



Country Report Biomass - Potentials, Research and Development and Application in Malaysia

By

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Biomass Resources

- Oil Palm Industry
(Empty Fruit Bunches, Palm Kernel Shell,
Palm oil Fibres, Palm Oil Mill Effluent)
- Wood Residue
(Sawdust, Off-cuts and Sander dust)
- Rice Industry
(Rice husk and paddy straw)



Biomass Potentials - Palm Oil

- Empty Fruit Bunches -21% of Fresh Fruit Bunches (FFB)
- Palm Kernel Shell -6 % of FFB
- Palm oil Fibres – 12 % of FFB
- Palm Oil Mill Effluent - 3.5m³ per ton of CPO/65% of FFB)

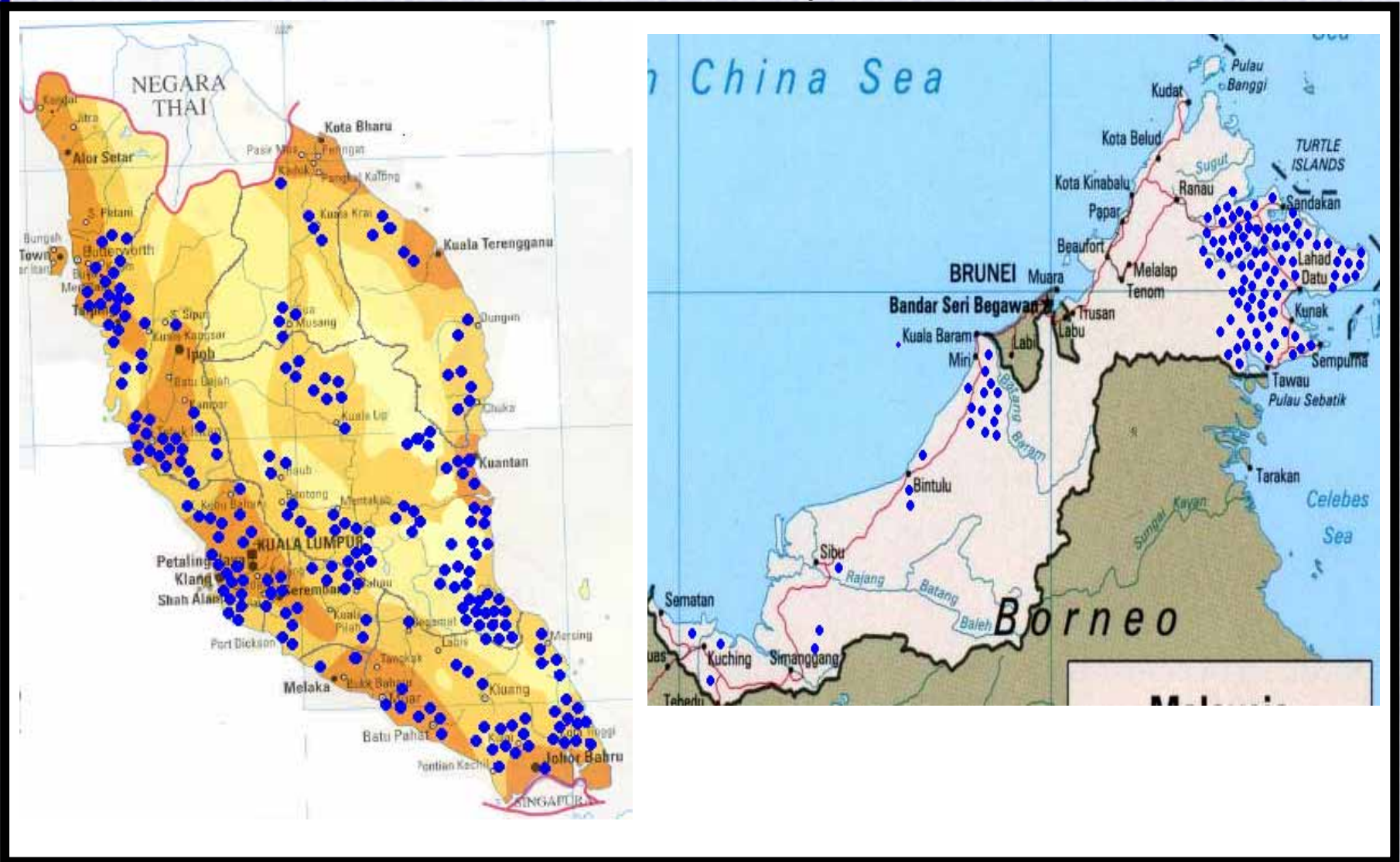


Biomass Resources

| Type of Industry | Production (Thousand Tonne) | Residue | Residue Generated (Thousand Tonne) |
|------------------|---|--------------|------------------------------------|
| Oil palm | 59,800 | EFB at 65%MC | 12,641 |
| | | Fiber | 7,606 |
| | | Shell | 3,390 |
| | Total Solid | | 16,670 |
| | POME(3.5m ³ per ton of CPO/65% of FFB) | | 38,870 |



Palm Oil Distribution in Malaysia



Biomass Potentials – Rice Ind.

- Rice Husk -20% of Paddy Production
- Paddy Straw – 40% of Paddy Production
- Paddy Production,2002 -2.1 million tonnes
- Rice Husk Production - 0.47 million tonnes
- Paddy Straw Production – 0.86 million tonnes



Biomass Residues Utilization

- Energy Generation
 1. Palm Kernel Shell and Palm oil Fibres for heat and electricity in the palm oil mill
 2. POME to produce biogas for electricity and heat in the palm oil mill
 3. SREP for grid connection



Biomass Residues Utilization

- Renewable energy, mainly biomass is now supported as the fifth fuel in the Malaysian fuel diversification program under the Eighth Malaysian Plan. It is targeted that it will contribute 5% of the country's total electricity demand by the end of the Eighth Malaysia Plan period.





Biomass Residues Utilization

| Type of Industry | Production (Thousand Tonne) | Residue | Residue product Ratio (%) | Residue Generated (Thousand Tonne) | Potential Energy PJ | Potential Elec MWe | |
|-------------------------------------|-----------------------------|--------------------|---------------------------|------------------------------------|---------------------|--------------------|-----|
| Oil palm (57.23 million tonnes) | 57,230 | EFB | 20.44 | 11,698 | 57 | 545 | |
| | | Fiber | 14.63 | 8,373 | 108 | 1032 | |
| | | Shell | 6.58 | 3,766 | 55 | 521 | |
| | Total Solid | | | | 23,837 | 15,308 | |
| | Others(POME) | | | | 38,870 | | 320 |
| Paddy 2.14 million tonnes | 2,141 | Rice Husk | 22 | 471 | 7.6 | 72 | |
| | | Paddy Straw | 40 | 856 | 8.8 | 83.9 | |
| Wood | 2,937,679 m3 | Sawn timber | 0.5-0.6 | 1,692,718 m3 | 5.2 | 50.11 | |
| | 523,336 | Plywood and veneer | 0.18-0.65 | 121,000m3 | 0.374 | 3.6 | |
| | 147,813 | Moulding | 0.2-1.0 | 75,600 m3 | 0.232 | 2.2 | |



Biomass Residues Utilization

- Non - Energy Utilization
 1. Nutrient Recycling Processes
 2. Mulching Media
 3. Composting Production
 4. Manufacturing Particleboard
 5. Pulp and Paper
 6. Fibre bales and eco-mats
 7. Activated Carbon



Biomass Residues Utilization

- Non - Energy Utilization
 8. Manufacture of MDF
 9. Oil Palm Plywood
 10. Composite Material for Automotive Industry
 11. Nanomass Material
 12. Animal Feed



| Residues | Competitive Use |
|---------------------------|---|
| Empty Fruit Bunches | <ul style="list-style-type: none"> ● As mulch and recycling of nutrient ● Pulp and paper ● Particle board ● Medium Density Fibre board ● Animal feed ● Compost as planting medium ● Organic Fertiliser |
| Shells | <ul style="list-style-type: none"> ● Activated Carbon |
| Trunks | <ul style="list-style-type: none"> ● Particle board ● Animal Feed ● Block board ● As mulch (shredded form and recycling of nutrient) |
| Fronds | <ul style="list-style-type: none"> ● Pulp and paper ● Medium Density Fibre board ● Animal feed ● As Mulch and recycling of nutrient ● Compost planting medium |



Biomass R&D

- Focus on the energy and non energy utilization
- Government through Intensified Research Priority Area (IRPA) – carry out by the universities and research organisations
- Private sector based on the commercial value
- Jointly supported by international agency such as NEDO and EU.



Biomass R&D

- For energy priority is on the improvement of empty fruit bunches combustion, EFB treatment and biogas recovery system
- For long term will include;
 - Pyrolysis or gasification processes
 - Hydrogen generation
 - Composting materials
 - Composite materials
 - Biodiesel



***THANK YOU
VERY MUCH FOR
YOUR KIND
ATTENTION***

