Energy Security and Biofuel for a Low Carbon Economy in the Asia-Pacific Region

International Forum for Sustainable Asia and the Pacific
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Energy Security Section, Environment and Development Division (EDD), ESCAP

Outline
- Asia Pacific: An Overview
- ESCAP Background
- Energy Situation in AP
- Energy Security Paradigm Shift
- Biofuels Status and Potential in AP
- Biofuel and Sustainable Development Dimension: economic, environmental and social (MDGs)
- Future of Energy Security and Biofuels - To biofuel or not to biofuel?
1. The Asia-Pacific: An Overview

- Population: 3.9 billion people or 2/3 of the global population
- Density: 1.5 times the global average
- Land surface: 40% of global land area

**UNESCAP**

53 Member states
9 Associate members
49 within the region

- Diversity and Disparity: LDCs (14), LLDCs (12), SIDS (16), Economies in transition (8) & developed economies (5)
- High GDP per capita (PPP) country & low country (Japan/US$33,100 & Tajikistan/US$1,300)
- 2/3 of the world’s poor (1/5 lives on $1/day)

2. ESCAP Background

- Established in 1947 (Shanghai ➔ Bangkok)
- Regional development arm of United Nations
- A forum to discuss inclusive socio-economic issues & strengthen regional cooperation
- Main areas: poverty reduction, environment, social issues, statistics, transportation, trade, ICT & disaster reduction
- Environment & Development Division: Environment, Water and Energy Security Sections
Key Milestones

- **MCED5** (Seoul, March 2005) adopted Green Growth as key regional strategy for achieving continued economic growth compatible with environmental sustainability.

- **64th session of the Commission** (Bangkok, April 2008) emphasized the need for transition towards a sustainable energy security path.

- **Low Carbon Development Path (LCDP)** envisioned to facilitate essential transition in line with Green Growth approach (17-19 June 2009, Beijing).

**Schedule**

- **17+18 June**: Expert Group Meeting on "Towards a Low Carbon Development Path for Asia and the Pacific: Challenges and Opportunities to the Energy Sector".
- **18 June**: Policy Dialogue on Energy Efficiency for Low Carbon Development in Cities: Challenges and Opportunities.
3. Energy Situation in Asia-Pacific

**Theme Study on Energy Security & Sustainable Development in AP**
**64th Commission, Bangkok, April 2008**

- High dependency on fossil fuels aggravating AP’s vulnerability to energy prices
- Share of fossil fuel consumption to remain 82% in 2030 under BAU scenario
- Shift to “quality of growth” and sustainable energy paradigm
- Regional energy system baseline scenario would require US$9 trillion up to 2030
- LDCs are most vulnerable to high oil price
Poor are paying disproportionately

According to UNDP, between 2002 & 2005, poor households in China, India, Indonesia and Lao PDR paid steeply for rising energy costs:

- 171% more for cooking fuels
- 120% more for transportation
- 67% more for electricity
- 55% more for lighting fuels
- 33% more for fertilizers & other agricultural inputs
- 74% more for energy as a whole

Snapshot of Energy Security Challenge for AP

- AP energy demand growth fastest, more than twice the world average requiring more energy
- Equity threat: 1.7 billion people using traditional biomass, 1 billion without access to electricity, per capita energy consumption well below world average
- Ecological threat: rising emissions, depleting natural resources, climate change impacts
- Economic threat: lower growth due to global financial crisis affecting energy development
Oil import dependency of selected countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Oil Supply (Thousand bpd)</th>
<th>Import (Thousand bpd)</th>
<th>Dependency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>5421.49</td>
<td>2023.96</td>
<td>37.33</td>
</tr>
<tr>
<td>Japan</td>
<td>5160.04</td>
<td>5224.50</td>
<td>100.00</td>
</tr>
<tr>
<td>India</td>
<td>2485.00</td>
<td>1710.64</td>
<td>68.84</td>
</tr>
<tr>
<td>Thailand</td>
<td>815.48</td>
<td>598.43</td>
<td>73.38</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>2032.33</td>
<td>2055.82</td>
<td>100.00</td>
</tr>
<tr>
<td>Philippines</td>
<td>316.04</td>
<td>318.82</td>
<td>100.00</td>
</tr>
<tr>
<td>New Zealand</td>
<td>136.55</td>
<td>110.44</td>
<td>80.88</td>
</tr>
</tbody>
</table>

Energy consumption in AP

Relatively Low Energy Consumption

More than 60% of the World’s population consumes just over 40% of the energy.
Global trends in CO2 emissions from fuel combustion by region from 1971 to 2004


<table>
<thead>
<tr>
<th>Country</th>
<th>2000</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>America</td>
<td>20.6</td>
<td>15.1</td>
</tr>
<tr>
<td>China</td>
<td>14.7</td>
<td>22.9</td>
</tr>
<tr>
<td>EU 25</td>
<td>14.0</td>
<td>7.8</td>
</tr>
<tr>
<td>Russia</td>
<td>5.7</td>
<td>2.8</td>
</tr>
<tr>
<td>India</td>
<td>5.6</td>
<td>9.2</td>
</tr>
<tr>
<td>Japan</td>
<td>3.5</td>
<td>1.6</td>
</tr>
<tr>
<td>Brazil</td>
<td>2.5</td>
<td>2.2</td>
</tr>
<tr>
<td>Canada</td>
<td>2.0</td>
<td>1.3</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>1.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Mexico</td>
<td>1.5</td>
<td>1.7</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1.5</td>
<td>2.2</td>
</tr>
<tr>
<td>Australia</td>
<td>1.5</td>
<td>1.0</td>
</tr>
<tr>
<td>South Africa</td>
<td>1.2</td>
<td>1.1</td>
</tr>
<tr>
<td>Rest of the World</td>
<td>23.8</td>
<td>29.9</td>
</tr>
</tbody>
</table>

Shares of GHG emissions in 2000 & 2050 (%)

Source: World Resources Institute, 2005; Matysek et al 2006
4. Energy Security Paradigm Shift

- To reverse carbon emissions and climate change trajectory
- To ensure energy supplies for sustaining socio-economic development
- To widen access to energy services by the poor contributing to the achievements the MDGs
- To minimize the impact of high and volatile oil/energy prices on the economy
- To promote regional and subregional energy cooperation

Dilemma with fossil fuels
Unsustainable energy-economy-environment nexus
Need for a paradigm shift based on a sustainable energy scenario

Vicious Cycle
- Deepening Poverty
- Global Warming/Climate Change
- Deepening Dependency on Fossil Fuels
- Unsustainable Economic Growth

Virtuous Cycle
- Energy Security
- Climate Action
- Renewable Energy/Energy Efficiency
- Quality of Economic Growth

New Sustainable Energy Scenario vs. Baseline Scenario

- Total energy consumption could decrease by 7% in 2020 and by 11% in 2030
- Share of renewables could increase from 9% in 2005 to 17% in 2030
- Sustainable scenario could decrease CO₂ emission by 38% in 2030
- Savings of $766 billion in investment could be generated up to 2030
5. Biofuels Status & Potential in Asia-Pacific

- Situation Analysis on Biomass Utilization & Trade in Asia & the Pacific with Particular Focus on Indonesia & Thailand
  June 2007
- Regional Forum on Bioenergy Sector Development: Challenges, Opportunities & the Way Forward
  January 2008, Bangkok
- Policy Dialogue on Biofuels in Asia: Benefits & Challenges
  September 2008, Beijing
- Theme Study: Sustainable Agriculture and Food Security in Asia & the Pacific
  April 2009, Bangkok

A. Situation Analysis on Biomass Utilization & Trade in Asia & the Pacific with Particular Focus on Indonesia & Thailand
June 2007

Biomass potential in South East Asia

Estimates of Agricultural Residues in Southeast Asia, tons
A. Situation Analysis on Biomass Utilization & Trade in Asia & the Pacific with Particular Focus on Indonesia & Thailand

June 2007

Biofuel potential in Indonesia & Thailand

![Graph showing estimated potential supply and demand of biofuels in Indonesia and Thailand]

*Estimated Potential Supply and Demand of Biofuels in Indonesia and Thailand*

B. Regional Forum on Bioenergy Sector Development: Challenges, Opportunities & the Way Forward

23-25 January 2008, Bangkok

In collaboration with the Ministry of Agriculture and Cooperatives of the Royal Government of Thailand

![Images of bioenergy projects]

*Small-scale Biomass Gasification Power Plant (Capacity 100 kw)*

*Bio-Ethanol Plant Using Molasses (Capacity 100,000 L/d)*

*Cassava Biogas Plant in Korat, Thailand*
C. Policy Dialogue on Biofuels in Asia: Benefits & Challenges
September 2008, Beijing

Major Outcomes from Summary Report

- For developing countries in the Asia-Pacific, biofuel programmes should address energy access for the poor at the community level.
- A regional body or a network should be created to provide certification on the production of sustainable biofuels.
- Trade within Asian countries should be given priority and opportunities explored for this trade to flourish.
- International cooperation and regional cooperation on biofuel and biomass resources among countries in Asia via dialogues, network creation and information sharing.

D. Theme Study: Sustainable Agriculture and Food Security in Asia & the Pacific
April 2009

- Rapid expansion of biofuels industry
  - World total of 62 billion litres (52 billion litres bioethanol & 10 billion litres biodiesel)
  - Between 2001-2006, bioethanol grew by 22.7% and biodiesel 43.2% per annum
  - In 10-15 years, biofuels could provide 25% of world’s energy needs (FAO)
Brazil + U.S. produce 88%, whilst AP only 5%

Biofuels and its impact on food security in AP

- **Biodiesel production in AP**
  - Europe responsible for 80%, Asia 10-20%
  - Malaysia and Indonesia are world largest producers of palm oil
  - Combines potential capacity of 22 billion litres
  - Palm oil, soybean, jatropha are main feedstocks for AP
Biofuels and its impact on food security in AP (cont’d)

- **Biofuel implications for AP**
  - Industry still in development stages
  - Production is relatively small
  - Unlikely to have significantly contributed to food crisis
  - Rice being primary staple crop, not affected

6. Biofuels and Sustainable Development Dimension: economic, environmental and social (MDGs)

“If we get it right, bioenergy provides us with a historic chance to fast-forward growth in many of the world’s poorest countries, to bring about an agricultural renaissance and to supply modern energy to a third of the world’s population.”

Jacques Diouf, Director-General, FAO

“It is a crime against humanity to convert agriculturally productive soil into soil which produces foodstuffs that will be burned into [as] biofuel.”

Jean Ziegler, UN Special Rapporteur on The Right to Food
Potential benefits of biofuels: GOOD

- Biofuels are carbon neutral (?)
- Reduced GHG (?)
- Biofuels can increase farm income
- Biofuels can improve energy security
- Biofuels can create new jobs
- Biofuels are simple to produce

Potential negative impacts of biofuels: BAD

- Threat of biodiversity
  - Clearing tropical forest, monotonous cultivation and genetically modified crops can cause significant distortion on biodiversity

- Unsustainable land use
  - Use of deforestation to extend arable land for biofuels will magnify GHG emission significantly rather than reduce them
Potential negative impacts of biofuels: BAD

- **Water shortage**
  - Expansion of arable land will require more irrigation
  - Biomass needed to produce one litre of biofuel evaporates between 1000-4000 litres of water

- **Food inflation and food security**
  - More requirement of land due to the increase in biofuel consumption leads to shortage of food and inflation in food market

7. Future of Energy Security and Biofuels
- “To biofuel or not to biofuel”?

**Sustainable and regulated biofuels**
- AP would eventually need to forge and reach a greater degree of consensus on biofuels
- AP should continue policy deliberations in support of global consensus along the lines prescribed in the CFA
- National biofuel plans and strategies to provide a standard and regulatory framework that is sustainable and consistent with policies on poverty alleviation, climate action and rural development
- Need for a full life cycle assessment (LCA) on biofuel crops produced in the region as information source for regulating and certifying biofuel production
Thank you

For more information:
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