ENRICHING THE NATION, SECURING THE FUTURE

LEVERAGING THE AGRO & PETROCHEMICAL INDUSTRIES TO ADVANCE THE BIOECONOMY

THE WORLD CONGRESS ON INDUSTRIAL BIOTECHNOLOGY

13 MAY 2014
As a **Bio-industry Developer**, we:

- **Accelerate and enhance** the growth of the Bio-Based Industry
- **Planned and realize** maximum value through strategic ventures
- **Selectively forge ventures** with ‘best-in-class’ global bio-based partners
- **Create iconic hub** of bio-based industry in Malaysia
- **Offer truly exciting investment climate** for visionaries and investors
MALAYSIA SETS A TARGET TO BECOME A HIGH-INCOME DEVELOPED NATION BY 2020

ENGINEERING & CONSTRUCTION

PALM OIL

AUTOMOTIVE

OIL & GAS, PETROCHEMICAL

ELECTRICS & ELECTRONICS

TIMBER & FURNITURE

STRATEGIC INDUSTRIES
NEW ECONOMIC MODEL WAS INTRODUCED TO ENABLE SUSTAINABLE ECONOMIC GROWTH & BECOMING A HIGH – INCOME NATION

USD15,000 GNI PERCAPITA BY 2020

- HIGH – INCOME NATION
- QUALITY OF LIFE
- INCLUSIVENESS
- SUSTAINABILITY

ENABLES ALL COMMUNITIES TO BENEFIT FROM THE WEALTH OF THE COUNTRY

MEETS PRESENT NEEDS, WITHOUT COMPROMISING FUTURE GENERATIONS
TO ACHIEVE THE HIGH – INCOME STATUS, MALAYSIA NEEDS TO BE:

FOCUS & COMPETITIVE

Introduction of the Bioeconomy Transformation Program as the new economic icon for Malaysia by:

SYNERGIZING THE OLEOCHEMICAL AND PETROCHEMICAL INDUSTRIES
COMPARING MALAYSIA’S BIOECONOMY TO SELECTED ECONOMIES BASED ON CONTRIBUTION TO THE GDP

BIOECONOMY’S CONTRIBUTION TO THE NATION’S GDP
USD50 BILLION
HOW DO WE LEVERAGE ON THE AGRO & PETROCHEMICAL INDUSTRIES TO ADVANCE THE BIOECONOMY
By 2010, Asia was already generating a high share of global chemical market value.

- **Asia**: (43%) USD 1.2 TRILLION
- **Europe**: (24%) USD 0.7 TRILLION
- **North America**: (21%) USD 0.6 TRILLION
- **Rest of the World**: (7%) USD 0.2 TRILLION
- **Latin America**: (5%) USD 0.1 TRILLION

**Global Chemical Market Value (2010)**

USD 2.8 TRILLION
THE CHEMICAL INDUSTRY WILL SHIFT EAST BY 2030

LATIN AMERICA
REST OF WORLD
NORTH AMERICA
EUROPE
ASIA

USD 1.2 TRILLION
USD 2.8 TRILLION
USD 4.0 TRILLION

2010
2030
South East Asia's forecasted chemical growth is backed by the ongoing development and expansion of Petrochemical Refineries. 

Malaysia: RAPID – Johor & GIPC – Kuantan
Singapore: Jurong 2.0
Thailand: IRPC – Rayong & Map Ta Phut
POTENTIAL BIOCHEMICAL MARKET SHARE IN SOUTH EAST ASIA (2030)
(The McKinsey Theory: 10% of chemical market share)
OIL PALM TREE: ‘A MULTI – PURPOSE TREE’

A UNIQUE FEEDSTOCK

Among the few feedstock of the world that is able to provide multi-platform feedstock for the industrial biotechnology industry

- **BIOMASS & CELLULOSIC SUGAR**
  - 20 million dry metric tonnes of biomass per year from empty fruit bunches (EFB, and Oil Palm Trunks)
  - Potential cellulosic sugar production of 12 million metric tonnes per year

- **OIL & LIPIDS**
  - 20 million metric tonnes of Crude Palm Oil (CPO)

- **METHANE**
  - 1 Billion cubic meter of biomethane from the Palm Oil Mill Effluents (POME)
GLOBAL OIL & LIPIDS MARKET (2010)

- **Asia**: USD 114 billion
- **North America**: USD 108 billion
- **Latin America**: USD 140 billion
- **Europe**: USD 52 billion
- **Rest of World**: USD 23 billion

GLOBAL VEGETABLE OIL & LIPIDS MARKET VALUE (2010)

USD 440 billion
GLOBAL MARKET FOR OIL & LIPIDS FROM 2010 - 2030

LATIN AMERICA: 35% in 2010, 38% in 2030
REST OF WORLD: 6% in 2010, 7% in 2030
NORTH AMERICA: 27% in 2010, 25% in 2030
EUROPE: 13% in 2010, 13% in 2030
ASIA: 26% in 2010, 23% in 2030

USD 114 BILLION
USD 140 BILLION
USD 630 BILLION
USD 440 BILLION

2010
2030
SOUTH EAST ASIA MARKET FOR OIL & LIPIDS (Palm Oil) FROM 2010 - 2030

2010

USD 45 BILLION
38% of ASIA

2030

USD 60 BILLION
35% of ASIA
<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>CHALLENGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>WORLD CLASS COMPANIES &amp; CONGLOMERATES i.e. SIME DARBY, PETRONAS, FELDA, GENTING, IOI</td>
<td>LIMITED AREA FOR PLANTATION EXPANSION, FORCING PALM GROWERS TO VENTURE FURTHER DOWNSTREAM</td>
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<td>READY &amp; WELL-ESTABLISHED INFRASTRUCTURE, DEDICATED, CUSTOMIZED INDUSTRIAL PARKS</td>
<td>LIMITED TECHNOLOGY KNOW-HOW, WILL REQUIRE STRATEGIC PARTNERSHIP WITH TECHNOLOGY PROVIDERS</td>
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<td>ADVANCED ENGINEERING CAPABILITIES FROM BOTH PALM OIL &amp; THE PETROCHEMICAL INDUSTRIES</td>
<td>LIMITED EXPERIENCE IN SCALING UP BIO-BASED PROJECTS</td>
</tr>
<tr>
<td>PROVIDE OPPORTUNITIES TO COMPLEMENT WITH THE STRATEGIC PROJECTS. i.e. PETRONAS RAPID, JOHOR &amp; PETRONAS GIPC, KUANTAN</td>
<td>VERY COMPETITIVE REGIONAL INVESTMENT LANDSCAPE</td>
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THE BIOCHEMICAL ECOSYSTEM IN MALAYSIA
(Synergizing Oleochemical & Petrochemical Industries)

NEW ACTIVITY

HIGH VALUE CHEMICALS

EXISTING ACTIVITIES

5.2 MILLION (HA)  430 MILLS  67 REFINERIES & OLEOCHEMICALS

BIOCHEMICALS

EXISTING ACTIVITIES

1.4 MILLION BARRELS / DAY  6 REFINERIES  265 CHEMICAL MANUFACTURERS

CRUDE OIL PRODUCTION  OIL REFINERIES  CHEMICAL PRODUCERS
VALUE ADDITION TO PALM OIL INDUSTRY

USD PRICE/MT

Adoption of Biotechnology in Downstream Palm Oil Industry

1,400 – 2,000

1,000 – 1,400

800 – 1,000

150

FRESH FRUIT BUNCHES

CRUDE PALM OIL

PALM REFINERY PRODUCTS

BASIC OLEO PRODUCTS

SPECIALTY BIO CHEMICALS

3,000 – 4,000

800 – 1,000

1,400 – 2,000
THANK YOU

READY TO INSPIRE

COMMERCIALIZING INNOVATION IN BIOTECHNOLOGY