

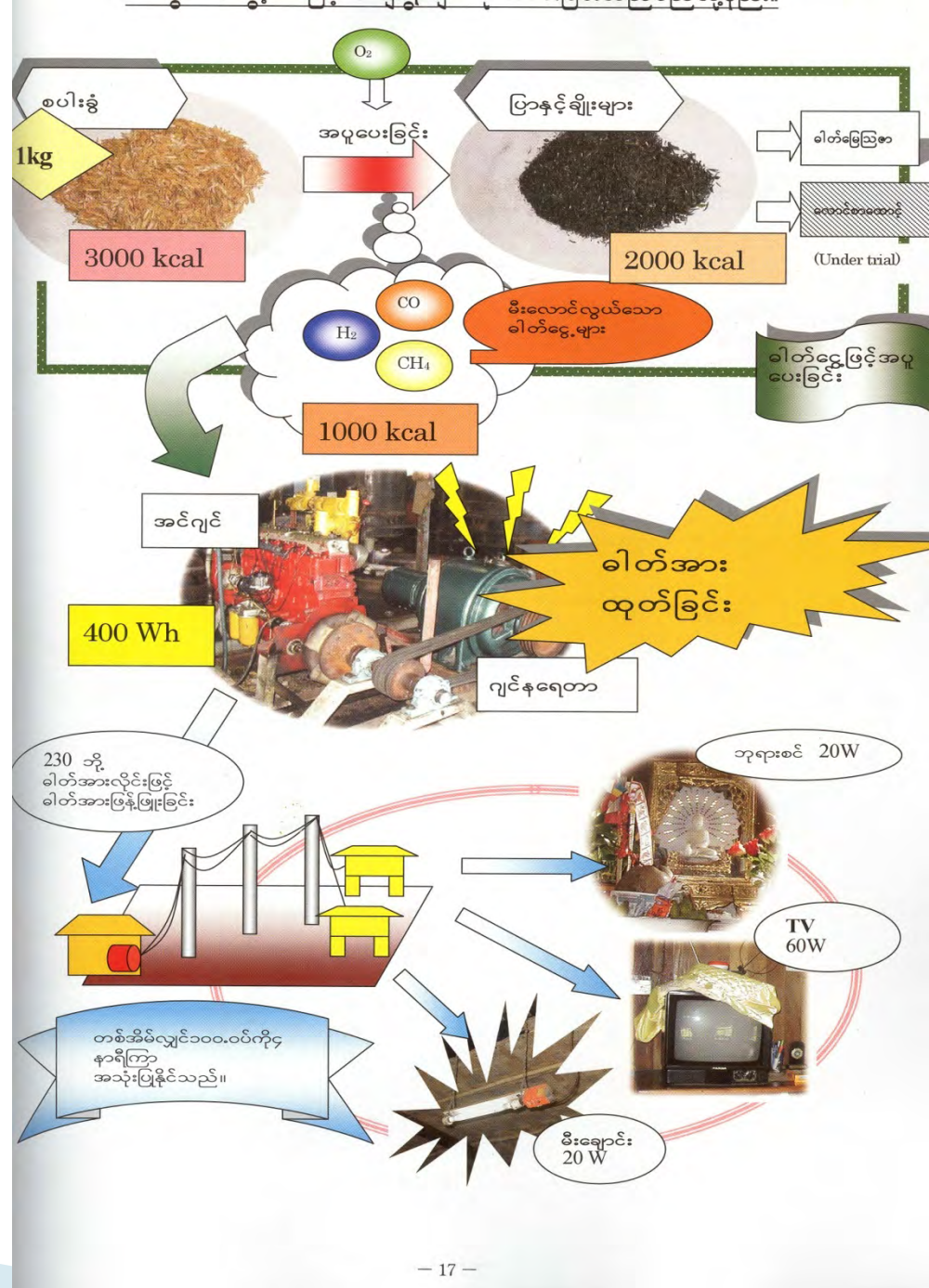
# Rice Husks

- 20% of paddy is husk. ( Annual paddy production : 22 million tons.)
- Some mid-to large-scale rice mills use rice husks as fuel to generate steam for steam engines.
- Rice mills using motors or diesel engines produce surplus rice husks.

## Estimated Rice Husk Production and Usage (2001/2002)

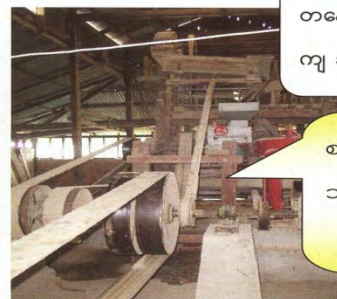
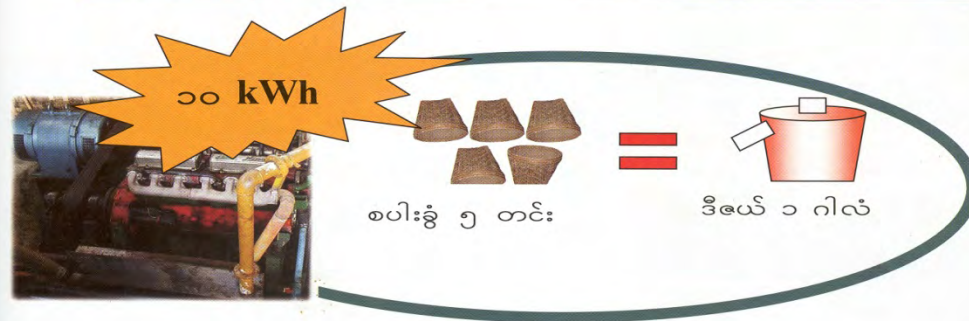
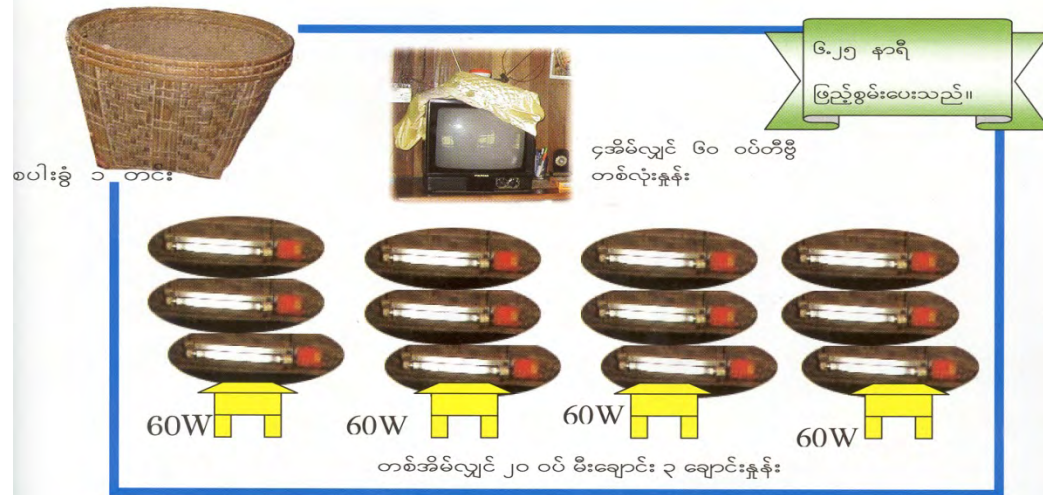
		#	Capacity ( ton/ 24 hrs)	Estimated paddy production ( $\times 10^3$ ton / year )	Estimated Husk volume ( $\times 10^3$ ton / year )	Rice husks used for power plant ( $\times 10^3$ ton / year )
Large-scale rice Mills	State	68	5,113	1,537	307	32
	Private	1,158	26,625	8,002	1,600	320
	Total	1,226	31,738	9,539	1,907	352
Small -scale rice mills		10,459	41,341	12,424	2,485	-
Total		11,695	73,079	21,963	4,392	352

These charts are distributed to most rural areas in Myanmar to educate the local people about the efficiency of rice husk energy production.



In the present day,  
the rice husk  
energy production  
has been widely  
used in most rural  
areas in our  
country.

## မြန်မာနိုင်ငံခြေတွက်ချက်မှု



တနေ့လျှင် ၂.၅ တန် ကျ ဆန်စက်မှ

စပါးခွံတင်း ၅၀ ထုတ် သည်။

# THE GOVERNMENT'S GUIDANCE FOR THE DEVELOPMENT OF THE BIODIESEL PRODUCTION

## Planning for Jatropha plantation :

- Year (2006 - 2007), total area - 3 million acres
- Year (2007 - 2008), total area - 4.5 million acres
- Year (2008 - 2009), total area - 6 million acres
- Year (2009 - 2010), total area - 7.5 million acres
- Year (2010 - 2011), total area - 8 million acres



# FACTS ABOUT JATROPHA CURCAS PLANTATION

- Total plantation area (2011) – 8 million Acre
- No. of plants per Acre – 1200 Nos.
- Raw Oil Produce per Acre – 100 Gallons per year



# Physical Properties of Pilot Plant Operation of Biodiesel from Jatropha curcas Oil

Physical Properties	Biodiesel (B100)from Jatropha curcas Oil with Ethanol* ( from FFA 8.8% raw oil)	Biodiesel (B100) from Jatropha curcas Oil with Methanol** (from FFA 5.23% raw oil)	ASTM D 6751 standard for biodiesel fuel	ASTM D 975 standard for diesel fuel
Cetane index	49	49.2	48 - 65	40 - 55
Flash point, °C	98	91	100 -170	60 - 80
Pour point, °C	-1	+3	-15 to 10	-35 to -15
Specific gravity @ 60 °F	0.8766 5.36	0.8746 4.78	0.88 1.9 - 6.0	0.85 1.3 - 4.1
Kinematic viscosity @ 40 °C, ( m <sup>2</sup> /sec)	1.1	1.0	0.8	-
Acid number	No.2	No.1	No.3, max	-
Color	Trace	Trace	0.05%,max	-
Water & sediment	352	333	360,max	370, max
Distillation @ 90% recovery, °C				

# Chemical Properties of Pilot Plant Operation of Biodiesel from *Jatropha curcas* Oil

Chemical Properties	ASTM D 6751 Standard	Biodiesel from <i>Jatropha curcas</i> Oil With Ethanol (from FFA 8.9% raw oil)	Biodiesel from <i>Jatropha curcas</i> Oil With Methanol (from FFA 5.23% raw oil)
Total glycerol %	0.24%	1.15%	1.1%
Free glycerol %	0.02 %	Nil	0.05 %
Combined glycerol %	0.22 %	1.15 %	1.05 %

# Results of Road Tests for Pilot Plant Operation of Biodiesel from *Jatropha curcas* Oil

Kinds of Car	Biodiesel Produced from <i>Jatropha curcas</i> Oil with Methanol ( Fuel Consumption)	Petro - diesel ( Fuel Consumption )
2L turbo engine, 4 cylinder Toyota ( Path Finder ) car	0.215 liter/mile ( from FFA 5.23% raw oil )	0.210 liter / mile
4 stoke, 4 cylinder, 2L, Ford Ranger Engine, ( Double Cap car )	0.165 liter/mile ( Initial FFA 8.8%, after neutralization FFA 1% )	0.174 liter/mile





Here in the Driving test of Toyota Land Cruiser VX Limited only by the use of biodiesel refined from Jatropha oil.





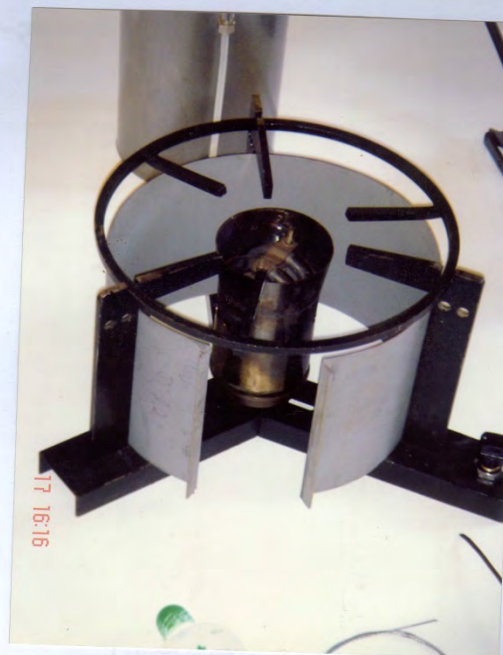
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( ပူးတွဲ ဓါတ်ပုံ - ၂ ) မီးစာ (၁၂) တိုင်ပါ ကြက်ဆူဆီသုံး မီးဖို ပုံစံ (၀၄)



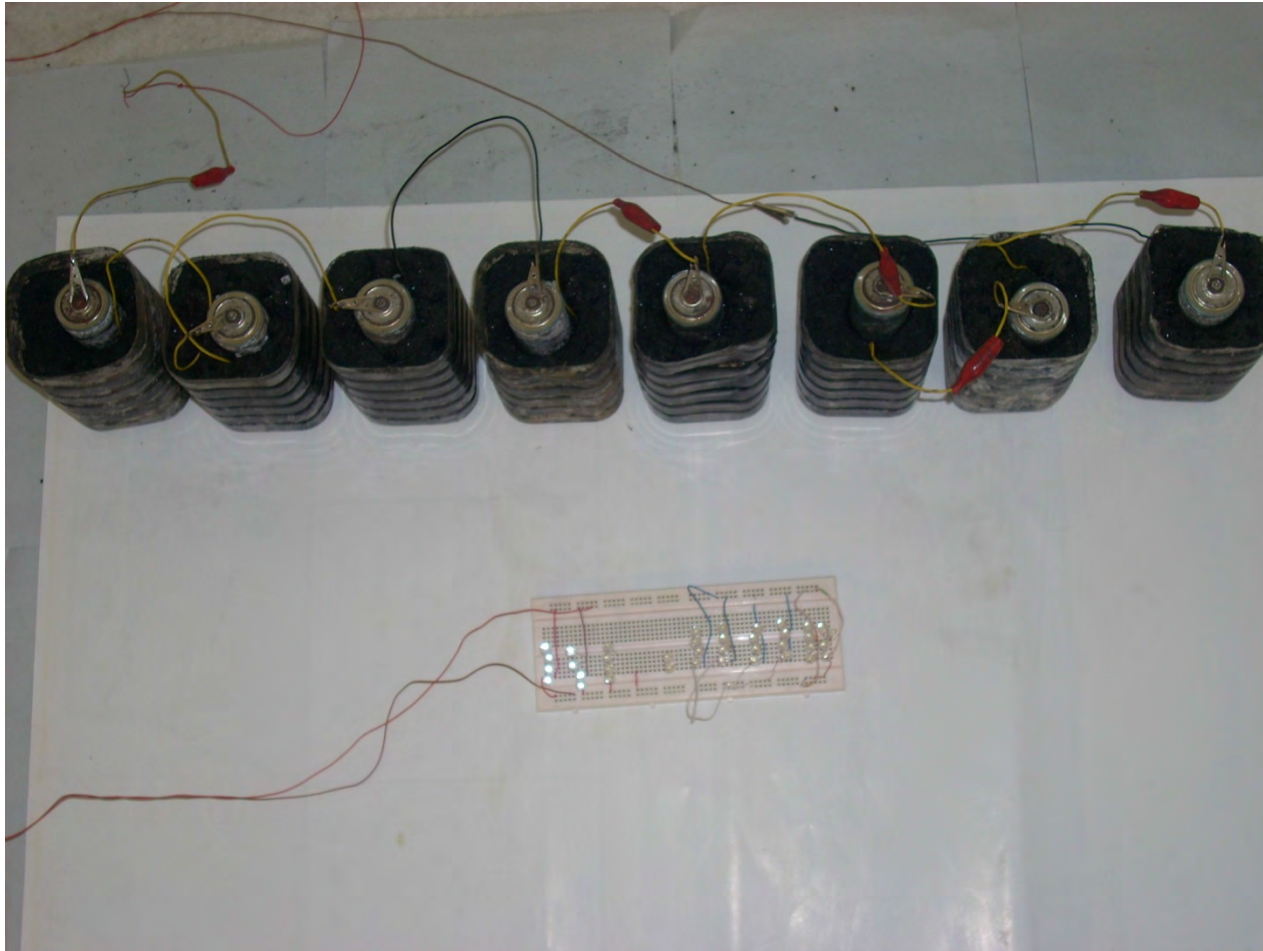
(ပူးတွဲဓါတ်ပုံ - ၁) ကြက်ဆူဆီမီးဖို နှင့် အဓိကပစ္စည်းများ၏ပုံ



(ပူးတွဲဓါတ်ပုံ-၂)ကြက်ဆူဆီသုံးမီးဖို၏ ( Furnace ) ပုံ

- Government is encouraging plantation of Jatropha through the country.
- Test run are being made on various vehicles by using Jatropha oil with treatment and without treatment.
- Research work on biodiesel production from Jatropha oil is almost finished and pilot production's is well under way.
- For the time beings, the plantation of Jatropha curcas has been carried out nation-wide as a national interest and movement.

# Cowden research at taungoo university





# Discussion

- ▶ We have so many energy resources in our country
- ▶ In this lecture, we emphasis some most potential renewable energy resources in Myanmar.
- ▶ We should discuss about current application and expected future application in Myanmar.
- ▶ Working principle and basic calculation.

# CONCLUSION

- ❖ It can clearly be seen, from our presentation, that the production and consumption of various kinds of energy from our country, does not make any harmful consequences on the global warming ,we are giving our best efforts on the environmental preservation and conservation.
- ❖ Sustainable energy is needed to use for rural area application, so we try to do research for this need.

**THANK YOU**