

Biofuel initiatives in Japan: Strategies, policies, and future potential

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Outline

1. Introduction
2. Strategies and plans
3. Policies
4. Production and markets
5. Potential to achieve objectives
6. Conclusion

1. Introduction

- Purpose of the paper:
 - Review Japan’s national strategies, plans and policies related to biofuels
 - Discuss their potential to reach their objectives
 - GHG reduction
 - Energy security
 - Rural development
 - Recycle-based society



2. Strategies and plans

Multiple objectives

“Biomass Nippon Strategy”

Emphasised transport biofuels as a major component

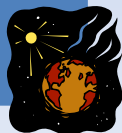


Climate change

“Kyoto Protocol Target Achievement Plan”

500,000 kl (oil eq.)

By 2010



Energy

“New National Energy Strategy”

Dependency on oil to 80% (transport) by 2030

“Next-generation Vehicle and Fuel Initiative”



Domestic production

“Large Scale Expansion of Domestic Biofuel Production”

50,000 kl by 2011

6 million kl by 2030



3. Policies

R&D / Pilot projects

- Feedstock production (both crops and wastes)
- E10 on-road tests

Blending rates

- Maximum ceiling (for safety and vehicle performance)
- Ethanol: 3vol%
- Biodiesel: 5%

Economic incentives

- Gasoline tax exemption
- Tax benefits and financial assistance
- Tariff exemption

Major fuel ethanol pilot projects

Area	Related ministry	Feedstocks	Demonstration
Shimizu Town, Hokkaido	MAFF	sugar beets, flour, etc.	
Tokachi Area, Hokkaido	MOE, MAFF, METI	substandard flour, corn, etc.	E3
Tomakomai, Hokkaido	MAFF	rice etc.	
Shinjo City, Yamagata	MAFF	sorghum	E3
Niigata City, Niigata	MAFF	rice and E3	E3
Kanto Region	METI		ETBE
Sakai City, Osaka	MOE	construction waste timbers	E3
Maniwa City, Okayama	METI	lumber wastes	E3
Kitakyushu City, Fukuoka	METI, MOE	food wastes	
Ie Island, Okinawa	MOE, MAFF, METI, Cabinet Office	high biomass amount molasses	E3
Miyakojima Island, Okinawa	METI, MOE, MAFF, MLIT, etc.	molasses	E3

4. Production and markets

Bioethanol

Production:

30kl/year as of 2007
increased to 30,000 kl this yr
(from various feedstocks including inedible rice, sub-standard flour, molasses, and wastes)

Sales:

in both E3 and ETBE

Biodiesel

Production:

5000kl/year as of 2007

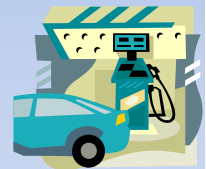
Mainly initiated by local governments and NGOs based on waste cooking oil.



Source: Kyoto City HP

5. Potential to achieve objectives

1. Can biofuels make a significant contribution to reducing Japan's **GHG emissions**?
2. Can biofuels improve Japan's **energy security**?
3. Can biofuels contribute to **rural development** in Japan?
4. Can biofuels contribute to the realisation of **a recycle-based society** in Japan?



5.1. Can biofuels make a significant contribution to GHG emission reduction?



Short-run

- Lower hanging fruit - require not much additional infrastructure
- Estimate:
10% of the KP reduction goal of transport sector
(1.3 /11-14million t)

Caveat: above calculation only based on emissions from running on the road

Long-run

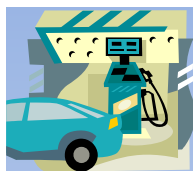
Japan's Target:

60-80% reduction by 2050

Role of biofuels depends on the development of:

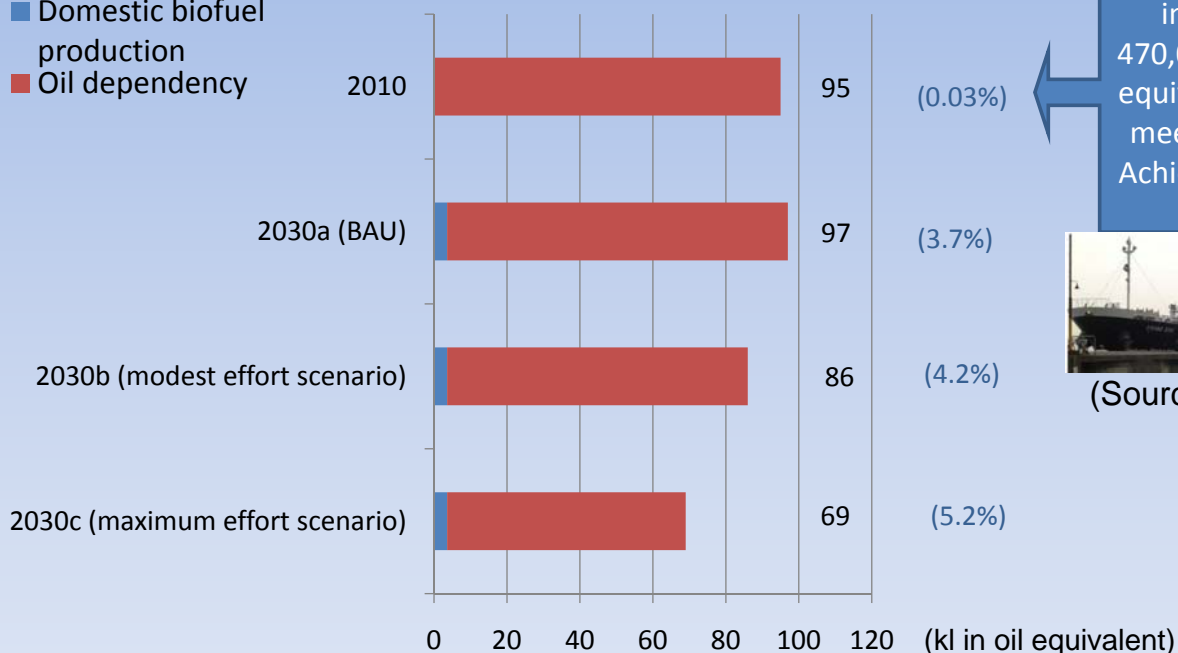
second generation or cellulosic biofuels

"next-generation vehicles"



5.2. Can biofuels improve Japan's energy security?

■ Domestic biofuel production
■ Oil dependency



Need to import 470,000 kl oil equivalent to meet Kyoto Achievement Plan



(Source: PAJ)

Forecast of total energy consumption in transport sector
(based on METI's outlook and Biomass Nippon Strategy Promotion Council's estimate)

5.3. Can biofuels contribute to rural development in Japan? (1)



Production and energy potential of domestic biofuels in 2030

Feedstock	Production potential (thousand kilolitres in ethanol)	Production potential (thousand kilolitres in oil equivalent)	Energy potential (PJ)*
1. Sugar/starch	50	30	1.2
2. Plant biomass	1,800 -2,000	1,100-1,200	43.0-47.8
3. Energy crops	2,000 - 2,200	1,200 – 1,300	47.8-52.6
4. Woody biomass	2,000 – 2,200	1,200 – 1,300	47.8-52.6
5. Biodiesel fuel etc.	100 – 200	60 – 120	2.4-4.8
Total	Approx. 6,000	Approx. 3,600	Approx. 143.4

(Source: Biomass Nippon Strategy Promotion Council 2007)

5.3. Can biofuels contribute to rural development in Japan? (2)



Potential energy crops

Erianthus spp.

Miscanthus

nepiergrass

sorghum



Opportunity: “abandoned cultivated lands”

386,000 ha (9.7% of total cultivated land)

Challenges:

- Still not enough data to determine feasibility
- Impacts to ecosystems/GHGs
- Low food self-sufficiency ratio
- Agreement of local communities
- High production cost

5.4. Can biofuels contribute to the realisation of a recycle-based society? (1)



Endowment potential of domestic unutilised biomass

		Endowment (Generated amount) (million tonnes / year)	Intensity (Place of generation)	Rate of utilisation	Utilisation potential (million tonnes / year)	Energy potential (PJ/year :HHV)
Plant	Rice straw, rice husk, wheat straw	14	Agricultural land, rice processing facility	30%	9.8 (70%)	147
Woody	Logging residue	3.4	Forest land	2%	3.3 (98%)	50
Woody	Saw mill residue	4.3	Factory	95%	0.2 (5%)	3
Woody	Construction waste timbers	4.7	Factory	70%	1.4 (30%)	21
Others	Waste paper	30.63	Urban area	91%	2.79 (9%)	42

(Source: Biofuel Technology Innovation Conference 2008)

5.4. Can biofuels contribute to the realisation of a recycle-based society? (2)



Challenges

1. Collection and transport
2. Advanced ethanol production technologies
3. Avoiding excessive exploitation from farmland
4. Environmental impact from disposal of residues from cellulosic material processing

6. Conclusion (1)

Strategies and Plans

- Strategies/plans developed by different ministries with various objectives and targets
- However, there are some interlinkages and common directions
 - Cellulosic biofuels without competition with food
 - Continued R&D

Promotion policies, production, and sales

- Still in early stages
- Rate of introduction slower and more cautions
 - No major large scale feedstock
 - Strict regulation on blending rates
 - Greater attention to safety and quality concerns

6. Conclusion (2) future roles of biofuels in Japan

Climate change

short term: not large, but a certain contribution as a lower hanging fruit

long term: depends not only on the technological breakthroughs relating to second generation biofuels but also on related advances in vehicle technology

Energy

constrained by the potential scale of domestic production and availability of imports

Rural economies and a recycle-based society

biofuels could play a more significant role, contingent on the future development of technologies and socio-economic infrastructure



Thank you very much.

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