Environment

coba GROUP

ENGINEERING AND ENVIRONMENTAL CONSULTANTS

PRESENTATION

COBA is a multinational and multidisciplinary group of Engineering and Environmental Consultants, founded in 1962.

The Group provides engineering consultancy services ranging from basic and planning studies, technical, environmental and economic feasibility studies, design and construction design as well as project management and works supervision, to operation follow-up and behaviour monitoring.

The Group has offices/subsidiaries in three continents and experience in more than fifty countries and encompasses several companies in accordance with functional specializations or geographical areas.

The competences acquired along the last six decades, together with the state-of-the-art employee expertise, the stability of its permanent staff and the comprehensive international experience allow to find out the best solutions for the full satisfaction of public and private Clients' needs and expectations.

During its existence, the Group has participated together with public authorities or private developers, in the feasibility of multidimensional projects, some of them being structuring projects and with major impacts on the improvement of peoples' life conditions in the several countries where it worked.

At present, the Group has a wide number of competences and technical areas that allow the composition of multidisciplinary teams who share knowledge and experiences in the execution of projects.

ENVIRONMENT AND LANDSCAPE

Bearing in mind the growing importance of environmental protection, pollution control and assessment of the environmental impacts caused by the development activities (agriculture, industry, town planning and infrastructures, among others), COBA created, in 1989, the Environment and Landscape Department (ELD) within the Natural Resources Department.

The main objective of this creation was to guide and coordinate the environmental studies of the numerous projects developed by COBA, mostly related to the following infrastructures: road, railway or air transportation, engineering structures, hydroagricultural and hydropower undertakings for energy generation, etc.

The evolution of the studies and projects and the increase of the response capacity allowed the contracting of the Departments' own studies, encompassing new areas, whether they are in the field of studies or in management and review of projects, for instance: land planning, environmental planning, strategic evaluation, environmental management and monitoring of undertakings, environmental remediation, waste management, environmental audits, among others.

The elaboration of studies and projects of such nature requires the intervention of multidisciplinary teams. Thus, in order to ensure the development of these studies, the ELD includes experts in different fields, including external collaborators who are used to working closely with COBA's team.

The fields implied involve environmental engineering, geography, land planning, biology, biophysics, landscape architecture, soil science, archaeology and acoustics, among others.

The ELD is also supported by staff from other departments at COBA, with a large experience in the areas of climatology, hydrology, geology, economy, agronomy, water supply and sanitation.

We also highlight the most recent evolution which involves the development of numerous environmental and social studies in countries such as Mozambique, Angola, Brazil, Algeria, Tunisia or Morocco, as well as in some more diffused locations, mostly in Africa.

FIELDS OF ACTIVITY

HYDRAULIC UNDERTAKINGS
Concrete, Earth-fill and Rock-fill Dams. Weirs and Reservoirs Water Conveyance Systems. Hydraulic Structures.

POWER GENERATION AND TRANSMISSION
Hydroelectric Power Plants. Photovoltaic power plants and wind farms. Small Hydropower Plants. Power Plants Rehabilitation and Modernization. Substations High Voltage Transmission Lines. Cooling Water Systems for Thermoelectric Plants.

WATER SUPPLY AND WASTEWATER SYSTEMS
Catchment, Transport and Distribution of Potable Water. Water Treatment Plants. Drainage Systems. Wastewater Treatment Stations. Pumping Stations.

AGRICULTURES AND RURAL DEVELOPMENT
Irrigation and Drainage Systems. Rural Roads. Production Systems. Mapping and Basic Information.

TRANSPORTATION INFRASTRUCTURES
Roads and highways. Railways. Passenger and Freight Railway Stations. Metro and Light Rail. Airports. Bridges and other engineering structures.

ENVIRONMENT
Environmental Impact Assessment. Environmental Management, Monitoring and Auditing. Pollution Control. Landscaping. Land Management. Recovery of Degraded Areas. Waste Landfills.

GEOTECHNICAL STRUCTURES
Tunnels and Caverns. Slopes in Fill and Cut Section. Special Foundations Breakwaters. Embankment Works.

MARITIME AND FLUVIAL WORKS
Wharfs. River Training. Quay Rehabilitation. Flood and Flow Control.

MINING INDUSTRY
Environmental Studies. Design of Tailings Dams and Related Structures. Safety Assessment of Tailings Dams. Design Review of Tailings Dam Closure. Operations Maintenance and Monitoring Manual for Tailings Dams. Risk Analysis.
Mine Closure Plan. Training.

BUILDINGS
Residential and Services Buildings. Industrial Buildings.
Steel and Mixed Industrial Structures. Rehabilitation and Restoration of Ancient Buildings.

CARTOGRAPHY AND CADASTRE
Geographic Information Systems (GIS). Digital Cartography. Thematic Cartography. Thematic Cadastres. Land Acquisition.

SAFETY CONTROL AND REHABILITATION
Expertise, Monitoring. Inspection and Reinforcement of Dams and Transportation Infrastructures. Works Instrumentation. Project Maintenance and Operation.

PROJECT MANAGEMENT AND CONSTRUCTION SUPERVISION
Project Management. Cost Management. Site Supervision.
Quality Assurance/Quality Control.

Environmental Management

- Mining areas;
- Ecosystems: terrestrial and aquatic;
- Sensitive areas;
- Parks and nature reserves;
- Habitat management;
- Urban systems.

Natural and Man-made Risks

- Droughts/floods;
- Coastal and land erosion;
- Soil degradation;
- Earthquakes;
- Flood waves and dam failure;
- Pipelines and gas pipelines;
- Industrial units.

Environmental Impact Assessments

- Climate and climate changes;
- Geology, geomorphology, hydrogeology;
- Pedology, soils and their use capacity;
- Ecology, flora, fauna and vegetation;
- Landscape and landscape integration;
- Noise pollution (noise and vibrations);
- Water resources: uses and polluting sources;
- Waste and treatment systems;
- Social and economic assessment;
- Land planning;
- Restricted use areas;
- Built and ethnographic cultural heritage.

Planning and Land planning

- Sector Plans: water resources, transports, etc.;
- Regional Plans: river basins;
- Special Plans: dams and protected areas, etc.;
- Municipal plans;
- Land planning.

Strategic Assessment

- Plans (national, regional, sector plans and
- land planning)
- Municipal and local plans.

Environmental Monitoring

- of infrastructures: dams, roads, railways, energy transmission lines, ecological flow and mitigating measures;
- of environmental aspects: water resources (surface and underground), ecologic systems, noise and air quality.

Follow-up and public consultations

- Engaging with government bodies, NGOs and local representatives;
- Running open sessions;
- Identification of social impacts;
- Resettlement and compensation plans;
- Elaboration of social and environmental support documents.

Environmental Projects

- Rehabilitation of degraded areas;
- Landscape integration projects;
- Heritage management;
- Noise protection measures;
- Framing projects in ecologically sensitive areas;
- Slope stabilisation and instable systems;
- Management and treatment systems of waste and wastewater;
- Supply and Sanitation.

Pollution Control

- Liquid effluents;
- Atmospheric emissions;
- Noise;
- Solid, toxic and dangerous waste.

Environmental Auditing (Construction and Operation)

-Buildings;

- Industrial Units;
- Roads and railways;
- Dams;
- Energy transmission lines.

Environmental Follow-up of Construction Works

- Works management plans;
- Implementation of environmental solutions for construction works;
- Environmental control;
- Management of construction and demolition waste.

Environmental Studies

In the field of Environmental Studies, COBA's ELD develops baseline studies and joint studies pertaining to the characterisation of the environmental and social reference situation, impact assessment, comparison of alternatives, among many others, entailing the most diverse fields of the physical, biotic, social and cultural environments.

The thematic areas comprise aspects such as climate and climate changes, soils and their use capacity, geology, geomorphology, water resources and ecological aspects including studies concerning fauna, flora, habitats, landscape, air quality and noise climate, demography, economic activity, land planning, built and cultural heritage.

The characterisation studies underpin the Environmental Impact Assessments, investment projects with a very diverse nature, sectoral planning and land planning, management of classified areas, rehabilitation of degraded areas, among many others.

The studies aimed at outlining the environmental diagnosis of the areas in question, including the identification, zoning and characterisation of the parameters pertaining to the study areas, including the interactions among the different existing systems, in order to determine the environmental situation.

The geographical areas of these studies include many countries, with particular stress in the following countries: Portugal, Angola, Mozambique, Brazil, Algeria and Tunisia.

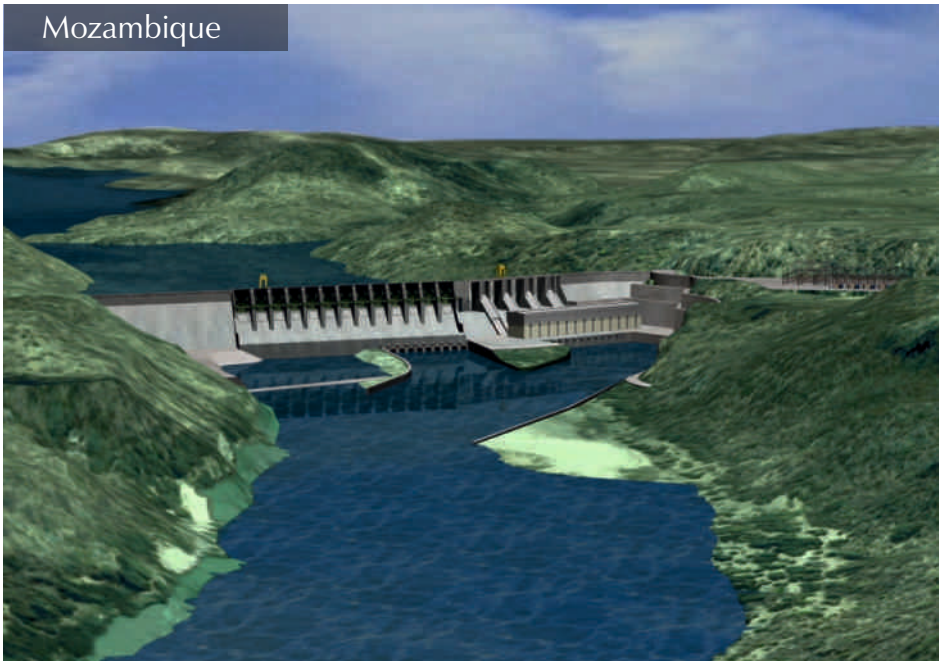
Vasco da Gama Bridge | LUSOPONTE, Concessionária para a Travessia do Tejo, S.A. | Portugal | 1993/94

Project for Construction of Three Cavities for Natural Gas Storage at Carriço | REN / TRANSGÁS | Portugal | 2011/12

G Line (Orange) – Casa da Música II/Laborim
Metro do Porto, S.A. | Portugal | 2009)

High Speed Railway Line between Lisbon/Oporto and Madrid
Lot A – Aveiro / Vila Nova de Gaia | RAVE, S.A. | Portugal | 2006/09

Mozambique

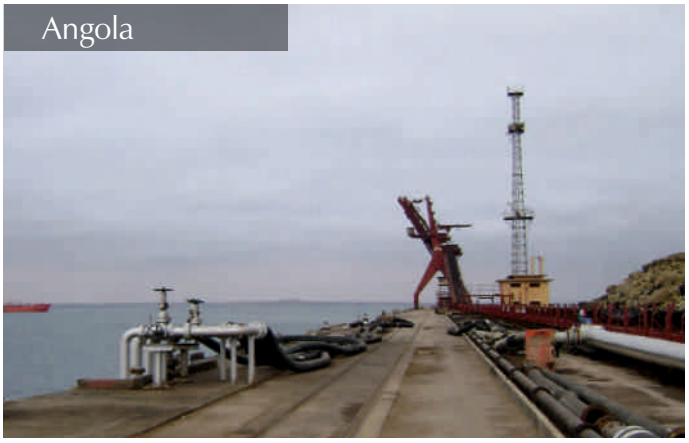


Mphanda Nkuwa Hydropower Development | Hidroeléctrica Mphanda Nkuwa, S.A. (HMNK) | Mozambique| 2010/12

Angola

High Voltage Energy Transmission Line, at 220 kV, between Dundo and Luena - Empresa Nacional de Eletricidade – E.P. | Angola | 2013

Angola

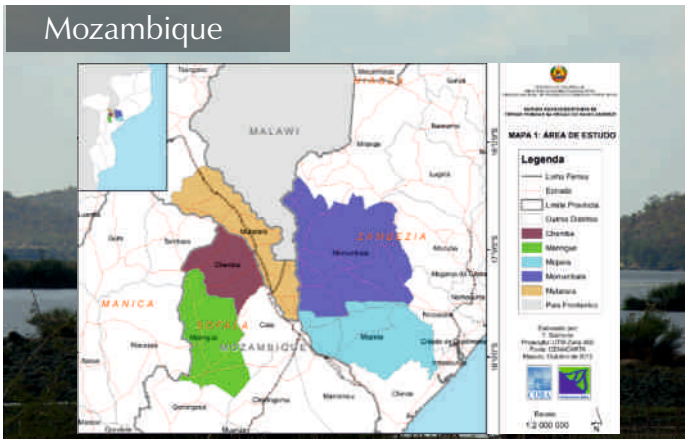


Rehabilitation of the Sacomar Port (Scorpion Mineral Processing Angolan Exploration of Mineral Resources) | Angola | 2011

Mozambique

Moatize Mine Expansion Project – Nacala Corridor
Vale Moçambique | Mozambique | 2010/11

Mozambique



Study of the Lower Zambeze Wetland Ecosystems
Direção Nacional de Promoção do Desenvolvimento Rural
Mozambique | 2012/13

Environmental follow-up of construction works

Construction works entail the involvement of different resources and interventions in the social and environmental environment of the implementation area.

The works / undertakings have a temporary characteristic trait and very diverse features according to their nature and/or the geographical areas in which they find themselves.

Such activities have caused environmental damage (whether they are greater or minor) and thus it is relevant to adopt measures and develop practices which bind the people responsible for the construction works, in order to reduce the associated environmental and social damage.

The environmental follow-up aims at reducing the environmental, natural and social disturbances construction works may cause where they are and, at the same time, at maximising benefits which are basically the improvement of social aspects.

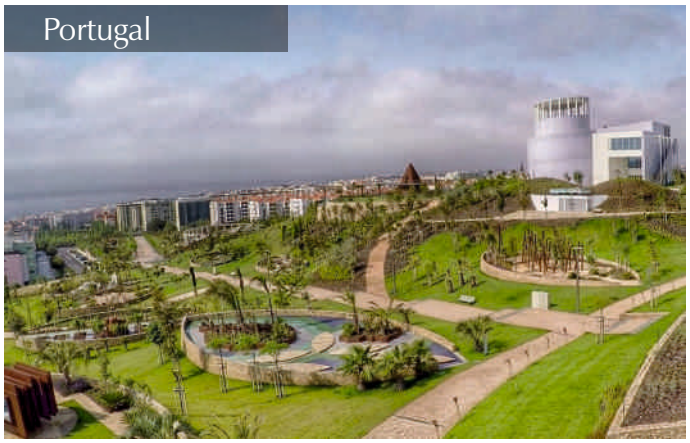
Therefore, this follow-up involves the identification, definition, application or supervision of environmental management measures, including mitigating and monitoring measures during the execution of construction works in all its stages, namely:

- Construction site installation: it involves planning and preparing the works as a whole, including the identification of the most appropriate locations for the construction site and social areas to support the undertaking, opening access roads or the definition of temporary/definitive spoil areas;
- Construction works management: the most relevant include social aspects and engagement with the local population, waste and effluent management, archaeologic follow-up, etc.;
- Decommissioning: this includes the removal and/or treatment of debris, quarries, land clearing, green areas and landscape rehabilitation, among others.

Angola

Laúca Hydropower Development | GAMEK – Gabinete de Aproveitamento do Médio Kwanza | Angola | 2014

Portugal



Technical Assistance to the Construction of the "Parques dos Poetas"– 2nd Phase | LEMO | Portugal | 2011/2014

Portugal

Trafaria Substation | REN – Rede Eléctrica Nacional Portugal | 2006/08

Angola

Cambambe Hydropower Development – Powerplant II. Overall Coordination and Construction works Supervision.
Environmental Follow-up of the Construction Works. GAMEK – Gabinete de Aproveitamento do Médio Kwanza | Angola | 2014/15

Algeria

Doubling of RN1 Motorway between Chiffa and Berrouaghia (53 km).
ANA - Agence Nationale des Autoroutes | Algeria | 2014/16

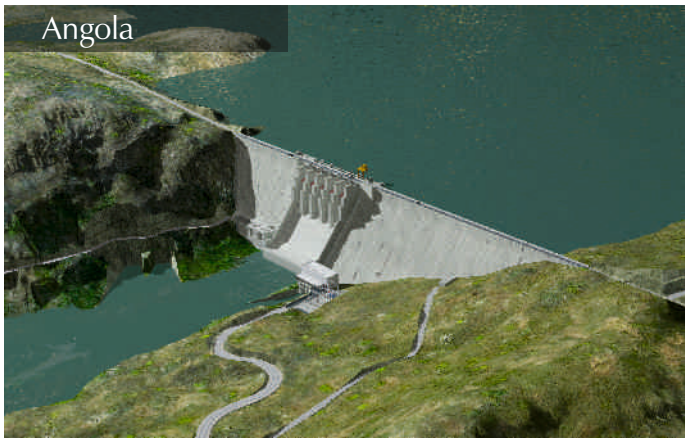
Portugal

Beja Airport. Environmental Follow-up of the Construction Works.
Archaeologic Follow-up and Landscape Integration | EDAB – Empresa de Desenvolvimento do Aeroporto de Beja, S.A. | Portugal | 2006/08

Angola

Luena Water Supply System. Design Review and Supervision of the Construction works | MINEA / DNAAS | Angola | 2013

Angola



Caculo-Cabaça Hydropower Development
GAMEK - Gabinete de Aprov. do Médio Kwanza | Angola | 2014/15

Environmental Auditing

The Environmental Auditing is a management tool which aims at assessing the environmental performance of equipment and/or activities, whether it is in the course of its construction or operation, involving public works projects such as dams, roads, railways, etc. It also aims at productive activities such as industrial units, commercial, touristic, farming exploitations, buildings, etc., with the purpose of checking their impact on the natural and social environment and to suggest mitigation or changing strategies, including procedures aiming at achieving the environmental compliance of the activities, processes or equipment.

This audit entails a procedure which can be characterised as independent, systematic, periodic, substantiated and objective, carried out by a multidisciplinary team of environmental auditors. These auditors are specialised in the following areas: economic, financial and socio-environmental (depending on the activity being audited, the auditors must have knowledge in the concerned subject), ecology, engineering (projects and processes), legislation, social sciences, industry and industrial processes, national procedures, thus allowing the right application of norms (ISO 14 000).

In addition to contributing to the safeguard of the environment and to meet the environmental requirements, it also ensures the verification of the compliance with legal or normative aspects as well as the verification of procedural guidelines of the company, thus allowing the identification of the compliance with the demands of the regulatory bodies and applicable norms.

The procedures of auditing are public (when determined by the regulator body) or private (when undertaken by the own will of the audited company/activity, aiming at the assessment/improvement of its environmental performance). Both of them are viewed as improvement tools of the environmental performance of the audited activity.

Furthermore, the Environmental Audits are voluntary environmental management tools which allow the verification of the compliance of the business activity with the environmental standards and applicable norms.

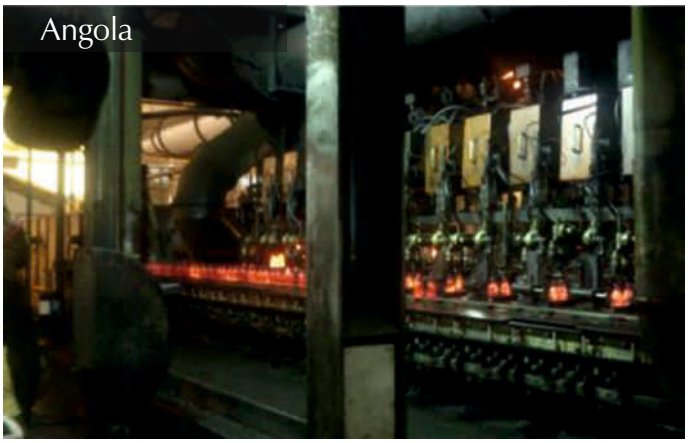
Angola

Environmental Audit of the PAENAL Facilities | PAENAL - Porto Amboim Estaleiros Navais, Lda | Angola | 2014

Portugal

Santa Luzia Hydropower Development. Alto Ceira Dam
EDP – Gestão da Produção de Energia, S.A. | Portugal | 2011/13

Angola



VIDRUL - Vidreira de Angola | Angola | 2014/15

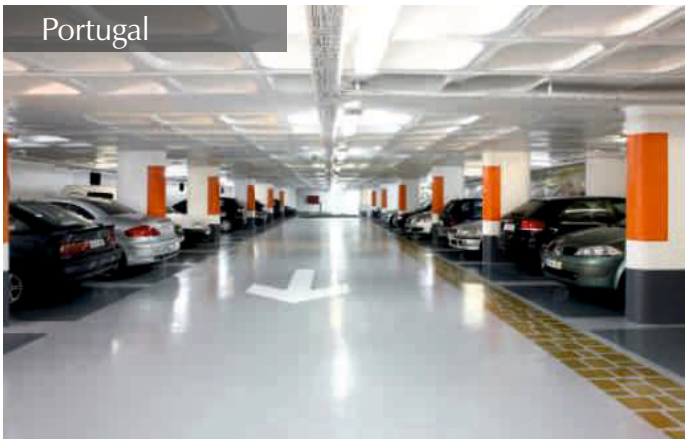
Angola

Environmental Audit to the Amílcar Cabral and the Mutamba Buildings | José António Fernandes Correia Teles | Angola | 2010

Angola

Waste Management Facilities of AES (Angola Environmental Services)
Block 22 Deepwater Project
REPSOL / Worley Parson | Angola | 2014)

Portugal



Emparque Group. Parks Construction and Exploitation
Emparque - Empreend. e Exploração de Parqueamentos, S.A.
Environmental Due Diligence |Portugal | 2009

Mozambique

Consulting Services for the Environmental Audit in Road Projects.
ANE - Administração Nacional de Estradas | Mozambique | 2013

Monitoring and Environmental Management of Undertakings

The purpose of the Environmental Monitoring is to verify the effects of a project on the relevant environmental factors, identified as potentially affected, due to a certain intervention in the natural and social environment in a specific area, aiming at determining and assessing the characteristics and dimension of the verified changes.

This process resorts to specific procedures/equipment, based on the environmental factor at stake (for instance: for groundwater, there may be piezometers involved, endowed with real time measurement equipment or with subsequent water sample collection; for fauna, the installation of a camera with auto-shooting mode, etc.).

The Environmental Monitoring entails the systematic collection of previously defined environmental standards, through proper methodologies and equipment and according to the frequency and periods of time adapted to the characteristics of the intervention and associated degree of impact. The results obtained are subject to an evaluation, whether by experts or with resource to mathematical models.

It may also involve the different construction works phases or execution of activities and public or private projects. The results obtained will serve to improve the environmental development of the activity. The objectives of the environmental monitoring of undertakings are:

- Validate and reassess the environmental assessment which was carried out;
- Verify the evolution of the environment when subject to such intervention;
- Verify the effectiveness of the proposed and implemented measures;
- Readjust the measures if/when applicable;
- Improve the environmental knowledge and a certain area and/or project type;
- Serve as technical support to the monitoring of other undertakings.

The Environmental Monitoring involves specialised teams in fields subject to monitoring, duly coordinated by staff with a vast experience in integrated environmental evaluations of different factors, aiming at assessing the obtained results according to the interactions between these factors, the effective interference of the project being assessed and the environment's interdependencies.

In the planning and development stage, it involves the identification of: parameters subject to monitoring, locations and frequency of samples or registers, necessary techniques and equipment, methods and techniques of assessing results, types of environmental management measures to adopt subsequently to the results of the monitoring programmes, presentation of results and follow-up proposals.

Portugal

Monitoring of the Iberian Wolf, Avifauna, Flora and Vegetation. Prior phases to the beginning of Construction, Construction and Operation of the Line
REN – Rede Elétrica Nacional, S.A. | Portugal | 2007/09

Portugal

Environmental Monitoring of the Parque das Nações and Maintenance and Control in the Phase following the Sealing of the Beirolas Landfill
Lisbon City Hall | Portugal | 2013

Northern Railway Line. Subsection 1.3 – Setil / Entroncamento. Section between km 88+000 and Entroncamento (not included).
Monitoring of the Ecologic Aspects | REFER | Portugal | 2009/10

A13 – Section Santo Estevão / Pegões / Marateca
BRISA – Auto-estradas de Portugal, S.A. | Portugal | 2003/06

Dredging and Deposition of Sediments from the Water Supply Basin of the Sines Thermoelectric Powerplant. Licensing Studies
EDP – Gestão da Produção de Energia, S.A | Portugal | 2006/07

Alto Lindoso Hydropower Development. Monitoring for Assessment of the Efficiency of the Ecologic Flow Regime
| EDP Labelec | Portugal | 2009/16

A2 - Southern Motorway. Subsections Castro Verde / Almodôvar / S. Bartolomeu de Messines / Algarve Longitudinal Motorway (VLA – "Via Longitudinal do Algarve") | BRISA, S.A. | Portugal | 2004/07

Environment Projects

The Environment Projects imply the conception of projects concerning environmental aspects, aiming at their execution.

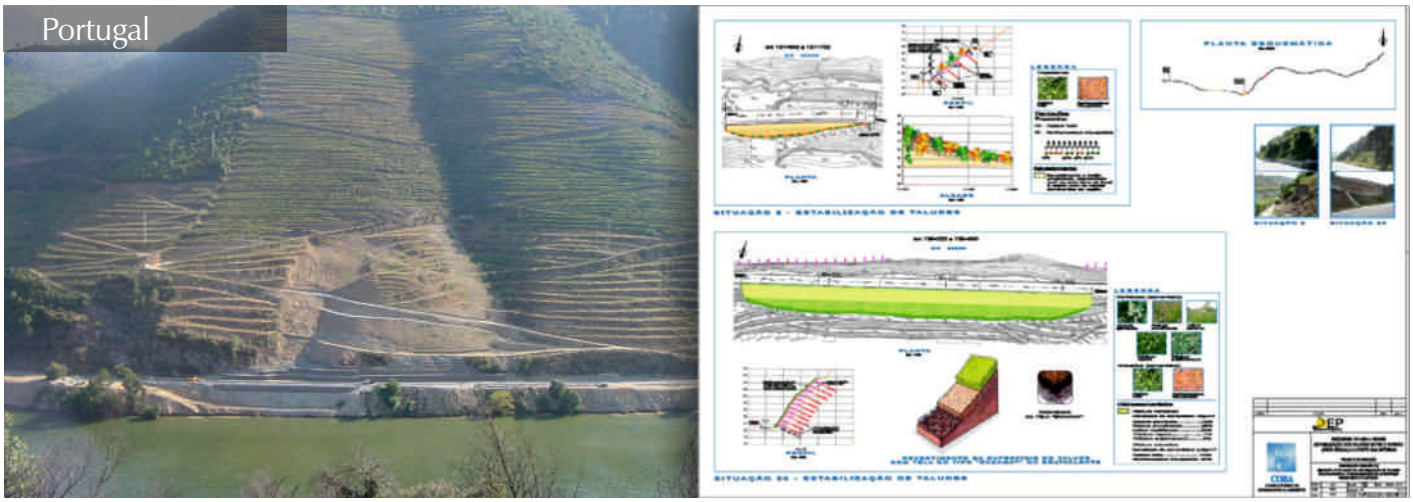
Such projects point at the mitigation, maintenance or improvement of the environmental quality, including:

- Detailing of minimisation measures and recovery of environmental impacts;
- Control over the exploitation of the natural resources;
- The environmental rehabilitation of different types of interventions identified as degrading of the environment, such as: rehabilitation of abandoned areas, waste disposal and sanitary landfills, slopes stabilisation (natural or built within the scope of road projects and other similar infrastructures);
- Interventions aiming at the control of the environmental risks associated to floods, coastal erosion, sand dunes changes, among others;
- Promoting the sustainable use of sensitive areas or protected by communities, namely by implementing raised walkways over dunes and marshes, among other aspects;
- Projects of protection of public works or other buildings/interventions, with adverse effects due to natural risks and climate changes.

Furthermore, the environment projects involve the execution of preliminary, basic and final designs, including the preliminary assessment of proposals concerning solutions, dimensioning, technical drawings, project briefs, bills of quantities and budgeting.

Slope treatment and Stability of National Road EN 379-1 between Outão and Portinho da Arrábida | EP – Estradas de Portugal, EPE
Portugal | 2005/06

Environmental Recovery of the Former Santo António de Penedono Mining Area | EDM – Empresa de Desenvolvimento Mineiro | Portugal | 2006/07



National Road EN 222 – Slope Stabilization and Landscape Integration Project between Torrão and the Bateiras Bridge
(km 131+500 to km 152+000) near Régua. EP - Estradas de Portugal, S.A. | Portugal | 2010

Lisbon Airport Development Plan. New Cargo Complex. Landscape Integration and Exterior Works
ANA - Aeroportos de Portugal, S.A. | Portugal | 2006

Final Design and Environmental Impact Assessment of the Ervidel Irrigation Blocks. Landscape Integration and Exterior Works.
EDIA - Empresa de Desenvolvimento e Infraestruturas do Alqueva | Portugal | 2009

Landscaping Design of National Road EN222, between km 131+500 and km 152+000 – Stabilization of Slopes between Torrão (in the vicinities of Régua) and the "Bateiras" Bridge EP, Estradas de Portugal, S.A. | Portugal | 2010

Resource Planning, Land Planning and Strategic Environmental Assessment

Land, as a space-time resource, presents a great diversification, bearing in mind the natural conditions (climate, geology, pedology, and natural resources), biological (support and home of the habitats, vegetation, fauna and flora) and human forms of appropriation (whether they are ancestral societies or the current ones) which define characteristics of the territories in each country and continent.

Based on growth (demographic, industrial, urban and resources exploitation), land has been in the scope of individuals pertaining to different domains, such political, social, environmental, aiming at its sustainable management, by the elaboration of resources and natural systems management plans (for example water management and river basins, transport management and planning, urban planning, etc.). These support land planning strategies, which are in fact forms of management and interconnection of the different resources and natural and cultural systems with a view to their safeguard.

Therefore, land planning reflects the articulation of culture and territory and is a reflection of the human forms of appropriation of the natural territory throughout generations, and is currently a tool with great political and administrative character. Furthermore, land planning possesses as great guideline the structure and land management, in the urban, residential and natural levels (including, among other aspects, the nature safeguard and preservation, management of the natural risks and climate changes).

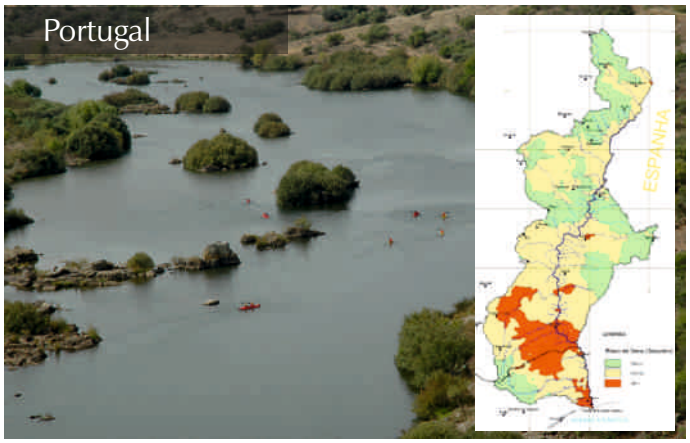
Associated to the concept of land planning, there is another factor which complements it: land management. Both interact with each other and merge together for a proper action in territory. Thus, to talk about land planning mandatorily implies to talk about land management:

- Land Planning: involves the diagnosis of the environment and foreseeing evolution by establishing a balance between the "demand" (social and economic) and "safeguard" (which mean the conservation rules of the nature and resources, supported in the "sustainable development") and creating a balanced occupation of space, efficient and lasting use of resources and the preservation of available natural and human resources.
- Land Management: act of planning by thoroughly understanding the identification of goals and means (financial, strategic, political, legal, administrative, etc.), necessary for achieving the objectives defined by Land Planning. It is developed in stages (usually every 5 years), including programmes pertaining to different types of intervention (action/execution, control, result correction and assessment. This lays the foundation of the political and social influence (in view of the governments), for achieving social progress, ecosystems balance and sustainable development.

The Strategic Environmental Assessment introduced the assessment of alternatives and impacts associated to the planning processes, including the analysis of impacts and the benchmarking of goals, sceneries and means to achieve goals. This is carried out by introducing the joint assessment of the social, economic, environmental, political, and administrative perspectives into the key links pertaining to the decision-making process of planning in the evaluation of plans, programmes and policies. This still includes the monitoring of the obtained results and rethinking objectives and goals.

Land Panning of the S. Mamede Natural Park Area | ICN - Instituto de Conservação da Natureza | Portugal | 2001/02

National Program of Dams with High Hydroelectric Potential
REN – Rede Elétrica Nacional | Portugal | 2007



Water Resources Management Plan of the Guadiana Watershed
INAG - Instituto Nacional da Água | Portugal | 2000/01

Angola

National Water Plan | Angola |2012/2013

Mozambique

Urban Requalification of the "George Dimitrov" Neighbourhood
Maputo Municipal Council | Mozambique | 2013/14

Mozambique

Master Plan and Final Design of the Tete and Moatize Water Supply Systems.
Strategic Environmental Assessment. Fundação VALE Moçambique| Mozambique | 2012/15

Portugal

Arrangement Plans of The Coastal Strip of the Alteirinhos, Furnas, Mareta and Martinhal Beaches. Rehabilitation and Improvement Plans
Park EXPO 98 and Polis Litoral Sudoeste | Portugal | 2011/12

JULY | 2023

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