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Abstract: The paper aims at establishing a frequency control strategy with the coordination of fractional order PID (FOPID) controller and electric vehicles (EVs) in interconnected smart grid power systems to improve the dynamic response under the change in load conditions. The system under consideration is a two-area system, wherein in one area, a thermal power unit is present, and a PV plant is installed in the second area. FOPID controller is proposed to have the secondary frequency control in the interconnected system. It is compared with classical controllers PI and PID to prove the proposed FOPID controller's