



Scenario of Biomass Energy in Malaysia

TECHNICAL WORKSHOP

**Biomass Energy for Growth: Potentials and challenges of Bioenergy
in Agricultural Communities and Rural Development in ASEAN
Region**

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Why Biomass Energy

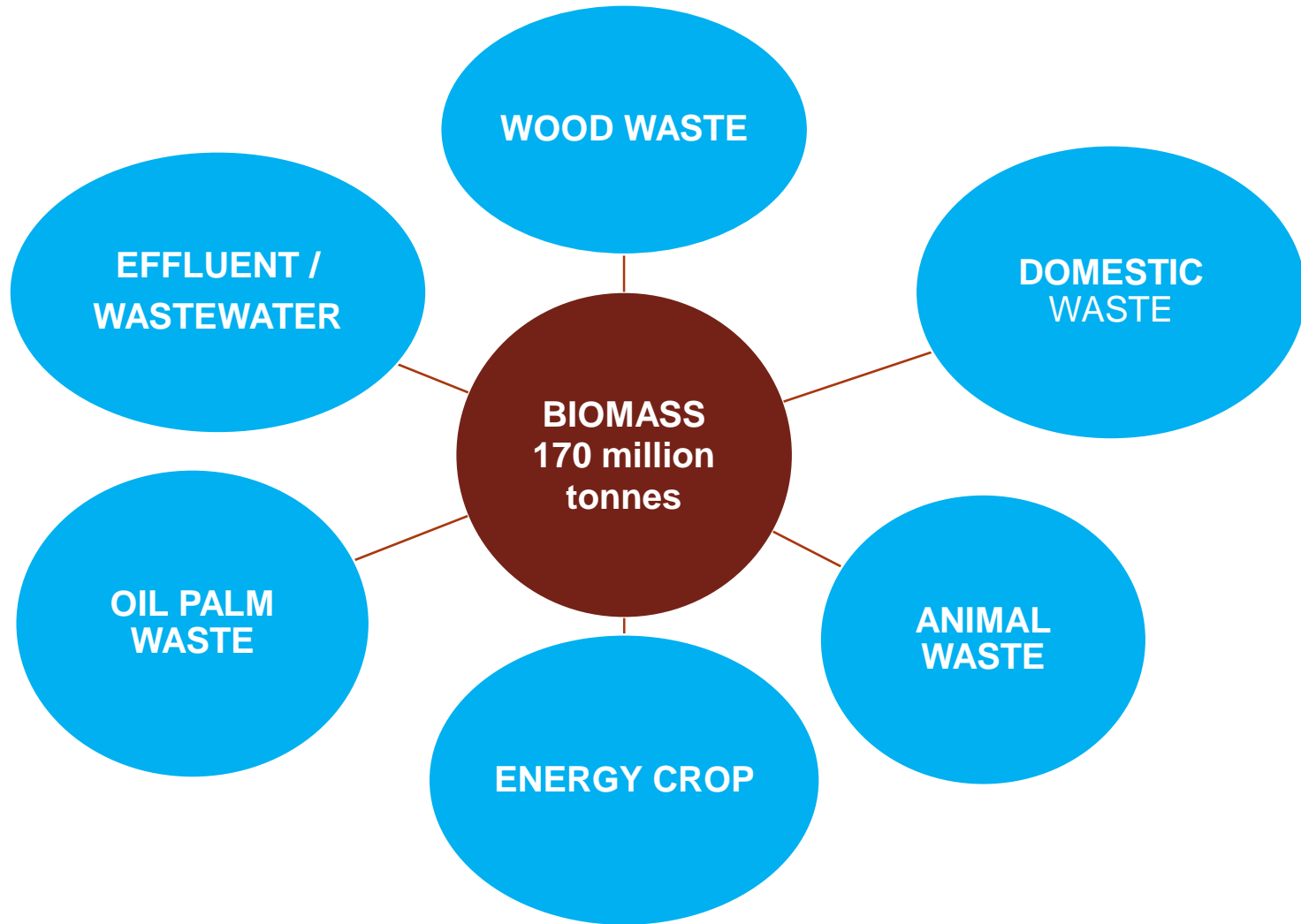
- Instability in fossil fuels prices
- Biomasses availability usually sustainable, alternative to rapidly depleting of reserves
- Potential sources of energy for rural communities
- Development of rural (employment, education, health, infrastructure etc)
- Mitigate environmental depletions
- Untapped or underutilised energy resources

Biomass Malaysia

- Abundant rainfall and sunlight throughout the year
- Agricultural is one of the sectors contributing to the nation's economy



Biomass Malaysia



Major Biomass

| No. | Biomass | Amount (dry weight) |
|-----|--|--|
| 1. | OPF (from pruning activity) OPF (from replanting activity) | 42.21 million tonnes 3.28 million tonnes |
| 2. | OPT (~5% replanting rate) | 33,299,000 trunks 17.5 million tonnes |
| 3. | From the 421 palm oil mills operating at total capacity of 97.40 million tonnes of FFB, ~ Estimated EFB = 22% x 92 million tonnes | 21.34 million tonnes |
| 4. | Mesocarp fibers | 7.73 million tonnes |
| 5. | Palm kernel shells | 4.46 million tonnes |
| 6. | POME generated from per tone of FFB is about 67%. | 62 million tonnes ** ** (million M ³) |

Major Biomass



30,000 tonnes daily
basis, 95% landfill

- 50% organic matter
- Loss of resources as starter ingredient



Other Agricultural Residues

- Varieties of non oil palm base agricultural wastes include:
 - Paddy husk and straw
 - Vegetable wastes
 - Coconut
 - Sugar cane
 - Manure
 - Kenaf
 - Pineapple peels, skin, core
 - Plantation residues as cocoa, rubber, pepper, timber etc
- Agricultural waste quantity ???

Domestic Policies

- National Green Technology Policy
- Renewable Energy Act
- Sustainable Energy Development Authority Act 2011
- National Biotechnology Policy
- Green Technology Foresight 2030



Domestic Policies

- Government of Malaysia (GoM) established the National Biomass Strategy (NBS-2020) in 2011
- The policy aims to:
 - valorise 20 million tons of dry biomass
 - reduce GHGs
 - generate renewable energy and
 - create 66,000 jobs.
- Targets for exploration of conversion of waste into clean, renewable and sustainable bioenergy and biofuels.
- However, the transition from fossil fuels to clean bioenergy in the Malaysian energy economy will require a paradigm shift that's addresses numerous techno-economic and socio-political challenges hampering clean energy and power generation technologies in the country.

Current Utilisation of Biomass

| Bio-Energy Products | Sources | Technological Process |
|-----------------------|---|---|
| 1. Biogas Fuel | | |
| a. Biogas | Wet solids / Liquid wastes such as manure, food waste, WAS, etc | Anaerobic Digestion |
| b. Syngas | Dry solids biomass such as wood chip, EFB, MSW, etc | Pyrolysis Gassification |
| 2. Liquid Fuel | | |
| a. Bio-ethanol | Cellulosic plant wastes such as sago waste, paper waste, etc | Enzymatic Pre-treatment Ethanol Fermentation |
| b. Bio-diesel | Liquefied oil /fat wastes such as oil sludge, cooking oil, etc | Esterification Pyrolysis |
| 3. Solids Fuel | | |
| a. Pellet / briquette | Dry Fibrous agricultural wastes such as EFB, Wood chip, saw dust, etc | Hammering, baling / palletizing |
| b. Bio-char | Dry Fibrous agricultural wastes such as EFB, Wood chip, saw dust, etc | Pyrolysis |

List of energy producing companies

| No: | Company name | Biomass fuel | Capacity (MW) | Electricity generate (MW h) |
|-----|--|------------------------|---------------|-----------------------------|
| 1. | TSH bio energy Sdn. Bhd. | Waste from palm oil | 14 | 79,246 |
| 2. | Seguntor bioenergy | EFB | 11.5 | 67,543 |
| 3. | Kina biopower Sdn. Bhd. | EFB | 11.5 | 67,570 |
| 4. | Recycle energy Sdn. Bhd. | Refused derive fuel | 8.9 | 7,032 |
| 5. | Bell eco power Sdn. Bhd. | Palm oil mill effluent | 2 | 1,436 |
| 6. | Achi Jaya Plnations Sdn. Bhd. | Palm oil mill effluent | 1.25 | - |
| 7. | Bahagaya Sdn.Bhd. | EFB | 3 | 20,130 |
| 8. | Bio-fuel Sdn.Bhd. | Wood waste | 10 | 306 |
| 9. | Evergreen intermerge Sdn.Bhd. | EFB | 6 | 10,289 |
| 10. | Seo energy Sdn.Bhd. | EFB | 1.2 | 2,565 |
| 11. | IJM biofuel Sdn. Bhd. | EFB | 3.6 | - |
| 12. | IOI bio-Energy Sdn.Bhd. | Empty fruit bunch | 15 | |
| 13. | Bemas production Setia Sdn.Bhd. | Rice husk | 0.2 | |
| 14. | Padi Beras national Bhd. | Rice husk | 0.7 | 106 |
| 15. | Sime Darby plantations Sdn.Bhd, Selangor | Agriculture residue | 3.4 | 3,845 |
| 16. | Sime Darby plantations Sdn.Bhd, Perak | Agriculture residue | 1.5 | 4,070 |
| 17. | Malaysian Newsprint Industries Sdn. Bhd. | Agriculture residue | 79.2 | 27,628 |
| 18. | Tian Siang oil mill (Perak) Sdn.Bhd. | Agriculture residue | 4.8 | 371 |
| 19. | Nibong Tebal paper mill Sdn.Bhd. | Wood dust | 0.8 | |
| 20. | Ban Heng Bee rice mill | Rice Husk | 0.5 | 2,837 |
| 21. | Felda palm industries Sdn.Bhd. | EFB | 7.5 | 19,640 |
| 22. | Palm energy Sdn.Bhd. | Agriculture residue | 6.5 | 11,103 |
| 23. | Sabah forest industries Sdn. Bhd. | Wood waste | 57 | 282,613 |
| 24. | Gula Padang Terap Sdn.Bhd | Agriculture residue | 10.3 | 24,804 |

Challenges of Biomass

| Factors Issues | Issues |
|-----------------------|--|
| Policy barriers | <ul style="list-style-type: none">-limited incentives on biomass utilisation-complexity in the downstream process |
| Supply & demand | <ul style="list-style-type: none">- no reliable data on actual potential of biomass- limited effort to regulate and enforce biomass programs (open burning)- logistics-not competitive compared to fossil fuels |
| Environment | <ul style="list-style-type: none">-current technologies are inefficient and too complex besides causing further polluting |
| Financial & technical | <ul style="list-style-type: none">- high initial investment- limited local technologies and equipment- poor financial support, no record on biomass industry- socio economical background |
| Institutional Barrier | <ul style="list-style-type: none">- limited coordination among the local agencies- unwillingness of the industry to change and to be proactive |

Conclusion

- Application of biomass as renewable energy source in Malaysia could reduce dependency on fossil fuels and significant advantage lies in reduction of net carbon dioxide emissions to atmosphere leading to less greenhouse effect, especially for agricultural community.
- Biomass residues create high potential for electricity generation in Malaysia. Currently, the most potential is using empty fruit bunch, fiber and shell of palm oil.
- However, various challenges have been hindrance for complete utilisation of biomass for energy generation, especially for the agricultural community itself as lacking of expert and technologies in optimisation biomass residue makes the country still low in utilisation of biomass. Therefore most of industries are not aware this benefit and they are reluctant to take the risk on utilisation of biomass for power generation

Conclusion

- Using biomass residues has social, economic, environmental and also political benefits.
- Hence, the Government of Malaysia is actively playing its roles:
 - ✓ to promote long term sustainability for both the industry and environment by reducing our dependence on fossil fuels in electricity generation through biomass utilisation
 - ✓ to develop in human capital resources especially in R&D in RE technologies
 - ✓ to create awareness in public with regards to the importance of biomass as RE resource and judicious usage of energy.