the future (see page 52).

[15] CNOT brings together all the regional control centers owned by Transelec throughout Chile, enabling safe and efficient 24-hour surveillance of its operations and maintaining a single, direct relationship with the National Electricity Coordinator (NEC).

THE LARGEST WILDFIRES IN THE HISTORY OF CHILE

Preventive emergency preparedness measures, coordination with important stakeholders and mitigation proposals were the most important lessons learned from the nearly 3,000 wildfires that affected several regions in the country (between Coquimbo Region in northern Chile and Los Lagos Region in southern Chile) at the start of 2017. The scope and range of the emergency meant that 14 people lost their lives as a direct or indirect consequence of the fire. Fire destroyed populated and rural areas, as well as nearly 600,000 hectares, 15,000 hectares of which were native forest.

Lessons learned from this catastrophe were harsh and painful, in that wildfires affected countless power transmission facilities. We consequently implemented a series of initiatives in terms of operational aspects, technological improvement, training and coordination in order to prevent and be prepared for emergencies, specifically at our facilities located in sensitive zones.

Based on this experience, we worked to improve risk control at our most exposed facilities and to analyze possible impacts in the event of a fire simultaneously affecting several transmission lines. In 2017 we designed a specific response procedure for forest fires and implemented several mechanisms to evaluate and mitigate the main risks associated to wildfires.

At an operational level, we doubled the number of emergency brigade members working in the field to control vegetation along safety strips in order to help landowners clear their land. We also hired forestry companies to help analyze preventive tasks for protecting forests along our transmission lines, thus preventing large-scale emergencies. We improved the land access protocol to ensure access and the clearing of vegetation along transmission lines. This was supported by a public communication campaign and direct communication with landowners (see page 80). Finally, we incorporated new technologies, such as the use of drones to ensure appropriate clearing of safety strips.

Emergencies must be addressed by multiple stakeholders and considering the importance of what happened, we decided that the second version of "Connecting Conversations cycle" would be hosted together with other public and private stakeholders who were in the emergency zone during wildfires (see highlighted section on page 57).

1 Source: The National Forestry Corporation (CONAF) Digital Information System for Controlling Operations (SIDCO).

CUSTOMER RELATIONS

Why is this important?

The business where we operate has two types of customers. Most of these are customers that need to connect to the trunk transmission system, which is regulated by the authority, while a lower number of customers require non-regulated transmission services, which are regulated by private contracts. Our regulated customers (78%) and non-regulated customers (22%) expect service quality and excellence, in which operational continuity and emergency response are highly valued (see pages 51 and 54). Our growth and diversification potential is greater with non-regulated customers. Understanding their needs enables us to add real value to their projects and businesses, because these users withdraw and/or inject power into transmission systems. These users are from different industries, such as mining, power generation and power distribution.

Forging and maintaining optimum relations with our customers is one of the Company's strategic pillars. We understand that providing a top-quality service creates a win-win relationship that we wish to create and maintain. We are leaders in the power transmission market and this means that we manage large-scale projects, something Transelec has done throughout its history, while providing the best solutions for each customer and adapting to new requirements of a constantly changing market.

We served 278 customers in 2017 and our power transmission services generated US$ 517.9 million in financial value, which was distributed between different economic system factors by means of distributed value (see page 17).

How do we manage this?

Customer service and customers' confidence in our know-how as system specialists are the foundation for forging close relations with them and with the power transmission business, which operates in accordance with international standards. Transelec was ISO 9001 recertified in 2017 to ensure service quality. In addition, we work to develop improved quality control mechanisms for service compliance, specifically for operation and maintenance, and develop internal platforms to improve our customer service.

In addition, we started using Customer Relationship Management (CRM) platforms for the Company's business operations in order to provide specific tracking of our customer interactions.

Dialogue with customers

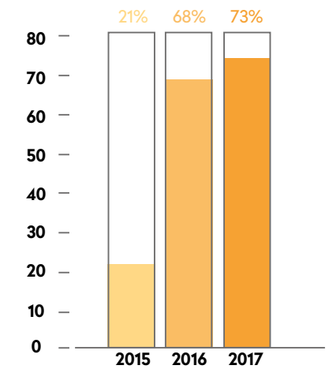
We take concern to create direct dialogue by means of working meetings with our main customers. The objective of these meetings is to revise projects in our portfolio and to create possible initiatives for future collaboration. In addition, we work closely with union associations, consultants and stakeholders in order to hear their opinions regarding technical and regulatory aspects of the power industry. Beyond a relationship based on technical issues, we take concern to provide an integral service.

Following suit with what was done in 2016, in 2017 we hosted "Connecting Conversations" seminars throughout the country in order to address key issues that will further our path to development. Our customers were invited to these seminars in order to discuss aspects of mutual interest. The 2017 issue was Emergency Resilience (see page 57).

Monitoring and results

Customer satisfaction is measured by a corporate reputation survey conducted once every two years. We also conduct an annual satisfaction level evaluation for our connection service provided for users connecting to Transelec facilities. Transelec and its users jointly develop an exhaustive system connection process. We have seen vast improvement with these results compared to when we first applied this measurement thanks to customer-focused management. In fact, the satisfaction indicator came to 73% in 2017, up 5% compared to 2016. This increase stemmed from a larger percentage of those surveyed indicating that they were "very satisfied" with the connection process support experience (5 on a scale of 1 to 5).

Service quality figures



Customer Satisfaction
Percentage, measured as connection customers

The Connecting Conversations Cycle

Resilience to natural disasters

The second "Connecting Conversations" cycle was hosted in conjunction with Qué Pasa magazine in the cities of Talca and Concepción. This time the seminars addressed the issues of resilience to natural disasters based on the following questions: How do we prepare? How do we react? and How do we recover?

We aim to "contribute to the development of Chile by means of conversations promoting broad-minded debate", as declared during the opening session by Transelec General Manager Andrés Kuhlmann. We consequently invited different authorities, specialists and civil society who were active protagonists in the emergency caused by wildfires in 2017 to participate in the discussion. The speakers agreed that we need to improve coordination between different institutions, empower civil society solidarity and corporate availability to meet requests made by authorities in situations of this nature, while training the community to respond to contingencies and reconstruction.

The speakers at the workshop in Talca were General Javier Iturriaga, Chief of Chilean Army Operations; Nicolás Birrell, executive director of Desafío Levantemos Chile; and Rodrigo Sepúlveda from the Maule Regional Ministerial Secretariat of Housing and Development. In turn, the panel for the workshop in Concepción was chaired by Rear Admiral Marcelo Gómez, Commander in Chief of the 2nd Naval Zone; Álvaro Miguieles, Governor of Ñuble; Roberto Izikzon, Cadem Public Affairs and Communications Manager; as well as Nicolás Birrell from Desafío Levantemos Chile.

Those in attendance at the seminars in Talca and Concepción amounted to a total of nearly 500 persons, highlighting the attendance of local authorities from the energy sector and other related agencies, as well as academic authorities, workers and executives employed by companies from these zones and from Transelec, members of organizations that responded to the emergencies, the media and members of the Armed Forces.