One Pagers

Indonesia 2050 Pathway Calculator Phase II

Cooperation of Ministry of Energy and Mineral Resources and Department of Energy & Climate Change United Kingdom

Bioenergy Supply Sector

Plantation Area for Biofuels

The raw materials of first generation biofuels derived from vegetable oils. Palm oil is the best raw material for biodiesel production in terms of feedstock availability and commercially available technologies. In addition, palm kernel oil is also a raw material for bioavtur production. Apart from palm oil, vegetable oils derived from cassava, sugar cane, corn and *nypa* may be used to produce bioethanol; as well as from non-edible oil such as jatropha, *kemiri sunan*, *pongam, nyamplung*, rubber, etc. Biofuels can also be produced from lignocelluloses-based raw materials and algae. This one pager describes scenario that can be selected to determine the extent of plantations area dedicated to the production of biofuels by 2050 based on the scenario of non-energy plantations, including palm oil.

Level 1

Level 1 assumes plantation area for biofuels reaches 1.05 times of the non-energy plantations in 2050. It is assumed that it happens due to a very strict implementation of the policy on the restriction of new land clearing and the government incentives for intensification programs that increase productivity.

Level 2

Level 2 assumes plantation area for biofuels reaches 1.1 times of the non-energy plantations in 2050. It is assumed that it happens due to the implementation of the policy on the restriction of new land clearing and mandatory re-planting of energy plantation especially palm oil plantations.

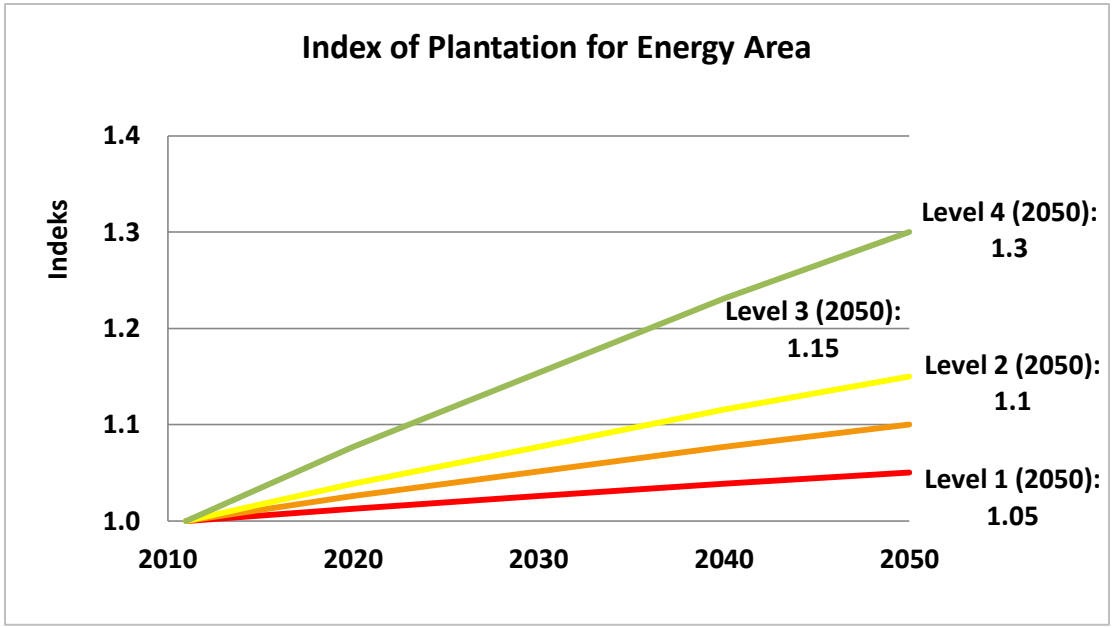
Level 3

Level 3 assumes the plantation area for biofuels reaches 1.15 times of the non-energy plantations in 2050. It is assumed, the situation is triggered by the moderate implementation of policy on limiting new land clearing without the support of incentives for intensification program.

Level 4

Level 4 assumes plantation area for biofuels reaches 1.3 times of the non-energy plantations in 2050. It is assumed the situation is triggered by the government's commitment to reduce greenhouse gas emissions from fossil fuels.

Source:
http://www.energitoday.com/uploads//2014/04/Bioethanol2.jpg



Municipal Waste for Biogas

Biogas from municipal waste processing is one of the components of bioenergy supply sector. Biogas is produced from organic waste through anaerobic process that uses microorganisms. Biogas can be used for cooking and electricity generation. Currently, municipal waste has not been used and dumped into landfills.

Level 1

Level 1 assumes the biogas potential which has been tapped is 1.87 MWe by 2050. It is supported by the construction of waste management facilities and bio-digesters in 20 major cities in Indonesia. The most efficient capacity of biogas plant from economic perspective is available in large cities with respect to the waste potential.

Level 2

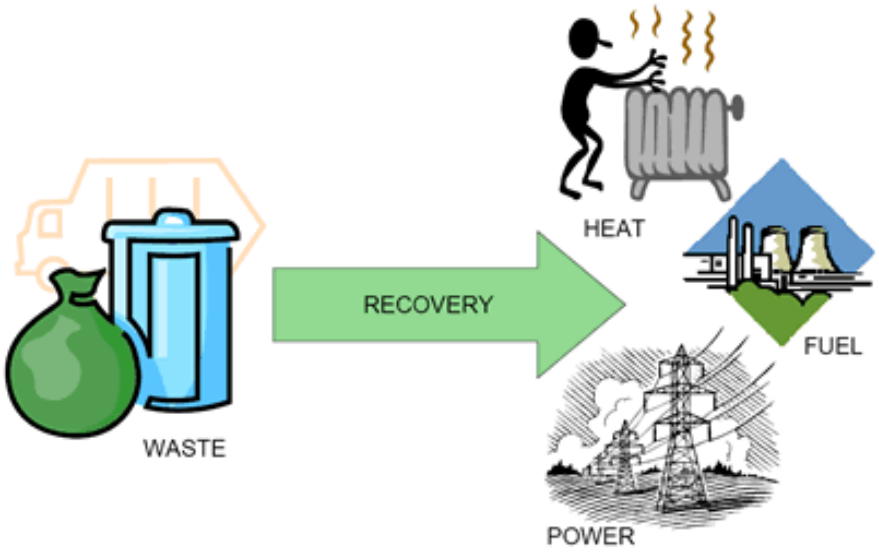
Level 2 assumes the biogas potential which has been tapped is 2.8 MWe by 2050. It is supported by the construction of waste management facilities and bio-digesters in 20 big cities and 25 medium cities in Indonesia. It is also supported by the presence of feed in tariff policy and the increasing awareness of local government to jointly invest in the utilization of municipal solid waste for energy generation.

Level 3

Level 3 assumes the biogas potential that has been tapped is 3.7 MWe by 2050. It is supported by the construction of waste management facilities and bio-digesters in 20 big cities and 50 medium cities in Indonesia. It is also supported by the feed in tariff policy and the increasing awareness of local government to jointly invest in in the utilization of municipal solid waste for energy generation through the PPP (public private partnership) mechanism. The efficient small-scale Waste to energy (WTE) technology for is also assumed available.

Level 4

Level 4 assumes the biogas potential that has been tapped is 6.2 MWe by 2050. It is supported by the construction of waste management facilities and bio-digesters in 20 big cities and 100 medium cities in Indonesia. It is also supported by the feed in tariff policy and the increasing awareness of local government to participate in the utilization of municipal solid waste for energy generation through the PPP (public private partnership) mechanism. The efficient small-scale waste to energy (WTE) technology is assumed available, thus more small towns utilize WTE technology in the waste management system.



Source: http://www.ecomena.org/wte-pathways/

Pemanfaatan Limbah Biomassa Kehutanan

Biomass waste can be utilized for alternative energy sources. Beside for direct use for cooking in the household sector, biomass waste of forestry sector can be used to supply biomass power plants. Based on biomass database of Ministry of Energy and Mineral Resources in 2013, the general potential of biomass from forestry sector reached 1,308 MWe.

Level 1

Level 1 assumes the level of biomass potential used to produce solid bioenergy from waste of forestry activities in 2050 reaches 5%. It is perceived that at this level, biomass is still utilized using traditional method and the community is still not familiar with the supporting technology.

Level 2

Level 2 assumes the level of biomass potential used to produce solid bioenergy from waste of forestry activities in 2050 reaches 10%. It is assumed that at this level the policy on incentives and feed-in-tariff for electricity from biomass are in place, thus the biomass utilization as alternative energy for industrial activities by forestry business entity increases.

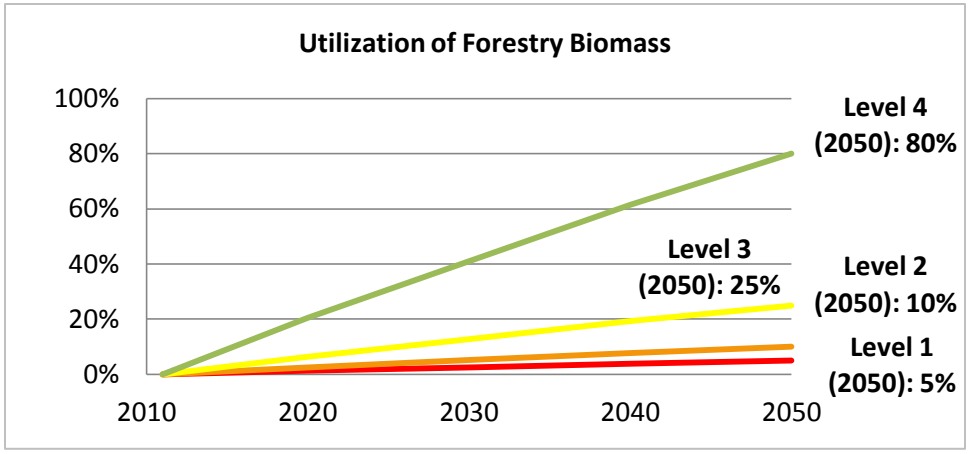
Level 3

Level 3 assumes the level of biomass potential used to produce solid bioenergy from waste of forestry activities in 2050 reaches 15%. It is assumed that at this level, the supporting policy such as policy on incentives, feed-in tariffs, green industrial policy, GHG emissions reduction, fuel consumption reduction and etc are in place. At this level, access to finance and human resource capacity is increases.

Source: http://www.biomassabr.com/noticias/biomassa-imagem.jpg

Level 4

Level 4 assumes the level of biomass potential used to produce solid bioenergy from waste of forestry activities in 2050 reaches 80%. The main policies that support the use of biomass is the zero waste policy in forestry industry activities, along with the availability of more efficient technologies for both large and small scale. At this level, funding schemes for biomass utilization activities have been developed and there are supports from government policies at national and local level.



Utilization of Agricultural and Non-Palm Oil Plantation Biomass Waste

Agricultural biomass waste includes straw and rice husks, stalks and cobs of corn, cassava stems etc. Meanwhile, plantation wastes, includes bagasse, shell and coconut fiber, and rubber rods. Based on the biomass database of Ministry of Energy and Mineral Resources in 2013, the biomass potential from agriculture and plantation sectors are 12,085 Mwe and 14,191 Mwe respectively.

Level 1

Level 1 assumes the level of biomass potential used to produce solid bioenergy from agricultural waste and non-palm oil plantations in 2050 reaches 5%. It is perceived that at this level, biomass is still utilized using traditional method and the community is still not familiar with the supporting technology.

Level 2

Level 2 assumes the level of biomass potential used to produce solid bioenergy from agricultural waste and non-palm oil plantations in 2050 reaches 10%. It occurs by assuming that the policy on incentives and electricity feed-in-tariffs for biomass electricity are in place. The business entity in agriculture and plantation have begun to use alternative energy from biomass waste for industrial activities.

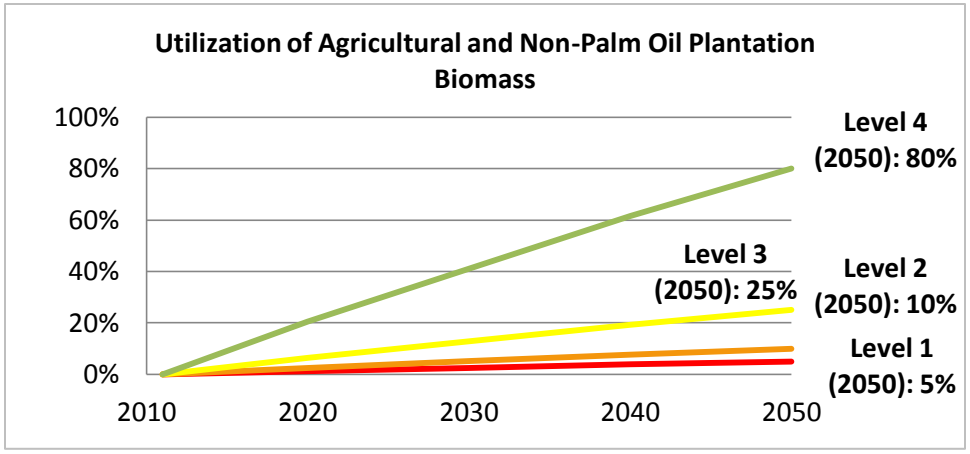
Level 3

Level 3 assumes the level of biomass potential used to produce solid bioenergy from agricultural waste and non-palm oil plantations in 2050 reaches 25%. This figure is achieved through policy on incentives, feed-in tariffs, green industrial policy, reduction of GHG emissions, fuel consumption reduction and etc. At this level, access to finance and human resource capacity increase.

Source: http://ganunggeong.blogspot.com/2011/05/fermentasi-jerami-untuk-pakan-ternak.html

Level 4

Level 4 assumes the level of biomass potential used to produce solid bioenergy from agricultural waste and non-palm plantations in 2050 has reaches 80%. This figure is achieved through policy on incentives, feed-in tariffs, green industrial policy, reduction of GHG emissions, fuel consumption reduction etc. At this level, access to finance and human resource capacity increase along with supporting policies of local government.



Utilization of Palm Oil Plantation Biomass Waste

The potential biomass of palm oil plantation in Indonesia is estimated at 14,191 Mwe. According to the biomass database of Ministry of Energy and Mineral Resources in 2013, the biomass waste of palm oil plantation sector that can be used as the source of alternative energy are rods, shells and palm empty fruit bunches.

Level 1

Level 1 assumes that 25% of the potential of biomass waste in palm oil sector has been used to produce solid bioenergy by 2050. It occurs based on the assumption that at this level the industry still utilizes biomass in a small-scale and the community still utilizes biomass using traditional method, without any infrastructure or supporting technology that the community is familiar with.

Level 2

Level 2 assumes that 35% of the potential of biomass waste in palm oil sector has been used to produce solid bioenergy by 2050. It is assumed that at this level the policy on incentives and feed-in-tariff for electricity from biomass are in place, thus the biomass utilization as alternative energy for industrial activities by palm oil business entity increases.

Level 3

Level 3 assumes that 50% of the potential of biomass waste in palm oil sector has been used to produce solid bioenergy by 2050. It is assumed that at this level, the supporting policy such as policy on incentives, feed-in tariffs, green industrial policy, GHG emissions reduction, fuel consumption reduction and etc are in place. At this level, access to finance and human resource capacity is increases.

Source: http://www.teladanprima.com/renew/index.php/sustainable-palm-oil/zero-waste-management?showall=1&limitstart=

Level 4

Level 4 assumes that 80% of the potential of biomass waste in palm oil sector has been used to produce solid bioenergy by 2050. The main policies that support the use of biomass is the zero waste policy in palm oil industry activities, along with the availability of more efficient technologies for both large and small scale. At this level, funding schemes for biomass utilization activities have been developed and there are supports from government policies at national and local level.