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Utilization of oil palm biomass as a renewable and sustainable energy source in aceh province

(Article)

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Abstract

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Oil palm production can convert and produce biomass waste, which has high energy value. Oil palm biomass (OPB) that can be discarded includes empty fruit bunches, palm oil leaves, stems, palm kernel shells and mesocarp fibres. Palm oil mills can produce a variety of products, one of which is renewable and sustainable energy, especially for power plant generators. This research concentrated on biomass-based cogeneration plant modelling and simulation. The objective of this article was to develop unit processes and configurations, simulate and optimize the cogeneration process in Aspen Plus simulator using biomass such as EFB, PKS and OPF as fuel. Moreover, this simulation is carried out to find the constant value of the biomass flow rate and the airflow rate and to do some variations with different variables and scenarios. Simulation results have shown results that are appropriate for the biomass flow rate of 5 kg/s with an airflow rate of 58.5 kg/s. Recycle LP-Stream without utilizing stream exhaust which is simulated that the recycle value that can be charged is 20%. While recycle using the exhaust value that can be installed is 80%. The more recycles that are made with various variations show better results. Overall simulation results in this paper have reached a constant value. © 2020 PENERBIT AKADEMIA BARU.

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Topic: Gasification | Tars | Producer Gas

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Substances

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References (37)

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1 Hani, M.R., Mahidin, M., Husin, H., Hamdani, H., Khairil, K.

Oil palm biomass utilization as an energy source and its possibility use for polygeneration scenarios in Langsa City, Aceh Province, Indonesia (Open Access)

(2018) *IOP Conference Series: Materials Science and Engineering*, 334 (1), art. no. 012003. Cited 7 times.
http://www.iop.org/EJ/journal/mse
doi: 10.1088/1757-899X/334/1/012003

View at Publisher

2 Samiran, N.A., Jaafar, M.N.M., Ng, J.-H., Lam, S.S., Chong, C.T.

Progress in biomass gasification technique - With focus on Malaysian palm biomass for syngas production

(2016) *Renewable and Sustainable Energy Reviews*, 62, pp. 1047-1062. Cited 72 times.
doi: 10.1016/j.rser.2016.04.049

View at Publisher

3 Widjaya, E.R., Chen, G., Bowtell, L., Hills, C.

Gasification of non-woody biomass: A literature review (Open Access)

(2018) *Renewable and Sustainable Energy Reviews*, 89, pp. 184-193. Cited 64 times.
doi: 10.1016/j.rser.2018.03.023

View at Publisher

4 Chan, Y.H., Cheah, K.W., How, B.S., Loy, A.C.M., Shahbaz, M., Singh, H.K.G., Yusuf, N.R., (...), Ngan, S.L.

An overview of biomass thermochemical conversion technologies in Malaysia (Open Access)

(2019) *Science of the Total Environment*, 680, pp. 105-123. Cited 23 times.
www.elsevier.com/locate/scitotenv
doi: 10.1016/j.scitotenv.2019.04.211

View at Publisher

5 Mastuli, M.S., Kamarulzaman, N., Kasim, M.F., Sivasangar, S., Saiman, M.I., Taufiq-Yap, Y.H.

Catalytic gasification of oil palm frond biomass in supercritical water using MgO supported Ni, Cu and Zn oxides as catalysts for hydrogen production (Open Access)

(2017) *International Journal of Hydrogen Energy*, 42 (16), pp. 11215-11228. Cited 25 times.
http://www.journals.elsevier.com/international-journal-of-hydrogen-energy/
doi: 10.1016/j.ijhydene.2017.02.174

View at Publisher

Mahidin , Saifullah , Erdiwansyah *(2020) Chemosphere*

The potential of using biogas feeding for fuel cells in malaysia

Shafie, S.M. , Othman, Z. , Hami, N. *(2020) International Journal of Energy Economics and Policy*

Optimization of oil palm empty fruit bunches value chain in peninsular malaysia

James Rubinsin, N. , Daud, W.R.W. , Kamarudin, S.K. *(2020) Food and Bioproducts Processing*

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Authors > Keywords >

6 Farid, M.A.A., Hassan, M.A., Othman, M.R., Shirai, Y., Ariffin, H.
Sustainability of oil palm biomass-based products

(2019) *Lignocellulose for Future Bioeconomy*, pp. 207-242. Cited 2 times.
http://www.sciencedirect.com/science/book/9780128163542
ISBN: 978-012816354-2
doi: 10.1016/B978-0-12-816354-2.00012-8

View at Publisher

7 Sánchez, J., Curt, M.D., Robert, N., Fernández, J.
Biomass resources

(2018) *The Role of Bioenergy in the Emerging Bioeconomy: Resources, Technologies, Sustainability and Policy*, pp. 25-111. Cited 10 times.
http://www.sciencedirect.com/science/book/9780128130568
ISBN: 978-012813056-8; 978-012813057-5
doi: 10.1016/B978-0-12-813056-8.00002-9

View at Publisher

8 Abbasi, T., Abbasi, S.A.
Biomass energy and the environmental impacts associated with its production and utilization

(2010) *Renewable and Sustainable Energy Reviews*, 14 (3), pp. 919-937. Cited 292 times.
doi: 10.1016/j.rser.2009.11.006

View at Publisher

9 Sansaniwal, S.K., Rosen, M.A., Tyagi, S.K.
Global challenges in the sustainable development of biomass gasification: An overview

(2017) *Renewable and Sustainable Energy Reviews*, 80, pp. 23-43. Cited 118 times.
doi: 10.1016/j.rser.2017.05.215

View at Publisher

10 Gładysz, P., Saari, J., Czarnowska, L.
Thermo-ecological cost analysis of cogeneration and polygeneration energy systems - Case study for thermal conversion of biomass (Open Access)

(2020) *Renewable Energy*, 145, pp. 1748-1760. Cited 8 times.
http://www.journals.elsevier.com/renewable-and-sustainable-energy-reviews/
doi: 10.1016/j.renene.2019.06.088

View at Publisher

11 Rodrigues Silveira, A.R., Nadaleti, W.C., Przybyla, G., Belli Filho, P.
Potential use of methane and syngas from residues generated in rice industries of Pelotas, Rio Grande do Sul: Thermal and electrical energy

(2019) *Renewable Energy*, 134, pp. 1003-1016. Cited 4 times.
http://www.journals.elsevier.com/renewable-and-sustainable-energy-reviews/
doi: 10.1016/j.renene.2018.11.063

View at Publisher

12 Luo, Y., Li, Z., Li, X., Liu, X., Fan, J., Clark, J.H., Hu, C.
The production of furfural directly from hemicellulose in lignocellulosic biomass: A review (Open Access)

(2019) *Catalysis Today*, 319, pp. 14-24. Cited 85 times.
http://www.sciencedirect.com/science/journal/09205861
doi: 10.1016/j.cattod.2018.06.042

View at Publisher

13 Erdiwansyah, Mamat, R., Sani, M.S.M., Sudhakar, K., Kadarohman, A., Sardjono, R.E.
An overview of Higher alcohol and biodiesel as alternative fuels in engines
(Open Access)

(2019) *Energy Reports*, 5, pp. 467-479. Cited 43 times.
http://www.journals.elsevier.com/energy-reports/
doi: 10.1016/j.egyr.2019.04.009

View at Publisher

14 Baloch, H.A., Nizamuddin, S., Siddiqui, M.T.H., Riaz, S., Jatoi, A.S., Dumbre, D.K., Mubarak, N.M., (...), Griffin, G.J.
Recent advances in production and upgrading of bio-oil from biomass: A critical overview

(2018) *Journal of Environmental Chemical Engineering*, 6 (4), pp. 5101-5118. Cited 58 times.
http://www.journals.elsevier.com/journal-of-environmental-chemical-engineering/
doi: 10.1016/j.jece.2018.07.050

View at Publisher

15 Fardhyanti, D.S., Triwibowo, B., Istanto, H., Anajib, M.K., Larasati, A., Oktaviani, W.
Liquid phase equilibrium of phenol extraction from bio-oil produced by biomass pyrolysis using thermodynamic models

(2019) *Chinese Journal of Chemical Engineering*, 27 (2), pp. 391-399. Cited 4 times.
doi: 10.1016/j.cjche.2018.08.011

View at Publisher

16 Guedes, R.E., Luna, A.S., Torres, A.R.
Operating parameters for bio-oil production in biomass pyrolysis: A review

(2018) *Journal of Analytical and Applied Pyrolysis*, 129, pp. 134-149. Cited 139 times.
doi: 10.1016/j.jaap.2017.11.019

View at Publisher

17 Amin, M., Chetpattananondh, P., Ratanawilai, S.
Application of extracted marine Chlorella sp. residue for bio-oil production as the biomass feedstock and microwave absorber

(2019) *Energy Conversion and Management*, 195, pp. 819-829. Cited 7 times.
https://www.journals.elsevier.com/energy-conversion-and-management
doi: 10.1016/j.enconman.2019.05.063

View at Publisher

18 de Caprariis, B., De Filippis, P., Petrullo, A., Scarsella, M.
Hydrothermal liquefaction of biomass: Influence of temperature and biomass composition on the bio-oil production

(2017) *Fuel*, 208, pp. 618-625. Cited 55 times.
http://www.journals.elsevier.com/fuel/
doi: 10.1016/j.fuel.2017.07.054

View at Publisher

19 Debnath, D.
From biomass to biofuel economics
(2019) *Biofuels, Bioenergy and Food Security*, pp. 45-60.
Academic Press

20 Prasad, S., Ingle, A.P.
Impacts of sustainable biofuels production from biomass

(2019) *Sustainable Bioenergy: Advances and Impacts*, pp. 327-346. Cited 4 times.
http://www.sciencedirect.com/science/book/9780128176542
ISBN: 978-012817654-2
doi: 10.1016/B978-0-12-817654-2.00012-5

View at Publisher

21 Zhang, J., Zhang, X.
The thermochemical conversion of biomass into biofuels

(2019) *Biomass, Biopolymer-Based Materials, and Bioenergy: Construction, Biomedical, and other Industrial Applications*, pp. 327-368. Cited 6 times.
http://www.sciencedirect.com/science/book/9780081024263
ISBN: 978-008102426-3; 978-008102427-0
doi: 10.1016/B978-0-08-102426-3.00015-1

View at Publisher

22 Onumaegbu, C., Mooney, J., Alaswad, A., Olabi, A.G.
Pre-treatment methods for production of biofuel from microalgae biomass

(2018) *Renewable and Sustainable Energy Reviews*, 93, pp. 16-26. Cited 26 times.
doi: 10.1016/j.rser.2018.04.015

View at Publisher

23 Erdiwansyah, Mamat, R., Sani, M.S.M., Sudhakar, K.
Renewable energy in Southeast Asia: Policies and recommendations

(2019) *Science of the Total Environment*, 670, pp. 1095-1102. Cited 38 times.
www.elsevier.com/locate/scitotenv
doi: 10.1016/j.scitotenv.2019.03.273

View at Publisher

24 Thapa, S., Indrawan, N., Bhoi, P.R., Kumar, A., Huhnke, R.L.
Tar reduction in biomass syngas using heat exchanger and vegetable oil bubbler

(2019) *Energy*, 175, pp. 402-409. Cited 11 times.
www.elsevier.com/inca/publications/store/4/8/3/
doi: 10.1016/j.energy.2019.03.045

View at Publisher

25 Hu, J., Li, C., Lee, D.-J., Guo, Q., Zhao, S., Zhang, Q., Li, D.
Syngas production from biomass using Fe-based oxygen carrier: Optimization

(2019) *Bioresource Technology*, 280, pp. 183-187. Cited 8 times.
www.elsevier.com/locate/biortech
doi: 10.1016/j.biortech.2019.02.012

View at Publisher

26 Glinwong, T., Wongchang, T.
Syngas production from biomass by linear heart gasifier (Open Access)

(2017) *Energy Procedia*, 138, pp. 762-765. Cited 3 times.
http://www.sciencedirect.com/science/journal/18766102
doi: 10.1016/j.egypro.2017.10.220

View at Publisher

27 Ahmad, F.B., Zhang, Z., Doherty, W.O.S., O'Hara, I.M.
The outlook of the production of advanced fuels and chemicals from integrated oil palm biomass biorefinery (Open Access)

(2019) *Renewable and Sustainable Energy Reviews*, 109, pp. 386-411. Cited 29 times.
https://www.journals.elsevier.com/renewable-and-sustainable-energy-reviews
doi: 10.1016/j.rser.2019.04.009

View at Publisher

28 Archer, S.A., Steinberger-Wilckens, R.
Systematic analysis of biomass derived fuels for fuel cells (Open Access)

(2018) *International Journal of Hydrogen Energy*, 43 (52), pp. 23178-23192. Cited 30 times.
http://www.journals.elsevier.com/international-journal-of-hydrogen-energy/
doi: 10.1016/j.ijhydene.2018.10.161

View at Publisher

29 Pang, S.
Advances in thermochemical conversion of woody biomass to energy, fuels and chemicals (Open Access)

(2019) *Biotechnology Advances*, 37 (4), pp. 589-597. Cited 51 times.
www.elsevier.com/inca/publications/store/5/2/5/4/5/5/index.htt
doi: 10.1016/j.biotechadv.2018.11.004

View at Publisher

30 Quah, R.V., Tan, Y.H., Mubarak, N.M., Khalid, M., Abdullah, E.C., Nolasco-Hipolito, C.
An overview of biodiesel production using recyclable biomass and non-biomass derived magnetic catalysts

(2019) *Journal of Environmental Chemical Engineering*, 7 (4), art. no. 103219. Cited 24 times.
http://www.journals.elsevier.com/journal-of-environmental-chemical-engineering/
doi: 10.1016/j.jece.2019.103219

View at Publisher

31 Zhang, Y., Li, L., Xu, P., Liu, B., Shuai, Y., Li, B.
Hydrogen production through biomass gasification in supercritical water: A review from exergy aspect

(2019) *International Journal of Hydrogen Energy*, 44 (30), pp. 15727-15736. Cited 30 times.
http://www.journals.elsevier.com/international-journal-of-hydrogen-energy/
doi: 10.1016/j.ijhydene.2019.01.151

View at Publisher

32 Park, J.-W., Heo, J., Ly, H.V., Kim, J., Lim, H., Kim, S.-S.
Fast pyrolysis of acid-washed oil palm empty fruit bunch for bio-oil production in a bubbling fluidized-bed reactor

(2019) *Energy*, 179, pp. 517-527. Cited 5 times.
www.elsevier.com/inca/publications/store/4/8/3/
doi: 10.1016/j.energy.2019.04.211

View at Publisher

33 Abdulrazik, A., Elsholkami, M., Elkamel, A., Simon, L.
Multi-products productions from Malaysian oil palm empty fruit bunch (EFB): Analyzing economic potentials from the optimal biomass supply chain (Open Access)

(2017) *Journal of Cleaner Production*, 168, pp. 131-148. Cited 26 times.
doi: 10.1016/j.jclepro.2017.08.088

View at Publisher

34 Yudiartono, A., Agus, S.W.L.M.A., Adiarso
Energy berkelanjutan untuk Transportas! Darat
(2018) *Indonesia energy Outlook 2018*, p. 1386.

35 Wu, Q., Qiang, T.C., Zeng, G., Zhang, H., Huang, Y., Wang, Y.
Sustainable and renewable energy from biomass wastes in palm oil industry: A case study in Malaysia (Open Access)

(2017) *International Journal of Hydrogen Energy*, 42 (37), pp. 23871-23877. Cited 28 times.
http://www.journals.elsevier.com/international-journal-of-hydrogen-energy/
doi: 10.1016/j.ijhydene.2017.03.147

View at Publisher

36 Wu, Q., Qiang, T.C., Zeng, G., Zhang, H., Huang, Y., Wang, Y.
Sustainable and renewable energy from biomass wastes in palm oil industry: A case study in Malaysia (Open Access)

(2017) *International Journal of Hydrogen Energy*, 42 (37), pp. 23871-23877. Cited 28 times.
http://www.journals.elsevier.com/international-journal-of-hydrogen-energy/
doi: 10.1016/j.ijhydene.2017.03.147

View at Publisher

37 Abdul Razak, N.A.A., Abdulrazik, A.
Modelling and optimization of biomass-based cogeneration plant (Open Access)

(2019) *IOP Conference Series: Earth and Environmental Science*, 257 (1), art. no. 012027.
https://iopscience.iop.org/journal/1755-1315
doi: 10.1088/1755-1315/257/1/012027

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