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## Seismic Hazard Assessment for the Energy Facilities in Marmara Region

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Marmara region is a tectonically active part of Turkey. Over the history, the Marmara region has been the site of numerous destructive earthquakes such as the 1509 Istanbul earthquake (Mw=7.5), 1766 Istanbul earthquake (Mw=5.63), 1953 Yenice-Gönen Depremi (Ms=7.2), 1999 Kocaeli (Mw=7.4) and Düzce (Mw=7.2) earthquakes. Many Electric power systems located in the Marmara region are exposed to the destructive effects of potential earthquakes. The serviceability and functionality of the electric power systems after a major earthquake are major concerns for people's wealth. Thus, the design of the electric power system requires site-specific seismic hazard assessment. Site-specific hazard analysis provides a uniform hazard spectrum used for the design of power structures. Response spectrums are presented for the seismically resistant design of the structures according to the Turkey Building Earthquake Regulation 2018 (TBDY2018) and Turkish Seismic Code 2007 (TSC2007) regulations.

In this study, seismic hazard assessment of the Marmara region has been studied using the Openquake platform. Earthquake hazard has been investigated using the time-independent probabilistic (Poisson) models. Probabilistic seismic hazard assessment (PSHA) is conducted based on SHARE project ESHM13 model characteristics. The SHARE project has presented the 2013 European -Mediterranean seismic hazard model (ESHM13). ESHM13 models consist of all events with magnitudes  $M_w \geq 4.5$  in the computation of seismic hazard and it covers the whole European territory including Turkey. The probabilistic seismic hazard assessment calculations take into account SHARE seismic source characterization. Akkar&Bommer(2010), Cauzzi&Faccioli(2008), Chiou&Youngs(2008), and Zhao et.al (2006) ground motion prediction models have been considered for active shallow crustal tectonic region. The study has developed uniform hazard spectrum and hazard maps of the Marmara Region with peak ground acceleration (PGA) and spectral accelerations (SA)'s at 0.2s and 1s periods corresponding to 10% and 2% probabilities of exceedance in 50 years. Obtained uniform hazard spectrums of electric power systems in the Marmara region have been compared with response spectrums of TBDY2018 and TSC-2007. The compatibility of SHARE model hazard analysis results with TBDY 2018 and TSC2007 has been assessed.