OIL PALM BIOMASS, ITS UTILISATION POTENTIAL

Hotel Grand Sahid Jaya, Jakarta
18 - 20 Oct 2017
The Malaysia Biomass Industries Confederation (MBIC) is formed in February 2012 by the Honouree Members of the EU-Malaysia Biomass Entrepreneurs Nurturing Programme (EUM-BENP), a flagship project of the EU-Malaysia Biomass Sustainable Production Initiative (Biomass-SP)
OVERVIEW

(I) M’SIA OIL PALM BIOMASS AVAILABILITY
(II) OPPORTUNITIES ON OIL PALM BIOMASS
(III) OPPORTUNITIES FOR INDONESIAN & MALAYSIAN ENTREPRENEURS
(IV) CONCLUSION
M’SIA OIL PALM BIOMASS AVAILABILITY

Palm Oil Mills - Malaysia

5.74 Million hectares
434 mills

Source: Map & Globe
Types of Oil Palm Biomass

- **Palm Fronds**
- **Palm Kernel Shell**
- **Mesocape Fibre**
- **Fresh Fruit Bunch**
- **Empty Fruit Bunch**
- **Oil Palm Trunk**
- **POME**

10% oil
90% biomass

www.mpob.gov.my
## OIL PALM BIOMASS AVAILABILITY

<table>
<thead>
<tr>
<th>No.</th>
<th>Biomass</th>
<th>Amount (wet weight)</th>
<th>Amount (dry weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Empty Fruit Bunch (EFB)</td>
<td>22% of FFB</td>
<td>35% of EFB (wet)</td>
</tr>
<tr>
<td>2.</td>
<td>Palm Kernel Shells (PKS)</td>
<td>5.5% of FFB</td>
<td>85% of PKS (wet)</td>
</tr>
<tr>
<td>3.</td>
<td>Mesocarp Fibres (MF)</td>
<td>13.5% of FFB</td>
<td>60% of MF (wet)</td>
</tr>
<tr>
<td>4.</td>
<td>Palm Oil Mill Effluent (POME)</td>
<td>67% of FFB or 0.65m3 per FFB ton</td>
<td>---</td>
</tr>
</tbody>
</table>

*Loh SK (MPOB)*
<table>
<thead>
<tr>
<th>No.</th>
<th>Biomass</th>
<th>Amount (dry weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>Oil Palm Trunk (OPT)</td>
<td>74.48 tons per ha</td>
</tr>
<tr>
<td></td>
<td></td>
<td>An average of 142 OPT is available from a ha of plantation. Assume only 50% are removed from the plantation.</td>
</tr>
<tr>
<td>6.</td>
<td>OPF (from pruning activity)</td>
<td>10.40 tons per ha</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assume only 50% are removed from the plantation.</td>
</tr>
<tr>
<td></td>
<td>OPF (from replanting activity)</td>
<td>14.47 tons per ha</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assume only 50% are removed from the plantation.</td>
</tr>
</tbody>
</table>

Loh SK (MPOB)
# OIL PALM BIOMASS AVAILABILITY IN 2014

**Processed FFB in 2014: 95.38Mt**

<table>
<thead>
<tr>
<th>No.</th>
<th>Biomass</th>
<th>Amount (dry weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Empty Fruit Bunch (EFB)</td>
<td>7.34 million tonnes</td>
</tr>
<tr>
<td>2.</td>
<td>Mesocarp Fibre (MF)</td>
<td>7.72 million tonnes</td>
</tr>
<tr>
<td>3.</td>
<td>Palm Kernel Shell (PKS)</td>
<td>4.46 million tonnes</td>
</tr>
<tr>
<td>4.</td>
<td>Palm Oil Mill Effluent (POME)</td>
<td>63.90 million tonnes (or 61.99 million M³)</td>
</tr>
<tr>
<td>5.</td>
<td>OPF (from pruning activity)</td>
<td>21.03 million tonnes</td>
</tr>
<tr>
<td></td>
<td>OPF (from replanting activity)</td>
<td>699 thousand tonnes</td>
</tr>
<tr>
<td>6.</td>
<td>OPT (estimated 96,584ha of replanting area)</td>
<td>3.6 million tonnes</td>
</tr>
</tbody>
</table>

*Loh SK (MPOB)*
## APPLICATION FOR OIL PALM BIOMASS (TRADITIONAL)

<table>
<thead>
<tr>
<th>Oil Palm Biomass</th>
<th>Traditional Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empty Fruit Bunche (EFB)</td>
<td>Mulch in plantation / Landfill</td>
</tr>
<tr>
<td>Palm Kernel Shell (PKS)</td>
<td>Fuel for mill boilers</td>
</tr>
<tr>
<td>Mesocarp Fibre (MF)</td>
<td>Fuel for mill boilers</td>
</tr>
<tr>
<td>Palm Oil Mill Effluent (POME)</td>
<td>Treated and discharged</td>
</tr>
<tr>
<td>Oil Palm Frond (OPF)</td>
<td>Mulch in plantation</td>
</tr>
<tr>
<td>Oil Palm Trunk (OPT)</td>
<td>Mulch in plantation</td>
</tr>
</tbody>
</table>
# APPLICATION FOR OIL PALM BIOMASS (TRADITIONAL VS CURRENT)

<table>
<thead>
<tr>
<th>Oil Palm Biomass</th>
<th>Traditional Use</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empty Fruit Bunche (EFB)</td>
<td>Mulch in plantation</td>
<td>Mattress, Fuel Pellet, Paper &amp; Pulp, WPC, etc.</td>
</tr>
<tr>
<td>Palm Kernel Shell (PKS)</td>
<td>Fuel for mill boilers</td>
<td>Fuel for power / heat generation, activated carbon</td>
</tr>
<tr>
<td>Mesocarp Fibre (MF)</td>
<td>Fuel for mill boilers</td>
<td>Extraction of residual oil</td>
</tr>
<tr>
<td>Palm Oil Mill Effluent (POME)</td>
<td>Treated and discharged</td>
<td>Biogas production, Animal Feed</td>
</tr>
<tr>
<td>Oil Palm Frond (OPF)</td>
<td>Mulch in plantation</td>
<td>Animal Feed</td>
</tr>
<tr>
<td>Oil Palm Trunk (OPT)</td>
<td>Mulch in plantation</td>
<td>Veneer, Plywood, Furniture, Animal Feed, Fuel Pellet</td>
</tr>
</tbody>
</table>
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Bio-Energy → Bio-Agriculture → Eco-products → Bio-Chemical
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Bio-Energy
**CURRENT APPLICATIONS FOR OIL PALM BIOMASS**

**Biomass Power Plant**

**SEDA** increased the FiT rate for the category of biomass power generation on Apr 2015 in order to encourage more participation.

<table>
<thead>
<tr>
<th>Description of Qualifying Renewable Energy Installation</th>
<th>FiT Rates (RM per kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Basic FiT rates having installed capacity of :</td>
<td></td>
</tr>
<tr>
<td>(i) up to and including 10MW</td>
<td>0.3085</td>
</tr>
<tr>
<td>(ii) above 10MW and up to and including 20MW</td>
<td>0.2886</td>
</tr>
<tr>
<td>(iii) above 20MW and up to and including 30MW</td>
<td>0.2687</td>
</tr>
<tr>
<td>(b) Bonus FiT rates having the following criteria (one or more) :</td>
<td></td>
</tr>
<tr>
<td>(i) use of gasification technology</td>
<td>+0.0199</td>
</tr>
<tr>
<td>(ii) use of steam-based electricity generating systems with overall efficiency of above 20%</td>
<td>+0.0100</td>
</tr>
<tr>
<td>(iii) use of locally manufactured or assembled boiler or gasifier</td>
<td>+0.0500</td>
</tr>
</tbody>
</table>

[www.seda.gov.my](http://www.seda.gov.my)
# CURRENT APPLICATIONS FOR OIL PALM BIOMASS

## Biomass Power Plant

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operational</strong></td>
<td>36.90</td>
<td>0.00</td>
<td>12.50</td>
<td>12.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>61.40</td>
</tr>
<tr>
<td><strong>In Progress</strong></td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>12.50</td>
<td>62.25</td>
<td>43.94</td>
<td>23.00</td>
<td>141.69</td>
</tr>
</tbody>
</table>

[www.seda.gov.my](http://www.seda.gov.my) as of 31/7/16
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Biogas Plant

<table>
<thead>
<tr>
<th>Status</th>
<th>As of 30 May 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed Biogas Plants</td>
<td>89</td>
</tr>
<tr>
<td>Under Construction</td>
<td>5</td>
</tr>
<tr>
<td>Under Planning</td>
<td>145</td>
</tr>
</tbody>
</table>

Source: MPOB
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Bio-Compressed Natural Gas (Bio-CNG) Plant
CURRENT APPLICATIONS FOR OIL PALM BIOMASS
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Solid Biomass Fuel

Palm Biomass Briquettes – Screw Extrusion Technology
Palm biomass briquettes – piston press technology

Palm Biomass Pellets

Palm Kernel Shell
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Bioethanol

**FRIM** and Japan JIRCAS JV R&D for Bioethanol production by utilizing OPT Juice.

www.frim.gov.my
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Bio-Agriculture
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Composting
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Bio-Fertiliser

Greenearth International Holdings Sdn Bhd is a company processing compost utilizing Empty Fruit Bunches.

They also applying enzyme into their compost for added value.

www.greenearthintlholdings.com
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Animal Feed

OPT Fibre

OPF Pellet
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Eco-products
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Palm Dried Long Fiber
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Palm Fiber Mat (Nursery Mat)
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Palm Fiber Mat (Erosion Control)
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Palm Fiber Mat

MTS Fibromat Sdn Bhd is a Bio-engineering company utilizing biomass as their material in their erosion-control projects.

www.fibromat.com.my
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Palm Plywood
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Medium Density Fiberboard

Dongwha Fiberboard Malaysia
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

EDS Process on OPT
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

EDS Process on OPT
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Wood Plastic Composite

MTIB subsidiary FIDEC has massive R&D on the composite technology utilizing biomass

www.mtib.gov.my
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Composite
(Sound Dampening Sheet)
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Carbonized PKS – Continuous Carbonization System
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Bio-Chemical
CURRENT APPLICATIONS FOR OIL PALM BIOMASS

Waris Nove Sdn Bhd, a company based in Gebeng, Pahang, in collaboration with MPOB on the production of Carbonxymethyl Cellulose (CMC) from Empty Fruit Bunches.

- Both cellulose and CMC plants were fully commissioned in early 2012
- Commercialized the Technical grade CMC for detergent (TL55)
- Cellulose product obtained the ‘Free For Sale’ certification from MOH, complied with the Food Act 1983 and Food Regulation 1985
- Patent for CMC was granted.
OPPORTUNITIES FOR INDONESIAN & MALAYSIAN ENTREPRENEURS
OPPORTUNITIES FOR INDONESIAN & MALAYSIAN ENTREPRENEURS

MALAYSIA & INDONESIA CPO PRODUCTION 1980 - 2014

Source: Oilworld & MPOB
OPPORTUNITIES FOR INDONESIAN & MALAYSIAN ENTREPRENEURS

- **Palm Fronds**
- **Palm Kernel Shell**
- **Mesocape Fibre**
- **Empty Fruit Bunch**
- **Fresh Fruit Bunch**
- **Oil Palm Trunk**
- **POME**

10% oil
90% biomass

www.mpob.gov.my
OPPORTUNITIES FOR INDONESIAN & MALAYSIAN ENTREPRENEURS

Technology

Marketing

Finance
OPPORTUNITIES FOR INDONESIAN & MALAYSIAN ENTREPRENEURS

Company “N”

Company “I”

Company “O”
CONCLUSION

Biomass Industry Value Chain
CONCLUSION

China’s Belt & Road Policy

Taiwan’s New Southward Policy
Contact Us

Malaysia Biomass Industries Confederation (MBIC)
20 Jalan Diplomatik Presint Diplomatik
62050 Putrajaya, Malaysia

Tel : +603-8884 8882
Fax : +603-8884 8838
secretariat@biomass.org.my
www.biomass.org.my

Michael Sew
Secretary-General
+6012-2805967
micksew@gmail.com
bluebiomatrix@gmail.com
OIL PALM BIOMASS,
ITS UTILISATION POTENTIAL

THANK YOU VERY MUCH !