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# Electrical Energy

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Achieve the appropriate level of understanding related to Electrical Energy generated by means of Diesel, Coal, Fuel, Lignite, Gas, Wind, Solar, Nuclear, Hydro, Geothermal, Ocean... energies.

Understand the right technical terms & vocabulary as well as units to be used, the various means of production, transportation, storage, utilization, and how to avoid wastage and saving of electrical energy.

Course Date	Course Duration	Course Location	Course Fee
From 18 Jul. 2011	5 days	Beirut	AED 11,000.00
To 22 Jul. 2011		Lebanon	USD 3,000.00

## Electrical Energy

Electrical energy is the presence and flow of an electric charge. The energy portion of electricity is found in a variety of phenomena such as static electricity, electromagnetic fields and lightning. Humans have found the ability to harness these phenomena and store the electrical charges for a later use. The concept of electrical energy is defined using a variety of different terminologies such as charge, current and potential.

## Course Description

This course will present many aspects of Electrical Energy from its conception until its final optimal utilization.

Indeed, the seminar will start by defining Electrical Energy resuming with its use and needs in everyday's life. The course will underline increasing needs to Electrical Energy all over the world and set its advantages and risks before plunging into its technical world.



## Course Objectives

Attending our Electrical Energy seminar will help you:

1. Achieve a complete overview of the field related to Electrical Energy.
2. Differentiate Power from Energy.
3. Understand how to use basic units related to electricity in general and the vocabulary to be applied.
4. Understand the generation of electricity and the transformation from mechanical to electrical power.

## How You Will Benefit

You will gain deep understanding of the principles of Electrical Energy in order to understand problems and achieve optimum production. The seminar is appropriate for experienced persons and decision makers.

## What Will Be Covered

The following points will be covered:

- Thermal production of electrical energy from fossil fuels.
- Function of the BOP into a Power Plant.
- Fossil fuels used for electrical production.
- Impact on the production and the environment by the fossil fuels.
- Efficiency and reliability of a Power Plant.
- Generation of Electrical Energy by means of Renewable energies.
- Nuclear Power Plant.
- Transportation of electrical energy.
- Storage of electrical energy.

## Who Should Attend

Managers, team leaders engineers, surveyors and inspectors who look for general and highly technical knowledge in the domain of Electrical Energy.



## Course Contents

### Thermal production of electrical energy from fossil fuels

- Diesel Generator Power Plant description and explanation of the principle of production and operation.
- Fuel oil Fired Power Plant description and explanation of the principle of production and operation, mainly with the water/steam cycle.
- Coal Fired Power Plant description and explanation of the principle of production and operation, mainly with the water/steam cycle.
- Lignite Fired Power Plant description and explanation of the principle of production and operation, mainly with the water/steam cycle.
- Gas Fired Power Plant (Gas Turbine only) description and explanation of the principle of production and operation.
- Gas Fired Power Plant as Combined Cycle (GTCC) description and explanation of the principle of production and operation, mainly with the Heat Recovery Steam Generator (HRSG) and the water/steam cycle.

### Fossil fuels used for electrical production

- Coal analysis giving all the contents found within the different types of coal.
- Fuel Oil analysis giving all the contents found within the several types of Fuel Oil. Definition of the Units used for the LVH, the GHV and the Heat Rate.
- Gas Analysis giving all the contents found within the different quality of Gas. Definition of LHV or NHV (Low Heating Value or Net Heating Value) and HHV or GHV (High Heating Value or Net Heating Value) for all the different types of Fuel and the efficiency of the Power Plant.  
What are their impacts on production.  
What is the Heat Rate of the Power Plant.  
Influence of the analysis contents on the combustion.
- How to determine the Efficiency of the Production according to the analysis contents into the used Fuel and the Heat Rate of the Power Plant.
- How to determine the consumption of fuel according to LVH of the fuel and the Heat Rate of the Power Plant.
- Environmental impact according to the analysis contents into the used Fuel and the effluents discharged by a Fossil Fuel Fired Power Plant.

### Renewable energies

- Explanation about how they work, what are their working and operating conditions, what is the efficiency and the financial aspect, the following Renewable Energies:
  - Wind Turbine Power.
  - Solar Photovoltaic.
  - Solar Thermal Electricity.
  - Small Hydropower.
  - Big Hydropower.
  - Geothermal Energy.
  - Biogas.
  - Urban Waste.
  - Solid Biomass.
  - Ocean Energy.



## **Nuclear Power Plant**

- What is a Nuclear Island.
- Steam Generation Principle (Primary and Secondary Loop).
- What is a Conventional Island.
- What is a Balance of Plant (BOP).
- Environmental Impact from a Nuclear Power Plant

## **Transportation of electrical energy**

- How is the Electricity transported.
- Disadvantage of long distance transportation.
- How to limit losses in line.
- What is a Transformer.
- What is the utility of the Transformer.

## **Storage of electrical energy**

- Difficulties to store Electricity.
- Batteries Storage system.
- Latent Electrical Energy.

## **Conclusion**

- Quick Review of all means of Electricity Production taking into consideration their advantages and disadvantages.
- Questions & Answers Session.

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## **Course Leader**

### **Emile Marie Raymond de Bonnefoy**

#### **Diesel, Gas, Coal, Nuclear Power Plants and Various Industrial Plants Specialist.**

Emile Marie Raymond de Bonnefoy has achieved three degrees in engineering as Electro-Mechanical Engineer I.E.T, Senior Engineer in Regulation & Instrumentation I.R.I.A and Chief Engineer S.E R.C.E and cumulated over 45 years of experience on power generation, industrial plants and related technical, erection, environmental, financial and all contracting issues.

Indeed, between 1987 and 2001 Mr. de Bonnefoy has worked as an Independent Consultant (EMR Consultant) in many countries such as Senegal, Sudan, India, China, Morocco, Mexico and Egypt, where he offered his services as Start-up Advisor, Technical Advisor, Director and Expert. Also, since 2002 Mr. de Bonnefoy is owner and General Director of Debonnefoy & Troullier Partners where he offered his services as Technical, Legal and Financial Advisor, Reorganization Consultant and Contracts Advisor, in countries such as Algeria, China, New Caledonia, Senegal and the Netherlands for private and governmental institutions.