Bioenergy Development in Southeast Asia

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Bioenergy - Benefits

- Sustainability: a clean and renewable energy source
- Availability: bioenergy development can increase access to energy in rural areas
- Flexibility: bioenergy can deliver power and heat .
- Energy Security: bioenergy can contribute to diversifying the energy mix; there are a wide variety of feedstocks (raw material) for bioenergy and all countries can rely on some domestic sources

- Mitigation of climate change an improve clean air – bioenergy can significantly reduce greenhouse gas (GHG) emissions compared to fossil fuels (if some conditions are met)
- Diversification of rural livelihoods – in the energy sector,
- Utilizing newly available energy services - facilitating rural development
- Reduction in land degradation by plantation of perennial bioenergyfeedstocks.

Bioenergy - Challenges

- Ensuring sustainability – environmental, social and economic
- Safeguarding food security – ensuring that increased demand for biofuels does not adversely affect the hungry.
- Protecting biodiversity
- Managing competition for land and water
- Controlling pollution of air, water and soils
- Removing barriers to biomass and bioenergy trade

Bioenergy in the Southeast Asia

"Saudi Arabia produces 11 million barrels per-day. Southeast Asia has potential to produce 14 millions barrel per-day of renewable biofuels"

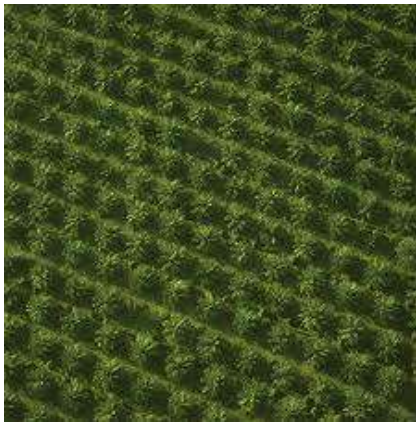
Per Dahlen, biodigest.com (11 March 2010)

- Since mid-2000s, most of the country in the Southeast Asia came up with national plan to develop and utilize biofuels, supporting with national Act.
- Estimate made by Eco-Asia (2009) suggested that some countries in SEA: Indonesia, Malaysia, Philippines, Vietnam, may have potential to increased their biofuels production 4 to 5 times than current production capacity by 2040, depending on the mix crops, area of utilized and amount of residues available for processing.
- Another analysis by Per Dahlen (2010) estimated that SEA requires 4.5 million ha land to compensate their petroleum import using 2nd Generation biofuel and most efficient conversion technology. WWF and FAO estimated that Southeas Asia has only 17.5 million ha land for energy crops. Only

Situation of Bioenergy in the Southeast Asia

- Cambodia:
  - Large scale plantation of energy crops has just begun
  - Priority feed-stock for biofuel is cassava and jathropa, alternative feedstock: corn, sugarcane, soy, palm oil, rice husk and agricultural residues
  - Foreign investment, export oriented biofuel product
- Indonesia
  - Largest palm-oil production in the world
  - Main feedstock for biofuel: palm oil, cassava, and sugarcane, alternative feedstock: sweet sorghum, jathropa
  - Biofuel production facility:
    - Ethanol: 272 million liter
    - Biodiesel: 3.9 million kilo-liter
  - Mandatory domestic use for biofuels
  - Indonesia developed Indonesia Sustainable Palm Oil Standard (2011)

- Malaysia
  - One of the largest palm oil producer
  - Main feed stock for biofuel is palm oil (for biofuel), develop 2nd generation biofuel technology from palm oil waste
  - Developing domestic market by mandatory using for B5 for government vehicle and industrial and transportation
  - Most of current biodiesel production is for overseas market
- Myanmar
  - Jathropa as national project
  - Expand land for jathropa plantation up to 6 million ha by 2015, and 20 million ton of biodiesel
  - Main feedstock for biofuel: jathropa, potential feedstock: sugarcane or palm oil.
  - Government plan to develop large scale production of bioethanol from cassava and sweet sorghum



- Philippines:
  - The largest producer of coconut oil
  - Main feed-stock for biofuel: coconut oil for biodiesel, recently sugarcane for bioethanol
  - 7 biodiesel plant, 257 million liter/year
  - Mandatory domestic use of biodiesel, B5 for biodiesel and E10 for gasoline

- Thailand:
  - Established biofuel industry, high national standard
  - Main feedstock for biofuel: sugarcane molasses (90%), cassava.
  - Production facilities:
    - 9 ethanol plants: 435 million liter/year
    - 9 biodiesel plants: 655 million liter/year
  - National mandate for blending of biofuels, strong domestic market, B2, B5, E10 (gasohol) and E20 available in the pump stations.
  - Exporting ethanol product to many countries

- Vietnam
  - Biofuels development is still infant
  - Setting up biofuels plant, enhance R&D
  - Potential feedstock: cassava, sugarcane for bioethanol, and rubber seed and jathropa, catfish oil for biodiesel
  - Strong national target, biofuel as alternative to fossil fuel
    - ethanol and vegetable oil to replace 1% of country's petroleum demand by 2015, and 5% in 2025.
  - Limited amount of biodiesel and bioethanol production, export

Common issue

- Strong national policy and target to use biofuels as substitute to petroleum, as the same time increase production for export.
  - Development of Biofuel industry is linked to poverty reduction, rural development, and job creation
- Rapidly expand cultivation of the first generation biofuels feedstock:
  - palm oil, jathropa for biodiesel,
  - cassava, sugarcane, sweet sorghum for ethanol.
- Expansion of biofuel crops threaten local food production, caused deforestation, water scarcity, and haze.
  - 18 million ha of tropical forest in Indonesia
  - 10.5 million ha of peat-land in the entire Southeast Asia

- Practices of biofuel development and production in the Southeast Asia widely neglected social and environmental consequences caused by conversion of land for the production energy crops.
- Current form of cultivation and producing of biofuels in the most of Southeast Asia countries have limited GHGs or net-energy benefit.
- Most of the large scale biofuel production in Asia currently is not economically viable without extensive subsidy and subject to boom and bust cycle.
- Most of the countries do not have an integrated sustainability criteria and standard to guide the biofuel development and processing.
  - Most countries have developed technical standard for the fuel quality.

Various Bio-energy Initiatives in the Southeast Asia

- ASEAN Energy Cooperation (2010 – 2015)
- East Asia Summit - Energy Cooperation Task Force
- Roundtable on Sustainable Palm Oil (RSPO)
- Roundtable on Sustainable Biofuels (RSB)
- Global Bioenergy Partnership

ASEAN Cooperation on Energy

- ASEAN Energy Cooperation 2010-2015 make biofuels as one of the area of cooperation
- Promoting the commercial development and utilization of biofuels:
  - Establish a functioning network consisting of key players in the biofuels and related industries to pursue cooperative partnerships in R&D and to promote sharing of information
  - Enhance commercialization of biofuels
  - Develop "ASEAN RE Policy Paper" on long-term sustainability of biofuels
  - Develop harmonized specifications for biofuels

East Asia Summit – Energy Cooperation Task Force (EAS-ECTF)

- Biofuels cooperation for transport and other purposes in 2007:
  - Working Group on of Biodiesel Fuel Standardization in East Asia
  - Working Group on Sustainability Assessment of Biomass Utilization in East Asia
- Working in progress

RSB

- A multi-stakeholder organizations, hosted by Swiss Federal Institute of Technology in Lausanne (EPFL).
- 120 members organization in 40 countries, few members are from Southeast Asia.
- Objectives: Develop and maintain a Global Sustainability Standard for biomass and biofuel production (RSB Global Sustainabilty Standard).
- Maintain third party accreditation system for organization in the supply chain to comply with RSB's Standard.
- Provide technical assistance, tools for operators to move to certification.
- RSB has adopted ambitious threshold of 50% cut in GHG emission for a blend biofuels compared to the fossil fuel baseline.

Global Bioenergy Partnership

- Objective: to develop global bioenergy potential market and global bioenergy sustainability standard
- Member includes UN agencies, international and regional organization. Some Southeast Asia organizations are in the observer list.
- Currently developed Global Bioenergy Partnership Common Methodological Framework for GHG Life Cycle Analysis of Bioenergy (ver 1.0)

Closing Remarks

- Biofuel development in Southeast Asia is emerging but large scale expansion of biofuels cultivation is facing sustainability challenges of land and water supply availability and competition with the food production.
- Many biofuels production have limited GHG and net-energy benefit, varies by feedstock, location where the feedstock is grown and fuel production process, including the use of co-products.
- Only few of Southeast Asia countries participate actively in the multilateral biofuel standard, such such RSB, RSPO and GBP.
- An international framework for sustainable standards and certification of biofuels is required to assist biofuel producing countries to comply with the highest environmental and social standard.
- Most of Southeast Asia countries requires assistance to developinstitutional capacity to implement sustainability criteria and practices, maintain standard for biofuelsproduction; enhance R&D and transfer of technology of more efficient biofuels cultivation and production, in particular for small-holders, and develop smart-incentives to promote biofuels development.

THANK YOU

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