References by activity

Electricity

References by activity

Electricity distribution

elecnor

ELECTRICITY DISTRIBUTION

CLIME INNOVATION AND ENERGY EFFICIENCY PROJECT

LOCATION ▸ Castilla-La Mancha (Spain)

CUSTOMER ▸ FEMP-CLM (Federación de Municipios y Provincias de Castilla-La Mancha-Federation of municipalities and provinces in Castilla-La Mancha)

PROJECT SCOPE ▸

Improvement of lighting in 58 municipalities of this Autonomous Community with the change to LED technology.

AMOUNT ▸ EUR 127.6 million

START DATE ▸ March 2019

FINISH DATE ▸ March 2029

CHARACTERISTICS:

- To be implemented in 58 municipalities
- Renovation of energy facilities:
  - ✓ Savings of 82.36% on public lighting
  - ✓ Savings of 61.79% on interior building lighting
  - ✓ Savings of 10.21% on heating and air conditioning
- Maintenance
  - ✓ 83,398 lights
  - ✓ 1,250 street lighting control centres
  - ✓ 983 buildings

SPAIN

Castilla-La Mancha

ELECTRICITY DISTRIBUTION

CLIME INNOVATION AND ENERGY EFFICIENCY PROJECT

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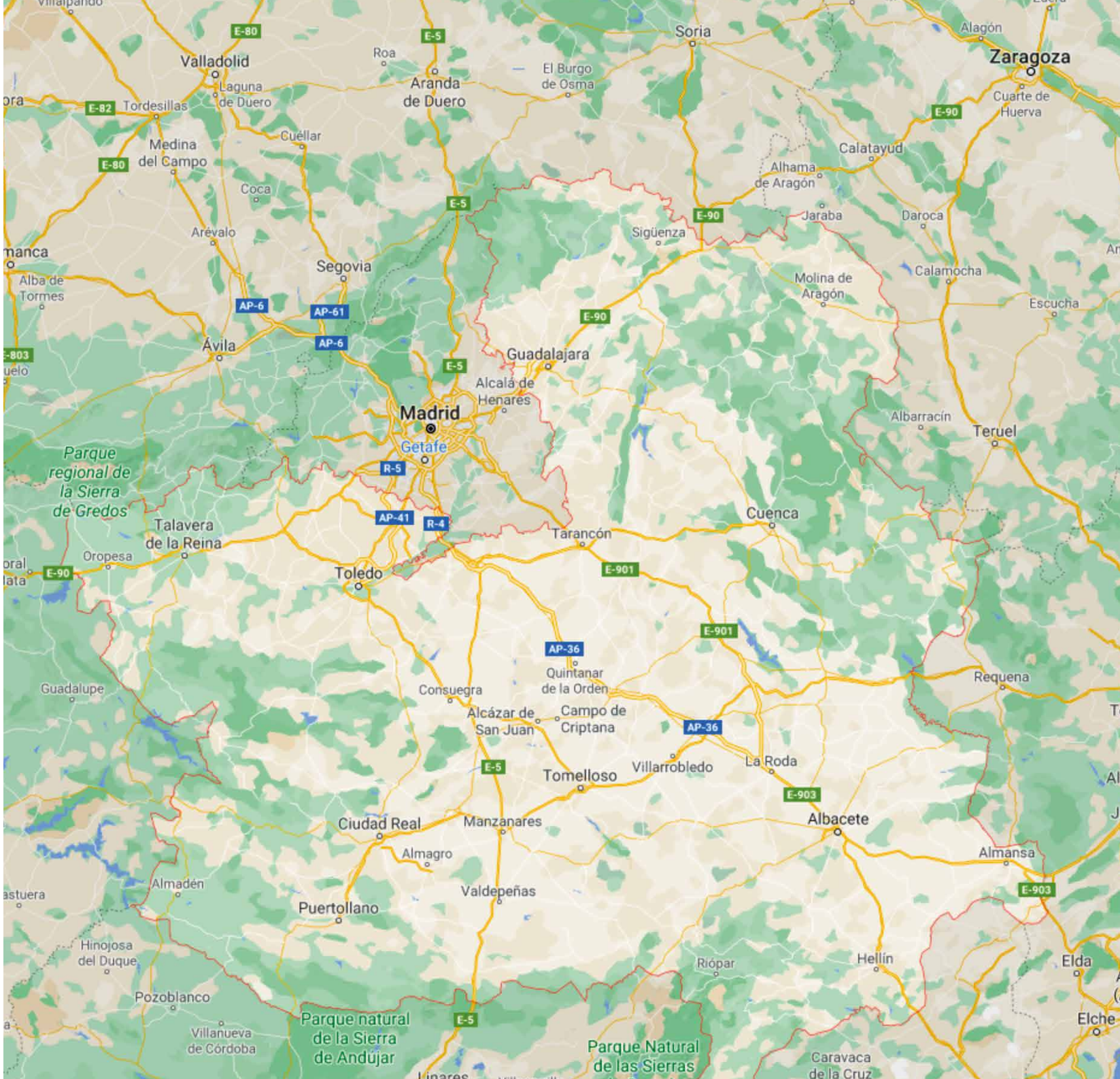

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ELECTRICITY DISTRIBUTION

ENDESA FRAMEWORK AGREEMENT

LOCATION ▸ Autonomous communities of Catalonia, Andalusia, Balearic Islands, Extremadura and the Canary Islands (Spain)

CUSTOMER ▸ Endesa

PROJECT SCOPE:

Construction and maintenance of electricity distribution network, live working, substations and high-voltage networks for Endesa in Spain

ANNUAL AMOUNT ▸ EUR 35 million

START DATE ▸ december 2003

FINISH DATE ▸ december 2006

CHARACTERISTICS:

- MV-LV electricity distribution networks
  - ✓ Maintenance and repair of transformer units and networks
  - ✓ Work on new projects
- Live working and services
  - ✓ MV work on distribution networks
- Substations
  - ✓ Surveys, calculations, preliminary designs, designs, certification and detailed engineering
  - ✓ Permit management
  - ✓ Construction, assembly work, testing, commissioning, maintenance and system failures
- High-voltage networks
  - ✓ Engineering work and preliminary arrangements
  - ✓ Construction, assembly work, testing, commissioning, maintenance and system failures

SPAIN

Autonomous communities of Catalonia, Andalusia, Balearic Islands, Extremadura and the Canary Islands (Spain)

ELECTRICITY DISTRIBUTION

ENDESA FRAMEWORK AGREEMENT

elecnor

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ELECTRICITY DISTRIBUTION

ENERGY SERVICE COMPANY STREET LIGHTING SANTANDER

LOCATION ▸ Cantabria (Spain)

CUSTOMER ▸ Santander City Council

PROJECT SCOPE ▸
Provision P1 Energy Management; Provision P2 Maintenance; Provision P3 Full warranty; Provision P4 Improvement and renovation work of street and decorative lighting aimed at energy saving and regulatory compliance.

AMOUNT ▸ P2+P3: EUR 738,558.96/year

START DATE ▸ P2, P3 and P4 November 2016; P1 January 2019

FINISH DATE ▸ P4 October 2018; P1 December 2033; P2 and P3 December 2029

CHARACTERISTICS:

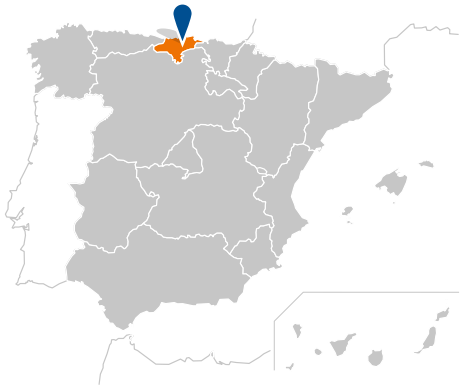
- Replacement of 22,500 SAP lighting points with led
- Installation of communication nodes for the remote management of 21,000 lighting points
- Replacement of 98 street lighting control panels
- Partial renewal of 88 control panels
- Installation of remote management on 309 street lighting panels
- Installation of 309 electrical surge protectors on control panels
- Arrangement of decorative lighting for Santander cathedral
- Arrangement of the decorative lighting of the Santander City Council façade, including musical show
- Arrangement of the decorative lighting in Plaza Porticada
- Improvement of the street lighting earthing network
- Installation and renewal of adapters from lanterns to lighting columns and auxiliary parts
- Processing and legalisation of 309 control panels
- Guaranteed energy saving P1 79.8843%
- Maintenance (P2) and full warranty (P3) of Santander City Council's complete street lighting infrastructure, including decorative Christmas lights and the provision and management of the provisional electrical service for the festive season (cultural and sports events, temporary supply etc.)

SPAIN

Cantabria (Spain)

ELECTRICITY DISTRIBUTION

ENERGY SERVICE COMPANY STREET LIGHTING



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ELECTRICITY DISTRIBUTION

GNF FRAMEWORK AGREEMENT

LOCATION ▸ Autonomous communities of Madrid, Castilla-La Mancha and Galicia (Spain)

CUSTOMER ▸ Gas Natural Fenosa (GNF)

PROJECT SCOPE:

Construction and maintenance of installations and live working for Gas Natural Fenosa in Spain

ANNUAL AMOUNT ▸ EUR 11 million

CHARACTERISTICS:

- Assembly and installation of connections
- New supply consignments or extensions to existing consignments
- Review of facilities
- Installation/replacement of energy control devices
- Modifications to the network
- Development work
- Remote control units
- Preventive and corrective maintenance
- Live working on medium-voltage network, local operation

SPAIN

Autonomous communities of Madrid, Castilla-La Mancha and Galicia (Spain)

ELECTRICITY DISTRIBUTION

GNF FRAMEWORK AGREEMENT

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ELECTRICITY DISTRIBUTION

IBERDROLA FRAMEWORK AGREEMENT

LOCATION ▸ Autonomous communities of Madrid, Castilla y León, Basque Country, Valencia, La Rioja and Murcia (Spain)

CUSTOMER ▸ Iberdrola

PROJECT SCOPE:

Construction and maintenance of electricity distribution network and high-voltage power lines for Iberdrola in Spain

ANNUAL AMOUNT ▸ EUR 31 million

CHARACTERISTICS:

- Construction and maintenance of electricity distribution up to 66 kV
- Installation of equipment at transformer units ("Star" project)
- Installation of cutout devices in area lines ("Star" project)
- Maintenance of automated, remote-control and/or supervised facilities
- Construction and maintenance of ultra-high voltage power lines

SPAIN

Autonomous communities of Madrid, Castilla y León, Basque Country, Valencia, La Rioja and Murcia (Spain)

ELECTRICITY DISTRIBUTION

IBERDROLA FRAMEWORK AGREEMENT

elecnor

elecnor

ELECTRICITY DISTRIBUTION

LIGHTING FOR THE PUENTE ROMANO IN MÉRIDA

LOCATION ▸ Mérida, Badajoz (Spain)

CUSTOMER ▸ Mérida City Council

PROJECT SCOPE ▸

Improvement of the current night lighting through installation of low-power LED projectors with optics strong enough to cover the entire desired surface area. The Puente Romano in Mérida is considered the longest surviving bridge from ancient times. Spanning the Guadiana River, it is 790 metres long and is supported by more than 60 arches.

AMOUNT ▸ EUR 142,469

START DATE ▸ September 2019

FINISH DATE ▸ November 2019

CHARACTERISTICS:

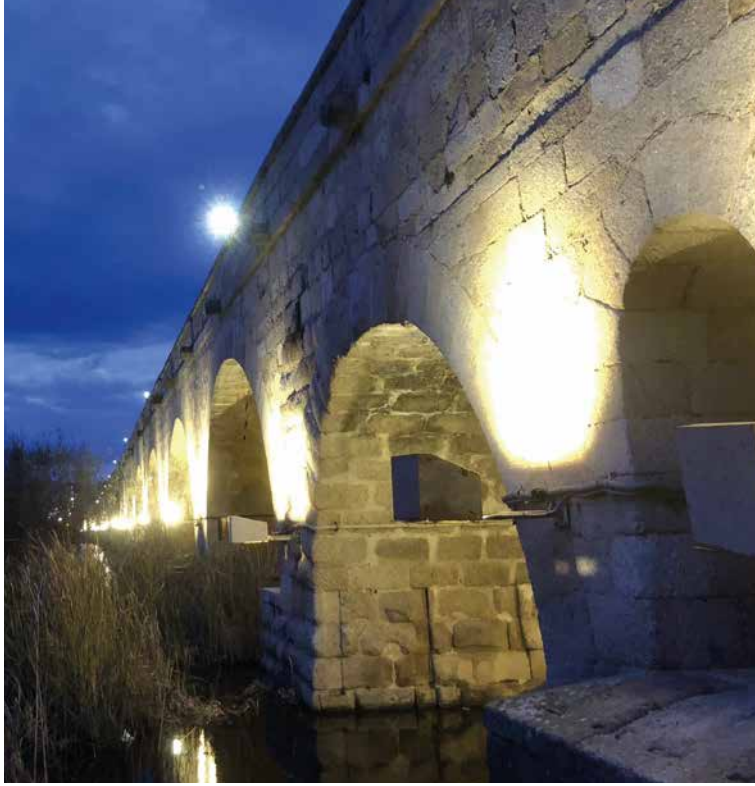
- Improved installation design
  - Smaller projectors
  - Adapted to the wet conditions
  - IP68 waterproof rating for the joints and optical blocks, and IP66 for the floodlights
- Improved light quality
  - 2,800–3,000 K projectors (warm white)
  - CRI of more than 80, with much higher light quality than current lighting
- Reduced consumption
  - Much lower installed power
  - Energy savings of 55%

SPAIN

Mérida, Badajoz

ELECTRICITY DISTRIBUTION

LIGHTING FOR THE PUENTE ROMANO IN MÉRIDA



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ELECTRICITY DISTRIBUTION

GABELA MV-LV

LOCATION ▸ Gabela. Kwanza Sul province (Angola)

CUSTOMER ▸ Empresa Nacional de Electricidade (ENE)

PROJECT SCOPE:

Refurbishment and extension of Gabela's low and medium-voltage networks

AMOUNT ▸ EUR 40 million

START DATE ▸ may 2009

FINISH DATE ▸ september 2010

CHARACTERISTICS:

- 50 km of 30 kV overhead power lines
- 5 km of 30 kV underground power lines
- 70 km of LV overhead power lines
- 70 km of overhead lighting lines
- 10 km of underground LV power lines
- 15 transformer units, 30/0.4 kV 630 KVA
- 2 transformer units, 30/0.4 kV 250 KVA
- 1 transformer unit, 30/0.4 kV 200 KVA
- 1 transformer unit, 30/0.4 kV 200 KVA
- 1 transformer unit, 30/0.4 kV 1500 KVA
- 16 AEREO transformer units, 30/0.4 kV 250 KVA
- 1,500 household connections with single-phase meter
- 50 household connections with three-phase meter
- 79 km of 30 kV power lines connecting Porto Amboim and Rio Longa

AFRICA

Gabela. Kwanza Sul province (Angola)

ELECTRICITY DISTRIBUTION

GABELA MV-LV

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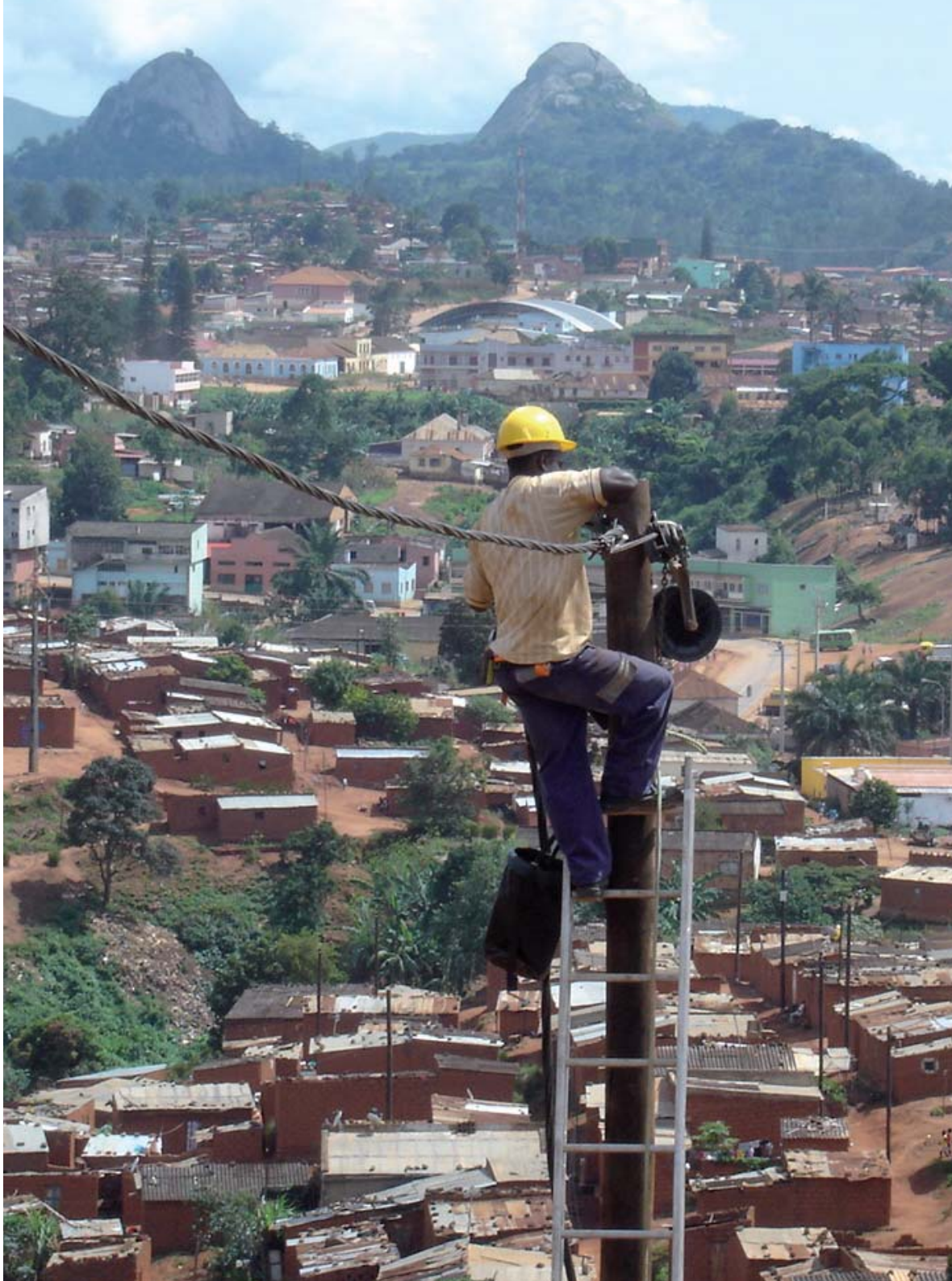

elecnor

ELECTRICITY DISTRIBUTION

LOBITO-BENGUELA MV-LV

LOCATION ▸ Benguela province (Angola)

CUSTOMER ▸ Empresa Nacional de Electricidade (ENE)

PROJECT SCOPE:

Reinforcement and extension of MV and LV electricity distribution and public lighting network for Lobito and Benguela

AMOUNT ▸ EUR 14 million

START DATE ▸ october 2007

FINISH DATE ▸ december 2008

CHARACTERISTICS:

- 40 km of 30 kV overhead power lines
- 110 km of LV overhead power lines
- 110 km of overhead public lighting lines
- 30 Monobloco transformer stations, 30/0.4 kV 630 KVA
- 2 civil engineering transformer stations, 30/0.4 kV 250 KVA

AFRICA

Benguela province (Angola)

ELECTRICITY DISTRIBUTION

LOBITO-BENGUELA MV-LV

elecnor

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ELECTRICITY DISTRIBUTION

DISTRIBUTION NETWORK STO. DOMINGO

LOCATION ▸ La Vega and Santo Domingo provinces (Dominican Republic)

CUSTOMER ▸ Corporación Dominicana Empresas Eléctricas Estatales (CDEEE)

PROJECT SCOPE:

Refurbishment of electricity distribution networks in a number of towns and districts in the provinces of La Vega and Santo Domingo Este

AMOUNT ▸ EUR 30 million

START DATE ▸ march 2011

FINISH DATE ▸ august 2013

CHARACTERISTICS:

- Santo Domingo Este:
  - Los Mina Viejo, Los Mina Centro, Felicidad, La Milagrosa, Respaldo Alma Rosa, Villa Faro and Alma Rosa II

- La Vega:
  - Villa Francisca 1 and 2, Los Multi (San Miguel), La Primavera, Doña Merin, Don Fausto, El Hatico, La Lotería, Fundación Panal, Ana Magalis and Altos de Hatico, Estancia, Los Multis, La Lotería, Las Carmelitas, part of the city centre, La Cigua, Guarionex, Barrio X, Santo Domingo Sabio, Los Robles 1, Don Bosco, Arboleda 1,2,3 and 4 Gamundi, La Enramada, Villa Margarita, Los Robles II, El Vedado, La Arboleda II, Urb. El Paraiso, Ens. Duarte, Brache and Villa Rosa

CENTRAL AMERICA

La Vega and Santo Domingo provinces (Dominican Republic)

ELECTRICITY DISTRIBUTION

DISTRIBUTION NETWORK STO. DOMINGO

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elecnor

ELECTRICITY DISTRIBUTION

STONY BROOK UNIVERSITY

LOCATION ▸ Long Island, New York (United States)

CUSTOMER ▸ Stony Brook University

PROJECT SCOPE:

Electricity distribution network to interconnect transformer units at Stony Brook University

AMOUNT ▸ EUR 12 million

START DATE ▸ june 2014

FINISH DATE ▸ may 2017

CHARACTERISTICS:

- 15 kV distribution line, 38 km
- 0.6 kV distribution line, 27 km
- 4 km of 6" steel piping galleries
- 670 connections
- 5 km of trenches for distribution piping

NORTH AMERICA

Long Island, New York (United States)

ELECTRICITY DISTRIBUTION

STONY BROOK UNIVERSITY

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References by activity

Electricity transmission

elecnor

ELECTRICITY TRANSMISSION

BARAJAS TL

LOCATION ▸ Madrid (Spain)

CUSTOMER ▸ Red Eléctrica de España (REE)

PROJECT SCOPE:

Burial and modification of dual-circuit 400 kV transmission line, San Sebastián de los Reyes-Loeches-Morata. Underground modification between supports 65/66 and 95/96 at Madrid's Barajas airport

AMOUNT ▸ EUR 38 million (ENO 50%)

START DATE ▸ september 2002

FINISH DATE ▸ march 2004

CHARACTERISTICS:

- Prefab gallery, length 12,386 m, width 2 m, height 2.25 m; 103 m tunnel, width 2.50 m, jacking in prefab parts, and a 213 m tunnel, width 2 m, with 2.25 m of masonry, using mining procedure. 26 bilge points and 3,680 m of 130 mm PVC drainage piping.
- 6 XLPE 2,500 mm^2 400 kV copper insulation conductors, total length 76,500 m.
- Medium-voltage ring with 79,900 m of Al 12/20kV 1x150, connecting five 250 KVA transformer units and two 160 KVA units and a switching and measurement unit: a generator with the same power output was fitted to each unit.
- Forced ventilation system with 15 x 38.3 Kw fans at 5 delivery points; 1,079 x 2x55 W lighting units; 213 emergency lighting units; CCTV and anti-intruder system; remote control and data communication system, wireless telephone system; fire detection system with 858 multi-criteria neural detectors and 5 modules.
- Disassembly of 400 kV DC duplex overhead power line, length 12,200 m with 30 supports

SPAIN

Madrid (Spain)

ELECTRICITY TRANSMISSION

BARAJAS TL

elecnor

elecnor

ELECTRICITY TRANSMISSION

FACINAS AND PUERTO DE LA CRUZ SS

LOCATION ▸ Facinas and Tarifa. Cádiz (Spain)

CUSTOMER ▸ Asociación Eólica Tarifa

PROJECT SCOPE:

Engineering, supply, civil engineering, assembly, testing and start-up of the Facinas and Puerto de la Cruz substations

AMOUNT ▸ EUR 18 million

START DATE ▸ may 2003

FINISH DATE ▸ june 2004

CHARACTERISTICS:

- Facinas substation - 20/66/220 kV, 390 MVA
- Puerto de la Cruz substation - 220/400 kV, 390 MVA

SPAIN

Facinas and Tarifa. Cádiz (Spain)

ELECTRICITY TRANSMISSION

FACINAS AND PUERTO DE LA CRUZ SS

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ELECTRICITY TRANSMISSION

GHARDAIA AND SALAH

LOCATION ▸ Provinces of Ghardaia and Tamanghasset (Algeria)

CUSTOMER ▸ SONELGAZ

PROJECT SCOPE:

Engineering, supply and construction of the 60 kV Ghardaia-Guerara transmission power lines, length 87 km, the SS Ain Salah-ADE 220 kV line, 70 km, and refurbishment of the 60 kV Ghardaia-Berriane line to Guerara, 64 km

AMOUNT ▸ EUR 28 million

START DATE ▸ august 2009

FINISH DATE ▸ february 2011

CHARACTERISTICS:

- 60 kV ST Ghardaia-Guerara line
  - STER conductor, 366 mm^2 and 570 mm^2
  - 1 circuit
  - 24F OPGW guard wire
  - 1 conductor per phase
- 220 kV ST ST Ain Salah-ADE line
  - ASTER conductor, 366 mm^2 and 570 mm^2
  - 1 circuit
  - 24F+ACSR 116 mm^2 OPGW guard wire
  - 1 conductor per phase
- Refurbishment of the 60 kV Ghardaia-Berriane line to Guerara
  - ASTER conductor, 366 mm^2 and 570 mm^2
  - 1 circuit
  - 24F OPGW guard wire
  - 1 conductor per phase

AFRICA

Provinces of Ghardaia and Tamanghasset (Algeria)

ELECTRICITY TRANSMISSION

GHARDAIA AND SALAH

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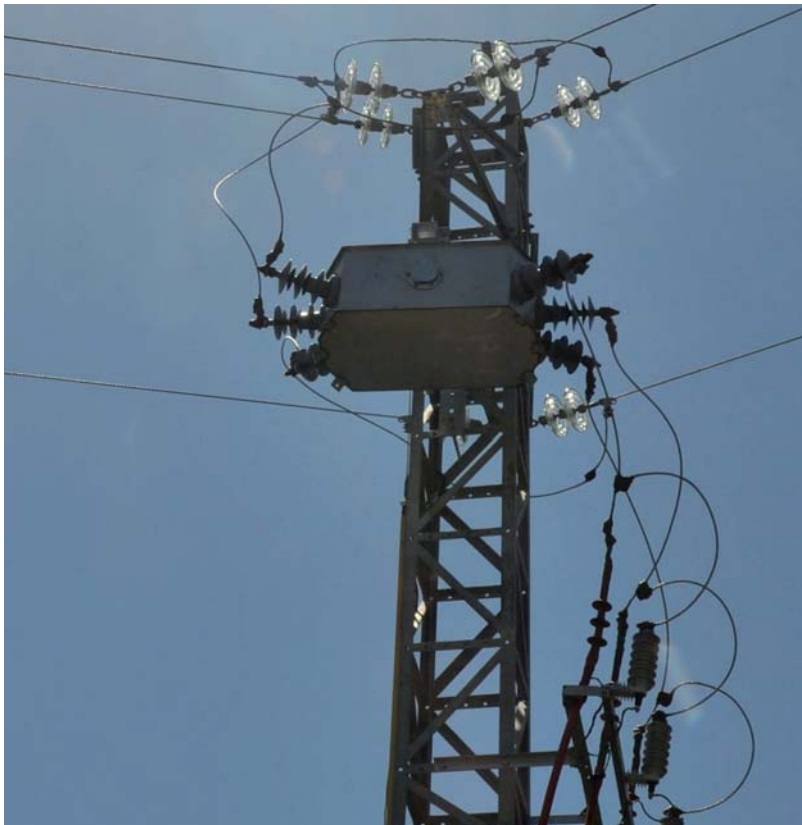

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ELECTRICITY TRANSMISSION

SALAH BEY-BIR GHBALOU TL

LOCATION ▸ Bouira province (Algeria)

CUSTOMER ▸ SONELGAZ

PROJECT SCOPE:

onstruction through a consortium of the 400 kV Salah Bey-Bir Ghbalou transmission line; Salahbey-Msila section, spanning 97 km

AMOUNT ▸ EUR 70 million (ENO 25%)

START DATE ▸ january 2006

FINISH DATE ▸ october 2007

CHARACTERISTICS:

- Aluminium conductor cable, 3x2x570 mm^2
- Conventional 79 mm^2 steel guard wire
- 24-fibre OPGW guard wire
- 20 A aerodynamic toughened glass insulators

AFRICA

Bouira province (Algeria)

ELECTRICITY TRANSMISSION

SALAH BEY-BIR GHBALOU TL

elecnor

elecnor

ELECTRICITY TRANSMISSION

TILGHMET-DJELFA TL

LOCATION ▸ Djelga province (Algeria)

CUSTOMER ▸ SONELGAZ

PROJECT SCOPE:

Design, supply and construction of the 400 kV Tilghmet-Djelfa transmission line spanning 205 km, from the Tilghmet substation (430 km south of Algiers), passing through the town of Laghouat, to the Djelfa substation (230 km south of Algiers)

AMOUNT ▸ EUR 51 million

START DATE ▸ november 2007

FINISH DATE ▸ february 2009

CHARACTERISTICS:

- ASTER 570 mm^2 conductor, single-circuit
- Two 24F 19.5 mm^2 OPGW guard wires
- Galvanised steel, 14.5 mm^2
- 2 conductors per phase

AFRICA

Djelga province (Algeria)

ELECTRICITY TRANSMISSION

TILGHMET-DJELFA TL

elecnor

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ELECTRICITY TRANSMISSION

ASSOCIATED SYSTEM FOR CAMBAMBE II

LOCATION ▸ Cuanza Norte province (Angola)

CUSTOMER ▸ Empresa Nacional de Electricidade (ENE)

PROJECT SCOPE:

Supply and construction of the transmission system associated with the Cambambe II hydroelectric power plant

AMOUNT ▸ EUR 40 million

START DATE ▸ december 2015

FINISH DATE ▸ march 2017

CHARACTERISTICS:

- 20 km of low voltage 60 kV between Cambambe and Dondo
  - N° circuits: 2
  - N° conductors: 1 per phase
  - Conductor type: ACSR Bear
  - Structure type: latticework pylons
- 30 km of low voltage 60 kV between Dondo and Cassoalala
  - N° conductors: 1 per phase
  - Conductor type: ACSR Bear
  - Structure type: latticework pylons
- 15 km of low voltage 30 kV distribution ring in Cassoalala
  - N° conductors: 1 per phase
  - Conductor type: ACSR Horse
  - Structure type: concrete posts
- 30 km of low voltage 30 kV between Cassoalala and Massangano
  - N° conductors: 1 per phase
  - Conductor type: ACSR Horse
  - Structure type: concrete posts
- 35 km of low voltage 30 kV between Cassoalala and Vila do Zenza
  - N° conductors: 1 per phase
  - Conductor type: ACSR Horse
  - Structure type: concrete posts
- Low voltage overhead network and public lighting in Cassoalala, Massangano and Zenza
- 60/30 kV Dondo and Cassoalala substations with installed capacity of 80 MVA

AFRICA

Cuanza Norte province (Angola)

ELECTRICITY TRANSMISSION

ASSOCIATED SYSTEM FOR CAMBAMBE II

elecnor

elecnor

ELECTRICITY TRANSMISSION

CACUACO-BOAVISTA

LOCATION ▸ Cacuaco, Boavista. Luanda and Bengo provinces (Angola)

CUSTOMER ▸ Empresa Nacional de Electricidade (ENE)

PROJECT SCOPE:

Supply and construction of a 220 kV and 60 kV gas-insulated substation, extension to the Cacuaco substation and 220 kV dual-circuit transmission line spanning 21 km

AMOUNT ▸ EUR 38 million

START DATE ▸ march 2012

FINISH DATE ▸ june 2013

CHARACTERISTICS:

- 220 kV and 60 kV gas-insulated substation
  - 2 x 220 kV outputs
  - 6 x 60 kV outputs
  - 2 220/60/15 kV 120 MVA transformer positions
  - Building for 220/60 kV gas-insulated substation, protection and control
- Extension of two 220 kV positions, Cacuaco substation
- 220 kV line, Cacuaco-Boavista substation

AFRICA

Cacuaco, Boavista. Luanda and Bengo provinces (Angola)

ELECTRICITY TRANSMISSION

CACUACO-BOAVISTA

elecnor

elecnor

ELECTRICITY TRANSMISSION

CAMANA

LOCATION ▸ Luanda. Luanda province (Angola)

CUSTOMER ▸ Empresa Nacional de Electricidade (ENE)

PROJECT SCOPE:

Bolstering of the transformation capacity at the Luanda Sul-Camana Viana Cazenga substation

AMOUNT ▸ EUR 21 million

START DATE ▸ january 2013

FINISH DATE ▸ july 2014

CHARACTERISTICS:

- 2 220/60/15 kV 120 MVA transformer positions
- Change to 220 kV double busbar configuaration
- 2 x 220 kV outputs
- 2 x 60 kV outputs
- Auxiliary services, accesses, protection and control panels
- Burial of the existing 60 kV Camana-Kilamba power line
- Transportation of two 60 kV transformers to the Viana substation

AFRICA

Luanda. Luanda province (Angola)

ELECTRICITY TRANSMISSION

CAMANA

elecnor

elecnor

ELECTRICITY TRANSMISSION

CAMBAMBE-CATETE

LOCATION ▸ Luanda and Cuanza Norte provinces (Angola)

CUSTOMER ▸ Empresa Nacional de Electricidade (ENE)

PROJECT SCOPE:

Supply and construction of 400 kV high voltage Cambambe-Catete line, length 122 km. This line will bring electricity generated at the new Cambambe power station to the capital, Luanda

AMOUNT ▸ EUR 31 million

START DATE ▸ october 2013

FINISH DATE ▸ june 2016

CHARACTERISTICS:

- Nominal voltage: 400 kV
- Frequency: 50 Hz
- Length: 122 km
- N° circuits: 1 (horizontal)
- N° conductors: 2 per phase
- Conductor type: AAAC SORBUS
- Type of structure: Delta mesh-type towers

AFRICA

Luanda and Cuanza Norte provinces (Angola)

ELECTRICITY TRANSMISSION

CAMBAMBE-CATETE

elecnor

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ELECTRICITY TRANSMISSION

CAPANDA-LUCALA-VIANA

LOCATION ▸ Kwanza Norte, Bengo and Luanda provinces (Angola)

CUSTOMER ▸ GAMEK (Minea)

PROJECT SCOPE:

Construction through a consortium of the 400 kV Capanda-Lucala-Viana transmission line and associated substations

AMOUNT ▸ EUR 190 million (ENO 33%)

START DATE ▸ october 2007

FINISH DATE ▸ december 2009

CHARACTERISTICS:

- 300 km of high voltage 400 kV between Capanda Elevadora substation and Viana substation
- 20 km of high voltage 220 kV between Viana substation and Cacuaco substation
- 3 km of high voltage 220 kV between Viana substation and Camama and Cazenga
- 5 km of high voltage 220 kV - duplex circuit between AH Capanda substation and Elevadora substation
- 4 electricity substations with a total of 180 MVA installed:
  - AH Capanda, 220 kV
  - Capanda Elevadora, 220/400 kV
  - Lucala, 400 to 220 kV
  - Viana, 220/400 kV

AFRICA

Kwanza Norte, Bengo and Luanda provinces (Angola)

ELECTRICITY TRANSMISSION

CAPANDA-LUCALA-VIANA

elecnor

elecnor

ELECTRICITY TRANSMISSION

KWANZA NORTE TL AND SS

LOCATION ▸ Towns in Kwanza Norte Province (Angola)

CUSTOMER ▸ Provincial Government of Kwanza Norte

PROJECT SCOPE ▸
a) New 60/30 kV substation in Golungo Alto and extension of the 220/60 kV N'dalatando substation
b) New 60 kV N'dalatando-Golungo Alto transmission line, a new medium-voltage network (with 180 km of 30 kV), and a low-voltage network, power transformer station, street lighting and 7,000 property connections in the areas of Banga, Bolongongo and Ngonguembo

AMOUNT ▸ EUR 88.6 million

START DATE ▸ March 2020

FINISH DATE ▸ March 2022

CHARACTERISTICS:

SUBSTATIONS

- Golungo Alto 60/30 kV SS (2 x 20 MVA)
  - 3 x 60 kV Line Posn
  - 2 x 60 kV Xfmr Posn
  - 2 x 60/30 kV 20 MVA Xfmr
  - Building and 30 kV cells
- N'dalatando 220/60 kV SS Extension
  - 1 x 220/60 kV Xfmr Posn
  - 220/60 kV 40 MVA Xfmr

LINES

- 60 kV transmission lines
  - N'dalatando–Golungo Alto 60 kV TL (54 km)
- 30 kV distribution lines
  - Pambos de Sonhe–Banga 30 kV TL (50 km)
  - Quicolungo–Terreiro 30 kV TL (30 km)
  - Golungo Alto–Ngonguembo 30 kV TL (30 km)
  - N'dalatando–Dondo 30 kV TL (70 km)
- Low-voltage connections network
  - 16-community network (circa 7,000 connections)

AFRICA

Towns in Kwanza Norte Province (Angola)

ELECTRICITY TRANSMISSION

KWANZA NORTE TL AND SS

elecnor

elecnor

ELECTRICITY TRANSMISSION

LOBITO-BENGUELA HV

LOCATION ▸ Benguela province (Angola)

CUSTOMER ▸ Empresa Nacional de Electricidade (ENE)

PROJECT SCOPE:

Refurbishment and strengthening of the high-voltage networks in the region of Benguela involving design, supply, transportation, civil engineering, assembly, testing and start-up of phase I of the Quileva and Biopio Hidrica substations, phase II of the Catumbela and Biopio Térmica substations and the transmission line between the Quileva and Catumbela substations

AMOUNT ▸ EUR 16 million

START DATE ▸ june 2007

FINISH DATE ▸ december 2008

CHARACTERISTICS:

- Quileva substation comprising:
  - 2 x 60 kV output line positions
  - 1 x 150/60 kV 50 MVA transformer
  - 1 x 150/30 kV 30 MVA transformer
  - 2 x 150 kV transformer positions
  - 2 x 150 kV output line positions
  - 17 non-AR 30 kV cells
  - Associated SCADA system
- Biopio Hidrica substation comprising:
  - 2 x 60 kV output line positions
  - 4 x 60 kV transformer positions
  - 4 x 150 kV transformer positions
  - 1 x 150 kV output line position
  - Associated SCADA system
- 60 kV dual-circuit ACSR Panther Conductor over 16 km between the Quileva substation and the Catumbela substation

AFRICA

Benguela province (Angola)

ELECTRICITY TRANSMISSION

LOBITO-BENGUELA HV

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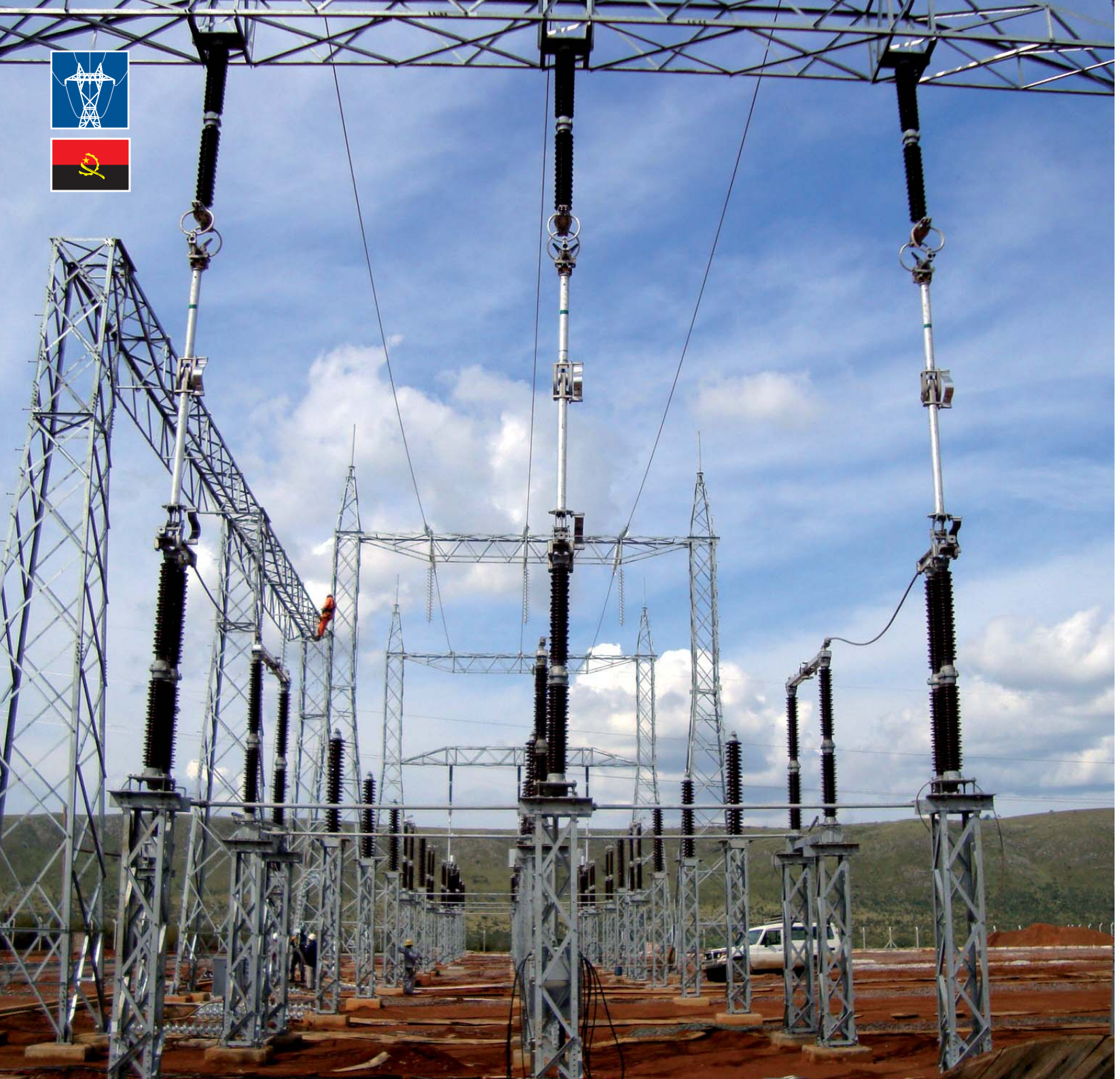

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ELECTRICITY TRANSMISSION

LUCALA-PAMBOS-UÍGE TL

LOCATION ▸ Cuanza Norte and Uíge provinces (Angola)

CUSTOMER ▸ GAMEK (Minea)

PROJECT SCOPE:

Construction through a consortium of the 220 kV Lucala-Pambos de Sonhe-Uíge transmission line and associated substations

AMOUNT ▸ EUR 205 million (ENO 33%)

START DATE ▸ january 2009

FINISH DATE ▸ december 2010

CHARACTERISTICS:

- 5 km of 60 kV power line between Uíge I substation and Uíge II substation
- 32 km of 60 kV power line between Uíge I substation and Negage substation
- 211 km of 220 kV power line between Pambos de Sonhe substation and Uíge I substation
- 31 km of 30 kV distribution line between Pambos de Sonhe substation and Samba Caju
- 53 km of 30 kV distribution line between Pambos de Sonhe substation and Camabatela
- 5 electricity substations with a total of 120 MVA installed:
  - Uíge II, 60/15 kV 15 MVA
  - Negage, 60/15 kV 15 MVA
  - Uige I, 220/60/15 kV 60 MVA
  - Pambos de Sonhe, 220/30 kV 30 MVA
  - Lucala, 220 kV

AFRICA

Cuanza Norte and Uíge provinces (Angola)

ELECTRICITY TRANSMISSION

LUCALA-PAMBOS-UÍGE TL

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ELECTRICITY TRANSMISSION

VIANA

LOCATION ▸ Luanda. Luanda province (Angola)

CUSTOMER ▸ Empresa Nacional de Electricidade (ENE)

PROJECT SCOPE:

Refurbishment of the Viana substation

AMOUNT ▸ EUR 15 million

START DATE ▸ january 2013

FINISH DATE ▸ august 2014

CHARACTERISTICS:

- Supply and replacement of Busbar I at the old 220 kV Viana facility
- Supply and replacement of 220 kV units
- Supply and assembly of new 60 kV Busbar II at the old 60 kV Viana facility
- Supply and replacement of 60 kV units
- Supply and assembly of new 60 kV line panels
- Supply and assembly of new 60 kV busbar interconnection panel
- Extension to control room

AFRICA

Luanda. Luanda province (Angola)

ELECTRICITY TRANSMISSION

VIANA

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ELECTRICITY TRANSMISSION

VIANA-FILDA

LOCATION ▸ Luanda province (Angola)

CUSTOMER ▸ Empresa Nacional de Electricidade (ENE)

PROJECT SCOPE:
Construction of a 19 km 220 kV power line

AMOUNT ▸ EUR 14 million

START DATE ▸ september 2011

FINISH DATE ▸ december 2012

AFRICA

Luanda province (Angola)

ELECTRICITY TRANSMISSION

VIANA-FILDA

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ELECTRICITY TRANSMISSION

ARARAQUARA-FERNÃO DIAS

LOCATION ▸ São Paulo State (Brazil)

CUSTOMER ▸ Mata de Santa Genebra (Furnas-Copel)

PROJECT SCOPE:

Supply and construction of 500 kV Araraquara II-Itatiba and Araraquara II-Fernão Dias power lines, lengths 207 and 241 km respectively

AMOUNT ▸ EUR 61 million

START DATE ▸ september 2014

FINISH DATE ▸ november 2016

CHARACTERISTICS:

- Length 448 km
- Conductor type: Acar 1000 MCM
- Type of guard wire: OPGW+Dotterel+Hawk
- 4 conductors per phase

SOUTH AMERICA

São Paulo State (Brazil)

ELECTRICITY TRANSMISSION

ARARAQUARA-FERNÃO DIAS

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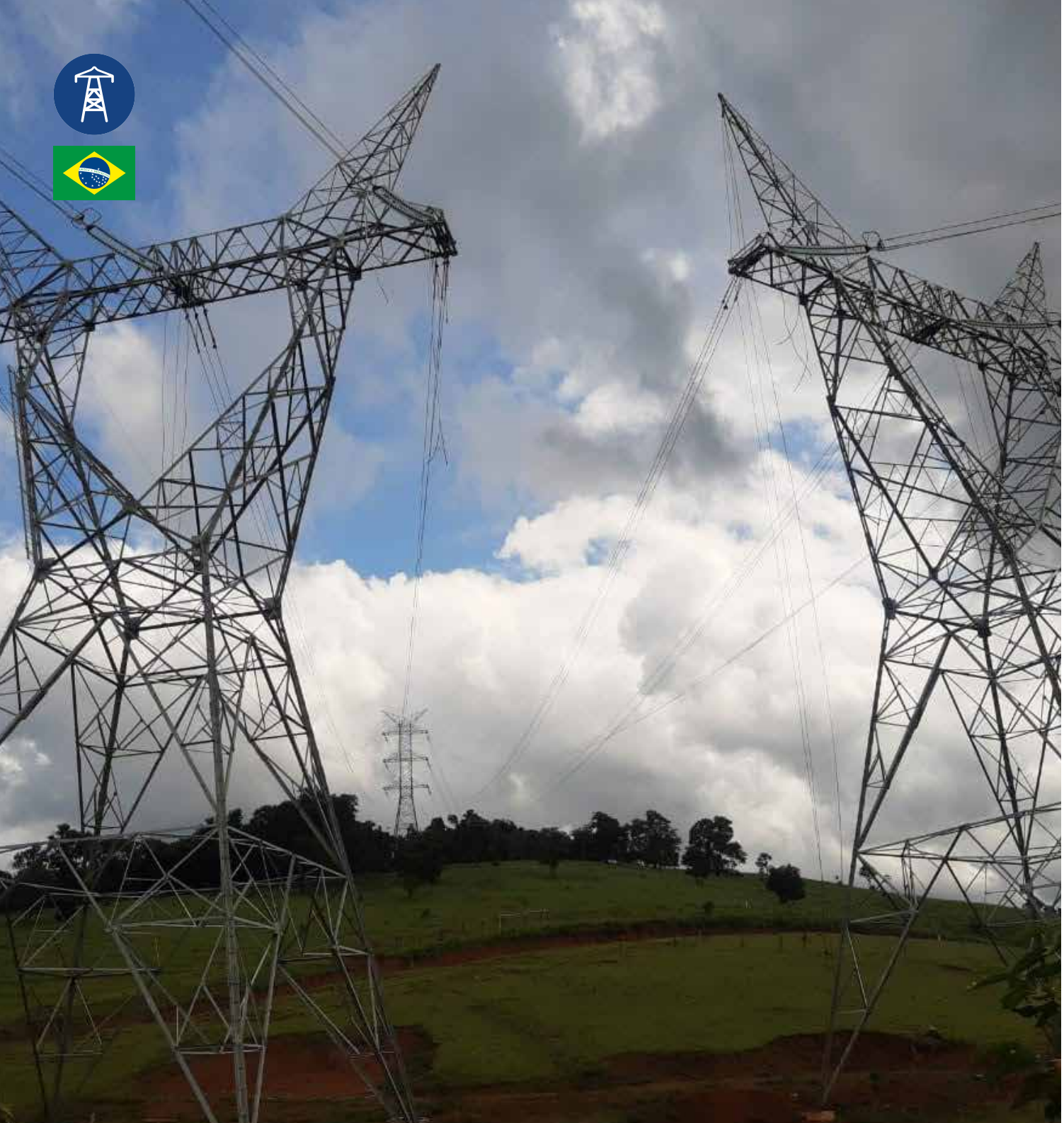

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ELECTRICITY TRANSMISION

ARARAQUARA-ITATIBA & ARARAQUARA-FERNÃO DIAS

LOCATION ▸ Interior region of the State of São Paulo, (Brazil)

CUSTOMER ▸ Mata de Santa Genebra Transmissão S.A.

PROJECT SCOPE ▸

Engineering, procurement and construction (EPC) contract for civil works; electromechanical assembly; supply of materials, equipment and systems; final review and testing for the construction of the 500 kV Araraquara II—Itatiba (222.59 km) transmission line and 500 kV Araraquara II—Fernão Dias (249.6 km) transmission line, and the 500 kV Campinas-Cachoeira Paulista (4.35 km) and 400 kV Bom Jardim-Taubate (0.94 km) transmission line sections

AMOUNT ▸ EUR 94.8 million

START DATE ▸ august 2016

FINISH DATE ▸ april 2020

CHARACTERISTICS:

- 500 KV SINGLE CIRCUIT ARARAQUARA II-ITATIBA TL
  - Kilometres: 222.59 km; Voltage: 500 kV; No. of circuits: 1; No. of conductors/phase: 4; No. of pylons: 496 (289 cable-stayed/ 207 self-supporting) and Structure tonnage: 6,126 tonnes
- 500 KV SINGLE CIRCUIT ARARAQUARA II-FERNÃO DIAS TL
  - Kilometres: 249.60 km; Voltage: 500 kV; No. of circuits: 1; No. of conductors/phase: 4, No. of pylons: 557 (274 cable-stayed/ 283 self-supporting) and Structure tonnage: 7,333 tonnes
- 500 KV CAMPINAS-CACHOEIRA PAULISTA SECTION OF TL
  - Kilometres: 4.35 km; Voltage: 500 kV; No. of circuits: 2; No. of conductors/phase: 3; No. of pylons: 15 self-supporting pylons and Structure tonnage: 529 tonnes
- 440 KV BOM JARDIM-TAUBATÉ SECTION OF TL
  - Kilometres: 0.94 km; Voltage: 440 kV; No. of circuits: 2; No. of conductors/phase: 4; No. of pylons: 6 self-supporting pylons and Structure tonnage: 244 tonnes

SOUTH AMERICA

Interior region of the State of São Paulo, Brazil

ELECTRICITY TRANSMISION

ARARAQUARA-ITATIBA & ARARAQUARA-FERNÃO DIAS

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ELECTRICITY TRANSMISSION

BRILHANTE

LOCATION ▸ Mato Grosso do Sul State (Brazil)

CUSTOMER ▸ Brilhante Transmissora de Energía (BTE)

TENDER ▸ ANEEL 008/2008. Lot B

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession through a consortium of 50% of an electricity transmission system comprising 470 km of 230/138 kV lines and 8 substations (4 owned) with a transformation capacity of 300 MVA

EPC AMOUNT ▸ EUR 136 million (ENO 50%)

INVESTMENT ▸ BRL 370 million

START DATE ▸ april 2009

FINISH DATE ▸ november 2010

CHARACTERISTICS:

- High voltage 230 kV, Imbirussu–Sidrolândia, 43.5 km
- High voltage 230 kV, Sidrolândia-Anastácio, 105.2 km
- High voltage 230 kV, Chapadão–Imbirussu, 309.4 km
- High voltage 230 kV, Santa Luzia II–Rio Brilhante, 10.1 km
- High voltage 230 kV, Santa Luzia II–Eldorado, 37.8 km
- High voltage 230 kV switching, Nova Porto Primavera–Imbirussu, 2.7 km
- High voltage 230 kV switching, Nova Porto Primavera–Dourados
- Substations - Imbirussu 230 kV; Sidrolândia 230 kV; Anastácio 230 kV; Santa Luzia I 138 kV; Santa Luzia II 230 kV; Eldorado 138 kV; Rio Brilhante 230/138 kV; Ivinhema 230 kV; Chapadão 138/230 kV

SOUTH AMERICA

Mato Grosso do Sul State (Brazil)

ELECTRICITY TRANSMISSION

BRILHANTE

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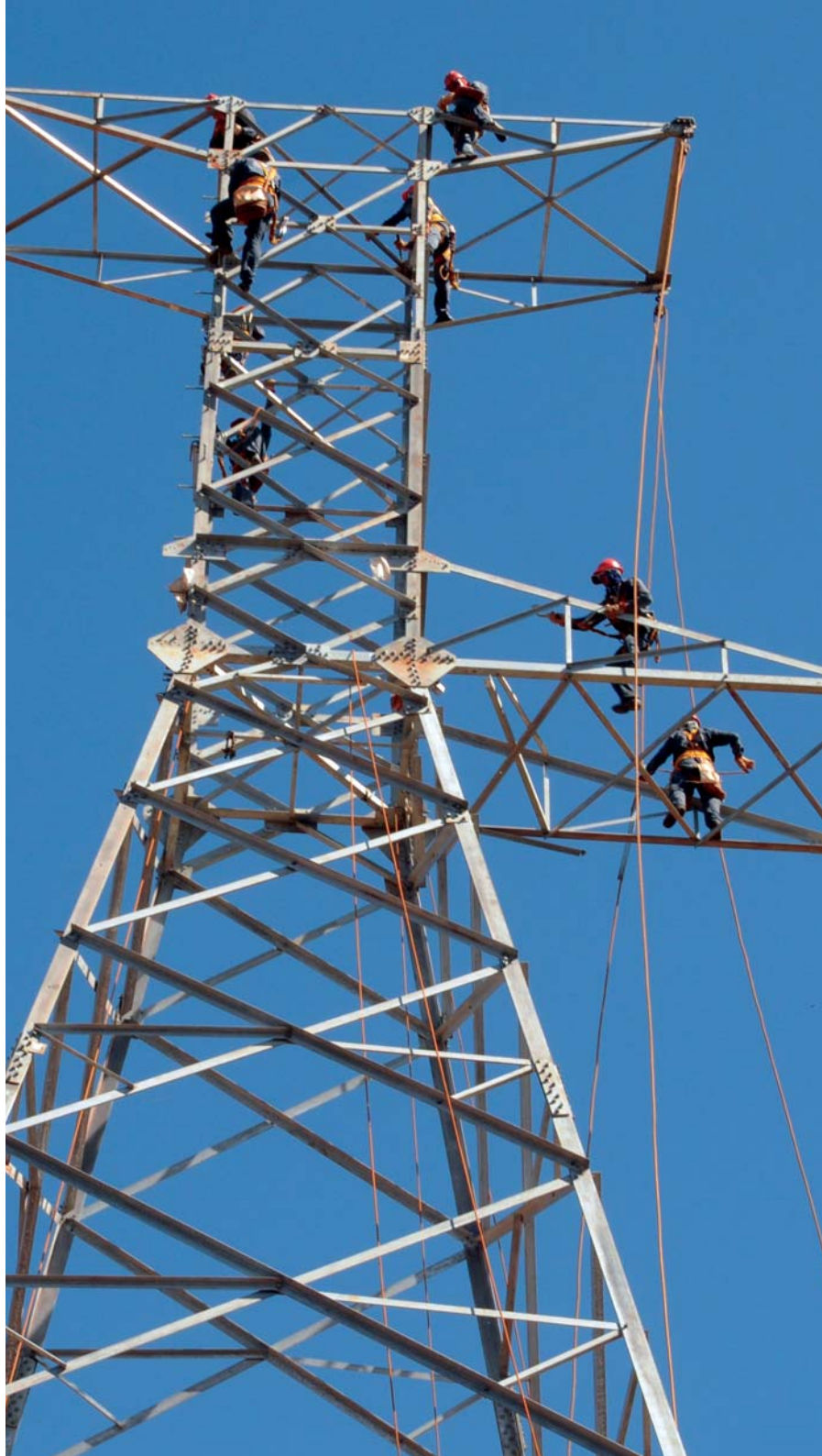

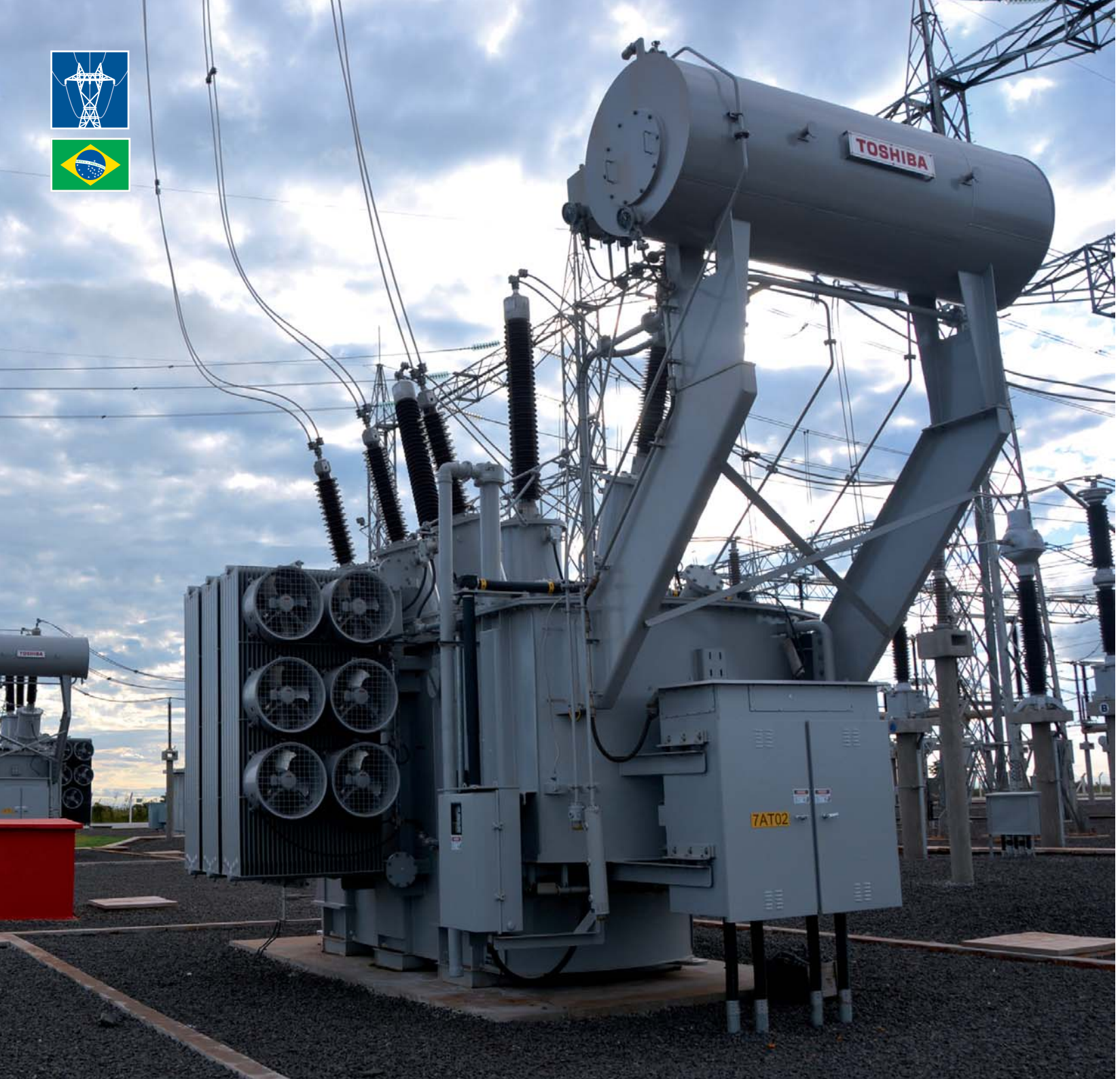

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ELECTRICITY TRANSMISSION

BRILHANTE II

LOCATION ▸ Mato Grosso do Sul State (Brazil)

CUSTOMER ▸ Brilhante II Transmissora de Energía (BTE II)

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession through a consortium of 50% of a substation with a transformation capacity of 200 MVA

EPC AMOUNT ▸ EUR 8 million (ENO 50%)

INVESTMENT ▸ BRL 28.5 million

START DATE ▸ october 2012

FINISH DATE ▸ november 2014

CHARACTERISTICS:

- 230/138 kV substation

SOUTH AMERICA

Mato Grosso do Sul State (Brazil)

ELECTRICITY TRANSMISSION

BRILHANTE II

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ELECTRICITY TRANSMISSION

CACHOEIRA

LOCATION ▸ Sao Paulo State (Brazil)

CUSTOMER ▸ Cachoeira Paulista Transmissora de Energía (CPTE)

TENDER ▸ ANEEL 002/2002. Lot E

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession until July 2011 of an electricity transmission system comprising 181 km of 500 kV lines and 2 substations with a transformation capacity of 2,720 MVA

EPC AMOUNT ▸ EUR 47 million (ENO 33%)

INVESTMENT ▸ BRL 205.4 million

START DATE ▸ december 2002

FINISH DATE ▸ december 2004

CHARACTERISTICS:

- 500 kV high voltage, Tijuco Preto–Cachoeira Paulista
- Cachoeira Paulista substation
- Tijuco Preto substation

SOUTH AMERICA

Sao Paulo State (Brazil)

ELECTRICITY TRANSMISSION

CACHOEIRA

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ELECTRICITY TRANSMISSION

CAIUÁ

LOCATION ▸ Paraná State (Brazil)

CUSTOMER ▸ Caiuá Transmissora de Energía (CATE)

TENDER ▸ ANEEL 006/2011. Lot E

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession through a consortium of 51% of an electricity transmission system comprising 135 km of 230 kV lines and 7 substations (5 owned) with a transformation capacity of 700 MVA

EPC AMOUNT ▸ EUR 54 million

INVESTMENT ▸ BRL 183 million

START DATE ▸ may 2013

FINISH DATE ▸ july 2014

CHARACTERISTICS:

- High voltage 230 kV Umuarama–Guaira line, single circuit of 105 km starting at the Umuarama Sul substation and finishing at the Guaira substation.
- High voltage 230 kV Cascavel Oeste-Cascavel Norte line, single circuit of 36 km starting at the Cascavel Oeste substation and finishing at the Cascavel Norte substation.
- Santa Quiteria substation, 230/69 kV 2 x 150MVA and 230/13.8 kV 2 x 50 MVA
- Cascavel Norte substation, 230/138 kV 2 x 150 MVA
- Underground high voltage 230 kV line, 0.9 km
- Underground high voltage 138 kV line, 0.2 km

SOUTH AMERICA

Paraná State (Brazil)

ELECTRICITY TRANSMISSION

CAIUÁ

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ELECTRICITY TRANSMISSION

CAMPINA GRANDE III AND CEARÁ-MIRIM II SS

LOCATION ▸ Campina Grande and Ceará Mirim. Paraiba and Rio Grande do Norte States (Brazil)

CUSTOMER ▸ Potiguar Sul Transmissão de Energia (NEOENERGIA)

PROJECT SCOPE:

Project scope: Supply of materials and services for turnkey construction of the 500 kV substations Campina Grande III and Ceará-Mirim II, part of Lot G of Leilão de Transmissão N° 001/2013, ANEEL

EPC AMOUNT ▸ EUR 13 million

START DATE ▸ january 2014

FINISH DATE ▸ january 2016

CHARACTERISTICS:

- Campina Grande III substation (500 kV)
  - 1 line bay (one and a half breaker arrangement)
  - 4 (3+1R) single-phase line reactors - 500/√3 kV, 33.33 MVAr each
  - 1 line reactor connection
  - 1 busbar extension module (one and a half breaker arrangement)

- Ceará-Mirim II substation (500 kV)
  - 1 line bay (one and a half breaker arrangement)
  - 4 (3+1R) single-phase line reactors - 500/√3 kV, 33.33 MVAr each
  - 1 line reactor connection
  - 1 busbar extension module (one and a half breaker arrangement)

SOUTH AMERICA

Campina Grande and Ceará Mirim. Paraiba and Rio Grande do Norte States (Brazil)

ELECTRICITY TRANSMISSION

CAMPINA GRANDE III AND CEARÁ-MIRIM II SS

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ELECTRICITY TRANSMISSION

CAMPO GRANDE-PARAÍSO-CHAPADÃO

LOCATION ▸ Mato Grosso do Sul State (Brazil)

CUSTOMER ▸ Eletrosul Centrais Elétricas

PROJECT SCOPE:

Supply and construction of high voltage 230 kV Campo Grande 2–Paraíso 2 C2, length 200 km, Paraíso 2–Chapadão C2, 65 km, high voltage 230 kV switching, Chapadão-Campo Grande 2 to Paraíso 2 substation, 1 km, and 230/138 kV Paraíso 2 substation, processing capacity 300 MVA

AMOUNT ▸ EUR 56 million

START DATE ▸ april 2014

FINISH DATE ▸ march 2018

CHARACTERISTICS:

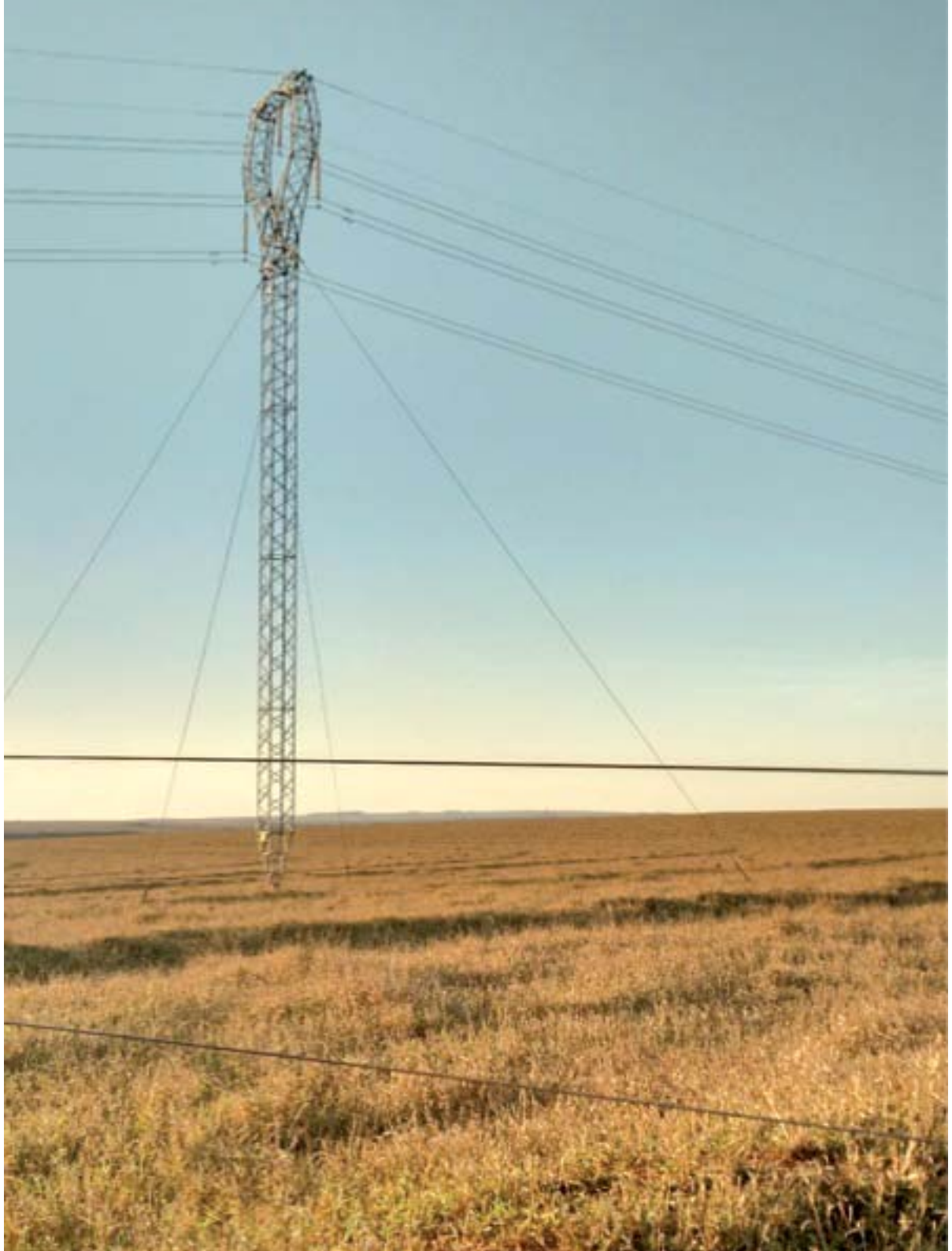
- Length 266 km
- Conductor type: ACAR 850 MCM
- Type of guard wire: OPGW+EHS+Dotterel
- 2 conductors per phase
- "Monomastro" tower

SOUTH AMERICA

Mato Grosso do Sul State (Brazil)

ELECTRICITY TRANSMISSION

CAMPO GRANDE-PARAÍSO-CHAPADÃO



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ELECTRICITY TRANSMISSION

CANTAREIRA

LOCATION ▸ São Paulo and Minas Gerais states (Brazil)

CUSTOMER ▸ Cantareira Transmissora de Energía (CANTE)

TENDER ▸ ANEEL 001/2014. Lot F

PROJECT SCOPE:

Engineering, supply, construction, commissioning and maintenance, and operation under a concession through a consortium - 51% of an electricity transmission system comprising 328 km of 500 kV lines and 2 substations

EPC AMOUNT ▸ EUR 248 million

INVESTMENT ▸ BRL 796.5 million

START DATE ▸ 2015

FINISH DATE ▸ 2018

CHARACTERISTICS:

- 500 kV HV Estreito-Fernão Dias line with a 328 km dual circuit

SOUTH AMERICA

São Paulo and Minas Gerais states (Brazil)

ELECTRICITY TRANSMISSION

CANTAREIRA

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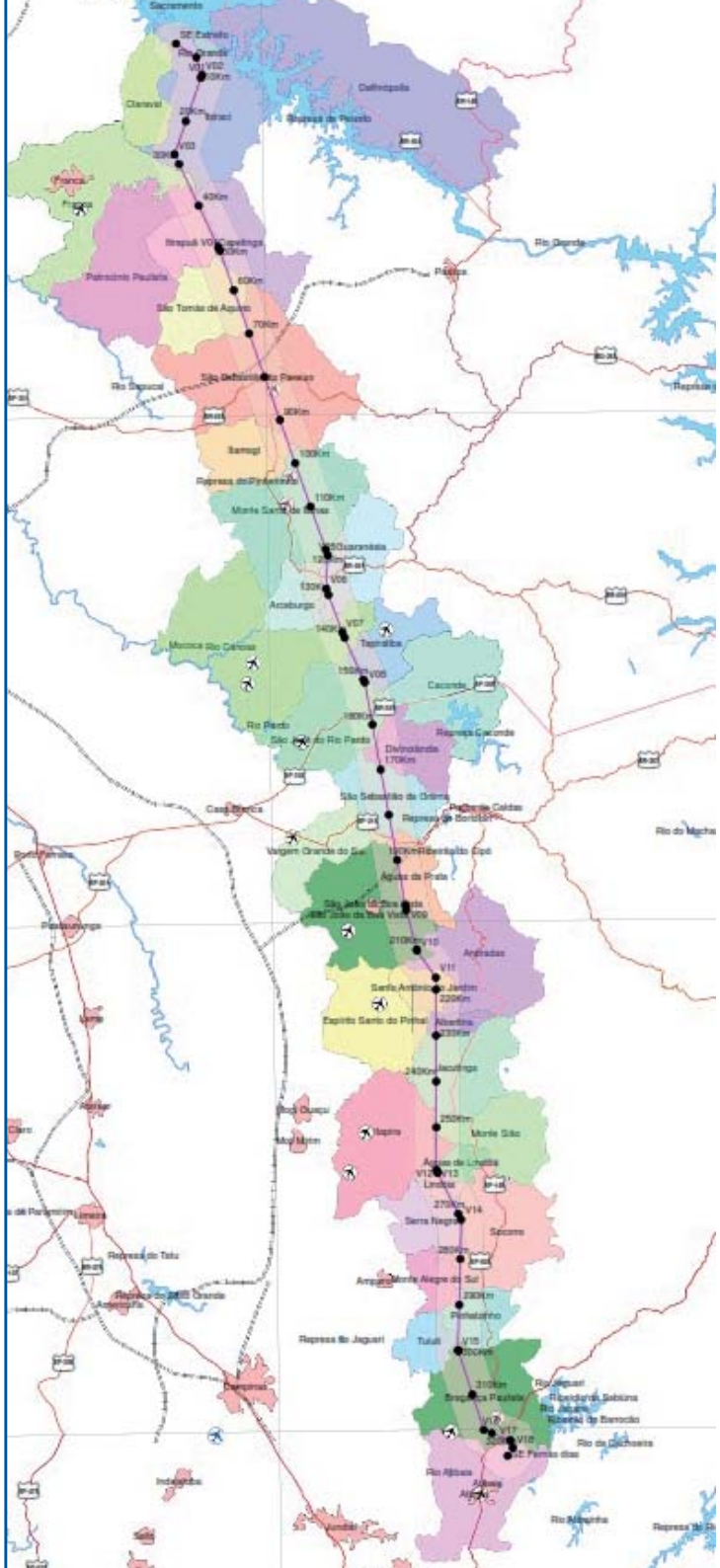

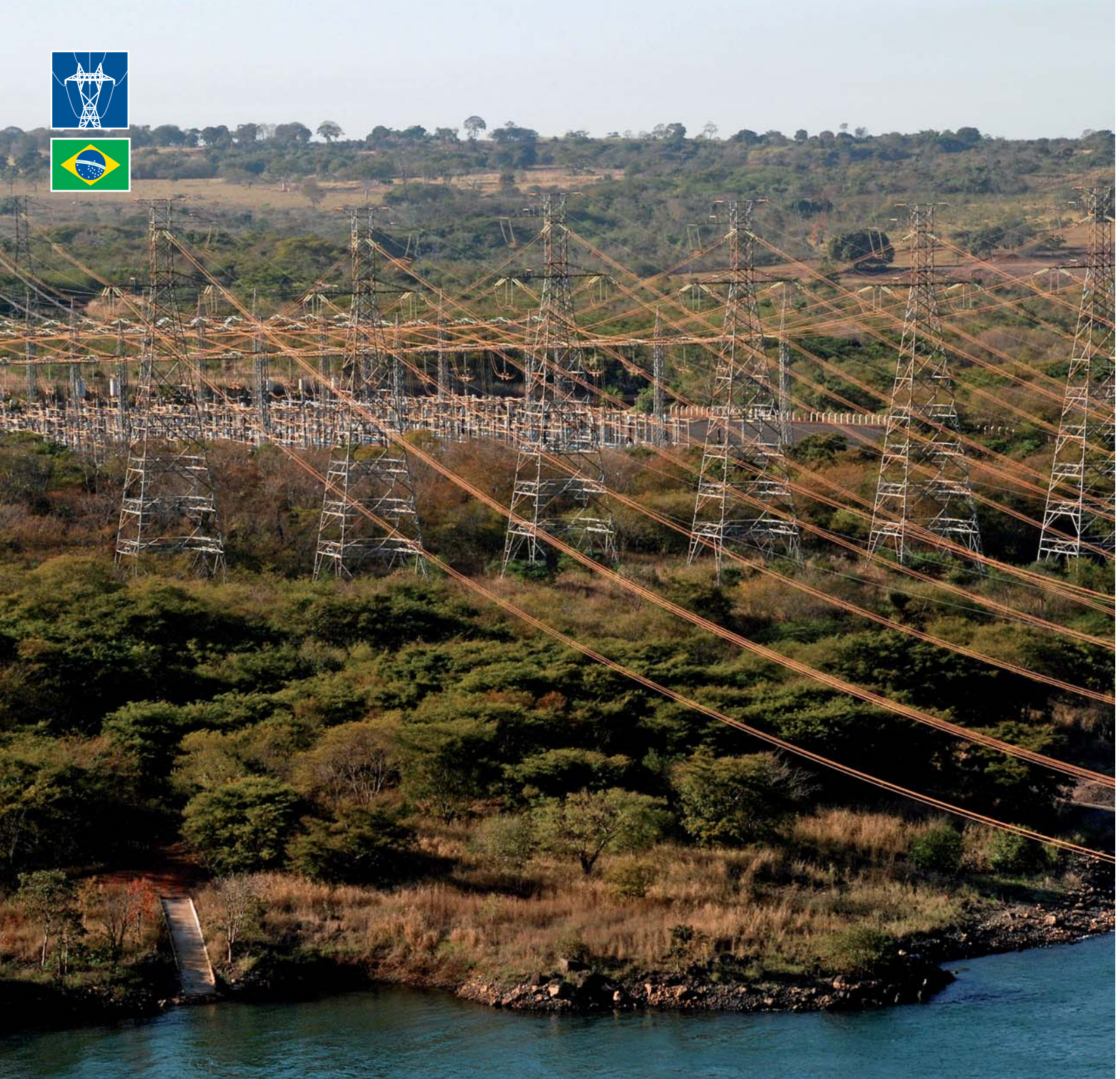

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ELECTRICITY TRANSMISSION

COQUEIROS

LOCATION ▸ Goiás State (Brazil)

CUSTOMER ▸ Coqueiros Transmissora de Energía (CTE)

TENDER ▸ ANEEL 004/2008. Lot L

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession of an electricity transmission system comprising 65 km of 500/230 kV lines and 5 substations (2 owned) with a transformation capacity of 675 MVA

EPC AMOUNT ▸ EUR 38 million

INVESTMENT ▸ BRL 95 million

START DATE ▸ december 2008

FINISH DATE ▸ august 2010

CHARACTERISTICS:

- HV 230 kV Itaguaçú–Barra dos Coqueiros, 45 km
- HV 500 kV São Simão–Itaguaçú, 19 km
- Itaguaçu 500/230 kV substation, 675 MVA
- Barra dos Coqueiros substation, 230 kV
- São Simão substation, 500 kV

SOUTH AMERICA

Goiás State (Brazil)

ELECTRICITY TRANSMISSION

COQUEIROS

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ELECTRICITY TRANSMISSION

CORUMBÁ

LOCATION ▸ Mato Grosso do Sul State (Brazil)

CUSTOMER ▸ Linha de Transmissão de Corumbá (LTC)

TENDER ▸ ANEEL 008/2010. Lot G

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession of an electricity transmission system comprising 282 km of 230 kV lines and 2 substations (1 owned) with a transformation capacity of 200 MVA

EPC AMOUNT ▸ EUR 83 million

INVESTMENT ▸ BRL 248.4 million

START DATE ▸ october 2011

FINISH DATE ▸ october 2013

CHARACTERISTICS:

- HV 230 kV line, Anastácio-Corumbá, 282 km
- Corumbá 230/138 kV substation, 2x100 MVA
- Anastácio 230 kV substation, 2x20 MVAr

SOUTH AMERICA

Mato Grosso do Sul State (Brazil)

ELECTRICITY TRANSMISSION

CORUMBÁ

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ELECTRICITY TRANSMISSION

CURITIBA

LOCATION ▸ Paraná State (Brazil)

CUSTOMER ▸ Marumbi Transmissora

PROJECT SCOPE:

Supply and construction of HV 525 kV power lines, Curitiba-Curitiba Este, Sec. Uberara-Posto Fiscal and Sec. Mónica-Distrito Industrial, total length 38 km

AMOUNT ▸ EUR 12 million

START DATE ▸ november 2013

FINISH DATE ▸ april 2015

CHARACTERISTICS:

- HV 525 kV power line, Curitiba-Curitiba Este
  - Length 28.6 km
  - Conductor type: Grosbeak
  - Type of guard wire: OPGW+Dotterel
  - 4 conductors per phase
- Sec. Uberara-Posto Fiscal
  - Length 1.5 km
  - Conductor type: Drake
  - Type of guard wire: OPGW+Dotterel
  - 1 conductor per phase
- Sec. Mónica-D. Industrial
  - Length 7.5 km
  - Conductor type: Drake
  - Type of guard wire: OPGW+Dotterel
  - 1 conductor per phase

SOUTH AMERICA

Paraná State (Brazil)

ELECTRICITY TRANSMISSION

CURITIBA

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ELECTRICITY TRANSMISSION

ENCRUZO NOVO

LOCATION ▸ Maranhão State (Brazil)

CUSTOMER ▸ Encruzo Novo Transmissora de Energía (ENTE)

TENDER ▸ ANEEL 001/2010. Lot E

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession of an electricity transmission system comprising 240 km of 230 kV lines and 2 substations (1 owned) with a transformation capacity of 100 MVA

EPC AMOUNT ▸ EUR 35 million

INVESTMENT ▸ BRL 90 million

START DATE ▸ december 2010

FINISH DATE ▸ december 2012

CHARACTERISTICS:

- HV 230 kV Miranda-Encruzo Novo line, 240 km
- Encruzo Novo 230/69 kV substation, 1x100 MVA

SOUTH AMERICA

Maranhão State (Brazil)

ELECTRICITY TRANSMISSION

ENCRUZO NOVO

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ELECTRICITY TRANSMISSION

EXPANSIÓN

LOCATION ▸ Goiás, Distrito Federal and Minas Gerais States (Brazil)

CUSTOMER ▸ Expansión Transmissâo de Energía Elétrica (ETEE)

TENDER ▸ ANEEL 002/2000. Lot B

PROJECT SCOPE:

Engineering, supply, construction, commissioning and maintenance, and operation under a concession until December 2010 of an electricity transmission system comprising 581 km of 500 kV lines and 3 substations

EPC AMOUNT ▸ EUR 127 million (ENO 25%)

INVESTMENT ▸ BRL 372 million

START DATE ▸ december 2000

FINISH DATE ▸ december 2002

CHARACTERISTICS:

- HV 500 kV Samambaia-Itumbiara line
- HV 500 kV Samambaia-Emborcação line
- Itumbiara, Samambaia and Emborcação 500 kV substations

SOUTH AMERICA

Goiás, Distrito Federal and Minas Gerais States (Brazil)

ELECTRICITY TRANSMISSION

EXPANSIÓN

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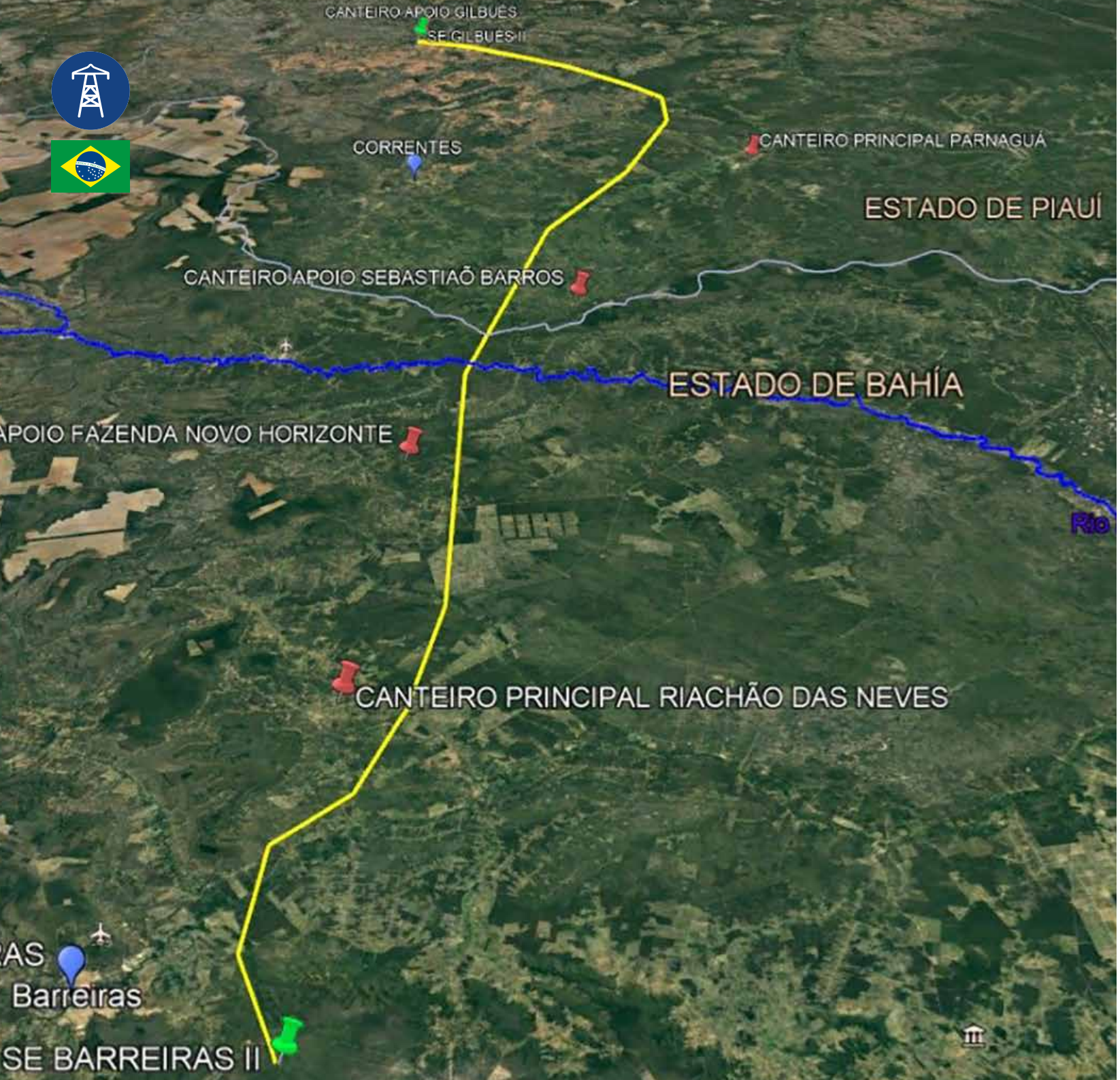

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ELECTRICITY TRANSMISSION

GILBUÉS II-BARREIRAS II TL

LOCATION ▸ States of Bahia and Piauí, (Brazil)

CUSTOMER ▸ Neoenergia

PROJECT SCOPE ▸

Construction of segment 2 of the transmission line tendered in Lot 04 of Auction No. 02/2017, with a length of 312 km

AMOUNT ▸ EUR 31 million

START DATE ▸ march 2020

FINISH DATE ▸ june 2021

CHARACTERISTICS:

- 500 kV, 312 km, single-circuit transmission line between the Gilbules II (Piauí) and Barreiras II (Bahia) substations. It has 6 cables per phase and 625 structures, 93% of which are cable-stayed via cross-rope suspension.

SOUTH AMERICA

States of Bahia and Piauí (Brazil)

ELECTRICITY TRANSMISSION

GILBUÉS II-BARREIRAS II TL

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ELECTRICITY TRANSMISSION

INTEGRAÇÃO MARANHENSE

LOCATION ▸ Maranhão State (Brazil)

CUSTOMER ▸ Integração Maranhense Transmissora de Energía (IMTE)

TENDER ▸ ANEEL 006/2011. Lot I

PROJECT SCOPE:

Engineering, supply, construction, commissioning and maintenance, and operation under a concession through a consortium (ENO, 51%) of an electricity transmission system comprising 365 km of 500 kV lines and 2 substations

EPC AMOUNT ▸ EUR 107 million

INVESTMENT ▸ BRL 321.8 millio

START DATE ▸ november 2012

FINISH DATE ▸ december 2014

CHARACTERISTICS:

- 500 kV line in Maranhão State - 365 km between the Açailandia substation and the Miranda II substation, 1 circuit
- Açailandia substation and Miranda II substation, 500 kV

SOUTH AMERICA

Maranhão State (Brazil)

ELECTRICITY TRANSMISSION

INTEGRAÇÃO MARANHENSE

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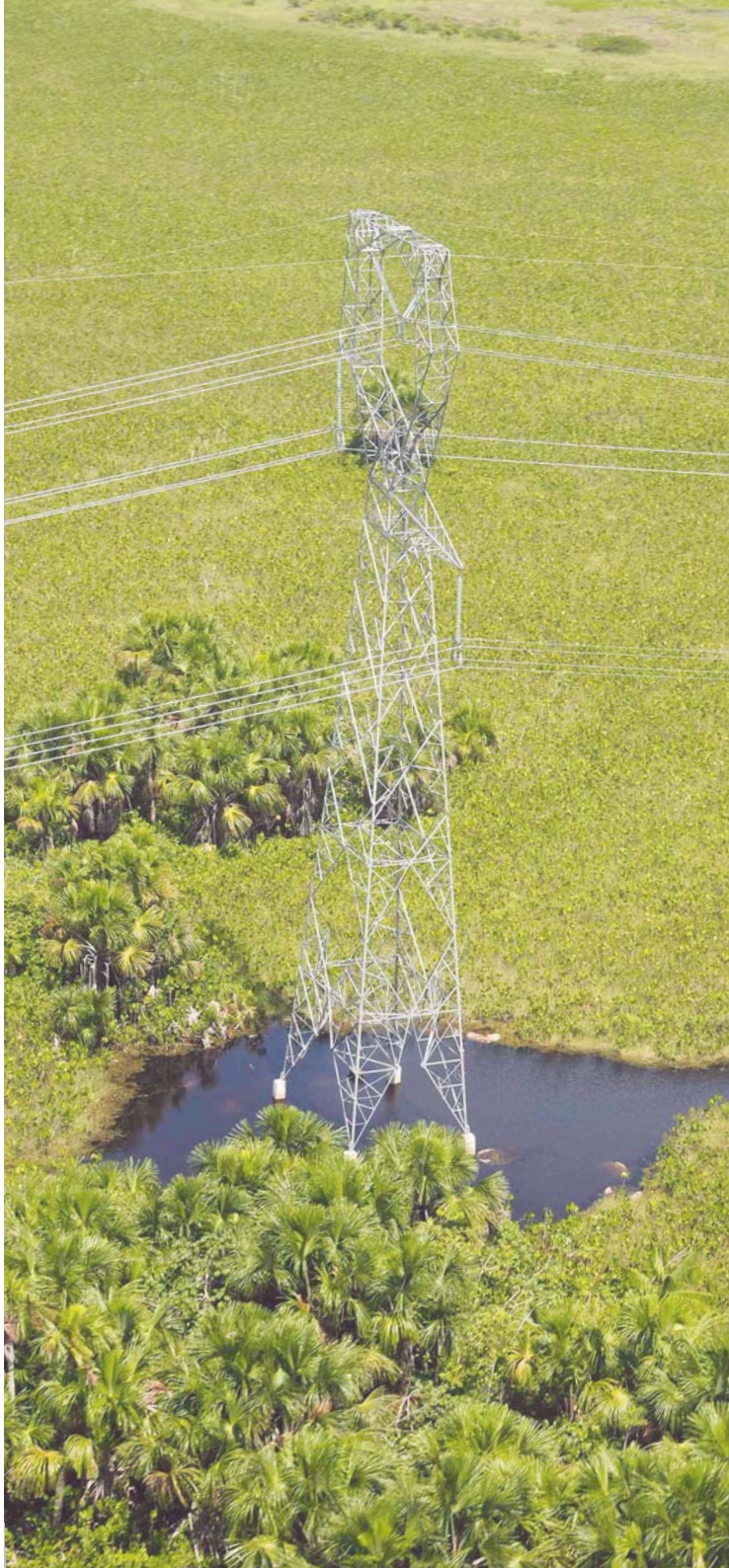

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ELECTRICITY TRANSMISSION

ITUMBIARA

LOCATION ▸ Mato Grosso and Goiás states (Brazil)

CUSTOMER ▸ Itumbiara Transmissora de Energía (ITE)

TENDER ▸ ANEEL 001/2004. Lot A

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession until December 2010 of an electricity transmission system comprising 817 km of 500 kV lines and 3 substations (2 owned) with a transformation capacity of 1,150 MVA

EPC AMOUNT ▸ EUR 263 million (ENO 33%)

INVESTMENT ▸ BRL 762.1 million

START DATE ▸ july 2005

FINISH DATE ▸ november 2006

CHARACTERISTICS:

- 500 kV Itumbiara-Cuiabá transmission line, 813 km
- 230 kV Ribeirãozinho–Barra do Peixe dual-circuit transmission line, 3.5 km
- Itumbiara substation, 500 kV
- Rio Verde Norte substation, 500 kV
- Ribeirãozinho substation, 500/230 kV
- Barra do Peixe substation, 230 kV
- Cuiabá substation, 500 kV

SOUTH AMERICA

Mato Grosso and Goiás states (Brazil)

ELECTRICITY TRANSMISSION

ITUMBIARA

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ELECTRICITY TRANSMISSION

ITUMBIARA MARIMBONDO

LOCATION ▸ Minas Gerais and Goiás states (Brazil)

CUSTOMER ▸ Expansión Transmissão Itumbiara Marimbondo (ETIM)

TENDER ▸ ANEEL 002/2002. Lot G

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession until December 2010 of an electricity transmission system comprising 214 km of 500 kV lines and 2 substations with a transformation capacity of 1,730 MVA

EPC AMOUNT ▸ EUR 40 million (ENO 33%)

INVESTMENT ▸ BRL 193.7 million

START DATE ▸ december 2002

FINISH DATE ▸ june 2004

CHARACTERISTICS:

- 500 kV Itumbiara-Marimbondo transmission line, 214 km
- Itumbiara substation
- Marimbondo substation

SOUTH AMERICA

Minas Gerais and Goiás states (Brazil)

ELECTRICITY TRANSMISSION

ITUMBIARA MARIMBONDO

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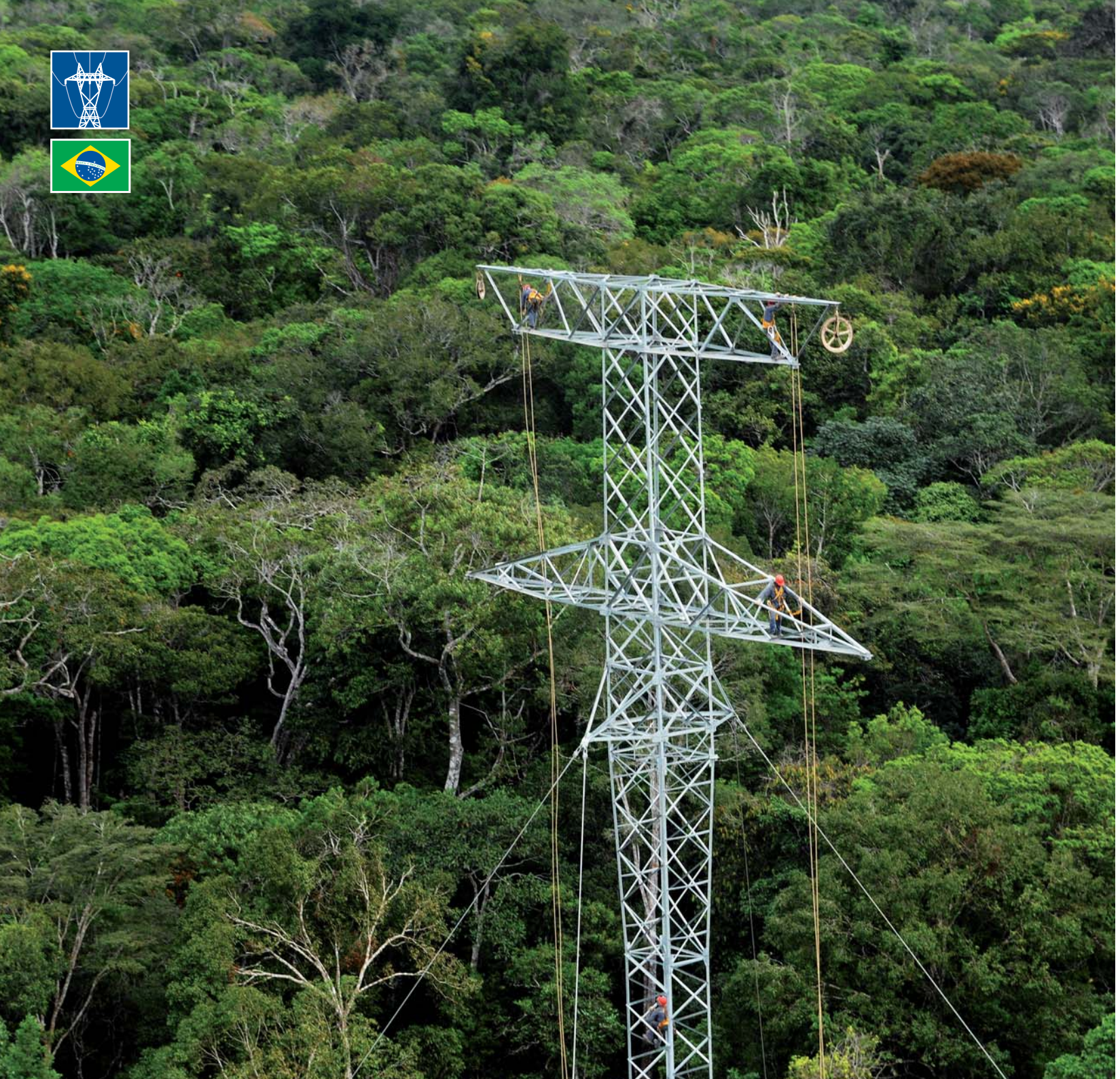

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ELECTRICITY TRANSMISSION

JAURU

LOCATION ▸ Mato Grosso and Rondônia states (Brazil)

CUSTOMER ▸ Jauru Transmissora de Energía (JTE)

TENDER ▸ ANEEL 005/2006. Lot A

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession through a consortium (ENO, 33%) of an electricity transmission system comprising 949 km of 230 kV lines and 7 substations with a transformation capacity of 740 MVA

EPC AMOUNT ▸ EUR 198 million (ENO 33%)

INVESTMENT ▸ BRL 523.7 million

START DATE ▸ april 2007

FINISH DATE ▸ december 2009

CHARACTERISTICS:

- 230 kV Samuel-Ariquemez transmission line, 154 km
- 230 kV Ariquemez-Ji Parana transmission line, 165 km
- 230 kV JI Parana-Pimenta Bueno transmission line, 117 km
- 138 kV Pimenta Bueno-Vilhena transmission line, 160 km
- Jaura substation, 230 kV
- Vilhena substation, 230 kV

SOUTH AMERICA

Mato Grosso and Rondônia states (Brazil)

ELECTRICITY TRANSMISSION

JAURU

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POWER TRANSMISSION

MARITUBA SS

LOCATION ▸ States of Pará and Bahía (Brazil)

CUSTOMER ▸ Equatorial

PROJECT SCOPE:

Lots 8 and 23 of tender n° 13/2015 (second stage) including the construction of a new 500/230/69 kV substation and the extension of another four 500 kV substations

AMOUNT ▸ EUR 54 million

START DATE ▸ march 2017

FINISH DATE ▸ november 2021

CHARACTERISTICS:

- New 500/230/69 kV Marituba substation
  - 500 kV yard: construction of two breaker and a half diameters. A position of 300 MVA transformer banks (3+1), 45.33 MVAr reactance position and line output
  - 230 kV yard: double busbar configuration with four keys. A 300 MVA transformer bank (3+1), two 200 MVA transformer positions, coupling position and five line outputs
  - 69 kV yard: main busbar configuration with transfer. Two 200 MVA transformer positions, coupling position and two line outputs
- Extension of Vila do Conde SS in the 500 kV yard with breaker and a half arrangement. Line output to Marituba SS
- Extension of Castanhal SS in the 500 kV yard with double busbar arrangement. Line output to Marituba SS
- Extension of the Rio da Éguas SS in the 500 kV yard with breaker and a half arrangement. Line output to Barreiras SS and supply of a 3x58.3 MVAr condenser bank
- Extension of the Barreiras SS in the 500 kV yard with full breaker and a half arrangement. Line output to Rio da Éguas SS and supply of a 3x58.3 MVAr condenser bank and 3x50 MVAr reactance

SOUTH AMERICA

States of Pará and Bahía (Brazil)

POWER TRANSMISSION

MARITUBA SS

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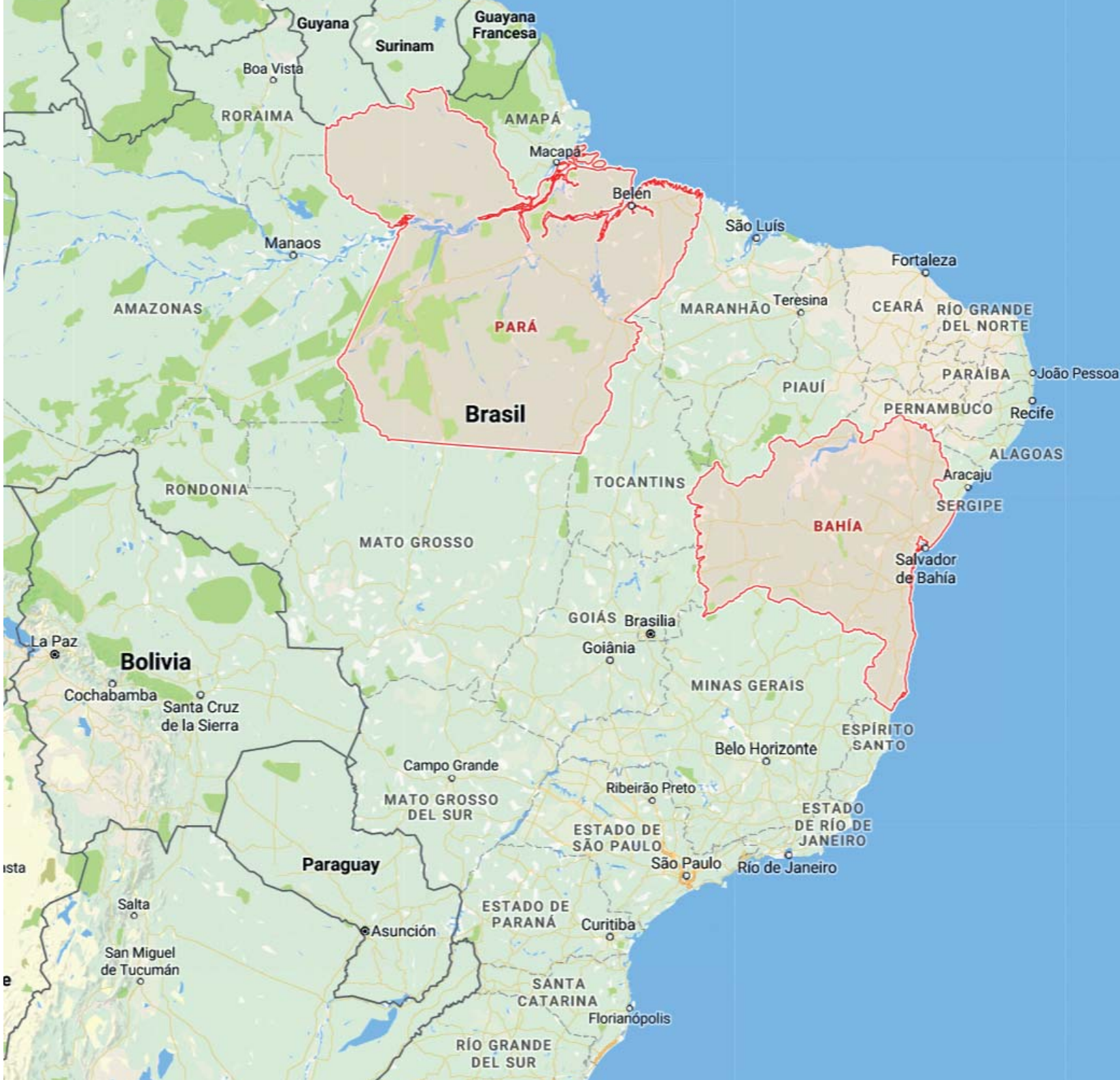

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ELECTRICITY TRANSMISSION

MIRACEMA, PALMAS AND LAJEADO SS

LOCATION ▸ State of Tocantins (Brazil)

CUSTOMER ▸ Transmissora Aliança de Energia Elétrica (TAESA)

PROJECT SCOPE:

Lot P of auction nº 13/2015 (first stage) including the construction in Palmas of a new 230 kV/138 kV substation, the enlargement of the Miracema substation by 500 kV and the 500 kV enlargement and adaptation of the Lajeado substation

AMOUNT ▸ EUR 28 million

START DATE ▸ june 2016

FINISH DATE ▸ december 2019

CHARACTERISTICS:

- Miracema substation: enlargement of a line position by 500 KV and a breaker and a half scheme
- Palmas substation: a new-build 230 kV/138 kV SS with a double busbar and an inter-busbar position in both facilities, two 230 kV line positions and a further two 138 kV positions and two 230/138 kV 200 MVA three-phase transformer positions
- Lajeado substation: enlargement of the substation of a hydroelectric power plant and its adaptation to Brazil's basic transmission grid. It has two 500 kV line positions, one 500/230 kV 960 MVA transformer position with three 320 MVA single-phase autotransformers, one 230 kV inter-busbar position for the double busbar of this facility and two 230 kV line positions with a double breaker

SOUTH AMERICA

State of Tocantins (Brazil)

ELECTRICITY TRANSMISSION

MIRACEMA, PALMAS AND LAJEADO SS

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ELECTRICITY TRANSMISSION

ORIXIMINÁ-PARITINS

LOCATION States of Pará and Amazonas (Brazil)

CUSTOMER PATE (Parintins Amazonas Transmissora de Energia, S.A.)

PROJECT SCOPE

Full engineering, procurement and construction (EPC) fixed-price contract, with all risks included, to obtain the environmental licences, and licences for expropriations, engineering, supply, construction and commissioning of 2 new substations, expansion of a substation and two transmission lines

AMOUNT EUR 230 million

START DATE march 2019

FINISH DATE march 2024

CHARACTERISTICS:

- Construction of 2 new 230/138 kV substations in Juruti and Parintins
- 500/230 kV expansion of the Oriximiná substation
- 230 kV transmission line between Oriximiná-Juruti (138 km and 299 pylons). Includes a 2.3 km crossing over the Amazon River, for which two 253 m-tall suspension pylons will be installed, weighing approximately 1,300 tonnes.
- 230 kV transmission line between Juruti-Parintins (102 km and 226 pylons)

SOUTH AMERICA

States of Pará and Amazonas (Brazil)

ELECTRICITY TRANSMISSION

ORIXIMINÁ-PARITINS

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elecnor

ELECTRICITY TRANSMISSION

PEDRAS

LOCATION ▸ Rio de Janeiro State (Brazil)

CUSTOMER ▸ Pedras Transmissora de Energía (PTE)

TENDER ▸ ANEEL 004/2008. Lot J

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession of an electricity transmission system comprising 52 km of 345 kV lines and 1 substation with a transformation capacity of 800 MVA

EPC AMOUNT ▸ EUR 31 million

INVESTMENT ▸ BRL 112.5 million

START DATE ▸ december 2008

FINISH DATE ▸ december 2010

CHARACTERISTICS:

- 345 kV Adrianópolis–Venda das Pedras power line, 25.9 km
- 345 kV Venda das Pedras–Macaé power line, 25.9 km
- Venda das Pedras substation, 345/138 kV

SOUTH AMERICA

Rio de Janeiro State (Brazil)

ELECTRICITY TRANSMISSION

PEDRAS

elecnor

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ELECTRICITY TRANSMISSION

POÇOS DE CALDAS

LOCATION ▸ São Paulo and Minas Gerais States (Brazil)

CUSTOMER ▸ Poços de Caldas Transmissora de Energía (PCTE)

TENDER ▸ ANEEL 005/2006. Lot B

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession until December 2010 of an electricity transmission system comprising 308 km of 500 kV lines and 4 substations with a transformation capacity of 2,000 MVA

EPC AMOUNT ▸ EUR 117 million (ENO 33%)

INVESTMENT ▸ BRL 370.7 million

START DATE ▸ april 2007

FINISH DATE ▸ september 2009

CHARACTERISTICS:

- 500 kV Ribeirão Preto–Poços de Caldas substation, 136 km
- 500 kV Ribeirão Preto–Estreito substation, 118 km
- 500 kV Jaguara–Estreito substation, 46 km
- Transmission operations centre at the Ribeirão Preto substation
- Ribeirão Preto substation, 500 kV
- Ribeirão Preto substation, 440 kV
- Jaguara substation, 500 kV
- Estreito substation, 500 kV
- Poços de Caldas substation, 500 kV
- Telecommunications system

SOUTH AMERICA

São Paulo and Minas Gerais States (Brazil)

ELECTRICITY TRANSMISSION

POÇOS DE CALDAS

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ELECTRICITY TRANSMISSION

PORT AÇU-MXP

LOCATION ▸ Rio de Janeiro State (Brazil)

CUSTOMER ▸ LLX

PROJECT SCOPE:

Supply and construction of power line, and 345 kV dual-circuit MXP-Port Açu substation

AMOUNT ▸ EUR 27 million

START DATE ▸ november 2011

FINISH DATE ▸ january 2013

CHARACTERISTICS:

- Length 57 km
- Conductor type: Rail 2
- Type of guard wire: 3/8 + fibre
- 2 conductors per phase

SOUTH AMERICA

Rio de Janeiro State (Brazil)

ELECTRICITY TRANSMISSION

PORT AÇU-MXP

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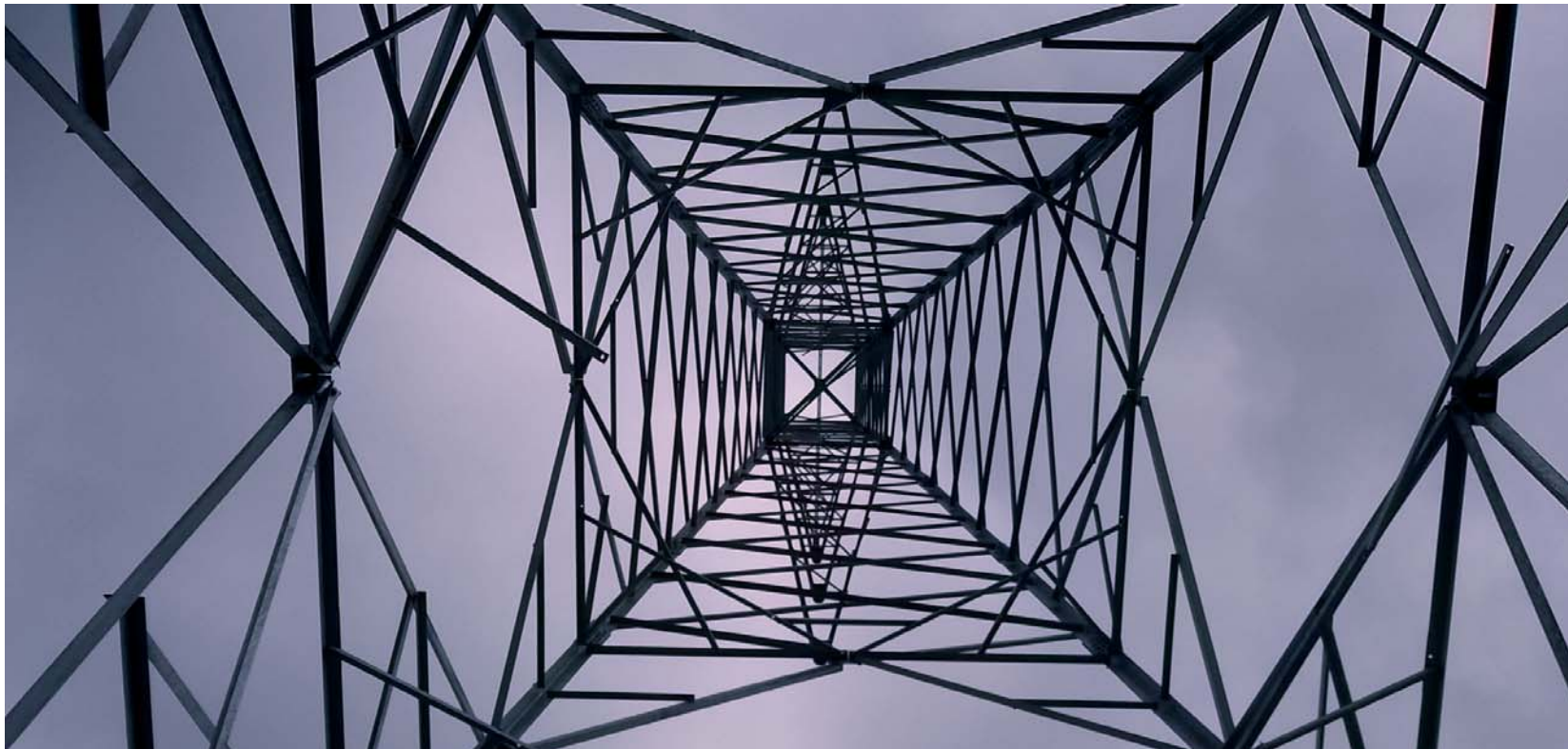

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ELECTRICITY TRANSMISSION

PORTO PRIMAVERA

LOCATION ▸ São Paulo and Mato Grosso do Sul States (Brazil)

CUSTOMER ▸ Porto Primavera Transmissora de Energía (PPTE)

TENDER ▸ ANEEL 001/2004. Lot J

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession until July 2011 of an electricity transmission system comprising 508 km of 230 kV lines and 3 substations (2 owned) with a transformation capacity of 1,200 MVA

EPC AMOUNT ▸ EUR 118 million (ENO 33%)

INVESTMENT ▸ BRL 339.1 million

START DATE ▸ july 2005

FINISH DATE ▸ october 2006

CHARACTERISTICS:

- 230 kV power line, Nova Porto Primavera–Imbirussu, 290 km
- 230 kV power line, Nova Porto Primavera–Dourados, 216 km
- 440 kV UHE power line, Sérgio Motta–Nova Porto Primavera, 2 km
- Nova Porto Primavera 230 kV substation
- Imbirussi 230 kV substation
- Dourados 230 kV substation

SOUTH AMERICA

São Paulo and Mato Grosso do Sul States (Brazil)

ELECTRICITY TRANSMISSION

PORTO PRIMAVERA

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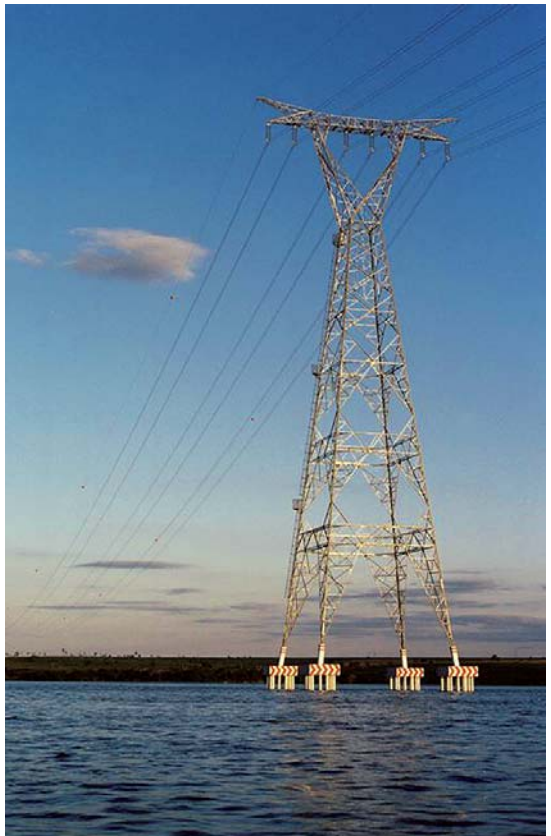

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ELECTRICITY TRANSMISSION

RIBEIRÃO PRETO

LOCATION ▸ Minas Gerais and São Paulo States (Brazil)

CUSTOMER ▸ Ribeirão Preto Transmissora de Energía (RPTE)

TENDER ▸ ANEEL 005/2006. Lot C

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession until December 2010 of an electricity transmission system comprising 412 km of 500 kV lines and 3 substations with a transformation capacity of 2,000 MVA

EPC AMOUNT ▸ EUR 88 million (ENO 33%)

INVESTMENT ▸ BRL 275.1 million

START DATE ▸ april 2007

FINISH DATE ▸ september 2009

CHARACTERISTICS:

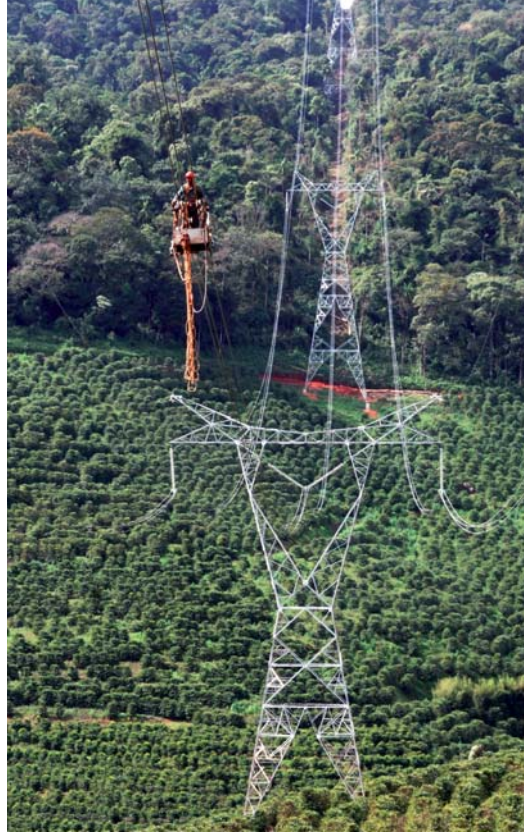
- 500 kV Ribeirão Preto–Marimbombo substation, 198 km
- 500 kV Marimbombo-São Simão substation, 210 km
- Transmission operations centre at the Ribeirão Preto substation
- Marimbombo substation, 500 kV
- São Simão substation, 500 kV
- Ribeirão Preto substation, 500 kV
- Telecommunications system

SOUTH AMERICA

Minas Gerais and São Paulo States (Brazil)

ELECTRICITY TRANSMISSION

RIBEIRÃO PRETO



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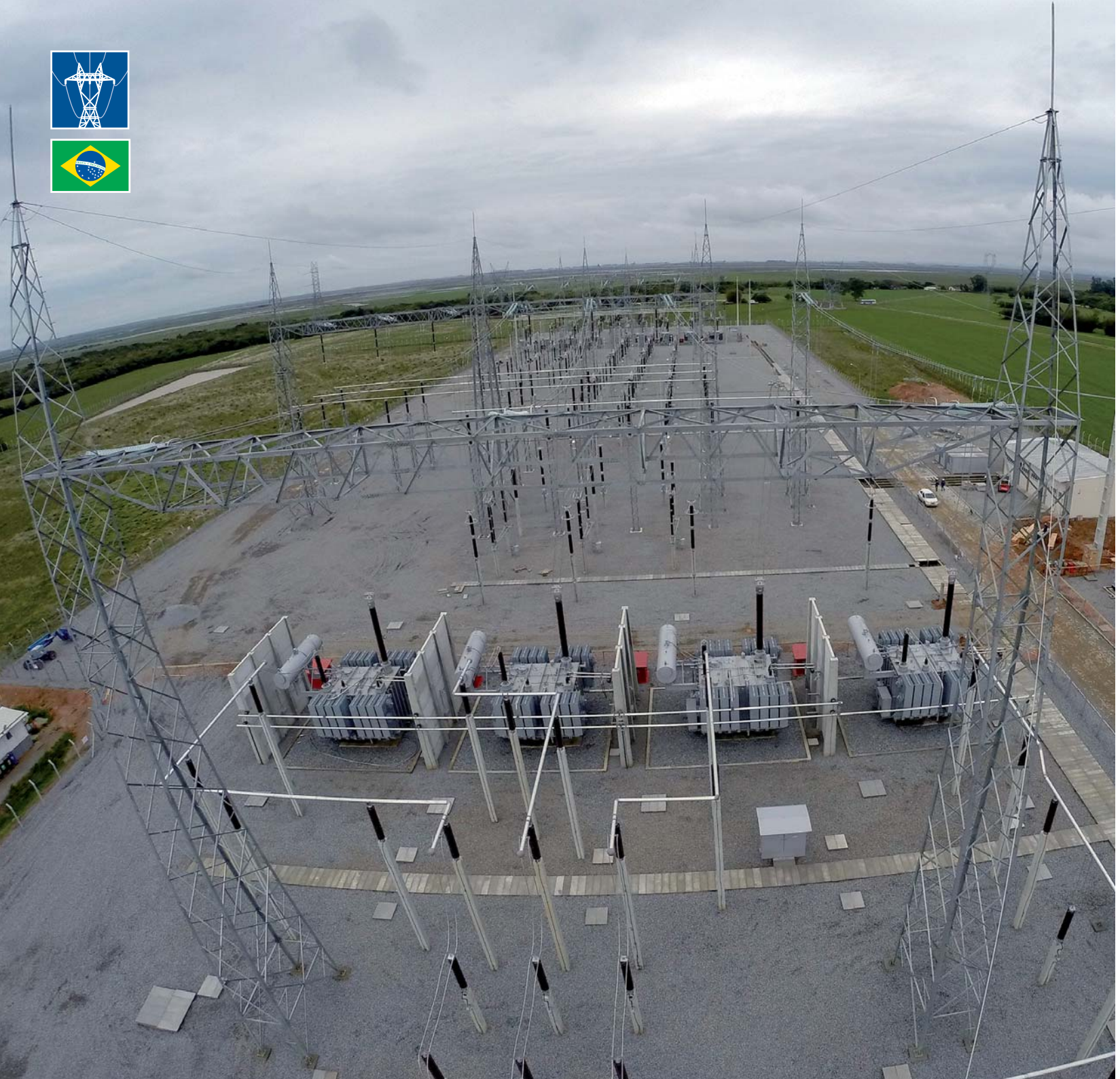

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ELECTRICITY TRANSMISSION

SANTA RITA-POVO NOVO

LOCATION ▸ Rio Grande do Sul State (Brazil)

CUSTOMER ▸ Transmissora Sul Litorânea

PROJECT SCOPE:

Supply and construction of the 265 km 525 kV Nova Santa Rita-Povo Novo power line from the Povo Novo 525/230 kV substation, and extension to the Nova Santa Rita 525 kV substation

AMOUNT ▸ EUR 122 million

START DATE ▸ november 2013

FINISH DATE ▸ march 2015

CHARACTERISTICS:

- Nova Santa Rita-Povo Novo 525 kV substation
  - Length 265 km
  - Conductor type: Liga 1120 MCM
  - Type of guard wire: OPGW+EHS
  - 4 conductors per phase
- Nova Santa Rita 525kV substation
  - One 525 kV line position with four 525/√3 kV, 50 MVAr single-phase reactors (1 standby bank)
- Povo Novo 525/230 kV substation
  - Two 525kV line positions with four 525/√3 kV single-phase reactors, 50 and 16.3 MVAr respectively (1 standby bank for each position)
  - One 525 kV/230 kV transformer position with four single-phase 525/√3-230/√3-13.8 kV, 224 MVA autotransformers (one 672 MVA bank and a 224 MVA standby bank)

SOUTH AMERICA

Rio Grande do Sul State (Brazil)

ELECTRICITY TRANSMISSION

SANTA RITA-POVO NOVO

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ELECTRICITY TRANSMISION

SERRA DA BABILONIA

LOCATION ▸ Morro de Chapéu, Bahia (Brazil)

CUSTOMER ▸ EDPR

PROJECT SCOPE ▸

EPC turnkey contract (Engineering, Procurement and Construction) for construction of a 4-switch double-busbar substation of a wind farm and the BAY for connection to the transmission network.

AMOUNT ▸ EUR 8.7 million

START DATE ▸ 2017

FINISH DATE ▸ 2018

CHARACTERISTICS:

- 2 x 230 KV transformer position modules
- 2 x three-phase 230/34.5 kV 90 MVA transformers
- 1 x 230 kV busbar interconnection module
- 1 x 230 kV line input module
- 1 BAY for connection to the transmission network

SOUTH AMERICA

Morro de Chapéu, Bahia (Brazil)

ELECTRICITY TRANSMISION

SERRA DA BABILONIA

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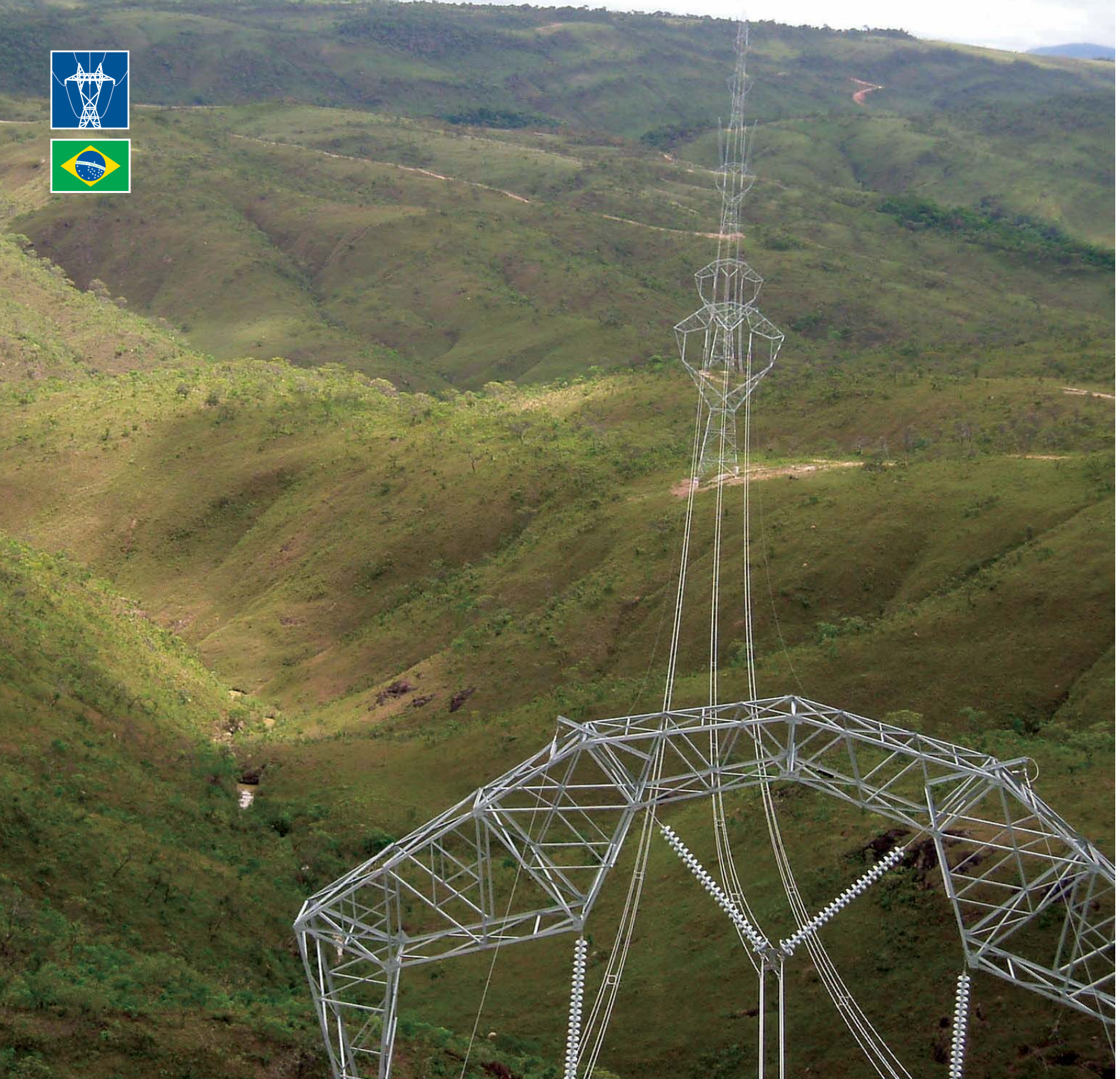

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ELECTRICITY TRANSMISSION

SERRA DA MESA

LOCATION ▸ Goiás, Distrito Federal and Minas Gerais States (Brazil)

CUSTOMER ▸ Serra da Mesa Transmissora de Energía (SMTE)

TENDER ▸ ANEEL 001/2005. Lot C

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession until December 2010 of an electricity transmission system comprising 681 km of 500 kV lines and 3 substations (2 owned) with a transformation capacity of 600 MVA

EPC AMOUNT ▸ EUR 227 million (ENO 33%)

INVESTMENT ▸ BRL 613.6 million

START DATE ▸ october 2011

FINISH DATE ▸ october 2013

CHARACTERISTICS:

- 500 kV Serra da Mesa-Luzitania-Samambaia-Paracatú-Emborcação power line, 681 km
- Serra da Mesa, Luziânia, Samambaia, Emborcação and Paracatú substations - 525 kV, 600 MVA, 180 MVAr

SOUTH AMERICA

Goiás, Distrito Federal and Minas Gerais States (Brazil)

ELECTRICITY TRANSMISSION

SERRA DA MESA

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ELECTRICITY TRANSMISSION

SERRA PARACATÚ

LOCATION ▸ Minas Gerais State (Brazil)

CUSTOMER ▸ Serra Paracatú Transmissora de Energía (SPTE)

TENDER ▸ ANEEL 003/2006. Lot A

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession until December 2010 of an electricity transmission system comprising 246 km of 500 kV lines and 2 substations (1 owned) with a transformation capacity of 1,650 MVA

EPC AMOUNT ▸ EUR 103 million (ENO 33%)

INVESTMENT ▸ BRL 265.6 million

START DATE ▸ june 2007

FINISH DATE ▸ april 2009

CHARACTERISTICS:

- 500 kV Paracatú 4–Pirapora 2 power line 244 km
- Operations centre at the Luzîana substation
- Paracatú 4 substation, 500 kV
- Pirapora 2 substation, 500 kV
- Pirapora 2 substation, 345 kV
- Pirapora 2 substation, 138 kV
- Telecommunications system

SOUTH AMERICA

Minas Gerais State (Brazil)

ELECTRICITY TRANSMISSION

SERRA PARACATÚ

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ELECTRICITY TRANSMISSION

TRIÁNGULO

LOCATION ▸ Minas Gerais State (Brazil)

CUSTOMER ▸ Linha de Transmissao Triángulo (LTT)

TENDER ▸ ANEEL 001/2005. Lot D

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession of an electricity transmission system comprising 706 km of 500 kV lines and 6 substations (1 owned) with a transformation capacity of 1,800 MVA

EPC AMOUNT ▸ EUR 196 million (ENO 33%)

INVESTMENT ▸ BRL 578.1 million

START DATE ▸ july 2007

FINISH DATE ▸ december 2008

CHARACTERISTICS:

- 500 kV Nova Ponte–Itumbiara power line, 182 km
- 500 kV Nova Ponte–Estreito power line, 140 km
- 500 kV Emborcação–Nova Ponte C2 power line, 88 km
- 500 kV Nova Ponte–São Gotardo 2 power line, 194 km
- 500 kV São Gotardo 2–Bom Despacho 3 C2 power line, 91 km
- Transmission operations centre at Itumbiara
- Emborcação substation, 500 kV
- Nova Ponte substation, 500 kV
- Itumbiara substation, 500 kV
- Estreito substation, 500 kV
- Estreito substation, 345 kV
- São Gotardo 2 substation, 500 kV
- Bom Despacho 3 substation, 500 kV

SOUTH AMERICA

Minas Gerais State (Brazil)

ELECTRICITY TRANSMISSION

TRIÁNGULO

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ELECTRICITY TRANSMISSION

VENTOS DA BAHIA

LOCATION ▸ State of Bahia (Brazil)

CUSTOMER ▸ EDF

PROJECT SCOPE ▸

Ventos da Bahia Phase 3 which includes the construction of a new 230/34.5 kV (200 MVA) substation for a wind farm and the 230 kV expansion of 1 substation for connection to the mains electricity grid. The scope also includes the engineering, supply and construction of 13 km of 230 kV lines

AMOUNT ▸ EUR 11.8 million

START DATE ▸ January 2020

FINISH DATE ▸ April 2021

CHARACTERISTICS:

- Construction of a new 230/34.5 kV substation at Ventos da Bahia 3, which includes:
  - 230 kV switchyard: double bus scheme, inter-busbar, two 200 MVA transformer positions, one 230 kV line position and one O&M building
  - 34.5 kV switchyard: sheltered and SF6-insulated enclosures, with 15 feeders (wind turbine lines)
- Connection bay (Extension of the Ventos da Bahia II substation); one 230 kV line position
- 230 kV, 13 km line, single circuit and two conductors per phase

SOUTH AMERICA

State of Bahia (Brazil)

ELECTRICITY TRANSMISSION

VENTOS DA BAHIA

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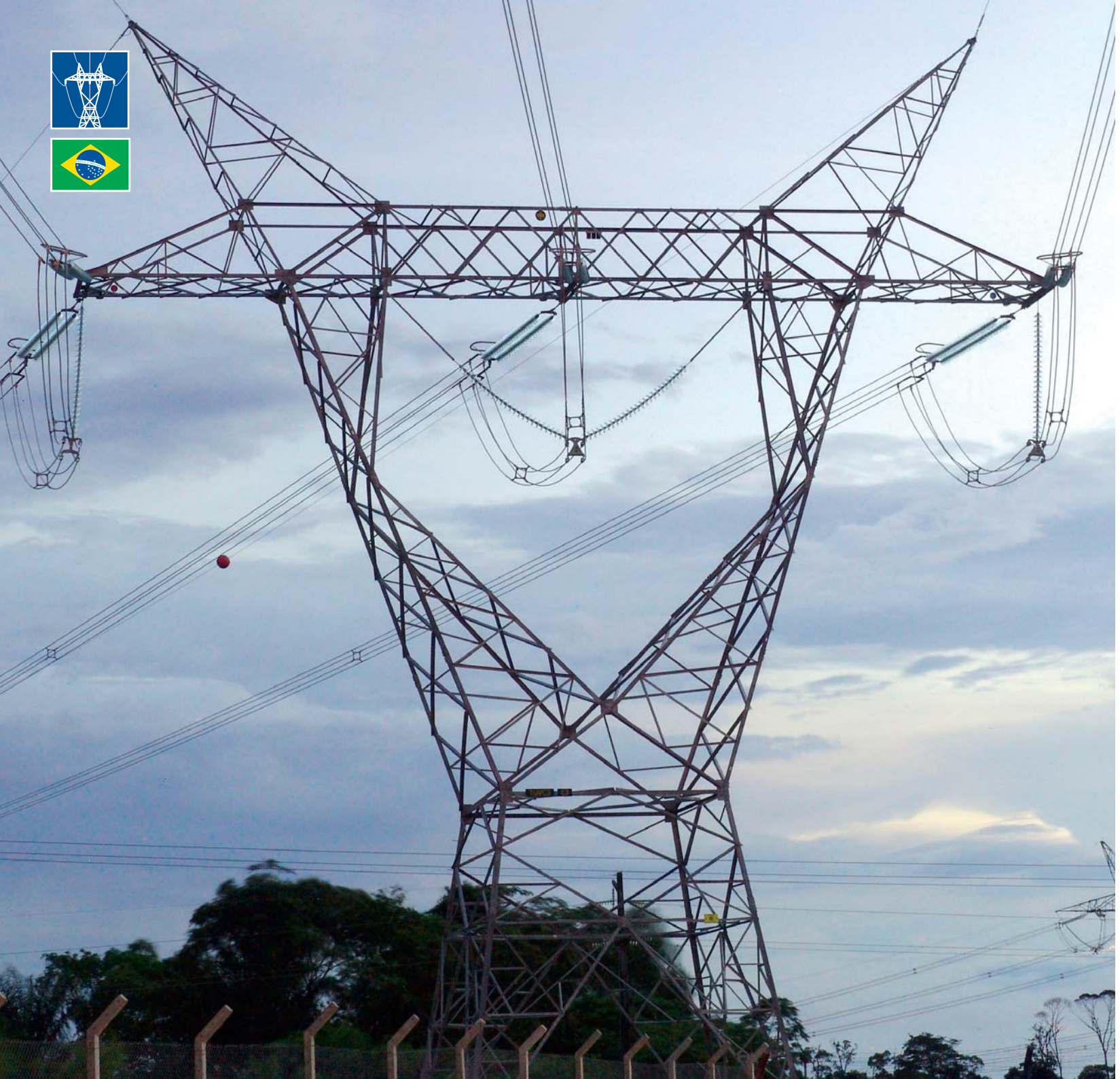

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ELECTRICITY TRANSMISSION

VILA DO CONDE

LOCATION ▸ Pará State (Brazil)

CUSTOMER ▸ Vila do Conde Transmissora de Energía (VCTE)

TENDER ▸ ANEEL 001/2004. Lot D

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance and operation under concession of an electricity transmission system comprising 325 km of 500 kV lines and 2 substations with a transformation capacity of 675 MVA

EPC AMOUNT ▸ EUR 85 million (ENO 33%)

INVESTMENT ▸ BRL 274.4 million

START DATE ▸ july 2005

FINISH DATE ▸ may 2006

CHARACTERISTICS:

- 500 kV Tucuruí–Vila do Conde power line, 325 km
- Tucuruí substation
- Vila do Conde substation
- Telecommunications system and control supervision system

SOUTH AMERICA

Pará State (Brazil)

ELECTRICITY TRANSMISSION

VILA DO CONDE

elecnor

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ELECTRICITY TRANSMISION

XINGU-TAPAJÓS

LOCATION ▸ State of Pará (Brazil)

CUSTOMER ▸ Equatorial

PROJECT SCOPE ▸

Lot No. 31 of Auction No. 005/2016 which includes the construction of a new 230/138 kV substation and the 230 kV expansion of 4 other substations. Synchronous condensers of +150/-75 MVAr and +110/-55 MVAr will be provided to two substations, respectively. Also included is the engineering, supply and construction of the 230 kV lines between Xingu-Altamira, Altamira-Trasamazónica and Trasamazónica-Tapajós, of a length of 60 km, 187 km and 183 km, respectively

AMOUNT ▸ EUR 167 million

START DATE ▸ august 2017

FINISH DATE ▸ february 2020

CHARACTERISTICS:

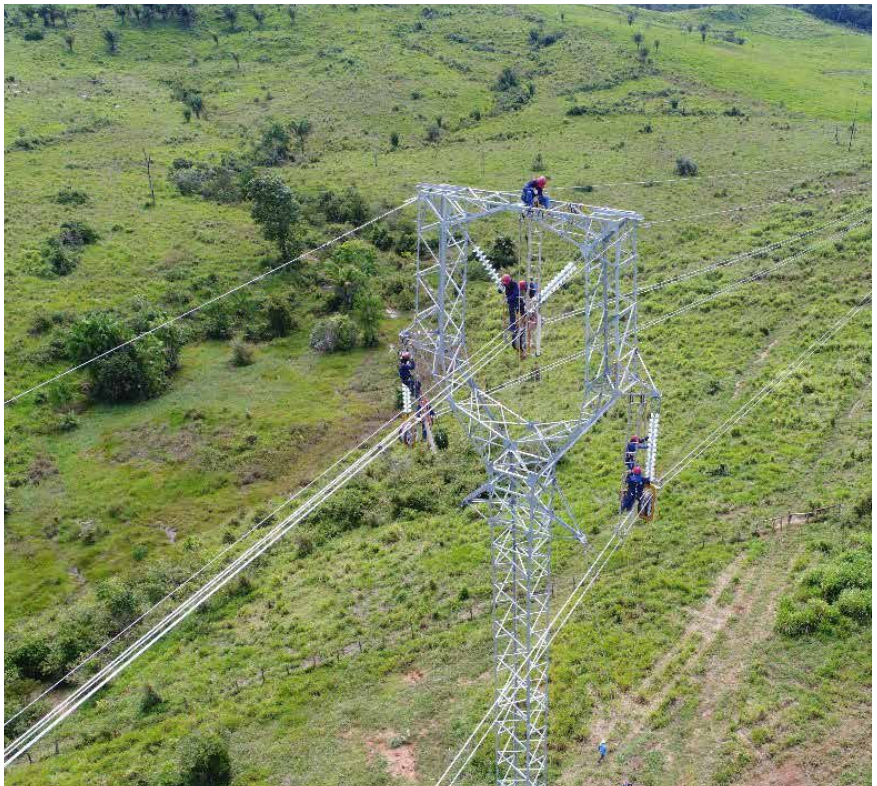
- Construction of the new 230/138 kV Tapajós substation, which includes:
  - 230 kV switchyard: double bus scheme with four sectioning switches, line position with 10 MVAr reactor, inter-busbar connection, +150/-75 MVAr synchronous condenser connection and two 2x150 MVA transformer connections
  - 138 kV switchyard: double bus scheme with four sectioning switches with a line position and inter-busbar connection
- Expansion of the Altamira, Xingu, Transamazónica and Rurópolis substations. Xingu and Altamira have 1 and 2 230 kV line outputs, respectively, and Transamazónica has two 230 kV line outputs with 30 MVAr and 10 MVAr reactors, respectively. Rurópolis is an isolated substation, and its range is based on the supply, construction and commissioning of a +110/-55 MVAr synchronous condenser
- 230 kV, 60 km Xingu-Altamira line, single circuit and two conductors per phase; 230 kV, 187 km Altamira-Trasamazónica line, single circuit and two conductors per phase; and 230 kV, 183 km Transamazónica-Tapajós line, single circuit and one conductor per phase

SOUTH AMERICA

State of Pará (Brazil)

ELECTRICITY TRANSMISION

XINGU-TAPAJÓS



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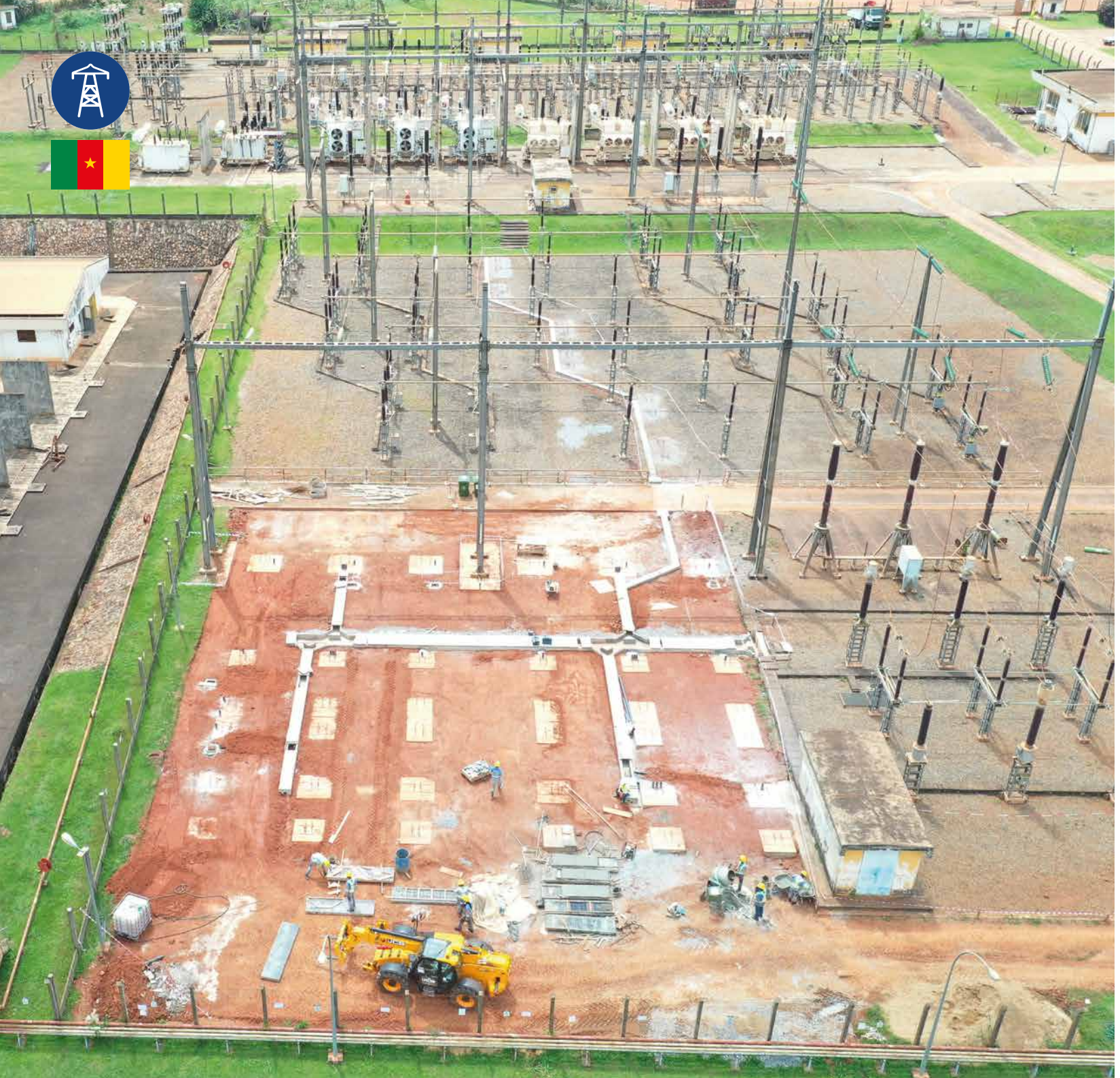

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ELECTRICITY TRANSMISSION

EDEA-YAOUNDÉ TL AND SS

LOCATION ▸ Yaoundé (Cameroon)

CUSTOMER ▸ Cameroon Ministry of Water and Energy (MINEE)

PROJECT SCOPE ▸

Turnkey project for the reinforcement and stabilisation of the high voltage grid and distribution of the power generated to the country's new hydroelectric power plants

AMOUNT ▸ EUR 45 million

START DATE ▸ May 2019

FINISH DATE ▸ May 2021

CHARACTERISTICS:

- Construction of two substations (225 kV and 90 kV)
  - Nkolanga 90 kV
  - Edea 225 kV
- Expansion of four existing substations
  - Oyomabang 225/90 kV
  - Ngousso 90/60/15 kV
  - Ahala 90/60/15 kV
  - Kondengui 90 kV (GIS)
- Construction of two high voltage lines 90 kV (18 km) and 225 kV (6 km)
  - Ahala-Nkolanga-Kondengui 90 kV
  - Edea-Kribi 225 kV

AFRICA

Yaoundé, (Cameroon)

ELECTRICITY TRANSMISSION

EDEA-YAOUNDÉ TL AND SS

elecnor

elecnor

ELECTRICITY TRANSMISSION

ALTO JAHUEL

LOCATION ▸ Metropolitan Region and regions VI and VII (Chile)

CUSTOMER ▸ Alto Jahuel Transmisora de Energía (AJTE)

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance, and concession operation of an electricity transmission system comprising 256 km of 500 kV lines and 2 substations

EPC AMOUNT ▸ EUR 180 million

INVESTMENT ▸ USD 323 million

START DATE ▸ april 2010 (1st circuit)

FINISH DATE ▸ january 2016 (2nd circuit)

CHARACTERISTICS:

- Construction of a high-voltage line (500 kV) forming a 256 km dual circuit (in 2 stages), and 2 output lines in Ancoa and Alto Jahuel. Installation of two 110 MVAr reactor banks, and a bank of 219 MVAr condensers in Ancoa. Includes civil engineering, installation of telecommunications system, control system and reactor control and protection system

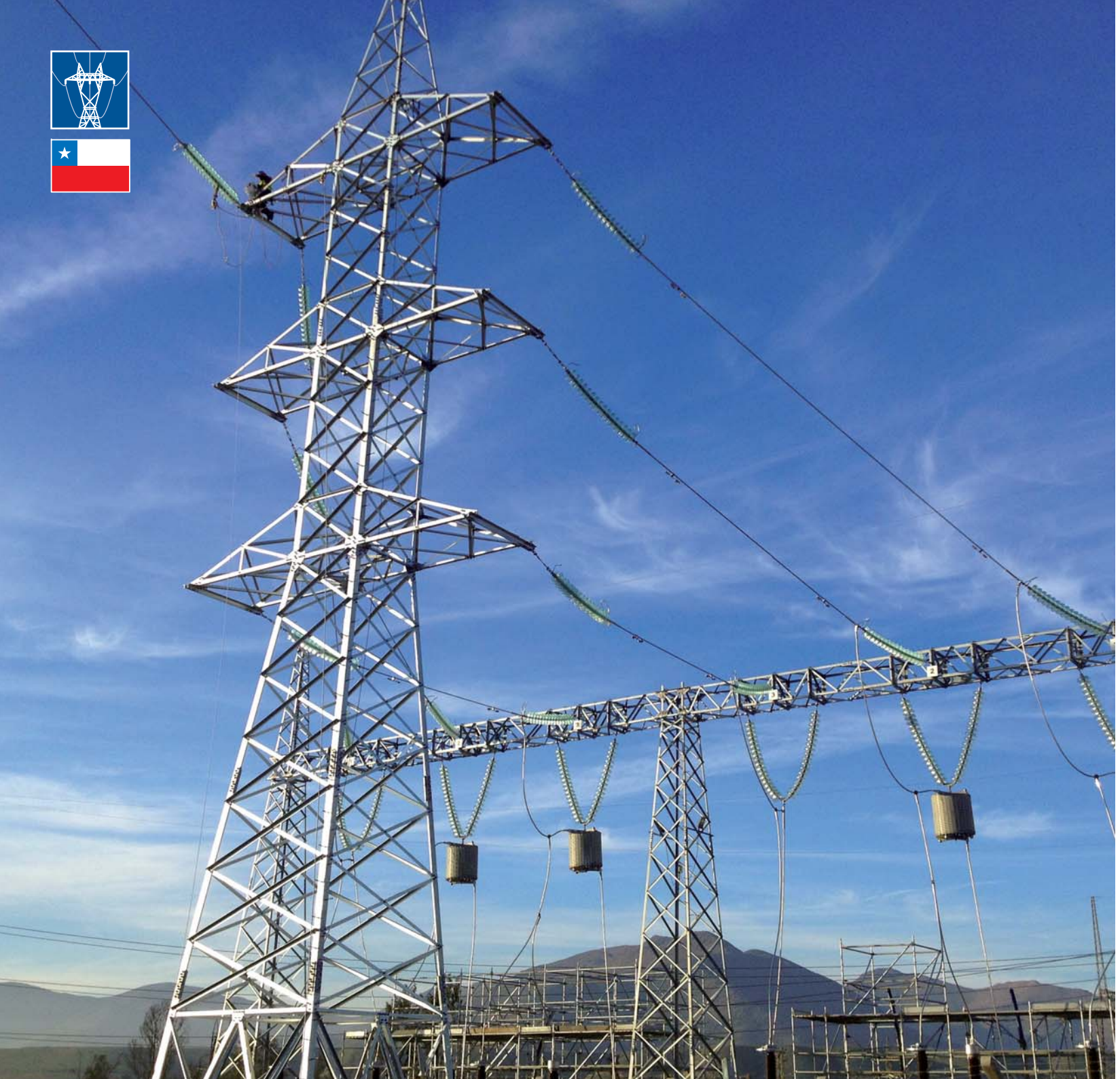
SOUTH AMERICA

Metropolitan Region and regions VI and VII (Chile)

ELECTRICITY TRANSMISSION

ALTO JAHUEL

elecnor



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ELECTRICITY TRANSMISSION

CABO LEONES I

LOCATION ▸ Comuna de Freirina, Huasco. III Atacama region, Chile

CUSTOMER ▸ Ibereólica

PROJECT SCOPE
Construction of the system of interconnection with the existing network of the 170 MW wind farm Cabo Leones I

AMOUNT ▸ EUR 27 million

START DATE ▸ June 2016

FINISH DATE ▸ July 2017

CHARACTERISTICS:

- Power output: 170 MW
- Line: 110 km of double circuit 220 kV line, 1 conductor per phase
- Extension of the Maitencillo substation (two positions in gas-insulated substation 220kV)

SOUTH AMERICA

Comuna de Freirina, Huasco.
III Atacama region, Chile

ELECTRICITY TRANSMISSION

CABO LEONES I

elecnor

elecnor

ELECTRICITY TRANSMISSION

CHARRÚA

LOCATION ▸ VII and VIII regions (Chile)

CUSTOMER ▸ Charrúa Transmisora de Energía (CHATE)

PROJECT SCOPE:

Engineering, supply, construction, commissioning, maintenance, and concession operation of an electricity transmission system comprising 198 km of 500 kV lines and 2 substations

EPC AMOUNT ▸ EUR 87 million

INVESTMENT ▸ EUR 153 million

START DATE ▸ february 2013

FINISH DATE ▸ february 2018

CHARACTERISTICS:

- Construction of a 2x500 kV high-voltage line forming a 198 km dual circuit from the Charrúa substation to the Ancoa substation. Dual-circuit structure and laying of first circuit with a capacity of 1,400 MVA

SOUTH AMERICA

VII and VIII regions (Chile)

ELECTRICITY TRANSMISSION

CHARRÚA

elecnor

elecnor

ELECTRICITY TRANSMISSION

NUEVA DIEGO DE ALMAGRO

LOCATION ▸ III region (Chile)

CUSTOMER ▸ Diego de Almagro Transmisora de Energía (DATE)

PROJECT SCOPE
Engineering, supply, construction, commissioning, maintenance and operation under concession of an electricity transmission system comprising 40 km of 220 kV lines, 1 substation and an autotransformer bank 1x750 MVA, 500/220 kV

EPC AMOUNT ▸ EUR 74 million

INVESTMENT ▸ USD 90 million

START DATE ▸ May 2016

FINISH DATE ▸ May 2018 (Stage 1: Substation Nueva Diego de Almagro and switching) and November 2019 (Stage 2: Line 2x220 kV, Nueva Diego de Almagro-Cumbres and autotransformer bank in SS Cumbres)

CHARACTERISTICS:

- Construction of the substation Nueva Diego de Almagro along with its switching, a 40 km double circuit 220 kV line with a capacity of 600 MVA which will connect the Nueva Diego de Almagro substation with the Cumbres substation and the installation of a 1x750MVA, 500/220kV autotransformer bank in the Cumbres substation

SOUTH AMERICA

III region (Chile)

ELECTRICITY TRANSMISSION

NUEVA DIEGO DE ALMAGRO

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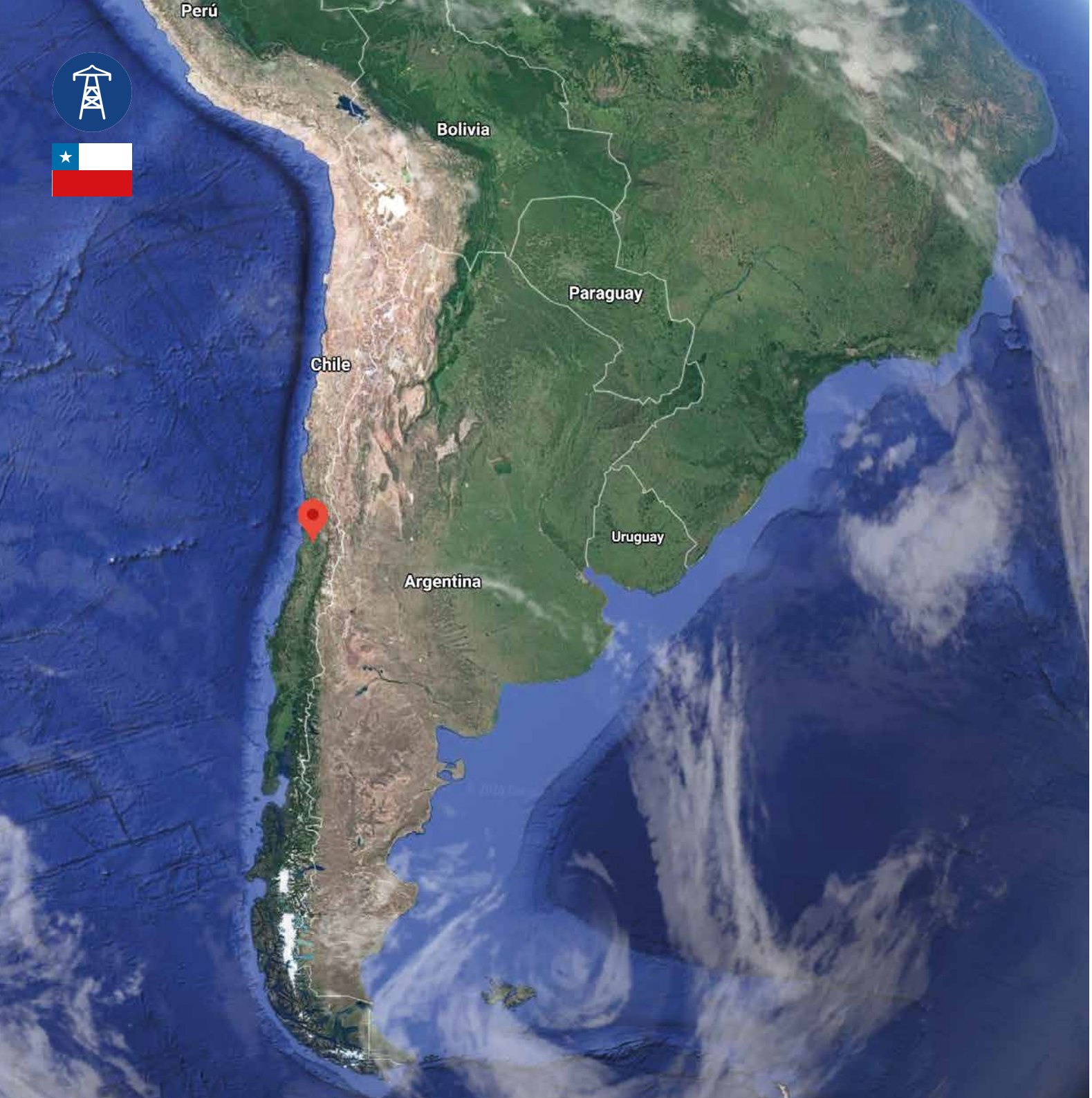

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ELECTRICITY TRANSMISSION

ZONAL TRANSMISSION SYSTEM

LOCATION ▸ Chile

CUSTOMER ▸ CNE (Comisión Nacional de Energía - National Energy Commission)

PROJECT SCOPE ▸

Construction, operation and maintenance of two new projects relating to the Zonal Transmission System

AMOUNT ▸ EUR 396 million

START DATE ▸ October 2018

FINISH DATE ▸ October 2023

CHARACTERISTICS:

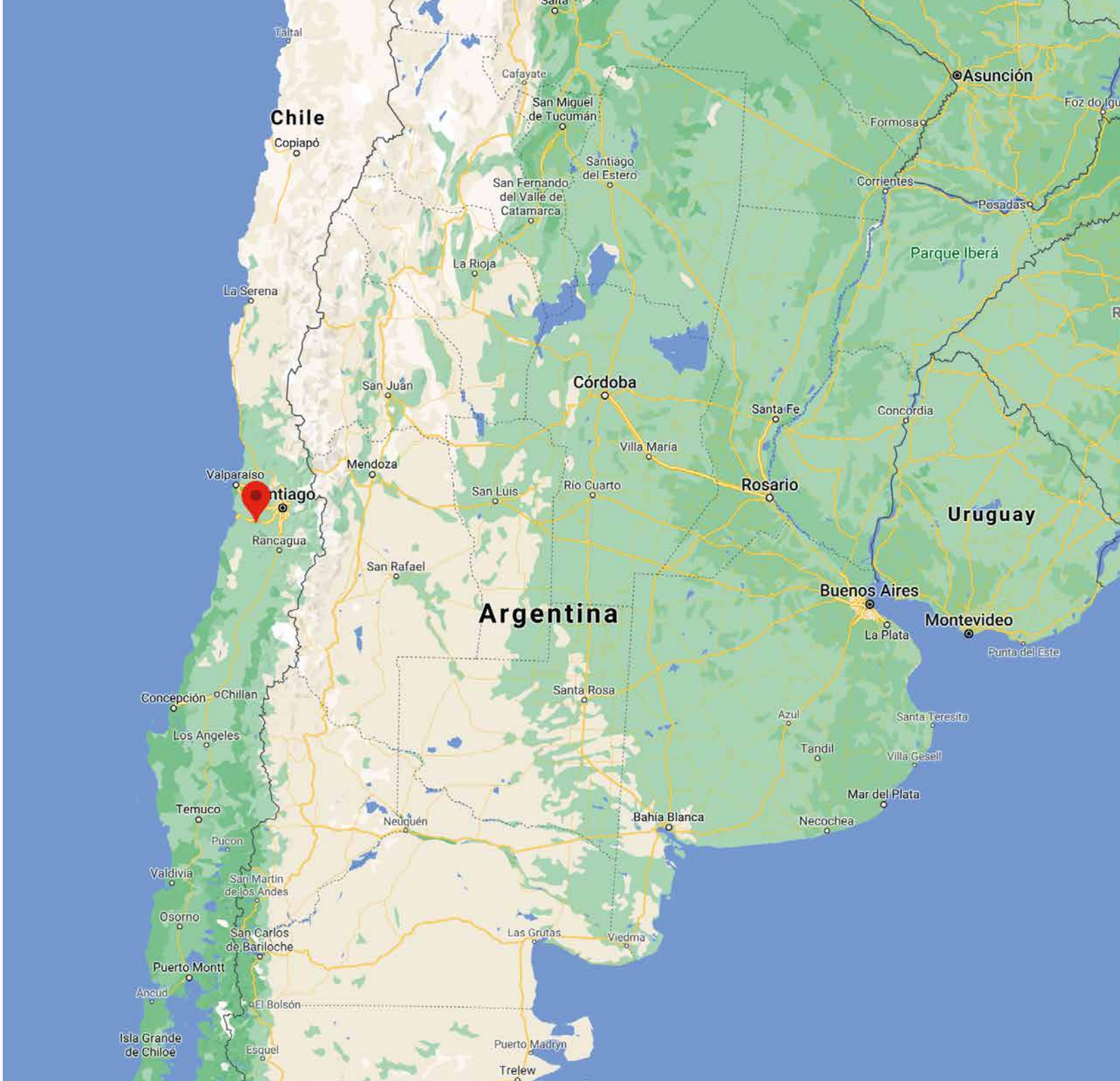
- PROJECT 1
  - West of Santiago de Chile, between Melipilla and Valparaíso
  - It will improve the electricity in the area as well as the connection between the capital and the Valparaíso region
  - Two new substations: Casablanca (220/66 kV) and La Pólvora (220/110 kV)
  - 220 kV double-circuit power transmission line (110 km)
- PROJECT 2
  - South of Santiago de Chile
  - Five substations
  - Transmission line (360 km through six substations)

SOUTH AMERICA

Chile

ELECTRICITY TRANSMISSION

ZONAL TRANSMISSION SYSTEM



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ELECTRICITY TRANSMISSION

FUNGURUME-KASUMBLESA

LOCATION ▸ Katanga province (Democratic Republic of Congo)

CUSTOMER ▸ Société Nationale d'Electricité (SNEL)

PROJECT SCOPE:

Construction through a consortium of 270 km of 3 transmission lines in Katanga province, Democratic Republic of Congo

AMOUNT ▸ EUR 66 million (ENO 50%)

START DATE ▸ november 2009

FINISH DATE ▸ december 2010

CHARACTERISTICS:

- 90 km of a dual-circuit 220 kV line (239 towers) between the Karavia substation (Lubumbashi) and a final tower in Kasumbalesa
- 110 km of a single-circuit 220 kV line (310 towers) between the Karavia substation and the Panda substation (Likasi)
- 70 km of a single-circuit 220 kV line (210 towers) between the Panda substation (Likasi) and the Fungurume substation

AFRICA

Katanga province (Democratic Republic of Congo)

ELECTRICITY TRANSMISSION

FUNGURUME-KASUMBLESA

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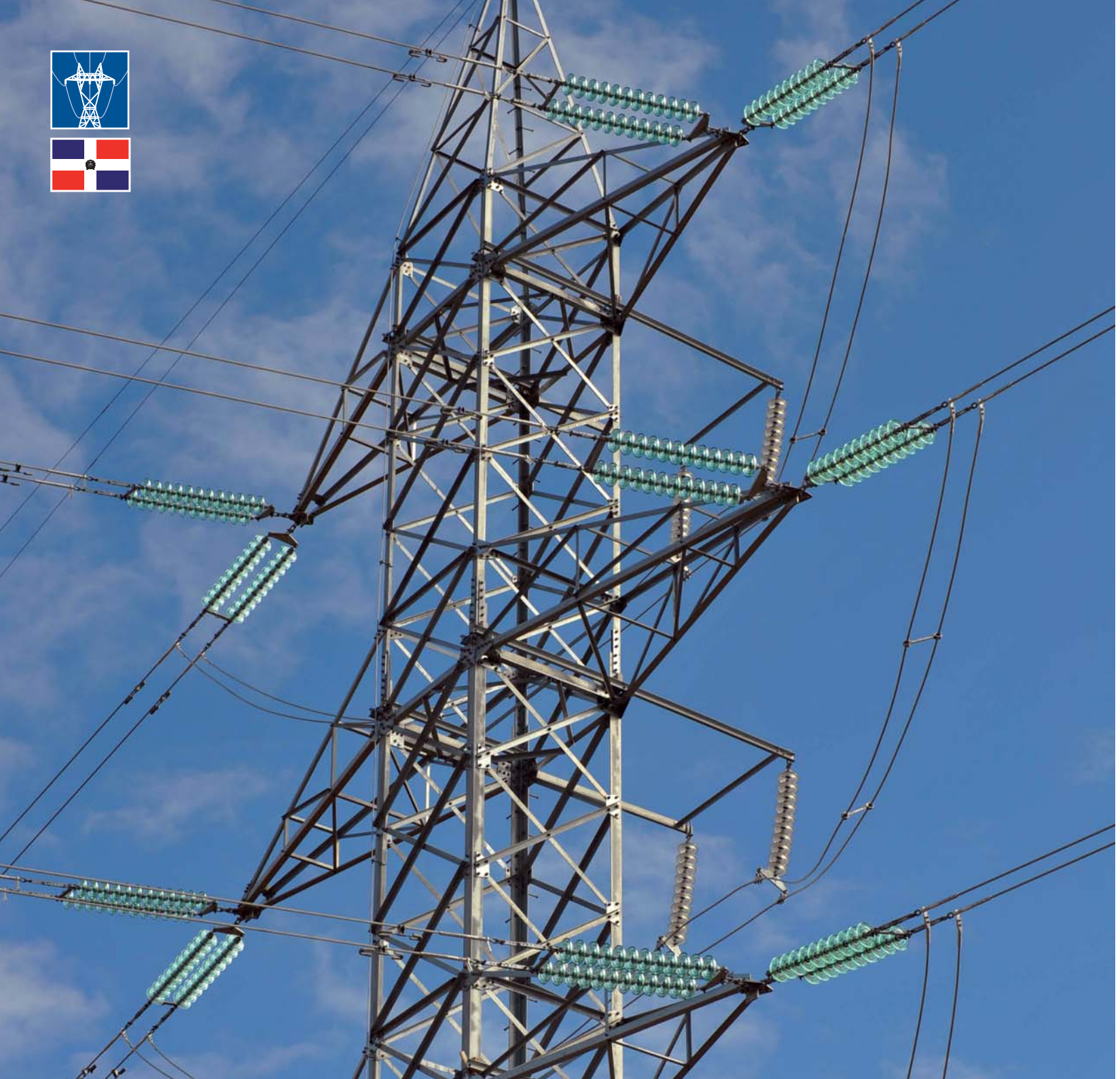

elecnor

ELECTRICITY TRANSMISSION

PEDRO BRAND-GUERRA TL

LOCATION ▸ Santo Domingo province (Dominican Republic)

CUSTOMER ▸ Empresa de Transmisión Eléctrica Dominicana (ETED)

PROJECT SCOPE:

Engineering, supply and construction of a 345 kV transmission line spanning 41.6 km from the Guerra substation to the interconnection with the 345 kV Julio Sauri-El Naranjo power line

AMOUNT ▸ EUR 15 million

START DATE ▸ october 2015

FINISH DATE ▸ april 2017

CHARACTERISTICS:

- 129 galvanised steel latticework pylons
- AAAC Darien 559.5 MCM aluminium alloy conductor cable
- Dual circuit, 3 conductors per phase
- Two guard wires - 24 optic fibre OPGW, and No. 9 Alumoweld 7
- Polymeric insulators

CENTRAL AMERICA

Santo Domingo province
(Dominican Republic)

ELECTRICITY TRANSMISSION

PEDRO BRAND-GUERRA TL

elecnor

elecnor

ELECTRICITY TRANSMISSION

PIZARRETE-S. JUAN DE LA MAGUANA

LOCATION ▸ Pizarrete, San Juan de la Managua (Dominican Republic)

CUSTOMER ▸ Empresa de Transmisión Eléctrica Dominicana (ETED)

PROJECT SCOPE:

Engineering, supply and construction of a 138 kV transmission line stretching 131 km from the Pizarrete substation to San Juan, and from there to San Juan de la Maguana

AMOUNT ▸ EUR 20 million

START DATE ▸ may 2015

FINISH DATE ▸ august 2016

CHARACTERISTICS:

- Pizarrete-Cruce San Juan power line, 76.8 km, dual circuit with two conductors per phase (Darien) and an OPGW
- Cruce San Juan-San Juan de la Maguana power line, 54.6 km, dual circuit with one conductor per phase (Darien) and an OPGW

CENTRAL AMERICA

Pizarrete, San Juan de la Managua
(Dominican Republic)

ELECTRICITY TRANSMISSION

PIZARRETE-S. JUAN DE LA MAGUANA

elecnor

elecnor

ELECTRICITY TRANSMISSION

PUEBLO VIEJO MINE

LOCATION ▸ Sánchez Ramírez and Monseñor Nouel provinces (Dominican Republic)

CUSTOMER ▸ Barrick

PROJECT SCOPE:

Engineering, supply and construction of a 230 kV transmission line spanning 27 km from the Piedra Blanca substation to the Mina Pueblo Viejo substation

AMOUNT ▸ EUR 30 million

START DATE ▸ february 2011

FINISH DATE ▸ december 2011

CHARACTERISTICS:

- 85 galvanised steel latticework pylons
- AAAC 1200 MCM aluminium alloy conductor cable
- Dual circuit, 1 conductor per phase
- Two OPGW guard wires
- Polymeric insulators

CENTRAL AMERICA

Sánchez Ramírez and Monseñor Nouel provinces (Dominican Republic)

ELECTRICITY TRANSMISSION

PUEBLO VIEJO MINE

elecnor

elecnor

ELECTRICITY TRANSMISSION

PUNTA CATALINA-JULIO SAURI TL

LOCATION ▸ Peravia and San Cristóbal provinces (Dominican R.)

CUSTOMER ▸ Corporación Dominicana Empresas Eléctricas Estatales (CDEEE)

PROJECT SCOPE:

Turnkey construction of a 345 kV transmission line from the Punta Catalina thermoelectric power plant to the 345/138 kV Julio Sauri substation. Includes the detailled design, manufacture, CIP supply, civil engineering, assembly and laying of conductors, testing and start-up

AMOUNT ▸ EUR 32 million

START DATE ▸ january 2016

FINISH DATE ▸ february 2017

CHARACTERISTICS:

- Galvanised steel self-supporting reticulated towers
- Dual circuit with two conductors per phase (AAAC Greeley)
- Two guard wires - 24 optic fibre OPGW, and No. 7 Alumoweld 7
- Line length 44.4 km

CENTRAL AMERICA

Peravia and San Cristóbal provinces (Dominican R.)

ELECTRICITY TRANSMISSION

PUNTA CATALINA-JULIO SAURI TL

elecnor

elecnor

ELECTRICITY TRANSMISSION

SAN PEDRO-COTUÍ TL

LOCATION ▸ San Pedro de Macorís province (Dominican Republic)

CUSTOMER ▸ Barrick

PROJECT SCOPE:

Engineering, supply and construction of a 230 kV transmission line spanning 111 km from the Quisqueya substation to the interconnection with the line linking the Piedra Blanca substation and the Mina Pueblo Viejo substation

AMOUNT ▸ EUR 28 million

START DATE ▸ may 2012

FINISH DATE ▸ august 2013

CHARACTERISTICS:

- 313 galvanised steel latticework pylons
- AAAC 1200 MCM aluminium alloy conductor cable
- Dual circuit, 1 conductor per phase
- Two 24 optic fibre OPGW guard wires
- Polymeric insulators

CENTRAL AMERICA

San Pedro de Macorís province
(Dominican Republic)

ELECTRICITY TRANSMISSION

SAN PEDRO-COTUÍ TL

elecnor

elecnor

ELECTRICITY TRANSMISSION

SANTO DOMINGO-SANTIAGO

LOCATION ▸ Sto. Domingo, Sánchez Ramírez, La Vega, Santiago and Puerto Plata provinces (Dominican Republic)

CUSTOMER ▸ Empresa de Transmisión Eléctrica Dominicana (ETED)

PROJECT SCOPE:

Engineering, supply and construction of 130 km of 345 kV and 60 km of 138 kV transmission lines

AMOUNT ▸ EUR 71 million

START DATE ▸ october 2006

FINISH DATE ▸ december 2010

CHARACTERISTICS:

- Conductor type: Darien
- Circuits: 2
- Type of guard wire: OPGW 48 F and Allumoweld 7#9
- Conductors per phase: 3

CENTRAL AMERICA

Sto. Domingo, Sánchez Ramírez, La Vega, Santiago and Puerto Plata provinces (Dominican Republic)

ELECTRICITY TRANSMISSION

SANTO DOMINGO-SANTIAGO

elecnor

elecnor

ELECTRICITY TRANSMISSION

SULTANA DEL ESTE

LOCATION ▸ San Pedro de Macorís province (Dominican Republic)

CUSTOMER ▸ Consorcio Energético Punta Cana Macao (CEPM)

PROJECT SCOPE:

Engineering, supply and construction of two 138 kV power lines over 124 km from Sultana del Este to the main CEPM facility via the La Romana substation

AMOUNT ▸ EUR 16 million

START DATE ▸ july 2006

FINISH DATE ▸ may 2010

CHARACTERISTICS:

- 138 kV power line from Sultana del Este-La Romana substation, length 49 km, 2 circuits with 1 conductor per phase (Darien) and one OPGW 48 F guard wire
- 138 kV power line from La Romana substation-main CEPM facility, length 75 km, 1 circuit with 2 conductors per phase (Darien) and one OPGW 48 F guard wire

CENTRAL AMERICA

San Pedro de Macorís province
(Dominican Republic)

ELECTRICITY TRANSMISSION

SULTANA DEL ESTE

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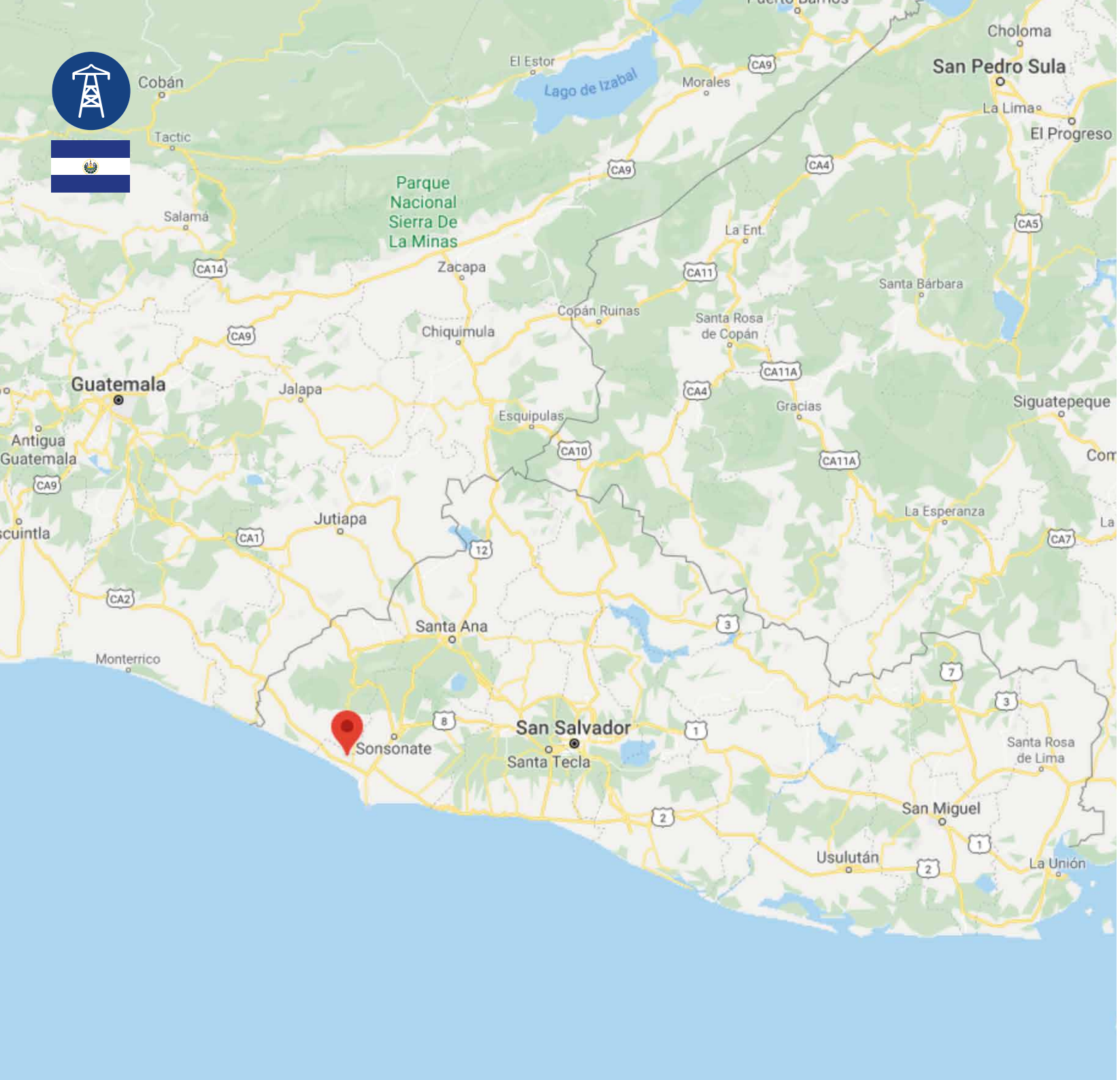


elecnor

POWER TRANSMISSION

ACAJUTLA-AHUACHAPÁN TL

LOCATION ▸ Acajutla, Sonsonate and Ahuachapán, Ahuachapán (El Salvador)

CUSTOMER ▸ Energía del Pacífico — Invenergy

PROJECT SCOPE ▸

EPC project: Construction of an evacuation system for a 378 MW natural gas power plant. This system consists of one overhead and two underground 230 kV transmission lines

AMOUNT ▸ EUR 46 million

START DATE ▸ December 2019

FINISH DATE ▸ October 2021

CHARACTERISTICS:

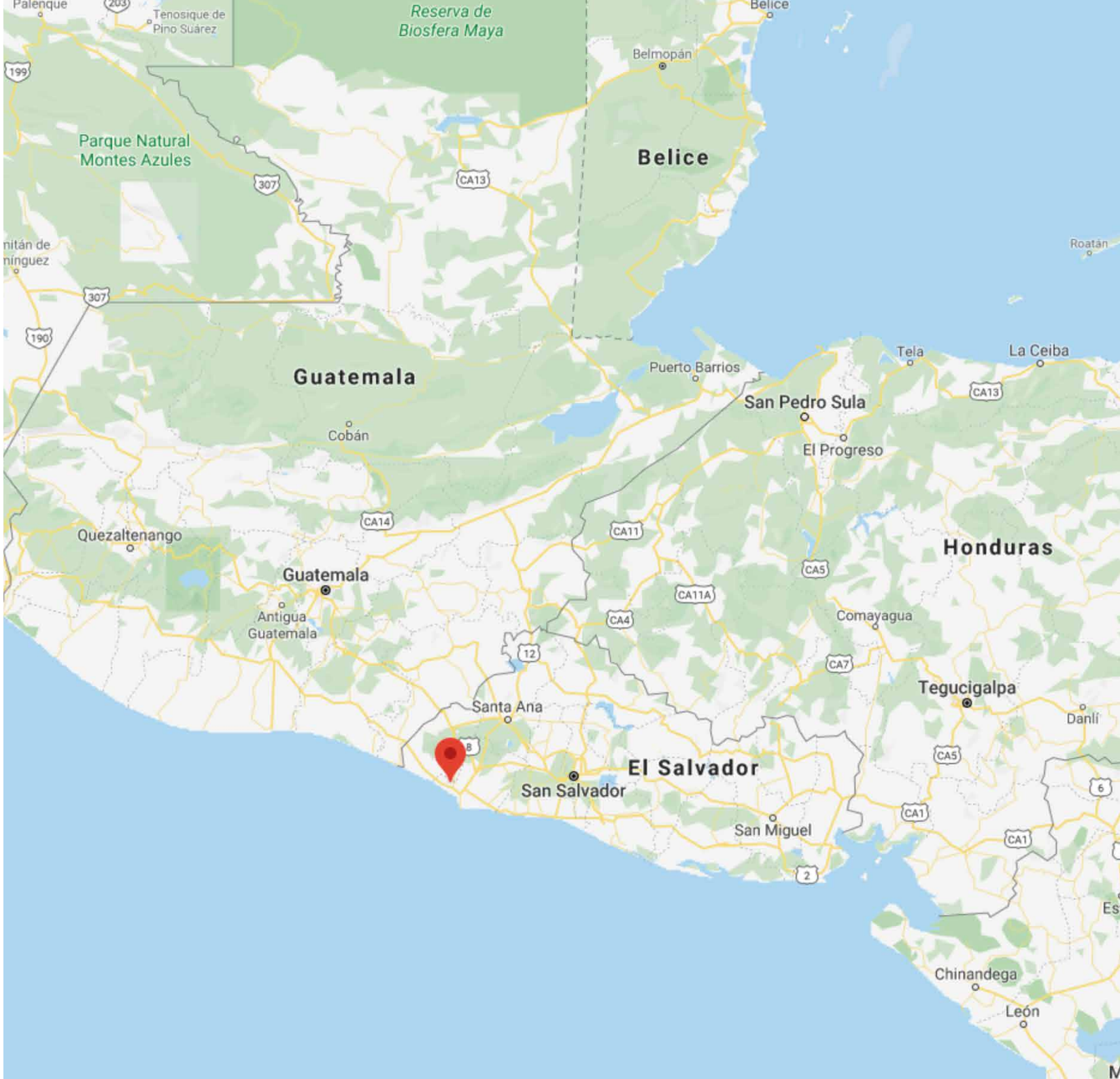
- Dual-circuit overhead 230 kV TL (43 km)
- Dual-circuit underground 230 kV TL (2 km)
- 230 kV GIS substation
- 230/115 kV GIS substation
- 230 kV substation extension

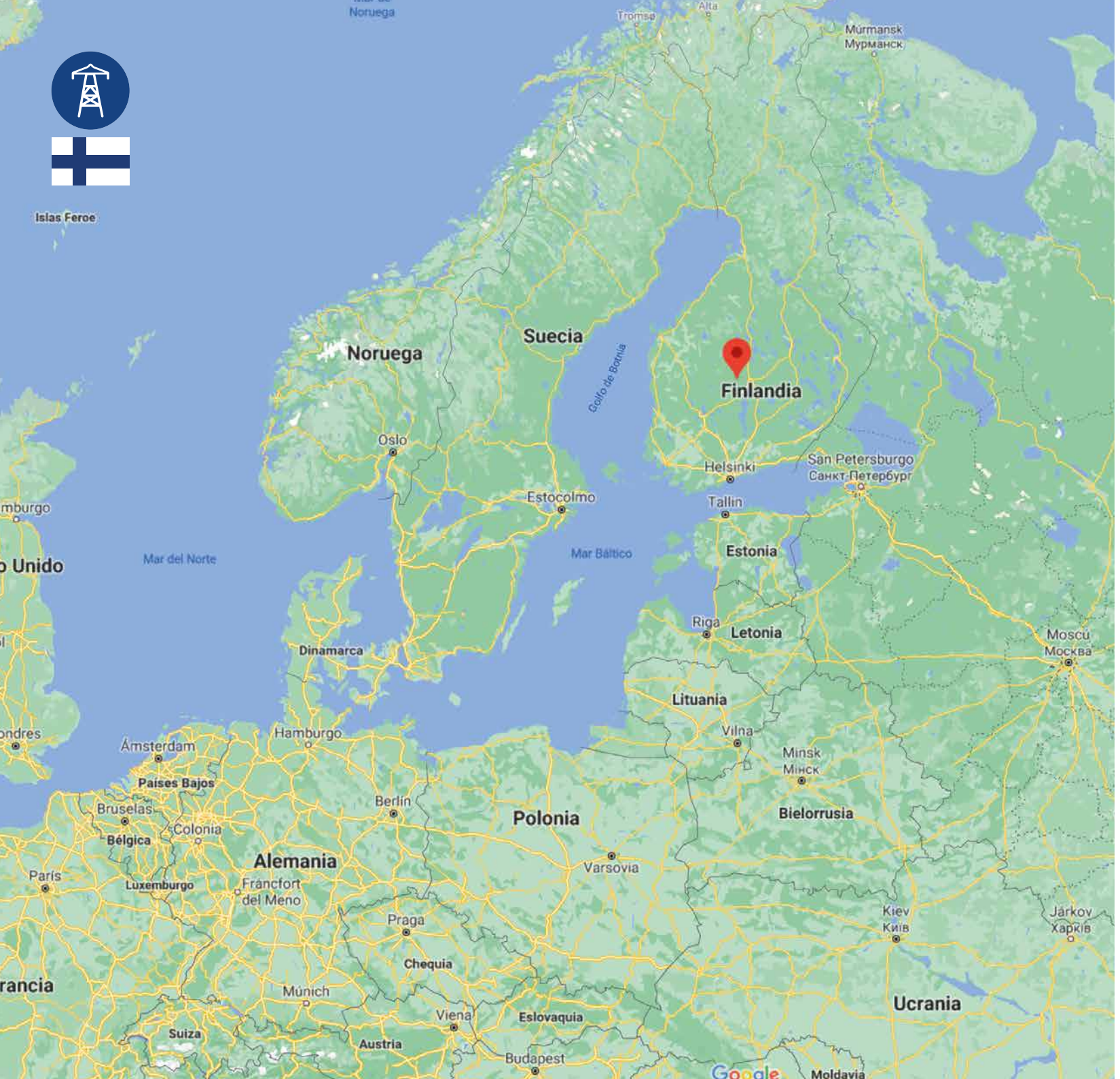
CENTRAL AMERICA

Acajutla, Sonsonate and Ahuachapán, Ahuachapán (El Salvador)

POWER TRANSMISSION

ACAJUTLA-AHUACHAPÁN TL





elecnor

ELECTRICITY TRANSMISSION

PETÄJÄVESI-PYHÄNSELKÄ LINE

LOCATION ▸ Petäjävesi (Finland)

CUSTOMER ▸ Fingrid

PROJECT SCOPE ▸

Construction of a 400 kV transmission line to replace the current system-the useful life of which is shortly coming to an end-and to virtually double the system's power capacity.

AMOUNT ▸ EUR 11.2 million

START DATE ▸ September 2019

FINISH DATE ▸ September 2022

CHARACTERISTICS:

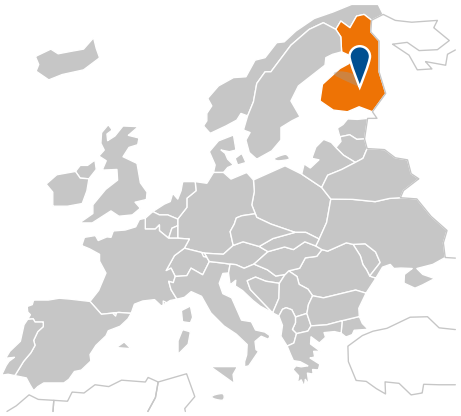
- It will be the most modern line in the country
- Development of a 59 km stretch of the so-called 'Forest Line'
- Difficult work due to extreme weather conditions

EUROPE

Petäjävesi (Finland)

ELECTRICITY TRANSMISSION

PETÄJÄVESI-PYHÄNSELKÄ LINE



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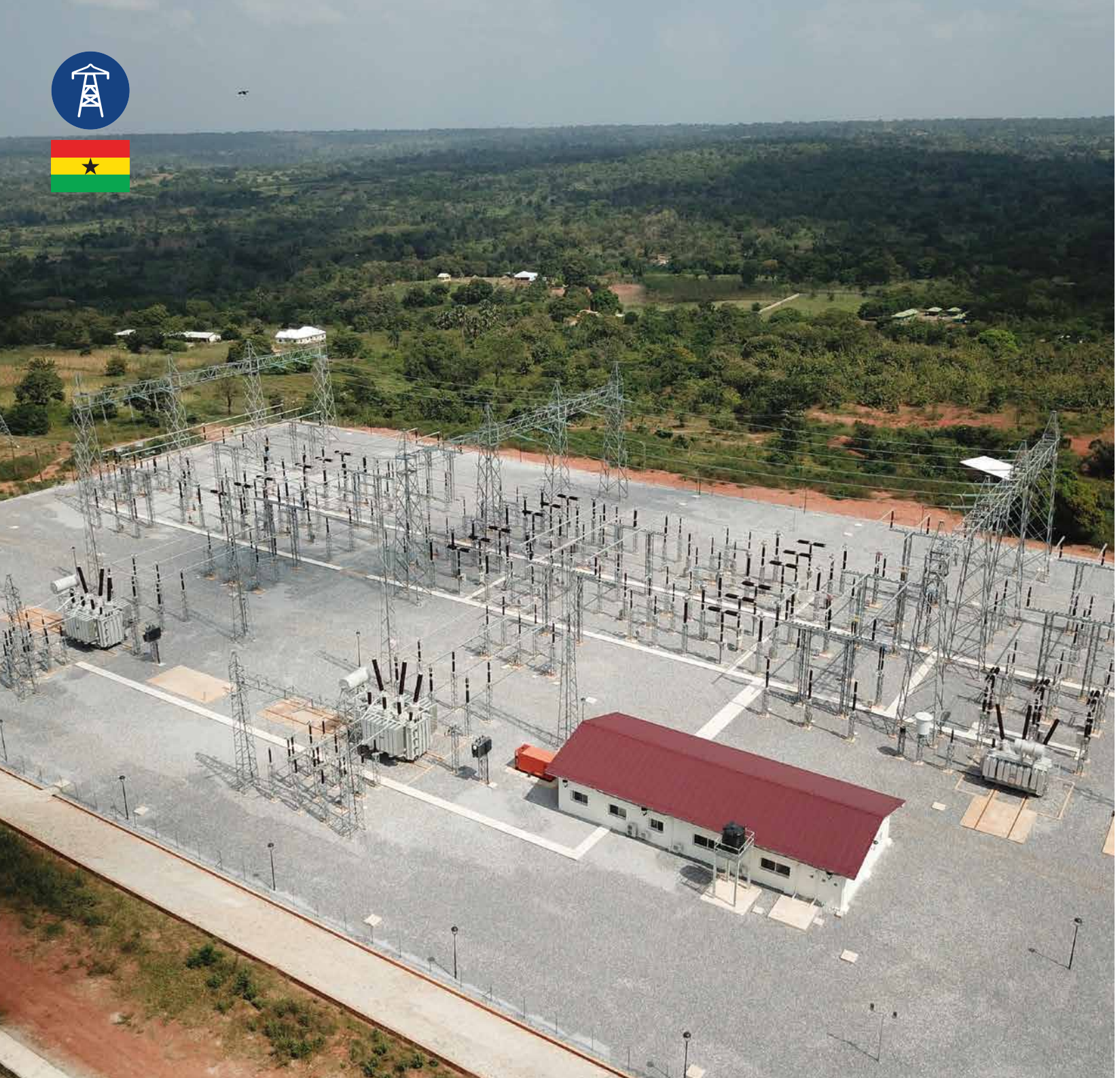

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ELECTRICITY TRANSMISSION

KINTAMPO & KUMASI II

LOCATION ▸ Brongh Ahafo (Kintampo) and Ashanti (Kumasi) (Ghana)

CUSTOMER ▸ Ghana Grid Company (GRIDCo)

PROJECT SCOPE ▸

Design, supply and installation of a 330/161 kV substation and a 330 kV extension to an existing substation

AMOUNT ▸ EUR 22 million

START DATE ▸ august 2016

FINISH DATE ▸ september 2018

CHARACTERISTICS:

- KINTAMPO SUBSTATION
  - 2 x 330/161/34.5 kV 120/160/200 MVA autotransformers
  - 1 x 330 kV 50 MVAr line reactor
  - 2 x 330 kV bays with breaker-and-a-half configuration
  - 2 x 330 kV transformer bays with breaker-and-a-half configuration
  - 2 x 161 kV transformer bays with breaker-and-a-half configuration
  - Control building and associated facilities
- KUMASI SUBSTATION EXTENSION
  - 1 x 161 kV 40 MVAr line reactor
  - 1 x 161 kV reactor bay with breaker-and-a-half configuration

AFRICA

Brongh Ahafo (Kintampo) and
Ashanti (Kumasi) (Ghana)

ELECTRICITY TRANSMISSION

KINTAMPO & KUMASI II

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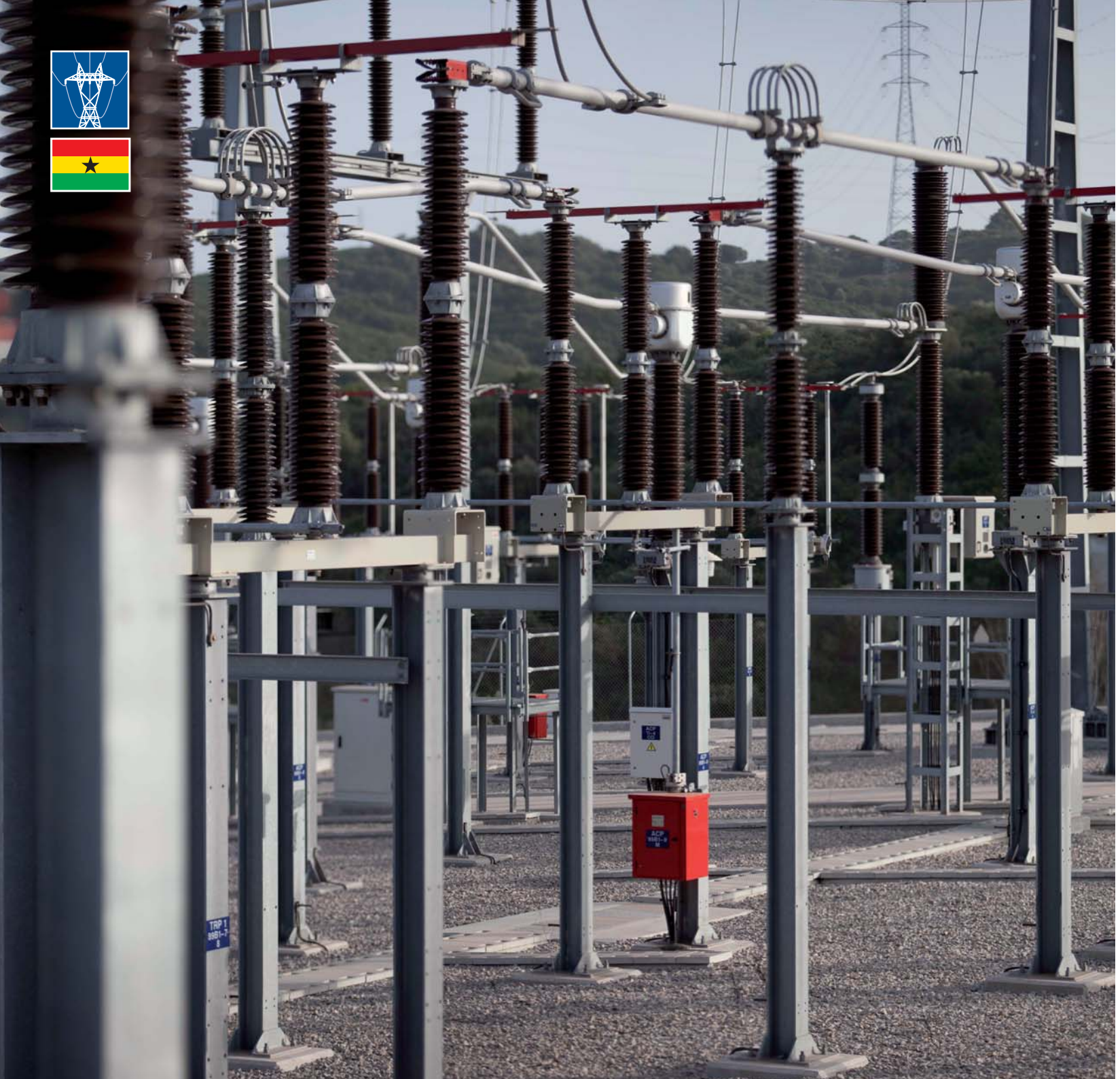

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ELECTRICITY TRANSMISSION

KINTAMPO II SS

LOCATION ▸ Kintampo (Republic of Ghana)

CUSTOMER ▸ Ghana Grid Company Limited (GRIDCo)

PROJECT SCOPE
Design, supply, installation and start up of the substation Kintampo II (330/161 kV) for the 330 kV Kumasi-Bolgatanga project

AMOUNT ▸ EUR 19 million

START DATE ▸ June 2016

FINISH DATE ▸ November 2017

CHARACTERISTICS:

- 330 kV system. (Weatherproofing, Breaker and half)
  - ✓ Section 1: equipped with a reactor position and a standby position
  - ✓ Sections 2 and 3: equipped with a line position and an autotransformer position
- Transformation: two autotransformers 330/161/34.5 kV, 120/220 MVA
- Control and Protection Building
- Auxiliary services systems
- 161 kV system. (weatherproofing, breaker and half)
  - ✓ Sections 1 and 2: equipped with an autotransformer position and a standby position
  - ✓ Section 3: standby equipped with porticos and main busbars

AFRICA

Kintampo (Republic of Ghana)

ELECTRICITY TRANSMISSION

KINTAMPO II SS

elecnor

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ELECTRICITY TRANSMISSION

POKUASE SUBSTATION

LOCATION ▸ Pokuase, Greater Accra (Ghana)

CUSTOMER ▸ Millennium Development Authority (MiDA)

PROJECT SCOPE ▸

Design, supply and installation of a 330/34.5 kV substation

AMOUNT ▸ EUR 41 million

START DATE ▸ march 2019

FINISH DATE ▸ march 2020

CHARACTERISTICS:

- ▸ 330 kV PHASE
  - ✓ 4 x 145 MVA transformers
  - ✓ Two-storey control building
  - ✓ 10 x 362 kV breakers
  - ✓ 20 x 362 kV isolator switches
  - ✓ Capacitor banks
  - ✓ Line opening (four towers)
- ▸ 34.5 kV PHASE
  - ✓ 2 x 39 MVA transformers
  - ✓ One-storey semi-basement control building
  - ✓ 16 x 36 kV breakers
  - ✓ 20 x 36 kV isolator switches

AFRICA

Pokuase, Greater Accra (Ghana)

ELECTRICITY TRANSMISSION

POKUASE SUBSTATION

elecnor

elecnor

ELECTRICITY TRANSMISSION

SONFONIA CASSE SUBSTATION

LOCATION ▸ Conakry (Republic of Guinea)

CUSTOMER ▸ EDG (Electricité de Guinee)

PROJECT SCOPE ▸

Restoration and expansion of the Sonfonia and Kipe electrical substations.

AMOUNT ▸ EUR 6,9 million

START DATE ▸ January 2020

FINISH DATE ▸ February 2022

CHARACTERISTICS:

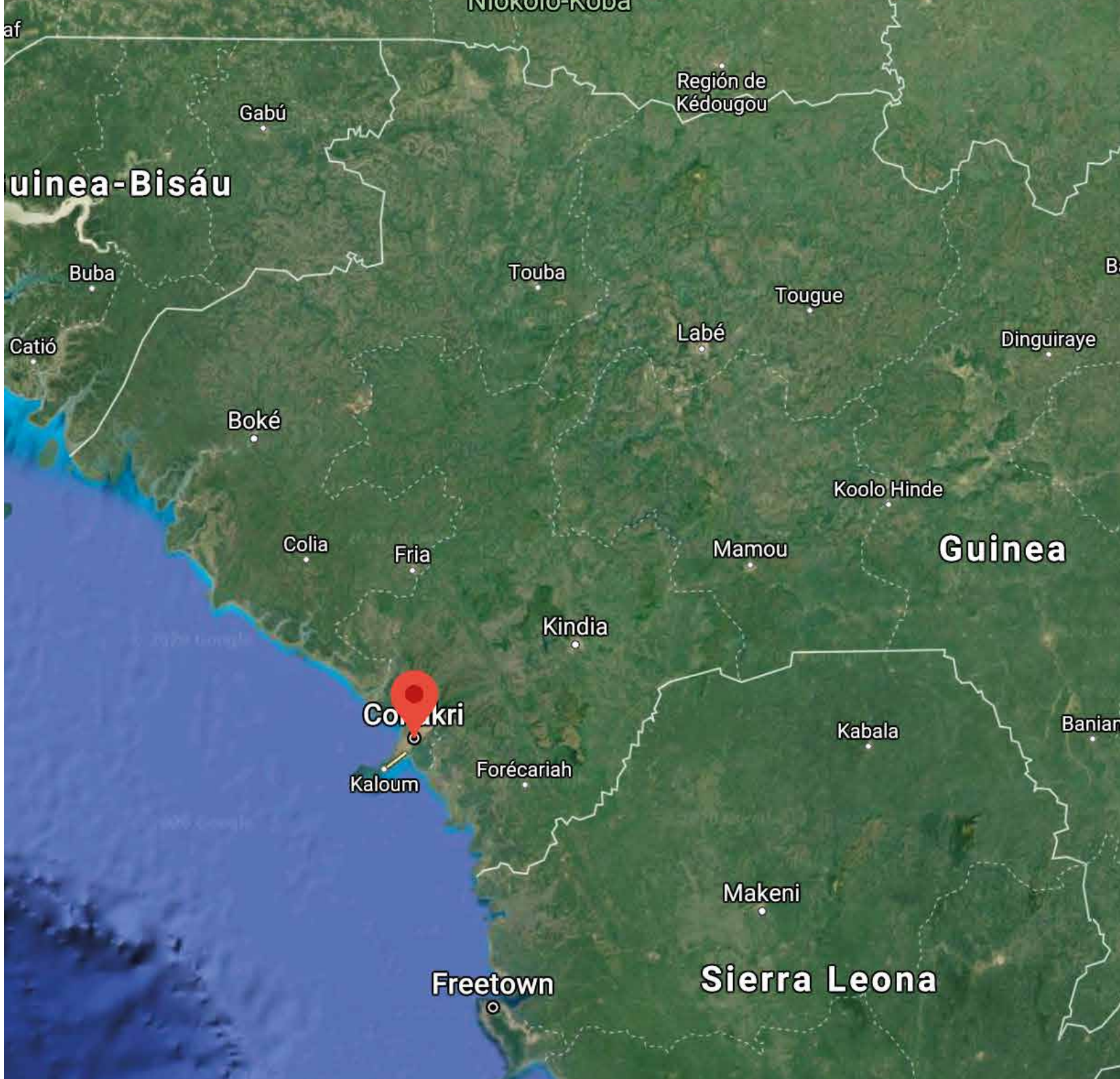
- Demolition of existing transformers
- Civil works for the adaptation of access, land and foundations for the new layout
- Restoration and expansion of the electrical building, construction of interior roads and restoration and expansion of existing enclosure
- Design, supply, installation and commissioning of new high-voltage pylon
- Installation of a new control and protection system and a new telecommunications system

AFRICA

Conakry (Republic of Guinea)

ELECTRICITY TRANSMISSION

SONFONIA CASSE SUBSTATION



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ELECTRICITY TRANSMISSION

LA ENTRADA SS

LOCATION ▸ San Nicolás. Copan "departamento" (Honduras)

CUSTOMER ▸ Empresa Nacional de Energía Eléctrica (ENEE)

PROJECT SCOPE:

Design, supply, transportation, assembly, testing and civil engineering work for construction of the 230/34.5 kV 50 MVA La Entrada switching/distribution substation

AMOUNT ▸ EUR 10 million

START DATE ▸ september 2015

FINISH DATE ▸ march 2017

CHARACTERISTICS:

- Transformation capacity, 50 MVA at 230 kV/34.5 kV
- Two line bays with one and a half breaker arrangement, 230 kV
- One full bay with 34.5 kV output lines, main busbar and transfer busbar arrangement to create a link between SIEPAC Latin American system and the Honduras transmission network
- Disassembly of a provisional 230/34.5 kV mobile substation
- Installation of three towers to take the power lines
- Improvements to associated distribution lines

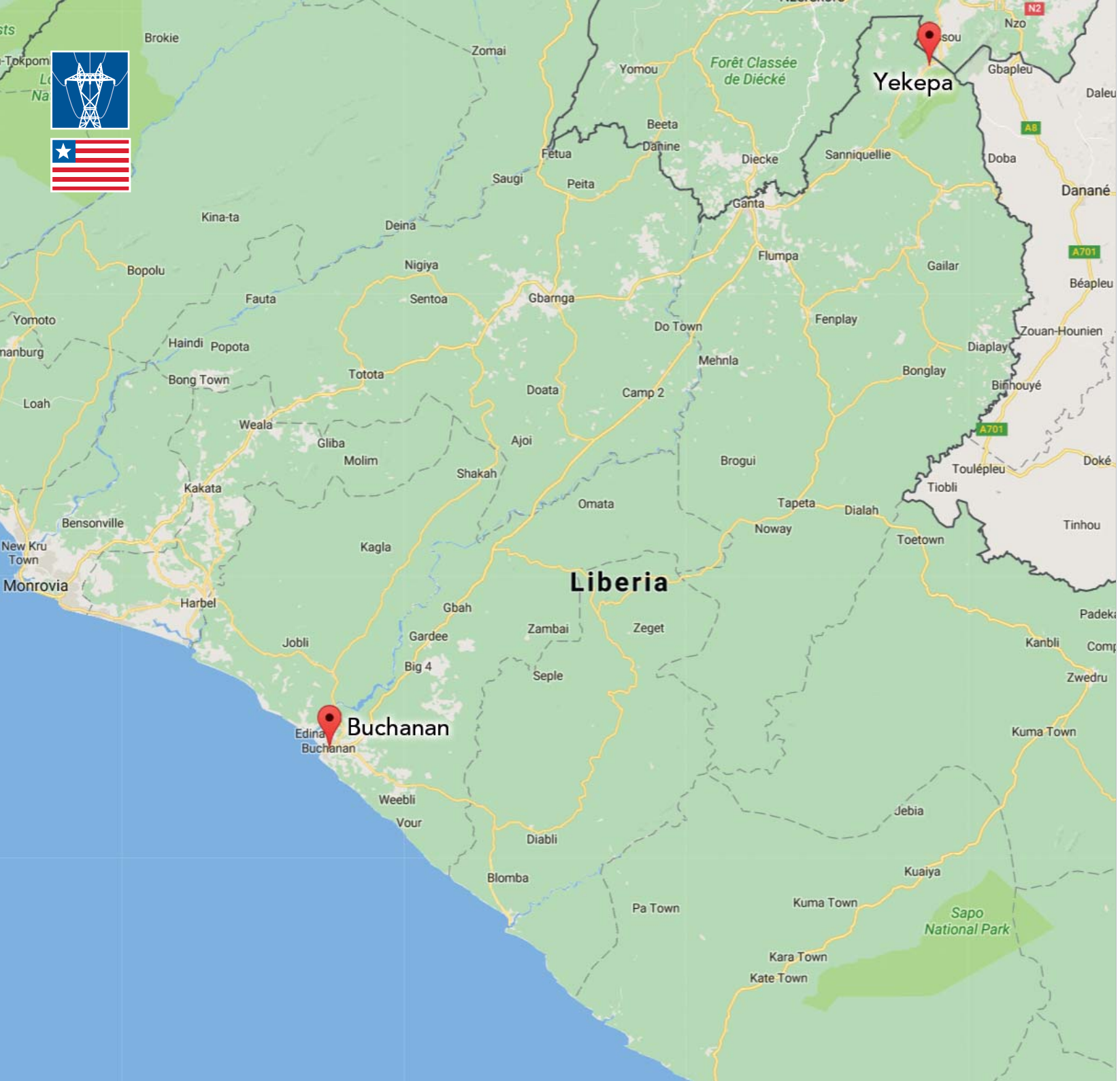
CENTRAL AMERICA

San Nicolás. Copan
"departamento" (Honduras)

ELECTRICITY TRANSMISSION

LA ENTRADA SS

elecnor



elecnor

POWER TRANSMISSION

TRANSCO CLSG INTERCONNECTION PROJECTS

LOCATION ▸ Yekepa and Buchanan (Liberia)

CUSTOMER ▸ Transco CLSG

PROJECT SCOPE:

Lots of 225 kV lines for the power interconnection project linking Ivory Coast, Liberia, Sierra Leone and Guinea. Transco CLSG is a company created by the 4 countries and entrusted with the development and monitoring of the project. The lot awarded to the Elecnor consortium is financed by the World Bank (WB)

AMOUNT ▸ EUR 58 million (ENO 50%)

START DATE ▸ july 2017

FINISH DATE ▸ november 2018

CHARACTERISTICS:

- 230 km of 225 kV line between Yekepa and Buchanan

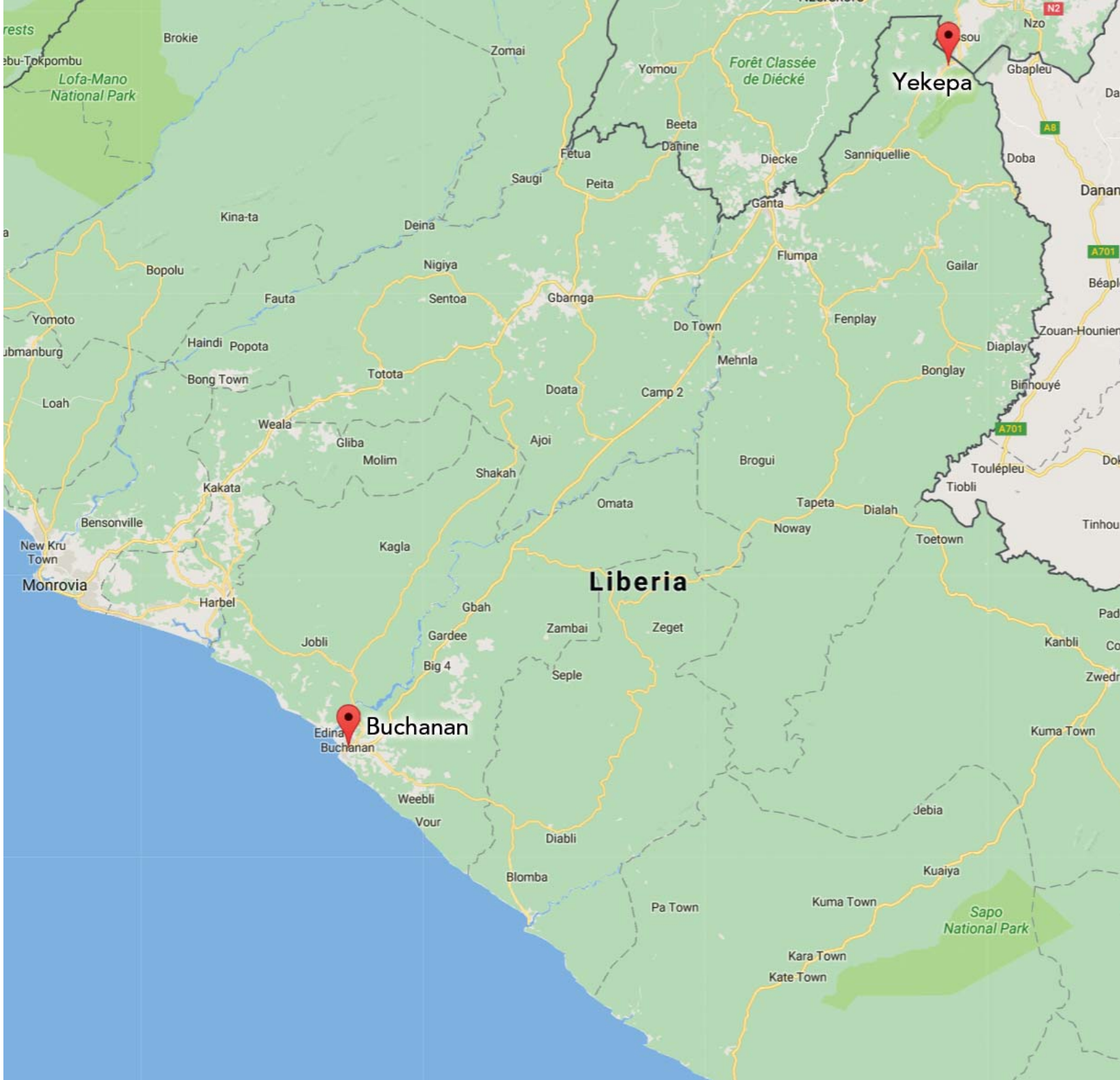
AFRICA

Yekepa and Buchanan (Liberia)

POWER TRANSMISSION

TRANSCO CLSG INTERCONNECTION PROJECTS

elecnor



elecnor

ELECTRICITY TRANSMISSION

YEKEPA-BUCHANAN TL (LIBERIA)

LOCATION ▸ Buchanan- Yekepa (Republic of Liberia)

CUSTOMER ▸ Transco CLSG

PROJECT SCOPE ▸

EPC Project: 227 km of 225 kV overhead line

AMOUNT ▸ EUR 54.5 million

START DATE ▸ september 2017

FINISH DATE ▸ march 2020

CHARACTERISTICS:

- Line forms part of the Transco CLSG project. Project to interconnect several countries in the subregion (Ivory Coast-Liberia-Sierra Leone-Guinea)
- Fully funded by the World Bank
- Duration: 30 months
- All engineering work carried out by ELECNOR
- Work carried out in joint venture with the EIFFAGE group
- 225 kV double-circuit line with 1 conductor per phase (ASTER 570)
- 3 guard cables (2 PHLOX conductor cables + 1 OPPC cable)
- The guard cables will be electrified at 34.5 kV in order to later install rural electrification facilities in the towns along the line
- Civil engineering: 14,800 m3 of concrete
- Lifting: 8,600-MT metal structure (90% raised by boom equipment)
- 227 km line
- Made entirely with own resources
- 85% of the workers were local, and 15% were foreign

AFRICA

Buchanan- Yekepa
(Republic of Liberia)

ELECTRICITY TRANSMISSION

YEKEPA-BUCHANAN TL (LIBERIA)

elecnor

elecnor

ELECTRICITY TRANSMISSION

ALTAMIRA NETWORK

LOCATION ▸ Potosí and Aguascalientes States (Mexico)

CUSTOMER ▸ Federal Electricity Commission (CFE)

PROJECT SCOPE:

Engineering work, supply and construction of two 400 kV transmission power lines on the 28 L T 407 project associated with Altamira II, III and IV (Phase 3), a total length of 291 km

AMOUNT ▸ EUR 18 million

START DATE ▸ november 2002

FINISH DATE ▸ november 2003

CHARACTERISTICS:

- 66 km of the 400 kV El Potosí-Palo Alto power line, a total length of 119 km
  - ACSR/AS 1113 conductor cable
  - 2 conductors per phase
  - 2 circuits
  - Fibre optic guard wire
- The 400 kV Palo Alto-Aguascalientes power line, a total length of 31 km
  - ACSR/AS 1113 conductor cable
  - 2 conductors per phase
  - 2 circuits
  - Fibre optic guard wire
  - Two 400 kV feeders
  - Two 230 kV feeders

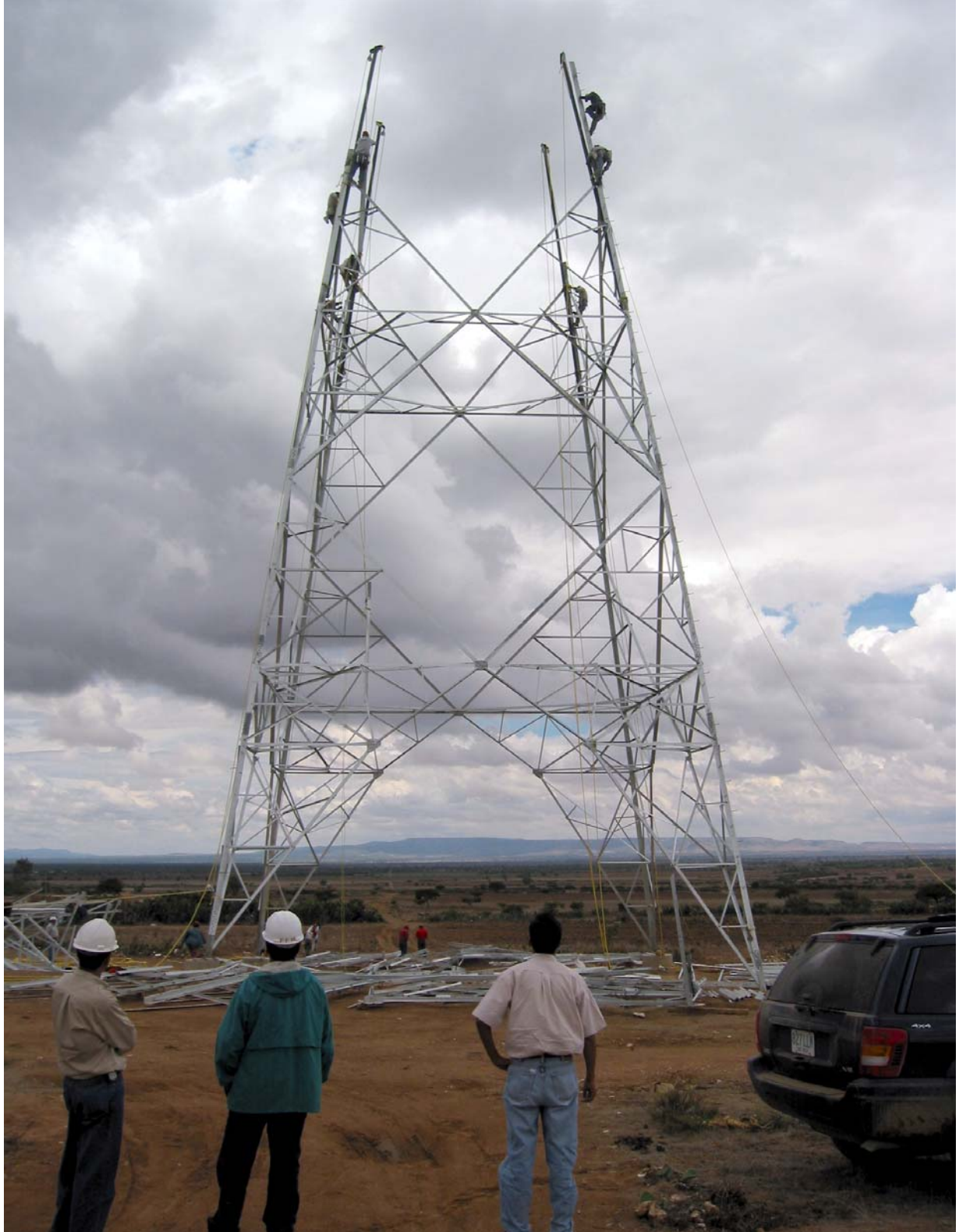
CENTRAL AMERICA

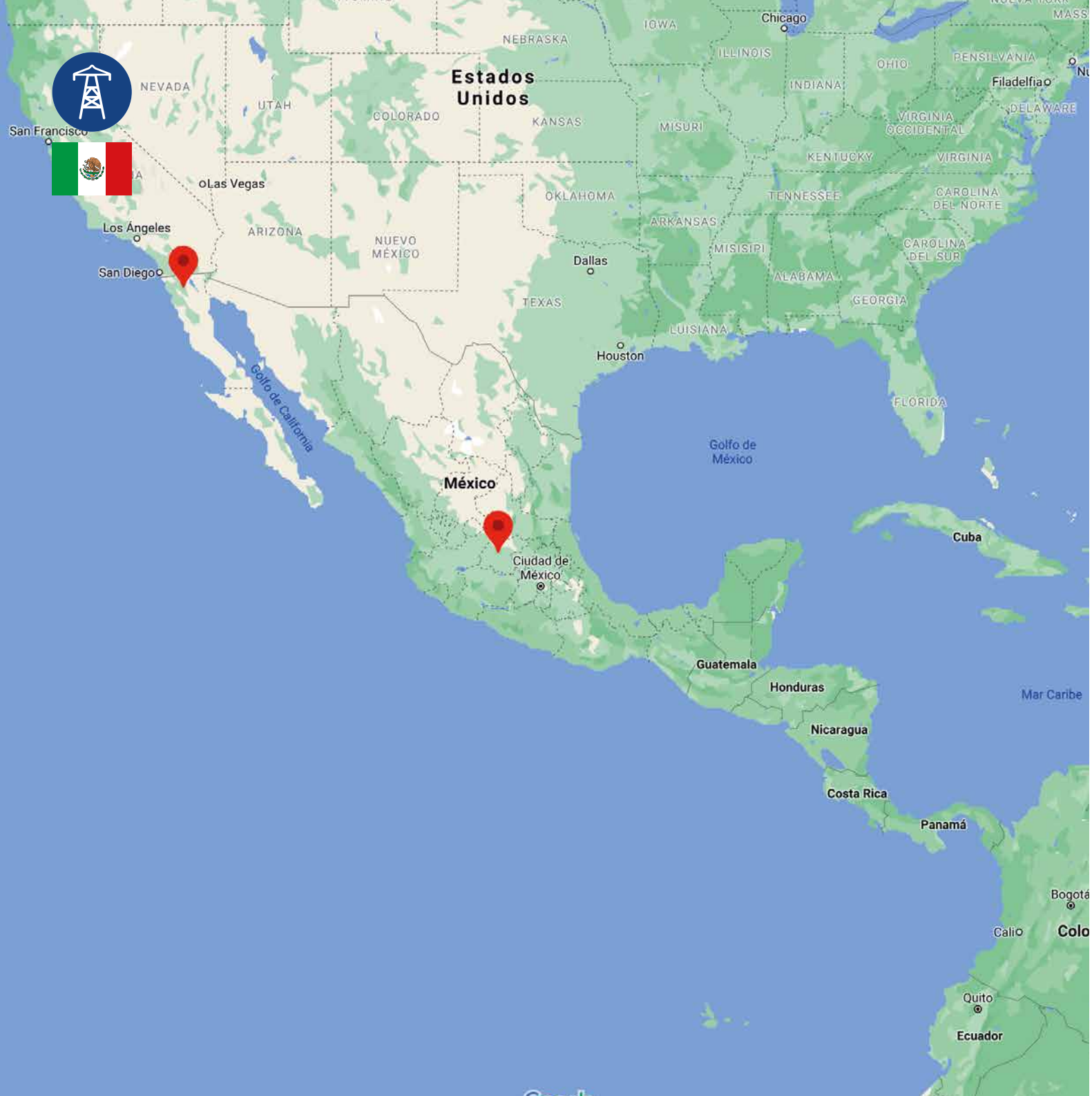
Potosí and Aguascalientes States (Mexico)

ELECTRICITY TRANSMISSION

ALTAMIRA NETWORK

elecnor





elecnor

ELECTRICITY TRANSMISSION

ANTOFAGASTA SUBSTATIONS

LOCATION ▸ States of Guanajuato and Baja California (Mexico)

CUSTOMER ▸ CFE (Comisión Federal de Electricidad-Federal Electricity Commission)

PROJECT SCOPE ▸

Expansion of six substations with voltages of 115 kV and 161 kV and a total capacity of 174 MVAr.

AMOUNT ▸ EUR 4.8 million

START DATE ▸ April 2019

FINISH DATE ▸ June 2020

CHARACTERISTICS:

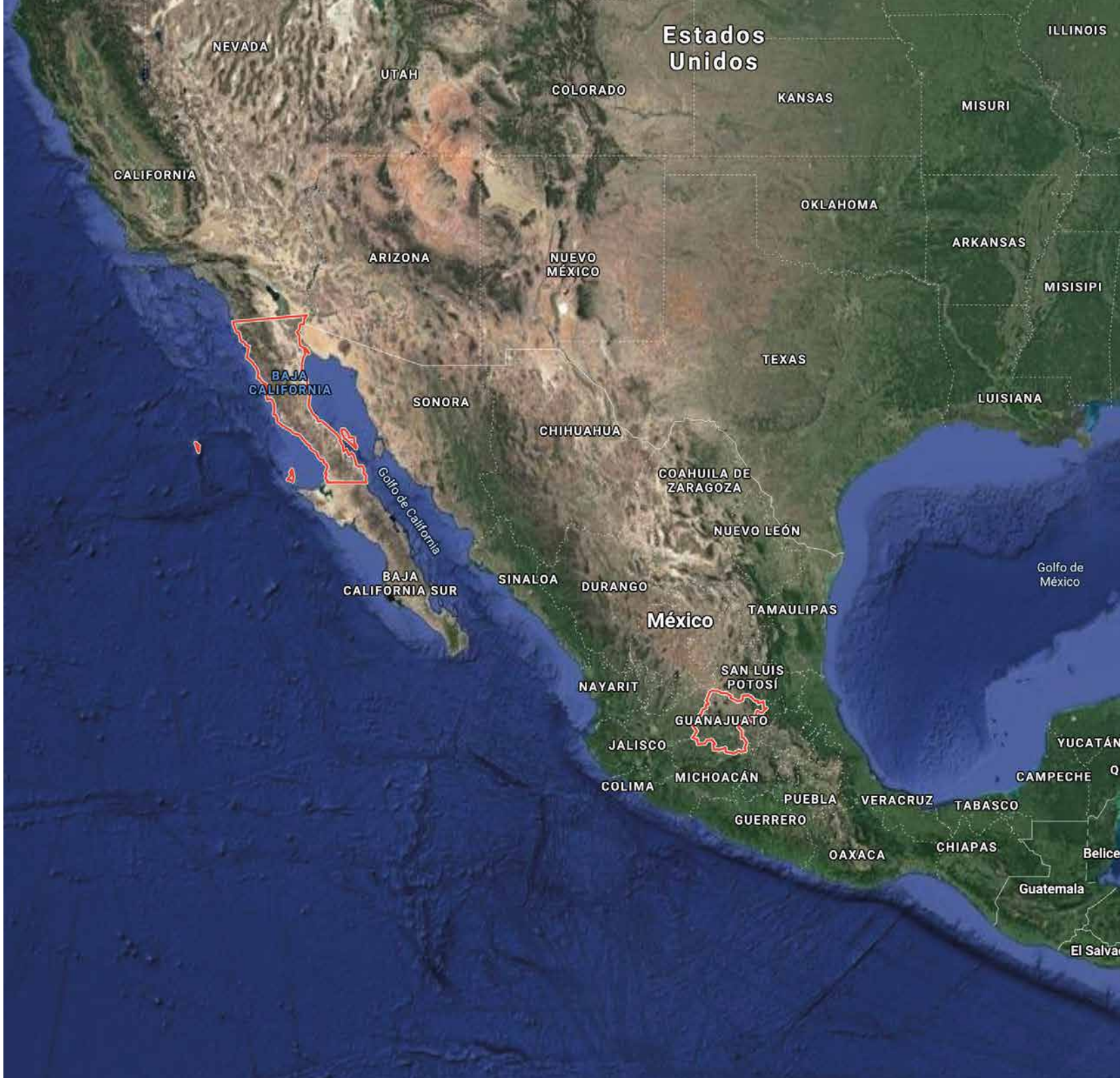
- SUBSTATIONS IN LEÓN, GUANAJUATO
  - ✓ León Substation III
  - ✓ León Substation IV
- SUBSTATIONS IN MEXICALI, BAJA CALIFORNIA
  - ✓ Mexicali Oriente Substation
  - ✓ Cachanilla Substation
  - ✓ Cetys Substation
  - ✓ González Ortega Substation

CENTRAL AMERICA

States of Guanajuato and Baja California (Mexico)

ELECTRICITY TRANSMISSION

ANTOFAGASTA SUBSTATIONS



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ELECTRICITY TRANSMISSION

EL CAJÓN

LOCATION ▸ Santa María del Oro. Nayarit State (Mexico)

CUSTOMER ▸ Federal Electricity Commission (CFE)

PROJECT SCOPE:

Construction of the El Cajón hydroelectric power plant's energy discharge system, where the rockfill dam is one of the world's largest. Construction of five 400 kV power lines over 239 km, and extensions to three 400 kV substations (Tesistan, Acatlan and Cerro Blanco)

AMOUNT ▸ EUR 36 million

START DATE ▸ may 2005

FINISH DATE ▸ may 2006

CHARACTERISTICS:

- Five 400 kV power lines over 239 km
- Extensions to the Tesistan, Acatlan and Cerro Blanco substations

CENTRAL AMERICA

Santa María del Oro. Nayarit State (Mexico)

ELECTRICITY TRANSMISSION

EL CAJÓN

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ELECTRICITY TRANSMISSION

LOWER CALIFORNIA AND NORTHWEST

LOCATION ▸ Tlaxcala and Sonora States (Mexico)

CUSTOMER ▸ Federal Electricity Commission (CFE)

PROJECT SCOPE:

Engineering, supply and construction of 3 lines and 2 substations on the 248 SLT 1401 project, Lower California and Northwest

AMOUNT ▸ EUR 15 million

START DATE ▸ october 2009

FINISH DATE ▸ march 2011

CHARACTERISTICS:

- Valle de Puebla substation: two 230 kV feeders, a 40 MVA 230/13.8 kV transformer, six 13.8 kV feeders and a 2.4 MVAr capacitor bank
- Hermosillo substation: a transformer bank, 4x75 MVA, 230/115/13.8 kV
- High voltage, 230 kV - Ruiz Cortines, junction Cerro Prieto I-Parque Industrial San Luis
- High voltage, 230 kV - Cerro Prieto II-Parque Industrial San Luis
- High voltage, Carranza - junction González Ortega-Cetys

CENTRAL AMERICA

Tlaxcala and Sonora States (Mexico)

ELECTRICITY TRANSMISSION

LOWER CALIFORNIA AND NORTHWEST

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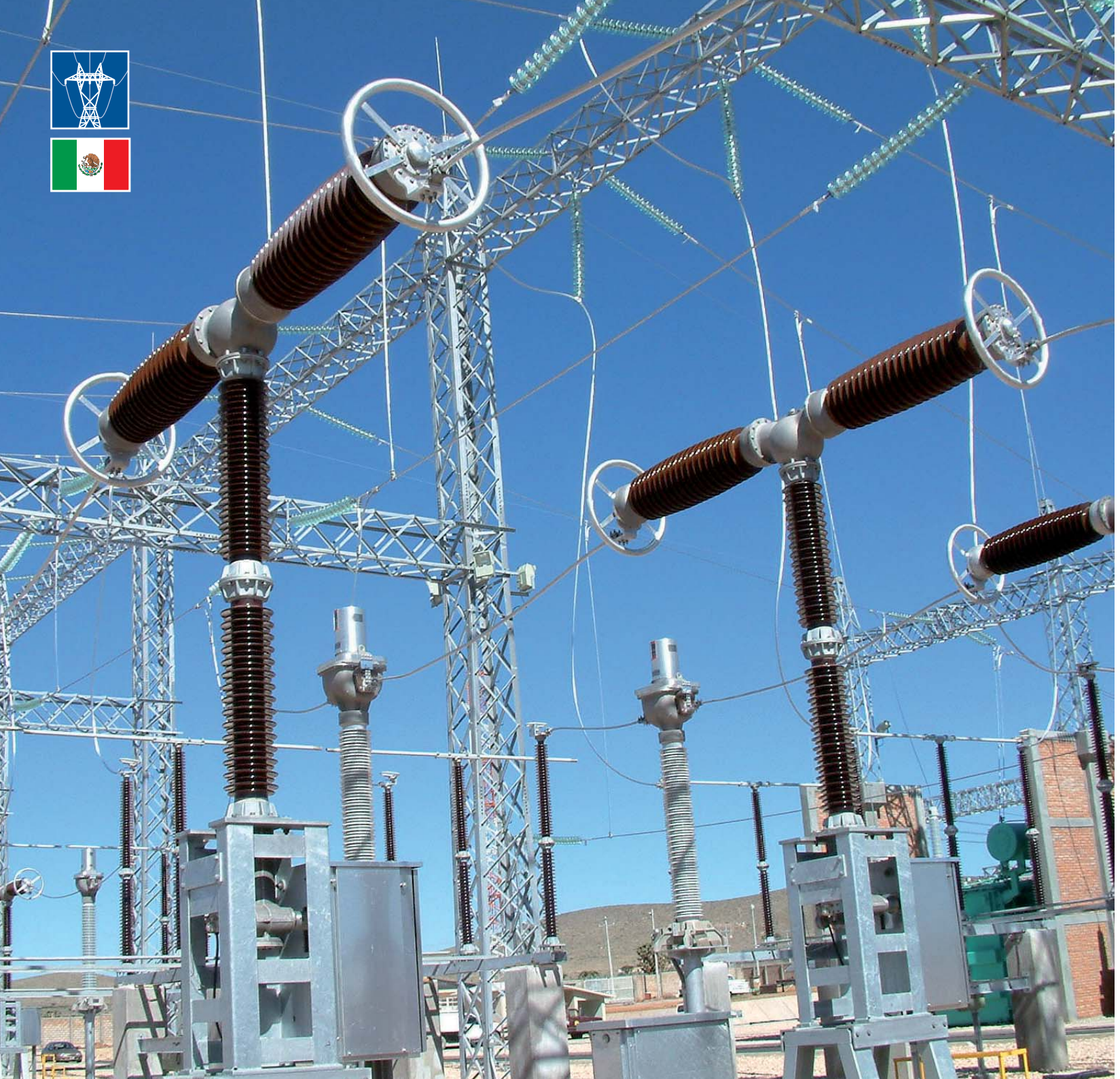

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ELECTRICITY TRANSMISSION

NATIONAL GRID SS

LOCATION ▸ Oaxaca, Morelos, Querétaro, Zacatecas and Tamaulipas States (Mexico)

CUSTOMER ▸ Federal Electricity Commission (CFE)

PROJECT SCOPE:

Engineering, supply and construction or extension of 5 substations forming part of the national grid's 410 project, with total capacity 575 MVA

AMOUNT ▸ EUR 53 million

START DATE ▸ may 2001

FINISH DATE ▸ november 2002

CHARACTERISTICS:

- Substation extension, Juchitan II Bco. 2
- Substation extension, Yautepec Potencia Bco. 3
- Substation extension, Conin Bco. 1
- New substation, 230/115 kV Fresnillo Bco. 1
- Substation extension, Lauro Villar Bco. 2

CENTRAL AMERICA

Oaxaca, Morelos, Querétaro, Zacatecas and Tamaulipas States (Mexico)

ELECTRICITY TRANSMISSION

NATIONAL GRID SS

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ELECTRICITY TRANSMISSION

NATIONAL GRID TL

LOCATION ▸ Several Mexican states

CUSTOMER ▸ Federal Electricity Commission (CFE)

PROJECT SCOPE:

Engineering, supply and construction of 4 x 400, 230 and 138 kV transmission lines on the "30 LT 411 Sistema Nacional" project, total length 639 km

AMOUNT ▸ EUR 47 million

START DATE ▸ august 2001

FINISH DATE ▸ august 2004

CHARACTERISTICS:

- Cárdenas II-Comalcalco Oriente transmission line, voltage 230 kV and total length 47 km
  - 1 conductor per phase
  - 2 circuits
- 89 km of the Río Escondido-Arroyo del Coyote transmission line, voltage 400 kV and total length 179 km
  - 2 conductors per phase
  - 2 circuits
- 11 km of the Río Bravo-Parque Industrial Reynosa transmission line, voltage 138 kV and total length 21 km
  - 1 conductor per phase
  - 2 circuits
- 3 km of the Terranova Entq. Samalacuya-Valle de Juárez transmission line, voltage 230 kV and total length 5 km
  - 1 conductor per phase
  - 2 circuits

CENTRAL AMERICA

Several Mexican states

ELECTRICITY TRANSMISSION

NATIONAL GRID TL

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ELECTRICITY TRANSMISSION

NOROESTE

LOCATION ▸ Baja California, Sinaloa and Sonora States (Mexico)

CUSTOMER ▸ Federal Electricity Commission (CFE)

PROJECT SCOPE:

Engineering, supply and construction or extension work on 14 substations on the "308 Noroeste" project

AMOUNT ▸ EUR 49 million

START DATE ▸ june 1999

FINISH DATE ▸ december 2002

CHARACTERISTICS:

- New substation, 230/115 kV Louisiana Bco. 1
- Substation extension, Obregon 4 Bco. 5
- New substation, 230/115 kV Loma Bco. 1
- Substation extension, Hermosillo 3
- Substation extension, Cerro Prieto II
- New substation, 161/13.8 kV González Ortega II Bcos. 1, 2
- New substation, 161/13.8 kV Santa Isabel Bcos. 1, 2
- New substation, 161/13.8 kV Mexicali OTE Bcos. 1, 2
- New substation, 161/13.8 kV Packard Bco. 1
- Substation extension, La Rosita Bco. 1
- Substation extension, Parque Industrial San Luis Bco. 2
- New substation, 69/13.8 kV El Durazno Bco. 1
- Substation extension, El Rubi Bco. 3
- New substation, 69/13.8 kV Tecolote Bco. 1

CENTRAL AMERICA

Baja California, Sinaloa and Sonora States (Mexico)

ELECTRICITY TRANSMISSION

NOROESTE

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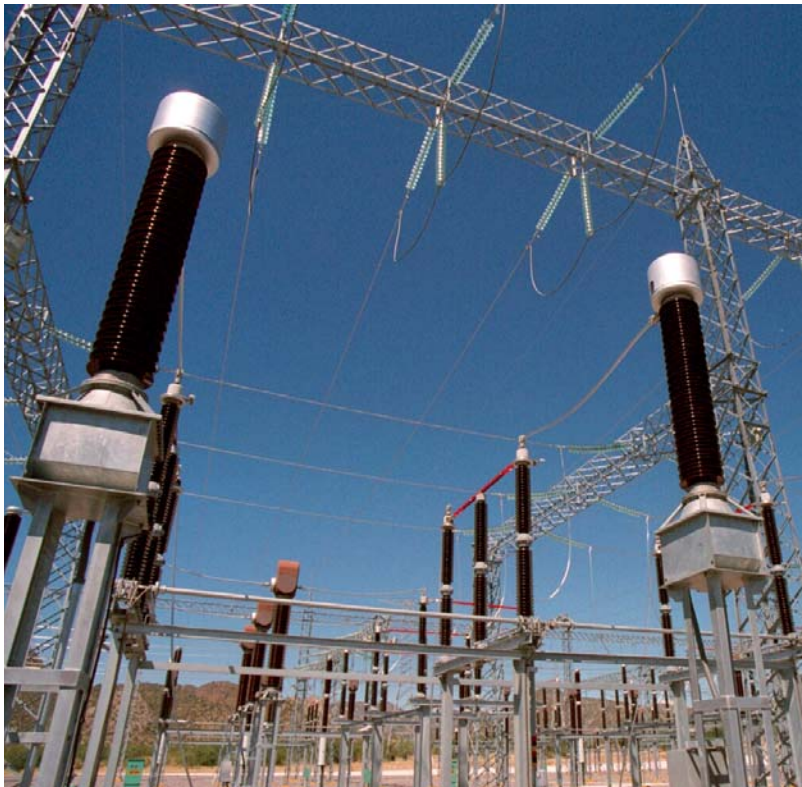

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ELECTRICITY TRANSMISSION

NOROESTE NORTE

LOCATION ▸ Baja California and Baja California Sur State (Mexico)

CUSTOMER ▸ Federal Electricity Commission (CFE)

PROJECT SCOPE:

Engineering, supply and construction or extension work on 9 substations on the "404 Noroeste Norte" project

AMOUNT ▸ EUR 22 million

START DATE ▸ march 2001

FINISH DATE ▸ junr 2002

CHARACTERISTICS:

- Substation extension, Metrópoli Bco. 4
- New substation, 115/13.8 kV Gallo Bco. 1
- Substation extension, Cabo Bello Bco. 2
- New substation, 115/13.8 kV Ensenada Bco. 2
- New substation, 115/13.8 kV Maneadero Bco. 1
- New substation, 115/13.8 kV El Sauzal Bco. 1
- New substation, 115/13.8 kV El Triunfo Bco. 1
- New substation, 115/13.8 kV Cabo del Sol Bco. 1
- New substation, 115/13.8 kV Bledales Bco. 1

CENTRAL AMERICA

Baja California and Baja California Sur State (Mexico)

ELECTRICITY TRANSMISSION

NOROESTE NORTE

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ELECTRICITY TRANSMISSION

OAXACA

LOCATION ▸ Oaxaca State (Mexico)

CUSTOMER ▸ Federal Electricity Commission (CFE)

PROJECT SCOPE:

Transmission network on the "Temporada Abierta" project and the wind power projects Oaxaca II, III and IV (phase 1)

AMOUNT ▸ EUR 96 million

START DATE ▸ september 2008

FINISH DATE ▸ september 2010

CHARACTERISTICS:

- 400 kV power line, length 154 km
- La Ventosa substation, 400/230/115 kV
  - Total capacity 2,125 MVA
  - 3 transformer banks, with 9 single-phase 125 MVA 400/230 kV transformers, and a standby unit
  - 2 transformer banks, with 9 single-phase 125 MVA 400/115 kV transformers, and a standby unit
  - Two 400 kV feeders
  - Two 230 kV feeders

CENTRAL AMERICA

Oaxaca State (Mexico)

ELECTRICITY TRANSMISSION

OAXACA

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ELECTRICITY TRANSMISSION

OLAS ALTAS

LOCATION ▸ Baja California Sur State (Mexico)

CUSTOMER ▸ Federal Electricity Commission (CFE)

PROJECT SCOPE:

Engineering, supply and construction of the 230 kV Olas Altas substation on the "55 LT Red Asociada de transmisión de la CCI Baja California Sur 1" project

AMOUNT ▸ EUR 13 million

START DATE ▸ january 2003

FINISH DATE ▸ november 2003

CHARACTERISTICS:

- Two 230 kV feeders for the circuits linking this facility to the Corumel substation (C1+C2)
- A 100 MVA transformer bank composed of 3 single-phase autotransformers, each with a capacity of 33.33 MVA, with nominal voltages of 230/115/13.8 kV, and a standby unit with the same characteristics.
- Six 115 kV feeders for the circuits linking this facility to the Bledales-Cabo San Lucas II substations (start of the Bledales-Cabo San Lucas II power line), Santiago-Punta Prieta II (start of the Santiago–Punta Prieta II power line), Villa Constitución-Punta Prieta II (start of the Villa Constitución-Punta Prieta II power line).
- The busbar setup for 230 kV and 115 kV was a main bar, and an auxiliary bar with an anchoring or transfer switch.

CENTRAL AMERICA

Baja California Sur State (Mexico)

ELECTRICITY TRANSMISSION

OLAS ALTAS

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ELECTRICITY TRANSMISSION

ORIENTAL-SURESTE (phase 1)

LOCATION ▸ Alto Lucero, Veracruz State (Mexico)

CUSTOMER ▸ Federal Electricity Commission (CFE)

PROJECT SCOPE:

400 kV gas-insulated substation Laguna Verde at the nuclear electric plant of the same name, and 36 km of 5 power lines on the project to repower this plant

AMOUNT ▸ EUR 38 million

START DATE ▸ may 2009

FINISH DATE ▸ november 2012

CHARACTERISTICS:

- 400 kV gas-insulated substation Laguna Verde
- Power line, Laguna Verde-Jamapa
- Power line, Jardín-Infonavit
- Power line, Jardín-Las Brisas
- Power line, Jardín-Lobos
- Power line, Jardín-Veracruz II

CENTRAL AMERICA

Alto Lucero, Veracruz State (Mexico)

ELECTRICITY TRANSMISSION

ORIENTAL-SURESTE (phase 1)

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ELECTRICITY TRANSMISSION

RED OCCIDENTAL

LOCATION ▸ Jalisco and Michoacán States (Mexico)

CUSTOMER ▸ Federal Electricity Commission (CFE)

PROJECT SCOPE:

Engineering, supply and construction of four 400 and 115 kV transmission lines, the Purépecha substation and extensions to the Vistahermosa and Jacona stations, on the "1803 Del. Occidental" project

AMOUNT ▸ EUR 36 million

START DATE ▸ april 2015

FINISH DATE ▸ october 2016

CHARACTERISTICS:

- Purépecha Entq. Sahuayo-Jiquilpan 115 kV power line, length 16 km, with 1 ACAR 795 conductor per phase, 2 circuits and 2 steel OPGW guard wires
- Purépecha Entq. Carapan-Mazamitla 400 kV power line, with 2 ACSR 1113 conductors per phase, 2 circuits and 2 steel OPGW guard wires
- Purépecha-Vista Hermosa 115 kV power line, length 44 km, with 1 ACSR 795 conductor per phase, 1 circuit and 2 steel OPGW guard wires
- Purépecha-Jacona 115 kV power line, length 33 km, with 1 ACSR 795 conductor per phase, circuits 1 and 2 and 2 steel OPGW guard wires
- Purépecha substation: 1 bank of transformers composed of three single-phase 125 MVA transformers, 400/115/34.5 kV; two 400 kV feeders for the power lines connecting to the Carapan and Mazamitla substations, and four 115 kV feeders connecting to the Jacona, Jiquilpan, Sahuayo and Vista Hermosa substations
- Jacona substation: one 115 kV feeder between this substation and the Purépecha substation
- Vista Hermosa substation: one 115 kV feeder for the power line to the Purépecha substation

CENTRAL AMERICA

Jalisco and Michoacán States (Mexico)

ELECTRICITY TRANSMISSION

RED OCCIDENTAL

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ELECTRICITY TRANSMISSION

SISTEMAS NORTE (phase 1)

LOCATION ▸ Puebla, Baja California and Chihuahua States (Mexico)

CUSTOMER ▸ Federal Electricity Commission (CFE)

PROJECT SCOPE:

Engineering, supply and construction of five substations and a power line on the "104 SLT 706 Sistemas Norte" project (phase 1)

AMOUNT ▸ EUR 35 million

START DATE ▸ october 2003

FINISH DATE ▸ november 2005

CHARACTERISTICS:

- Piedras Negras substation, 230/138 kV 4x75 MVA
- Acuña substation, 138 kV
- Río Escondido substation, 230 kV
- Cuauthémoc substation, 230 kV
- Torreón Sur substation, 400/115 kV 4x125 MVA
- Cuauhtémoc II-Quevedo power line

CENTRAL AMERICA

Puebla, Baja California and
Chihuahua States (Mexico)

ELECTRICITY TRANSMISSION

SISTEMAS NORTE (phase 1)

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ELECTRICITY TRANSMISSION

SISTEMAS NORTE (phase 2)

LOCATION ▸ Puebla, Baja California and Chihuahua States (Mexico)

CUSTOMER ▸ Federal Electricity Commission (CFE)

PROJECT SCOPE:

Engineering, supply and construction of four 230 and 115 kV transmission lines on the "104 SLT 706 Sistemas Norte" project (phase 2)

AMOUNT ▸ EUR 23 million

START DATE ▸ october 2006

FINISH DATE ▸ november 2007

CHARACTERISTICS:

- Terranova Entq. Samalayuca Sur-Valle de Juárez power line, 230 kV, 2 km
  - 2 conductors per phase, ACSR/AS 1113
  - 2 circuits
  - Type of guard wire: AW 7#8 and OPGW (2)
- Hermosillo 4-Esperanza I power line, 230 kV, 58 km
  - 1 conductor per phase, XLPE 1000 m2 AL
  - 1 circuit
  - Type of guard wire: AW 7#8 and OPGW (2)
- Hermosillo 4-Esperanza I underground power line, 230 kV, 5 km
  - 1 conductor per phase, ACSR/AS 1113
  - 1 circuit
  - Type of guard wire: F. Op. Dielectric Cable (1)
- Esperanza I power line-junction P-Fátima power line, 115 kV
  - 1 conductor per phase, ACSR/AS 477
  - 1 circuit
  - Type of guard wire: AW 7#8 and OPGW (2)

CENTRAL AMERICA

Puebla, Baja California and Chihuahua States (Mexico)

ELECTRICITY TRANSMISSION

SISTEMAS NORTE (phase 2)

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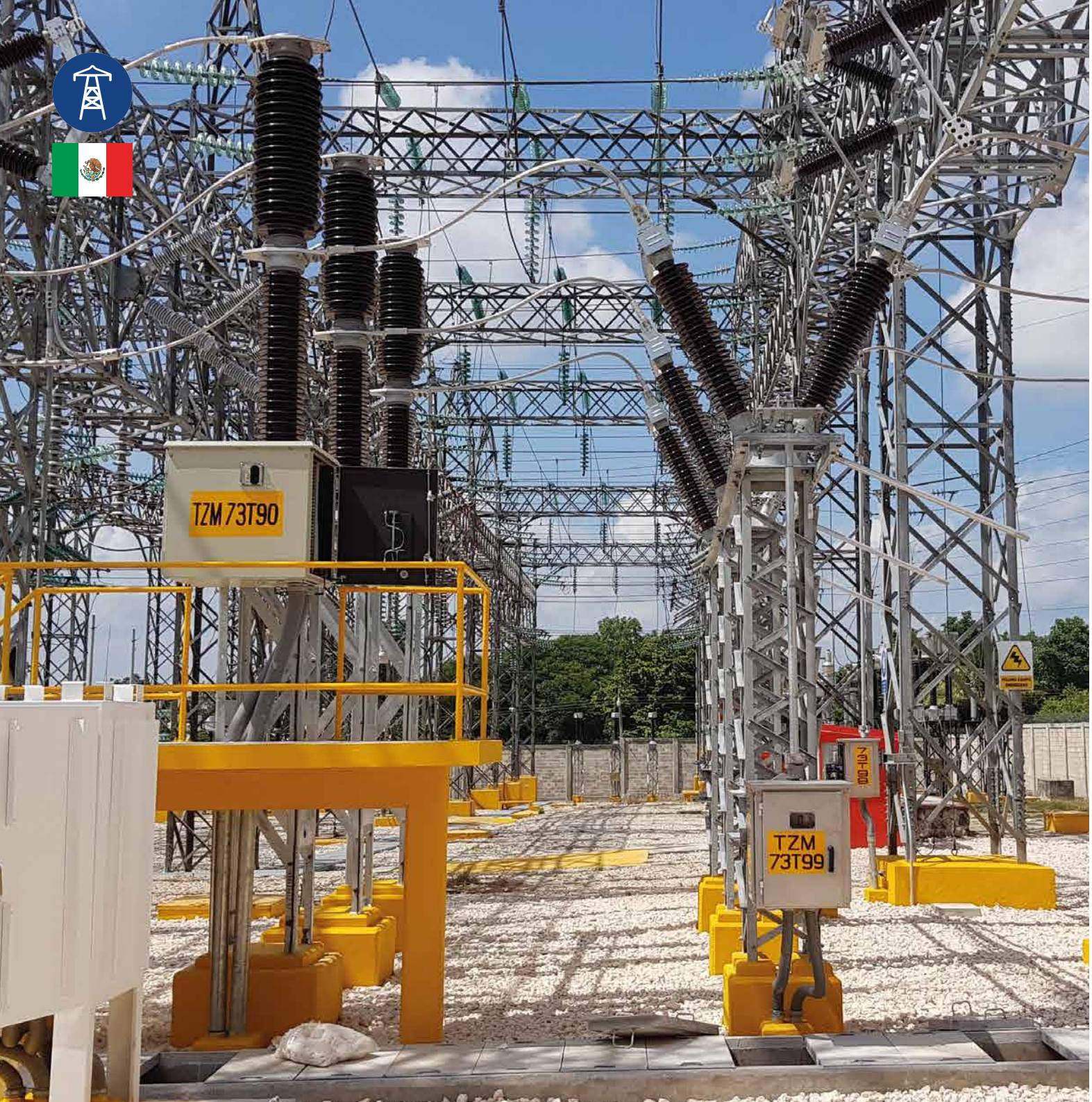

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ELECTRICITY TRANSMISSION

TIZIMÍN INTERCONNECTION

LOCATION ▸ Tizimín, Yucatan (Mexico)

CUSTOMER ▸ Fuerza y Energía Limpia de Tizimín, S.A. de C.V. (Grupo Alarde)

PROJECT SCOPE ▸

Supply, assembly and start-up of the interconnection electrical infrastructures at the Tizimín wind farm: Two substations and an interconnection line

AMOUNT ▸ EUR 8.2 million

START DATE ▸ june 2017

FINISH DATE ▸ july 2018

CHARACTERISTICS:

- SUBSTATION
  - Booster substation to increase the Tizimín wind farm from 115 kV to 90 MVA
  - Increase in the CFE SE
- LINE
  - 115 kV transmission line, 1 conductor per phase, ACSR 477 and 47 km of overhead lines on towers and 650 m of underground lines

CENTRAL AMERICA

Tizimín, Yucatan (Mexico)

ELECTRICITY TRANSMISSION

TIZIMÍN INTERCONNECTION

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ELECTRICITY TRANSMISSION

TUXPÁN

LOCATION ▸ Jalisco, Mexico and Veracruz States (Mexico)

CUSTOMER ▸ Federal Electricity Commission (CFE)

PROJECT SCOPE:

Engineering work, supply and construction of two 400 kV power lines on the 27 LT 406 project associated with Tuxpán II, III and IV, a total length of 348 km and capacity 175 MVA

AMOUNT ▸ EUR 37 million

START DATE ▸ november 2000

FINISH DATE ▸ august 2003

CHARACTERISTICS:

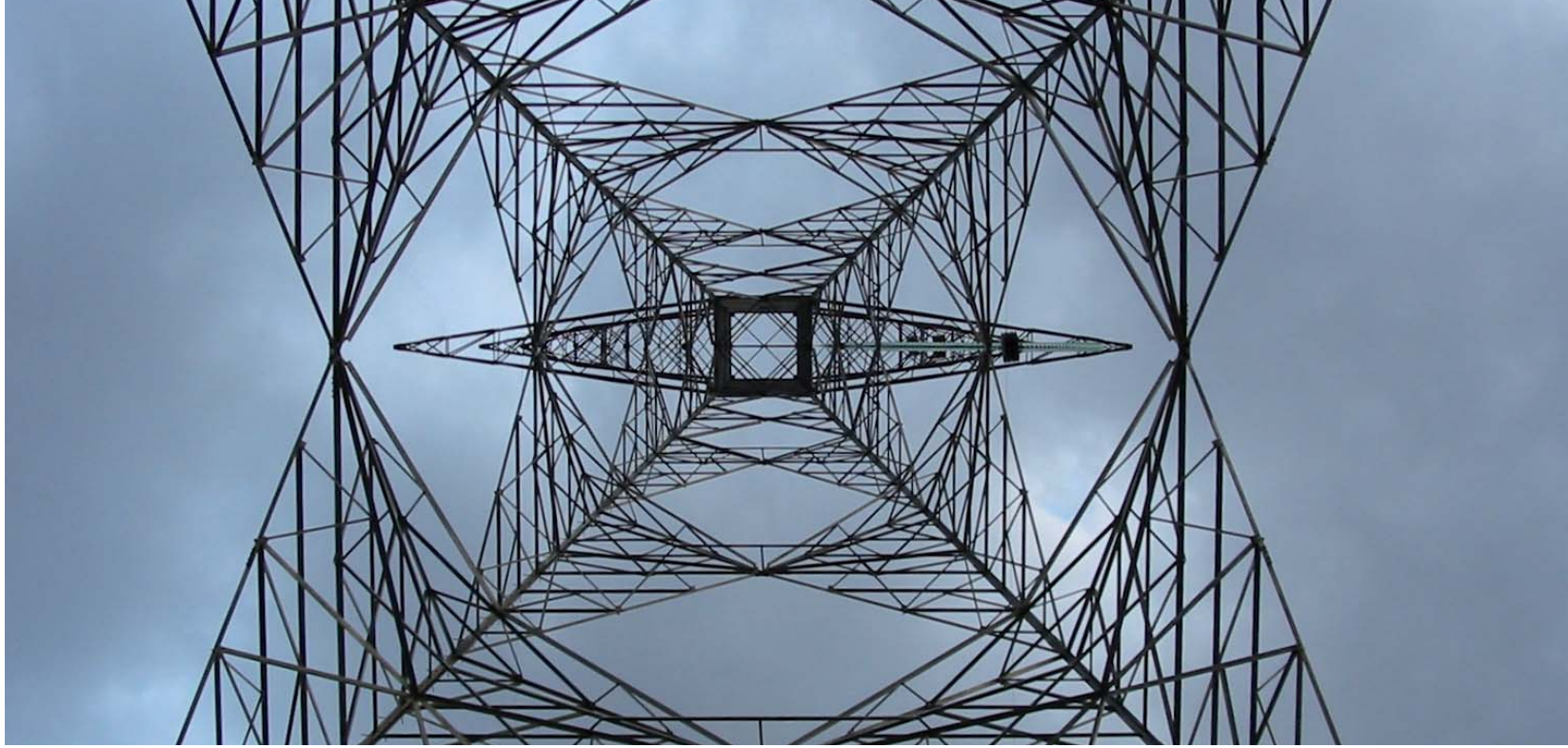
- 60 km of the 400 kV El Salto-Teotihuacan power line, a total length of 125 km
  - ACSR/AS 1113 conductor cable
  - 3 conductors per phase
  - 2 circuits
- 13 km of the 400 kV Tres Estrellas-Poza Rica II L1 power line, a total length of 54 km
  - ACSR/AS 1113 conductor cable
  - 3 conductors per phase
  - 2 circuits
- 13 km of the 400 kV Tres Estrellas-Poza Rica II L2 power line, a total length of 55 km
  - ACSR/AS 1113 conductor cable
  - 3 conductors per phase
  - 2 circuits

CENTRAL AMERICA

Jalisco, Mexico and Veracruz States (Mexico)

ELECTRICITY TRANSMISSION

TUXPÁN



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ELECTRICITY TRANSMISSION

CHIMUARA-NACALA

LOCATION ▸ Chimuara and Alto Molocue, Zambézia Province (Mozambique)

CUSTOMER ▸ Electricidade de Moçambique (EDM)

PROJECT SCOPE ▸

Construction of two new 400/220/33 kV substations.

AMOUNT ▸ EUR 54.5 million

START DATE ▸ April 2020

FINISH DATE ▸ April 2022

CHARACTERISTICS:

- CHIMUARA
  - 13 bays (6 line bays, 2 reactor bays, 2 transformer bays, 2 coupling bays and 1 STATCOM bay) and space for expansion in the future with 3 further line bays
  - Two 250 MVA disassociated phase armoured power autotransformers
  - Two 60 MVAr reactors and one ±100 MVAr STATCOM
  - Replacement of the protection, control and telecommunications systems of the existing substation and integration of the SCADA system with that of the new substation
- ALTO MOLOCUE
  - 12 bays (5 line bays, 3 reactor bays, 2 transformer bays and 2 coupling bays) and space for 3 more line bays in the future
  - Two 250 MVA disassociated phase armoured power autotransformers
  - Three 60 MVAr reactors and one ±100 MVAr STATCOM
  - Integration of the SCADA system of the existing substation into the new command room

AFRICA

Chimuara and Alto Molocue,
Zambézia Province (Mozambique)

ELECTRICITY TRANSMISSION

CHIMUARA-NACALA

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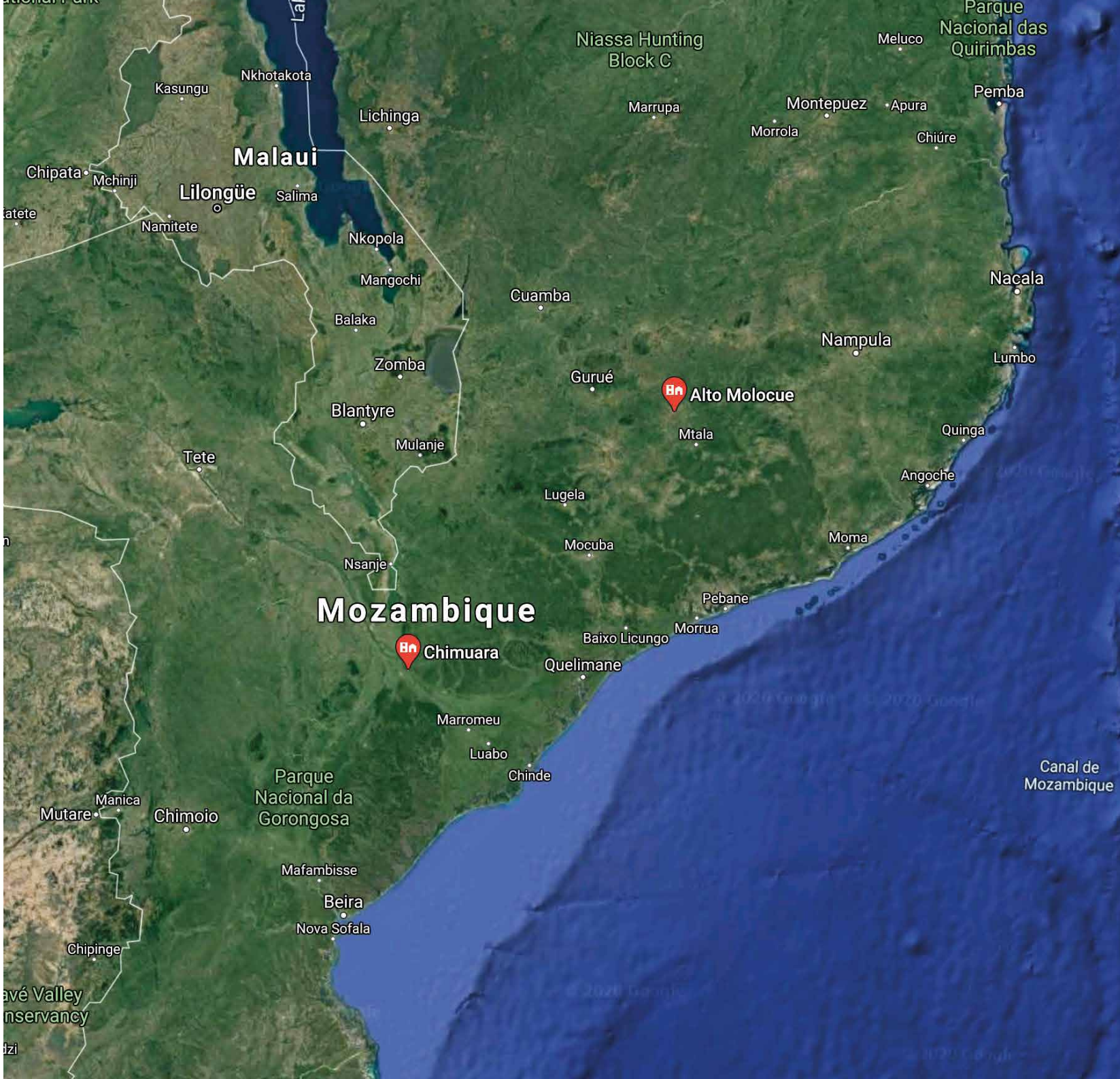

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ELECTRICITY TRANSMISSION

KRISTIANSAND SS

LOCATION ▸ Kristiansand (Norway)

CUSTOMER ▸ Statnett

PROJECT SCOPE ▸

Replacement of the old switchgear at the high-voltage substation in order to introduce a new control system to the 300 kV park, which involves constructing a new control building and the corresponding engineering structures

AMOUNT ▸ EUR 14 million

START DATE ▸ August 2017

FINISH DATE ▸ October 2021

CHARACTERISTICS:

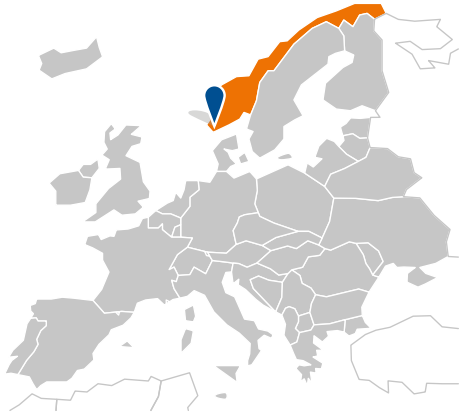
- Civil engineering:
  - Construction of a control building measuring approximately 400 m^2
  - Construction of new cable channels in order to interconnect the new control building with the 300 kV park
  - Refurbishment of the current operations building
- Electro-mechanical installation:
  - 300 kV switchgear replacement: switches, disconnectors, instrument transformers, busbars…
  - Replacement of metallic structures
  - Installation of low-voltage interconnecting wiring between the park's various buildings

EUROPE

Kristiansand (Norway)

ELECTRICITY TRANSMISSION

KRISTIANSAND SS



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ELECTRICITY TRANSMISSION

LEIRDØLA AND SALTEN SUBSTATIONS

LOCATION ▸ Straumen (Norway)

CUSTOMER ▸ Statnett

PROJECT SCOPE ▸

Construction of two 420/132 kV electrical substations (civil work and assembly of the parks as well as construction of the control building).

AMOUNT ▸ EUR 13.5 million

START DATE ▸ April 2020

FINISH DATE ▸ October 2022

CHARACTERISTICS:

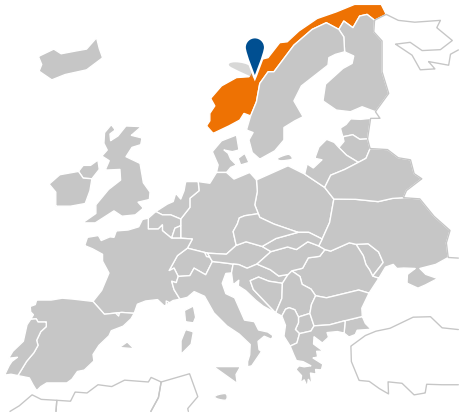
- LEIRDØLA SUBSTATION
  - ✓ Design, supply and assembly of a new transformation station to ensure supply between northern and central Norway.
- SALTEN SUBSTATION
  - ✓ Replacement of the current installation, meeting the electricity demand that is currently poorly serviced on the west coast of Norway, where renewable production is growing significantly.

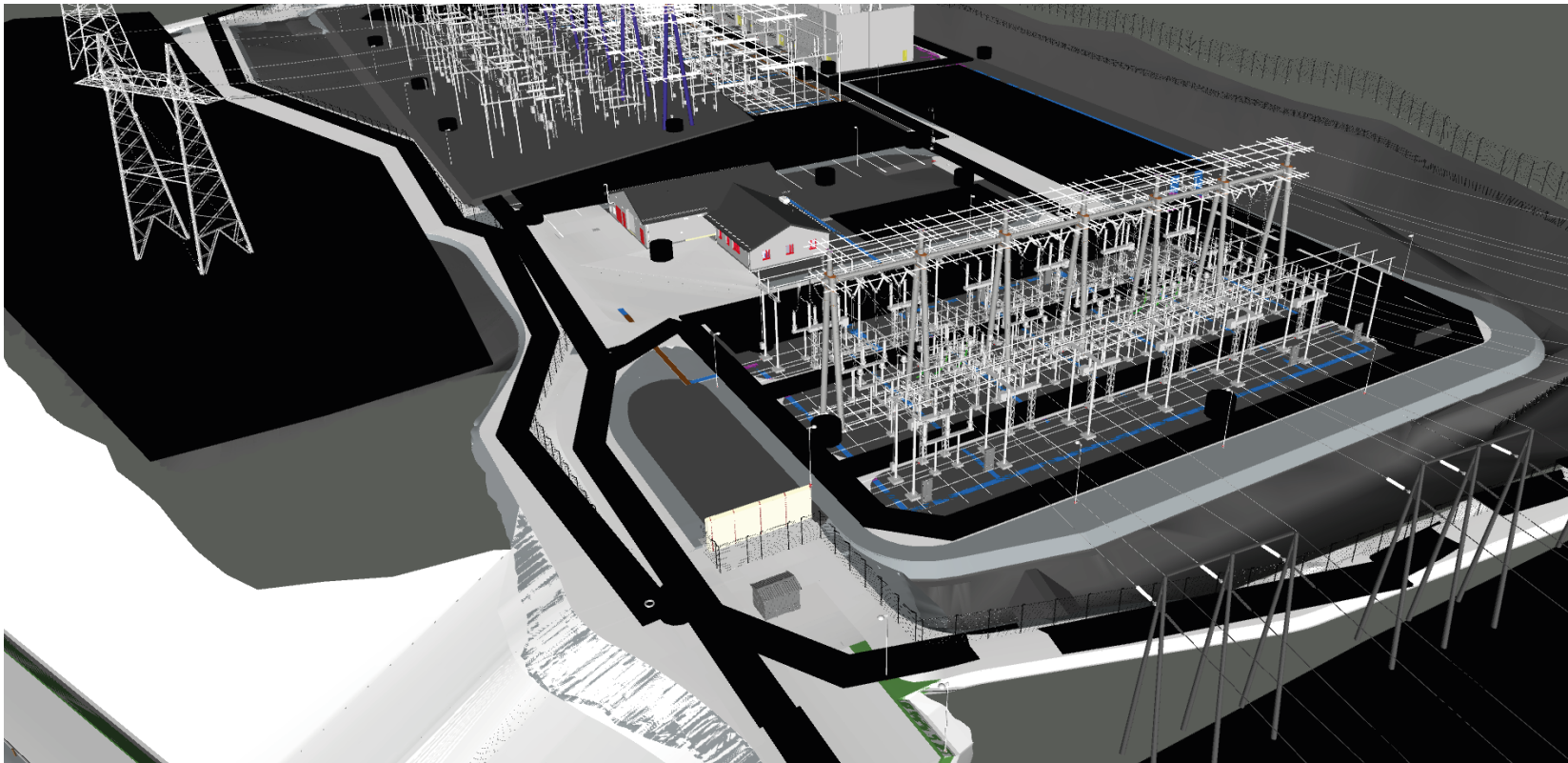
EUROPE

Straumen (Norway)

ELECTRICITY TRANSMISSION

LEIRDØLA AND SALTEN SUBSTATIONS





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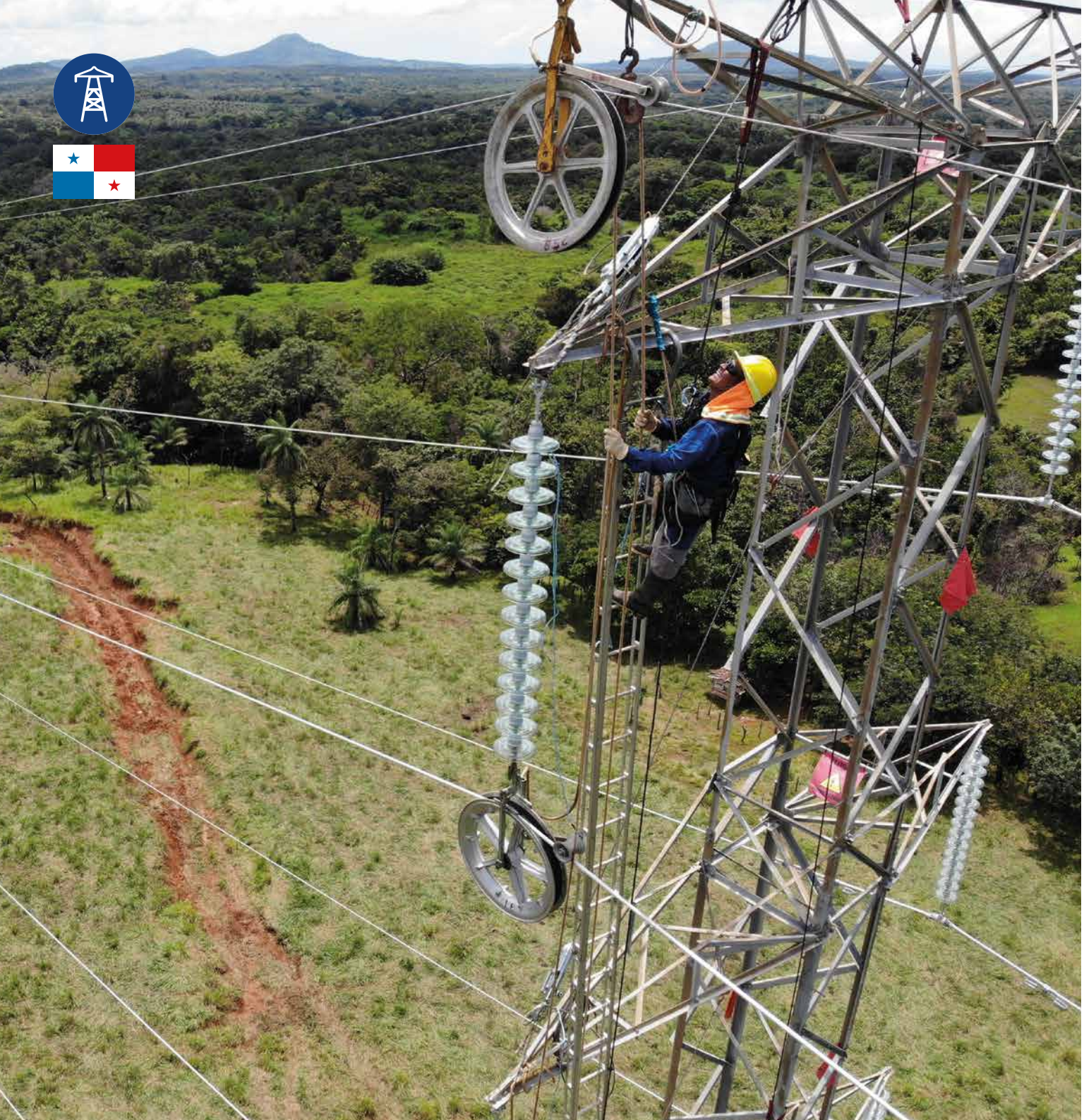

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ELECTRICITY TRANSMISSION

MATA DE NANCE TL

LOCATION ▸ Chiriquí Province (Panama)

CUSTOMER ▸ Empresa de Transmisión Eléctrica S.A. ETESA

PROJECT SCOPE ▸

Supply, assembly and the work involved in expanding the capacity of the current Mata de Nance-Veladero 230 kV line: the conductor on the Mata de Nance-Veladero Transmission Line (lines 230-5B/6C) will be replaced with a special high-temperature low-sag conductor (HTLS)

AMOUNT ▸ EUR 24.3 million

START DATE ▸ January 2018

FINISH DATE ▸ January 2020

CHARACTERISTICS:

- The transmission line will have the following characteristics:
  - 230 kV voltage
  - Two vertically arranged circuits (5B/6C)
  - Circa 86.3 km long
  - Self-supporting tower structures
  - Type 7, number 8 conventional guard cable (two units)
  - 750 kcmil phase conductor
- Repowering the Transmission Line involves the following activities:
  - Calculation of the charge in the towers by simulating the new conductor's characteristics and behaviour
  - Replacement of the fittings and guard cables, conventional type 7, number 8 and 24 FO OPGW
  - Replacement of the insulation chains and fittings
  - Replacement of the 750 kcmil conductor with an HTLS 713.5 kcmil conductor
  - Replacement of conventional connections in the HTLS Substations
  - Connection and roll-out of fibre optic communications
  - Replacement of current towers
  - Measurement and replacement of earthing system
  - Positioning of Beacons
  - Implementation of mitigation measures

CENTRAL AMERICA

Chiriquí Province (Panama)

ELECTRICITY TRANSMISSION

MATA DE NANCE TL

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ELECTRICITY TRANSMISSION

ITAIPÚ-VILLA HAYES TL

LOCATION ▸ San Pedro de Macorís province (Paraguay)

CUSTOMER ▸ Itaipú Binacional

PROJECT SCOPE:

Engineering, supply and construction through a consortium of a 500 kV transmission line spanning 348 km from the substation on the right bank of the Itaipú SEMD to the Villa Hayes SEVH substation

AMOUNT ▸ EUR 160 million (ENO 50%)

START DATE ▸ december 2011

FINISH DATE ▸ august 2013

CHARACTERISTICS:

- 759 free-standing pylons
- 3 phases, 4 conductors per phase
- 110,000 insulators

SOUTH AMERICA

San Pedro de Macorís province (Paraguay)

ELECTRICITY TRANSMISSION

ITAIPÚ-VILLA HAYES TL

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ELECTRICITY TRANSMISSION

BEMPOSTA-LAGOAÇA 3

LOCATION ▸ Tras-os-Montes (Portugal)

CUSTOMER ▸ Rede Eléctrica Nacional (REN)

PROJECT SCOPE:

Construction of a 30 km 400 kV power line, including supply consignments and assembly work, involving: foundations, assembly, land survey work, post retautening, unwinding, regulation, bracing, setting cables, connections and optic tests, final checks and start-up. Includes modification of the 220 kV Picote-Bemposta power line (between supports 39 and 50)

AMOUNT ▸ EUR 13 million

START DATE ▸ july 2010

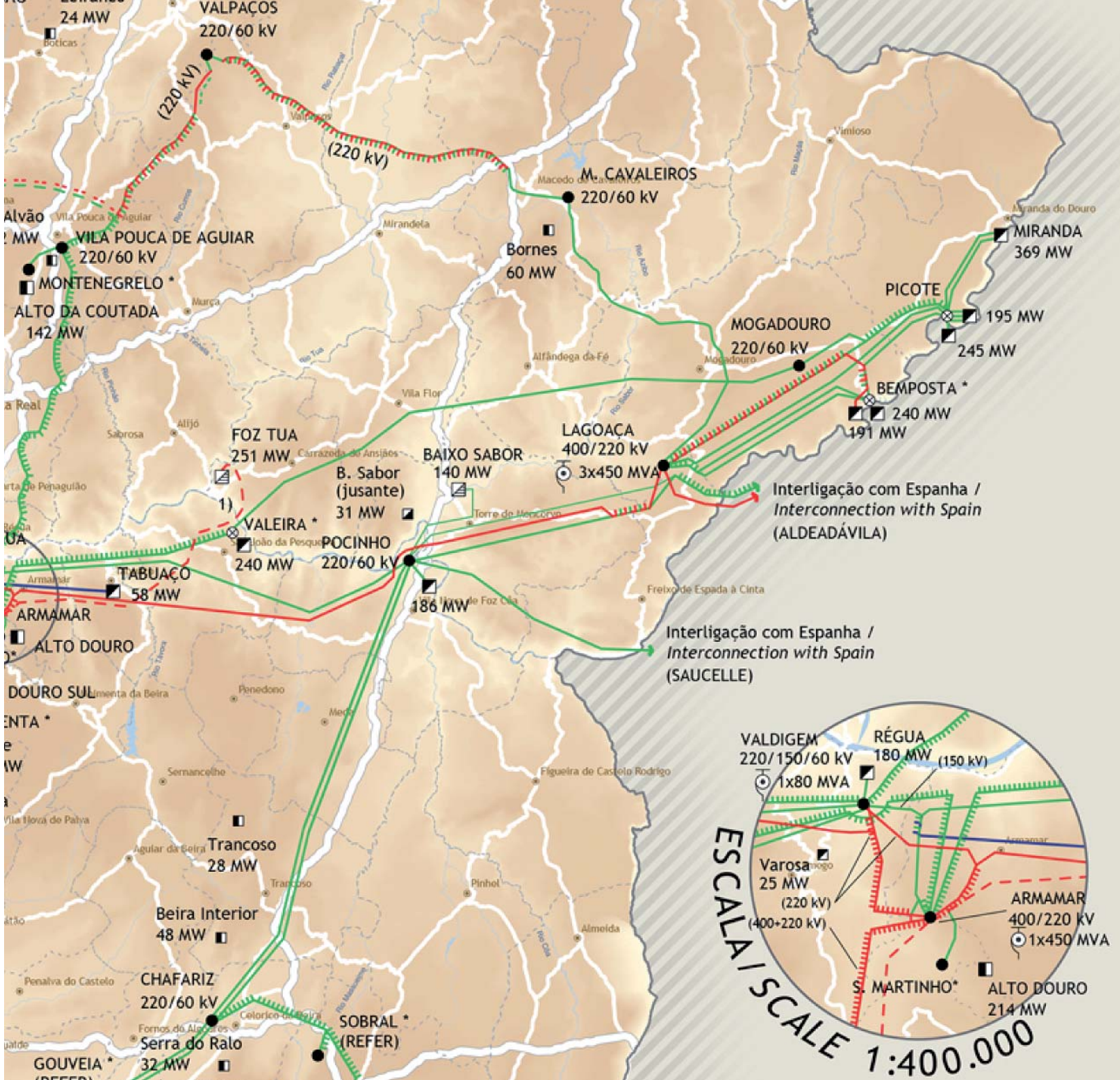
FINISH DATE ▸ december 2010

EUROPE

Tras-os-Montes (Portugal)

ELECTRICITY TRANSMISSION

BEMPOSTA-LAGOAÇA 3



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ELECTRICITY TRANSMISSION

PALMELA-SINES 3

LOCATION ▸ Lisbon (Portugal)

CUSTOMER ▸ Rede Eléctrica Nacional (REN)

PROJECT SCOPE:

Construction of the Palmela-Sines 3 line to the 400 kV Fanhoes substation, 97 km, including supplies and assembly: foundations, special foundation system (23 supports, 21 with piles), assembly, land survey work, post retautening (including two 98 m tubular supports across the River Tagus), unwinding, regulation, bracing, setting cables, connections and optic tests, final checks and start-up

AMOUNT ▸ EUR 19 million

START DATE ▸ march 2012

FINISH DATE ▸ december 2012

EUROPE

Lisbon (Portugal)

ELECTRICITY TRANSMISSION

PALMELA-SINES 3

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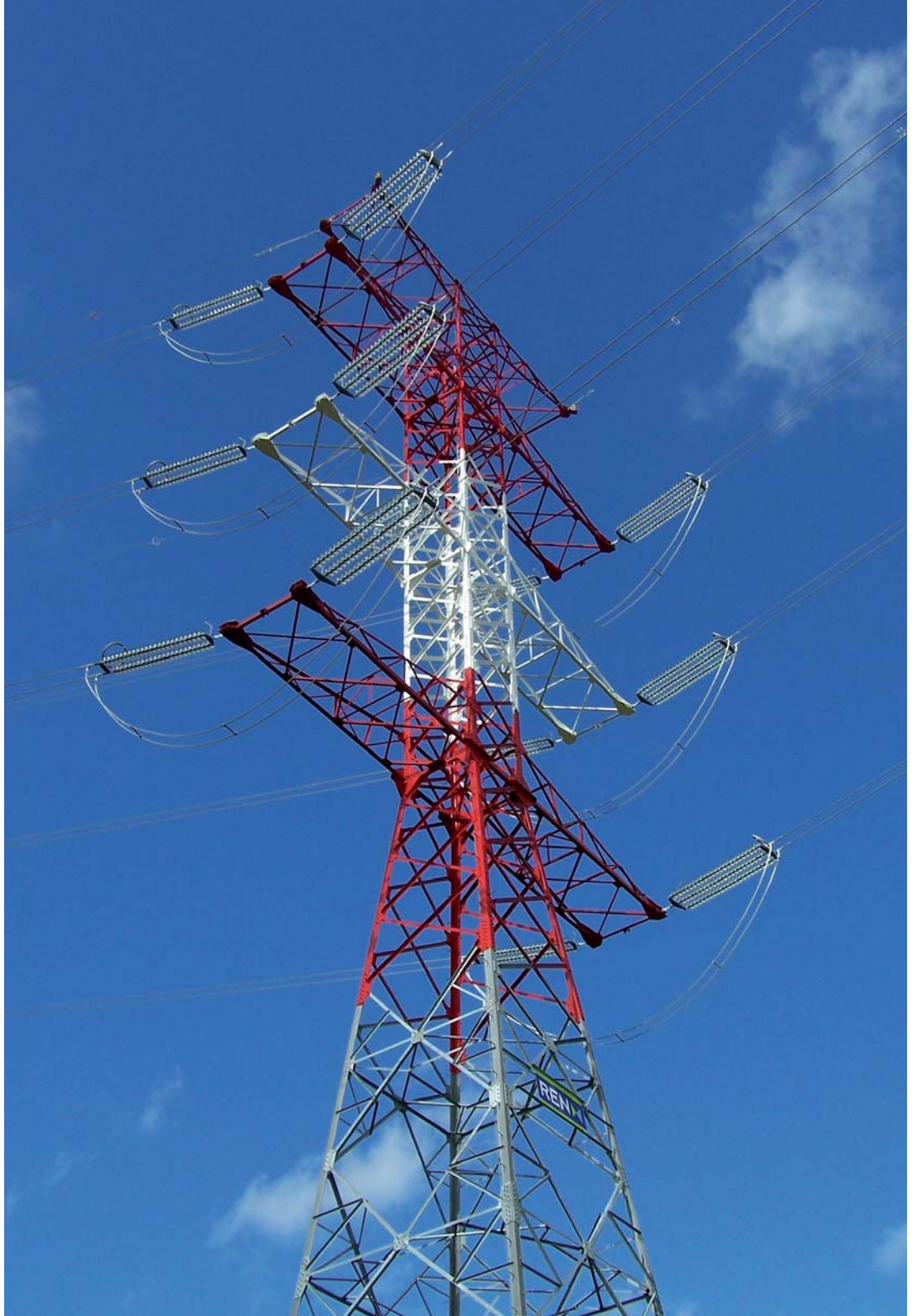

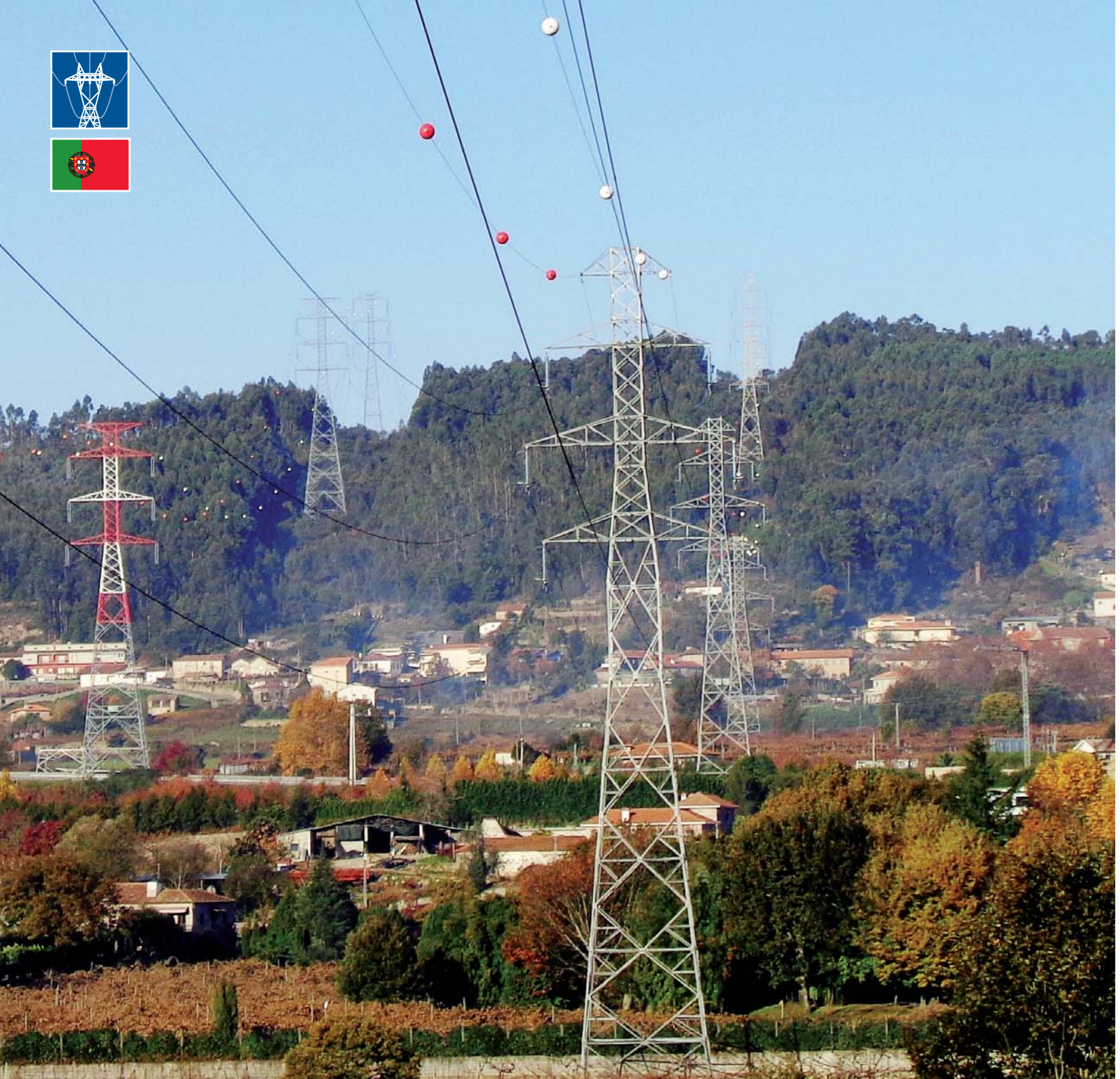

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ELECTRICITY TRANSMISSION

VALDIGEM-RECAREI-URRÔ

LOCATION ▸ Duero and Tras-os-Montes (Portugal)

CUSTOMER ▸ Rede Eléctrica Nacional (REN)

PROJECT SCOPE:

Remodelling work and extension to the transmission capacity of the Valdigem-Recarei 1, Valdigem-Urrô and Recarei-Urrô 220 kV transmission lines, including supplies and assembly: foundations, assembly, land survey work, post retautening, modification of supports with adaptations to 2 guard wires, assembly of prismatic modules, unwinding, regulation, bracing, setting cables, connections and optic tests, final checks and start-up

AMOUNT ▸ EUR 7 million

START DATE ▸ june 2013

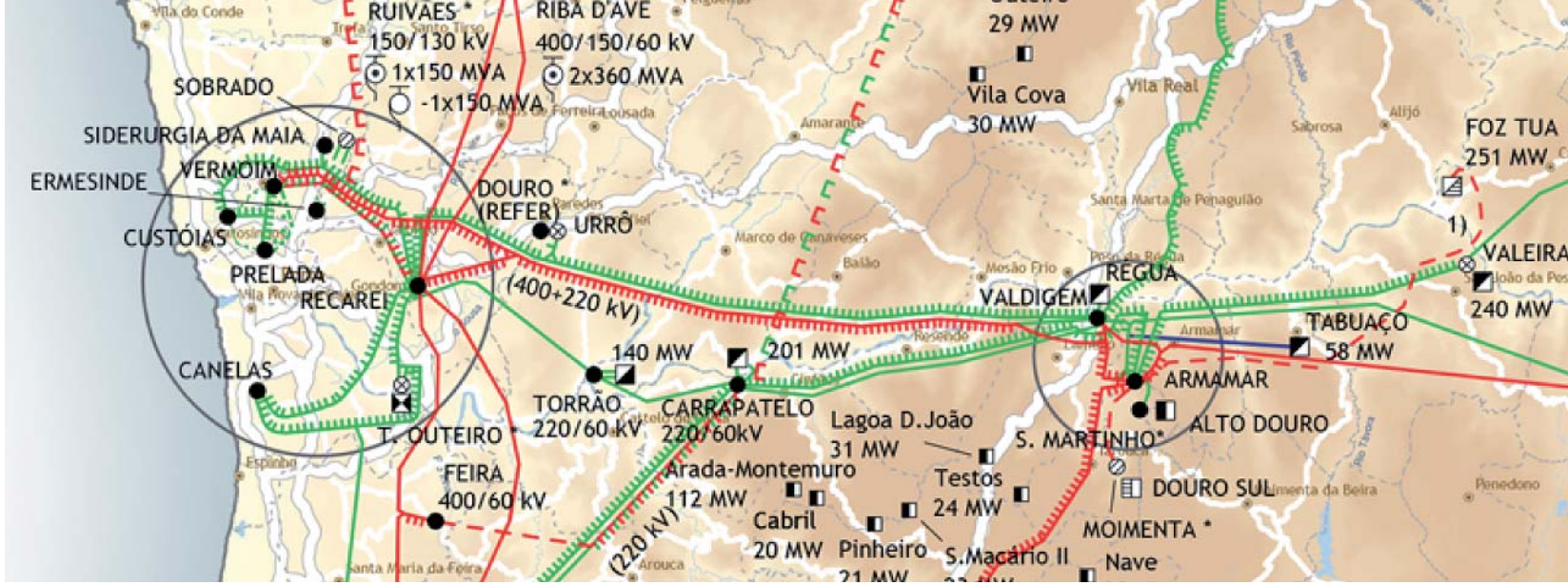
FINISH DATE ▸ december 2013

EUROPE

Duero and Tras-os-Montes (Portugal)

ELECTRICITY TRANSMISSION

VALDIGEM-RECAREI-URRÔ



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ELECTRICITY TRANSMISSION

KOUNOUNE-PATTE D'OIE TL AND SS

LOCATION ▸ Dakar, Kounoune et Patte d'Oie (Senegal)

CUSTOMER ▸ Senelec

PROJECT SCOPE ▸

EPC project: 23 km underground 225 kV line, 225 and 90 kV GIS substations and 225/90/33 kV transformers

AMOUNT ▸ EUR 33.3 million

START DATE ▸ september 2019

FINISH DATE ▸ march 2021

CHARACTERISTICS:

- 1,600 mm^2 of 225 kV HV cable
- 138 km of DN200 pipe
- 22,000 m^3 of concrete
- Civil works in dual circuits, installation of cables for one circuit
- Construction of a new 225 kV GIS substation (8 bays)
- Extending an existing 225 kV GIS substation (2 bays)
- Extending an existing 90 kV GIS substation (3 bays)
- Supply and installation of three 225/90/30 kV 150/150/30 MVA power transformers

AFRICA

Dakar, Kounoune et Patte d'Oie (Senegal)

ELECTRICITY TRANSMISSION

KOUNOUNE-PATTE D'OIE TL AND SS

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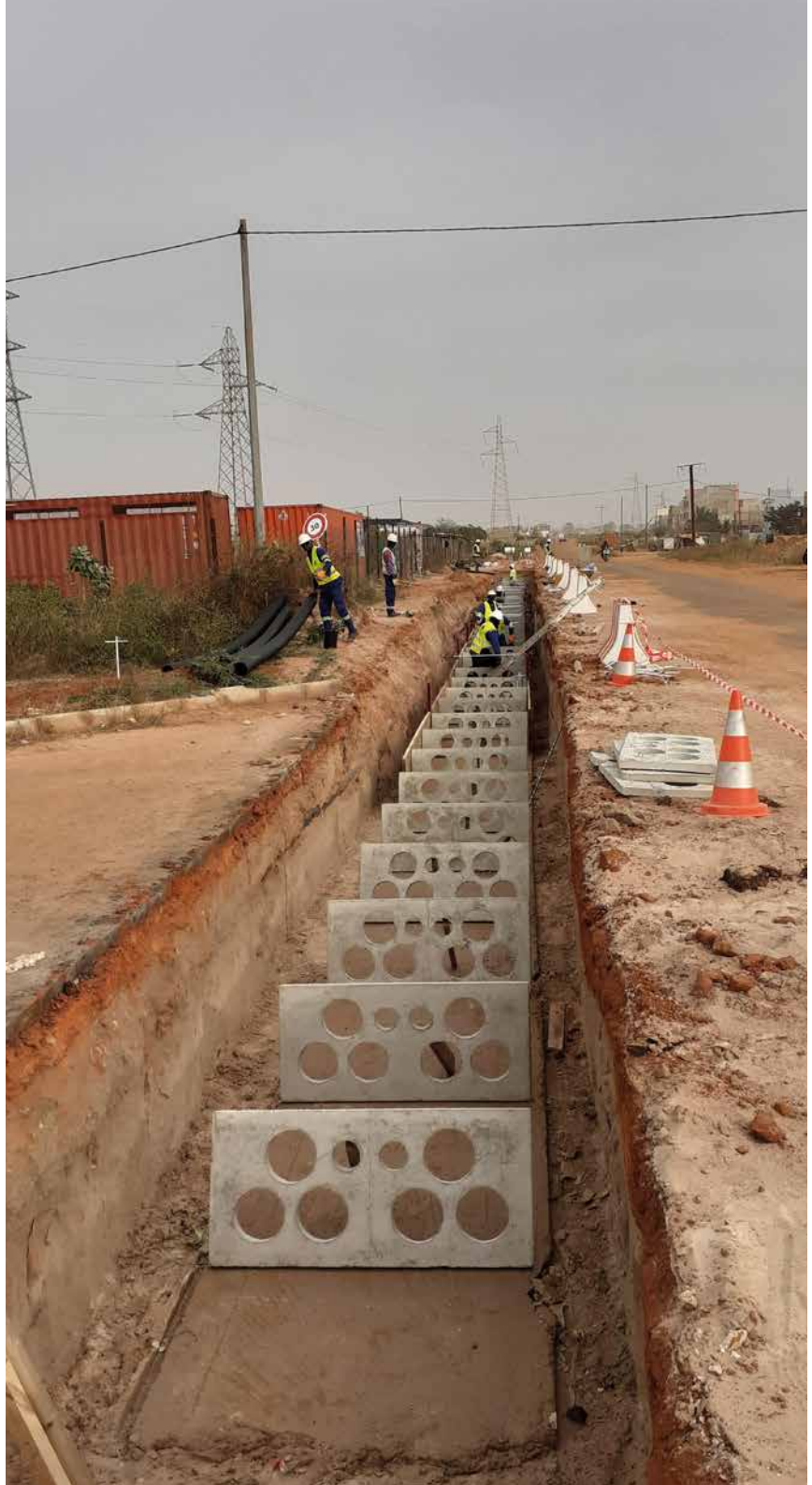

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POWER TRANSMISSION

OMVG INTERCONNECTION PROJECTS

LOCATION ▸ Senegal, Gambia, Guinea and Guinea-Bissau (Africa)

CUSTOMER ▸ OMVG (Organisation de Mise en Valeur du Fleuve de Gambie)

PROJECT SCOPE:

Construction of 11 225/30 kV substations in Gambia, Guinea and Guinea Bissau. OMVG is a company created by the 4 countries and entrusted with the development and monitoring of the project. The 4 lots awarded are financed by various multilateral bodies including the World Bank (WB), the Islamic Development Bank (IDB), West African Development Bank (WADB) and the European Investment Bank (EIB).

AMOUNT ▸ EUR 80 million (ENO 50%)

START DATE ▸ july 2017

FINISH DATE ▸ november 2018

CHARACTERISTICS:

- 225/30 kV SS Soma and Brikama (Gambia)
- 225/30 kV SS Bissau, Mansoa, Bamdadinca and Saltinho (Guinea-Bissau)
- 225/30 kV SS Kaleta and Boké, Mali, Labé and Linsan (Guinea)

AFRICA

Senegal, Gambia, Guinea and Guinea-Bissau (Africa)

POWER TRANSMISSION

OMVG INTERCONNECTION PROJECTS

SENEGAL
GAMBIA
GUINEA-BISSAU
GUINEA

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ELECTRICITY TRANSMISSION

LEWISTON TL

LOCATION ▸ Lewiston, Maine (United States)

CUSTOMER ▸ Central Maine Power (Iberdrola USA)

PROJECT SCOPE:

Construction and refurbishment of 115 kV and 34.5 kV power lines

AMOUNT ▸ EUR 13 million

START DATE ▸ june 2014

FINISH DATE ▸ march 2017

CHARACTERISTICS:

- Live working to replace steel conductor with OPGW over 11 km
- 26 steel monoposts, over 33 m high
- 77 wooden posts, over 38 m high
- 10 km of matting using 3,000 more

NORTH AMERICA

Lewiston, Maine (United States)

ELECTRICITY TRANSMISSION

LEWISTON TL

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ELECTRICITY TRANSMISSION

PERALTA

LOCATION ▸ Cuchilla de Peralta. Tacuarembó (Uruguay)

CUSTOMER ▸ Saceem

PROJECT SCOPE:

Engineering, supply, construction and commissioning of the 150 kV electrical discharge system for the 100 MW Peralta wind power plant

AMOUNT ▸ EUR 18 million

START DATE ▸ february 2014

FINISH DATE ▸ december 2015

CHARACTERISTICS:

- Cuchilla de Peralta (PER) 150/31.5 kV substation.
  - 2 line positions - 150 kV transformer
  - 2 x 150/31.5 kV 50/63 ONAN/ONAF transformers
  - 2x6 cells, 31.5 kV gas-insulated substation
- Connection and measurement unit, Cuchilla de Peralta B substation (CPB) 150 kV configuration main busbar + transfer
- 150 kV high-voltage power line
  - Length 3.5 km
  - Conductor type: Hawk
  - Type of guard wire: OPGW
  - 1 conductor per phase
- Enlargement of the Cuchilla de Peralta A (CPA) 150 kV substation. Configuration main busbar + transfer
- Laying of second circuit in LAT CPA-BOB, 150 kV
  - Length 35 km
  - Conductor type: Hawk
  - Type of guard wire: OPGW
  - 1 conductor per phase
- Enlargement of the Rincón del Bonete B (BOB) 150 kV substation. Configuration main busbar + transfer

SOUTH AMERICA

Cuchilla de Peralta. Tacuarembó (Uruguay)

ELECTRICITY TRANSMISSION

PERALTA

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ELECTRICITY TRANSMISSION

CALABOZO-SAN FERNANDO II

LOCATION ▸ Calabozo and San Fernando, Guárico and Apure states (Venezuela)

CUSTOMER ▸ CADAFE

PROJECT SCOPE:

Engineering, supply, civil engineering, assembly, testing and start-up of two output lines at the 230/115 kV Calabozo substation and the San Fernando II substation, and their interconnection through a 150 km transmission line

AMOUNT ▸ EUR 45 million

START DATE ▸ september 2006

FINISH DATE ▸ october 2009

CHARACTERISTICS:

- Calabozo–San Fernando II 230 kV interconnection, 150 km dual-circuit line
- San Fernando II substation, 230/115/34.5 KV 508 MVA
- Extension to Calabozo 230 kV substation

SOUTH AMERICA

Calabozo and San Fernando, Guárico and Apure states (Venezuela)

ELECTRICITY TRANSMISSION

CALABOZO-SAN FERNANDO II

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ELECTRICITY TRANSMISSION

JUANA LA AVANZADORA SS

LOCATION ▸ Maturín. Monagas State (Venezuela)

CUSTOMER ▸ CADAFE

PROJECT SCOPE:

Engineering, supply, civil engineering, assembly, testing and start-up of the Juana la Avanzadora 230/115 kV 400 MVA substation, rerouting of the 230 kV DT Indio–Casanay power line to Juana Avanzadora, 115 kV interconnection at the Juana la Avanzadora substation with the Maturín, Quiriquire and Boulevard substations

AMOUNT ▸ EUR 21 million

START DATE ▸ may 2008

FINISH DATE ▸ august 2011

SOUTH AMERICA

Maturín. Monagas State
(Venezuela)

ELECTRICITY TRANSMISSION

JUANA LA AVANZADORA SS

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ELECTRICITY TRANSMISSION

JUANA LA AVANZADORA SS EXTENSION

LOCATION ▸ Maturín. Monagas State (Venezuela)

CUSTOMER ▸ CADAFE

PROJECT SCOPE:

Engineering, supply, civil engineering work, assembly, testing and start-up of the extension to the 230/115 kV Juana la Avanzadora substation, rerouting of the second circuit of the 230 kV Indio substation-Casanay substation line to the Juana la Avanzadora substation, and distribution circuits

AMOUNT ▸ EUR 56 million

START DATE ▸ february 2013

FINISH DATE ▸ november 2018

SOUTH AMERICA

Maturín. Monagas State
(Venezuela)

ELECTRICITY TRANSMISSION

JUANA LA AVANZADORA SS EXTENSION

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ELECTRICITY TRANSMISSION

LA HORQUETA-CALABOZO

LOCATION ▸ Horqueta and Calabozo, Delta Amacuro and Guárico States (Venezuela)

CUSTOMER ▸ CADAFE

PROJECT SCOPE:

Engineering, supply, civil engineering, assembly, testing and start-up of the 400/230 kV La Horqueta substation and the 230/115 kV Calabozo substation, and their interconnection through a 150 km transmission line

AMOUNT ▸ EUR 43 million

START DATE ▸ april 2004

FINISH DATE ▸ april 2006

CHARACTERISTICS:

- La Horqueta substation, 400/230 kV
  - 2 x 230 kV outputs
- Calabozo substation, 230/115 kV
  - 2 x autotransformer sections, 230/115 kV 100 MVA
  - 2 x 230 kV outputs
  - 1 x 230 kV transfer section
  - 1 x 115 kV output
  - 1 x 115 kV transfer section
- Interconnection, La Horqueta-Calabozo substations
- 150 km of the 230 kV dual-circuit transmission line

SOUTH AMERICA

Horqueta and Calabozo, Delta Amacuro and Guárico States (Venezuela)

ELECTRICITY TRANSMISSION

LA HORQUETA-CALABOZO

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ELECTRICITY TRANSMISSION

MATURÍN TL

LOCATION ▸ Maturín. Monagas State (Venezuela)

CUSTOMER ▸ PDVSA

PROJECT SCOPE:

Engineering, supply and construction of 115 kV transmission lines for the NIF 115/13.8 kV substation

AMOUNT ▸ EUR 25 million

START DATE ▸ july 2012

FINISH DATE ▸ may 2015

CHARACTERISTICS:

- Single-circuit 115kV transmission line, NIF substation–Furrial substation
  - Length 14 km
  - Conductor type: 1024MCM
  - Type of guard wire: OPGW
  - 2 conductors per phase
- Dual-circuit 115 kV transmission line, NIF substation-IGG Wilpro AP substation
  - Length 3.6 km
  - Conductor type: 500MCM
  - Type of guard wire: OPGW+Alumoweld 7 n° 9
  - 1 conductor per phase
- Dual-circuit 115 kV transmission line, rerouting Furrial substation-Jusepin substation (support T47)-NIF substation
  - Length 0.5 km
  - Conductor type: 1024MCM
  - Type of guard wire: OPGW
  - 2 conductors per phase

SOUTH AMERICA

Maturín. Monagas State
(Venezuela)

ELECTRICITY TRANSMISSION

MATURÍN TL

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ELECTRICITY TRANSMISSION

MONAGAS

LOCATION ▸ Monagas and Delta Amacuro States (Venezuela)

CUSTOMER ▸ CADAFE

PROJECT SCOPE:

Engineering, supply, civil engineering, assembly, testing and start-up of substations and power lines to improve electricity system reliability and meet demand in Monagas and Delta Amacuro states

AMOUNT ▸ EUR 79 million

START DATE ▸ september 2006

FINISH DATE ▸ november 2009

CHARACTERISTICS:

- 8 electricity substations, 230/115/34.5/13.8 kV, with a total of 396 MVA installed:
  - Tucupita 115/34.5/13.8 kV 3x36 MVA
  - El Parque 115/115/13.8 kV 2x36 MVA
  - San Jaime 115/115/13.8 kV 2x36 MVA
  - Barrancas 115/13.8 Kv 1x36 MVA
  - Temblador 115/34.5/13.8 kV 2x36 MVA
  - Jobo Mocho 115/34.5 Kv 1x36 MVA
  - El Indio 230/115 kV
  - Jusepín 115 kV
- 230 km of 115 KV dual-circuit transmission lines
- 140 km of 34.5 kV and 13.8 kV transmission lines

SOUTH AMERICA

Monagas and Delta Amacuro States (Venezuela)

ELECTRICITY TRANSMISSION

MONAGAS

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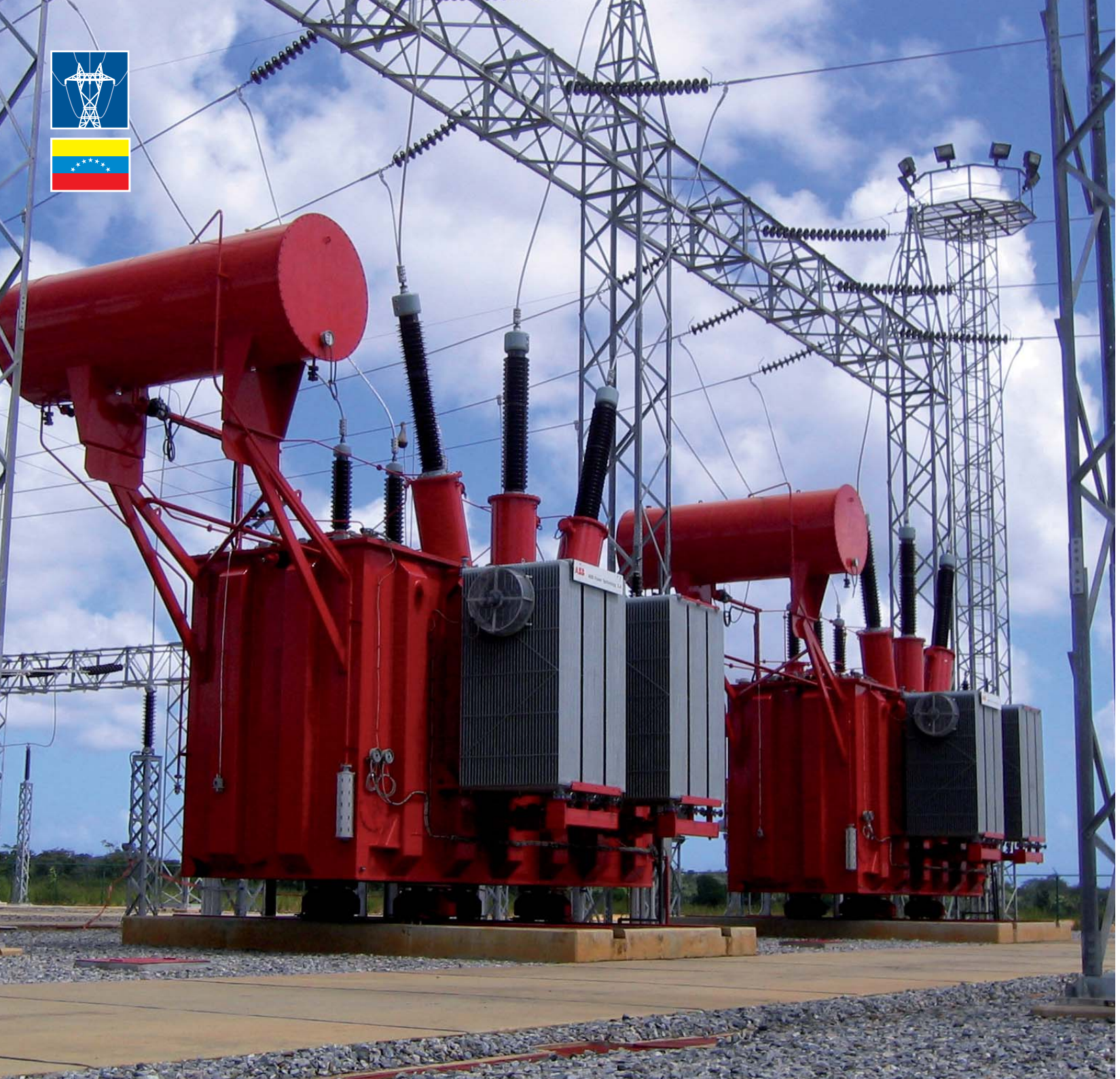

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ELECTRICITY TRANSMISSION

RÍO CHICO, HIGUEROTE AND TUCACAS

LOCATION ▸ Río Chico, Higuerote and Tucacas Miranda and Falcón states (Venezuela)

CUSTOMER ▸ CADAFE

PROJECT SCOPE:

Engineering, supply, civil engineering, assembly, testing and start-up of 230/115 kV Río Chico II substation, and 115/34.5 kV Higuerote and Tucacas substations with 452 MVA of installed capacity

AMOUNT ▸ EUR 30 million

START DATE ▸ july 2002

FINISH DATE ▸ january 2005

CHARACTERISTICS:

- Rio Chico II substation, 230/115/13.8 kV
  - 2 x 230 kV outputs
  - 2 x autotransformer sections, 230/115 kV 100 MVA
  - 4 x 115 kV outputs
- Higuerote substation, 115/34.5/ 13.8 kV
  - 2 x 115/34.5 kV 36 MVA transformer sections
  - 2 x 115/13.8 kV 20 MVA transformer sections
  - 2 x 115 kV outputs
  - 6 x 34.5 kV outputs
  - 4 x 13.8 kV outputs
- Tucacas substation, 115/34.5/ 13.8 kV
  - 1 x 115/34.5 kV 36 MVA transformer section
  - 2 x 115/13.8 kV 36 MVA transformer sections
  - 3 x 115 kV outputs
  - 3 x 34.5 kV outputs
  - 4 x 13.8 kV outputs

SOUTH AMERICA

Río Chico, Higuerote and Tucacas
Miranda and Falcón states
(Venezuela)

ELECTRICITY TRANSMISSION

RÍO CHICO, HIGUEROTE AND TUCACAS

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ELECTRICITY TRANSMISSION

TERMOCENTRO NETWORK

LOCATION ▸ Miranda State (Venezuela)

CUSTOMER ▸ Electricidad de Caracas (CORPOELEC)

PROJECT SCOPE:

Engineering, supply, civil engineering, assembly, testing and start-up of substations and power lines to connect 1,610 MW of power generated in the Sitio and La Raisa area to the national grid

AMOUNT ▸ EUR 159 million

START DATE ▸ march 2010

FINISH DATE ▸ november 2012

CHARACTERISTICS:

- El Sitio substation, 230/115 kV 1,560 MVA
- Castaño substation, 230/115 kV 748 MVA
- Curupao substation, 230/69 kV 374 MVA
- La Raisa substation, 230/115 kV 690 MVA
- 50 km of 230 kV dual-circuit transmission lines

SOUTH AMERICA

Miranda State (Venezuela)

ELECTRICITY TRANSMISSION

TERMOCENTRO NETWORK

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