Increased global energy consumption and decreased of fossil fuel stocks provides us to find a renewable and green energy, and geothermal energy is one of them. One of Indonesian regions that has geothermal prospect fields is Wai Selabung, Oku Selatan residence, South Sumatera province with 15 km² abroad. Gravity, Magnetoelluric, and Geochemistry surveys are intended to observe fault structure and geothermal system to see a global picture of energy on that areas. Formation of geothermal system on Wai Selabung were influenced by volcanic environment and tectonic with same direction as Sumateras fault. Results of SVD Bouguer anomaly residual analysis shows two normal fault and one thrust fault directing NW-SE on Kota dalam and Teluk Agung, and one thrust fault in Sinarmarga. Based on 3D Bouguer anomaly inversion model, we were obtained two reservoir with densities 1.4-1.7 gr/cm³ and total volume 15.7 km³, Cap rock with densities 2-2.4 gr/cm³ and resistivities <20 ohm as a volcanic alteration, and Heat source with densities 2.4-2.9 gr/cm³ as a intrusion lava Tebat gayat. Integrated compilation shows reservoir temperature based on geothermometer Na-K-Mg was 170°C, so hypothesis potential energy classes on prospecting field is 182 MWe.

Key words: Geothermal, Faults, Gravity, Geochemistry