



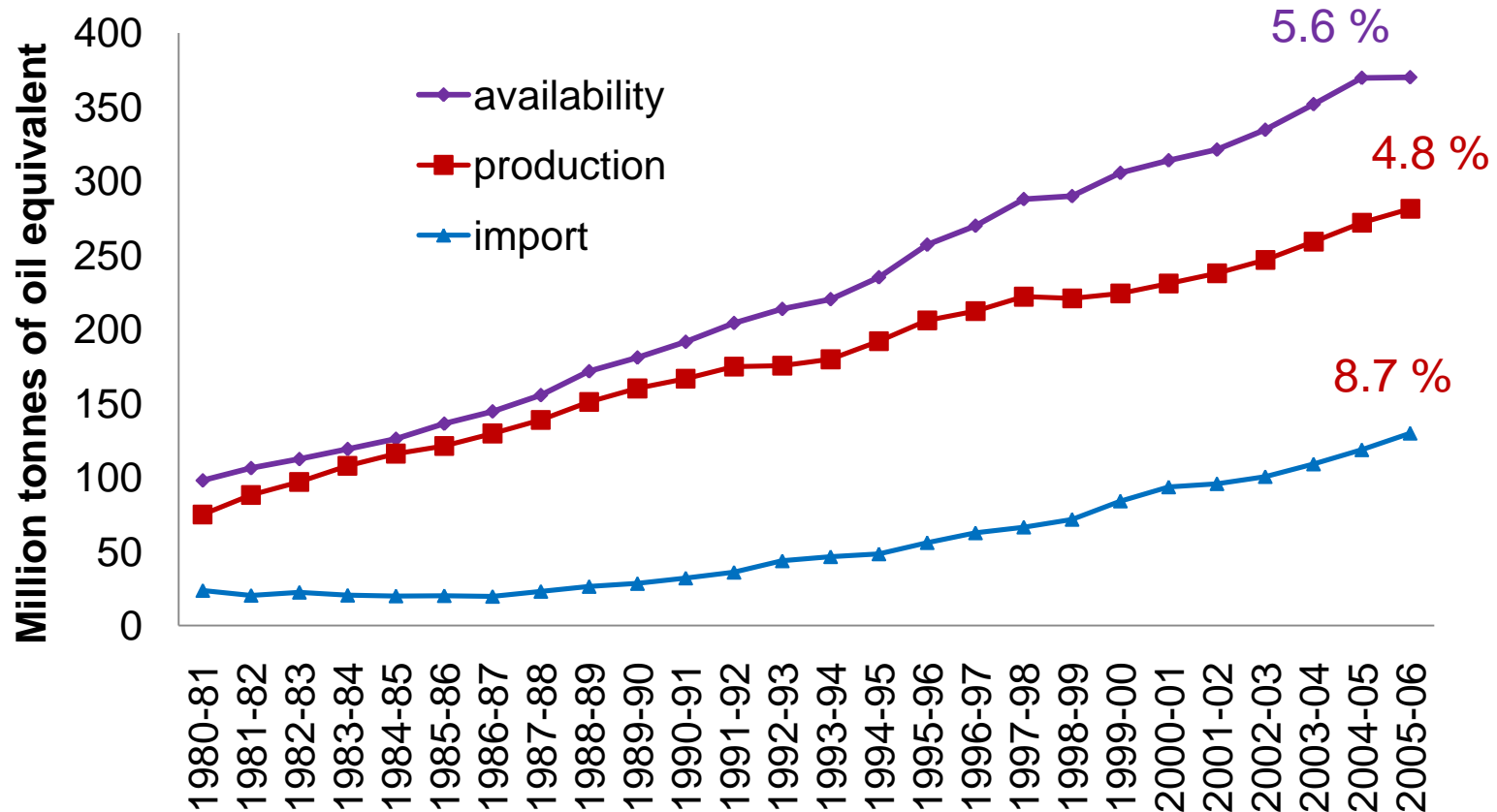
# Overview of Biofuels Policy and Potential in India

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October 29, 2009

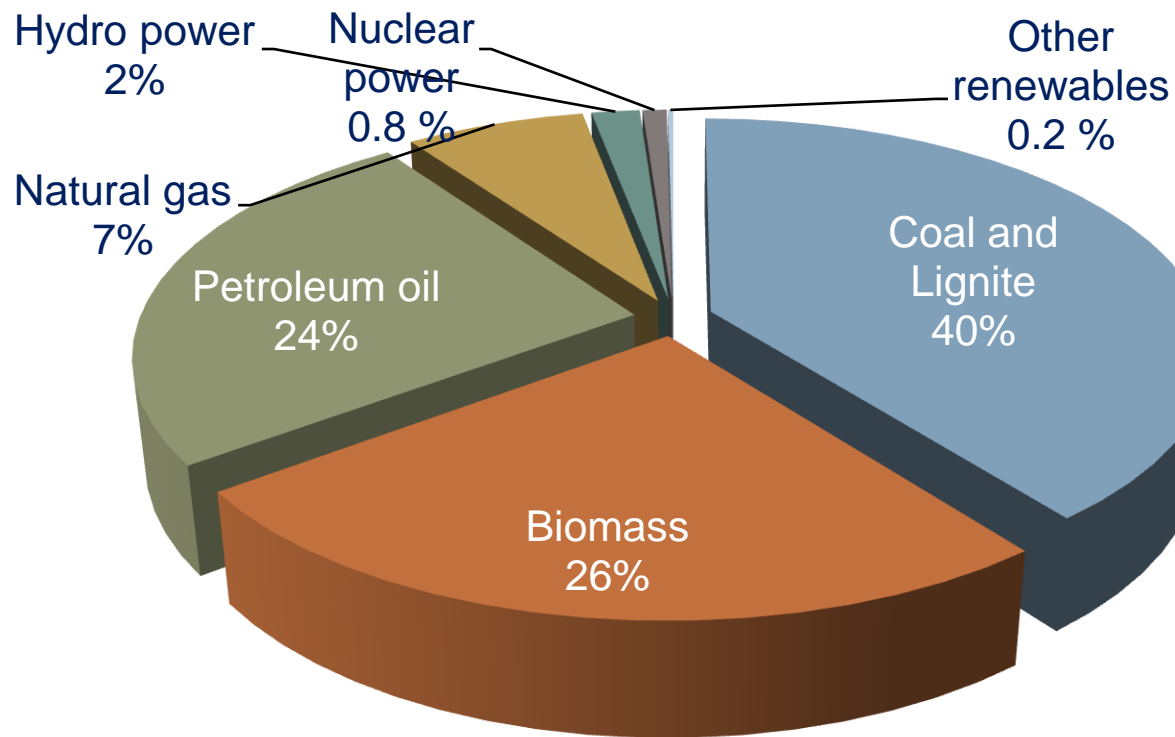
National Centre for Agricultural Economics and Policy Research (NCAP),  
New Delhi, India. web: [www.ncap.res.in](http://www.ncap.res.in)

# Increasing energy demand in India



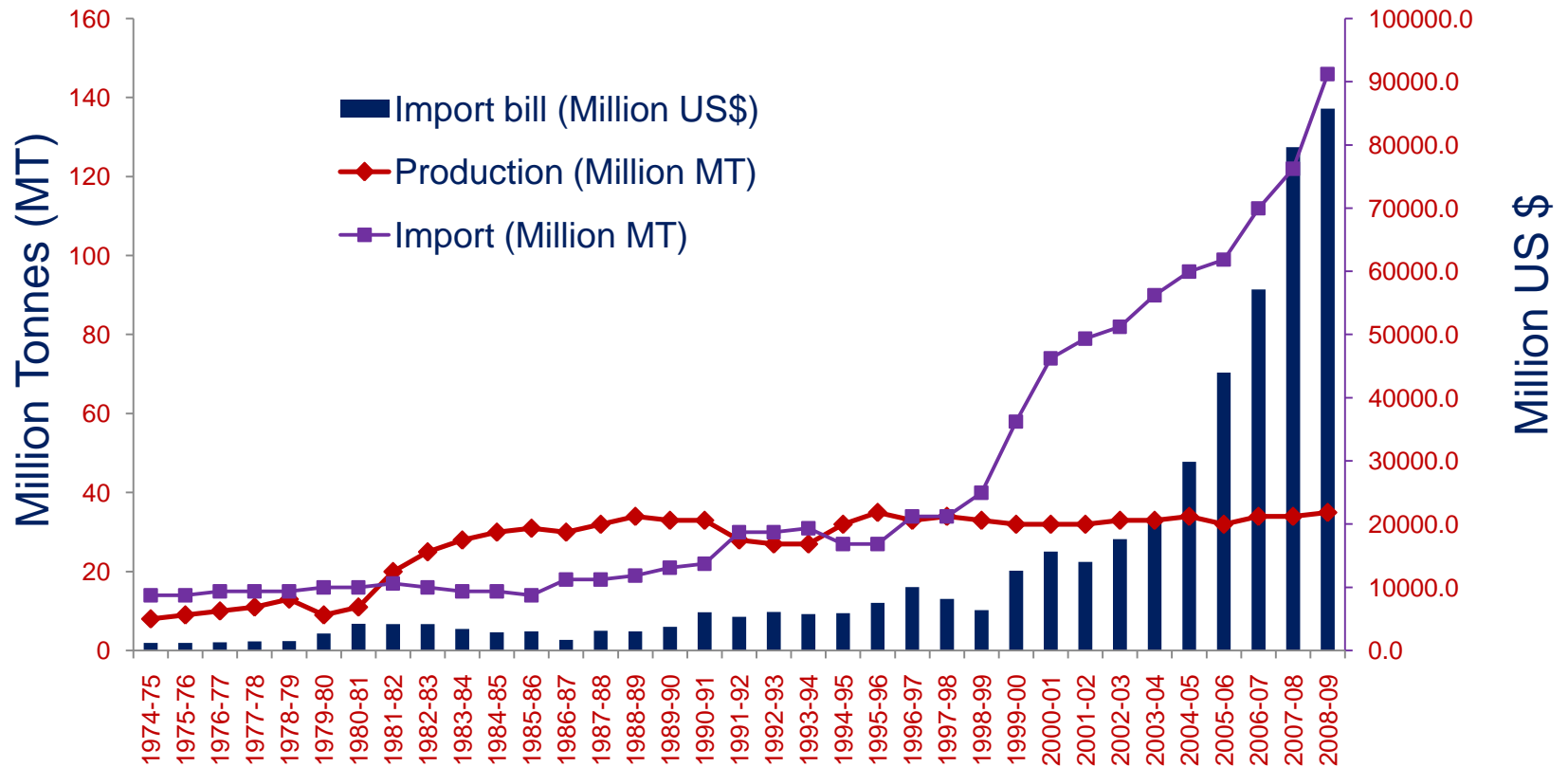
Source: Centre for Monitoring of Indian Economy, 2008

# Sources of energy in India



Source: Centre for Monitoring of Indian Economy, 2008

# Import of crude oil growing

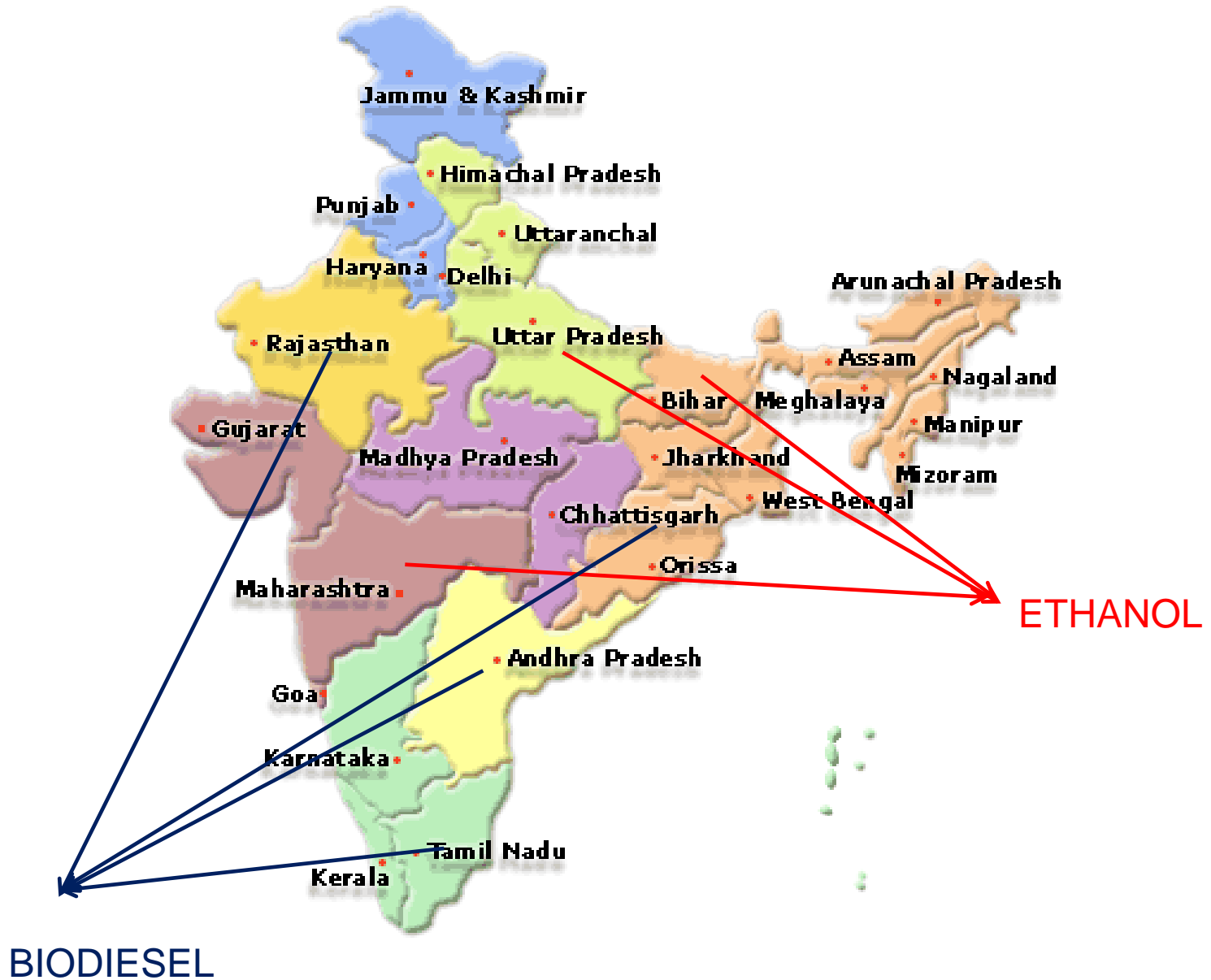


Source: Ministry of Petroleum and Natural Gas, 2009

# Biofuels in India

- Bioenergy- Drawing the attention of policy makers
  - As a sustainable source of energy
  - To overcome the rising cost of energy
  - To address environmental concerns
  - To improve rural income and employment opportunities
  - To limit import bill
- Present status
  - India's total biofuel production accounts for only one percent of global production (2008).
  - India produces around 425 million litres of Biofuel consisting of 380 million litres of ethanol and 45 million litres of biodiesel.

# Major Biofuel growing states in India



# National Biofuels Policy

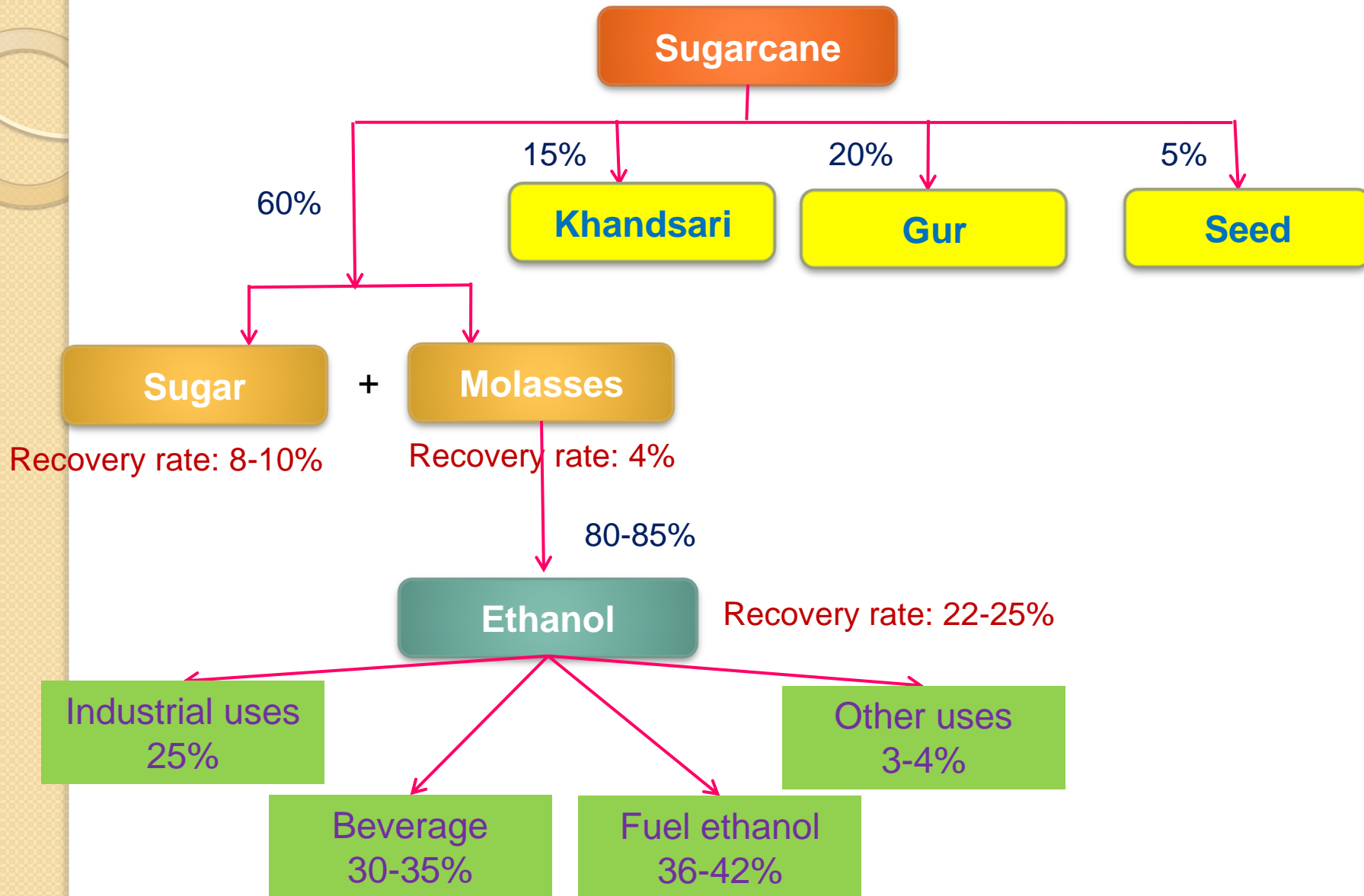
- Formulated by Ministry of New and Renewable Energy (MNRE) and approved by cabinet (yet to notify)
- Envisages wide range of crops
- Setting up of National Biofuel Development Board
- Removing all central taxes and according declared goods status to biofuels
- Introduction of Minimum Purchase Price (MPP) for biofuels.

# Ethanol Production in India

Year	Molasses Production (million litres)	Alcohol Production (million litres)	Industrial and other uses (%)	Potable use (%)	Available for fuel (%)
1998-99	7000	1411.8	41.7	41.3	16.8
1999-00	8020	1654.0	34.8	37.6	27.5
2000-01	8330	1685.9	34.8	37.6	27.4
2001-02	8770	1775.2	33.7	36.4	29.7
2002-03	9230	1869.7	32.7	35.3	31.9
2003-04	9730	1969.2	32.9	35.2	31.8
2004-05	10240	2074.5	32.8	35.1	32.1
2005-06	10790	2187.0	31.8	34.1	33.9
2006-07	11360	2300.4	30.9	33.2	35.7

Source : Ethanol India, 2009

# Ethanol situation in India



# Economics of ethanol production from molasses in India (2008)

Item	Unit	Stand alone distillery	Integrated with sugar production
Cost of molasses	Per MT	5000	5000
Transportation cost	Per MT	150	0
Total		5150	5000
Recovery of ethanol /MT of molasses	Litres	220	220
Recovery cost	Rs/ litre	23.40	22.72
Direct Cost of distillation	Rs/ litre	6.69	5.17
Finance and other indirect costs	Rs/ litre	3.05	2.77
Total costs	Rs/ litre	33.14	30.66

Source: Planning Commission (2003) with revision as per present rates.

# Ethanol Policy in India

- Ethanol policy is an integral part of national biofuel policy.
- Specific initiatives
  - The GoI launched Ethanol Blended Petrol Programme (EBPP) in Jan 2003.
  - Blending requirement according to EBPP
    - 5 Percent blending of ethanol with petrol by the year 2011-12
    - 10 Percent blending by the year 2016-17
    - 20 Percent blending after 2016-17
    - Announced Minimum Purchase Price (MPP) for ethanol @ Rs. 21.50 per litre
    - To limit customs duty on molasses from 10 to 5 per cent.
    - To remove all central taxes on ethanol and would ensure a uniform 4 % sales tax on bioethanol across states

## Projected demand for petrol and fuel ethanol, India (million tonnes)

Year	Petrol demand	Ethanol blending requirement	
		@ 5 %	@ 10 %
2007-08	11.00	0.55	1.10
2008-09	12.50	0.62	1.25
2009-10	14.50	0.72	1.45
2010-11	16.50	0.82	1.65
2011-12	18.15	0.90	1.80
Availability in 2006-07		0.83	

Source: Ministry of Petroleum and Natural Gas, 2007

# Status and hurdles in implementing EBPP

- Requirement of Ethanol (10% blending): 1.8 MT
  - Oil marketing company contract: 1.4 MT
  - Present status of procurement: 0.54 MT
- Non-uniformity of taxes across states.
- Shortage in procurement of ethanol (by oil marketing companies) for fuel purpose.
- Higher cost of production in relation to MPP announced by the government leading to lower procurement.
- High variability in price of molasses leading to large variation in production costs.
- Govt. policy on use of molasses

# Recent initiatives on R & D of bioethanol

- Efforts to produce ethanol from other feed stocks like :
  - Sweet Sorghum
  - Sweet Potatoes
  - Sugar beet
  - Cassava
- Initial research on second generation biofuel feedstock – Cellulosic waste

# Biodiesel situation in India

- Biodiesel in India is not produced from vegetable oils derived from rapeseed, mustard or palm oil or any other edible crops.
- Reason: India is not self sufficient in the production of vegetable oil crops.
- Presently around 40 percent of domestic edible oil requirement is met through imports.
- Tree-borne oilseeds like Jatropha and Pongamia are mainly used for biodiesel production in India.
- Every year around 1.2 million tonnes of tree-borne seed oil is produced in the country.
- Biodiesel industry is still at a nascent stage.

# Biodiesel Policy in India

- **Specific Initiatives**

- The GoI launched Biodiesel Blending Programme (BDBP) in 2003.
- Announced Minimum Support Price (MSP) for biodiesel oilseeds
- Announced Minimum Purchase Price (MPP) for Biodiesel under Biodiesel purchase policy, 2005
- MSP for Jatropha / pongamia seeds vary between Rs. 6-10 and MPP for biodiesel is R. 26.50 /litre presently.
- Biodiesel plantations of non edible oilseeds on community / government / waste / degraded / marginal lands would be encouraged, while, plantation in fertile irrigated lands would not be supported.

## Projected demand for diesel and biodiesel, India (million tonnes)

Year	Diesel demand	Biodiesel blending requirement	
		@ 5 %	@ 10 %
2009-10	60.07	3.00	6.00
2011-12	66.90	3.35	6.69
2016-17	83.58	4.18	8.36
2019-20	111.92	5.60	11.19

Source : Planning Commission of India, TERI

# Benefits of Jatropha as a feed stock

- Oil produced is non-edible and hence does not affect food security.
- Jatropha can survive in areas of low rainfall and low fertility.
- Diversion of land from food crops is not required for Jatropha cultivation.
- Jatropha requires very little inputs and care.
- The cake left over after oil extraction can be used as organic manure, insecticides.
- Biogas can be produced from Jatropha oil cake.
- Large scale cultivation of Jatropha in marginal land can earn carbon credits for the country.

# Potential land availability for Jatropha

Type of land	Total area (Million ha)	Area for plantation (Million ha)	Assumptions
Forest cover	69	3	20% of 14 m ha JFM
Agril.land	142	3	10 % of 30m ha as a hedge plants
Agro-forestry		2	-
Fallow lands	24	2.4	10 % of fallows
Waste lands		2	-
Public lands		1	-
<b>Total</b>		<b>13.4</b>	

Source : Planning Commission, Government of India

# Supply of biodiesel from Jatropha

Particulars	2007	Unit
Area under Jatropha	400	Thousand ha
Yield of Jatropha seeds	3	Ton /ha
Production of Jatropha seeds	1200	Thousand Tons
Seed-diesel conversion rate	30	Percent
Potential production of biodiesel	360	Thousand Tons
<b>Requirement @ 5%</b>	<b>2700</b>	<b>Thousand Tons</b>

# Area required for Jatropha plantations for meeting the blending targets

Jatropha Seed yield ( t / ha)	Biodiesel yield ( t / ha)	Jatropha ( M ha) required for blending at			
		5 per cent		10 per cent	
		2011-12	2016-17	2011-12	2016-17
1	0.30	11.02	13.75	22.01	27.50
2	0.61	5.51	6.88	11.00	13.75
3	0.91	3.67	4.58	7.34	9.17
4	1.22	2.75	3.44	5.50	6.88
5	1.52	2.20	2.75	4.40	5.50

Source : Authors' calculation

The area under jatropha in 2007 is 0.4 million ha which is just 11 % of the most reasonable estimate of required area for 5 % blending.

# Hurdles in implementing BDBP

- Slow progress in Jatropha plantation (So far only 0.4 million ha are covered against a target of 13.4 million ha by 2011-12).
- Lack of good quality planting material and long gestation period.
- Ownership issues of waste lands.
- Higher cost of production of biodiesel (Rs. 35-40 / litre) in relation to MPP announced by the government.

# Recent initiatives on R & D of biodiesel

- National Oilseeds and Vegetable Oil Development (NOVOD) Board – National Network on Jatropha and Pongamia
  - Identification of elite planting material
  - Development of HYV's
  - Developing suitable package of practices
  - Post harvest tools and technology
  - Detoxification of oil meal

# Implications of biofuel expansion in India

- Food security
  - Food security is a national priority for India
  - Diversion of food crops production to biofuels may affect food security
  - Many related implications like food price rise.
- Socio-economic development
  - Raising biofuels in marginal lands may enhance household income of rural communities and employment opportunities for the poor.
  - Community participation and entrepreneurship development.
  - Women empowerment
- Environmental sustainability

# Current strategy- is it adequate?

- Better co-ordination between the ministries involved in biofuel .
- The biofuel policy in its complete form not yet in place.
- Mechanism for timely adaptation of policies is not standardized.
- Confusion regarding land rights, implementing agencies, procurement mechanism etc still prevalent.
- Research on biofuels in the nascent stage.
- No proper and comprehensive evaluation done on the implications of biofuels on India's food security and socio-economic development of rural inhabitants.

# Summary

- India's position in the global biofuel map is not very prominent
- Blending targets look unfeasible for 2017
- Adequate stimulus packages and proper price and procurement policies are required
- Community and local institutions participation is a must
- Policy should ensure energy security, food security and environmental sustainability

# Outlook for Indian biofuels

- Future price of oil
- Economic viability for farmer /oil producers
- Availability of cost-effective feed stocks
- Supportive policies by government
  - Infrastructure development
  - Processing industries
  - Clearly defined land right policy
  - Institutional/land policies
- Technological break-throughs
  - High yielding / resistant varieties
  - Commercially feasible and viable conversion methods



**Thank You....**