BiomassPLUSWorkshop

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Sime Darby Plantation

Developing Sustainable Futures

Content:

- Global Megatrends
- Malaysia's Pledge & Green Targets
- Available Options
- Biomass
- Conclusion

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Global Megatrends

Situational Analysis:

- Long-term environmental, social and economic mega-trends drive the need for Biogreen solutions

  - ✓ Energy security - Global energy demand expected to **increase by 45% by 2030** while oil production from known sources has been flat since 2004 (new technology has made shale oil extraction economically viable).

  - ✓ **Environmental concerns, climate change & sustainability** - Strong societal and environmental pressure to reduce carbon footprint and lower the environmental impact of energy generation, food production and chemicals.

  - ✓ Food security - Growing global population with coincident loss of prime farm land (for development and urbanisation) will escalate the need to **increase productivity per unit of land** with reduced inputs particularly of water and fertilizer.
    - ➢ Experts estimate that agricultural production will need to double by 2050 to be able to feed the world's burgeoning population.

  - ✓ China and India - Growth of the Indian and Chinese economies will consume massive amounts of food, energy, chemicals and materials.

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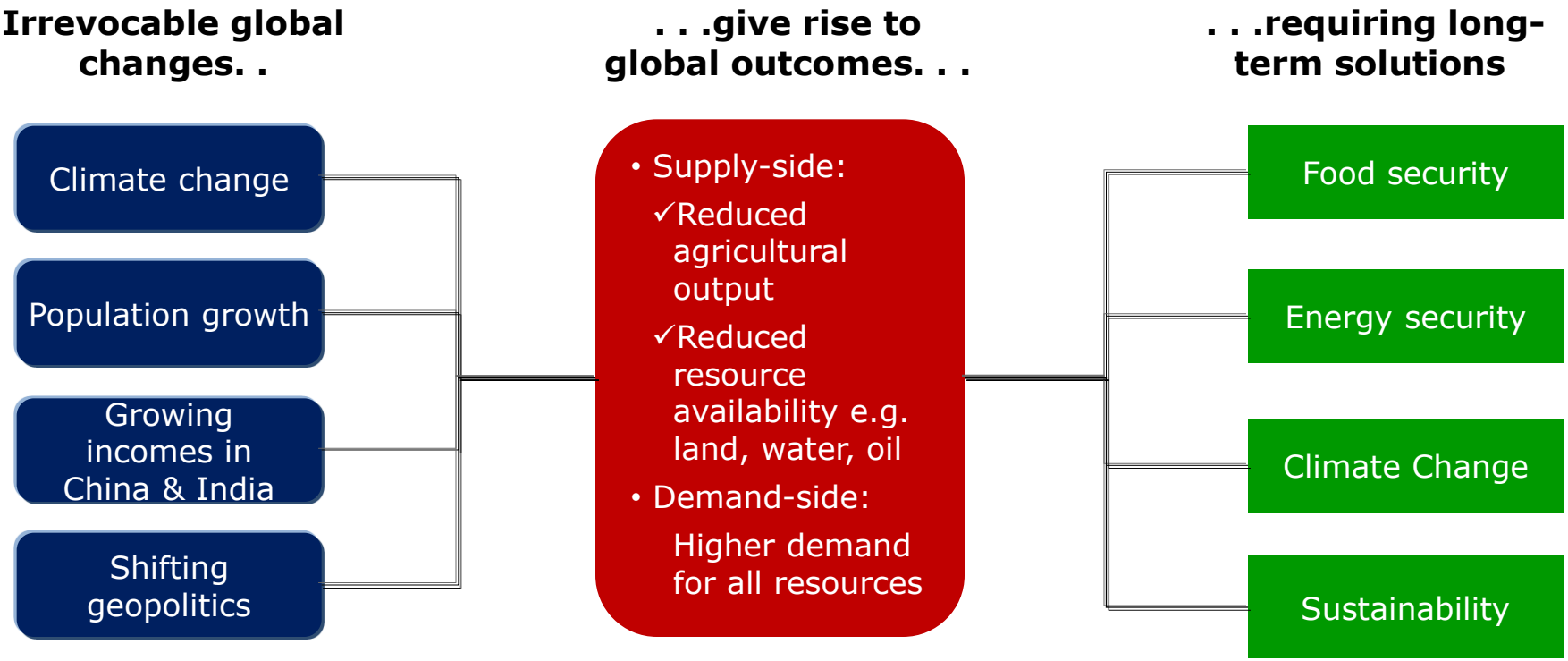
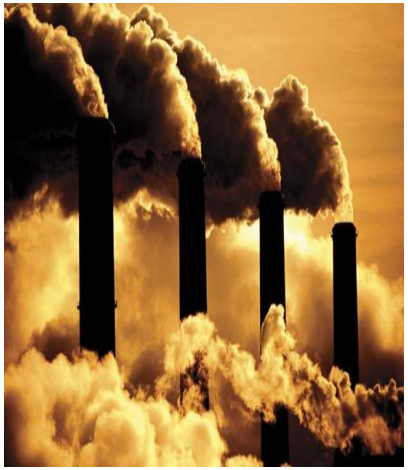
The entrepreneurs and investors that can understand the interplay of three areas – food, energy and environment – and address all of these challenges at once will reap the rewards in the years ahead.

Global Megatrends (Cont'd)



Malaysia's Pledge



To **Reduce Carbon Emission** up to **40%** in terms of Emission Intensity of GDP **by 2020** Compared with its 2005 Levels

Malaysian Green Growth Strategy

"A Prosperous Low Carbon Future: Leveraging on Green Growth for A Carbon Efficient Economy"

The 4 Pillars of Success

- **Energy**
- **Economy**
- **Environment**
- **Society**

- **New Economic Model**
- **National Biotechnology Policy**
- **National Green Technology Policy**
- **National Innovation Model**

Green Growth Strategy Aims

To ensure food is provided, efficiently and sustainably, for growing population while reduce environmental pressure

↓

To prioritize productivity and environmental performance for food and agriculture

↓

Constraints to delivering improvements

↓

Fostered and encouraged policies and management practices

↓

- At the core of green growth is the presence of un-priced public goods and external factors that drive a gap between private returns to economic activities and overall benefits to society.

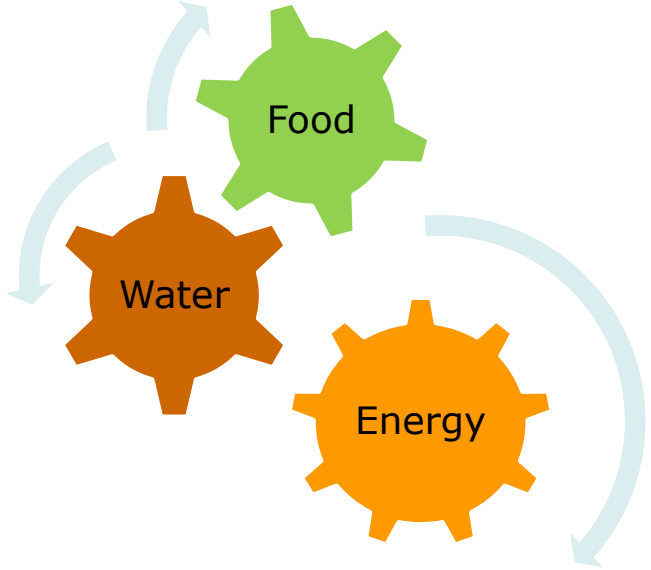
- Green growth strategies should attempt to close this gap.

Towards a Greener Nation

- Similarly, biofuel pose additional risks to food security by competing heavily for land and water.

- Agricultural intensification to ensure food security requires high energy costs. Indeed, the pressure on the natural resource base that generates food, water and energy, is more acute than at any previous time in human history.

Moving forward, we need to embrace the "nexus approach" between



Integrated

To stay within the safe operating space

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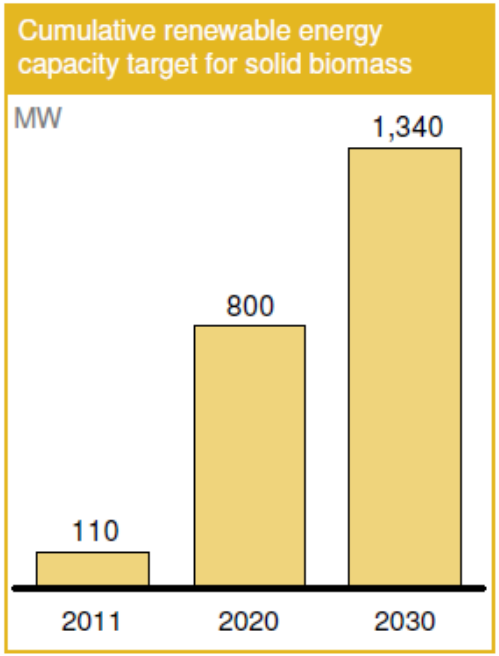
Read more: [Green growth strategies - Politics - New Straits Times http://www.nst.com.my/nation/politics/green-growth-strategies-1.81643#ixzz2CNHp5Tor](http://www.nst.com.my/nation/politics/green-growth-strategies-1.81643#ixzz2CNHp5Tor)

Towards a Greener Nation- Energy

- Malaysia has set quantitative targets as below:
  - 6% (or 985 MW) of national energy-mix to come from renewable by 2015
  - 11%(2GW) by 2020
  - 22% (4GW) by 2030

- The renewable energy covered in this target are: biogas, biomass, municipal solid waste, small hydro and solar photovoltaic (PV)

- These targets are backed by:
  - Renewable Energy Act 2011
  - Sustainable Energy Development Authority



- **For biomass**, the target is to reach 1,340MW by 2030

- It can be achieved by installing small power plants in the vicinity of grid connected mills or larger, more efficient power plants closer to industrial clusters

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Read more: Green growth strategies - Politics - New Straits Times http://www.nst.com.my/nation/politics/green-growth-strategies-1.81643#ixzz2CNHp5Tor, National Biomass Strategy 2020: New wealth creation for Malaysia's palm oil industry

Towards a Greener Nation

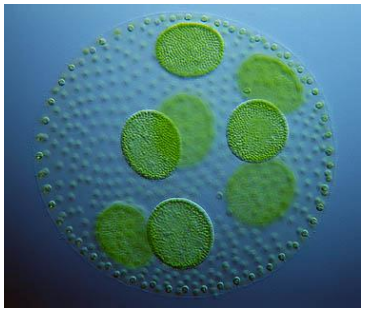
Available Options

Biomass

- Oil Palm
- Rice

Alternative crops –improved via genomics/new technology

- Algae



National Biomass Strategy

- National Biomass Strategy (NBS), as part of Malaysia's bio-economy agenda that will boost Malaysia's competitiveness as a biotechnology hub.

- NBS would pave the way for the growth of new high value industries from locally-developed innovation and technologies, including in bio-based chemicals and bio-energy, that would generate some RM30 billion in new income by 2020 and create 70,000 new jobs for Malaysian, including 40,000 high-skilled jobs.

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Source: Sustainable production (SP) of the biomass industries in Malaysia

Issues Related to Growth of Biomass Industry in Malaysia

- The most developed technologies for biomass conversion into green products come from outside of Asia
- Official policy or governmental guidelines on biomass do not exist to support investments to develop and commercialize biomass-derived products
- Institutional and market capabilities to provide a stable long term access to biomass
- Competition of biomass usage among different biomass stakeholders

Source: Sustainable production (SP) of the biomass industries in Malaysia

Incentives for the Utilisation of Oil Palm Biomass

i) New Companies

- Pioneer status
- Tax exemption of 100% of the statutory income (10 years)
- Unabsorbed capital allowances / accumulated can be carried forward and deducted from the post pioneer income of the company

OR

- 100% investment tax allowance
- The allowance can be offset against 100% of the statutory income for each year of assessment.
- Any unutilised allowances can be carried forward to subsequent years until fully utilised.

ii) Existing Companies that Reinvest

- Pioneer Status
- Income tax exemption of 100% of the increased statutory income arising from the reinvestment for a period of ten years.
- Unabsorbed capital allowances / accumulated losses can be carried forward and deducted from the post pioneer income of the company

OR

- 100% investment tax allowance
- The allowance can be offset against 100% of the statutory income for each year of assessment
- Any unutilised allowances can be carried forward to subsequent years until fully utilised.

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Plantation

Source: http://www.mtib.gov.my

Challenges & Opportunities
The case from plantation perspective

- Financial limitation
  - Engage participation from private sector for monetary and investment contribution. This engagement would also spur innovation and skills development

- The quality and flexibility of green technology policy
  - Key to generate private investment and economic growth.
  - Complements legal and investment framework, political and social environment
  - Well functioning administrative structures and absence of excessive bureaucratic rules and delays

- Intellectual property protection
  - An effective and efficient IP rights regime provides incentives to take risks and encourages the creation and adoption of new technologies

- Demand for new skills / Human capital
  - Efforts are underway to develop carbon trading expertise in Malaysia

- Pricing mechanism of the biomass
  - An optimum cost at which biomass can be removed needs to be identified to achieve maximum economic value for Malaysia

- Making full use of the plants to make them cost effective
  - Identifying conversion technologies for cellulosic biomass that is near commercial stage
  - Which product platforms will provide the biggest value add from the biomass

- Identifying the downstream clusters in Malaysia

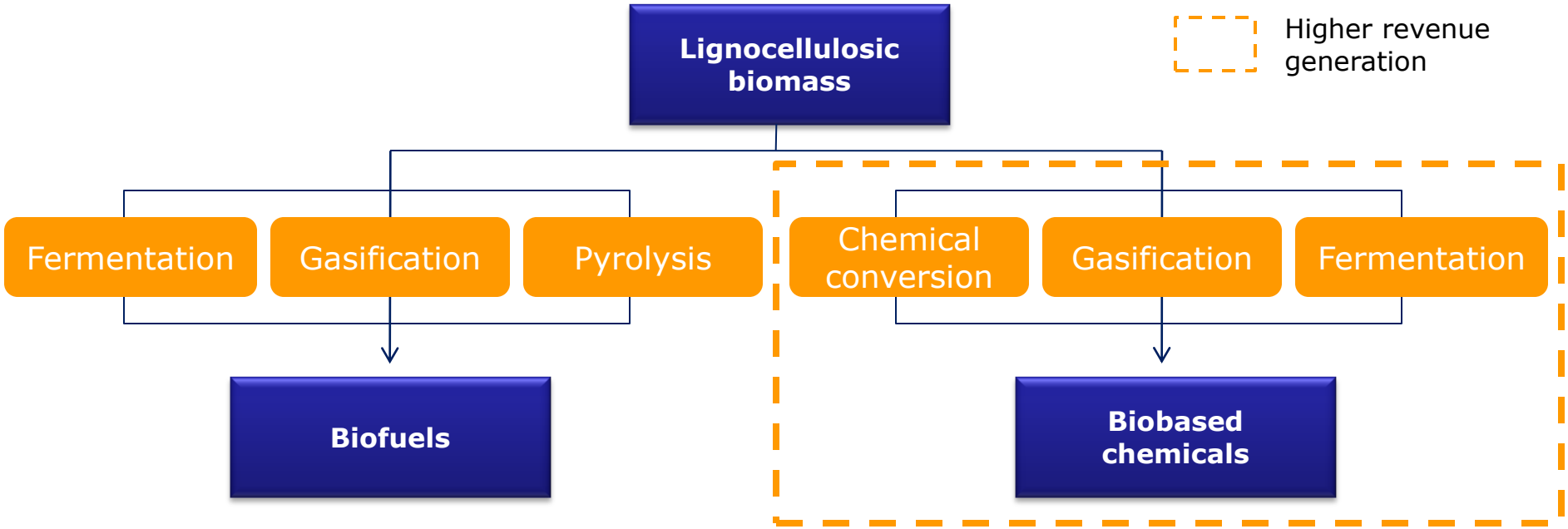
Source: Green Growth and Development, BIAC

Oil Palm Biomass

National availability and composition

Oil Palm Biomass	Availability (dry weight)	Dry biomass composition		
	National Total (mn tonnes)	Lignin	Hemicelullose	Cellulose
EFB	6.7	21	24	41
POME	3.0	27	23	38
Shells	4.0	51	23	21
Fiber	7.1	43	16	21
Fronds	47.7	18	34	47
Trunks	13.0	18	25	46

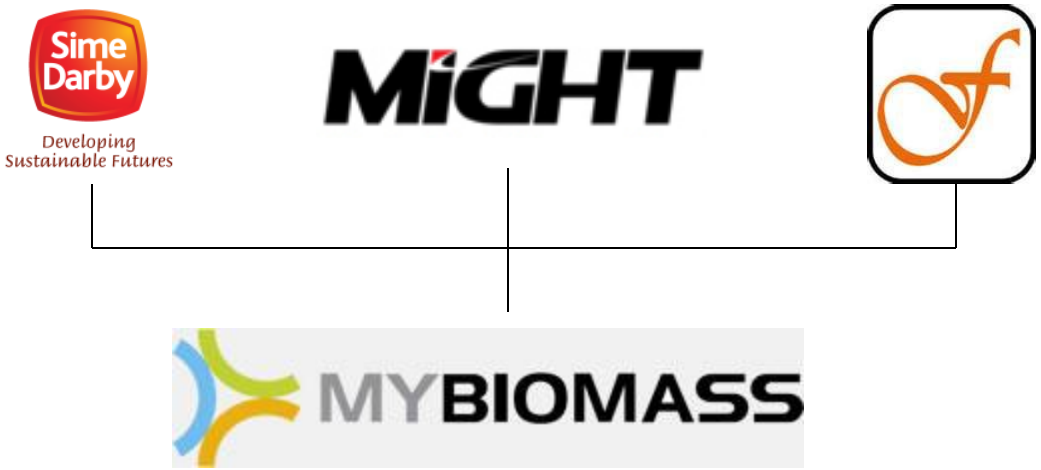
Exploring the Routes of Opportunities for Biomass



- Biobased chemicals represent the **largest potential for Malaysia**.
- Current global market for all chemicals = **RM 7 trillion.**
- Lignocellulosic biomass supply 0.6%, equivalent to a global market size of RM 48 billion, which expected to grow to RM 110-175 billion by 2020.
- Malaysia can produce as much as 1.6 million tonnes of biobased chemical (market value of RM 7-9 billion). This would require 10-20 biobased chemical plants and a total investment of RM 10-15 billion by private sector as well as the mobilisation of 5.5 million tonnes of biomass.
- Seizing the biobased chemical opportunity could lead to an increase in GNI of RM 14-15 billion and the creation of 2,500 and 13,400 direct and indirect jobs respectively.
- *Source: National Biomass Strategy 2020: New wealth creation for Malaysia's palm oil industry, 2011*

Green Growth Strategy – The Way Forward

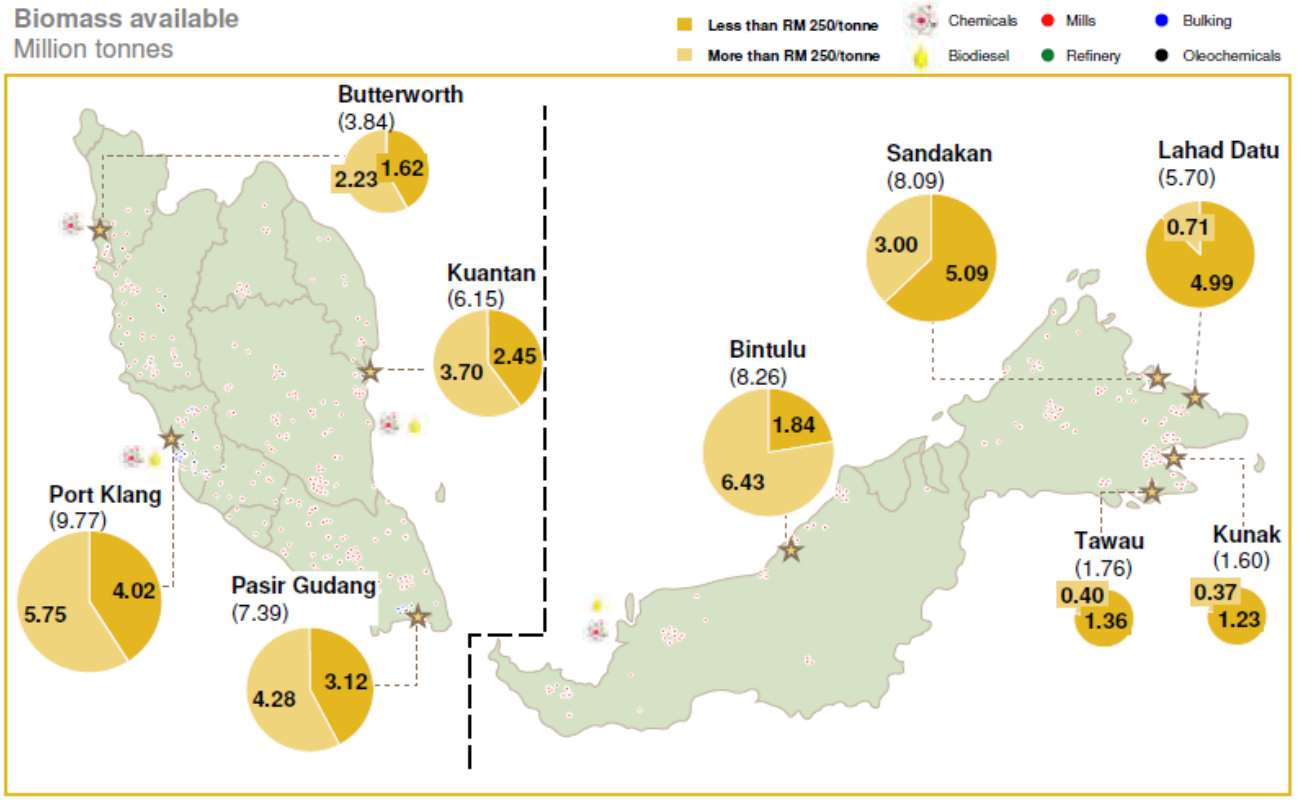
Smart partnership model



- MYBiomass is an initiative mooted by the Global Science, Innovation and Advisory Council (GSIAC) as a Special Purpose Vehicle (SPV) to aggregate biomass and setting up biorefinery facilities of converting biomass feedstock into valuable biochemicals for downstream application
- Sime Darby and Felda are the early participants in this partnership
- The partnership aims at pioneering high value green chemical conversion for biomass conversion and promoting continuous growth and business opportunities in producing high value green chemicals
- May include other agricultural and plantation players in the future to tap on their biomass; forest wood, agricultural waste

Challenges Ahead

Oil palm biomass needs to be removed at a competitive cost



SOURCE:, M. Islam et al.; K. Haron et al.; H. Kalid et al;. Lazaro A. et al.; ICIS; MARDI; MPOB; Field visit; Interviews

Key hurdles of biomass aggregation

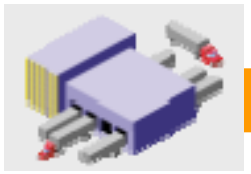
- Substitution cost
- Labor (harvesting and collection)
- Pre-processing cost
- Transportation cost
- Terrain conditions
- Machinery

Selection of site for a biorefinery is crucial for a sustainable economies of scale – consistency in supply and demand

FFB

Fronds, Trunks

EFB, Fronds, Trunks, Shell



Collection hub

Biorefinery

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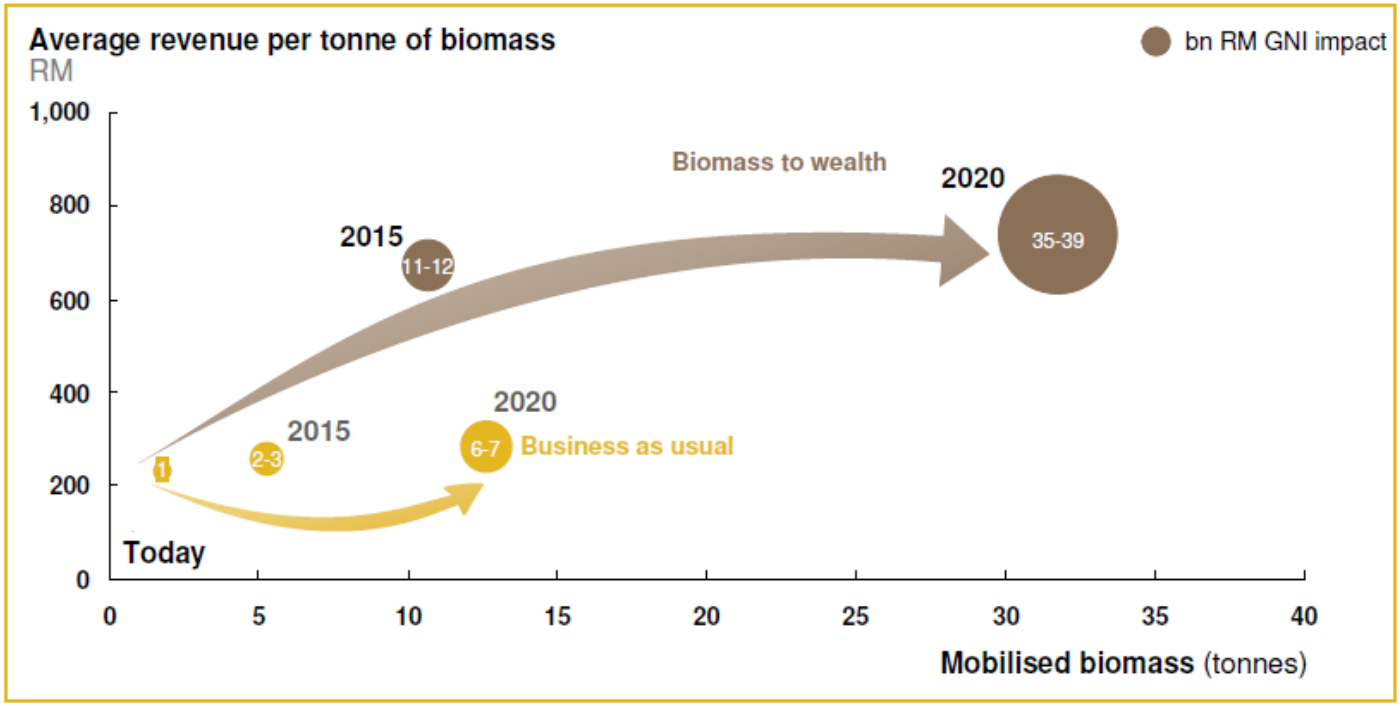
Map source: National Biomass Strategy 2020: New wealth creation for Malaysia's palm oil industry, 2011

Value Creation from Biomass: From Waste to Wealth

Additional 20 million tonnes of biomass could be deployed towards higher value downstream activities



The National Biomass Strategy 2020 would deliver incremental **GNI of approximately RM30bn**

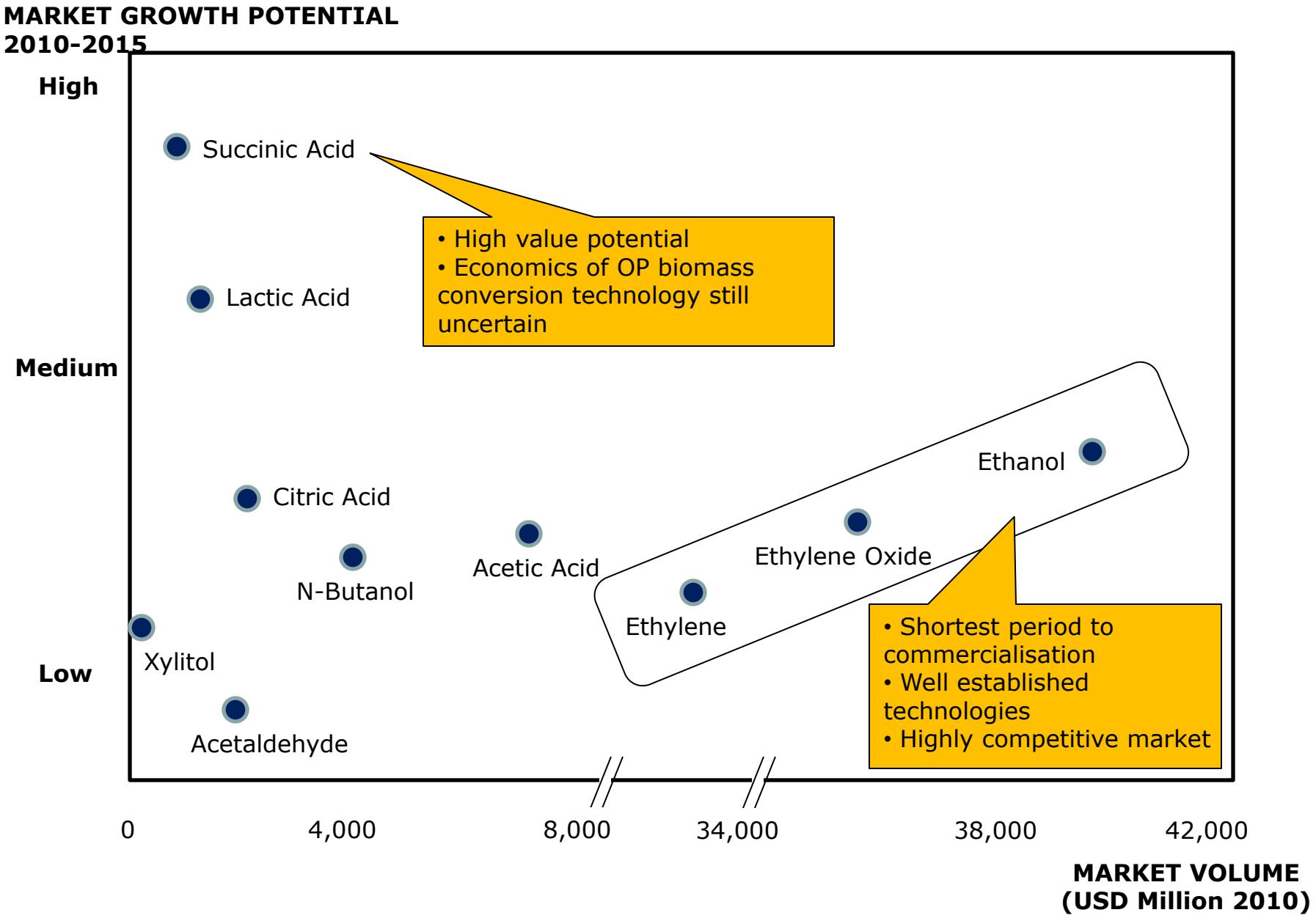
Focus on biomass usage could shift from lower value activities to higher value creation

Short term	Medium term	Long term
Composting, Pulp & Paper, Wood industry uses, Animal feed, Biogas, Pellets	Biofuels	Biobased chemicals
Available today	**2011-2015**	**2015-2020**

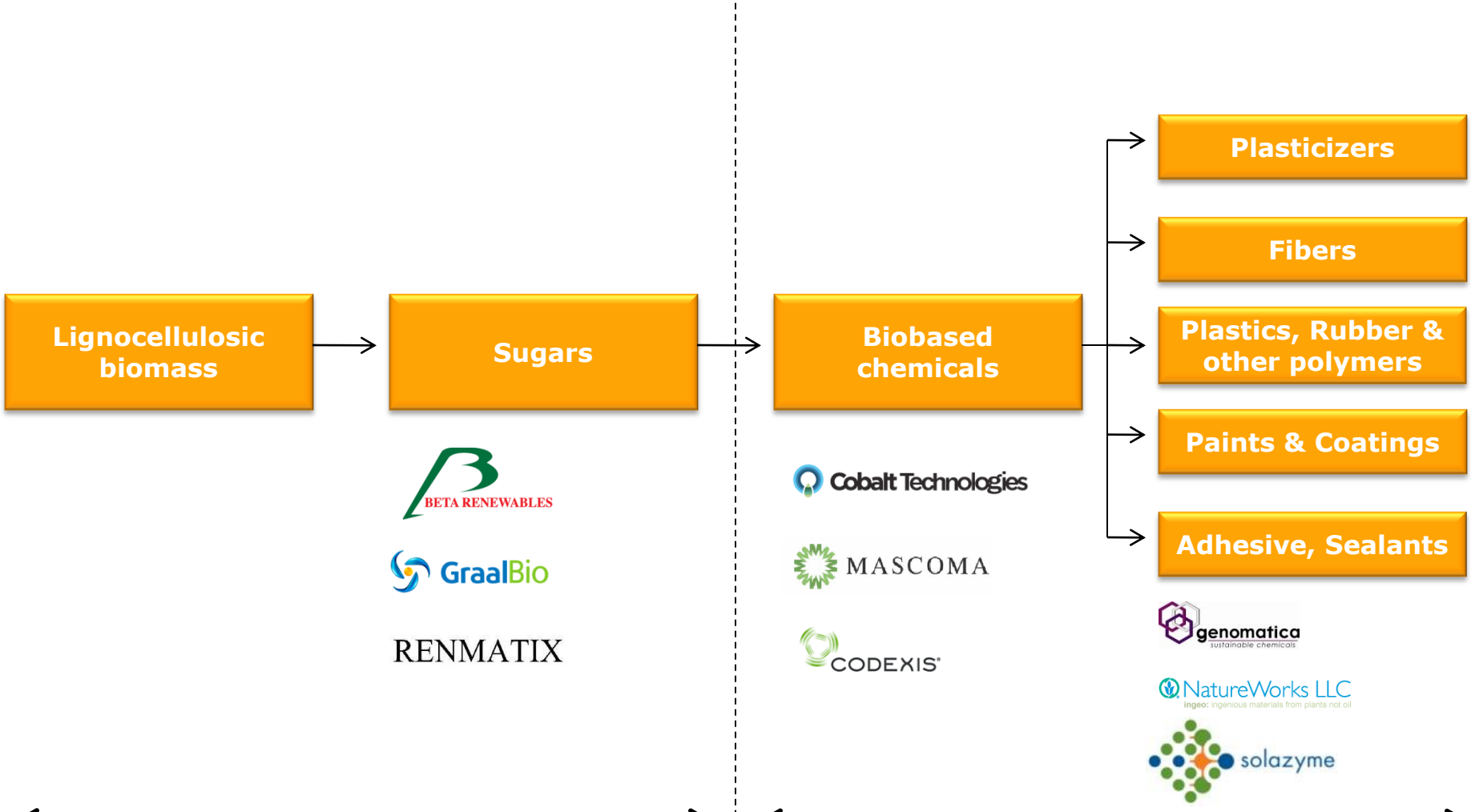
Source: National Biomass Strategy 2020: New wealth creation for Malaysia's palm oil industry, 2011

Market Outlook for Biobased Chemical

Due diligence is required to make viable investment decision



By going further downstream, we have the benefit to capture the entire value chain



Smart partnership is key

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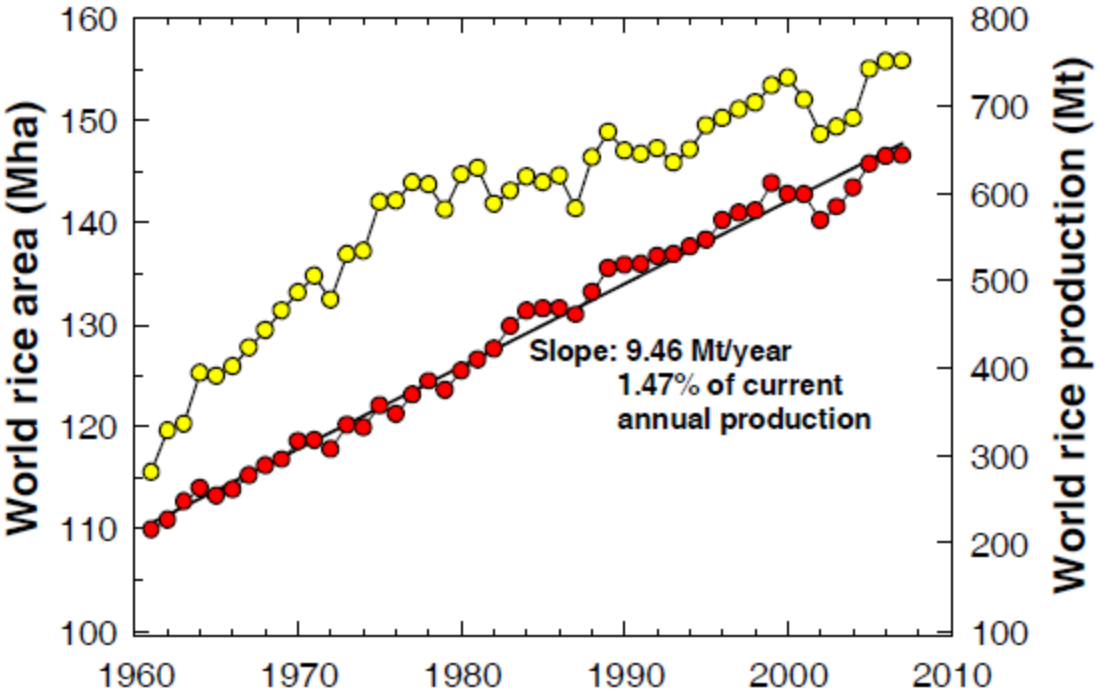
We should also look into rice biomass



- World rice production and area is increasing by the year
- The world is producing 580 million tonnes of rice straw per year

- Current use: burning, fuel for cooking, animal feeds, some are recycled
- Energy content: 14 MJ/kg at 10% moisture

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Source: Rice straw for electricity and heat production, Dr. Robert Baker, Wageningan University, June 2009

RICE BIOMASS

Rice straw : 100% of crop weight
Rice husk (full) : 22% of paddy weight
Rice bran : 8% of paddy weight

For biomass rice straw:
For 1kg of harvested paddy, 1 kg of rice straw will be harvested.
Paddy production: 2.4 million kg = 2.4 million kg rice straw

Source:
Rice biomass for agricultural in Philippines
www.statistic.gov.my/Economic/files/08padi

Conclusions

Many challenges remain to migrate to low carbon economy

1. Technology challenges (not mature) for biomass conversion
2. Human resources- development and education
3. Creating green markets & obtaining investment in Green Technology still challenging- Many current business propositions still not clearly economically viable
4. Are there sufficient resources available to achieve renewable energy and bioeconomy targets? Logistical issues need addressing, Food vs Fuel still not resolved

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What can we do?

- Policy- creating a conducive environment
- Education & outreach- getting buy in from public & producers; building talent
- R&D- closing the gaps

Thank You

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