

Visit at E-DISTRIBUZIONE Headquarters

Technical Report

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On Thursday the 22nd of March the class 4ELI/ELTB, together with 5^A AUT A, visited the eastern Electrical Power station located in Viale Venezia, in Udine, aimed at reducing the voltage from high (130KV) to medium (20KV) and then to low (230/400V), ready to be then delivered to Udine's power grid.

Our English teacher asked us to write a technical report on this very interesting experience, so the following text summarizes the contents of the guided tour.

The visit started with a two-hour notional explanation which introduced us the company that locally distributes energy, called "E-Distribuzione". The company's main task is to lower voltage from Terna's (another ENEL's daughter company) transmission lines and give power to the customer.

Nowadays the company challenge is to create a virtual ethernet grid which gains data from different substations all over Friuli-Venezia Giulia to prevent damage to the power lines. Another important point which has been underlined by the engineers who work for ENEL, is that the company is trying to generate a "net" to power every substation from two or more sides, even the most remote ones, in order to be able to perform maintenance on a certain line tract in order not to let any towns with no energy.

Even though most of the topics were quite complicated to understand for us, however some aspects of the explanation were very useful to know the specific functioning of the whole facility.

The rest of the tour was focused on the field analysis of the facility, by visiting the 3 areas that compose the powerplant. We went outside to learn how the station works and all its electrotechnic devices, firstly the transformers, then all the electric units that control the station's switches and finally the switches themselves.

High Voltage area

It is the area where the 130KV voltage arrives from the outside and gets converted, by means of a transformer, to 20 KV. In this area, on the electric line there are several high voltage switches, used to open the circuit in case of faults. On top of them there are some smaller voltometric and amperometric transformers, used to analyze the values of current and voltage in the line. Then the wires arrive inside the transformer, which is a huge machine that changes both current and voltage. The transformer is also capable to change its output voltage by using a VARIAC. One interesting aspect that has been noticed, was that at the beginning of the high voltage circuit, next to the pylon and connected to one of the three phases, there was an optical fiber cable that uses the same line but with a different frequency to transmit information and connect to the Internet.

Medium Voltage /switch section

Since the voltage here is lower than before, in this area there are the switches used to send the electricity in the various facilities where the medium voltage is required. The switches are designed to cut the current with a mechanical system that extinguishes the electric arc caused by the attempt of opening the circuit. In the same section are also located the panels that ensure that the switches and the transformers are working without any troubles. On the contrary, an error message is displayed and then sent to the ENEL's facility and the fault is solved by remote controls; if the problem persists, a technician squad is dispatched.

Low Voltage section

This section is composed by the single transformation cabin, which is usually located outside and far away from the powerplant. Here the voltage is transformed from medium (20KV) to low (230/400V), which is exactly the amount that flows in our houses.

Summing up, the visit was very interesting, the information acquired were useful and satisfied our hunger of knowledge, despite the notional explanation being a bit complicated. Even though it might be thought that the visit was more suitable for Electrothechnics students, also those who study Electronics have found it very interesting, since most of the notions which have been said, had partially already been analysed in class and we are sure that what we have learnt, will be useful for our studies.

DAMANINS Alessandro and ZUCCATO Paolo representing 4^A ELI/ELT B

