Our present world is based on developments in synthetic materials technology. One of the most important building blocks in manufacturing numerous fine chemicals is Ethylene Oxide. Production of EtO by partial oxidation of Et on promoted Silver catalyst is industrially one of the most important reactions. Mechanism of this kinetically controlled reaction is still unclear even after decades of investigation. In this first principles based DFT study we investigate interaction of various Oxygen species with Ag(100) surface to identify electrophilic oxygen species which has been shown to bring about partial oxidation of ethylene to EtO. Based on pDOS data we propose that the electrophilic oxygen is not atomic but molecular in nature. This insight is important in illucidation of high selectivity direct epoxidation mechanism of modern industrial catalysts.