BIOFUEL DEVELOPMENT IN INDONESIA

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OUTLINE

I. Introduction
II. Biofuel Development
III. Progress of Biofuel Development and Implementation
IV. Challenges
V. Conclusion
INTRODUCTION
WHY BIOFUEL?

1. BIOFUEL have a long and distinguished pedigree
2. BIOFUEL could guarantee energy security and prevent climate change
3. BIOFUEL are significantly reduce greenhouse gas emission, especially in transportation sector
4. BIOFUEL also provide important opportunities for industrial development, innovation and jobs creation
5. BIOFUEL industry allows community participations, including farmer
6. BIOFUEL offer us an option that is full of promise and are developed in ways that protect our planet
WHY BIOFUEL? (continuation)

7. Indonesia has high biodiversity for BIOFUEL feedstock supply and land availability that suitable for BIOFUEL plantation

8. Proven BIOFUEL technology by domestic potential (Engineering, Research and Development)

9. High number of unemployment in Indonesia - that could be transferred to BIOFUEL sector - and poverty

10. Opportunity for Regional Governments to increase their economic development

11. Opportunity to substitute fossil fuel using BIOFUELS

12. Opportunity in exporting BIOFUELS products
CURRENT ENERGY MIX (1 million BOE)

National (Primary) Energy Mix

- Oil: 51.66%
- Coal: 15.34%
- Natural Gas: 28.57%
- Geothermal: 1.32%
- Hydro Power: 3.11%

National Energy Mix 2025 (3 million BOE)

(Presidential Decree No. 5/2006)

- Coal: 33%
- Gas: 30%
- Oil: 20%
- RE: 17%
- Biofuel: 5%
- Geothermal: 5%
- Biomass, Nuclear, Hydro Solar Energy: 5%
- Wind Power: 5%
- Coal Liquefaction: 2%
BIOFUELS ACCELERATING PROGRAM

NATIONAL ENERGY POLICY

National Energy Mix 2025 (Presidential Decree No. 5/2006)

- Coal, 33%
- Gas, 30%
- Oil, 20%
- RE, 17%
- Biofuels, 5%
- Geothermal, 5%
- Biomass, Nuclear, Hydro
- Solar Energy, Wind Power, 5%
- Coal Liquefaction, 2%

Presidential Decree No. 10/ 2006 on National Team on BIOFUELS Development

Presidential Instruction No. 1/ 2006 to 13 Gov’t Institutions & Regional Gov’t on BIOFUELS Supply and Utilization as an Alternative Energy

BLUEPRINT, ROADMAP, RECOMMENDATION

IMPLEMENTATION
BIOFUEL DEVELOPMENT
OBJECTIVE OF BIOFUEL DEVELOPMENT

1. Poverty alleviation and job creation

2. Encourage enhancement of sustainable economical activities, through biofuel development:
   • Meet quantity and quality requirements
   • Reasonable price
   • Efficient, reliable, save and environmental friendly

3. Reducing domestic fossil fuel consumption
FAST TRACK BIO-ENERGY DEVELOPMENT

Each Region Developing its Bio-energy Potential

SPECIAL BIO-ENERGY ZONE

Create Job

Poverty Alleviation

SHORT RUN

LONG RUN

Energy Self Sufficient Village

Energy

- Infrastructure
- Demplot
- On time schedule
- Explicit investment employment ratio
BACKGROUND OF ENERGY SELF SUFFICIENT VILLAGE (ESSV) DEVELOPMENT

1. Indonesia has more than 70,000 villages, 45% of which are under poverty line.

2. Energy Self Sufficient Village is a program to fulfill the village’s needs on energy, to create job and to alleviate poverty through optimizing local community capabilities.

3. The target of this program is to release local community dependency on fossil fuel.

4. Energy Self Sufficient Village is implemented gradually, starting from the villages that have been prioritized by the Government.
ENERGY SELF SUFFICIENT VILLAGE (ESSV) FUNDING

Funding Sources

State Budget

Department/Institution

State Own Company

Regional Government

Private Sector

Small/Medium Enterprise

ESSV
DEVELOPMENT OF SPECIAL BIOFUEL ZONE

- **SEED**
  - CULTIVATION
  - CULTIVATION

BIOFUEL INDUSTRY

- INDUSTRY
- PLN (STATE OWNED ELECTRICITY COMPANY)
- EXPORT
- PERTAMINA (STATE OWNED OIL AND GAS COMPANY)
- TRANSPORTATION
BIOFUEL FEEDSTOCK

MAIN FEEDSTOCK
- Palm Oil
- Jatropha curcas
- Cassava
- Sugar cane

UNDER DEVELOPMENT
- Coconut
- Seed of Hevea braziliancis
- Aleurites molucana
- Micro algae
- Sweet sorghum
- Sugar palm
- Sago
- Corn

PRODUCTS
- BIOOIL
- BIODIESEL
- BIOETHANOL
TARGET 2010

1. Job creation for 3.5 million unemployment
2. Increasing income for On-Farm and Off-Farm workers in biofuel sector up to the Regional Minimum Payment
3. Development of biofuel plantation in 5.25 million ha unused land
4. 1000 Energy Self Sufficient Villages and 12 Special biofuel Zone
5. Reducing Fossil Fuel for transportation up to 10%
6. Reducing fuel subsidy
7. Achievement of biofuel target
# Roadmap for Biofuel Development

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Biodiesel</strong></td>
<td>Biodiesel Utilization 10% of Diesel Fuel Consumption 2.41 million kL</td>
<td>Biodiesel Utilization 15% of Diesel Fuel Consumption 4.52 million kL</td>
<td>Biodiesel Utilization 20% of Diesel Fuel Consumption 10.22 million kL</td>
</tr>
<tr>
<td><strong>Bioethanol</strong></td>
<td>Bioethanol Utilization 5% Gasoline Consumption 1.48 million kL</td>
<td>Bioethanol Utilization 10% Gasoline Consumption 2.78 million kL</td>
<td>Bioethanol Utilization 15% Gasoline Consumption 6.28 million kL</td>
</tr>
<tr>
<td><strong>Bio-oil</strong></td>
<td>Biokerosene Utilization 1 million kL</td>
<td>Biokerosene Utilization 1.8 million kL</td>
<td>Biokerosene Utilization 4.07 million kL</td>
</tr>
<tr>
<td>- Biokerosene</td>
<td>PPO Utilization 0.4 million kL</td>
<td>PPO Utilization 0.74 million kL</td>
<td>PPO Utilization 1.69 million kL</td>
</tr>
<tr>
<td>- Pure Plantation Oil for Power Plant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BIOFUEL</strong></td>
<td>BIOFUEL Utilization 2% of energy mix 5.29 million kL</td>
<td>BIOFUEL Utilization 3% of energy mix 9.84 million kL</td>
<td>BIOFUEL Utilization 5% of energy mix 22.26 million kL</td>
</tr>
</tbody>
</table>
PROGRESS OF BIOFUEL DEVELOPMENT AND IMPLEMENTATION
Availability of biofuel Development Blue Print and Road Map
Availability of biofuel Development Regulations and Standards
Biodiesel (B-5), has been sold in 201 gas stations in Jakarta and 15 gas stations in Surabaya
Bioethanol (E-5), biopremium has been sold in 1 gas station in Malang. Started December 2006 Bio-Pertamax has been sold in 4 gas stations in Jakarta, 5 gas stations in Surabaya and 3 gas stations in Malang.
Started of Energy Self Sufficient Village using biofuel
Commitments of Investor to develop biofuel
PRODUCTION OF FUEL GRADE BIOETHANOL – April 2007: 82,500 KL

- **BPPT Lampung**
  - 2,500 kl/yr
  - (cassava)

- **SUGAR GROUP Lampung**
  - 70,000 kl/yr

- **Molindo Raya Malang, Jatim**
  - 10,000 kl/yr
### ADDITIONAL PRODUCTION OF FG BIOETHANOL:
2 million up to 2.7 million kL/year (1.1 million ha): 2007 – 2010

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Capacity</th>
<th>Land Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>SALIM GROUP</td>
<td>Sumsel</td>
<td>70,000 kL/yr</td>
<td>70,000 ha</td>
</tr>
<tr>
<td>MEDCO</td>
<td>Lampung, Jabar, Kalimantan</td>
<td>180,000 kL/yr</td>
<td>45,000 ha</td>
</tr>
<tr>
<td>EN3 Korea</td>
<td>Sulsel, 180,000 kL/yr</td>
<td>45,000 ha</td>
<td></td>
</tr>
<tr>
<td>ANGEL PRODUCT</td>
<td>Sultra, 10,000 kL/yr</td>
<td>8,000 ha</td>
<td></td>
</tr>
<tr>
<td>SORINI Tbk</td>
<td>200,000 kL/yr, 150,000 kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUGAI BUDI</td>
<td>Lampung</td>
<td>120,000 kL/yr</td>
<td>25,000 ha</td>
</tr>
<tr>
<td>SUGAR GROUP</td>
<td>Lampung, Sumsel, Kalimantan</td>
<td>500,000 kL/yr</td>
<td>200,000 ha</td>
</tr>
<tr>
<td>WILMAR GROUP</td>
<td>Lampung, Sumsel</td>
<td>70,000 kL/yr</td>
<td>70,000 ha</td>
</tr>
<tr>
<td>MOLINDO</td>
<td>Lampung, Kediri, Pacitan</td>
<td>100,000 kL/yr</td>
<td>25,000 ha</td>
</tr>
<tr>
<td>SAMPURNA</td>
<td>Madiun, Pawonsari</td>
<td>375,000 kL/yr</td>
<td>100,000 ha</td>
</tr>
<tr>
<td>MITSUI PETROBRAS</td>
<td>Papua, Kalimantan, 500,000 kL/yr</td>
<td>200,000 ha</td>
<td></td>
</tr>
<tr>
<td>RNI, PTPN</td>
<td>2,8,8,9,10,11,14</td>
<td>Sumut, Lampung, Sulsel, Jawa, NTT</td>
<td>200,000 kL/yr, 60,000 + 40,000 ha</td>
</tr>
</tbody>
</table>
PRODUCTION OF BIODIESEL – April 2007: 520,000 Ton/Year

- **PTPN 4 & GANESHA ENERGI Medan**
  - 4,000 ton/yr (CPO)

- **BPPT Serpong**
  - 300,000 ton/yr (CPO)

- **RAP Bintaro**
  - 1,650 ton/yr (CPO)

- **EAI Jakarta**
  - 500 ton/yr (CPO)

- **SUMIASIH Bekasi**
  - 40,000 ton/yr (CPO)

- **DHARMA**
  - 4,000 ton/yr (CPO)

- **ETERINDO Gresik & Tanggerang**
  - 120,000 ton/yr (CPO)

- **WILMAR GROUP Dumai**
  - 350,000 ton/yr (CPO)
ADDITIONAL PRODUCTION OF BIODIESEL: 2 million kL/year (3.6 million ha): 2007 – 2011

- WILMAR GROUP
  - Sumatra, Borneo
  - 1,000,000 kL/yr
  - 180,000 ha

- PERTAMINA
  - Dumai, Balongan, Balikpapan
  - 500,000 kL/yr

- SINARMAS
  - Dumai
  - 400,000 kL/yr

- BAKRIE, INDOFOOD, ASIANAGRO SUMIASIH
  - Sumatra, Jawa
  - 600,000 kL/yr

- INDOMAL+PTPN
  - Medan, Banten, Pekanbaru
  - 1,500,000 kL/yr

- TOLARAM
  - Kalbar
  - 110,000 ha

- ASIATIC GROUP
  - Kalbar
  - 80,000 ha

- CLEAN BIOFUEL
  - Gorontalo
  - 50,000 ha

- BUMN AGRO
  - Riau, Jambi, Sumsel, Sumsel, Papua
  - Inti 220,000 ha
  - Plasma 880,000 ha

- MUTING GROUP
  - Merauke
  - 290,000 ha

- TOLARAM
  - Kalbar
  - 110,000 ha

- SWEDEN BIOENERGY
  - NTT 350,000 kL/yr
    - 100,000 ha

- INDOMAL
  - Sula & Merauke
  - 300,000 ha

- 9 BADAN USAHA
  - Merauke
  - 340,000 ha

- APROBI GROUP
  - Kalimantan
  - 100,000 ha

- BP
  - NTT, Papua, Kalimantan
  - 100,000 ha

- PERTAMINA
  - Medan, Balikpapan
  - 1,500,000 kL/yr

- INTI
  - Dumai
  - 220,000 ha

- ASIA GROUP
  - Dumai
  - 400,000 kL/yr

- INOFOOD
  - Balong, Balikpapan
  - 500,000 kL/yr

- SUMIASIH
  - Sumatra, Jawa
  - 600,000 kL/yr

- SINARMAS
  - Dumai
  - 400,000 kL/yr

- BAKRIE, INDOFOOD, ASIANAGRO
  - Sumatra, Jawa
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- APROBI GROUP
  - Kalimantan
  - 100,000 ha

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  - NTT, Papua, Kalimantan
  - 100,000 ha

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- INDOMAL
  - Sula & Merauke
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- 9 BADAN USAHA
  - Merauke
  - 340,000 ha
## BIOFUEL POWER GENERATOR 2007

<table>
<thead>
<tr>
<th>No.</th>
<th>Location</th>
<th>Numbers of Power Generator</th>
<th>Total Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>North Sumatera</td>
<td>1</td>
<td>4.5</td>
</tr>
<tr>
<td>2</td>
<td>Maluku</td>
<td>7</td>
<td>4.0</td>
</tr>
<tr>
<td>3</td>
<td>Riau and The Islands of Riau</td>
<td>2</td>
<td>14.1</td>
</tr>
<tr>
<td>4</td>
<td>Lampung</td>
<td>1</td>
<td>11.0</td>
</tr>
<tr>
<td>5</td>
<td>Bali</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>6</td>
<td>South Kalimantan</td>
<td>5</td>
<td>19.8</td>
</tr>
<tr>
<td>7</td>
<td>East Kalimantan</td>
<td>7</td>
<td>16.0</td>
</tr>
</tbody>
</table>
CHALLENGES
CHALLENGES

1. Land availability for Biofuel Development
   - Land availability inventory, synchronizing data among Forestry Department, National Land Affairs Agency and Regional Government

2. High price of biodiesel feedstock, especially CPO
   - Feedstock diversification is needed

3. Improving quality of Biofuel commodities
   - Agricultural research on biofuel commodities sector

4. Improving national technological capabilities on biofuel processing
   - Research and Development, technology transfer on biofuel processing with more experienced parties

5. The price of biofuel that has not yet competitive in compare with fossil fuel
   - Feedstock diversification and effective technology will decrease the price of biofuel
CONCLUSION
CONCLUSION

1. Biofuel is an alternative energy which can substitute fossil fuel
2. Biofuel industry allows community participations, including farmer
3. Optimizing biofuel processing technology from upstream to downstream is very important to meet efficiency and to reduce the price of biofuel
THANK YOU

Energy and Mineral Resources Department
www.esdm.go.id
www.mesdm.net
LAND AND CLIMATE COMPATIBILITY MAP FOR PALM
(3 million hectares)
LAND AND CLIMATE COMPATIBILITY MAP FOR SUGARCANE
(0.5 million hectares)
LAND AND CLIMATE COMPATIBILITY MAP FOR JATROPHA CURCAS (million hectares)
POTENTIAL LAND FOR CASSAVA PLANTATION (million hectares)

Potential land:
- < 75 ha
- 75 – 200 ha
- 201 – 400 ha
- 401 – 1,800 ha

Production projection 100 ton cassava per dot