

APEC EGNRET42, Hawaii, USA

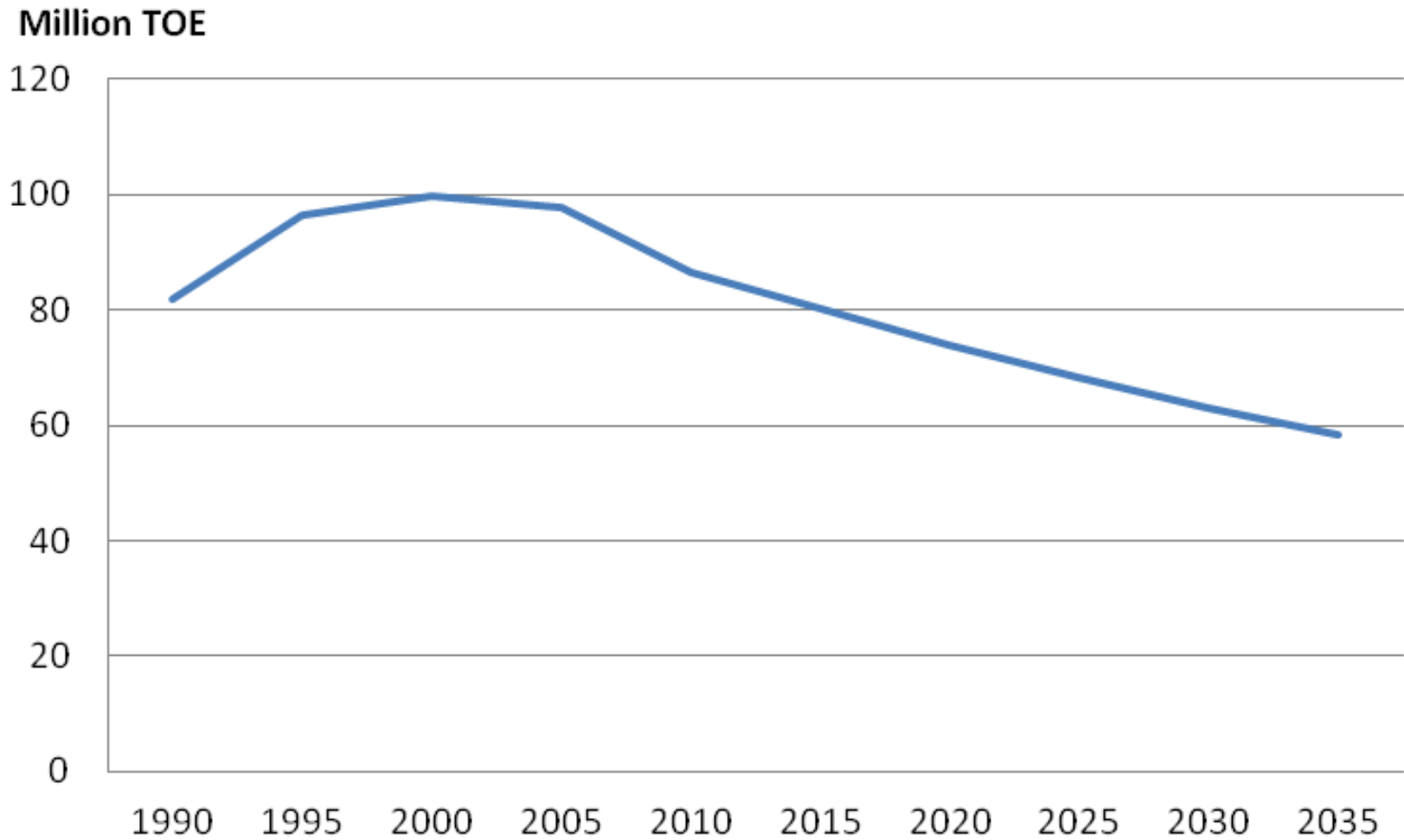
The Promotion of Biofuels in Transportation Sector in Japan

April 7th, 2014

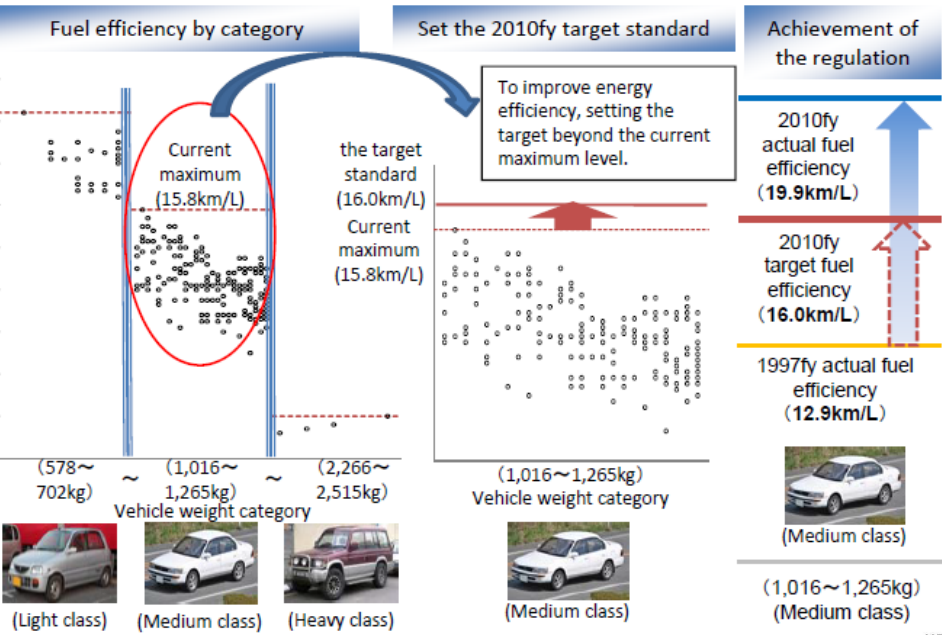
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(IEEJ)



Energy Demand in Transportation sector in Japan



Deployment of Electric Vehicle, Plug in Hybrid Vehicle and Hybrid Vehicle Increase Energy Efficiency by Top runner Program

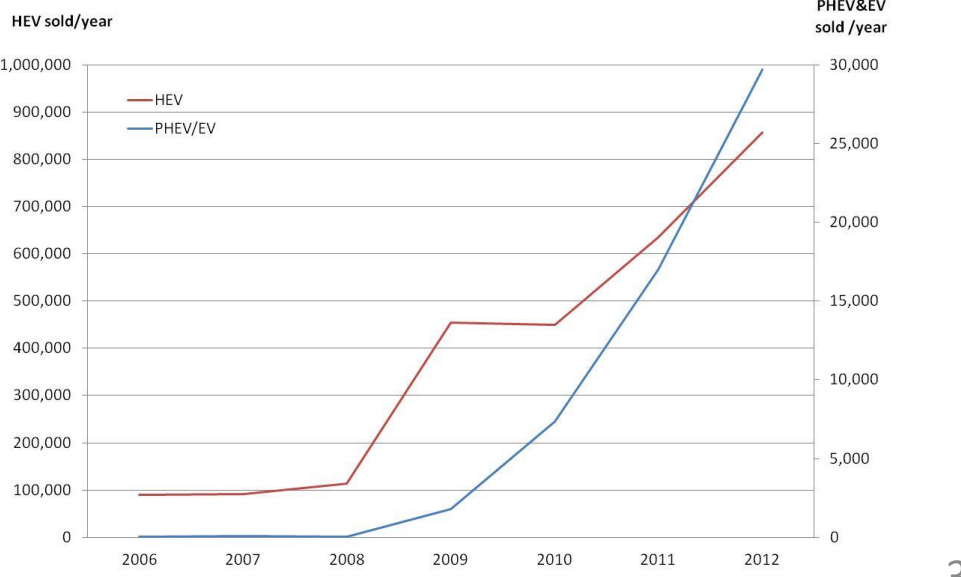


Diffusion projections by type of vehicle (with private-sector efforts)

- Diffusion projections assuming private-sector efforts (scenario where auto makers make the utmost efforts to improve fuel efficiency and develop next-generation vehicles) were made.
- Next-generation vehicles will account for less than 20% of new vehicle sales in 2020 and 30-40% in 2030.

	2020	2030
Conventional vehicles	80% or more	60 - 70%
Next-generation vehicles	Less than 20%	30 - 40%
Hybrid vehicles	10 - 15%	20 - 30%
Electric vehicles	5 - 10%	10 - 20%
Plug-in hybrid vehicles	Miniscule	1%
Fuel-cell vehicles	Miniscule	- 5%

- Some kind of medium class Vehicle, which doesn't have hybrid system, recently achieved same fuel economy level as hybrid vehicles.
- Hybrid vehicles are the most sold car in Japan.
- Light class vehicles are also increasing.



Policies and Program to Promote Biofuels

Biofuel Policy in Japan (1)

➤ Biomass Nippon Strategy (2002/2006)

Comprehensive strategy of utilization of biomass

➤ Kyoto Protocol Target Achievement Plan(2005)

Plan to reduce 6% of greenhouse gases mainly based on each industries voluntary commitments.

Plan to Introduce 500,000KL (equivalent of crude oil) of biofuels by Mar.2010

*Plan by Petroleum Association of Japan was 210,000KL (equivalent of crude oil)

➤ New National Energy Strategy (2006)

National energy strategy for 2030. Introducing 20% alternative energy in transportation sector etc.

➤ Amend “the Law on the Quality Control of Gasoline and Other Fuels” (2007)

Blending ethanol to gasoline up to 3% (E3) and biodiesel to diesel oil up to 5% in volume (B5).

➤ Tax exemption for ethanol in gasoline (2008)

1.6 yen per liter tax reduction for ethanol blended gasoline from May 2008

(Gasoline Tax: ¥53.8 /L, Oil& Coal Tax: ¥2.04/L, Consumption tax: 5%)

➤ Biofuel law of Agriculture, Forestry and Fisheries (2008)

50% Reduction of Fixed Asset Tax for biofuel plant & set of financial support (loan with no interest etc).

Biofuel Policy in Japan (2)

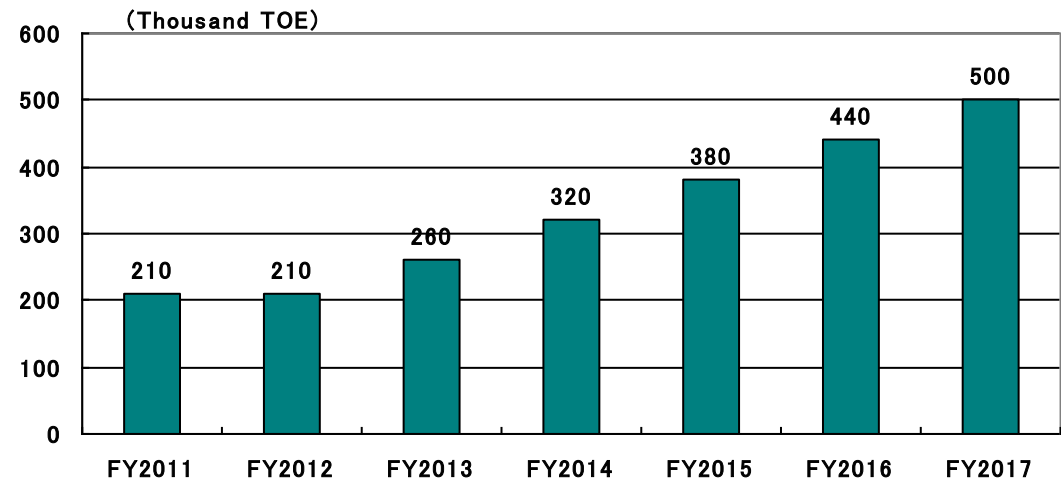
➤ Basic Energy Policy Act (2010 Jun)

Indicates 3% ethanol introduction in gasoline in 2020

Establish next generation biofuel technology and deploy by 2030

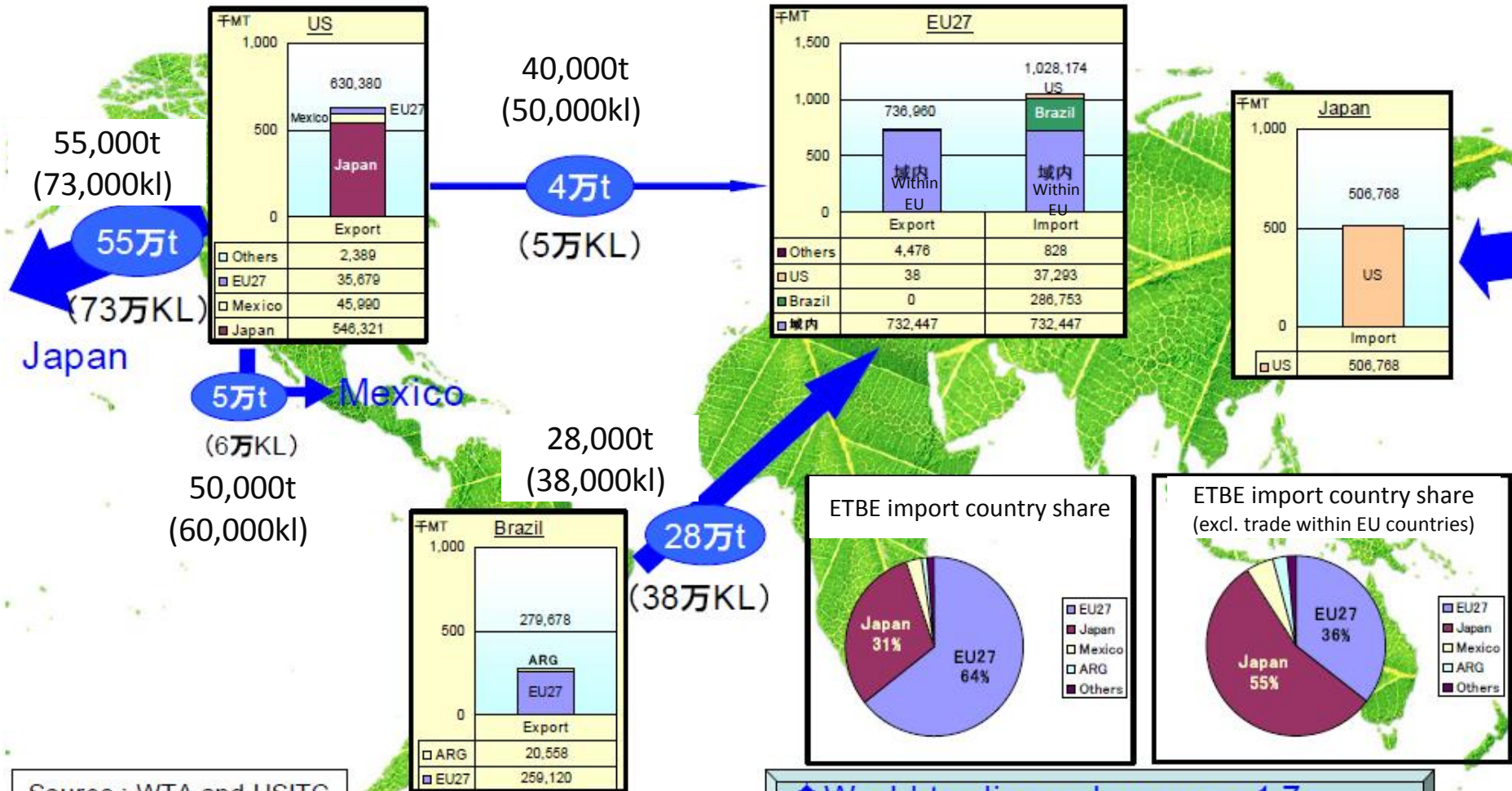
➤ Law regarding Advanced Energy Supply Structures (2010 Nov)

- Law regarding promote the effective utilization of raw materials of fossil energy and use of non-fossil energy sources (Law regarding Advanced Energy Supply Structures) was passed in July 2009.
- Related ministerial order including ethanol introduction target was in effect in November 2010
- LCA of GHG emission of ethanol should be less than 50% of baseline gasoline
- Both of ETBE and direct blend (E3) are accepted.
- Mandate of Ethanol Usage from 2011
- 3,360 SS among total approximately 36,000 SS are selling biofuel included gasoline in Japan



World ETBE Trade Flow 2012

(Source :JBSL---Japan Biofuels Supply LLP)



Source : WTA and USITC

◆ World trading volume was 1.7 million tons (2.2 mil KL) in 2012.



バイオマス燃料供給有限責任事業組合

E10 for E10 vehicle

E10 for E10 proof vehicle can be sold after April 2012

■ Main Product Specifications in Japan

●Motor Gasoline (JIS K2202)	Lead	Unleaded
	Density (max.)	0.783g/cm ³ (15°C)
	RVP	44~78kPa
	RON (min.)	Premium 96; Regular 89
	Sulfur content (max.)	0.0010wt%
	Benzene (max.)	1vol%
	MTBE (max.)	7vol%
	Ethanol (max.)	3vol% *1
●Kerosene (JIS K2203)	Sulfur content (max.)	0.0080wt% (for fuel cell : 0.0010wt%)
	Smoke point (min.)	23mm (in winter season: 21mm)
●Gas Oil (JIS K2204)	Pour point (max.)	Special No.3: -30°C; No.3: -20°C; No.2: -7.5°C; No.1: -2.5°C;
	Cetane index (min.)	Special No.1: +5°C; Special No.1, No.1: 50 No.2, No.3, Special No.3: 45
	Sulfur content (max.)	0.0010wt%
	Density (max.)	0.86 (15°C)
	Note: 5 grades depending on ambient temperature of seasons and/or districts.	
●Fuel Oil A *2 (JIS K2205)	Kinematic viscosity (max.)	20mm ² /S (50°C)
	Pour point (max.)	5°C
	Sulfur content (max.)	No.1: 0.5wt%; No.2: 2.0wt%
●Fuel Oil B *2 (JIS K2205)	Kinematic viscosity (max.)	50mm ² /S (50°C)
	Pour point (max.)	10°C
	Sulfur content (max.)	3.0wt%
●Fuel Oil C *2 (JIS K2205)	Kinematic viscosity (max.)	No.1 250mm ² /S (50°C)
		No.2 400mm ² /S (50°C)
		No.3 400mm ² /S~1000mm ² /S (50°C)
	Sulfur content (max.)	No.1 3.5wt% No.2, No.3. no specification

*1 For an automobile that received registration by the Road Vehicle Act or its vehicle number is specified by law as a vehicle compatible with E10, gasoline specifications for both oxygen and ethanol are relaxed to 3.7 mass% and 10 vol% max, respectively.

*2 Fuel oil is classified into 3 types by viscosity. Even though Fuel Oil A has the name "fuel oil", it's a kind of distillate product. This is used for marine diesel engines, small boilers, etc. Fuel Oil B had been produced in large quantities in the past, but this fuel is rarely produced nowadays. Average sulfur level of Fuel Oil C produced in Japan is about 1.5wt% recently (including all its grades).

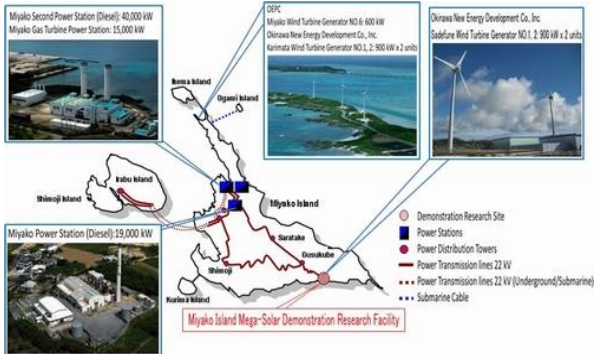
Miyako-jima Eco-Island Project including E10 vehicle



資料) 国土交通省



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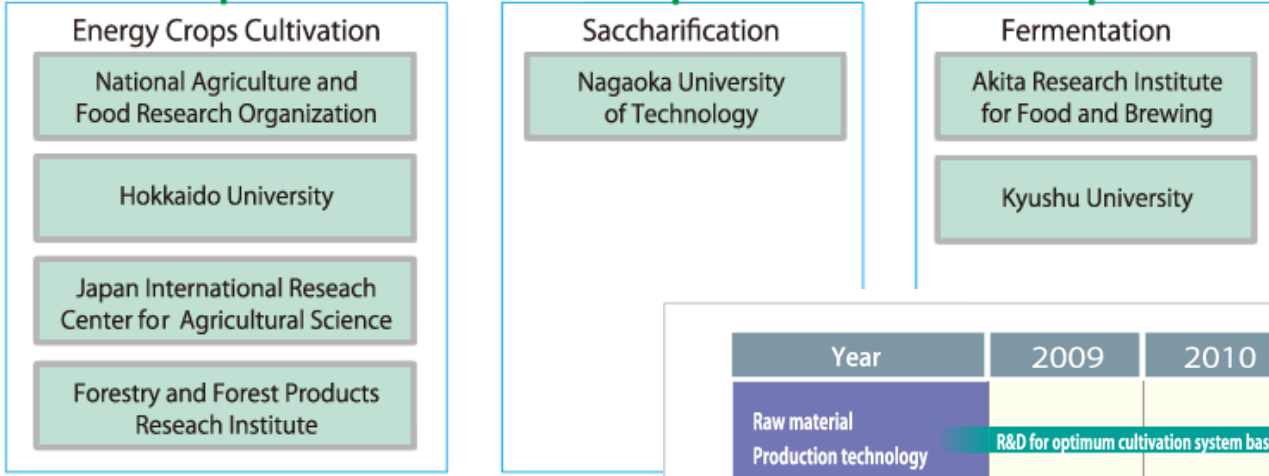
- E10 vehicle is deployed is Miyakojima Island
- EV/PHEV service station, PV-Wind- NAS Batteries Microgrid and BEMS/HEMS are also provided in Miyako-jima island.
- 73% CO2 reduction by 2050 is planned in Miyakojima Island .

R & D information of Biofuels

Research Association of Innovative Bioethanol

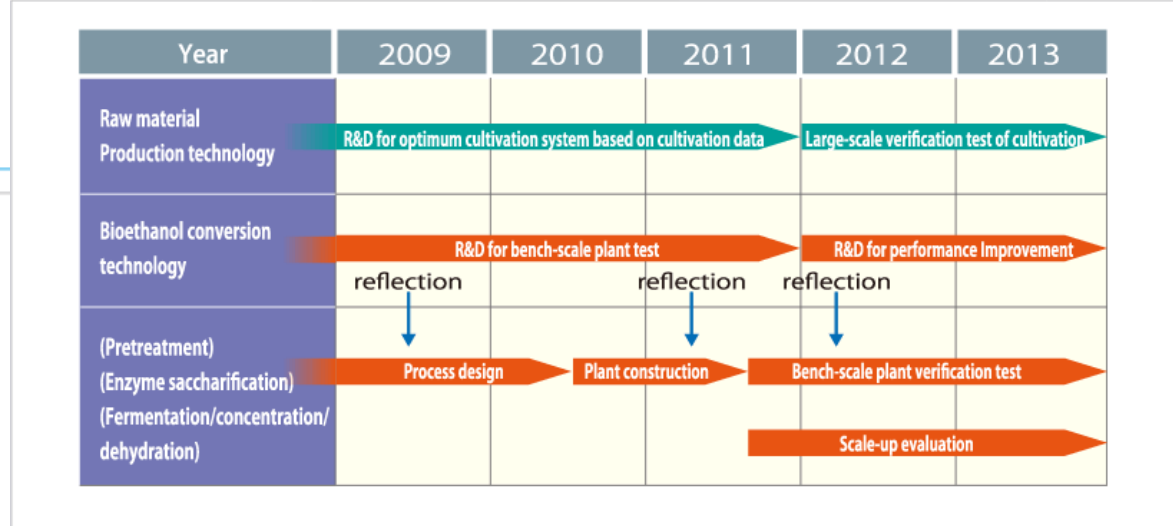


Affiliates



This research focuses on grass biomass. There is a similar research activity on wood biomass.

(Source) Research Association of Innovative Bioethanol



Research Association of Innovative Bioethanol

RAIB Started From March 2009

This material focus on grass biomass. There is a similar research activity on wood biomass.



JX Nippon Energy
total process development

JX Nippon Energy, Toyota, Kajima, Mitsubishi Heavy Ind., Toray Sapporo Eng.

LCA, Environment Assessment, Intellectual Property, Technical Demonstration

Toyota
Energy Plants Production

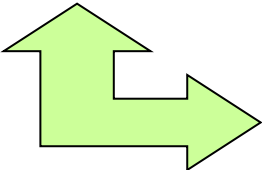
Mitsubishi Heavy Ind.
Pretreatment Technology

Sapporo Eng.
Fermentation Distillation

Kajima
Harvest, Transport Strage

Toray
Saccharification

Tokyo Univ. Research Institutes of Agriculture
Production of Energy Plants, saccharification, Fermentation



Joint Study

(Source) JX Energy Research

Thank you for your attention !