

References by activity



Power generation



Biomass





BIOMASS GHENT BIOMASS PLANT

LOCATION ▶ Ghent (Belgium)

CUSTOMER ▶ Gentse Warmte Centrale nv (GWC)

PROJECT SCOPE ▶

EPC construction of a new 19.9 MWe electricity generation and steam production plant to serve an adjacent plant. The plant will be fuelled by recycled and reusable wood from demolition sites.

AMOUNT ▶ EUR 86 million

START DATE ▶ january 2020

FINISH DATE ▶ february 2022

CHARACTERISTICS:

- ▶ Engineering
- ▶ Studies: Geotechnical, topographical and other
- ▶ Civil engineering: demolitions, earth movement, piling, foundations and construction
- ▶ Electrical, mechanical and instrumentation and control assemblies
- ▶ Start-up



EUROPE

Ghent (Belgium)

BIOMASS

GHENT BIOMASS PLANT



Hydroelectric power





HYDROELECTRIC POWER PLANTS

GORONA DEL VIENTO

LOCATION ▶ El Hierro. Canary Islands (Spain)

CUSTOMER ▶ Gorona del Viento El Hierro

PROJECT SCOPE:

Supply, assembly and start-up of electromechanical equipment at the Gorona del Viento hydroelectric power plant (4 x 2,830 kW Pelton turbines, 6 x 500 kW pumping units, 2 x 1,500 kW pumping units and main transformers). Assembly and start-up of the electrical and control system

AMOUNT ▶ EUR 20 million

START DATE ▶ june 2009

FINISH DATE ▶ august 2013

CHARACTERISTICS:

- ▶ The Gorona del Viento plant is composed of an 11.5 MW wind plant, a pumping unit and the 11.3 MW hydroelectric unit. The wind plant can supply electricity directly to the grid, and simultaneously power a pumping unit to store water in a high-level holding tank as an energy storage facility. The hydroelectric unit uses the potential energy stored to guarantee a supply of electricity and grid stability



SPAIN

El Hierro. Canary Islands (Spain)

HYDROELECTRIC POWER PLANTS

GORONA DEL VIENTO





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HYDROELECTRIC POWER PLANTS **CAMBAMBE I**

LOCATION ▶ Kwanza Norte (Angola)

CUSTOMER ▶ Empresa Nacional de Electricidad

PROJECT SCOPE:

Full refurbishment of plant and substation, including disassembly of existing units, installation of 2 new turbine-generator units, supply and installation of 2 units for refurbishment of 220 kV substation

AMOUNT ▶ EUR 56 million

START DATE ▶ january 2009

FINISH DATE ▶ march 2013

CHARACTERISTICS:

- ▶ General data
 - ✓ Number of units: 4
 - ✓ Type of unit: 4 Francis
 - ✓ Power output: 4 x 65 MW
- ▶ Penstock
 - ✓ Inner diameter: 3.8
 - ✓ Developed length: 105
- ▶ Equipment
 - ✓ 4 Francis turbines
 - ✓ Nominal power output: 4 x 75 MW



AFRICA

Kwanza Norte (Angola)

HYDROELECTRIC POWER PLANTS
CAMBAMBE I





elecnor

HYDROELECTRIC POWER PLANTS **CAMBAMBE II**

LOCATION ▶ Dondo. Kwanza Norte (Angola)

CUSTOMER ▶ Empresa Nacional de Electricidad

PROJECT SCOPE:

Electromechanical assembly for the 714.4 MW Cambambe II hydroelectric power plant, including assembly of 4 turbine-generators, and supply and assembly of the electricity and mechanical BOP, the 15/220 kV 4 x 200 MVA step-up transformers and the 400, 220 and 60 kV substations

AMOUNT ▶ EUR 168 million

START DATE ▶ august 2013

FINISH DATE ▶ june 2017

CHARACTERISTICS:

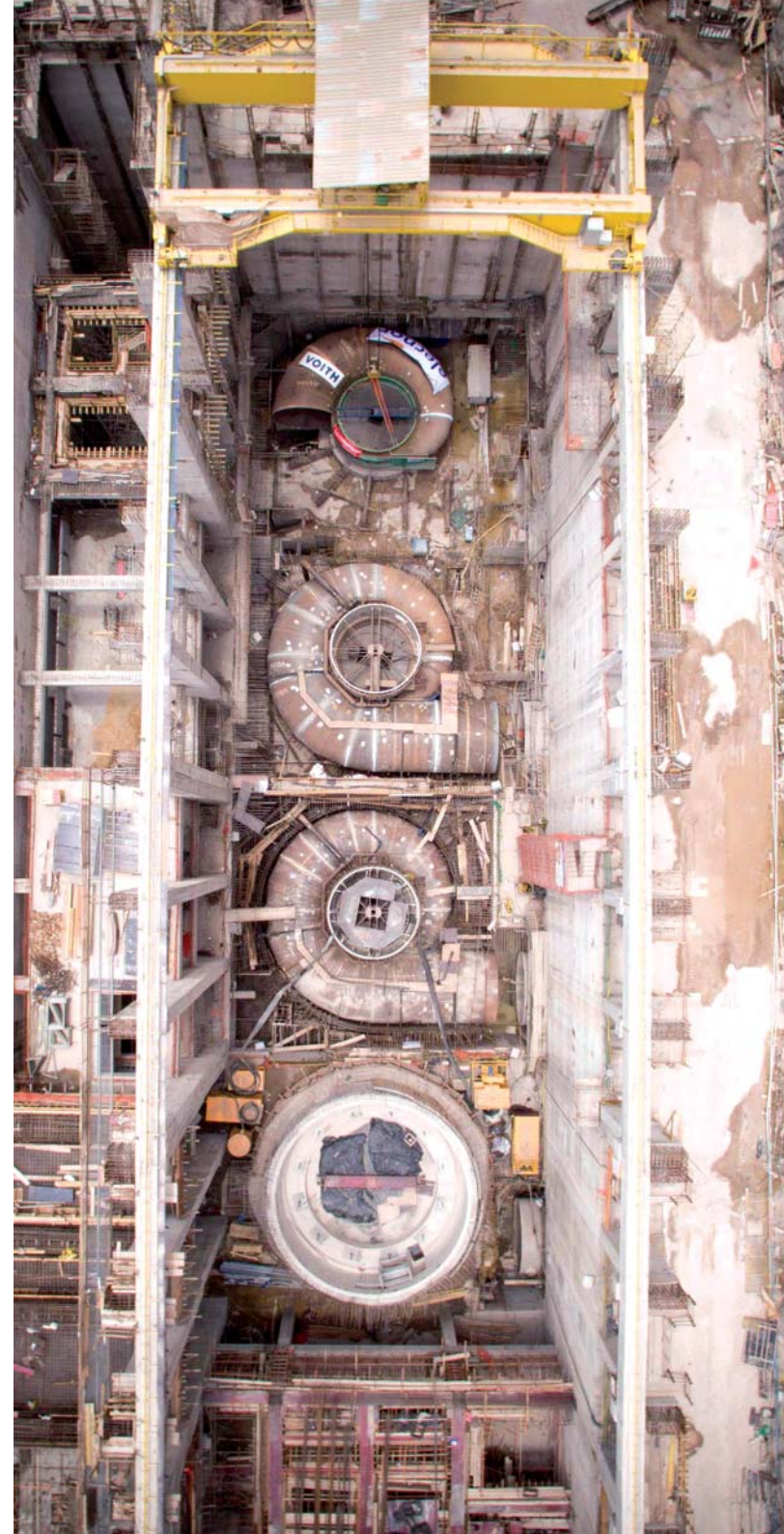
- ▶ General data
 - ✓ Power output: 4 x 178.6 MW
 - ✓ Number of units: 4
 - ✓ Type of unit: 4 Francis
- ▶ Penstock
 - ✓ Inner diameter: 7.5 m
 - ✓ Developed length: 124 m
- ▶ Equipment
 - ✓ 4 VOITH Francis turbines
 - ✓ Nominal power output: 178.6 MW
 - ✓ Nominal speed: 187.5 rpm



AFRICA

Dondo. Kwanza Norte (Angola)

HYDROELECTRIC POWER PLANTS CAMBAMBE II





HYDROELECTRIC POWER PLANTS

GOVE

LOCATION ▶ Caala. Huambo (Angola)

CUSTOMER ▶ Empresa Nacional de Energia

PROJECT SCOPE:

Electromechanical assembly of the 60 MW Gove hydroelectric power plant, power house building and substation

AMOUNT ▶ EUR 25 million

START DATE ▶ january 2010

FINISH DATE ▶ december 2012

CHARACTERISTICS:

- ▶ 3 x 20 MW vertical Francis turbine-generators (h=4.5 m, n=230.77 rpm)
- ▶ Generator cooling system, CO₂ system, frequency converters, lighting system, control and protection panels
- ▶ Step-up substation composed of 3 step-up transformers (11kV/220 kV 24 MVA), 1 power transformer (220kV/30 kV 10 MVA), 2 x 220 kV line outputs, 1 x 30 kV line output and a building for control and protection and MV cells

CHARACTERISTICS:

- ▶ Penstock
 - ✓ Inner diameter: 6 m
 - ✓ Developed length: 84 m
 - ✓ Guard device: butterfly valve
- ▶ Equipment
 - ✓ 3 vertical Francis turbines
 - ✓ Nominal speed: 230.77 rpm



AFRICA

Caala. Huambo (Angola)

HYDROELECTRIC POWER PLANTS

GOVE



ANGOLA





HYDROELECTRIC POWER PLANTS

LAÚCA HP PLANT

LOCATION ▶ Malanje (Angola)

CUSTOMER ▶ GAMEK (Ministry for Energy and Water)

PROJECT SCOPE:

Electro-mechanical assembly work on the 2,070 MW Laúca hydroelectric power plant

AMOUNT ▶ EUR 151 million

START DATE ▶ November 2015

END DATE ▶ August 2018

CHARACTERISTICS:

- ▶ General data
 - ✓ Power capacity: 6 x 334 MW + 1 x 67 MW
 - ✓ Main plant with six 334 MW turbine-generators and mechanical and electrical BOP
 - ✓ A 67 MW ecological flow turbine and mechanical and electrical BOP
 - ✓ Hydromechanics
 - ✓ Lifting systems
 - ✓ Penstocks and sluiceway gates
 - ✓ 400 kV and 200 kV substation
 - ✓ 15 kV, 400 kV and 220 kV lines between the substations and the plants



AFRICA
Malanje (Angola)

HYDROELECTRIC POWER PLANTS

LAÚÇA HP PLANT





HYDROELECTRIC POWER PLANTS

MATALA REFURBISHMENT

LOCATION ▶ Huila (Angola)

CUSTOMER ▶ Public Electricity Production Enterprise (PRODEL)

PROJECT SCOPE ▶

Comprehensive refurbishment of the plant to achieve the installed capacity that this infrastructure allows, in order to fully harness the hydroelectric resources available and expand the availability of energy in the area

AMOUNT ▶ EUR 106.9 million

START DATE ▶ April 2019

FINISH DATE ▶ November 2022

CHARACTERISTICS:

- ▶ Refurbishment of the electromechanical system and other installations.
- ▶ Supply and installation of three new sets of 17 MVA turbine generators.
- ▶ Installation of a 130 km long medium-voltage network and its distribution to 3,000 houses, renovation of the control unit and the restoration of outdoor areas and access points.



AFRICA
Huila (Angola)

HYDROELECTRIC POWER PLANTS
MATALA
REFURBISHMENT





HYDROELECTRIC POWER PLANTS

NACHTIGAL

LOCATION ▶ 60 km north of Yaoundé (Cameroon)

CUSTOMER ▶ NHPC

PROJECT SCOPE ▶

Electromechanical installation of seven power-generation units, including auxiliary systems, a bridge crane, step-up transformers and an electrical substation

AMOUNT ▶ EUR 70 million

START DATE ▶ July 2018

FINISH DATE ▶ March 2023

CHARACTERISTICS:

- ▶ General specifications:
 - ✓ Rated power: 7 x 60 MW
 - ✓ Number of generation units: 7
 - ✓ Unit types: Vertical Francis Turbine (General Electric)
 - ✓ Rated speed: 136 rpm
 - ✓ Voltage generated: 10.3 kV – 50 Hz
- ▶ Step-up transformers:
 - ✓ Power capacity: 8 x 60 MW
 - ✓ Number of transformers: 7 + 1 reserves
 - ✓ Voltage: 10.3 / 225 kV
- ▶ Substation
 - ✓ Voltage level: 225 kV
 - ✓ Configuration: Double busbar
 - ✓ Number of line positions: 9 (7 entering the generation units and 2 exiting)



AFRICA

60 km north of Yaoundé
(Cameroon)

HYDROELECTRIC POWER PLANTS

NACHTIGAL





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HYDROELECTRIC POWER PLANTS **RÍO DUQUECO**

LOCATION ▶ Biobío region (Chile)

CUSTOMER ▶ Ibener

PROJECT SCOPE:

Engineering, construction, supply, assembly, start-up and operation of the River Duqueco hydroelectric plant, composed of two heads with the Peuchén plant (75 MW) and the Mampil plant (50 MW), generating an average of 591 GWh per year, and a 220 kV energy discharge line from the Peuchén plant to the Mampil plant, with connection to Chile's Central Interconnected System

AMOUNT ▶ EUR 85 million

INVESTMENT ▶ USD 156 million (ENO 25%)

START DATE ▶ april 1996

FINISH DATE ▶ february 2000

CHARACTERISTICS:

	Peuchén HP	Mampil HP
Plant dimensions	30 x 16.7 m	30 x 16.7 m
Elevation of access level	653.35 MASL	523.0 MASL
Number of units	2	2
Type of unit	Vertical-shaft Francis turbine	Vertical-shaft Francis turbine
Power output	2 x 37.5 MW	2 x 24.5 MW
Average yearly production	360.2 GWh	230.7 GWh
Capture flow rate	36 m ³ /s	45 m ³ /s
Length of channel	12,046 m	12,260 m
Gross head	237.1 m	124.1 m
Maximum flow	2 x 18 m ³ /s	2 x 22.5 m ³ /s
Maximum shaft torque	2 x 37.5 MW	2 x 24.5 MW
Nominal speed	600 rpm	500 rpm



SOUTH AMERICA
Biobío region (Chile)

HYDROELECTRIC POWER PLANTS
RÍO DUQUECO



CHILE





HYDROELECTRIC POWER PLANTS

INGA I

LOCATION ▶ Inga, Bas-Congo (Democratic Republic of Congo)

CUSTOMER ▶ Société Nationale d'Electricité (SNEL)

PROJECT SCOPE:

Modernisation of the Inga I hydroelectric power plant by refurbishment of two 55 MW generators (G11 and G15)

AMOUNT ▶ EUR 32 million

START DATE ▶ july 2013

FINISH DATE ▶ december 2016

CHARACTERISTICS:

- ▶ General data
 - ✓ Plant dimensions: 150 x 25 m²
 - ✓ Number of units: 6
 - ✓ Type of units: vertical-shaft Francis turbine
 - ✓ Power output: 6 x 55 MW
- ▶ Penstock
 - ✓ Inner diameter: 5.5 m
 - ✓ Developed length: 60 m
 - ✓ Guard device: hydraulic sluice
- ▶ Turbines
 - ✓ Nominal gross head: 50 m
 - ✓ Nominal flow rate: 6 x 140 m³/s
 - ✓ Nominal power output: 6 x 55 MW
 - ✓ Nominal speed: 136 rpm

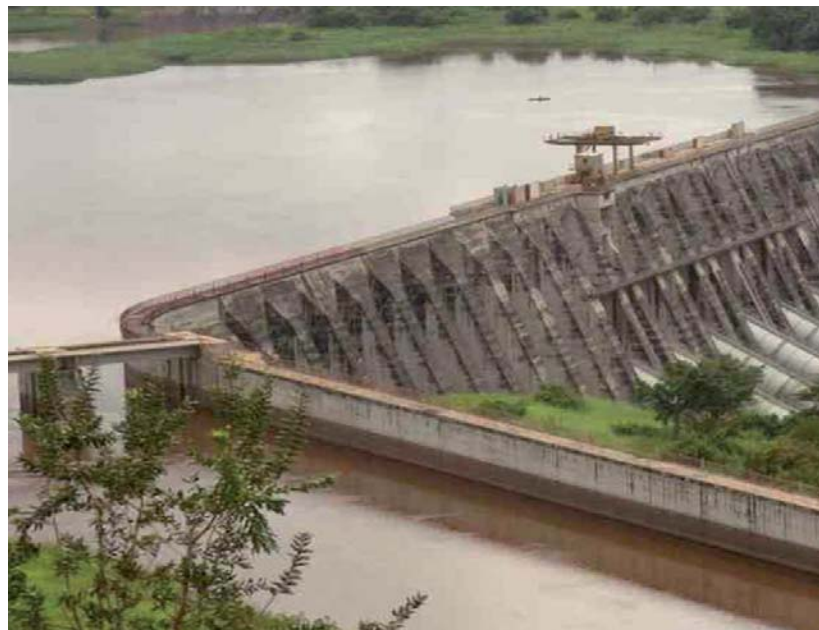


AFRICA

Inga, Bas-Congo
(Democratic Republic of Congo)

HYDROELECTRIC POWER PLANTS

INGA I





HYDROELECTRIC POWER PLANTS

NACAOME

LOCATION ▶ Choluteca (Honduras)

CUSTOMER ▶ SECOPT

PROJECT SCOPE:

Construction and subsequent reconstruction work in the wake of damage caused by Hurricane Mitch to a 28.06 MW power plant at a dam

AMOUNT ▶ USD 64 million

START DATE ▶ september 1993 (construction)

FINISH DATE ▶ october 2002 (reconstruction)

CHARACTERISTICS:

- ▶ General data
 - ✓ Plant dimensions: 32 x 17 m²
 - ✓ Elevation of access level: 100.10 MASL
 - ✓ Number of units: 2 + 1
 - ✓ Type of unit: 2 vertical-shaft Francis turbines;
1 horizontal-shaft Francis turbine
 - ✓ Power output: 2 x 12.48 MW, 1 x 3.10 MW
- ▶ Dam
 - ✓ Normal maximum reservoir level: 128.14 MASL
 - ✓ Maximum rise: 135.14 MASL
 - ✓ Type of dam - central core: RCC
 - ✓ Capture flow rate: 70.6 m³/s
- ▶ Penstock
 - ✓ Inner diameter: 4 m
 - ✓ Developed length: 348 m
 - ✓ Guard device: butterfly valve
- ▶ Equipment
 - Turbines
 - GI and GII units
 - ✓ Nominal gross head: 44 m
 - ✓ Nominal flow rate: 2 x 31, 40 m³/s
 - ✓ Nominal power output: 2 x 12.48 MW
 - ✓ Nominal speed: 327.3 rpm
 - GI and GII units
 - ✓ Nominal gross head: 44 m
 - ✓ Nominal flow rate: 7.80 m³/s
 - ✓ Nominal power output: 3.10 MW
 - ✓ Nominal speed: 360 rpm



CENTRAL AMERICA

Choluteca (Honduras)

HYDROELECTRIC POWER PLANTS

NACAOME





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HYDROELECTRIC POWER PLANTS **MASPARRO**

LOCATION ▶ Cruz Paredes. Barinas State
(Venezuela)

CUSTOMER ▶ CADAFE

PROJECT SCOPE:

Construction of power house, supply and installation of penstocks, excavation work on discharge channel, supply and installation of two 12.5 MW Francis turbines, supply and assembly of transmission line and 13.8/115 kV Masparro substation

AMOUNT ▶ EUR 23 million

START DATE ▶ july 2006

FINISH DATE ▶ july 2008

CHARACTERISTICS:

- ▶ General data
 - ✓ Plant dimensions: 25 x 19 m²
 - ✓ Elevation of access level: 189.15 MASL
 - ✓ Number of units: 2
 - ✓ Type of unit: 2 vertical-shaft Francis turbines
 - ✓ Power output: 2 x 12.5 MW
 - ✓ Excavation volume, power house: 15,500 m³
 - ✓ Excavation volume, penstock: 9,000 m³
 - ✓ Excavation volume, discharge channel: 33,000 m³
 - ✓ Volume of concrete in m³: 10,000 m³
- ▶ Penstock
 - ✓ Capture flow rate: 52 m³/s
 - ✓ Inner diameter: 3.8 m
 - ✓ Inner diameter of branches: 2.4 m
 - ✓ Developed length: 95 m
 - ✓ Guard device: butterfly valve
- ▶ Turbines
 - ✓ Nominal gross head: 54 m
 - ✓ Nominal flow rate: 2 x 26 m³/s
 - ✓ Nominal power output: 2 x 12.5 MW
 - ✓ Nominal speed: 327.27 rpm



SOUTH AMERICA

Cruz Paredes. Barinas State
(Venezuela)

HYDROELECTRIC POWER PLANTS MASPARRO



References by activity



Cycles





COMBINED CYCLES

AGUA PRIETA II

LOCATION ▶ Agua Prieta. Sonora State (Mexico)

CUSTOMER ▶ Federal Electricity Commission (CFE)

PROJECT SCOPE:

Design, engineering, supply of equipment, construction, installation and start-up by a consortium of the 394 MW Agua Prieta II plant

AMOUNT ▶ EUR 239 million (ENO 50%)

START DATE ▶ september 2010

FINISH DATE ▶ december 2014

CHARACTERISTICS:

- ▶ Power output: 394 MW
- ▶ Heat rate: 6,980 kJ/kWh
- ▶ 2 x 165 MW M501F Mitsubishi turbines
- ▶ 1 x 170 MW Mitsubishi steam turbine
- ▶ 2 heat recovery boilers
- ▶ 1 air-cooled condenser
- ▶ 2 service water and fire prevention and control water tanks, each with a capacity of 1,400 m³
- ▶ 1 demineralised water tank, 1,290 m³
- ▶ 1 demineralisation unit
- ▶ 1 x 230 kV energy measurement unit
- ▶ 1 waste treatment unit



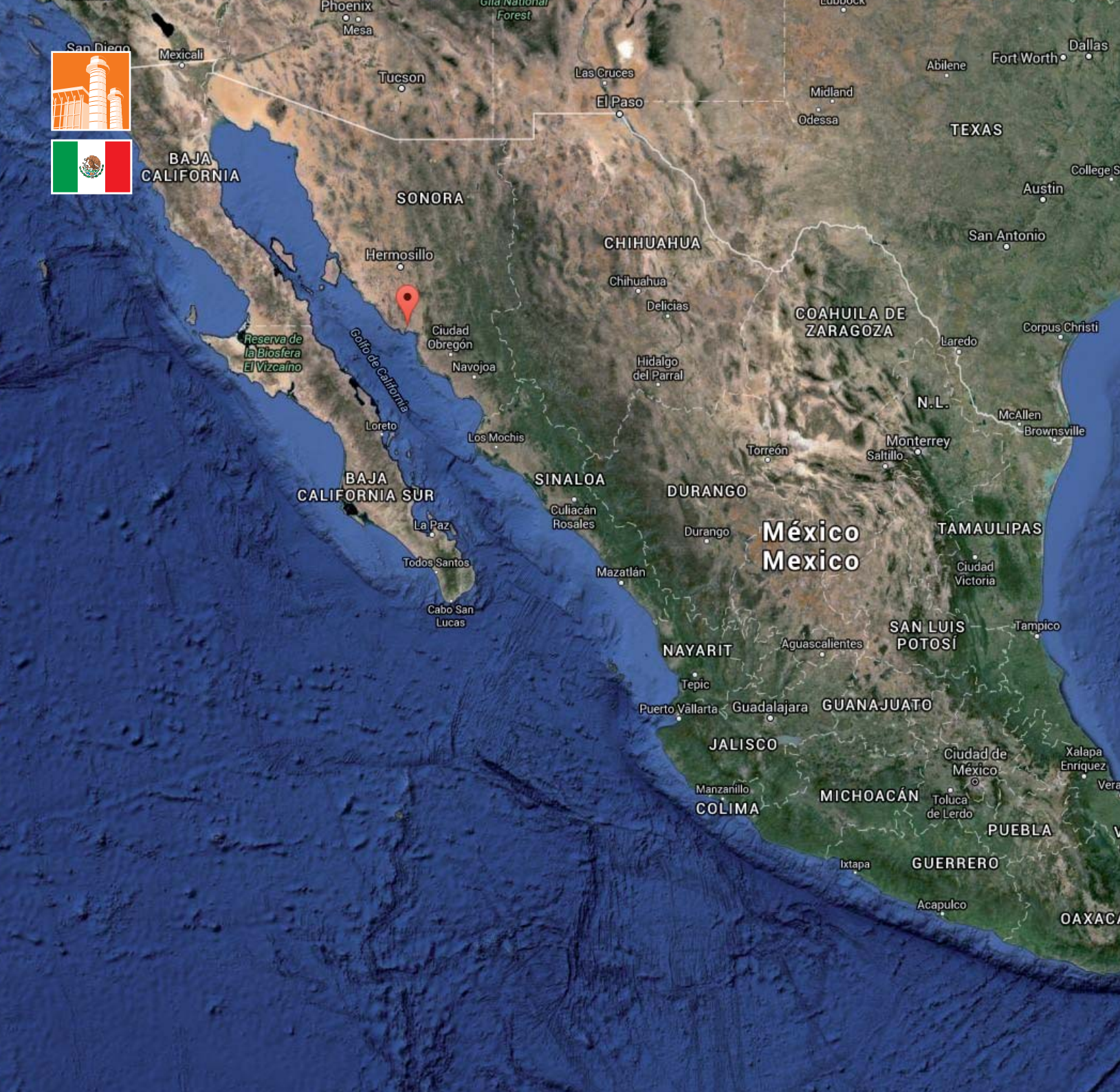
CENTRAL AMERICA

Agua Prieta.
Sonora State (Mexico)

COMBINED CYCLES

AGUA PRIETA II





COMBINED CYCLES

EMPALME II

LOCATION ▶ Empalme. Sonora State (Mexico)

CUSTOMER ▶ Federal Electricity Commission (CFE)

PROJECT SCOPE:

Design, engineering, supply of equipment, construction, installation and start-up by a consortium of the 791 MW Central Empalme II plant

AMOUNT ▶ EUR 350 million (ENO 50%)

START DATE ▶ november 2015

FINISH DATE ▶ april 2018

CHARACTERISTICS:

- ▶ Power output: 791.167 MW
- ▶ Heat rate: 6,000 kJ/kWh
- ▶ 2 x 255.7 MW Siemens SGT6-8000H turbines
- ▶ 296.4 MW steam turbine
- ▶ 2 heat recovery boilers with 3 pressure levels
- ▶ One-through seawater condenser
- ▶ 2 service water and fire prevention and control water tanks, each with a capacity of 1,100 m³
- ▶ Demineralised water tank, 1,500 m³
- ▶ Distilled water tank, 1,000 m³
- ▶ Water treatment plant (evaporation unit, demineralisation unit, hypochlorite generator system, water purification unit)
- ▶ Wastewater treatment plant
- ▶ Underwater discharge piping



CENTRAL AMERICA
Empalme. Sonora State (Mexico)

COMBINED CYCLES

EMPALME II





OPEN CYCLES

EDC SUR

LOCATION ▶ Valle del Tuy (Venezuela)

CUSTOMER ▶ Electricidad de Caracas (EDC)

PROJECT SCOPE:

Turnkey construction of a 136 MW thermoelectric power plant with dual gas turbines for open-cycle operation, treatment system for fuel and process water and extension of a 230 kV substation

AMOUNT ▶ EUR 111 million

START DATE ▶ december 2010

FINISH DATE ▶ december 2014

CHARACTERISTICS:

- ▶ 2 GE LM6000 aero-derivative turbo generators, each 48 MW, and two Pratt & Whitney FT49A aero-derivative turbo generators, each 20 MW
- ▶ Diesel tank, 3,300 m³
- ▶ Filtered fuel tank, 1,000 m³
- ▶ Raw water tank, 3,800 m³
- ▶ Demineralised water tank, 1,000 m³
- ▶ Demineralisation unit
- ▶ 2 three-phase power transformers, 13.8/230 kV and 75 MVA
- ▶ 2 three-phase power transformers, 13.8/230 kV and 30 MVA
- ▶ Network frequency: 60 Hz



SOUTH AMERICA

Valle del Tuy (Venezuela)

OPEN CYCLES

EDC SUR





elecnor

OPEN CYCLES

GÜIRIA

LOCATION ▶ Güiria (Venezuela)

CUSTOMER ▶ PDVSA GAS

PROJECT SCOPE:

Turnkey construction of the 350 MW Juan Manuel Valdez thermoelectric power plant with dual gas turbines for open-cycle operation, treatment system for process water, and construction of an underground energy discharge line to the Sucre 230 kV substation. Includes supply of a further two Siemens SGT6 5000F turbo generators in the city of Barcelona

AMOUNT ▶ EUR 709 million

START DATE ▶ october 2012

FINISH DATE ▶ january 2017

CHARACTERISTICS:

- ▶ Installation of 2 x 175 MW Siemens SGT6 5000F turbo generators
- ▶ Supply of 2 x 175 MW Siemens SGT6 5000F turbo generators
- ▶ Service water and fire prevention and control water tank, 4,433 m³
- ▶ Underground electricity discharge line, 4.5 km, 230kV
- ▶ 2 three-phase power transformers, 16.5/230 kV and 185 / 300 MVA
- ▶ Network frequency: 60 Hz



SOUTH AMERICA

Güiria (Venezuela)

OPEN CYCLES

GÜIRIA



Solar photovoltaic





SOLAR PHOTOVOLTAIC

ALMODÓVAR DEL CAMPO

LOCATION ▶ Almodóvar del Campo. Ciudad Real (Spain)

CUSTOMER ▶ Argasol Desarrollos Energéticos

PROJECT SCOPE:

Engineering, supply and construction of the 10 MW Almodóvar del Campo solar photovoltaic plant

EPC AMOUNT ▶ EUR 71 million

START DATE ▶ november 2007

FINISH DATE ▶ september 2008

CHARACTERISTICS:

- ▶ Installed capacity: 11.52 MWp-10 MW
- ▶ Estimated production: 20,000 MWh/year
- ▶ Modules: Atersa
- ▶ Single-shaft horizontal sun tracking system
- ▶ Surface area: 36 hectares/90 acres



SPAIN

Almodóvar del Campo. Ciudad Real (Spain)

SOLAR PHOTOVOLTAIC

ALMODÓVAR DEL CAMPO





SOLAR PHOTOVOLTAIC **ARROYO DE SAN SERVÁN**

LOCATION ▶ Arroyo de San Serván. Badajoz (Spain)

CUSTOMER ▶ Alumbra Solar

PROJECT SCOPE:

Engineering, supply and construction of the 10 MW San Serván solar photovoltaic plant

EPC AMOUNT ▶ EUR 60 million

START DATE ▶ june 2007

FINISH DATE ▶ february 2008

CHARACTERISTICS:

- ▶ Installed capacity: 11.52 MWp-10 MW
- ▶ Estimated production: 16,500 MWh/year
- ▶ Modules: Yingli (230W)
- ▶ Investors: Ingeteam
- ▶ Fixed-structure sun tracking system
- ▶ Surface area: 29 hectares/70 acres



SPAIN



Arroyo de San Serván. Badajoz
(Spain)

SOLAR PHOTOVOLTAIC
**ARROYO DE SAN
SERVÁN**





SOLAR PHOTOVOLTAIC **GUADARRANQUE**

LOCATION ▶ San Roque. Cádiz (Spain)

CUSTOMER ▶ Endesa

PROJECT SCOPE:

Engineering, supply and construction of the 12.3 MW Guadarranque solar photovoltaic plant

EPC AMOUNT ▶ EUR 28 million

START DATE ▶ december 2006

FINISH DATE ▶ september 2007

CHARACTERISTICS:

- ▶ Installed capacity: 13.53 MWp-12.3 MW
- ▶ Estimated production: 24,300 MWh/year
- ▶ Single-shaft horizontal sun tracking system
- ▶ Surface area: 53 hectares/130 acres



SPAIN

San Roque. Cádiz (Spain)

SOLAR PHOTOVOLTAIC
GUADARRANQUE





SOLAR PHOTOVOLTAIC

HOYA DE LOS VICENTES

LOCATION ▶ Jumilla. Murcia (Spain)

CUSTOMER ▶ Luzentia

PROJECT SCOPE:

Engineering, supply and construction of the 20 MW Hoya de los Vicentes solar photovoltaic plant

EPC AMOUNT ▶ EUR 133 million

START DATE ▶ december 2006

FINISH DATE ▶ september 2007

CHARACTERISTICS:

- ▶ Installed capacity: 23.04 MWp-20 MW
- ▶ Estimated production: 40,000 MWh/year
- ▶ Modules: Suntech (14.18 MWp), Yingli (1.38 MWp), Atersa (4.18 MWp) and Solon (2.3 MWp)
- ▶ Investors: Atersa
- ▶ Single-shaft horizontal sun tracking system
- ▶ Surface area: 73 hectares/180 acres



SPAIN

Jumilla. Murcia (Spain)

SOLAR PHOTOVOLTAIC

HOYA DE LOS VICENTES





SOLAR PHOTOVOLTAIC **LA MAGASCONA**

LOCATION ▶ Trujillo. Cáceres (Spain)

CUSTOMER ▶ Fotowatio

PROJECT SCOPE:

Engineering, supply and construction of the 34.5 MW La Magascona and La Magasquilla solar photovoltaic plants

EPC AMOUNT ▶ EUR 213 million

START DATE ▶ november 2006

FINISH DATE ▶ september 2008

CHARACTERISTICS:

- ▶ Installed capacity: 34.56 MWp-30 MW
- ▶ Estimated production: 60,000 MWh/year
- ▶ Modules: Suntech (230W)
- ▶ Investor: Ingeteam
- ▶ Single-shaft horizontal sun tracking system
- ▶ Surface area: 127 hectares/312 acres



SPAIN

Trujillo. Cáceres (Spain)

SOLAR PHOTOVOLTAIC
LA MAGASCONA





SOLAR PHOTOVOLTAIC

LORCA

LOCATION ▶ Lorca. Murcia (Spain)

CUSTOMER ▶ Miras and Torrealvilla photovoltaic plants

PROJECT SCOPE:

Engineering, supply and construction of the 13.2 MW Lorca I and II solar photovoltaic plants

EPC AMOUNT ▶ EUR 93 million

START DATE ▶ april 2008

FINISH DATE ▶ september 2008

CHARACTERISTICS:

- ▶ Installed capacity: 15.20 MWp-13.2 MW
- ▶ Estimated production: 40,900 MWh/year
- ▶ Modules: Atersa
- ▶ Single-shaft horizontal sun tracking system
- ▶ Surface area: 60 hectares/148 acres



SPAIN

Lorca. Murcia (Spain)

SOLAR PHOTOVOLTAIC

LORCA





SOLAR PHOTOVOLTAIC

MALPARTIDA DE CÁCERES

LOCATION ▶ Malpartida de Cáceres. Cáceres (Spain)

CUSTOMER ▶ Viproes Energías Renovables

PROJECT SCOPE:

Engineering, supply and construction of the 10 MW Malpartida de Cáceres solar photovoltaic plant

EPC AMOUNT ▶ EUR 34 million

START DATE ▶ march 2010

FINISH DATE ▶ march 2011

CHARACTERISTICS:

- ▶ Installed capacity: 11.82 MWp-10 MW
- ▶ Estimated production: 18,300 MWh/year
- ▶ Modules: Atersa
- ▶ Single-shaft horizontal sun tracking system
- ▶ Surface area: 45 hectares/110 acres



SPAIN



Malpartida de Cáceres, Cáceres
(Spain)

SOLAR PHOTOVOLTAIC

MALPARTIDA DE CÁCERES





SOLAR PHOTOVOLTAIC

OLMEDILLA

LOCATION ▶ Olmedilla de Alarcón. Cuenca (Spain)

CUSTOMER ▶ EGM Proyectos y Sistemas Energéticos

PROJECT SCOPE:

Engineering, supply and construction of the 10 MW Olmedilla solar photovoltaic plant

EPC AMOUNT ▶ EUR 62 million

START DATE ▶ may 2007

FINISH DATE ▶ december 2007

CHARACTERISTICS:

- ▶ Installed capacity: 11.52 MWp-10 MW
- ▶ Estimated production: 16,500 MWh/year
- ▶ Modules: Atersa
- ▶ Single-shaft horizontal sun tracking system
- ▶ Surface area: 25 hectares/62 acres



SPAIN



Olmedilla de Alarcón. Cuenca
(Spain)

SOLAR PHOTOVOLTAIC

OLMEDILLA





SOLAR PHOTOVOLTAIC PERSEO FOTÓN

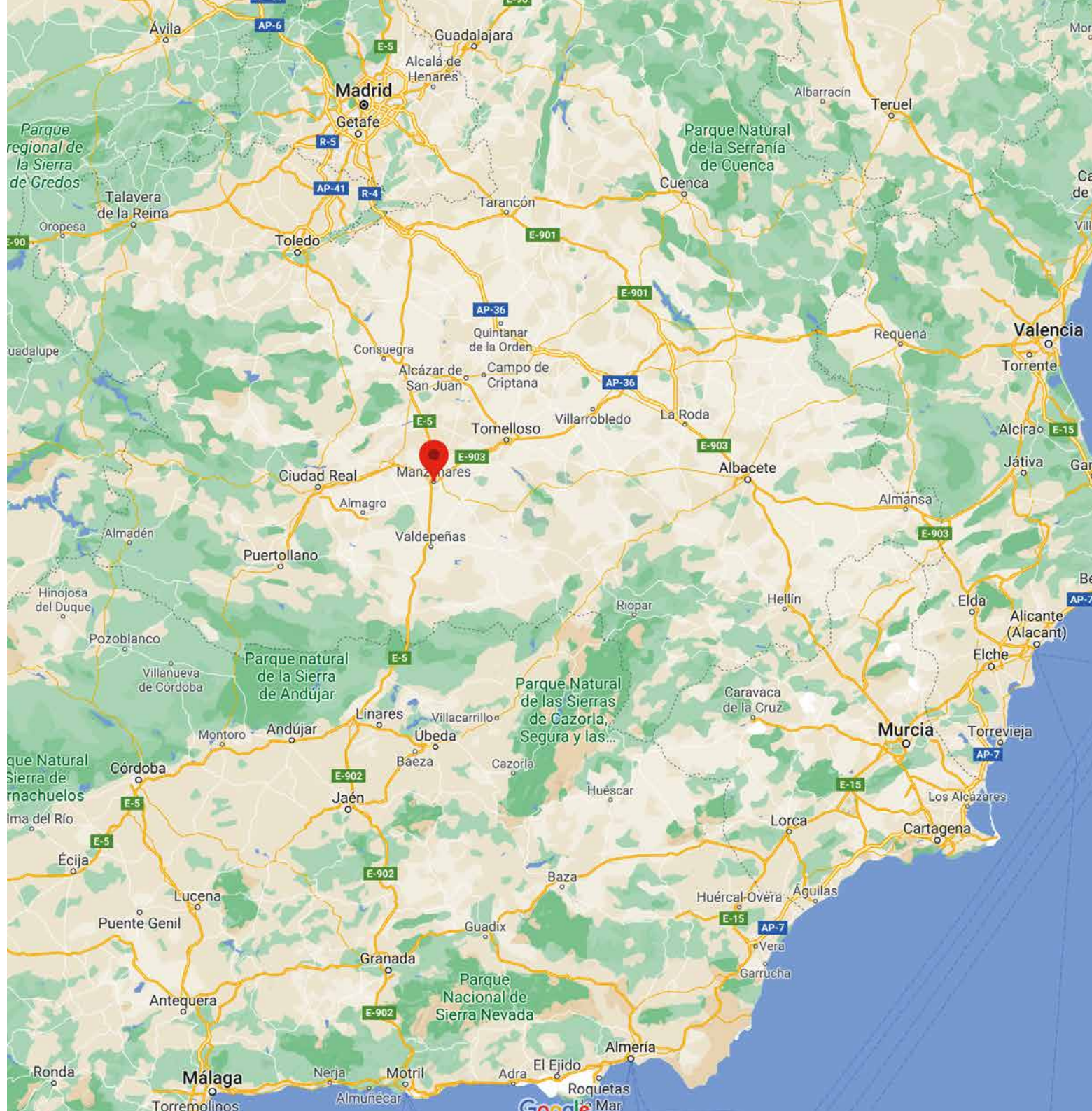
- LOCATION** ▶ Manzanares (Ciudad Real)
- CUSTOMER** ▶ Tramerase, S.L. (of which Repsol Renovables is the sole shareholder)
- PROJECT SCOPE** ▶
Turnkey contract including EPC for three photovoltaic plants with a combined power capacity of 126 MWp.
- AMOUNT** ▶ EUR 50 million
- START DATE** ▶ February 2020
- FINISH DATE** ▶ July 2024
- CHARACTERISTICS:**
 - ▶ 440/445 Wp monocrystalline cell panels
 - ▶ Central inverters: 3.63 and 2.42 MVA
 - ▶ 1P dual-row trackers



SPAIN

Manzanares (Ciudad Real)

SOLAR PHOTOVOLTAIC PERSEO FOTÓN





SOLAR PHOTOVOLTAIC **VALDECABALLEROS**

LOCATION ▶ Valdecaballeros. Badajoz (Spain)

CUSTOMER ▶ Siberia Solar (Elecnor)

PROJECT SCOPE:

Engineering, supply and construction of the 10 MW Valdecaballeros solar photovoltaic plant

INVESTMENT ▶ EUR 34 million

START DATE ▶ april 2010

FINISH DATE ▶ october 2010

CHARACTERISTICS:

- ▶ Installed capacity: 11.82 MWp-10 MW
- ▶ Estimated production: 16,600 MWh/year
- ▶ Single-shaft horizontal sun tracking system
- ▶ Surface area: 41 hectares/100 acres



SPAIN

Valdecaballeros. Badajoz (Spain)

SOLAR PHOTOVOLTAIC
VALDECABALLEROS





elecnor

SOLAR PHOTOVOLTAIC **ZUERA**

LOCATION ▶ Zuera. Zaragoza (Spain)

CUSTOMER ▶ Tratamiento y Generación de Energía

PROJECT SCOPE:

Engineering, supply and construction of the 9 and 9.9 MW Zuera I and Zuera II solar photovoltaic plants

EPC AMOUNT ▶ EUR 83 million

START DATE ▶ january 2008

FINISH DATE ▶ august 2008 and 2012

CHARACTERISTICS:

- ▶ Installed capacity: 21.45 MWp-18.9 MW
- ▶ Estimated production: 35,550 MWh/year
- ▶ Modules: Atersa
- ▶ Investors: Atersa
- ▶ Polar sun tracking systems - single-shaft with 20° inclination, and horizontal
- ▶ Surface area: 49 hectares/121 acres



SPAIN

Zuera. Zaragoza (Spain)

SOLAR PHOTOVOLTAIC
ZUERA





SOLAR PHOTOVOLTAIC **BARCALDINE**

LOCATION ▶ Barcaldine, Queensland (Australia)

CUSTOMER ▶ Barcaldine Remote Community Solar Farm (ElecnoR)

PROJECT SCOPE:

Promotion, development and construction of the 20 MW Barcaldine solar photovoltaic plant

AMOUNT ▶ EUR 47 million

START DATE ▶ december 2015

FINISH DATE ▶ december 2016

CHARACTERISTICS:

- ▶ Installed capacity: 25 MWp-20 MW
- ▶ Estimated production: 56,000 MWh/year
- ▶ 79,000 photovoltaic panels with single-shaft horizontal sun tracking system
- ▶ Surface area: 90 hectares



OCEANIA

Barcaldine, Queensland (Australia)

SOLAR PHOTOVOLTAIC

BARCALDINE





SOLAR PV **BUNGALA ONE**

LOCATION ▶ Port Augusta (Australia)

CUSTOMER ▶ ENEL Green Power

PROJECT SCOPE ▶

Engineering, supply and construction of a 138 MWp solar PV plant.

AMOUNT ▶ EUR 133.5 million

START DATE ▶ April 2017

FINISH DATE ▶ August 2018

CHARACTERISTICS:

- ▶ Installed power: 138 MWp / 110 MWac
- ▶ Estimated production: 285,000 MWh/year
- ▶ Installation with a horizontal solar tracker on an axis
- ▶ Plant area: 250 hectares



OCEANIA

Port Augusta (Australia)

SOLAR PV

BUNGALA ONE





SOLAR PV **BUNGALA TWO**

LOCATION ▶ Port Augusta (Australia)

CUSTOMER ▶ ENEL Green Power

PROJECT SCOPE ▶

Engineering, supply and construction of a 138 MWp solar PV plant.

AMOUNT ▶ EUR 117.5 million

START DATE ▶ July 2017

FINISH DATE ▶ February 2019

CHARACTERISTICS:

- ▶ Installed power: 138 MWp / 110 MWac
- ▶ Estimated production: 285,000 MWh/year
- ▶ Installation with a horizontal solar tracker on an axis
- ▶ Plant area: 250 hectares



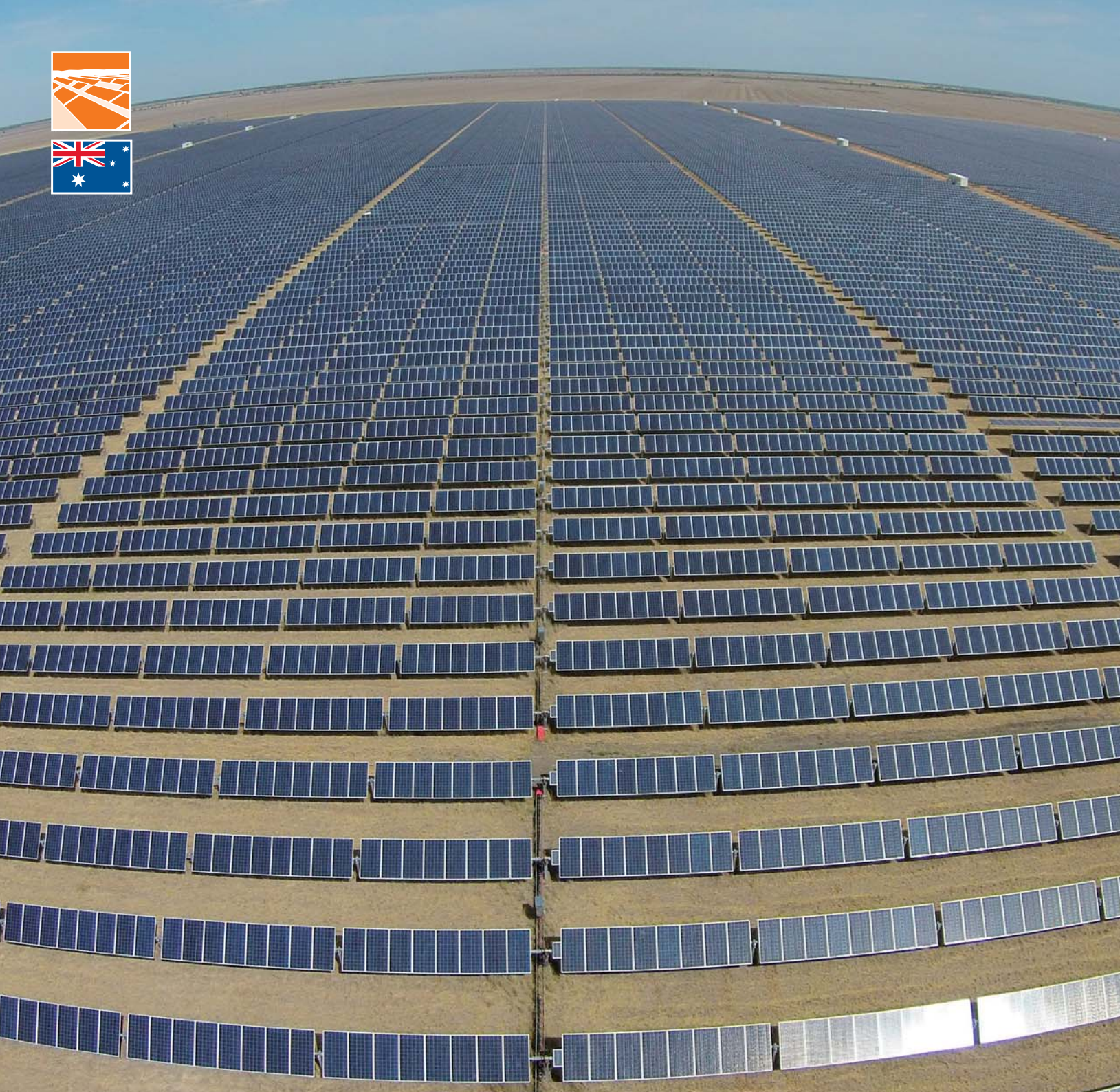
OCEANIA

Port Augusta (Australia)

SOLAR PV

BUNGALA TWO





SOLAR PHOTOVOLTAIC **MOREE**

LOCATION ▶ Moree (Australia)

CUSTOMER ▶ Moree Solar Farm

PROJECT SCOPE:

Engineering, supply and construction of the 56 MW Moree solar photovoltaic plant

EPC AMOUNT ▶ EUR 92 million

START DATE ▶ october 2014

FINISH DATE ▶ april 2016

CHARACTERISTICS:

- ▶ Installed capacity: 70 MWp-56 MW
- ▶ Estimated production: 155,000 MWh/year
- ▶ Single-shaft horizontal sun tracking system
- ▶ Surface area: 210 hectares/519 acres



OCEANIA

Moree (Australia)

SOLAR PHOTOVOLTAIC
MOREE



AUSTRALIA





SOLAR PHOTOVOLTAIC NEW ENGLAND (1ST PHASE)

LOCATION ▶ Uralla, New South Wales
(Australia)

CUSTOMER ▶ ENEL Green Power

PROJECT SCOPE ▶

EPC contract for the engineering and construction of the first phase of the solar plant project and a 33/330 kV substation, as well as operation and maintenance in the two years following start-up.

START DATE ▶ June 2020

FINISH DATE ▶ June 2022

CHARACTERISTICS:

- ▶ Australia's largest hybrid solar and battery project
- ▶ Start-up of 400 MW of the total 750 MW, and of the first 50 MWh of the potential 400 MWh from the Battery Energy Storage System (BESS)
- ▶ Single-axis tracking technology allowing the solar panels to follow the course of the sun
- ▶ Green energy for more than 250,000 homes

Uralla

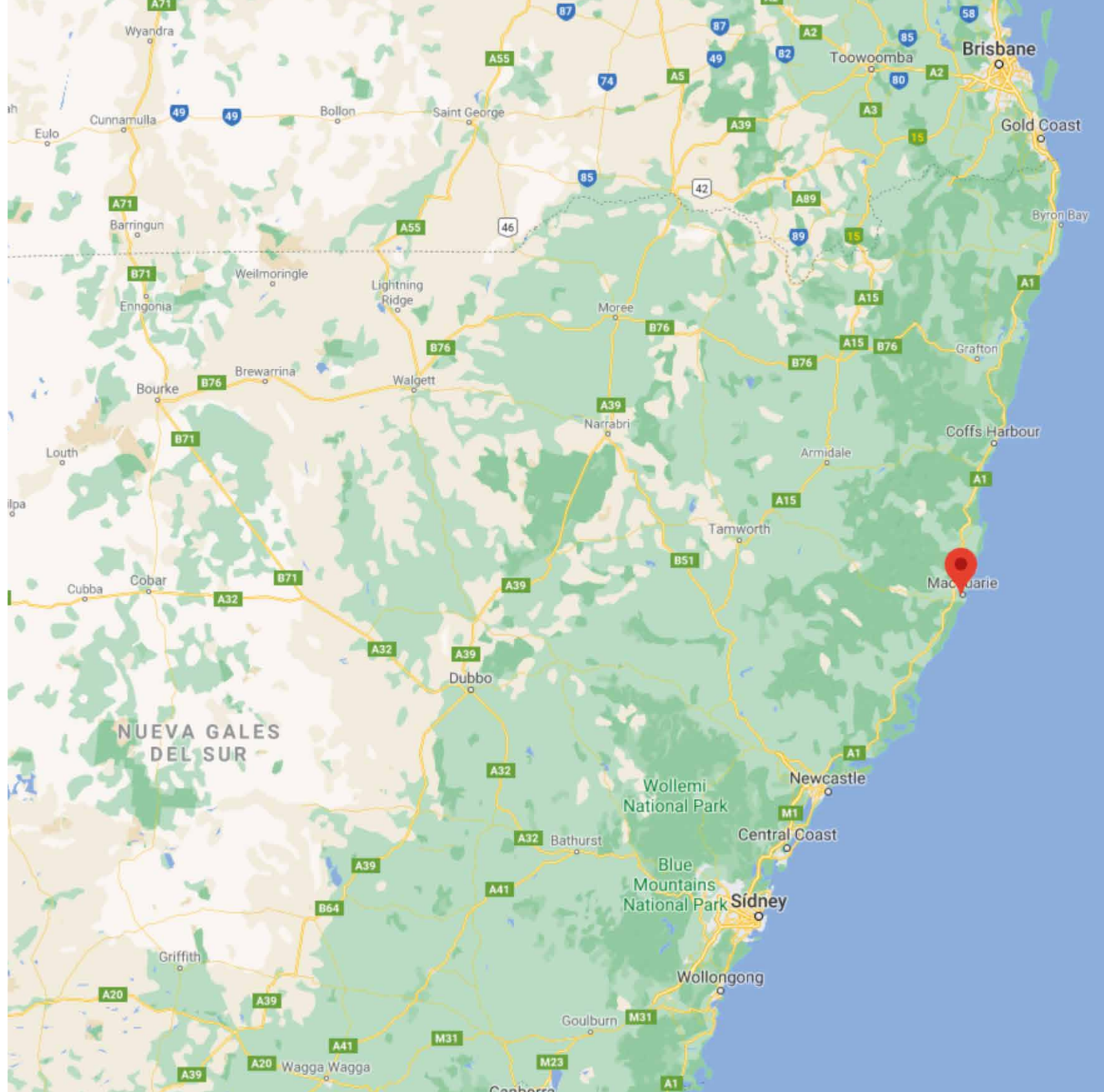


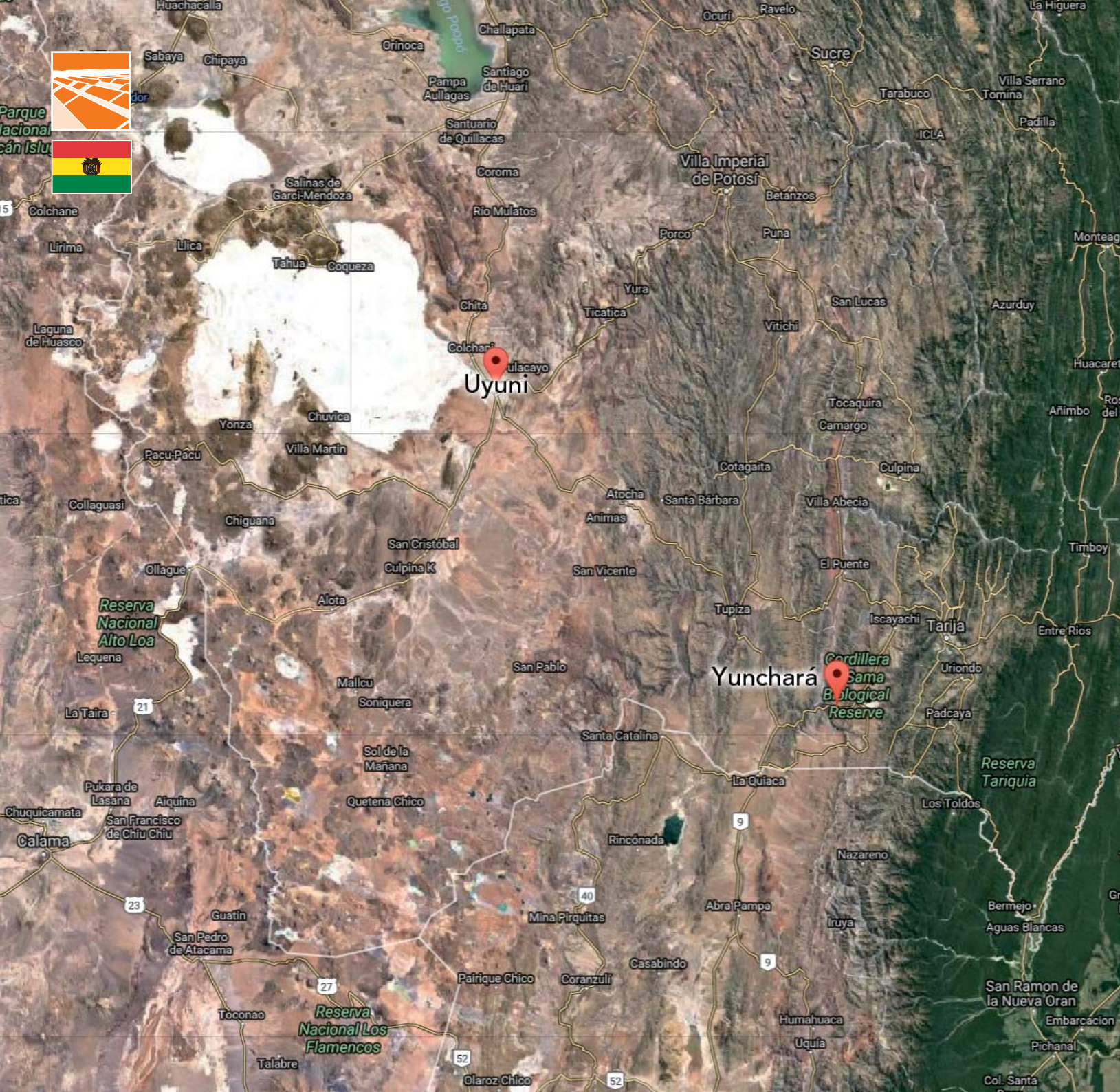


OCEANIA

Uralla, New South Wales (Australia)

SOLAR PHOTOVOLTAIC
**NEW ENGLAND
(1ST PHASE)**





SOLAR PV

UYUNI AND YUNCHARÁ SOLAR PV PLANTS

LOCATION ▶ Uyuni (Potosí Dpt.) and Yunchará (Tarija Dpt.) (Bolivia)

CUSTOMER ▶ ENDE Guaracachi

PROJECT SCOPE:

Engineering, supply and construction in a consortium of the Uyuni (60 MW) and Yunchará (5 MW) solar PV plants

EPC AMOUNT ▶ EUR 66 million

START DATE ▶ november 2016

FINISH DATE ▶ november 2017

CHARACTERISTICS:

- ▶ Installed power: 69 MWp-65 MW
- ▶ Estimated output: 148,181 MWh/year
- ▶ Fixed structure
- ▶ Area: 175 hectares/432 acres



SOUTH AMERICA

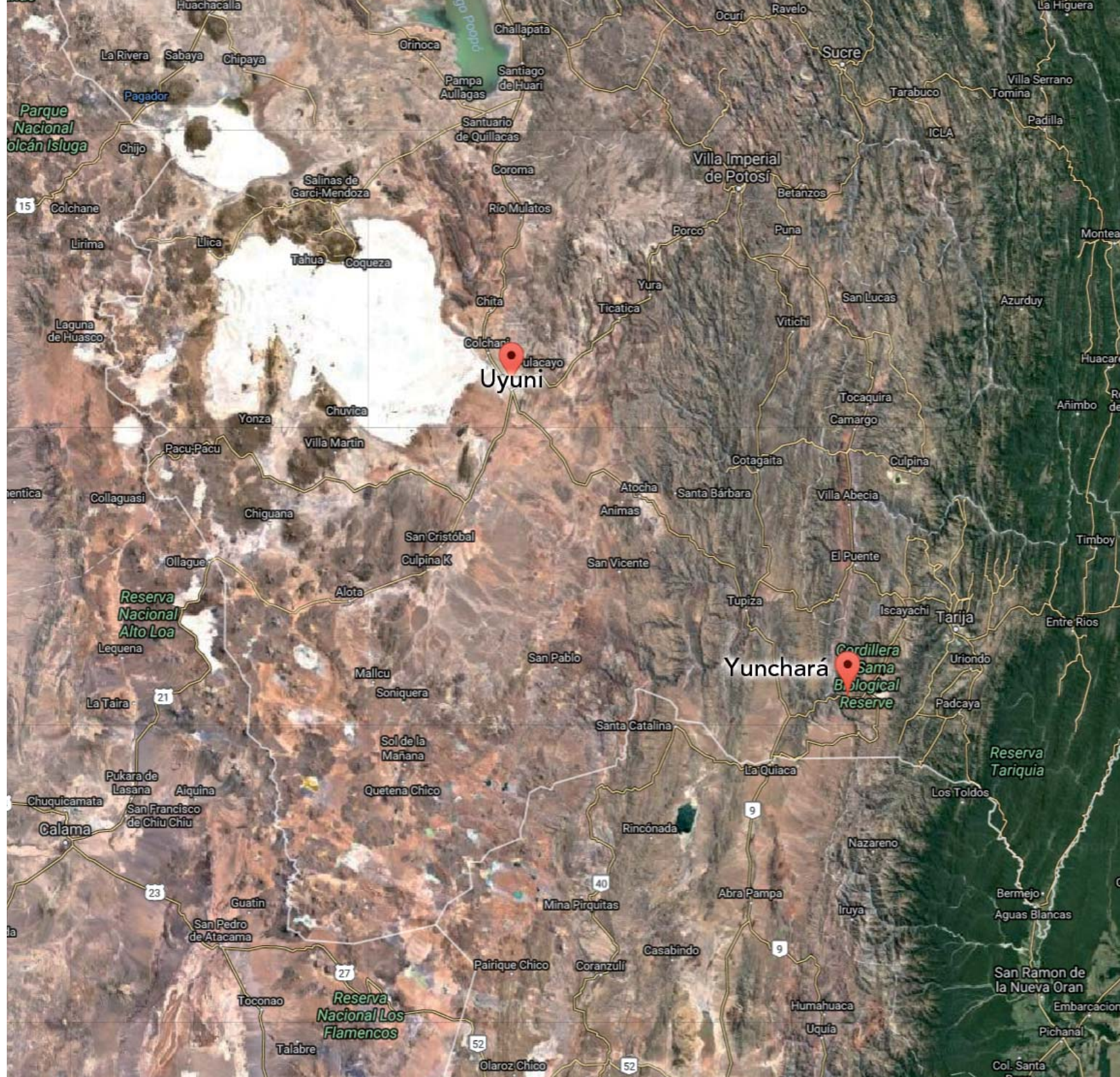


Uyuni (Potosí Dpt.) and Yunchará (Tarija Dpt.) (Bolivia)

SOLAR FOTOVOLTAICA PSF UYUNI Y YUNCHARÁ



BOLIVIA





SOLAR PV SÃO JOÃO DE PIAUÍ

LOCATION ▶ State of Piauí (Brazil)

CUSTOMER ▶ Celeo

PROJECT SCOPE ▶

Turnkey engineering, procurement and construction (EPC) project for 6 photovoltaic plants, one electrical evacuation substation and one 500 kV, 16 km connection line

AMOUNT ▶ EUR 181 million

START DATE ▶ october 2018

FINISH DATE ▶ may 2020

CHARACTERISTICS:

- ▶ Installed power: 180 MW
- ▶ Area: 460 hectares
- ▶ Supplying: 190,000 households



SOUTH AMERICA
State of Piauí (Brazil)

SOLAR PV
**SÃO JOÃO
DE PIAUÍ**





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SOLAR PV DJOUM

LOCATION ▶ Djoum (Cameroon)

CUSTOMER ▶ ENEO

PROJECT SCOPE ▶

Two-phase EPC of a 372-kWp solar power system with hybridisation to existing diesel power plant using PLC known as Fuel Save Controller manufactured by German brand SMA

AMOUNT ▶ EUR 0.9 million

START DATE ▶ January 2017

FINISH DATE ▶ September 2019

CHARACTERISTICS:

- ▶ 1,100 Atersa 310-watt photovoltaic modules. Total 372 kWp
- ▶ 12 SMA STP 25-kWp inverters
- ▶ East-west oriented panels for better penetration with diesel and consumption
- ▶ Schletter mounted metal structure
- ▶ PLC Fuel Save Controller control system with integrated SCADA.
- ▶ Annual fuel savings of 156,000 litres (16%) with up to 48% penetration in daylight hours (solar/diesel)



AFRICA
Djoum (Cameroon)



SOLAR PV
DJOUJ





SOLAR PV

SANTIAGO SOLAR SOLAR PLANT

LOCATION ▶ Til Til, Metropolitan Region of Santiago (Chile)

CUSTOMER ▶ Santiago Solar

PROJECT SCOPE:

Engineering, supply and construction of the 98 MW Santiago Solar solar PV plant

EPC AMOUNT ▶ EUR 107 million

START DATE ▶ january 2017

FINISH DATE ▶ december 2017

CHARACTERISTICS:

- ▶ Installed power: 115 MWp-98 MW
- ▶ Estimated output: 210,000 MWh/year
- ▶ Fixed structure
- ▶ Area: 202 hectares/500 acres



SOUTH AMERICA

Til Til, Metropolitan Region of Santiago (Chile)

SOLAR PV

SANTIAGO SOLAR SOLAR PLANT





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SOLAR PV **BÁVARO**

LOCATION ▶ Punta Cana, La Altagracia province
(Dominican Republic)

CUSTOMER ▶ Consorcio Energético Punta
Cana-Macao

PROJECT SCOPE ▶

EPC project: Design and execution of civil engineering, mechanical and low- and medium-voltage electrical work for a power plant using photovoltaic solar panels.

AMOUNT ▶ EUR 6,8 million

START DATE ▶ January 2019

FINISH DATE ▶ December 2019

CHARACTERISTICS:

- ▶ Area: 10 Ha
- ▶ Power capacity: 8.7 MWdc
- ▶ Main equipment:
 - ✓ 24,210 photovoltaic modules mounted on Fixed Structures
 - ✓ 34 Electrical Panels
 - ✓ 2 2,420-kVA Power Stations and 1 3,630-kVA Power Station



CENTRAL AMERICA

Punta Cana, La Altagracia province (Dominican Republic)

SOLAR PV BÁVARO





SOLAR PV **CANOA**

LOCATION ▶ Paraje Miramar, Vicente Noble municipality, Barahona province (Dominican Republic)

CUSTOMER ▶ Emerald Solar Energy, S.R.L. (Potencia Renewables Inc.)

PROJECT SCOPE ▶ EPC project: Design and execution of civil engineering, mechanical and low- and medium-voltage electrical work for a power plant using photovoltaic solar panels. Operation and maintenance for two years following completion of construction.

AMOUNT ▶ EUR 30,2 million

START DATE ▶ February 2019

FINISH DATE ▶ December 2019

CHARACTERISTICS:

- ▶ Area: 42.05 Ha
- ▶ Power capacity: 32.612 MWdc
- ▶ Main equipment:
 - ✓ 88,140 photovoltaic modules mounted on Fixed Structures
 - ✓ 123 Electrical Panels
 - ✓ 8 3.630-kVA Power Stations



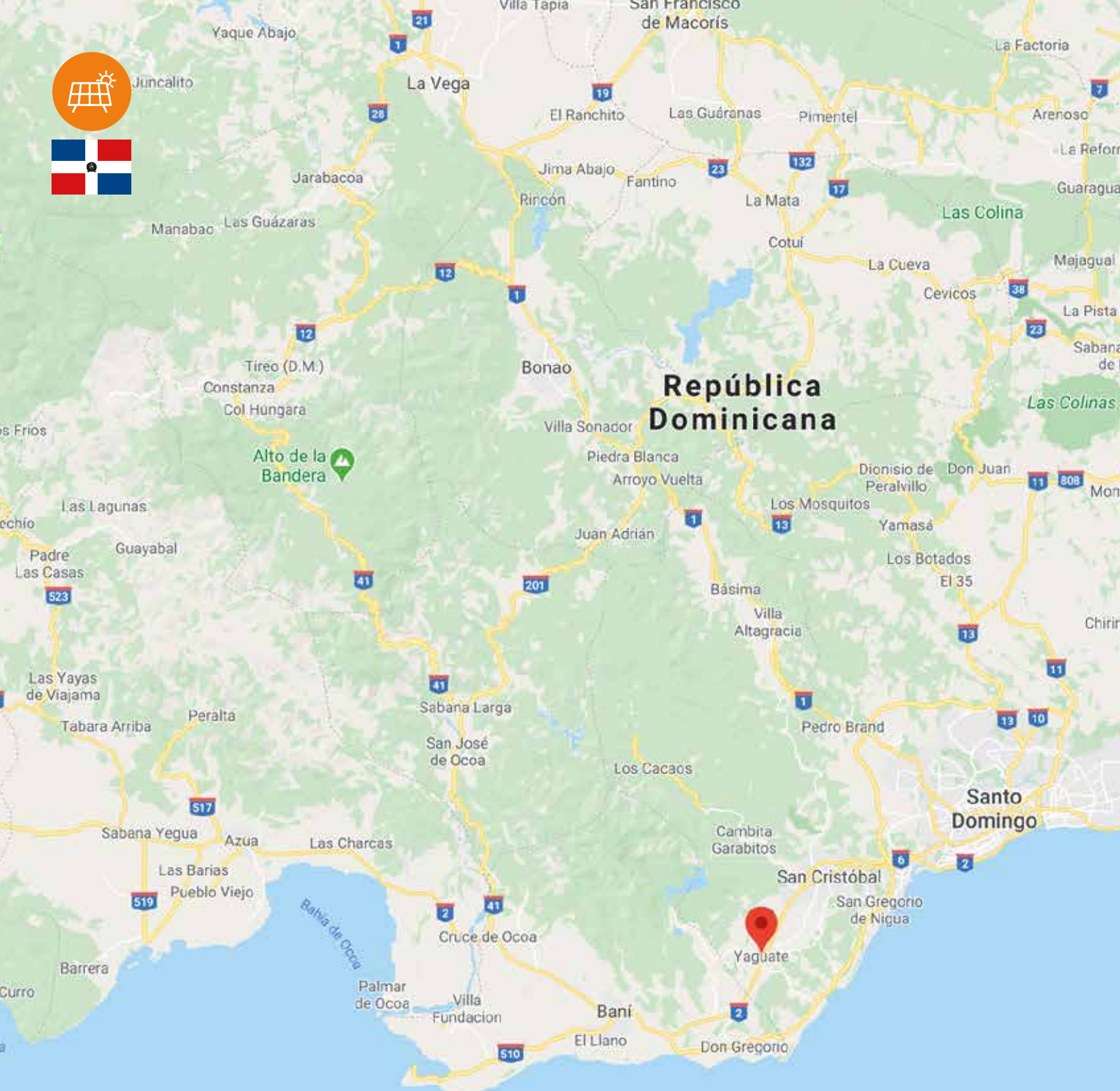
CENTRAL AMERICA



Paraje Miramar, Vicente Noble
municipality, Barahona province
(Dominican Republic)

SOLAR PV CANOA





SOLAR PV GIRASOL

LOCATION ▶ Yaguata, San Cristóbal province (Dominican Republic)

CUSTOMER ▶ Empresa Generadora de Electricidad Haina (EGE Haina)

PROJECT SCOPE ▶

Turnkey construction of the Girasol solar plant, a 138/34.5 kV 150 MVA substation and a 138 kV 9 km double-circuit transmission line, and extension of the existing Pizarrete substation. This project will increase the capacity of the solar projects connected to the SENI (Sistema Eléctrico Nacional Interconectado — National Interconnected Electrical System) by 64%. It will be the largest in the country.

START DATE ▶ February 2020

FINISH DATE ▶ March 2021

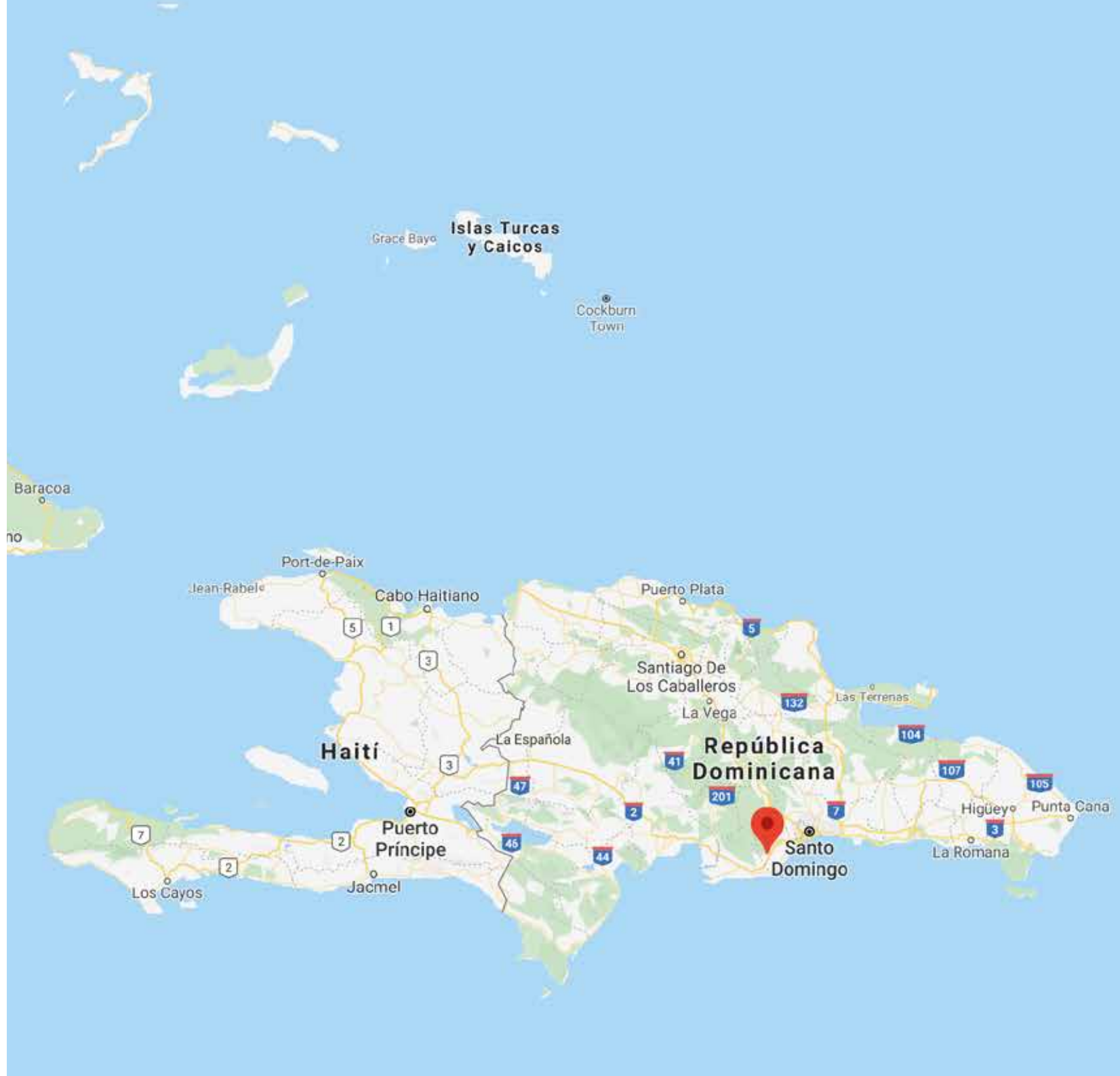
CHARACTERISTICS:

- ▶ Power capacity: 120 MWp
- ▶ Approx. 268,150 photovoltaic modules
- ▶ Plant area: 220 hectares, in a location where solar irradiance is higher than the average in the Dominican Republic.



CENTRAL AMERICA
Yaguatape, San Cristóbal province
(Dominican Republic)

SOLAR PV
PSF GIRASOL





SOLAR PHOTOVOLTAIC **SANDOUVILLE AND FLINS**

LOCATION ▶ Rouen and Paris (France)

CUSTOMER ▶ Gestamp Renewables

PROJECT SCOPE:

Engineering, supply and construction of the Sandouville and Flins solar photovoltaic plants

EPC AMOUNT ▶ EUR 31 million

START DATE ▶ may 2012

FINISH DATE ▶ november 2012

CHARACTERISTICS:

- ▶ Installed capacity: 19.6 MWp-18.4 MW
- ▶ Estimated production: 21,000 MWh/year
- ▶ Sun tracking system: fixed-structure
- ▶ Surface area: 24 hectares/58 acres



EUROPE

Rouen and Paris (France)

SOLAR PHOTOVOLTAIC

SANDOUVILLE AND FLINS



FRANCE





SOLAR PHOTOVOLTAIC **KALEO AND LAWRA**

LOCATION ▶ Upper West Region (Ghana)

CUSTOMER ▶ Volta River Authority (VRA)

PROJECT SCOPE ▶

Design, supply and execution of the 13 MW (Kaleo) and 4MW (Lawra) photovoltaic solar plants. It will include two control buildings, two switching lines, medium-voltage transmission lines, photovoltaic panels, inverters and transformers.

AMOUNT ▶ EUR 19 million

START DATE ▶ October 2019

FINISH DATE ▶ December 2020

CHARACTERISTICS:

- ▶ It will generate enough energy annually to fuel 32,000 homes and will prevent about 7,400 tonnes of CO₂ emissions each year



AFRICA

Upper West Region (Ghana)

SOLAR PHOTOVOLTAIC
KALEO AND
LAWRA





SOLAR PHOTOVOLTAIC

MARCHE

LOCATION ▶ Marche region (Italy)

CUSTOMER ▶ Novapower

PROJECT SCOPE:

Engineering, supply and construction of several solar photovoltaic plants in the Marche region (Cartoceto, Fossombrone, Agugliano, Fano, Barchi, San Giorgio di Pesaro, Castelleone di Suasa, San Lorenzo in Campo, San Severino Marche, Pergola and Corridonia), 16 MW

EPC AMOUNT ▶ EUR 39 million

START DATE ▶ december 2010

FINISH DATE ▶ august 2011

CHARACTERISTICS:

- ▶ Installed capacity: 17.4 MWp-16.1 MW
- ▶ Estimated production: 21,500 MWh/year
- ▶ Modules: Atersa
- ▶ Fixed-structure roof sun tracking system
- ▶ Surface area: 48 hectares/118.5 acres



EUROPE

Marche region (Italy)

SOLAR PHOTOVOLTAIC
MARCHE





SOLAR PV MINA AL-FAHAL ROOF-MOUNTED SOLAR PANELS IN CAR PARKS

LOCATION ▶ Mina Al-Fahal (Oman)

CUSTOMER ▶ Education Department, Regional Government of Andalusia

PROJECT SCOPE:

Petroleum Development Oman (PDO)
Project scope: Design, supply, installation, prior start-up, testing and start-up of a car park 5 MW roof-mounted solar photovoltaic panel electricity generation facility including connection to the existing grid

EPC AMOUNT ▶ EUR 8 million (ENO 60%)

START DATE ▶ december 2016

FINISH DATE ▶ december 2017

CHARACTERISTICS:

- ▶ Capacity of 5.92 MWp
- ▶ 4.04 MWac
- ▶ 18,500 solar panels
- ▶ Estimated output of 9,480 MWh/year
- ▶ CO₂ emissions are reduced by 6,662 tonnes per year



ASIA

Mina Al-Fahal (Oman)

SOLAR PV
**MINA AL-FAHAL
ROOF-MOUNTED
SOLAR PANELS
IN CAR PARKS**



OMAN





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SOLAR PV **RURAL ELECTRIFICATION**

LOCATION ▶ Senegal

CUSTOMER ▶ PNUD (Programme des Nations Unies pour le développement)

PROJECT SCOPE:

Engineering, supply, installation and start-up of PV/Diesel/Battery hybrid systems, stand-alone PV systems and solar streetlights for 102 villages throughout Senegal under the Urgent Community Development Programme (UCDP)

EPC AMOUNT ▶ EUR 15 million

START DATE ▶ october 2016

FINISH DATE ▶ april 2017

CHARACTERISTICS:

- ▶ 66 15 kWp PV/Diesel/Battery hybrid systems
- ▶ 29 30 kWp PV/Diesel/Battery hybrid systems
- ▶ 7 50 kWp PV/Diesel/Battery hybrid systems
- ▶ 276 100 kWp stand-alone PV/Battery hybrid systems
- ▶ 184 200 kWp stand-alone PV/Battery hybrid systems
- ▶ 78 18W LED solar streetlights
- ▶ Total hybrid capacity: 2,210 kWp



AFRICA
Senegal

SOLAR PV
RURAL
ELECTRIFICATION





SOLAR PHOTOVOLTAIC **GUERNSEY**

LOCATION ▶ California (United States)

CUSTOMER ▶ Pacific, Gas & Electric

PROJECT SCOPE:

Engineering, supply and construction of the 20 MW Guernsey solar photovoltaic plant

AMOUNT ▶ USD 65 million

START DATE ▶ august 2012

FINISH DATE ▶ july 2013

CHARACTERISTICS:

- ▶ Installed capacity: 25 MWp-20 MW
- ▶ Estimated production: 63,000 MWh/year
- ▶ Single-shaft horizontal sun tracking system
- ▶ Surface area: 60 hectares/146 acres



NORTH AMERICA

California (United States)

SOLAR PHOTOVOLTAIC

GUERNSEY



Solar thermal





elecnor

SOLAR THERMAL

ASTE 1A

LOCATION ▶ Alcázar de San Juan. Ciudad Real (Spain)

CUSTOMER ▶ Aries Solar Termoeléctrica

PROJECT SCOPE:

Promotion, design, supply, construction, commissioning, maintenance and operation of a 50 MW solar thermal plant

EPC AMOUNT ▶ EUR 252 million

INVESTMENT ▶ EUR 301 million

START DATE ▶ august 2010

FINISH DATE ▶ may 2012

CHARACTERISTICS:

- ▶ Parabolic trough collectors
- ▶ Heat storage facilities
- ▶ Solar farm, 120,000 m² and 120 loops
- ▶ Thermal fluid system, 30 bar @ 400°C
- ▶ Ancillary heating system with 3 x 16 MWt natural gas boilers
- ▶ 140 MWt dual steam generation unit
- ▶ Siemens steam turbine for HP and LP with preheating facility
- ▶ Tower cooling system
- ▶ Water treatment plant composed of: pretreatment and filtering; reverse osmosis system; electrodeionisation unit
- ▶ Treatment of effluents and hydrocarbon separator with mixing ponds
- ▶ Water storage, 6,000 m³
- ▶ Natural gas feed system to boilers, including 11,429 Nm³/h RMS for natural gas and 4,351 Nm³/h plant RMS
- ▶ Water/steam circuit dosing and sampling system
- ▶ Comprehensive fire protection system
- ▶ Dual system pumping water at 250 m³/h, at a height of 1.245 m
- ▶ OVATION@EMERSON® plant operation and control system
- ▶ Includes 220 kV underground power line and substation



SPAIN

Alcázar de San Juan. Ciudad Real
(Spain)

SOLAR THERMAL

ASTE 1A





SOLAR THERMAL

ASTE 1B

LOCATION ▶ Alcázar de San Juan. Ciudad Real (Spain)

CUSTOMER ▶ Aries Solar Termoeléctrica

PROJECT SCOPE:

promotion, design, supply, construction, commissioning, maintenance and operation of a 50 MW solar thermal plant

EPC AMOUNT ▶ EUR 248 million

INVESTMENT ▶ EUR 307 million

START DATE ▶ august 2010

FINISH DATE ▶ may 2012

CHARACTERISTICS:

- ▶ Parabolic trough collectors
- ▶ Heat storage facilities
- ▶ Solar farm, 122,000 m² and 120 loops
- ▶ Thermal fluid system, 30 bar @ 400°C
- ▶ Ancillary heating system with 3 x 16 MWt natural gas boilers
- ▶ 140 MWt dual steam generation unit
- ▶ Siemens steam turbine for HP and LP with preheating facility
- ▶ Tower cooling system
- ▶ Water treatment plant composed of: pretreatment and filtering; reverse osmosis system; electrodeionisation unit
- ▶ Treatment of effluents and hydrocarbon separator with mixing ponds
- ▶ Water storage, 6,000 m³
- ▶ Natural gas feed system to boilers, including 11,429 Nm³/h RMS for natural gas and 4,351 Nm³/h plant RMS
- ▶ Water/steam circuit dosing and sampling system
- ▶ Comprehensive fire protection system
- ▶ Dual system pumping water at 250 m³/h, at a height of 1.245 m
- ▶ OVATION@EMERSON® plant operation and control system
- ▶ Includes 220 kV underground power line and substation



SPAIN

Alcázar de San Juan. Ciudad Real
(Spain)

SOLAR THERMAL

ASTE 1B





elecnor

SOLAR THERMAL

ASTEXOL

LOCATION ▶ Badajoz (Spain)

CUSTOMER ▶ Dioxipe Solar

PROJECT SCOPE:

Promotion, design, supply, construction, commissioning, maintenance and operation of a 50 MW solar thermal plant

EPC AMOUNT ▶ EUR 241 million

INVESTMENT ▶ EUR 320 million

START DATE ▶ july 2010

FINISH DATE ▶ march 2012

CHARACTERISTICS:

- ▶ Parabolic trough collectors
- ▶ Heat storage facilities
- ▶ Solar farm, 510,000 m² and 112 loops
- ▶ CCP Skal-ET 150 collector technology
- ▶ Thermal fluid system, 40 bar @ 400°C
- ▶ 1,200 tm of HTF Downtherm-A thermal fluid
- ▶ Ancillary heating system with 3 x 15 MWt natural gas boilers
- ▶ Automatic degraded HTF regeneration system with a process throughput of 970 kg/h.
- ▶ 140 MWt dual steam generation unit.
- ▶ General Electric steam turbine for HP and LP with preheating facility
- ▶ Tower cooling system
- ▶ Treatment plant with pretreatment and filtering, reverse osmosis and electrodeionisation
- ▶ Treatment of effluents and hydrocarbon separator with 318.5 m³ mixing pond
- ▶ Water storage, 6,000 m³
- ▶ Satellite LNG plant for 5,000 Nm³/h.
- ▶ Satellite nitrogen plant for plant inertisation
- ▶ Facilities for capturing, treating and pumping water from the River Guadiana - 235 m³/h and 70 kWe of installed power
- ▶ Collector cleaning system for reflectivities above 92%
- ▶ OVATION@EMERSON® plant operation and control system
- ▶ 220 kV substation and discharge line



SPAIN

Badajoz (Spain)

SOLAR THERMAL
ASTEXOL



Wind power





WIND POWER **ARRECIFE**

LOCATION ▶ Lanzarote. Canary Islands (Spain)

CUSTOMER ▶ Insular de Aguas de Lanzarote (INALSA)

PROJECT SCOPE ▶

Supply and installation of wind turbines, construction of access points, civil works, auxiliary installations and medium-voltage power transmission line for the wind farm, with a power capacity of 9.2 MW

AMOUNT ▶ EUR 11 million

START DATE ▶ october 2019

FINISH DATE ▶ august 2020

CHARACTERISTICS:

- ▶ Power capacity: 9.2 MW
- ▶ Wind turbines: Four 2.3 MW Enercon E-70s
- ▶ Hub height: 85 m
- ▶ Rotor diameter 71 m
- ▶ Height: 120 m (including blades)
- ▶ Expected output: 28,605 MWh/year



SPAIN

Lanzarote. Canary Islands (Spain)

WIND POWER
ARRECIFE





WIND POWER **COFRENTES WF**

LOCATION ▶ Valencia (Spain)

CUSTOMER ▶ Enerfin

PROJECT SCOPE ▶

Construction of a wind farm with a power capacity of 50 MW (civil and electrical Balance of Plant, transmission line and substation).

AMOUNT ▶ EUR 53 million

START DATE ▶ March 2020

FINISH DATE ▶ February 2020

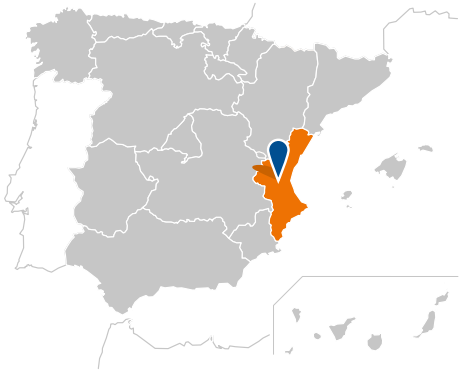
CHARACTERISTICS:

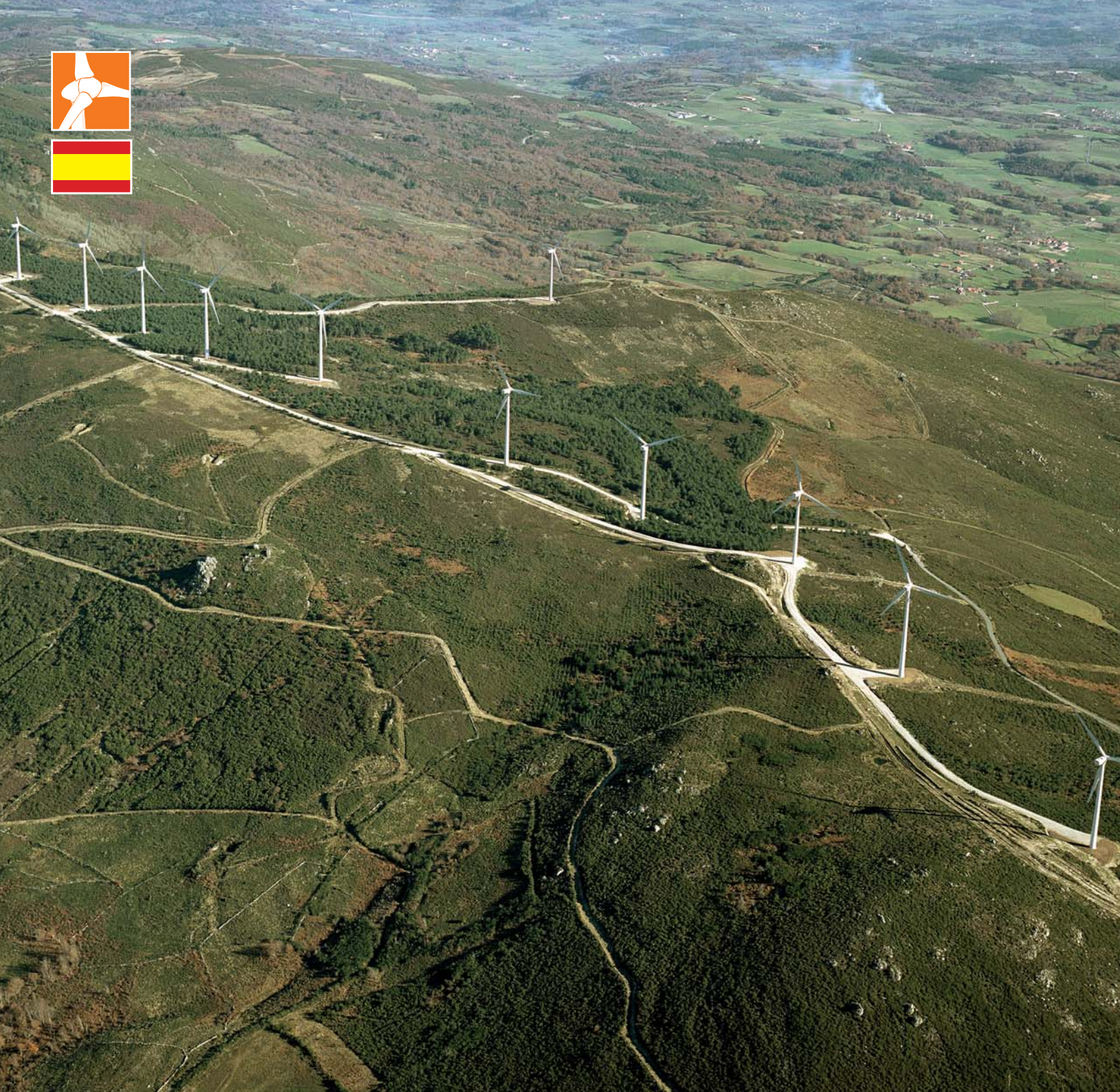
- ▶ Construction of thirteen 3.83 MW wind turbine generators (WTG)
- ▶ The energy generated by the wind turbines will be transported through a 30 kV underground network to the 'La Señorita' park substation, owned by the promoter, which will increase the generated power capacity to 132 kV
- ▶ A 3.45 km long overhead line of 132 kV will connect La Señorita SET to the Cofrentes Hydroelectric Power Plant Substation, a connection point to the Spanish electrical system distribution network owned by Iberdrola Distribución
- ▶ It will generate an electricity production of 155,000 MWh, equivalent to the electricity consumption of 43,000 families a year and prevent the emission of 66.000 tonnes of CO₂



SPAIN
Valencia

WIND POWER
COFRENTES WF





WIND POWER

FARO-FARELO

LOCATION ▶ Serras Faro-Farelo. Lugo and Pontevedra (Spain)

CUSTOMER ▶ Galicia Vento

PROJECT SCOPE:

Promotion, design, supply, construction, start-up, commissioning, maintenance and operation of four 128 MW wind farms (Penas Grandes 14.4 MW, Chantada 48 MW, Monte Cabeza 36.8 MW and Farelo 28.8 MW)

INVESTMENT ▶ EUR 135 million

START DATE ▶ march 2004

FINISH DATE ▶ september 2005

CHARACTERISTICS:

- ▶ Power output: 128 MW
- ▶ Technology: Ecotecnia (Alstom)
- ▶ Wind turbines: 80 x ECO/1.6 MW
- ▶ Equivalent hours: 2,705



SPAIN



Serras Faro-Farelo. Lugo and Pontevedra (Spain)

WIND POWER

FARO-FARELO





WIND POWER **GALICIA**

LOCALIZACIÓN ▶ La Coruña and Lugo (Spain)

CLIENTE ▶ Greenalia

ALCANCE ▶

Construction of five wind farms (Miñón, Oourol, Croa I, Croa II and Monte Tourado).

IMPORTE ▶ EUR 64.3 million

INICIO ▶ July 2019

FIN ▶ December 2020

CARACTERÍSTICAS:

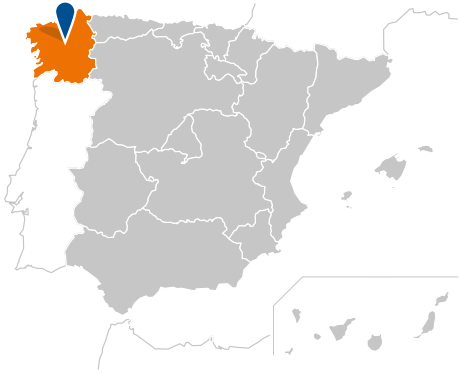
- ▶ Installation of 19 turbines
- ✓ Adding 74.22 MW of power capacity
- ✓ Will provide electricity to 45,000 homes
- ▶ Two substations (132 kV and 66 kV)
- ▶ 8 km HV line
- ▶ Medium-voltage networks
- ▶ Fibre optic
- ▶ Design and construction of civil infrastructure
- ▶ Maintenance, operation and control of the farms during the first 24 months



SPAIN

La Coruña and Lugo

WIND POWER
GALICIA





WIND POWER **MALPICA REPOWERING**

LOCATION ▶ Malpica de Bergantiños,
La Coruña (Spain)

CUSTOMER ▶ Parque Eólico de Malpica, S.A.

PROJECT SCOPE ▶
Development, design, supply, construction,
start-up, maintenance and operation of a
16.45 MW wind farm

AMOUNT ▶ EUR 18.7 million

START DATE ▶ march 2017

FINISH DATE ▶ september 2017

CHARACTERISTICS:

- ▶ Power capacity: 16.45 MW
- ▶ Technology: Enercon
- ▶ Wind turbines: 7 x E92/2.35 MW
- ▶ Equivalent hours: more than 4,000

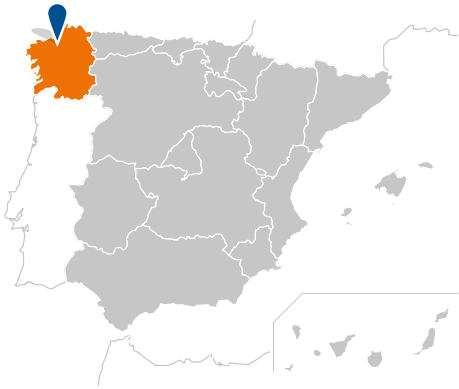


SPAIN

Malpica de Bergantiños,
La Coruña (Spain)

WIND POWER

MALPICA REPOWERING





WIND POWER **MONLORA**

LOCATION ▶ Sierra de Luna, Luna, Las Pedrosas and Castejón de Valdejasa, in the region of Cinco Villas, Zaragoza (Spain)

CUSTOMER ▶ Forestalia

PROJECT SCOPE ▶

Construction of six wind farms (named Monlora I, Monlora II, Monlora III, Monlora IV, Monlora V and La Sarda). Preliminary studies and works, civil works to develop the wind farms, electrical works and construction of three substations and two transmission lines

AMOUNT ▶ EUR 47 million

START DATE ▶ june 2019

FINISH DATE ▶ november 2019

CHARACTERISTICS:

- ▶ Power capacity: 231 MW
- ▶ Wind turbines: 61; 3.83 MW each
- ▶ Three 132/30 kV substations
- ▶ Two 132 kV transmission lines

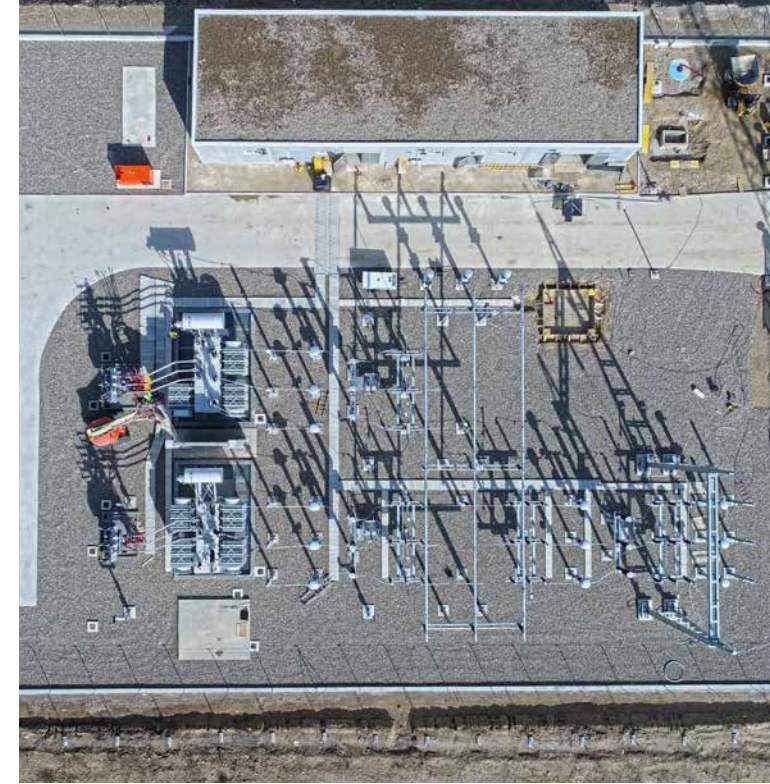


SPAIN



Sierra de Luna, Luna, Las Pedrosas and Castejón de Valdejasa, in the region of Cinco Villas, Zaragoza (Spain)

WIND POWER MONLORA





ELECTRICITY TRANSMISSION **MONTETORRERO WWF**

LOCATION ▶ El Burgo de Ebro, La Cartuja and Zaragoza (Spain)

CUSTOMER ▶ Alectoris Energía Sostenible (Repsol Group)

PROJECT SCOPE ▶

The Montetorrero cluster comprises two farms: Romerales 1 and Romerales 2. There are two substations, one on each farm, an overhead line that connects the Romerales I and Romerales II substations, and another that will connect the Romerales II substation with the existing Montetorrero substation (Endesa).

AMOUNT ▶ EUR 26 million

START DATE ▶ November 2019

FINISH DATE ▶ October 2020

CHARACTERISTICS:

- ▶ Civil works, underground medium-voltage line, two 132/30 kV substations with 50/60 MVA Xfmr and a high-voltage overhead line.
- ▶ Underground power line:
 - ✓ 110 km medium voltage in 33 km ditch
 - ✓ 45 km high voltage in 15 km ditch
- ▶ 13× 3.83 MW GE wind turbines-rotor diameter 130 m, hub height 85 m (to be installed by the manufacturer)
- ▶ 100 MW approx. (49.79 MW per farm)
- ▶ Construction of 25 km of road
- ▶ 700,000 m³ of earth moving



SPAIN

El Burgo de Ebro,
La Cartuja and Zaragoza

ELECTRICITY TRANSMISSION
MONTETORRERO
WWF





WIND POWER

PÁRAMO DE POZA

LOCATION ▶ Poza de la Sal. Burgos (Spain)

CUSTOMER ▶ Eólica Páramo de Poza

PROJECT SCOPE:

Promotion, design, supply, construction, start-up, commissioning, maintenance and operation of two 101 MW wind plants (50.5 MW + 50.25 MW)

INVESTMENT ▶ EUR 80 million

START DATE ▶ july 2001

FINISH DATE ▶ may 2002

CHARACTERISTICS:

- ▶ Power output: 101 MW
- ▶ Technology: Ecotecnia (Alstom)
- ▶ Wind turbines: 132 x ECO/ 750 kW + 1 ECO7 1,670 kW
- ▶ Equivalent hours: 1,452



SPAIN

Poza de la Sal, Burgos (Spain)

WIND POWER

PÁRAMO DE POZA





WIND POWER

R&D MONTES DEL CIERZO II WF

LOCATION ▶ Tudela (Navarra)

CUSTOMER ▶ Enerfín

PROJECT SCOPE ▶

R&D of energy storage for the first park on the peninsular to include a battery with a real-time management optimisation system which is key to ensuring that the network is not destabilised due to the intermittency of renewables.

CHARACTERISTICS:

- ▶ A control system for managing the energy generated by a Tesla lithium ion battery connected to a wind turbine in the wind farm. The system collects information, which together with market variables, controls charging and discharging with the help of different statistical models
- ▶ It enables the integration of renewables on a large scale.
- ▶ The use of batteries will remove the need for backup technologies, mainly thermal, which are the main generators of greenhouse gases.

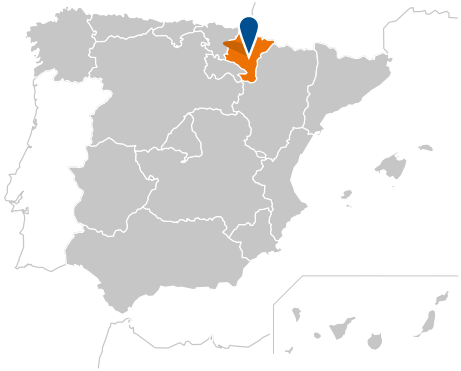


SPAIN

Tudela (Navarra)

WIND POWER

R&D MONTES DEL CIERZO II WF





elecnor

WIND POWER

TARIFA

LOCATION ▶ Tarifa. Cádiz (Spain)

CUSTOMER ▶ Aerogeneradores del Sur

PROJECT SCOPE:

Promotion, design, supply, construction, start-up, commissioning, maintenance and operation of two 55 MW wind plants, La Herrería and Pasada de Tejada (44.8 MW + 9.6 MW)

INVESTMENT ▶ EUR 59 million

START DATE ▶ august 2003

FINISH DATE ▶ january 2005

CHARACTERISTICS:

- ▶ Power output: 55 MW
- ▶ Technology: Ecotecnia (Alstom)
- ▶ Wind turbines: 34 x ECO/1.6 MW
- ▶ Equivalent hours: 2,111

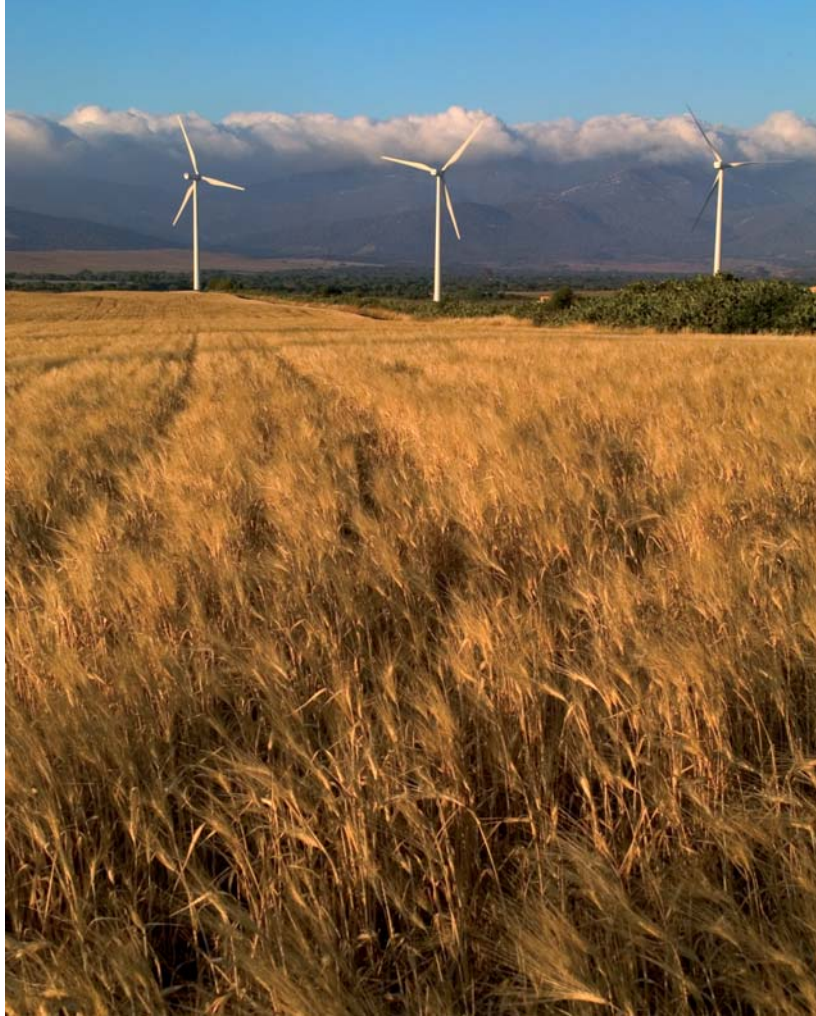


SPAIN

Tarifa. Cádiz (Spain)

WIND POWER

TARIFA





WIND POWER **TEGUISE I**

LOCATION ▶ Lanzarote. Canary Islands (Spain)

CUSTOMER ▶ Insular de Aguas de Lanzarote (INALSA)

PROJECT SCOPE ▶

Supply and installation of turbines, construction of access roads, civil works, auxiliary facilities and MV evacuation line for the 9.2 MW Teguisse I wind farm

AMOUNT ▶ EUR 12 million

START DATE ▶ July 2017

FINISH DATE ▶ March 2018

CHARACTERISTICS:

- ▶ Power capacity: 9.2 MW
- ▶ Wind turbines: 4 Enercon E-70 2.3 MW
- ▶ Height of rotor hub: 85 m
- ▶ Diameter of rotor 71 m
- ▶ Height: 120 m (including rotor blades)
- ▶ Expected output: 28,605 MWh/year



SPAIN

Lanzarote. Canary Islands (Spain)

WIND POWER

TEGUISE I





WIND POWER

VILLANUEVA

LOCATION ▶ Jarafuel. Valencia (Spain)

CUSTOMER ▶ Parques Eólicos de Villanueva

PROJECT SCOPE:

Promotion, design, supply, construction, start-up, commissioning, maintenance and operation until July 2016 of two 67 MW wind plants (Villanueva I and II - 18.4 MW + 48.3 MW)

INVESTMENT ▶ EUR 93 million

START DATE ▶ April 2008

FINISH DATE ▶ July 2009

CHARACTERISTICS:

- ▶ Power output: 67 MW
- ▶ Technology: Enercon
- ▶ Wind turbines: 29 x ECO/2.3 MW
- ▶ Equivalent hours: 1,921



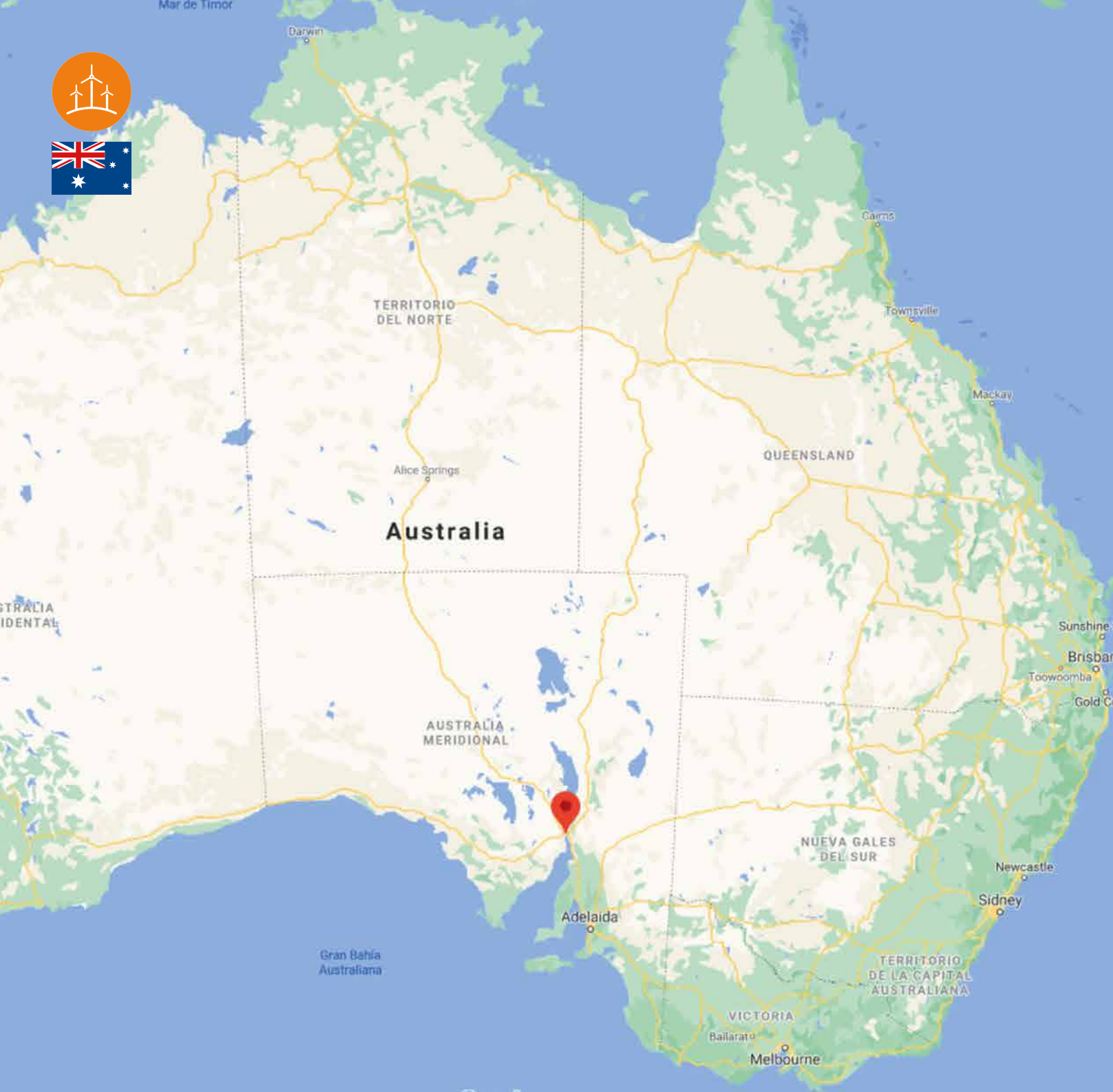
SPAIN

Jarafuel, Valencia (Spain)

WIND POWER

VILLANUEVA





WIND POWER PORT AUGUSTA WF

LOCATION ▶ South Australia (Australia)

CUSTOMER ▶ Iberdrola

PROJECT SCOPE ▶

EPC, BOP, civil engineering and electromechanical work for the start-up of the 210 MW wind farm. This is a pioneering project as it forms part of one of the country's first hybrid wind and solar energy parks.

AMOUNT ▶ EUR 76.3 million

START DATE ▶ October 2020

FINISH DATE ▶ November 2021

CHARACTERISTICS:

- ▶ 50 Vestas turbines
- ▶ 100 km of medium-voltage cables
- ▶ Interconnection of the park
 - ✓ 33/275 kV substation
 - ✓ 4 km of 275 kV underground transmission lines



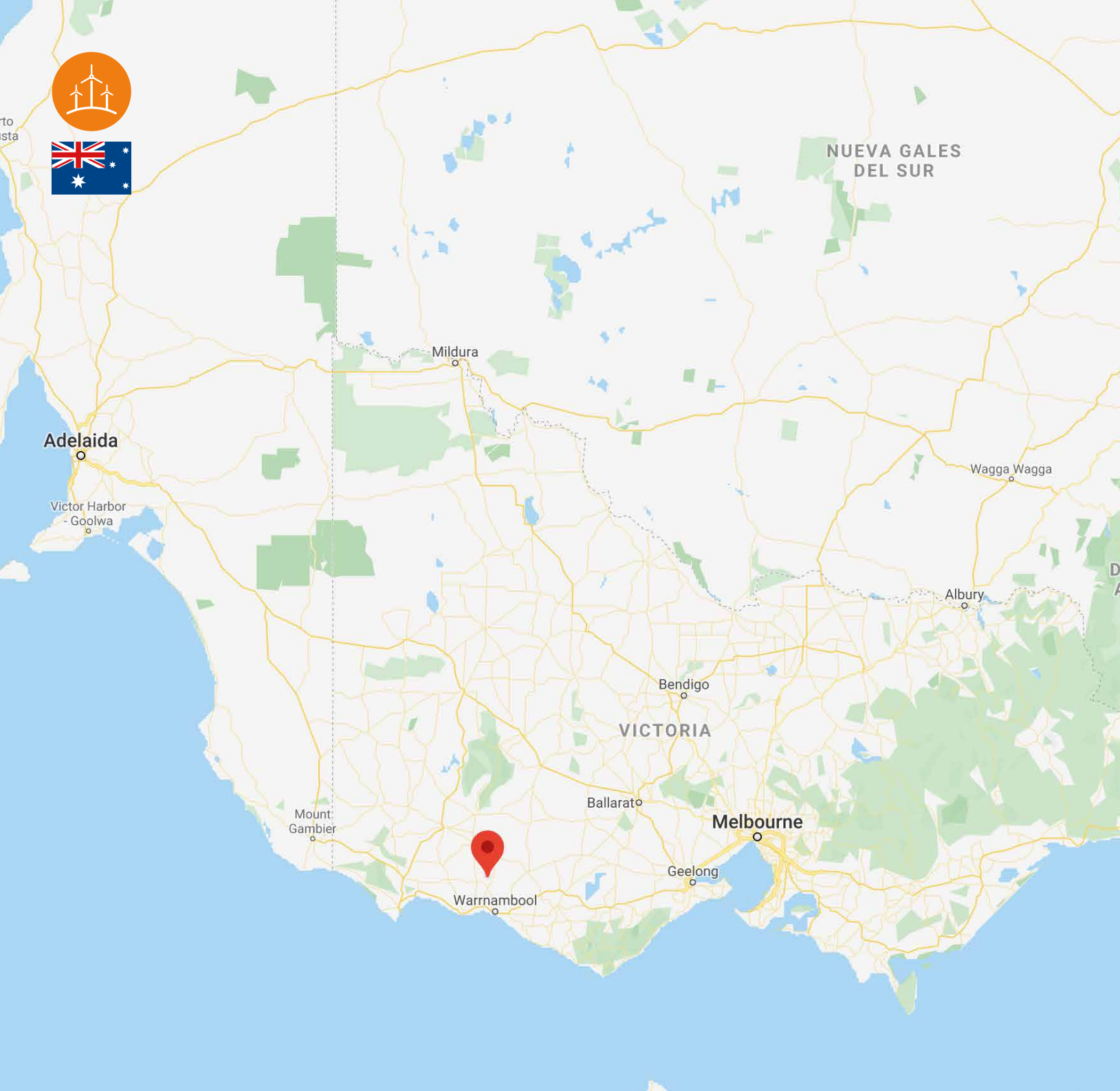
OCEANIA

South Australia (Australia)

WIND POWER

PORT AUGUSTA WF





EÓLICA PE WOOLSTHORPE

LOCALIZACIÓN ▶ Woolsthorpe, Victoria (Australia)

CLIENTE ▶ Enerfin

ALCANCE ▶ Balance of plant

IMPORTE ▶ 88 millones de euros

INICIO ▶ Septiembre 2020

FIN ▶ Septiembre 2021

CARACTERÍSTICAS:

- ▶ Potencia instalada: 72 MW
- ▶ Producción estimada: 255 – 270 GWh/año
- ▶ Turbina: 20 x SG132-3.65 MW
- ▶ Superficie del parque: 460 ha



OCEANÍA

Woolsthorpe, Victoria (Australia)

EÓLICA
PE
WOOLSTHORPE





WIND POWER

DOS INDIOS

LOCATION ▶ Osório, Rio Grande do Sul State (Brazil)

CUSTOMER ▶ Ventos dos Índios

PROJECT SCOPE:

Promotion, design, supply, construction, start-up, commissioning, maintenance and operation of two 53 MW wind plants (Dos Índios 2 and 3)

INVESTMENT ▶ EUR 78 million

START-UP ▶ december 2014

CHARACTERISTICS:

- ▶ Power output: 53 MW
- ▶ Technology: Enercon
- ▶ Wind turbines: 23 x E-92/2.3 MW
- ▶ Equivalent hours: 3,486



SOUTH AMERICA

Osório, Rio Grande do Sul State
(Brazil)

WIND POWER

DOS INDIOS





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WIND POWER

ITAGUAÇÚ DE BAHÍA

LOCATION ▶ Itaguaçu, Bahia State (Brazil)

CUSTOMER ▶ Furnas

PROJECT SCOPE:

Electricity BOP for a 280 MW wind plant

EPC AMOUNT ▶ EUR 31 million

START DATE ▶ 2016

FINISH DATE ▶ 2019

CHARACTERISTICS:

- ▶ Power output: 280 MW
- ▶ Wind turbines: 150
- ▶ 36 km of a 230 kV power line
- ▶ 79 km of 34.5 kV collection systems
- ▶ 2 x 34.5/230 kV substations, each with capacity 160 MVA



SOUTH AMERICA
Itaguaçu. Bahia State (Brazil)

WIND POWER

ITAGUAÇU DE BAHIA





WIND POWER

PALMARES

LOCATION ▶ Palmares. Rio Grande do Sul State (Brazil)

CUSTOMER ▶ Parques Eólicos Palmares

PROJECT SCOPE:

Promotion, design, supply, construction, start-up, commissioning, maintenance and operation of four 57.5 MW wind farms (Palmares 9.2 MW, Fazenda Rosario-1 9.2 MW, Fazenda Rosario-2 23 MW and Fazenda Rosario-3 16.1 MW)

INVESTMENT ▶ EUR 114 million

START DATE ▶ december 2010

FINISH DATE ▶ march 2013

CHARACTERISTICS:

- ▶ Power output: 57.5 MW
- ▶ Technology: Enercon
- ▶ Wind turbines: 25 x E-82/2.3 MW
- ▶ Equivalent hours: 3,192



SOUTH AMERICA

Palmares, Rio Grande do Sul State
(Brazil)

WIND POWER

PALMARES





elecnor

WIND POWER **SÃO FERNANDO I AND II**

LOCATION ▶ Rio Grande do Norte (Brazil)

CUSTOMER ▶ Ventos de Sao Fernando I
Energía S.A. and Ventos de Sao
Fernando II Energía S.A.

PROJECT SCOPE ▶

Full EPC, civil and electrical BOP, transmission line
and substation. Supply and installation of turbines

AMOUNT ▶ EUR 42 million

START DATE ▶ May 2019

FINISH DATE ▶ May 2020

CHARACTERISTICS:

- ▶ Rated power:
 - ✓ SF I: 76.23 MW
 - ✓ SF II: 72.765 MW
- ▶ Wind turbines:
 - ✓ SF I: 22
 - ✓ SF II: 21
- ▶ Technology: AW-132, height: 120 m

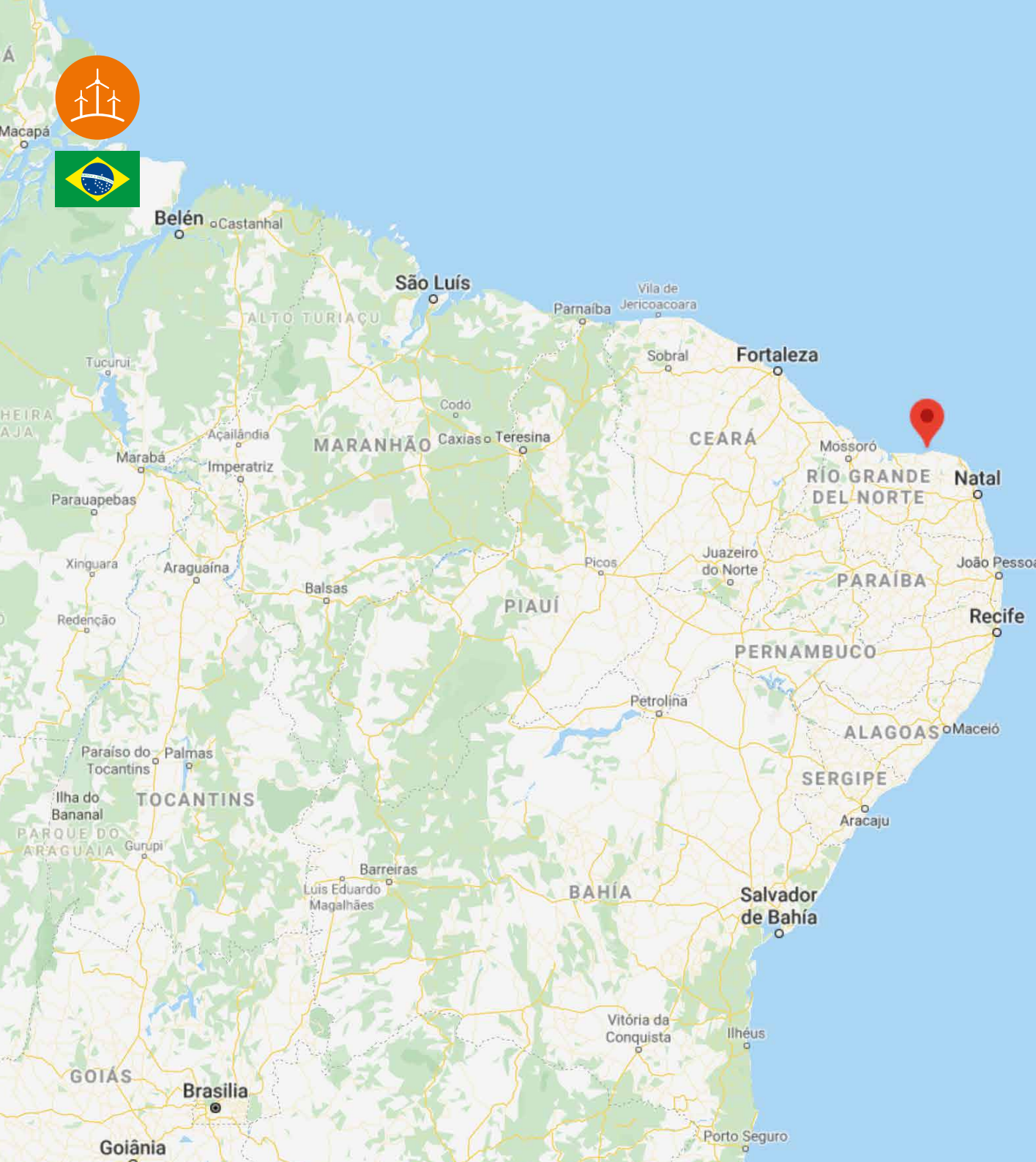


SOUTH AMERICA

Rio Grande do Norte
(Brazil)

WIND POWER
**SÃO FERNANDO
I AND II**





SÃO FERNANDO IV

LOCATION ▶ São Bento do Norte, Nordeste (Brazil)

CUSTOMER ▶ Ventos de São Fernando IV Energia, S.A.

PROJECT SCOPE ▶

Promotion, design, supply, construction, start-up and management of the operation

AMOUNT ▶ EUR 68.6 million

START DATE ▶ may 2020

FINISH DATE ▶ january 2021

CHARACTERISTICS:

- ▶ Power capacity: 83.2 MW
- ▶ Technology: Nordex-Acciona
- ▶ Wind turbines: 24 x AW132/3.465 MW
- ▶ Equivalent hours: 4,318

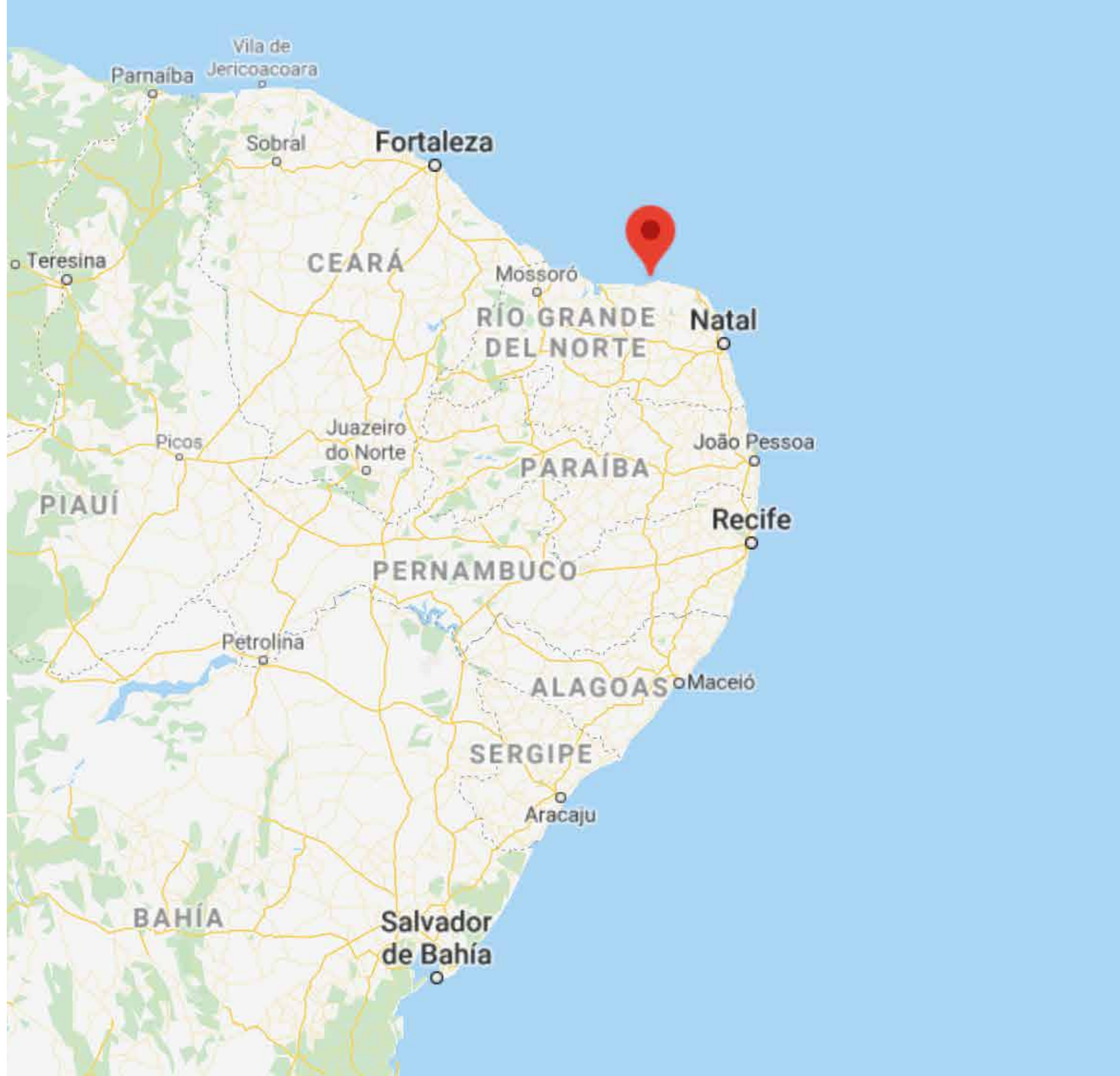


SOUTH AMERICA

São Bento do Norte, Nordeste
(Brazil)

WIND POWER

SÃO FERNANDO IV





elecnor

WIND POWER

VENTOS DA LAGOA

LOCATION ▶ Osório, Rio Grande do Sul State (Brazil)

CUSTOMER ▶ Ventos da Lagoa

PROJECT SCOPE:

Promotion, design, supply, construction, start-up, commissioning, maintenance and operation of two 57.5 MW wind plants (Sangradouro 2 and 3)

INVESTMENT ▶ EUR 96 million

START-UP ▶ may 2012

CHARACTERISTICS:

- ▶ Power output: 57.5 MW
- ▶ Technology: Enercon
- ▶ Wind turbines: 25 x E-82/2.3 MW
- ▶ Equivalent hours: 3,036



SOUTH AMERICA

Osório, Rio Grande do Sul State
(Brazil)

WIND POWER

VENTOS DA LAGOA





elecnor

WIND POWER

VENTOS DO LITORAL

LOCATION ▶ Osório, Rio Grande do Sul State (Brazil)

CUSTOMER ▶ Ventos do Litoral

PROJECT SCOPE:

Promotion, design, supply, construction, start-up, commissioning, maintenance and operation of two 57.5 MW wind plants (Osório 2 and 3)

INVESTMENT ▶ EUR 98 million

START-UP ▶ february 2013

CHARACTERISTICS:

- ▶ Power output: 57.5 MW
- ▶ Technology: Enercon
- ▶ Wind turbines: 25 x E-82/2.3 MW
- ▶ Equivalent hours: 2,955



SOUTH AMERICA

Osório, Rio Grande do Sul State
(Brazil)

WIND POWER

VENTOS DO LITORAL





WIND POWER

VENTOS DO SUL

LOCATION ▶ Osório, Rio Grande do Sul State (Brazil)

CUSTOMER ▶ Ventos do Sul

PROJECT SCOPE:

Promotion, design, supply, construction, start-up, commissioning, maintenance and operation of three 150 MW wind plants (Sangradouro, Osório and Dos Índios, 50 MW each)

INVESTMENT ▶ EUR 228 million

START-UP ▶ 2006

CHARACTERISTICS:

- ▶ Power output: 150 MW
- ▶ Technology: Enercon
- ▶ Wind turbines: 75 x E-70/2 MW
- ▶ Equivalent hours: 2,463



SOUTH AMERICA

Osório, Rio Grande do Sul State
(Brazil)

WIND POWER

VENTOS DO SUL





WIND POWER

L'ÉRABLE

LOCATION ▶ St. Ferdinand, Ste. Sophie, St. Pierre-Baptiste. Quebec (Canada)

CUSTOMER ▶ Eoliennes de L'Érable

PROJECT SCOPE:

Promotion, design, supply, construction, start-up, commissioning, maintenance and operation of a 100 MW wind plant

AMOUNT ▶ EUR 266 million

START DATE ▶ december 2011

FINISH DATE ▶ november 2013

CHARACTERISTICS:

- ▶ Power output: 100 MW
- ▶ Technology: Enercon
- ▶ Wind turbines: 50 x E-82/2 MW
- ▶ Equivalent hours: 3,466



NORTH AMERICA

St. Ferdinand, Ste. Sophie, St.
Pierre-Baptiste. Quebec (Canada)

WIND POWER

L'ERABLE





WIND POWER CABO NEGRO

LOCATION ▶ Magallanes and Chilean Antarctica region, about 20 km north of Punta Arenas, Cabo Negro (Chile)

CUSTOMER ▶ Vientos Patagónicos SpA

PROJECT SCOPE ▶

Engineering, supply and construction of the wind farm under an Engineering, Procurement and Construction (turnkey) arrangement

AMOUNT ▶ EUR 19.7 million

START DATE ▶ September 2018

FINISH DATE ▶ September 2019

CHARACTERISTICS:

- ▶ Power capacity: 10 MW
- ▶ Wind turbines: 3x 3.45 MW, 69 m high and 20-year lifespan



SOUTH AMERICA



Magallanes and Chilean Antarctica region, about 20 km north of Punta Arenas, Cabo Negro (Chile)

WIND POWER CABO NEGRO





WIND POWER **CERRO TIGRE**

LOCATION ▶ 50 km east of Antofagasta,
Antofagasta (Chile)

CUSTOMER ▶ Mainstream

PROJECT SCOPE ▶

Construction of a wind farm that allows for electrical evacuation

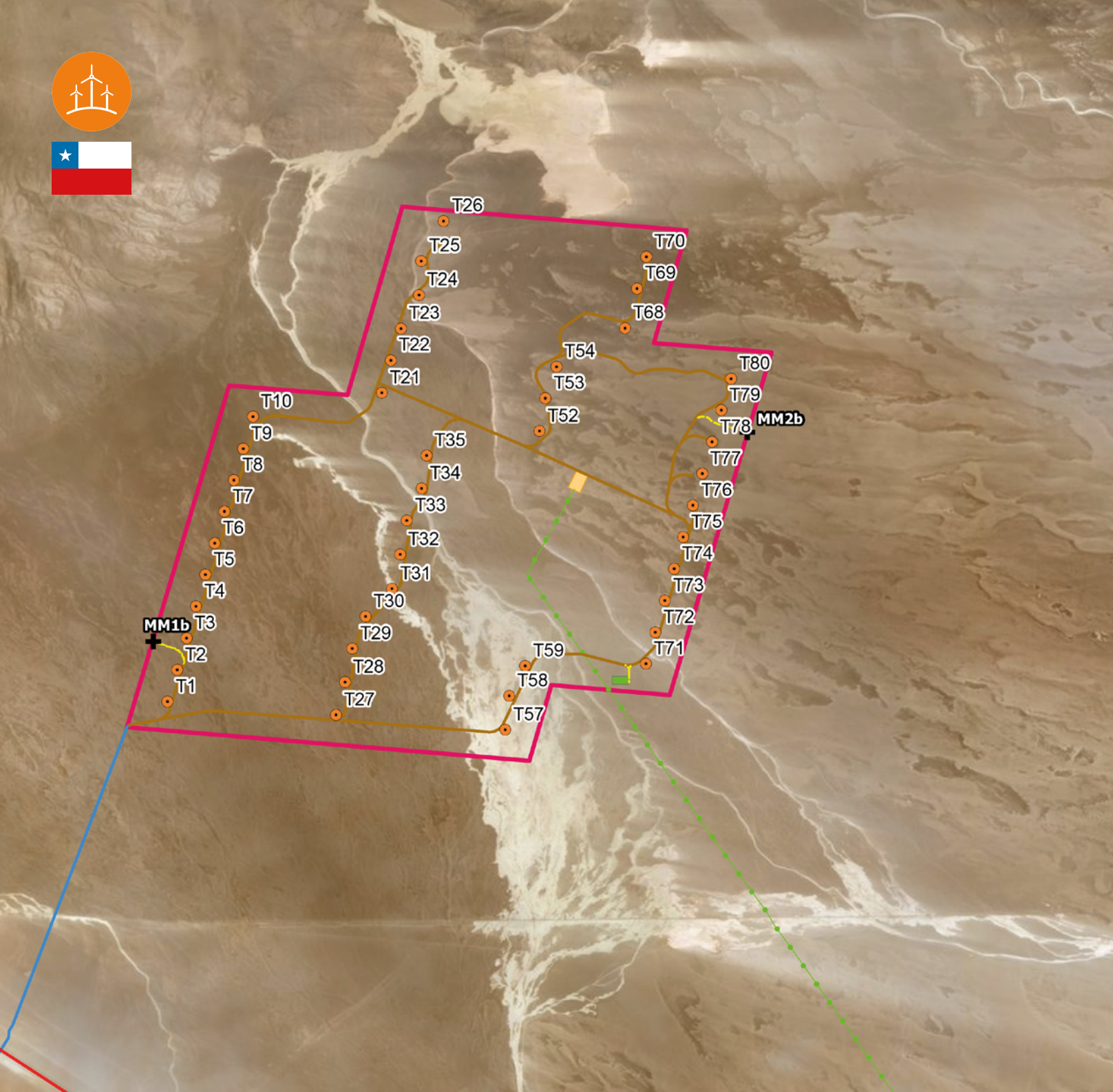
AMOUNT ▶ EUR 30 million

START DATE ▶ November 2019

FINISH DATE ▶ November 2020

CHARACTERISTICS:

- ▶ Installed power: 185 MW
- ▶ Wind turbines: 44x Vestas V117-4.0 MW Mk3E HH72
- ▶ Elevated substation 33/220 kV
- ▶ Overhead transmission line 220 kV (13 km)
- ▶ Other work
 - ✓ Transport route modifications
 - ✓ Main access and internal roads
 - ✓ Platforms
 - ✓ Foundations
 - ✓ Start-up
 - ✓ Temporary construction facilities
 - ✓ Concrete plant

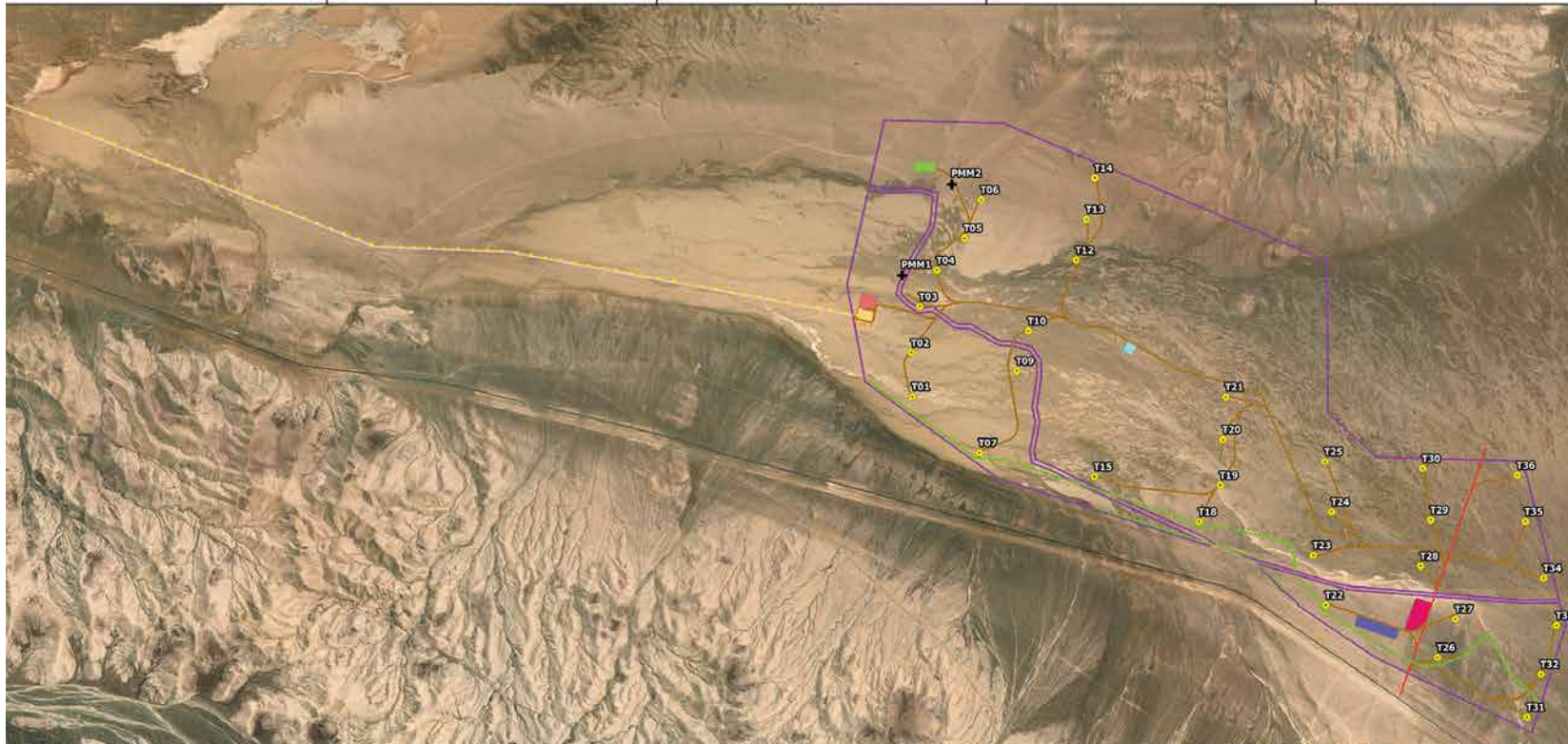




SOUTH AMERICA

50 km east of Antofagasta,
Antofagasta (Chile)

WIND POWER CERRO TIGRE





WIND POWER

SAN JUAN

LOCATION ▶ Freirina, Vallenar. III Atacama region, Chile

CUSTOMER ▶ Latin American Power

PROJECT SCOPE:

Contract for BOP and engineering, supply and construction of transmission system for the 185 MW San Juan wind plant

AMOUNT ▶ EUR 75 million

START DATE ▶ may 2015

CHARACTERISTICS:

- ▶ Power output: 185 MW
- ▶ Line: 84 km of a 220 kV power line
- ▶ Substation: 33/220 kV



SOUTH AMERICA

Freirina, Vallenar. III Atacama region, Chile

WIND POWER

SAN JUAN





WIND POWER GUAJIRA I WF

LOCATION ▶ Uribia, La Guajira (Colombia)

CUSTOMER ▶ Isagen

PROJECT SCOPE ▶

Engineering, supply and complete construction of a 20 MW wind farm.

AMOUNT ▶ EUR 31.7 million

START DATE ▶ August 2020

FINISH DATE ▶ January 2022

CHARACTERISTICS:

- ▶ Ten 78 m high Vestas turbines, each with a power capacity of 2 MW, connected to a booster substation
- ▶ It is the second park to be developed in Colombia

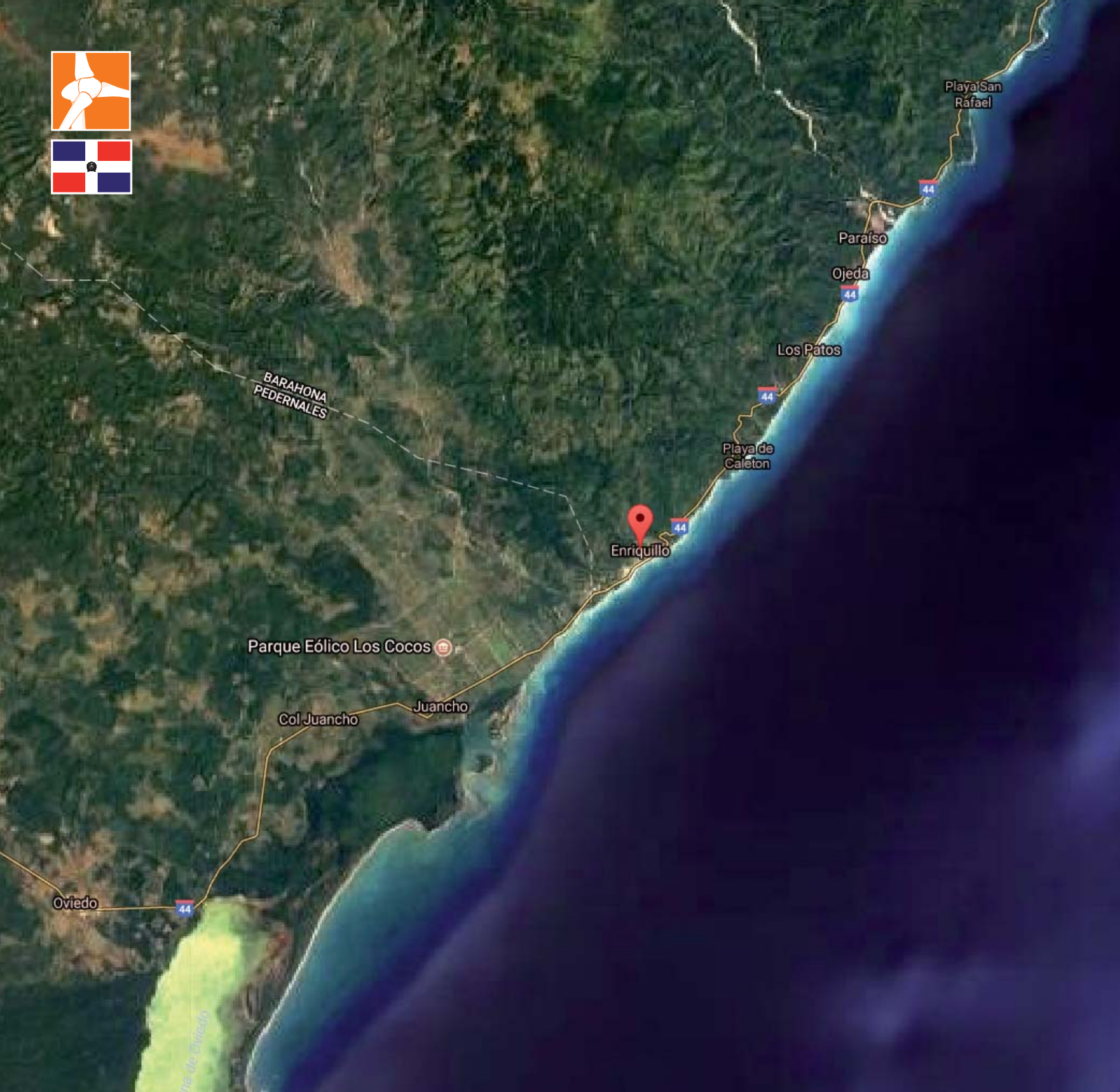


SOUTH AMERICA

Uribe, La Guajira (Colombia)

WIND POWER
GUAJIRA I WF





WIND POWER

LARIMAR II

LOCATION ▶ Enriquillo. Barahona (Dominican Republic)

CUSTOMER ▶ EGE Haina

PROJECT SCOPE:

Engineering, supply, construction and start-up of a 48.3 MW wind farm

EPC AMOUNT ▶ EUR 80 million

START DATE ▶ July 2017

FINISH DATE ▶ December 2018

CHARACTERISTICS:

- ▶ Power capacity: 48.3 MW
- ▶ Technology: Vestas V117
- ▶ Wind turbines: 14/3.45 MW



CENTRAL AMERICA



Enriquillo, Barahona
(Dominican Republic)

WIND POWER

LARIMAR II





WIND POWER

AL-RAJEF WIND FARM

LOCATION ▶ Al-Rajef, Maan (Jordan)

CUSTOMER ▶ Green Watts Renewable Energy
Co LLC (Alcazar Energy)

PROJECT SCOPE:

Design, supply, construction, start-up, maintenance and operation for 20 years of an 86.1 MW wind farm

EPC AMOUNT ▶ EUR 131 million (ENO 35 M)

START DATE ▶ november 2016

FINISH DATE ▶ october 2018

CHARACTERISTICS:

- ▶ Power capacity: 86.1 MW
- ▶ Technology: Gamesa
- ▶ Wind turbines: 41/ G114 - 2100kW



ASIA

Al-Rajef, Maan (Jordan)

WIND POWER

AL-RAJEF WIND FARM





WIND POWER

MAAN

LOCATION ▶ Maan (Jordan)

CUSTOMER ▶ Ministry for Energy and Natural Resources

PROJECT SCOPE:

Engineering, supply, construction, start-up, maintenance and operation of an 80 MW wind plant

AMOUNT ▶ EUR 127 million

START DATE ▶ september 2014

FINISH DATE ▶ july 2017

CHARACTERISTICS:

- ▶ Power output: 80 MW
- ▶ Technology: Gamesa
- ▶ Wind turbines: 40/2 MW



ASIA

Maan (Jordan)

WIND POWER
MAAN





WIND POWER TAFILAH

LOCATION ▶ Tafilah (Jordan)

CUSTOMER ▶ Mass Group Holding

PROJECT SCOPE ▶

Engineering, supply, construction and start-up of a 100 MW wind farm in partnership with GE Renewable Energy

AMOUNT ▶ EUR 111 million
(ENO EUR 28 million)

START DATE ▶ February 2018

FINISH DATE ▶ July 2020

CHARACTERISTICS:

- ▶ Power capacity: 100 MW
- ▶ Technology: GE 3.6
- ▶ Wind turbines: 28/3.6 MW (G137 112 HH)



ASIA

Tafilah (Jordan)

WIND POWER
TAFILAH





WIND POWER

SHAGAYA

LOCATION ▶ Shagaya Energy Park (Kuwait)

CUSTOMER ▶ Kuwait Scientific Research Institute (KISR)

PROJECT SCOPE:

Engineering, consortium construction, start-up and maintenance over 6 years of a 10 MW wind plant

EPC AMOUNT ▶ EUR 23 million (ENO 60%)

START DATE ▶ may 2015

FINISH DATE ▶ august 2016

CHARACTERISTICS:

- ▶ Wind turbines: 5 – 2 MW each
- ▶ Power output: 10 MW
- ▶ Rotor height: 78 m
- ▶ Rotor diameter: 90 m
- ▶ Electrical and data interconnection for turbines and service room for the Shagaya 132 kV substation



ASIA

Shagaya Energy Park (Kuwait)

WIND POWER

SHAGAYA





WIND FARMS **BOULENOUAR**

LOCATION ▶ Boulenouar, Dakhlet Nouadhibou (Mauritania)

CUSTOMER ▶ Société Mauritanienne d'Electricité (SOMELEC)

PROJECT SCOPE ▶
Engineering, supply, construction and start-up of a 100 MW wind farm in a consortium with Gamesa

AMOUNT ▶ EUR 123 million (ENO 39 M)

START DATE ▶ August 2017

FINISH DATE ▶ August 2019

CHARACTERISTICS:

- ▶ Power capacity: 100 MW
- ▶ Technology: Gamesa G114
- ▶ Wind turbines: 39/2.6 MW



AFRICA

Boulenouar, Dakhlet
Nouadhibou (Mauritania)

WIND FARMS

BOULENOUAR





elecnor

WIND POWER **NOUAKCHOTT**

LOCATION ▶ Nouakchott (Mauritania)

CUSTOMER ▶ Somelec

PROJECT SCOPE:

Engineering, construction, substation connection, start-up and maintenance over 11 years of a 30 MW wind plant

EPC AMOUNT ▶ EUR 45 million

START DATE ▶ june 2013

FINISH DATE ▶ december 2014

CHARACTERISTICS:

- ▶ Wind turbines: 15 Gamesa G97 turbines, each with capacity 2 MW
- ▶ Power output: 30 MW



AFRICA

Nouakchott (Mauritania)

WIND POWER

NOUAKCHOTT





elecnor

WIND POWER **COROMUEL WF**

LOCATION ▶ La Paz, Baja California Sur (Mexico)

CUSTOMER ▶ Eurus Energy

PROJECT SCOPE ▶

Engineering and construction of a 56 MW wind farm (Balance of Plant, overhead and underground collection network, two electrical substations, fibre optic lines) that will change the area's energy matrix, reducing energy dependence on fossil fuels.

AMOUNT ▶ EUR 28.8 million

START DATE ▶ January 2020

FINISH DATE ▶ December 2020

CHARACTERISTICS:

- ▶ 20 General Electric 2.8/127 2.8 MW wind turbines supplied and installed by the owner
- ▶ Area: 1721 ha
- ▶ 21.20 km of roads and drainage works
- ▶ 12.95 km long medium-voltage underground line of 34.5 kV
- ▶ 8.90 km long medium-voltage overhead line of 34.5 kV
- ▶ A 115 kV transformation substation
- ▶ A 34.5 to 115 kV booster substation with 2 power transformers
- ▶ A 0.3 km long transmission line of 115 kV
- ▶ 120 km of optical ground wires (OPGW) to connect the high-voltage pylons



CENTRAL AMERICA

La Paz, Baja California Sur (Mexico)

WIND POWER

COROMUEL WF





Baja California

elecnor

WIND POWER **SAN MATÍAS WF**

LOCATION ▶ Baja California, Mexico

CUSTOMER ▶ Sinia Renovables

PROJECT SCOPE ▶

Development of a 30 MW wind farm. Wind turbines with individual monitoring and supervision systems for both local and remote control, control centre in the building located in the park's electricity substation, medium-voltage underground networks, electromechanical finishings, connections, communications lines, installation accesses and other civil infrastructure.

AMOUNT ▶ EUR 17.8 million

START DATE ▶ September 2018

FINISH DATE ▶ September 2020

CHARACTERISTICS:

- ▶ Eight 3.8 MW wind turbines
- ▶ 250 hectares

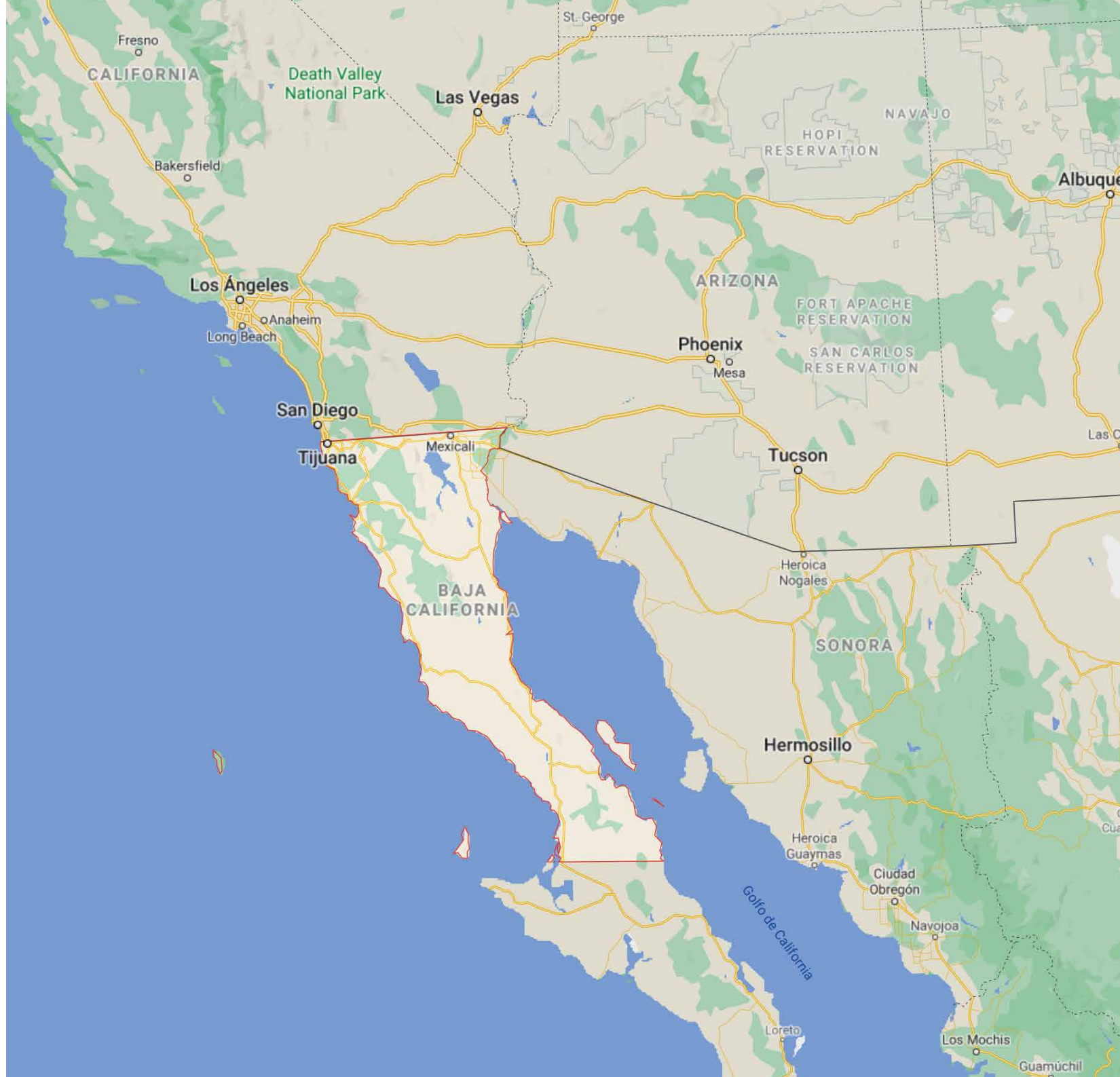


CENTRAL AMERICA

Baja California, Mexico

WIND POWER

SAN MATÍAS WF





elecnor

WIND POWER **PE TOABRÉ**

LOCATION ▶ Penonomé District, Coclé Province (Panama)

CUSTOMER ▶ Parque Eólico Toabré, S.A.

PROJECT SCOPE ▶

Engineering, supply, construction and start-up of a 66 MW wind farm under an Engineering, Procurement and Construction arrangement. Includes supply and installation of wind turbines, balance of plant (civil works and medium voltage), booster and switching substation, and the 230 kV transmission line.

AMOUNT ▶ EUR 106 million

START DATE ▶ May 2018

FINISH DATE ▶ March 2020

CHARACTERISTICS:

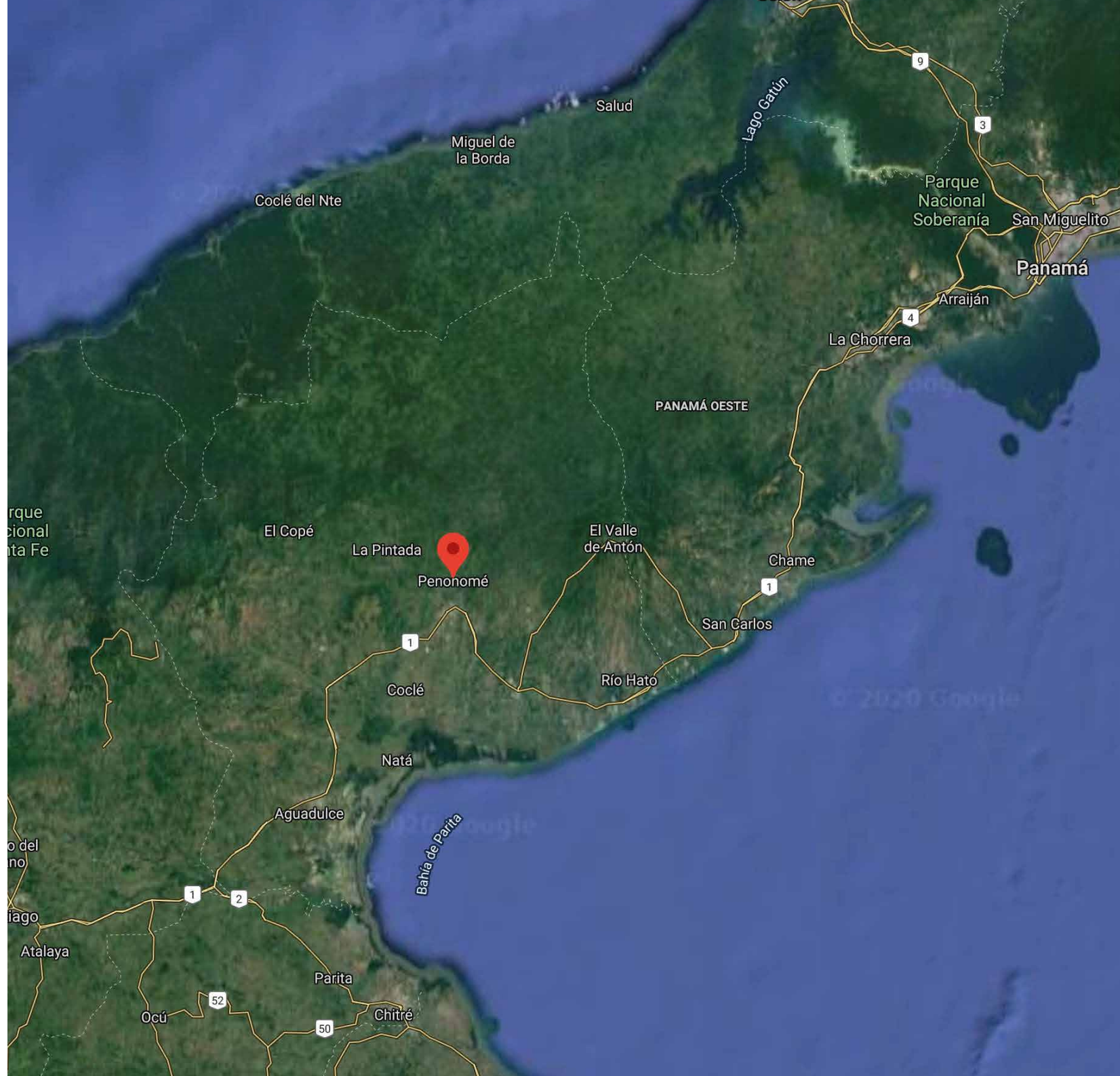
- ▶ Power capacity: 66 MW.
- ▶ Technology: Vestas V117, 3.3 MW, 84 m tower height
- ▶ Wind turbines: 20



CENTRAL AMERICA

Penonomé District, Coclé Province
(Panama)

WIND POWER PE TOABRÉ





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