

**LINCE INGENIERÍA**

WORKING WITH ENERGY  
SINCE 1994



LINCE INGENIERIA S.A.S. IS A 100% COLOMBIAN COMPANY THAT PROVIDES ELECTRICAL AND MECHANICAL ENGINEERING SERVICES IN DESIGN, ASSEMBLY, MAINTENANCE, MODERNIZATION, TECHNICAL ASSISTANCE, AND COMMISSIONING PROJECTS FOR THE ENERGY AND INDUSTRIAL SECTOR, INSIDE AND OUTSIDE COLOMBIA

**WE ARE LEADERS IN SOLUTIONS FOR THE ENERGY SECTOR!**

**ENGINEERING**

**ASSEMBLY AND MAINTENANCE**

**CONSULTANCY**

**TECHNICAL ASSISTANCE**

**ENGINEERING AND CONSTRUCTION SUPERVISION**

Contact us at: +57 310 680 6312  
[www.linceingenieria.com.co](http://www.linceingenieria.com.co) | [info@linceingenieria.com.co](mailto:info@linceingenieria.com.co)

# SERVICES

LINCE INGENIERÍA S.A.S. offers a broad portfolio of high-quality services, based on technical knowledge, experience in the sector and logistical support for the proper execution of all our projects.

## ENGINEERING

Engineering and design services that follow national and international technical regulations and applicable quality standards, in accordance with the needs of the clients. During the execution of the projects, the preliminary, basic and detailed design phases are developed in the following areas:

- Design of electrical installations.
- Design of electrical networks.
- Design of BT, MT and AT substations.
- Design of photovoltaic solar and wind farms.
- Study of protection coordination.
- Insulation coordination study.
- Electrical system loadability study.
- Shielding study.
- Grounding system study.
- Short circuit study.

## ASSEMBLY AND MAINTENANCE

Engineering and design services that follow national and international technical regulations and applicable quality standards, in accordance with the needs of the clients. During the execution of the projects, the preliminary, basic and detailed design phases are developed in the following areas:

- Turbines and generators in hydroelectric and thermoelectric plants.
- AIS and GIS type electrical substations in Medium Voltage (MV), High Voltage (AT) and Extra High Voltage (EAT).
- Loading pipes and valves in hydroelectric plants.
- Isolated phase ducts in generation plants.
- Instrumentation, control and protection systems.
- Low and medium voltage power grids
- AC and DC auxiliary service systems
- Battery banks and inverters
- Motors and pumps
- Grounding system
- Shielding systems
- Civil works and electromechanical assembly of solar parks





# TECHNICAL ASSISTANCE

At LINCE INGENIERÍA S.A.S., we understand the importance of having reliable and efficient technical support. Our Technical Assistance service is designed to provide fast and effective solutions to technical problems that may arise in energy systems. We offer:

## a. Diagnosis and Troubleshooting

Our specialized engineers perform accurate diagnostics to identify and solve technical problems in power generation and transmission systems, minimizing downtime.

## d. Systems Update and Optimization

We offer upgrade and optimization services to improve the performance and efficiency of existing systems, incorporating the latest technologies and industry practices.

## b. Remote Technical Support

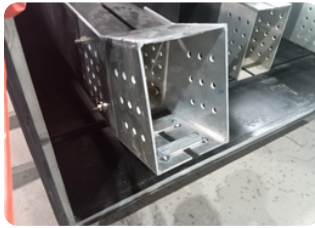
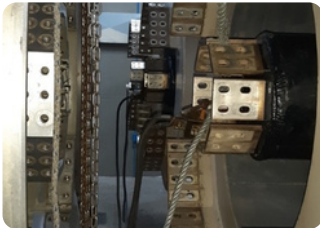
We provide remote technical assistance to resolve urgent issues and offer real-time guidance, ensuring that operations continue without interruption.

## e. Technical Training

We provide specialized technical training to your staff, ensuring that they have the necessary knowledge to operate and maintain your energy systems effectively. With our Technical Assistance service, LINCE INGENIERÍA S.A.S. is committed to providing the necessary support to ensure that your energy operations are reliable, efficient and sustainable.

## c. Preventive Maintenance

We implement customized preventive maintenance programs to ensure the optimal operation and longevity of your equipment and energy systems.



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# CONSULTANCY

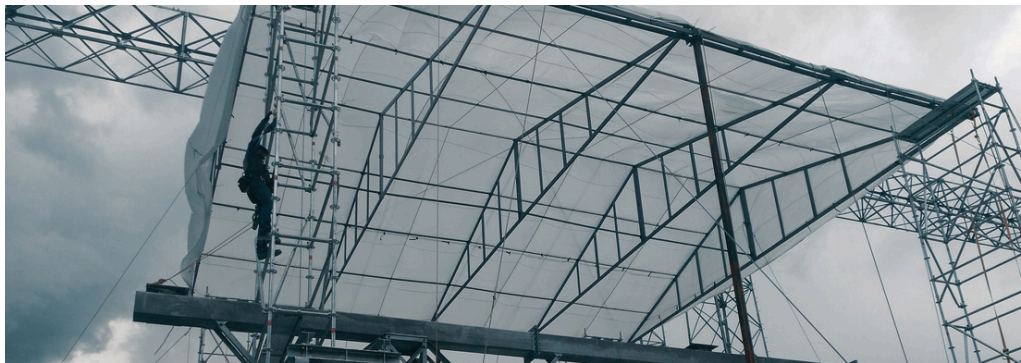
Consulting and advisory services for the development of engineering projects, in the estimation of budgets and selection of equipment for the modernization, rehabilitation and repowering of hydroelectric plants and electrical substations, as well as the assembly and start-up of solar and wind farms.

LINCE INGENIERÍA S.A.S. offers supervision services during the design and construction stage of electrical projects in the industrial, residential and commercial sectors.

## ENGINEERING AND CONSTRUCTION SUPERVISION

Supervision services in the engineering review and supervision of civil construction assemblies and electromechanical assemblies for power generation plants.

- Hydraulic
- Thermal
- Solar



LINCE INGENIERÍA S.A.S. carries out its activities based on the quality standards established by national and international regulations and on the procedures developed by equipment manufacturers:

- RETIE, IEEE, IEC for the electrical and electronic area
- ASME, ASTM, ANSI, AWS, NACE, SSPC for the mechanical area

## PARTNERS



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# EXPERIENCE

## ASEA BROWN BOVERI ABB (HITACHI ENERGY)

### **SAN CARLOS HYDROELECTRIC POWER PLANT:**

Dismantling and modernization of the switches of eight (8) 155 MW generating units.  
San Carlos, Antioquia, Colombia, 2017-2019.

### **GIS ANTIOQUIA 500 kV SUBSTATION:**

Installation of the substation consisting of two diameters for four line outputs.  
Ituango, Antioquia, Colombia, 2018.

### **CENTRAL TERMOFLORES:**

Technical assistance, bushing failure correction.  
SE Termoflores, Barranquilla, Colombia, 2019.

### **DARÍO VALENCIA SAMPER HYDROELECTRIC POWER PLANT:**

Disassembly and assembly of a 115 kV ABB power switch, LTB type, with BLK 222 operating mechanism.  
Mesitas del Colegio, Cundinamarca, Colombia, 2019.

### **SALTO I HYDROELECTRIC POWER PLANT:**

Disassembly and assembly of two 115 kV ABB LTB type power switches with BLK 222 operating mechanism.

### **TEBSA GENERATION PLANT:**

Overhaul and retrofit maintenance of GCBs generation switches.  
Atlántico, Colombia, 2021.

### **RÍO CÓRDOBA 220 kV SUBSTATION:**

Connection and disconnection service of PASS-type module.  
Atlántico, Colombia, 2021.

## ELECTROTECNIA DE URUMEA EUSKABEA

### **OXEC II HYDROELECTRIC POWER PLANT:**

Supervision of electrical assembly of the power plant, consisting of three (3) 23 MVA horizontal axis Kaplan type units.  
Guatemala, 2018.

### **TACOTAN AND TRIGOMIL HYDROELECTRIC POWER PLANTS:**

Supervision of electrical assembly of the power plants, composed of two (2) 3.5 MVA horizontal axis Francis type units.  
México, 2016/2017.

### **SIGCHOS HYDROELECTRIC POWER PLANT:**

Supervision of electrical assembly and commissioning of the power plant, consisting of three (3) 6.28 MVA horizontal axis Pelton type units.  
Sigchos, Cotopaxi, Ecuador, 2017.

### **ESCUELA DE MINAS HYDROELECTRIC POWER PLANT:**

Supervision of electrical installations and support in the start-up of electrical systems and auxiliary services.  
El Peñol, Antioquia, Colombia, 2019.

### **CALHETA III HYDROELECTRIC POWER PLANT:**

Technical assistance for the start-up of the excitation systems of the generating units.  
Madeira, Portugal, 2019.

### **KASHIMBILA HYDROELECTRIC POWER PLANT:**

Commissioning of the excitation system of the Kashimbila hydroelectric power station.  
Nigeria, 2020.



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## VOITH HYDRO

### **Escuela de Minas Hydroelectric Power Plant**

Electrical installations and support for the start-up (PEM) of the electrical systems and auxiliary services of the collection house, substation and plaza, access tunnel, transformer cavern, machine cavern.

El Peñol, Antioquia, Colombia, 2019.

## ANDRITZ HYDRO

### **Providencia III Hydroelectric Power Plant**

Specialized technical engineering advice for the evaluation of the state of the equipment, identification of improvements and recommendations for the Operation and Maintenance (O&M) of the plant.

Liberia, Anorí, Antioquia, Colombia, 2018.

## SIEMENS

### **La Tasajera Hydroelectric Power Plant**

Design, supply and technical assistance in the installation of the medium voltage segregated busbar, ensuring compliance with the technical operating conditions at 13.8 kV. The staff was supervised and advised during all stages of the assembly, ensuring a safe and efficient installation.

Barbosa, Antioquia, Colombia, 2024.

## GAMESA ELECTRICS

### **El Encanto Hydroelectric Power Plant**

Technical assistance for the assembly and placement at the operating site of two 6667 KVA generators at the CFE-owned power plant. The parts were assembled, mounted at the operating site, and assistance was provided for the start-up tests of the generating units and synchronization with the grid.

Veracruz, Mexico, 2024.

### **Minas Hydroelectric Power Plant**

Technical assistance for the disassembly, transfer to the assembly site, assembly and placement at the operating site of three 6667 KVA generators at the CFE-owned power plant. The generators were disassembled at a different power plant, the parts were transferred to the Minas power plant, the parts were assembled, the assembly at the operating site, assistance for the start-up tests of the generating units and synchronization with the grid.

Veracruz, Mexico, 2024.

## AFRY (PÖYRY)

### **Central Hidroeléctrica Providencia III:**

Asesoría técnica especializada en ingeniería para la evaluación del estado de los equipos, identificación de mejoras y recomendaciones para la Operación y Mantenimiento (O&M) de la central.

Liberia, Anorí, Antioquia, Colombia, 2018

## INGETEA INDAR

### **Central Hidroeléctrica Misicuni**

Asesoría técnica especializada en ingeniería para la ejecución de pruebas y validación del modelo matemático del sistema de excitación y control de las unidades 2 y 3.

Cochabamba, Bolivia, 2018

## GAMESA ELECTRICS

### **Doña Julia Hydroelectric Power Plant**

Technical assistance in the assembly and start-up of two 13,000 kVA synchronous generators at the Coopesca-owned power plant. The generators were assembled, aligned with respect to the turbine, and assistance was provided for the start-up tests of the generating unit and synchronization with the grid.

Horquetas, Costa Rica, 2024.

### **Portezuelos II Hydroelectric Power Plant**

Technical assistance for the start-up of 1350 kW synchronous generators at the CFE-owned power plant. Assistance was provided for the start-up tests of the generating units and synchronization with the grid.

Puebla, Mexico, 2024.

### **Central Hidroeléctrica Portezuelos I**

Asistencia técnica en el montaje y puesta en marcha de dos generadores sincrónicos de 1350 kW en la central de propiedad de CFE. Se realizó el desensamblaje de los generadores, ubicación en el sitio de montaje y ensamble de las partes, montaje y alineación con respecto a la turbina, asistencia para las pruebas de puesta en marcha de las unidades generadoras y sincronización con la red.

Puebla, México, 2024.

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for more information  
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# PHOTOVOLTAIC PROJECTS

## TERMOTASAJERO DOS SOLAR PARK (5.2 MWp)

San Cayetano, Norte de Santander, 2022-2023

Civil, mechanical and electrical construction, Operation and Maintenance (O&M) of a photovoltaic solar plant with an installed capacity of 5.2 MWp (4.0 MWn).

Installation of 9,600 Jinko 545 Wp solar panels, supported on a fixed Gonvarri 3PVx32 structure driven into the ground by means of a concrete footing system, and connected through Huawei 215 kVA 800 Vac inverters. The energy is exported to the distribution network through a 34.5 kV underground line that connects to the Guaduas substation, owned by the CENS Network Operator.

termotasajero  
colgener

## La Loma Solar Park (187.4 MWp)

La Loma, Cesar, 2021-2022

Electrical construction of two (2) subfields, covering the serialization of 460 Wp Jinko panels, laying of BT (CC) solar cable, connection in string boxes and laying of BT (CC) wiring to the Transformation Center (CT), with their respective quality parameters in terms of procedures and release tests.

Additionally, the scope of the works included the laying of 34.5 kV MT (AC) wiring between the different Transformation Centers and the substation, as well as the construction of the corresponding terminals and joints.

Soltec enel  
Green Power

## SOLAR PARK BOSQUES LLANOS I, II AND III

Puerto Gaitán, Meta - 2020

Erection of the Grounding System (SPT) and Medium Voltage (MV) cabling of the three solar generation plants. The company Trina Solar, specialized in integral solutions for solar energy, in partnership with Aldesa, LINCE INGENIERÍA SAS, carried out the construction of the first project financed by the Colombian government. In each phase, approximately 27.2 MW of renewable solar energy were delivered to the National Interconnected System.

aldesa Trinasolar



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# ACTIVITIES CARRIED OUT IN PHOTOVOLTAIC PROJECTS

1. Laying, connection and installation of conductors for XLPE solar systems up to 1000 kmil.
2. Laying, installation of copper cable and solderable connections for physical earth systems.
3. Laying and installation of Medium Voltage (MV) cabling - 34.5 kV.
4. Installation of pre-molded terminals for MV systems - 34.5 kV.
5. Installation, fixing and connection of Transformer Centres (CT) for solar systems.
6. Serialisation of solar panels and connections of solar cabling to string boxes.
7. Excavation and filling in low and medium voltage trenches, civil works for solar systems.
8. Installation of cold splices for conductors up to 1250 kmil for voltage level of 34.5 kV.
9. Quality assurance tests: insulation, VLF, partial discharges, step and contact voltage, thermography and IV curves.
10. Installation and connection of communication systems - Optical Fiber (FO).



Contact us for more  
information about our  
capabilities in photovoltaic  
projects



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# SUBSTATION PROJECTS

Throughout its history in the sector, LINCE INGENIERÍA SAS has provided engineering, assembly, maintenance and technical assistance services in Medium and High Voltage substations. Our main objective is to provide specialized support in all phases of the project, from initial planning to start-up, always focused on offering the best quality and ensuring the satisfaction of our clients.

Below, we detail some of the most outstanding projects carried out by LINCE INGENIERÍA SAS in the complete assembly of electrical substations and associated activities:

- Assembly of gantry structures
- Assembly of equipment support structures
- Secondary concrete
- Assembly of High Voltage (HV) equipment
- Supply and assembly of High Voltage (HV) connections, connectors and guard cable
- Assembly of secondary systems
- Complementary works
- Testing and Commissioning (PEM). Assembly of equipment in outdoor plaza
- 110 kV step-up substation
- Control building - Cooling system
- Assembly of collection equipment
- Assembly of equipment in machine house
- Medium Voltage (MV) cells

## GIS ANTIOQUIA 500 kV SUBSTATION AND GIS PORCE III 500 kV SUBSTATION

- Assembly of gantry structures
- Assembly of equipment support structures
- Secondary concrete
- Assembly of high voltage equipment
- Supply and assembly of high voltage connections, connectors and guard cable
- Assembly of secondary systems
- Complementary works
- Testing and commissioning

## 115 KV MINING SCHOOL HYDROELECTRIC POWER PLANT

- Assembly of equipment in outdoor plaza
- 110 kV lifting substations
- Control building
- Cooling system
- Assembly of collection equipment
- Assembly of equipment in machine room
- Turbine floor
- Generator floor at machine foot
- Medium Voltage cells
- Assembly of equipment in transformer cavern
- Cable laying in access tunnel

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# LINCE INGENIERÍA

## OUR CLIENTS AND PARTNERS



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