



COURSE CATALOGUE RENEWABLE ENERGY



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www.renovetec.com

Julio Iturriaga de Pablo General Manager



From RENOVETEC want to thank our costumers and all those attending the open program courses, confidence placed on our Company since the beginning of our activity. Thanks to them we have achieved a leading position, which allowed us to collaborate in the training plans of some of the best companies in the country and initiate our international expansion in Europe, North Africa, Latin America and Asia. Our goal is to grow and offer more training coverage every day. Honestly, we believe that in times of crisis, as the ones that we are living in recent years, should be increased and enhanced all areas from development training.

We are convinced that training is an essential activity for companies. It contributes decisively to improving results, staff motivation and enrichment of society and its members. Training bet is to bet for social growth and talent retention in organizations.

Our goal is to follow increasing our training offer, incorporating a greater number of technical and practical courses. And of course, our team consists of the best trainers, who are neither the best technicians nor the people who have forged their careers in educational institutions. But those professionals with great knowledge and skills acquired in the field, with a vocation developed to teach and to pass on others these skills.

So we invite you to use this Catalogue as a tool of reference and work to complement and help them to create their Training Plan. Do not hesitate to contact us when looking for the best training solution in any case.

Many thanks to all

Julio Iturriaga

IF YOU CAN NOT ATTEND TO OUR COURSES BUT YOU WOULD LIKE TO HAVE THE DOCUMENTATION:



Now, for 195 € you can purchase the documentation of the RENOVETEC course that you want *, VAT and delivery cost included (Peninsula and Balearic Islands. Other destinations on request)

*Book format 17 x 24, colour paperback

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List of courses

PROGRAM RENEWABLE ENERGY

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Remember:

You can also do all this courses by DISTANCE

Find out in: inFo@renovetec.com or call (91 126 37 66)

GENERAL TECHNICAL COURSE OF SOLAR THERMAL POWER PLANT

The main objective of this course is to know the main aspects of solar thermal power plants and each of their component systems.

We study the solar radiation, the solar field and its theoretical and technical basis, the complex Thermal Fluid system (HTF), the water-steam cycle, auxiliary systems (balance of plant or BOP), steam turbines and high voltage systems.

With more than 30 courses taught in-company from 2009 to the most prestigious companies in the energy sector, it is one of the most demanding RENOVETEC courses.

Who is it directed?

- » Project development engineers, who need to know each of the equipment involved in solar thermal power plants
- » Technicians in general, who wish to redirect their careers to the thermal power plants and renewable energy
- » Operation and maintenance technicians
- » Contractors' technicians who will provide any type of service in thermal power plants

Duration: Between 13 and 16 hours

MORE INFORMACIÓN: 91 126 37 66 - info@renovetec.com



Type of Course: On site classes, based on a presentation developed with the help of programs like *Power Point*

Course Level:

Basic, previous knowledge is not required

Material:

Colour Book 17 x 24 Paperback.

Practices:

Not performed

Course Director:

Santiago García Garrido, Bachelor in Chemistry and Technical Director RENOVETEC. Author of numerous books on industrial maintenance and electrical generation

Usual Speakers:

Beatrice Scola, Alex Lupión, Carlos Hernández, Santiago Mirabal



InCompany RENOVETEC Catalogue

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SOLAR THERMAL POWER PLANTS INTRODUCTION

- Solar thermal power plants
- Types of plants
- Cost of a 50MW solar thermal plant
- Projects in Spain
- Worldwide projects

SOLAR FIELD (SOF)

- Parabolic trough concentrator
- Absorber tube
- Solar Trucking system
- Collectors: Group of modules.
- Loops
- Solar field

HTF SYSTEM

- System overview
- Thermal fluid: composition and main characteristic
- Pumping system
- Expansion system
- Waste disposal system (Ullage system)
- Antifreeze system and auxiliary boiler.
- Overview of the steam generation train

THERMAL STORAGE SYSTEM (TES)

- Inorganic molten salts
- General operation system
- Main elements of the system

STEAM GENERATOR AND STEAM WATER CYCLE

- Rankine cycle
- ■Water steam cycle overview
- Steam generation train in solar thermal power plants
- Degasser
- Condenser

- Condenser vacuum pump
- Drive pumps(to feed the boiler and condensate)
- High and low pressure preheaters
- Bypass valves
- Seal steam

BOP

- Main cooling system
- Equipments cooling system
 - o Closed Cooling Water (CCW)
- Water treatment plant (WTA)
- ■Gas regulating and metering station (ERM)
- ■Effluent treatment plant (PTE)
- ■Fire prevention system
- Compressed air production system

STEAM TURBINE

- Types of turbines
- Turbine overview
- Blades
- Rotor
- Casing
- Bearings
- Lubrication system
- Sealing system: steam seals, labyrinth seals, seals steam condenser.
- Inlet valves
- Drain valves
- Virador
- Control system
- Steam turbines regulation

HIGH VOLTAGE POWER SYSTEM

- Single-line diagram
- Main transformer and auxiliary transformers
- Switchgear switching
- Evacuation line



BIOMASS PLANTS COURSE

Throughout the course, it is discussed the basic operation principles of an electric generation biomass plant, to address later in detail each of the elements that are part of a normal plant.

The aim of course is that the assistant knows each one of the equipment, master the terminology associated with these plants and learns the main aspects that make the work of a professional power generation.

Course Objectives

- » To know the technical fundamentals of a biomass plants
- » To know each type of plant biomass and its characteristics
- » To know in detail each of the equipment that make up a biomass plant
- » To know the Operation

Who is it directed?

- » Engineers and project technicians
- » Operation and Maintenance Professionals of a biomass plant
- » Students and professionals wishing to develop their career in renewable energy field

» Duration: Between 13 and 16 hours MORE INFORMACIÓN: 91 126 37 66 - info@renovetec.com





Type of Course: On site classes, based on a presentation developed with the help of programs like *Power Point*

Course Level:

Basic, previous knowledge is not required

Material:

Colour Book 17 x 24 Paperback.

Practices:

Not performed

Course Director:

Santiago García Garrido, Bachelor in Chemistry and Technical Director RENOVETEC. Author of numerous books on industrial maintenance and electrical generation

Usual Speakers:

María del Pino Pérez, Alex Lupión, Santiago Mirabal



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BIOMASS PLANTS

- Biomass exploitation for electricity production
- Characteristic parameters
- Regulations controlling biomass plants
- Biomass plants in Spain

TYPES OF BIOMASS

- Forest waste
- Agricultural waste
- Energy cultivation
- Biomass calorific value: comparative

RANKINE CYCLE: THERMAL ENERGY CONVERSION INTO ELECTRICITY

- Basic Rankine Cycle
- Improved Rankine Cycle: preheating and overheating
- Sankey diagram

FUEL PREPARATION

- Humidity setting: dry
- Sizing: grinding
- Storage and its problems: Spontaneous combustion and humidity

BOILERS

- Type of boiler
- Burners and grills
- Economizer, evaporator, superheater
- Ashes disposal
- Fumes purification system
- Common problems in boilers
- Examples

WATER STEAM CYCLE

- Bypass valves
- Condenser
- Vapour seals
- Vacuum System
- Condensate pumps

- Feed water tank
- Feed water pumps
- High and low pressure preheaters
- Chemical control: sampling points
- Chemical control: doping points

STEAM TURBINE

- Types of steam turbines
- Blades
- Rotor
- Casing
- Virador
- Examples of turbines

ELECTRIC GENERATOR

- Operating diagram
- Type of generators
- Main elements of the generator

COOLING SYSTEM

- Cooling towers
- Air condensers
- Evaporative towers vs. Air condenser comparison
- Closed cooling system

WATER TREATMENT PLANT

- Pretreatment: filtering, softening and biocides treatment
- Deionization: reverse osmosis
- Refining: mixed beds or electrodeionization

HIGH VOLTAGE POWER SYSTEM

- Single-line diagram
- Main transformer and auxiliary transformers
- Switchgear switching
- Evacuation line

PLANTS OPERATION

- Operating system
- Biomass management
- Waste and effluents management



GENERAL TECHNICAL COURSE OF COGENERATION PLANTS

Course Objectives

This course has purely technical orientation and it seeks to deepen the knowledge of each of the systems and equipment that make up a cogeneration plant. It tries to provide an overview of all aspects that affect a cogeneration plant, addressing matters related to the design, operation, maintenance and such installations management.

The program avoids going into overly theoretical concepts, far from what a technician dedicated to cogeneration plants need.

Who is it directed?

- » Project Engineers
- » Plant Design Engineers
- » Cogeneration plant technicians of operation and maintenance technicians. It is particularly interesting to technicians who have joined the work after the plant start-up
- » Engineers, technicians and professionals who want to work in power generation plants

» Duration: Between 13 and 16 hours MORE INFORMATION: 91 126 37 66 - info@renovetec.com





Type of Course:

On site classes, based on a presentation developed with the help of programs like *Power Point*. Also available blended learning course or distance course

Course Level:

Medium. It is not a basic or introductory course, although previous knowledge it is not required. It is advisable that the participants have a university technical degree (engineering, for example), but it is not indispensable

Material:

Colour Book 17 x 24 Paperback. Numerous videos and high quality graphic material

Practices:

Two practices are performed:

- Cogeneration plant sizing - Analysis of economic feasibility



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COGENERATION PLANTS

- What is the cogeneration plant?
- Operation principles
- Main parameters of cogeneration plants
- Environmental Impact
- Regulatory framework: RD 661/07
- Other reference standards
- Management permits for the installation of cogeneration plants
- REE (Spanish power grid
- Cogeneration plant sizing
- Economic analysis and feasibility plan

TYPES OF COGENERATION PLANTS

- Plants of gas engine in open cycle
- Plants of combine cycle gas engine
- Plants of gas turbine in open cycle
- Plants of combined cycle gas turbine
- Plants of steam turbine

FUELS

- Natural gas
- Biogas
- Diesel
- Fuel oil
- Other fuels

GAS ENGINES

- Operation principles
- Main types of gas engines
- Characteristic parameters
- Main elements of gas engines

GAS TURBINES

- Operation principles
- Main types of gas turbines
- Characteristic parameters
- Main elements of gas turbines

STEAM TURBINES

Course conten

- Operation principles
- Main types of steam turbines
- Characteristic parameters
- Main elements of steam turbines

RECOVERY BOILER

- Operation principles
- Main types of gas turbines
- Characteristic parameters
- Main elements of recovery boilers for steam generation
- Main elements of boilers for superheated water generation
- Main elements of thermal oil boiler

WATER STEAM CYCLE

- Condenser
- Bypass
- Degasser
- Feed pumps
- Condensate pumps
- Preheaters

ELECTRICAL SYSTEMS

- Transformers
- Switchgear: circuit breakers and switches
- Measuring transformers (current and
- 🔷 voltage)
- Protections
- Grounding
- Lightning protection
- Condenser's batteries
- Other elements of electrical systems of high and medium voltage.

CONTROL SYSTEM The control system

- Main elements

AUXILIARY SYSTEMS

- Cooling systems
- Cooling system equipment

BIOFUELS COURSE: BIOETHANOL, BIODIESEL AND BIOGAS

Throughout the course, it is discussed the biofuels of first, second and third generation and processes of biogas production for energy purposes.

It deepens engineering aspects for plant design, in the key processes of production of biofuels such as biodiesel refining and liquefaction and saccharification in the bioethanol. It also deepens different technologies production logistics, plants operation and the possibilities of production development in the future.

Who is it directed?

- » Engineers and technicians who develop or will develop their work in Biofuels plants
- » Operation and Maintenance Professionals of industrial plants
- » Directors and Executives dedicated to the management of energy projects that require to know very well the technology, terminology and the main aspects that determine the technique.

Duration: Between 13 and 16 hours

MORE INFORMATION: 91 126 37 66 - info@renovetec.com



Type of Course:

On site classes, based on a presentation developed with the help of programs like *Power Point*

Course Level:

Basic, previous knowledge is not required

Material:

Colour Book 17 x 24 Paperback.

Practices:

Not performed

Course Director:

Santiago García Garrido, Bachelor in Chemistry and Technical Director RENOVETEC. Author of numerous books on industrial maintenance and electrical generation

Usual Speaker:

María del Pino Pérez, Óscar León



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INTRODUCTION

- Climate change and International Legal Framework
- Types of Biomass
- Solid biomass
- Forest residues
- Agricultural waste
- Energy cultivation
- Biomass calorific value: comparative
- Liquid Biomass
- Biodiesel
- Bioethanol
- Gaseous biomass
- Biogas
- Anaerobic digestion
- Second-generation biomass

BIOFUELS. INTRODUCTION. BIOFUELS PRODUCTION. HISTORY AND GENERALITIES

Interesting aspects: economic, environmental and legal aspects.

PRODUCTION PLANTS PROCESSES. BIODIESEL AND BIOETHANOL, ENERGY IN-TEGRATION AND THERMAL USE

- Energy integration with cogeneration plants, steam turbines, etc.
- Pinch Point en Methodology in energy optimization.
- Design materials for the main equipment and heat exchangers.

BIOETHANOL

- Introduction
- Bioethanol production processes.
- Plants operation and maintenance.
- Regulation related to ethanol. State and perspectives. Bioethanol taxation.

BIODIESEL

Technology and Design

- Fundamentals of oil Refining and biodiesel production.
- Vegetable oils refining processes and technology. Selection criteria.
- Biodiesel processes and technology. Selection criteria.
- Lay-out fundamentals of a biodiesel plant
- Raw material for biodiesel production. Specifications and procedures.
- Byproducts. Specifications and applications.
- Operation
 - Biodiesel plant organization. Organization chart
 - Common operational problems.
 - Analysis of a standard incomes account of a biodiesel plant.
- Product
 - Biodiesel quality specifications.
 - Problems detected in field and new demands.
 - Biodiesel post-treatment Systems face to the new specifications
 - Methyl ester different applications from its use as biofuel.
 - Ethyl ester as a biofuel.
- Energy Integration and thermal use
 - Analysis of energy consumers in the plants for biodiesel.
 - Integration and energy efficiency in a biodiesel plant.
 - Pinch-Point methodology application to a biodiesel plant.



WIND TURBINES COURSE

This course devoid of superfluous information, it revises wind energy fundamentals and wind power generation with wind turbines and it studies in depth each of the elements that make up these equipments.

We also review the wind farms operation and current trends.

This is the most complete and updated technical course concerning Wind Energy and Wind Turbines.

The course has excellent graphical material, and it is developed in an enjoyable and participatory way.

Who is it directed?

- Engineers and technicians who develop or will develop its work on wind farms
- » Operation and Maintenance Professionals of industrial plants
- » Directors and Executives involved in the management of energy projects that require to dominate the technology, terminology and key aspects that determine the technique.

Duration: Between 13 and 16 hours

MORE INFORMATION: 91 126 37 66 - info@renovetec.com



Type of Course:

On site classes, based on a presentation developed with the help of programs like *Power Point*

Course Level:

Basic, previous knowledge is not required

Material:

Colour Book 17 x 24 Paperback.

Practices:

Not performed

Course Director:

Santiago García Garrido, Bachelor in Chemistry and Technical Director RENOVETEC. Author of numerous books on industrial maintenance and electrical generation



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WIND ENERGY, BASIC PRINCIPLES

TRANSFORMATION OF WIND ENERGY IN ELECTRICITY

WIND RESOURCE ASSESSMENT

SITE SELECTION

WIND FARMS

OFFSHORE WIND FARMS

TYPES OF WIND TURBINES

CHARACTERISTIC PARAMETERS

MAIN COMPONENTS AND WIND TURBINE SYSTEMS

- Nacelle and tower
- Blades
- Rotor and low speed shaft
- Gearbox
- Generator
- Blade guidance system (Pitch)
- Gondola orientation system (Jaw)
- Brakes
- Lubrication Systems
- Control system

MAIN COMMERCIAL WIND TURBINES CUR-RENTLY : ANALYSIS OF DIFFERENCES

SCHEDULED MAINTENANCE

- Maintenance Strategy
- Development of a farm maintenance plan
- Generic Instructions for the systems maintenance

- Lubrication tasks
- Technical Cleaning
- Blade cleaning
- Nacelle cleaning
- Monthly / quarterly maintenance
- Six-monthly / yearly maintenance
- Great review

CORRECTIVE MAINTENANCE

Small correction: detailed analysis of small breakdowns

Course Conten

- Great Corrective: detailed analysis of the great correction
- Breakdowns analysis: root cause studies

PREDICTIVE MAINTENANCE

- Boroscopic Inspections of the gearbox
- Thermographic inspections in blades, gearbox, generator and electrical systems
- Possibilities of vibration analysis

TECHNICAL RESOURCES

- List of mechanical tools
- List of electrical tools
- List of instrumentation tools
- List of diagnostic and predictive maintenance tools

FARMS MAINTENANCE CONTRACTING

- Time & materials contract
- Preventive maintenance contracting
- Predictive inspections contracting
- Fixed price contract
- Win-to-win contract: price per MWh generated
- Current Trends



PHOTOVOLTAIC ENERGY COURSE

Course Objectives

It is aimed at engineers and technicians who develop or will develop their work in the field of Photovoltaic Energy. This course is a general description of each of the elements that make up a solar farm or a isolated installation from the grid.

The course examines the various components of a photovoltaic system, the relationships between different equipment and systems, their operation ways and some basic ideas about its maintenance.

The course is also designed for Directors and Executives involved in the management of energy projects that require mastery of technology, the main aspects that condition it and the terminology.

Who is it directed?

- » Engineers and technicians who develop or will develop its work on photovoltaic systems, grid connected and isolated
- » Operation and Maintenance Professionals of industrial plants
- » Directors and Executives involved in the management of energy projects that require to dominate the technology, terminology and key aspects that determine the technique.

» Duration Between 13 and 16 hours MORE INFORMATION: 91 126 37 66 - info@renovetec.com



Type of Course: On site classes, based on a presentation developed with the help of programs like

Power Point

Course Level:

Basic, previous knowledge is not required

Material:

Colour Book 17 x 24 Paperback.

Practices:

Not performed

Course Director:

Alex Lupión Romero, Industrial Engineer, from Switzerland. He has worked in the design and construction of connected and isolated solar farms in different countries.



SOLAR RADIATION: BASIC PRINCIPLES

- Sun's movement geometry
- Radiation spectrum
- Direct radiation, global radiation and diffuse radiation
- Irradiation and irradiance
- Shadows calculation
- Instruments for measuring solar radiation
- Radiation maps in Spain
- Radiation in the world
- Present and future of PV solar energy

CONVERSION OF SOLAR RADIATION INTO ELECTRICITY

- Photovoltaic effect
- Photovoltaic cells
- Production of photovoltaic cells
- Photovoltaic modules
- Temperature effect
- Operating characteristic curves

PV SOLAR SYSTEM COMPONENETS

- The photovoltaic module: types of modules
- Fixed structure
- Advantages and disadvantages of fixed structure vs mobile structure
- One axis solar tracker
- Two axis solar tracker
- Energy storage
- Charge regulators
- Inverters
- High voltage system: transformers, switching elements and line.
- Control system, measurement and protection

INSTALLATION ON COVER

- Issues to consider when choosing a cover
- Structure needed

SOLAR FARM MAINTENANCE

- Solar cell Cleaning: frequency, type of water and pressure
- Electrical maintenance
- Phytosanitation treatment
- Staff and resources for a solar farm maintenance
- Cost of maintenance estimation

PHOTOVOLATAIC ENERGY APPLICATIONS

- Isolated Systems from the grid
- Grid-connected systems

SITE SELECTION

- Solar resource assessment
- Production model: simulation
- Other considerations when choosing location

PHOTOVOLTAIC PROJECT: PERMITS AND LICENSES. SOLAR FARM CONSTRUCTION

- Construction phases
- Construction period
- Construction costs
- Common problems during construction

PHOTOVOLTAIC BUSINESS

- Regulatory framework
- Feasibility study: income and costs
- Current profitability



HYDROELECTRIC POWER PLANTS COURSE. SMALL-HYDRO PLANTS

Taking into account the great development of this type of generation, throughout the course it is discussed the principles of operation, different types of plants, and main elements of a hydroelectric plant, such as the turbine, generator and auxiliary systems. It is studied in detail the different types of turbines and their selection criteria.

It is a perfect course for knowing all substantial aspects of hydropower from the point of view of the feasibility study, design and plants operation and maintenance.

Who is it directed?

- » Engineers and technicians who develop or will develop their work in hydroelectric power plants
- » Operation and Maintenance Professionals of industrial plants
- » Directors and Executives dedicated to the management of energy projects that require to know very well the technology, terminology and the main aspects that determine the technique.

» Duration: Between 13 and 16 hours

MORE INFORMATION: 91 126 37 66 - info@renovetec.com



Type of Course: On site classes, based on a

presentation developed with the help of programs like *Power Point*

Course Level:

Basic, previous knowledge is not required

Material:

Colour Book 17 x 24 Paperback.

Practices:

Two practices are performed: the design and sizing of a hydroelectric plant and calculation of its profitability and its financial parameters

Course Director:

Santiago Garcia Garrido, Bachelor in Chemistry and Technical Director RENOVETEC. Author of numerous books on industrial maintenance and electrical generation



RENEWABLE ENERGY

Spanish energy system Spanish electricity market Medium and maximum productions Energy mix What is renewable energy? Current regulatory framework and remuneration Hydropower generation in Spain Installed power Generated energy Electricity generation in the world Installed power Generated energy

HIDRAULIC POWER

Historical references Hydraulic power over 10 MW Small hydroelectric power plants Main hydroelectric power plants in Spain Main hydroelectric power plants in the world Hydroelectric power plants advantages Hydroelectric power plants disadvantages Hydroelectric power plants environmental impact

MAIN PARAMETERS OF A HYDROELECTRIC POWER PLANTS

PRINCIPLES OF OPERATION

Potential energy, kinetic energy and pressure

A waterfall energy calculation

TYPES OF HYDROELECTRIC POWER PLANTS

Flowing water hydroelectric power plants Hydroelectric power plants located at the

base of a dam Run of the river hydroelectric power plants Small hydro

Pumped storage hydroelectric power plants Hybridization hydroelectric power plants with wind power

MAIN ELEMENTS

Reservoir Water canalization Penstock Intake filters (screen) Turbine Tailrace Afterbay Generator Electrical systems Auxiliary systems Buildings

WATER ADMISSION

HYDRAULIC TURBINES

Types of turbines Pelton turbines Cross-flow turbines (or Banki-Michell) Kaplan turbines Francis turbines

POWER CONTROL

GENERATOR AND ELECTRICAL SYSTEMS

Types of generators Parts of the generator Differences between the generators of a power plant and hydroelectric plant Single-line diagram of a hydroelectric plant Main transformer Switchgear: circuit breakers and switches

AUXILIARY SYSTEMS

Overhead cranes Electrical buildings and control buildings

EXERCICES

Hydroelectric power plant sizing Costs and profitability calculation



PERMITTING AND FINANCIAL MANAGEMENT OF ENERGY PROJECTS

Throughout the course it is discussed the tools used to know the projects viability, phases to be considered in the administrative process, the electricity generation projections and the calculation of income, itemized costs, focusing in depth on the management financial analysis of various case-studies and many experiences.

Finally, it examines the technological and financial risks and their insurance through insurance contracts.

Especially, this course is recommended for those who develop their activity in the renewable energy sector or will have to negotiate contracts that are related to these plants, either in relation to its design, construction, commissioning, operation or maintenance.

Who is it directed?

- » Engineers and technicians who develop or will develop their work with energy projects
- » Operation and Maintenance Professionals of industrial plants
- » Directors and Executives dedicated to the management of energy projects that require to know very well the technology, terminology and the main aspects that determine the technique.

Duration: Between 13 and 16 hours

MORE INFORMATION: 91 126 37 66 - info@renovetec.com



Type of Course: On site classes, based on a

presentation developed with the help of programs like *Power Point*

Course Level:

Basic, previous knowledge is not required

Material:

Colour Book 17 x 24 Paperback.

Practices:

Various practices are performed on sizing installations, budget calculation, calculation of profitability and financial parameters

Course Director:

Santiago García Garrido, Bachelor in Chemistry and Technical Director RENOVETEC. Author of numerous books on industrial maintenance and electrical generation

Usual Speaker:

Beatrice Scola, Industrial Engineer.



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CURRENT LEGISLATIVE FRAMEWORK

Spanish legal Framework: organic and ordinary laws, RD, RDL of the state, and , laws and decree of the CCAA

- Laws 54/97 and 17/2007
- RD 661/07 and RDL 6/2009
- RD 1955/2000
- RD 15/65/2010, RDL 14/2010, RD 1614/2010

ELECTRICITY MARKET OPERATION

- Daily market
- Intraday markets
- Regulation: primary, secondary and tertiary
- Support services

EVALUATION OF THE GENERATION POTENTIAL

- Evaluation of solar radiation for photovoltaic business
- Evaluation of solar radiation for solar thermal business
- Evaluation of wind resources
- Evaluation of water resources
- Evaluation of cogeneration potentials

PHASES OF AN ENEGY PROJECT

- Location of a site
- Previous contacts with the Administration
- Previous contacts with potential partners
- Conceptual engineering
- Basic engineering
- Equipment purchasing with long delivery term
- Detail engineering
- Other equipment and materials purchasing
- Construction and assembly
- Commissioning
- Acceptance testing
- Commercial exploitation

PLANNING QUALIFICATION

- Procedures for obtaining planning qualification
- Community interest declaration

ENVIRONMENTAL PROCEDURE

- RDL 1/2008
- Environmental impact assessment
- Environmental assessment process
- Environmental impact statement
- Environmental rating

PERMITTING

- Local administration procedures
- Autonomous Community procedures
- Ministry of Industry procedures (DGPEM)
- Transport network manager procedures

COMMISSIONING AND CONSTRUCTION BUDGET (CAPEX)

ARRANGEMENTS FOR CONDUCTING CONSTRUCTION

- EPC
- Large packages
- Multi-contract

OPERATION AND MAINTENANCE BUDGET (OPEX)

INVESTMENT FINANCIAL ANALYSIS

INVESTMENT RISKS

FUNDING OPPORTUNITIES

- Project Finance
- Funding with an external investor
- Own resources funding
- Joint Venture

