

PRESENTATION



TERAWATT
ENERGY AND
COMMUNICATIONS

SEABRA GLOBAL
ENGINEERING
SOLUTIONS.
SINCE 1947

WHO WE ARE



TERAWATT OPERATES IN THE AREAS OF ENERGY, COMMUNICATIONS AND SECURITY

Terawatt is a company that operates in the Energy, Communications and Security market, present in Portugal, Angola and Equatorial Guinea. A deep knowledge of the global market was a key determinant on the course of events; the international projects in which it intervenes are evidence of that.

Its team is constituted by specialized engineers, dedicated to the development of professional and quality projects, customized to the needs of each client, here or in any part of the world.

It develops and executes projects in the Electrical installations, Communications and Active Safety to all types of buildings (Commercial type, administrative, industrial, housing, school, medical), Production areas (MHPs – Micro Hydro Power Plants), Energy Transformation (Substations and Switching and Transformer Stations), VHV Transportation Networks (Very High Voltage) and HV (High Voltage), Energy Distribution (MV Distribution Networks – Medium Voltage, subterranean and aerial), (LV Distribution Networks – Low Voltage, subterranean and aerial), (PB Grids – Public Lighting Networks – Road Lighting, subterranean and aerial), LV (Live Working – Networks and infrastructures up to 400Kv), Telecommunications, Building Security, Project Execution and Technical Consulting.



OUR POSITIONING

VISION

Becoming an international benchmark of “knowledge” and “Know How”, turning us into a strategic partner for a long-term relationship with our clients.

MISSION

Constantly seek in a consistent and nonconformist manner, the best and most innovative engineering solutions, guaranteeing our clients the creation of added value to their businesses.

VALUES

SERVICE FOCUS ON THE CLIENT. A FRIEND IN NEED IS A FRIEND INDEED.

COMMITMENT WALK THE TALK. THE ROAD TO HELL IS PAVED WITH GOOD INTENTIONS.

PROFESSIONALISM KNOW MORE. ACT BETTER. CURIOSITY DID NOT KILL THE CAT.

ACCURACY TELL THE TRUTH NO MATTER WHAT. EVEN WHEN IT'S NOT GOOD FOR US.

AVAILABILITY ALWAYS GO THE EXTRA-MILE. WHERE THERE'S A WILL, THERE'S A WAY.

TEAM SPIRIT ONE FOR ALL, AND ALL FOR ONE, OF COURSE.

RESPECT ALWAYS WALK ON THE BRIGHT SIDE OF LIFE. IT'S GREAT.

WORLD PRESENCE



WE ARE PRESENT: PORTUGAL • ANGOLA • ALGÉRIE • EQUATORIAL GUINEA • MOZAMBIQUE • SAUDI ARABIA • SPAIN • UNITED ARAB EMIRATES • VENEZUELA

WE DID WORK: BRAZIL • CAPE VERDE • FRANCE • MORROCO • SAO TOME AND PRINCIPE • SOUTH AFRICA • TIMOR

Integrated into the Seabra Group, TERAWATT is the trademark working in the international market in the area of energy, communications and security, already intervening in some important projects.

A deep knowledge of the international market propelled Terawatt's development, taking advantage of the existent synergies with the most important equipment companies in this area of activity.

BUSINESS AREAS

SPECIAL FACILITIES EXECUTION

ENERGY PRODUCTION

ENERGY TRANSFORMATION

ENERGY DISTRIBUTION

LIVE WORKING

TECHNICAL CONSULTING

PROJECT EXECUTION



ELECTRICAL INSTALLATIONS

INSTALLATION OF ELECTRICITY GENERATION GROUPS;
INSTALLATION OF PHOTOVOLTAIC SYSTEMS;
INSTALLATION OF INTERCOM SYSTEMS;
INSTALLATION OF NORMAL AND EMERGENCY LIGHTING;
INSTALLATION OF ELECTRIC SOCKET AND STABLE CURRENT;
INSTALLATION OF FEEDERS CIRCUITS AND DRIVING FORCE;
INSTALLATION OF EARTHING NETWORK CONNECTIONS AND SURGE ARRESTER;
MANUFACTURE AND INSTALLATION OF ELECTRIC BOXES;
INSTALLATION OF DOMOTICS SYSTEMS;
IMPLEMENTATION OF ALL TYPES OF SERVICES RELATED WITH LOW VOLTAGE
AND TO THIS AREA IN PARTICULAR.



TERAWATT has extensive experience and know-how in the conception and implementation of LV | Low Voltage electrical installations, in the most kind of buildings, namely administrative buildings, commercial buildings (shopping centers, stores, supermarkets), hospital care, school, industrial (logistics warehouses, factories), cultural activities buildings (cinemas, amphitheatres, theaters, playhouses) and single/multi-family residential buildings.

TELECOMMUNICATIONS

TELECOMMUNICATIONS INFRASTRUCTURE IN BUILDING (TIB)
MOBILE, FIXED AND ADSL SYSTEMS TELECOMMUNICATIONS
INFRASTRUCTURE
TELECOMMUNICATIONS INFRASTRUCTURE IN COMMUNICATION
TOWERS



Since day one, Terawatt is present in the telecommunication structure installations, such as Telecommunications Infrastructure in Buildings (TIB), Infrastructures – Telecommunications Infrastructure in Property Developments, Structured Cabling, amongst others, having installed the respective equipments. With the market introduction of the mobile and telecommunications operators, the implementation of a more reliable and comprehensive network was necessary, therefore Terawatt created and developed all of the requirements needed in this area. As far as fixed telecommunications are concerned, Terawatt is able to develop projects of network and infrastructure installation. In this area, Terawatt will precede with the construction of infrastructures, fusion splicing and fiber optics network installations. Terawatt also provides cable TV services, furnishing equipments, know-how and services. We have, human and technical resources, able to furnish not only the necessary infrastructure but all of the necessary means, allowing for simultaneous multichannel transmissions between the operator and consumers, to function perfectly. The entire scale of the structural coaxial and optical cable TV service is supplied by the company together with the operator.

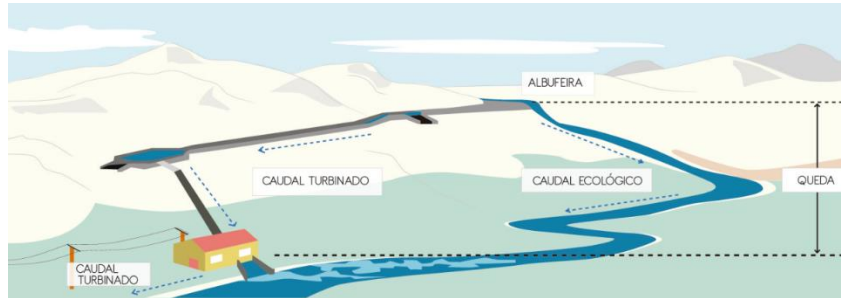
ACTIVE SAFETY

Active Safety installations, namely:

AUTOMATIC FIRE DETECTION SYSTEM (AFDS)
AUTOMATIC GAS DETECTION SYSTEM (AGDS)
FIRE FIGHTING SYSTEM (FFS)
ELECTRONIC SUPERVISIONS SYSTEM
PERSONNEL TRAINING
INTRUSION DETECTION SYSTEMS (IDS)
PARKING CONTROL SYSTEMS



TERAWATT, its also specialized in Fire Prevention Security Area, aiming towards providing services, project development and the performance of Emergency Plans and also the production and commercialization of safety signs. Terawatt has guided its development aiming towards continuous improvement and satisfying client's needs.



MHPs – MICRO HYDROELECTRIC POWER PLANTS

OVER TIME, TERAWATT HAS BEEN
DEVELOPING THE ACTIVITY OF MHPs –
MICRO HYDROELECTRIC POWER PLANTS

With a strong experience and know-how in this field, we can say with great certainty that the advantages and motivation for investing in the construction of MHPs are:

- HIGH EFFICIENCY TECHNOLOGY LEVEL (70% to 90%)
- HIGH CAPACITY FACTOR (P/P_{max}), MORE THAN 50%, HIGH COMPARED TO SOLAR (10%) AND WIND ENERGY (30%)
- EASILY PREDICTABLE RESOURCE
- SOFT INTERMITTENCE AND CHANCE RATES (SMALL FLUCTUATIONS ON A DAY TO DAY BASIS)

It has been a very reliable and mature technology for over 40 years. Since it essentially uses hydropower, its environmental impact is not very significant.

ENERGY TRANSFORMATION



The **Substations Department** is one of Terawatt's main area of activity, in constant evolution.

Dimensioned in order to answer market demands, this structure is designed by a Studies Cabinet constituted by plant managers, operational technicians and IT technicians specialized in CAD.

This cabinet collaborates in the project's development, according to the requirements provided by the client. These tasks are processed in a predefined matter, respecting pre-established timings in order to meet a strict compliance with project deadlines, completion and starting activity.

In order to have constantly updated information necessary to perform these tasks, this work group, receives periodical technical training to ensure the quality service performance of this service. Terawatt is able to deliver **turnkey** construction contracts, expansion and remodeling projects to the Primary Grid Substations up to 400kV.

TERAWATT

ENERGY AND
COMMUNICATIONS



EHV and HV Transportation Networks (Extra High Voltage and High Voltage)

TERAWATT has the human resources, technologies and equipment in order to install High Voltage networks up to 400kV.

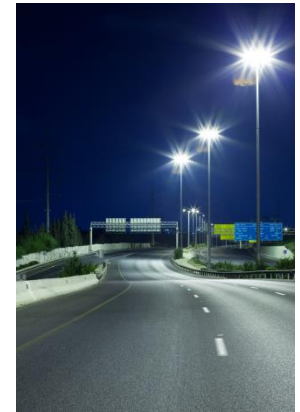
It has business partnerships which guarantee vehicles and equipment, including public project equipment, of about two hundred items, including heavy machinery such as tower cranes and dump trucks. The company has full capacity to perform **turnkey projects**, by client request.

In order to fully and accurately fulfil the demands of each project and because of their very nature, we provide our human resources with constant training and specialization.



MV Distribution Networks (10 kV to 30 kV)

TERAWATT has the human resources, technologies and equipment necessary to assemble aerial and subterranean networks from 10kV to 30kV. The company has full capacity to perform turnkey projects, upon client's request.



LV Distribution Networks up to 400V

- Remodel switching and transformer stations, subterranean and aerial
- Switch cabinet construction in the distribution network
- CA2 substitution in switching and transformer stations
- Connections/aerial and subterranean network derivation transitions
- Building switching and transformer stations for public and private/Clients.

Public Lighting Networks

Conservation and maintenance works like public lighting is an ongoing continuous activity. Our company has specially created resources for this type of projects, for example, lift platforms. Has part of this service, we should mention; record updating, inspection and LV network protective range maintenance. In these interventions, we use whenever possible, Live Working MV / LW MV Works, for the performance of tasks such as: light fixture substitution or any other deteriorated/damaged item. We should also mention in this context, as a community service, electrical meter readings and power cuts.



Taking into account the continuous efforts in order to improve the Electrical Distribution Network, causing repeated power outages in the national distribution network, even when programmed, is the highest dissatisfaction factor of any electrical energy consumer. These interruptions are often the result of network interventions and can, in many cases, be avoided, using techniques of Live Working.

The Exploration Department, Conservation and Live Working have been created to provide Terawatt's clients with a high quality service and technical accuracy, guaranteeing the consumers comfort and maximizing the availability of the electrical power supply. This Department is divided in three divisions:

EXPLORATION AND PRESERVATION DIVISION

Oriented towards the exploration and preservation of all Electric Power Grids up to 400 KV, providing the following services:

- READING TEAMS PRESERVATION OF LV/PI GRIDS
- PRESERVATION OF PI AMD BAND CLEANING PIQUETS
- I.M.S. CONSISTING IN THE CONNECTION IDENTIFICATION BETWEEN HATCHES AND THE TRANSFORMER STATIONS

LV LIVE WORKING DIVISION

Oriented towards the performance of Low Voltage tasks, like:

- LINES AND CONNECTIONS
- AERIAL AND SUBTERRANEAN GRIDS
- TRANSFORMER STATIONS

MV LIVE WORKING DIVISION

Oriented towards the performance of Medium Voltage projects in Transformer Stations.

TERAWATT provides technical consulting services on the following areas:

- Thermography
- Assessment of Energy Quality
- Energy Audit
- And others.



HV, MV, LV ELECTRICAL INSTALLATION AND POWER SUBSTATIONS

TELECOMMUNICATIONS INSTALLATIONS PROJECTS:

STRUCTURED CABLING NETWORK

INFRASTRUCTURES - TELECOMMUNICATIONS INFRASTRUCTURE IN PROPERTY DEVELOPMENTS

VIDEO SURVEILLANCE SYSTEM, MOBILE, FIXED AND ADSL SYSTEMS

CENTRALIZED TECHNICAL MANAGEMENT

ELECTROMECHANICAL INSTALLATIONS

ANTI FIRE SYSTEMS INSTALLATION PROJECTS FOR BUILDINGS

FIRE FIGHTING SYSTEM - FFS

SPRINKLING SYSTEM

FIRE PUMP CENTRAL

SELF-PROTECTION MEASURES PLANNING

HEALTH AND SAFETY PLANNING

SAFETY CONSTRUCTION COORDINATION



TERAWATT
ENERGY AND
COMMUNICATIONS



MAIN REFERENCES



MAIN REFERENCES

ALVES RIBEIRO CONSTRUÇÕES

Supply and installation of two 1000kVA electrogenous group.

Supply of stainless gas exhaust pipelines with isolation from the second floor up to the cover on the 25th floor

Design and implementation of a filtering system and exhaust gas purification of the generators

Design and implementation of an automatic filtering system, fuel storage and transfer (20m³).



NORAFRICA

Luanda's road infrastructure at Rua da Comarca-Nocal (1,9 Km) and Troço da Base Logística (0.65 Km).

AAA

Design and Project execution of the electrical installation connected to the AVAC, and supply of its materials to IKA and IU hotels in Angola.



COMINDER

Supply and installation of electrical switchboards, cableways and power cables.

EQUIMINA

Project and execution of service station with 30 m³ buried tank.

Supply and assembly of 275kVA soundproof generator with fuel transfer automatic system and 5.000 litres auxiliary tank and switchboard.

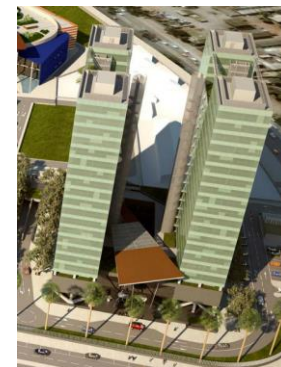
HIMOINSA

20 MW electrical cogeneration plant in Kassaque, province of Zango in Angola.

SUL ENGENHARIA

Execution of electrical installation, communications and active safety in Bengo Complex
- Training Center.

Execution of electrical installation, communications and active safety on three
administrative levels in Gika Complex.



SOTAL

Execution of electrical installation and communications on administrative and commercial building.

MAXI ZANGO

Execution of Electrical installation, communications and active safety (Fire detection, safety signs, first intervention means (Fire extinguishers), intrusion detection and CCTV).

MINISTRY OF AGRICULTURE, RURAL DEVELOPMENT AND FISHERIES - ANGOLA

Supply and installation of a 100kVA electrogenous group.

Supply and assembly of 3 gas stations and 10 m³ reservoirs to service fishing vessels.

SACEP

Electrical power for illumination and motive power, as well as facilities for active and passive safety for the entire industrial complex. Installation of bollards fire outside the complex and a hydraulic network firefighting (reels and fire extinguishers) over the entire building.

To complement the safety systems described above, and to ensure constant surveillance of all areas of the industrial complex, has installed a video surveillance system in a closed circuit (CCTV).

PESKWANZA

Supply and installation of an 800kVA electrogenous group.
Tests and final testing for launching the generator group system.
Supply and assembly of electrical switchboards, cableways and power cables.

OLIVEIRA & LIMA

Execution of electrical installation on medium and low voltage transformation station of Multiperfil Clinic, in Alvalade quarter, Angola.
The transformation station is constituted by a medium voltage switchboard, to the manner of 1000 kVA.

HOTEL FLAT VELEIRO

Execution of electrical installation associated to HVAC of building and supply of their materials to Flat Veleiro Hotel.



PORTUGAL

Rua Horta dos Bacelos, Lt 18, 3º Andar
2690-390 Santa Iria de Azóia
Portugal
Tel: +351 219 533 130
GPS: 38.840245, -9.081377

ANGOLA

Belas Business Park, nº601 Esq
Edifício Cabinda – Talatona
Luanda – Angola
Tel: +244 222 016 611
GPS: -8.919669, 13.188744

EQUATORIAL GUINEA

Parques África – Caracolas
Malabo – Equatorial Guinea
Tel: +240 222 702 231
GPS: 3.758017, 8.783634

www.terawatt.seabraglobal.com | info@terawatt.seabraglobal.com