

Report on a visit to Power Grid, Narendra, Dharwad

(For B. Sc. (Physics) Students)

The Power Grid is a high-voltage electricity transmission network for delivering electricity from electricity generating plant to the consumers. The electricity generated from the power stations such as thermal power plants, hydropower plants, Nuclear reactors, wind power plants etc. is stepped up using a step-up transformer to make it feasible for long-distance transmission. The transmission network carries electricity to the substation. The substation is a place where electricity is stepped down from a transmission level voltage to a distribution level voltage. The power substation has a "bus" that can split the distribution power off in multiple directions and it has a circuit breakers and switches so that the substation can be disconnected from the transmission grid or separate distribution lines can be disconnected from the substation when necessary. The National Grid, “**One Nation-One Grid-One Frequency**” is the integration of Northern, Eastern, Western, North-Eastern and the Southern regions of India, with the inter- regional transmission capacity of 1,18,740 MW. Synchronisation of all regional grids will help in optimal utilization of scarce natural resources by transfer of power from resource centric regions to load centric regions. There is a continuous change in load drawing the power. Hence one of the main functions of Power grid is to adjust the generation of electricity and maintain supply of power without crashing at 50 Hz.

In order to understand the various functions of the Power grid, The **Einstein Study Circle forum of Department of Physics, Karnatak Science College, Dharwad** had organised a visit to 400kv Power Grid at Narendra near Dharwad established by PGCIL. Prior to the field visit, Prof. M.R. Ranganath, Department of Physics had presented a special lecture on “**Basics of electricity transmission and distribution**” to B.Sc. students on 19-12-2023.

On 20-12-2023, thirty five students of B.Sc. with Physics combination (B.Sc.I, III and V semester students), and some staff members of department, Prof. M.R.Ranganath, Dr. (Smt) Reshma Nesargi, Dr. (Smt) Nirupama J.M., Shri Manjunath Charantimath, and Shri Ningnanagouda M. had visited the 400/220 KV Power Grid, Narendra. The Engineer, P. Ravikumar, explained about the function of lightning arrester, wave trap, current transformer, working of various types relays such as mechanical relay, electromagnetic and microprocessor controlled relays. Students were excited when they were told that 440KV transmission line also works like communication lines at higher frequency exclusively for power grid operation. The students and staff members visited control room, electrical switchyard, and battery backup

room. The General Manager of the power grid Shri Jayachandran, addressed the students and wished them good luck for their future endeavour. Finally, Miss Radhika Naik of B.Sc. I semester and Mr. Sambhaji Dondennavar of B.Sc. V semester thanked the staff of power grid, Narendra substation.



At the Entrance Gate



Inside the Control Room



Near the Current Transformer



At the Electrical Switchyard



With the staff of Power Grid Substation