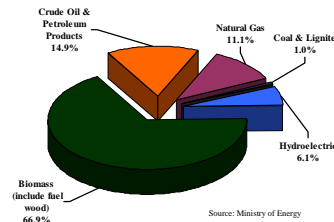


BIOMASS ENERGY PRODUCTION: PROSPECTS AND POTENTIAL IN MYANMAR

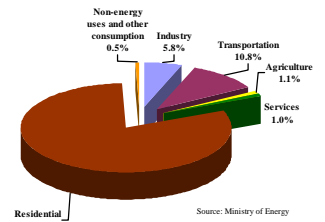
San Thein
Myanmar Sugarcane Enterprise

Current Energy Status in Myanmar

Energy supply (%) by source (2003-04)



Energy consumption (%) by sector (2002-03)



Energy utilization in Myanmar mainly depends upon traditional energy in the form of fuel wood, charcoal and biomass which are inefficient, wasteful and environmentally degradable process. Sound technologies are now available to better harness the biomass energy in terms of efficiency, conservation and environmental sustainability.

This study presents rice-husk as a promising candidate for biomass energy development model. Promoting the energy crops through better energy conversion technology could offer us "energy bonus" out of the existing food production

Bagasse-based Power Generation from Sugar Industry

Annual crushed amount of sugarcane

- 17 state-owned factories – 1,500,000 MT
 - SMEs of private sector – 2,000,000 MT
- ➔ Total bagasse output – 875,000 MT
Total molasses output – 122,500 MT



25-30% bagasse in millable cane



For sugar mill @crushing capacity (1000 tons cane/d)

bagasse (250 tons/d)
2.2 tons of super heated steam/ton bagasse

Boiler current efficiency 65%

Generate super heated steam (550 tons/d)

Total steam requirement for sugar processing (650 tons/d)

To be supplemented by fuel wood or F.O. to generate extra 100 tons required

Measures needed to be taken:

- Should adopt market price in cane purchase to ensure sufficient, continuous, and regular sugarcane supply to the factories.
- Up-grade the mills and improve boiler efficiency in state-owned sugar factories.
- Redesign and rehabilitate the small scale sugar mills of private sector to improve energy efficiency.
- The above policy option and technical improvement could lead to co-generation (electrical supply to nearby villages) besides the energy sufficiency of the industry.

Molasses-based Gasohol Production



Ethanol Production Plant Myanmar Sugarcane Enterprise Ministry of Agriculture & Irrigation



Distillation Columns

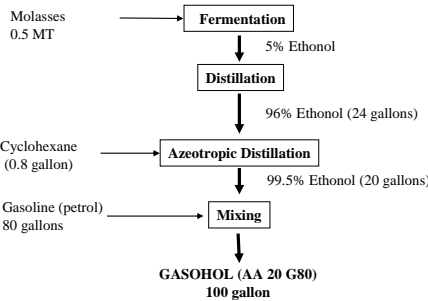


Operator's Control Room

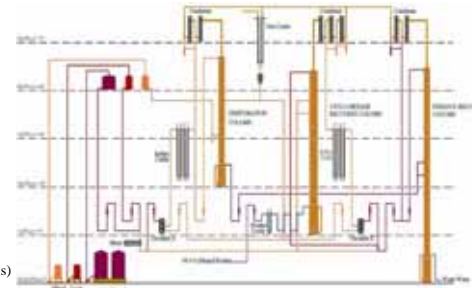
Yearly output of Molasses (state + private sector) = 122,500 MT

If 30% of total Molasses could be diverted to Ethanol production, the total output of liquid fuel per year could be expected about 1,650,000 gallons (7,501,065 liters)

Gasohol production



Res. Octane No. - 88
Specific gravity - 0.7608
Gasohol usage - 30 miles/gallon
Unit Product cost - Ks. 1812 per gallon
Current selling price - Ks. 1800 per gallon of gasoline (Petrol)



Azeotropic Dehydration of Ethanol to Absolute Alcohol

Measures needed to be taken:

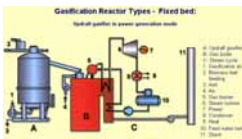
- Sweet sorghum production should be integrated in sugar factories zone of marginal rainfall to help avoid competition between cane-based energy production and other value-added production.
- The maximum biomass yield of sweet sorghum in Myanmar transitional climatic zone was found to be 78 MT/ha with the yield of 380 gallons of syrup (@ 75 ° brix)
- Investment by private sector alcohol distillery should be encouraged.

Gasification of Rice-husk for Power Generation

- National paddy production ranges from 21 – 22 mil. MT. About 20% of paddy is husk, available year round.
- Some medium to large scale rice mills use rice husk as fuel to generate steam for steam engines.
- Small scale rice mills using motors or diesel engines produce surplus rice husk.
- The existing system could be improved by the technology of rice-husk gasification for power generation.

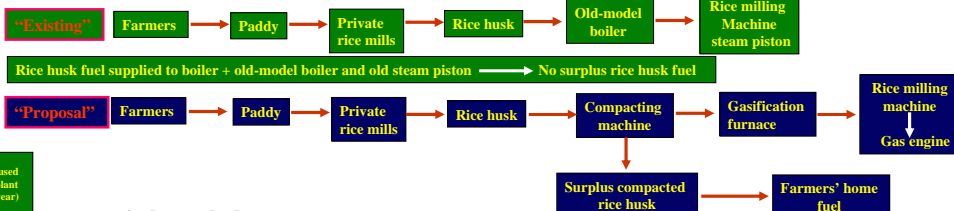


Rice-husk



Gasification Reactor Types - Fixed bed:

NEDO's Option for Rice Husk Compacting & Utilization for Power Generation



Available Rice-husks and Utilization

Category	Number	Capacity (ton/24hrs)	Estimated paddy production (× 10 ⁶ ton/year)	Estimated husk volume (× 10 ⁶ ton/year)	Rice husks used for power plant (× 10 ⁶ ton/year)
Large scale rice mills	State	68	5,113	1,537	307
	Private	1,158	26,625	8,002	1,600
	Total	1,226	31,738	9,539	1,907
Small-scale rice mills	10,469	41,341	12,424	2,485	-
Total	11,695	73,079	21,963	4,392	352

Acknowledgement

- Sein Thuang Oo, President, Myanmar Chemical Engineering Association, for gasohol production technology in Myanmar.
- NEDO (New Energy and Industrial Development Organization) Yangon office and Shikoku Electric Power Co., Inc., Japan, for rice husk gasification feasibility survey in Myanmar.