Economic Dispatch in the Main Interconnected System of Oman

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Abstract

Economic Dispatch (ED) is an important and difficult optimization problem in power system planning. This is because power plants are not located at the same distance from load centres and hence their fuel costs are different. In addition, the generation capacity under normal condition is more than the total load demand and losses. Therefore, there are multiple options for scheduling the generation units.

This research presents an overview understanding of the economic dispatch problem. In addition, this research presents the difference between the vertically integrated market and the liberalized market. Moreover, this research introduces the economic dispatch formulation, objectives and their constraints. Also solution/optimization techniques used for solving the economic dispatch problem are presented.

Furthermore, loss coefficients of the main interconnected system (MIS) of Oman is determined and included as part of the dispatch decision. In addition, MATLAB® code is used in modelling MIS network of Oman. After that, ED in MIS of Oman is found for three scenarios. The first scenario is without considering the network losses in ED. The second scenario is to consider the network loss as a fixed load. The third scenario is to consider the network losses implicitly using the B-Coefficients method. The ED simulation result of third scenario is compared with Oman Electricity Transmission Company (OETC) dispatch for 1 hour in peak load.