THE HELLENIC ELECTRIC POWER SYSTEM

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The Power Generation

The Hellenic electric power generation system consists of an interconnected system of generation units on the mainland, with the islands linked to that, and the independent power generation systems of Crete, Rhodes and the rest of the smaller islands.

The total installed capacity reached 11,000 MW (9830 MW in the mainland and 1170 MW in the islands) in 2000, while the net production, in GWh, was in excess of 48,400 in the same year.

The power generation system consists of thermal and hydroelectric stations, as well as a small number of units using renewable energy sources. More specifically:

- The interconnected generation system of the mainland consists mainly of lignite-fired stations which are the basis of the system. In addition, there are natural gas, oil-fired, and hydroelectric stations, as well as some small wind parks.
- The Crete generation system consists almost entirely of oil-fired stations (steam turbines, internal combustion engines, gas turbines, and one combine cycle unit). The system also includes two small hydroelectric stations and a serious number of wind-powered generators.
- The Rhodes generation system consists of oil-fired stations (steam turbines, internal combustion engines, gas turbines) and a few wind-powered generators.
- The rest of the smaller islands have their own autonomous production stations (oil-fired and some wind-powered generators and photovoltaic parks) except for those that are linked to the mainland system by submarine cables.

The Transmission System

The system for the transmission of the electric energy -from the generating stations to the major urban centers and large industrial units which are major consumers of electricity- consists of high voltage -3 phase- transmission lines. The voltage levels are 380 kV, 150 kV and a few lines 66 kV. The total length of the transmission lines is approximately 10,500 km.

In the interconnected system of the mainland, there are transmission lines of 380 kV and 150 kV. The 380 kV network, which has been developed consistently in the recent years, forms the “backbone” for the transmission of electric energy from Northern Hellas, where the majority of power stations are located, to the broader Athens area, where the demand is more than 32% of the demand in the mainland system.

The Distribution System

The Distribution System includes medium and low voltage lines with a total length over 185,000 km. The voltage levels are 20 kV, 15 kV and 220/380 V.

The Interconnections

The Hellenic Transmission System is already connected with the networks of Albania, Ex Yugoslavia (FYROM) and Bulgaria, through transmission lines of 150 kV and 380 kV. Additionally, an interconnection of 380 kV with Turkey has been launched and it is under scheduling.

Another important interconnection is with Italy, through a 400 kV DC submarine cable, which is going to be in operation at the end of this year.

Although the total capacity of the above interconnections reaches the 3000 MVA level, the total load ability is limited up to 700÷800 MVA because of stability and security of supply reasons.

Besides improving the reliability of the system, the electrical energy exchanges of the Hellenic system with the neighboring ones, via the above interconnections, are of the following types:

- Economy interchanges
- Maintaining hydraulic reserves
- Electricity deficits due to reasons of *"force majeure"*

The Union for the Coordination of Transmission of Electricity (UCTE)

The Hellenic Power System is operating under UCTE standards and norms. UCTE provides the framework of the interconnected operation of West European electric networks and was founded in 1951.

All electricity companies in UCTE participating countries are connected to their neighbors via three-phase high voltage power lines of 220 and 380 kV. In addition to this, there are also direct interconnections with other countries which operate their networks asynchronously with the UCTE network, with their own frequencies.

Thus, the European interconnected electrical network has optimized the benefits of interconnecting networks between them and has achieved the main objective of the UCTE, which has always been to make the most possible efficient use of energy within its sphere of influence and to increase the reliability and security of supply.

Energy interchange, as well as the network techniques that this requires, have been duly developed. In this context, it is worth noting that the exchange of electricity within the UCTE had already been totally liberalized when all international commerce was still subject to limitations and controls.

Since today's interconnected network is very heavily meshed, the various load dispatching centers responsible for operation within their region have to be in full control of their own network and at the same time have a good knowledge of the operating situation in neighboring networks. The operating decisions taken within each network must not cause unacceptable disruption in neighboring networks.

This does not, however, mean that a central organization is needed to co-ordinate, manage or control operation. It merely requires the load dispatching centers to keep one another permanently informed by exchanging, for example, the values of operating parameters for their networks.

This cooperation assumes that recommendations have been jointly prepared for this purpose and they constitute the basis of the interconnected mode of operation practice today.

The most important prerequisites for a member-country, included in UCTE rules and recommendations cover all issues related to:

- Security of supply
- Self sufficiency of each electric power system
- Primary, secondary and tertiary active power control
- Reactive power and voltage control
- Satisfaction of n-1 criterion and stability of each network

- Requirements for new power plants
- Measures to avoid major incidents
- Measures affecting energy economy
- Other issues (organizational, legal, commercial, etc.)