Pemodelan Kebutuhan Listrik, Perancangan Teknis dan Analisis Ekonomi Untuk Rencana Revitalisasi Teknologi Energi Terbarukan di Bungin Techno Village dan Desa Pantai Bakti, Kecamatan Muaragembong, Kabupaten Bekasi = Electricity Demand Modelling, Technical Planning and Economical Analysis of Renewable Energy Technology Revitalization Plan in Bungin Techno Village and Pantai Bakti Village, Muaragembong District, Bekasi

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Abstrak

In 2020, renewable energy sources contribution in Indonesia’s energy production mix had only reached 14,71%. The percentage was still far from Indonesia’s renewable energy mix target of 23% in 2025 and 31% in 2050 according to their own national energy plan. To enhance their progress in reaching those targets, one way that can be done is to benefit promising renewable energy potential in many areas, including coastal area such as Muara Bungin Beach located in Pantai Bakti Village, Bekasi. The village mentioned before have an average of 3,26-5,41 m/s wind speed and solar radiation of 5-5,4 kWh/m2/day. To utilize the area’s potential, three units of The Sky Dancer TSD-500 wind turbine and two monocrystalline solar panels with a total capacity of 1800 Watt peak have been installed in that area since 2014, making Muara Bungin Village mostly known as Bungin Techno Village to public. Sadly, the wind turbines have been removed recently in October 2021 due to poor physical condition, and the solar panels rarely being used and maintenanced. A revitalization plan can be done to keep Bungin Techno Village’s existance in utilizing their renewable energy potential alive.

.....The revitalization plan will create huge project, which is to install renewable energy power plants that can serve Desa Pantai Bakti’s electricity demand. A modelling result by LEAP shows that Desa Pantai Bakti’s electricity demand will reach 1.965,1 kWh/day in 2031. The planned renewable energy power plants will handle electricity load of 1.021,85 kWh/day or 51,6% from the village’s total electricity demand. A solar power plant consisting 104 units of Monocrystalline Maysun Solar Cell 500 Wp Peak Power with a lifetime of 25 years, a wind power plant consisting 24 units of 2000 W/220 V capacity wind turbines with a lifetime of 20 years, and a waste-to-energy power plant consisting a TG30 gasification machine and a 200 kVa/160 kW capacity diesel genset Caterpillar with a lifetime of 20 years. The total cost for lifetime operation of the planned solar, wind, and waste-to-energy power plant is estimated to be around Rp1.519.049.423; Rp3.238.231.499; and Rp859.733.884 respectively. The investment for the renewable energy technology revitalization plan can be considered economically worthy, judging by the NPV and ROR of every single planned power plants showing positive values or greater than zero.