

# Analisa Dampak Penurunan Emisi Dan Kebijakan Dari Penggunaan Biodiesel Dengan Konfigurasi Optimal Energi Baru Terbarukan Di Pulau Sabang, Banda Aceh = Emissions Decrease Effect And Policy Analysis Of Using Biodiesel With Configuration Optimal of Renewable Energy In Sabang Island, Banda Aceh

Andi Kurniawan, author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20389443&lokasi=lokal>

---

## Abstrak

[<b>ABSTRAK</b><br>

Sistem kelistrikan Pulau Sabang merupakan off grid system, dimana listriknya di suplai dari Pembangkit Listrik Tenaga Diesel (PLTD) menggunakan Bahan Bakar Minyak (BBM) jenis solar. Disamping itu, Pulau Sabang memiliki potensi energi baru terbarukan seperti angin dan sinar matahari. Oleh karena itu, diperlukan konfigurasi optimal dalam memanfaatkan potensi energi baru terbarukan guna pengendalian pemakaian BBM, mengingat selain sulit untuk memperoleh BBM juga harganya mahal. Berdasarkan hasil simulasi menggunakan perangkat lunak HOMER diperoleh konfigurasi optimal energi baru terbarukan di Pulau Sabang yaitu konfigurasi Pembangkit Listrik Tenaga Hibrida (PLTH) yang mengkombinasikan konfigurasi Pembangkit Listrik Tenaga Surya (PLTS) dan Pembangkit Listrik Tenaga Diesel (PLTD) dengan nilai NPC sebesar \$ 94335192, COE sebesar 0,287 \$/kWh serta menghemat penggunaan Bahan Bakar Minyak (BBM) sebanyak 2.650.577 liter/tahun dari kondisi awal sistem yaitu konfigurasi PLTD. Kemudian, untuk mengurangi gas emisi CO<sub>2</sub>, NO<sub>x</sub>, HC, CO, SO<sub>x</sub>, dan partikulat (PM) yang memiliki dampak negatif terhadap lingkungan yang ditimbulkan dalam pengoperasian PLTD, maka konfigurasi optimal energi baru terbarukan di Pulau Sabang menggunakan Bahan Bakar Nabati (Biofeul) jenis biodiesel. Pada penelitian ini, selain mengitung penurunan gas emisi dan menganalisis dampak penurunan emisi juga menganalisis dari sisi kebijakan pemerintah yang terkait dengan ketenagalistrikan. Adapun penurunan bahan gas emsi yang diperoleh untuk SO<sub>x</sub> sebanyak 239 Kg/tahun, Partikulat (PM) sebanyak 1.473.340 Kg/tahun, CO<sub>2</sub> sebanyak 128.629 Kg/tahun, NO<sub>x</sub> sebanyak 441 Kg/tahun, HC sebanyak 38 Kg/tahun dan sebanyak 88 Kg/tahun untuk emisi CO.

<hr>

<b>ABSTRACT</b><br>

Sabang Island electrical system is off-grid systems, source of supply electrical from the Diesel Power Plant (PLTD). In addition, Sabang Island has the potential of renewable energy such as wind and solar. Therefore, the optimal configuration is needed in exploiting the potential of renewable energy in order to control fuel usage, since in addition it is difficult to obtain fuel and expensive. Based on the simulation results with software HOMER obtained configuration optimal of renewable energy on the island of Sabang which configuration Hybrid Power Plant (PLTH) which combines configuration Solar Power Plant (PLTS) and Diesel Power Plant (PLTD) with NPC = \$ 94,335,192, COE = \$ 0.287 / kWh and save the use of fuel as much as 2,650,577 liters/year compared of initial conditions the system is diesel configuration. Then, to reduce emissions of CO<sub>2</sub>, NO<sub>x</sub>, HC, CO, SO<sub>x</sub>, and particulate matter (PM) that has a negative impact on the environment caused by the operation of the diesel, the configuration optimal of renewable energy on the island of Sabang using Biofuel type biodiesel. In this study, in addition to counting the emissions decrease

and analyzed the impacts of emissions reduction are also analyzed in terms of government policy related to electricity. The decrease in gas materials for SO<sub>x</sub> obtained 239 kg/year, Particulate (PM) obtained 1.473.340 Kg/year, as many as 128.629 kg/year of CO<sub>2</sub>, NO<sub>x</sub> obtained 441 kg/year, HC obtained 38 kg/year and as many as 88 kg/year for CO emissions.

;Sabang Island electrical system is off-grid systems, source of supply electrical from the Diesel Power Plant (PLTD). In addition, Sabang Island has the potential of renewable energy such as wind and solar. Therefore, the optimal configuration is needed in exploiting the potential of renewable energy in order to control fuel usage, since in addition it is difficult to obtain fuel and expensive. Based on the simulation results with software HOMER obtained configuration optimal of renewable energy on the island of Sabang which configuration Hybrid Power Plant (PLTH) which combines configuration Solar Power Plant (PLTS) and Diesel Power Plant (PLTD) with NPC = \$ 94,335,192, COE = \$ 0.287 / kWh and save the use of fuel as much as 2,650,577 liters/year compared of initial conditions the system is diesel configuration. Then, to reduce emissions of CO<sub>2</sub>, NO<sub>x</sub>, HC, CO, SO<sub>x</sub>, and particulate matter (PM) that has a negative impact on the environment caused by the operation of the diesel, the configuration optimal of renewable energy on the island of Sabang using Biofuel type biodiesel. In this study, in addition to counting the emissions decrease and analyzed the impacts of emissions reduction are also analyzed in terms of government policy related to electricity. The decrease in gas materials for SO<sub>x</sub> obtained 239 kg/year, Particulate (PM) obtained 1.473.340 Kg/year, as many as 128.629 kg/year of CO<sub>2</sub>, NO<sub>x</sub> obtained 441 kg/year, HC obtained 38 kg/year and as many as 88 kg/year for CO emissions.

, Sabang Island electrical system is off-grid systems, source of supply electrical from the Diesel Power Plant (PLTD). In addition, Sabang Island has the potential of renewable energy such as wind and solar. Therefore, the optimal configuration is needed in exploiting the potential of renewable energy in order to control fuel usage, since in addition it is difficult to obtain fuel and expensive. Based on the simulation results with software HOMER obtained configuration optimal of renewable energy on the island of Sabang which configuration Hybrid Power Plant (PLTH) which combines configuration Solar Power Plant (PLTS) and Diesel Power Plant (PLTD) with NPC = \$ 94,335,192, COE = \$ 0.287 / kWh and save the use of fuel as much as 2,650,577 liters/year compared of initial conditions the system is diesel configuration. Then, to reduce emissions of CO<sub>2</sub>, NO<sub>x</sub>, HC, CO, SO<sub>x</sub>, and particulate matter (PM) that has a negative impact on the environment caused by the operation of the diesel, the configuration optimal of renewable energy on the island of Sabang using Biofuel type biodiesel. In this study, in addition to counting the emissions decrease and analyzed the impacts of emissions reduction are also analyzed in terms of government policy related to electricity. The decrease in gas materials for SO<sub>x</sub> obtained 239 kg/year, Particulate (PM) obtained 1.473.340 Kg/year, as many as 128.629 kg/year of CO<sub>2</sub>, NO<sub>x</sub> obtained 441 kg/year, HC obtained 38 kg/year and as many as 88 kg/year for CO emissions.

]