

Analisis pemetaan initial cost terhadap levelized cost of energy sistem on-grid PV residensial di lima wilayah Indonesia = Preliminary cost mapping analysis to levelized cost of energy residential on grid PV system in five areas of Indonesia

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Abstrak

ABSTRACT

Tarif listrik dimasa yang akan datang diperkirakan akan mengalami kenaikan. Hal ini terlihat dari tren tarif listrik beberapa tahun terakhir yang cenderung mengalami kenaikan dibandingkan penurunan. Berdasarkan peraturan menteri ESDM no 41 tahun 2017, tarif listrik akan mengalami kenaikan dan penurunan per tiga bulan sekali mengikuti harga minyak mentah Indonesia, tingkat inflasi, dan nilai tukar rupiah terhadap dollar amerika. Akibatnya terjadi ketidakpastian harga tarif listrik khususnya bagi pelanggan non subsidi. Untuk mengatasi ketidakpastian tersebut, muncul gagasan bagaimana rumah dapat menghasilkan listrik sendiri dengan memanfaatkan potensi energi matahari. Namun dalam pengimplementasiannya terdapat kendala perbedaan biaya awal pemasangan sistem diberbagai wilayah di Indonesia mengingat Indonesia bukan negara kontinental dan mayoritas pusat penjualan investasi sistem hanya berada pada wilayah tertentu. Tujuan penelitian ini adalah untuk mengetahui pengaruh initial cost terhadap levelized cost of energy yang dihasilkan sistem pada beberapa wilayah di Indonesia. Hasil akhir dari simulasi ini dapat dijadikan sebagai bahan pertimbangan residensial dalam pengimplementasian sistem. Penelitian ini menggunakan perhitungan pengembangan Levelized Cost of Energy dan analisis kelayakan keekonomian melalui perhitungan net present value yang didapatkan oleh masing masing sistem pada wilayah simulasi. Net present value adalah total biaya tarif listrik yang dapat dihemat residensial akibat dilakukannya pengimplementasian sistem. Skenario dilakukan menggunakan perangkat lunak System Advisor Model dengan skema net metering dimana harga tarif listrik cenderung mengalami kenaikan dan harga investasi sistem mengalami penurunan. Kota Manado merupakan kota yang optimum dalam pengimplementasian sistem. Hal ini terlihat dari NPV yang dihasilkan paling besar meskipun initial cost cukup tinggi dibandingkan dengan kota simulasi lainnya.

ABSTRACT

Future electricity tariffs are expected to increase. This is evident from the trend of electricity tariffs in recent years which tend to increase compared to the decline. Based on the Minister of Energy and Mineral Resources Regulation No. 41 of 2017, electricity tariffs will increase and decrease every three months following the Indonesian crude oil price, inflation rate, and the rupiah against the US dollar. As a result there is uncertainty in the price of electricity tariff especially for nonsubsidized customers. To overcome these uncertainties, came the idea how the house can generate its own electricity by utilizing the potential of solar energy. However, in implementing it there are constraints of the initial cost difference of installation of systems in various regions in Indonesia considering Indonesia is not a continental state and the majority of sales center of system investment is only in certain area. The purpose of this study is to determine the effect of initial cost on the levelized cost of energy produced by the system in some regions in Indonesia. The final

result of this simulation can be used as residential consideration in implementing the system. This study uses the calculation of the development of Levelized Cost of Energy and the analysis of economic feasibility through the calculation of net present value obtained by each system in the simulation area. Net present value is the total cost of electricity tariff that can be saved by the implementation of system implementation. Scenario is done using System Advisor Model software with net metering scheme where the price of electricity tariff tends to increase and the investment price of the system decreases. Manado city is the most suitable city in implementing the system. This can be seen from the NPV that produced the greatest although the initial cost is quite high in this city. initial cost will affect the LCoE generated by the system, but if a region has high solar energy potential then the initial cost can be covered by the amount of cash flow generated by the system.