USDA Foreign Agricultural Service
GAIN Report
Global Agricultural Information Network

Required Report - public distribution

Date: 2009-7-17
GAIN Report Number: CH9059

China - Peoples Republic of

BIOFUELS ANNUAL

China Biofuels Annual

Approved By:
Michael Woolsey
Prepared By:
Chanda Beckman and Jiang Junyang

Report Highlights:
China's fuel ethanol production is forecast to rise to 1.70 million metric tons (MMT) in 2009, an increase of eight percent compared to 2008. The GOC's policy to restrict grain processing (including fuel ethanol) is forecast to be unchanged in 2009 and beyond, as food security concerns top the government's agenda. In the wake of food price increases in 2007, the government halted approval of any new grain processing projects (including fuel ethanol plants). The government's policies have turned to support non-grain based fuel ethanol production; however, the sector's growth is constrained by limited feedstock supplies, which compete with land use for grain production.

Post:
Beijing

Commodities:
select

Executive Summary:

China's fuel ethanol production is forecast to rise to 1.70 million metric tons (MMT) in 2009, an increase of eight percent compared to 2008. The GOC's policy to restrict grain processing (including fuel ethanol) is forecast to be unchanged in 2009 and beyond, as food security concerns top the government's agenda. In the wake of food price increases in 2007, the government halted approval of any new grain processing projects (including fuel ethanol plants). The government's policies have turned to support non-grain based fuel ethanol production; however, the sector's growth is constrained by limited feedstock supplies, which compete with land use for grain production.

The official government guidelines for the biofuel sector are that biofuel development (including fuel ethanol and bio-diesel) should not compete with crops intended for human consumption. According to the new government policy, cassava, sweet potato, and sweet sorghum are viewed as potential feedstock for new ethanol plants in the coming years. However, the current domestic production of cassava, sweet potato, and sweet sorghum is not able to sustain large scale ethanol production, as most of these crops have to be planted on marginal, less fertile land.

To date, there are five plants licensed for fuel ethanol production. Among them, there are four plants (located in Jilin, Heilongjiang, Henan, and Anhui Provinces) that use grain-based feedstock. Their production totaled 1.46 MMT in 2008. It is estimated that 80 percent of production is corn based and the remaining 20 percent is wheat or rice based. The fifth plant (in Guangxi Province), which started trial operations in December 2007, was designed to produce at an annual capacity of 200,000 tons, using only cassava as its feedstock. Its fuel ethanol production reached 120,000 tons in 2008, as prescribed in the E10 mandate (10 percent ethanol blended into fuel) the province has already implemented.

Overall annual biodiesel production capacity in 2008 is estimated at three MMT, however actual biodiesel production in 2008 is estimated at 250,000 MT. Feedstock for biodiesel production is scarce in China, given that China is a net importer of vegetable oils such as soy and palm oil for food consumption. Currently, the main feedstock is waste cooking oil from restaurants, which is difficult to collect on a commercial scale for biodiesel production.

Note: During the 11th five-year plan (2006-2010), the Chinese government made clear that it will not approve any new plants that use corn or other grains as feedstock, which virtually capped the usage of grains (corn, wheat, and rice) at the current capacity. For a complete report on China's grain situation, please refer to GAIN report CH9013.

The official guidance policy relevant to the biofuel sector has been unchanged since 2007. Please refer to CH7039 and CH8052 for complete background information.

Author Defined:

Biofuel Situation

China views biofuels as essential and strategic components of a secure economy and diversified energy policy. To ensure the development of biofuels, the central government has taken an active role in regulating both the supply and demand side of the biofuel market and has limited ownership of production facilities to the state industry. The National Development and Reform Commission (NDRC) has been China's leader in the development of biofuels , guiding future energy production and consumption in China, as well as industry's participation in the sector.

There are five fuel ethanol plants (located in Jilin, Heilongjiang, Henan, Anhui and Guangxi Provinces) currently licensed for operation. Among them, there are four grain-based plants that have reached full capacity. Their total usage of corn (and wheat) for ethanol will remain at the current level. The fifth plant (in Guangxi Province) began trial operations in December of 2007, with designed annual capacity at 200,000 tons, based entirely on cassava feedstock. Its fuel ethanol production reached 120,000 tons in 2008, as required by a provincial E10 mandate.

Food security has been a top issue on the central government's agenda. Escalating food prices since 2007 have triggered a series of policy shifts in the industrial use of grain. To reduce industrial grain consumption, the government denied approval of any new grain-based processing projects (including fuel ethanol plants) in 2007 and 2008.

State policy prescribed that biofuel development (including fuel ethanol and bio-diesel) should not compete for arable land designated for crops for human consumption. The future development of feedstock for biofuel will necessarily have to come from marginal, less arable land; and therefore increase of planting tuber crops and sweet sorghum is a realistic expectation. Some provincial governments and private companies are already experimenting with sweet potato and sweet sorghum as feedstock for biofuel production. However, current production of such crops is far from sufficient for large-scale industrial ethanol production, as supply of these feedstock has been seasonal and low yielding. Given the current crop limitations and transportation logistics, the feasible production capacity of a biofuel plant based on tuber crops and sweet sorghum will not exceed 100,000 MT annually, according to industry estimates.

To maintain low energy costs for all sectors, the central government provides subsidies to state refineries for gasoline and diesel production. More importantly, price control or stabilization on strategic commodities has been a key function for the relevant government agencies; as a result, domestic gasoline and diesel prices sometimes do not follow the international market price. The domestic fuel price swing is less volatile than international

prices. The government evaluates international oil prices periodically to determine a benchmark price for gasoline and diesel for domestic distribution.

The latest oil pricing mechanism announced by NDRC took effect earlier this May, and states that domestic fuel prices should be adjusted when global crude prices fluctuate by more than four percent for 22 working days in a row.

The fuel ethanol price is linked to set government fuel prices and then marketed by state designated retailers. Due to relative high prices on feedstock including corn, wheat, and rice, the five fuel ethanol producers still receive government subsidies to cover losses under the current pricing regime. This pricing regime also functions to discourage the private sector's investment in fuel ethanol production.

Government Subsidy for Fuel Ethanol Production

(in U.S. $/Metric Ton)

2005	2006	2007	2008*
270	239	202	258

* Post estimate on the average amount for the five plants in 2008 (U.S.$ 1 = RMB 6.8)

In 2008, the average subsidy for fuel ethanol production set by the central government reached $258/ton, while it was approximately $202/ton in 2007 and $239/ton in 2006. The rise in the subsidy amount is primarily due to high grain prices in 2008. Since 2008, the government started to implement a flexible subsidy program for all five fuel ethanol producers. According to the program, the final subsidy level is based on the actual evaluation of each individual plant's performance. The evaluation is scheduled in November of each year. The program is designed to make more efficient use of government funding to the sector.

Currently, ten provinces participate in the fuel ethanol program. These ten provinces will remain the priority for use of an E10 gasoline (with a fuel/ethanol mix rate of 10 percent). Six of these provinces use E10 within their entire provinces, while four provinces have only partly adopted the product. Close to full adoption by these four provinces remains a priority for the government's fuel ethanol program.

Fuel Ethanol Production

Table 1 shows the expansion in China's fuel ethanol production during the eight year period 2002-2009. The fuel ethanol production in 2009 is forecast to grow eight percent from the previous year, in tandem with fuel market expansion in these ten provinces.

Table 2 (unchanged from the previous report) provides a geographic breakdown of the production facilities within China in terms of production capacity. It also gives estimated

production data for 2009. The Jilin Province ethanol plant has the largest processing capacity in China with an output of 500,000 MT/year. In 2007, a new plant opened in Guangxi Province using cassava as a primary feedstock. The province plans to increase ethanol production (based on cassava) with the goal of reaching 1 MMT by 2010. Industry sources report that other plants using sweet potato as feedstock will be submitted for approval to the NDRC and if approved these plants located in Hebei or Sichuan, might begin construction in 2009. These plants' individual annual capacity will have to be below 100,000 tons, given the limited feedstock supplies.

Table 1. A Historical Look at China's Fuel Ethanol Production

Year	Production Quantity	% Increase from Previous Year
2002 and before	Official fuel ethanol production began in 2004. There is little recorded fuel ethanol production before 2002.	NA
2003	<20,000 MT/year	
2004	300,000 MT/year	1,400%
2005	920,000 MT/year	206%
2006	1,300,000 MT/year	41%
2007	1,370,000 MT/year	5%
2008	1,580,000 MT/year	13%
2009	1,700,000 MT/year	8%

Sources: Industry Sources

Table 2. Current Fuel Ethanol Production

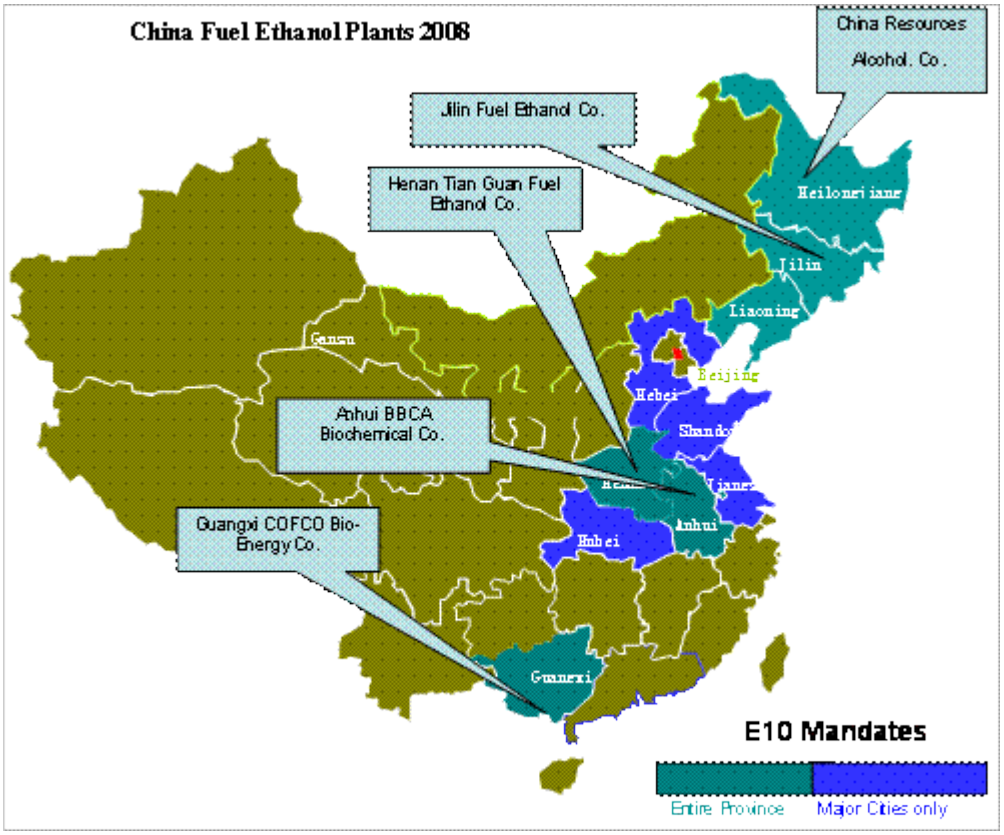
Location *(Province, City)*	**Company Name**	**Principal Feedstock**	**Estimated 2008 Production** *(MT/year)*	**2009 Production Capacity**	**Supply Location**
Heilongjiang, Zhaodong	China Resources Alcohol Co.	Corn/Rice	180,000	180,000	Heilongjiang
Jilin, Jilin	Jilin Fuel Ethanol Co.	Corn	470,000	500,000	Jilin
					Liaoning
Henan, Nanyang	Henan Tian Guan Fuel-Ethanol Co.	Wheat	410,000	450,000	Henan
					Hubei (9 cities)
					Hebei (4 cities)
Anhui, Bengbu	Anhui BBCA Biochemical Co.	Corn	400,000	440,000	Anhui
					Shandong (7 cities)
					Jiangsu (5 cities)
					Hebei (2 cities)
Guangxi	Guangxi COFCO Bio-Energy Co.	Cassava	120,000	200,000	Guangxi
Total:			1,580,000	1,770,000	

Sources: Industry Sources

**Note 1: The list of cities with an E10 mandate for each province is as follows:*

- **Hubei**: *Xiangfan, Jingmen, Suizhou, Xiaogan, Shiyan, Wuhan, Wichang, Huangshi, and Ezhou*
- **Hebei**: *Shijiazhuang, Baoding, Xingtai, and Handan (locations supplied by Henan)*
- **Shandong**: *Jinan, Heze, Zaozhuang, Linyi, Lioacheng, Jining, and Tai'an*
- **Jiangsu**: *Xuzhou, Lianyugang, Huai'an, Yancheng, and Suqian*
- **Hebei**: *Canzhou and Hengshui (locations supplied by Anhui)*

*Source: Law Concerning Testing for the Extensive Use of Ethanol Blended Gasoline for Automobiles and the Regulations Concerning the Conduct of Testing for the Extensive Use of Ethanol Blended Gasoline for Automobiles.



Trade in Ethanol

Both ethanol imports and exports have been minimal in 2008 and 2007. China's ethanol exports have dropped substantially since the government removed ethanol export rebate in 2007. In 2007, to discourage the expansion of China's grain-processing sector, the government removed a 13 percent Value Added Tax (VAT) rebate on ethanol exports. This rebate removal substantially cut profits for ethanol exporters.

In June 2009, as part of the central government's stimulus policy package, the government

announced a five percent VAT rebate for ethanol export, however due to sluggish external demand, China's ethanol exports are not expected to increase significantly in 2009. Partially due to freight advantages, the neighboring markets Japan, Korea, and other Asian countries are predominant export destinations for Chinese ethanol (mainly food grade).

Ethanol imports to China have been relatively minor in recent years. Due to the relative cheaper priced feedstock for ethanol production in China, imported ethanol is not price competitive.

China Ethanol Exports in 2004-2008 in 1,000 LTR						
HTS#	**Description**	**2004**	**2005**	**2006**	**2007**	**2008**
	Total Ethanol	96,912	162,204	1,017,779	129,973	108,110
220710	Undenatured	91,596	158,654	970,721	110,718	100,064
220720	Denatured	5,316	3,550	47,058	19,256	8,047
China Ethanol Imports 2004-2008 in 1,000 LTR						
HTS#	**Description**	**2004**	**2005**	**2006**	**2007**	**2008**
	Total Ethanol	4,253	19,590	7,972	678	402
220710	Undenatured	2,021	15,936	5,930	154	293
220720	Denatured	2,232	3,654	2,042	524	109

Source: World Trade Atlas

China Ethanol Exports by Destination in 2004-2008 in 1,000 LTR					
Country	**2004**	**2005**	**2006**	**2007**	**2008**
World	96,912	162,204	1,017,779	129,973	108,110
Korea, South	16,881	39,144	191,642	50,304	34,933
Australia	0	0	0	0	17,685
Taiwan	21,909	22,655	41,811	15,592	14,556
Singapore	46	5,063	59,923	21,659	14,532
Japan	49,975	79,375	113,665	35,420	12,560
Korea, North	6,844	14,648	9,433	5,588	8,467
Others	1,257	1,319	601,304	1,411	5,377

Source: World Trade Atlas

China Ethanol Imports by Destination in 2004-2008 in 1,000 LTR					
Country	***2004***	***2005***	***2006***	***2007***	***2008***
World	4,253	19,590	7,972	678	402
Pakistan	0	0	0	0	194
Japan	1,900	1,807	1,802	179	131
Philippines	0	0	0	0	19
Germany	32	31	91	68	19
United States	25	35	149	119	13
Malaysia	0	7	3	16	10
Korea, South	40	992	29	12	8
Netherlands	15	7	10	15	7
United	9	31	15	4	1

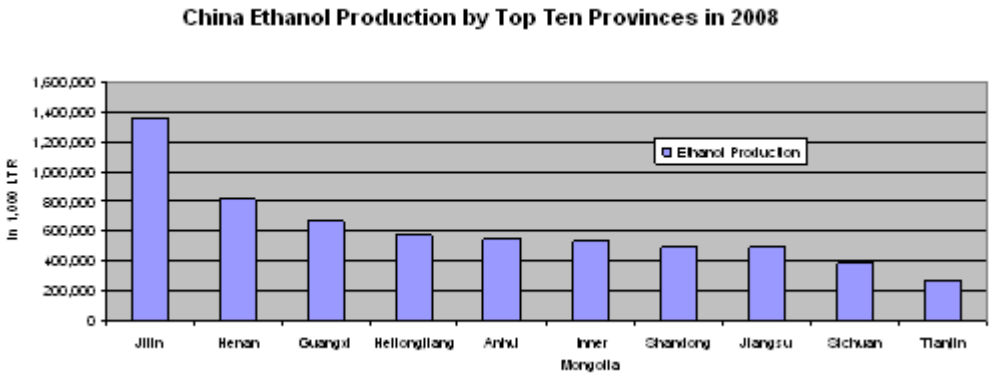
Kingdom					
Singapore	35	16	10	5	1
Others	2,196	16,662	5,865	261	1

Source: World Trade Atlas

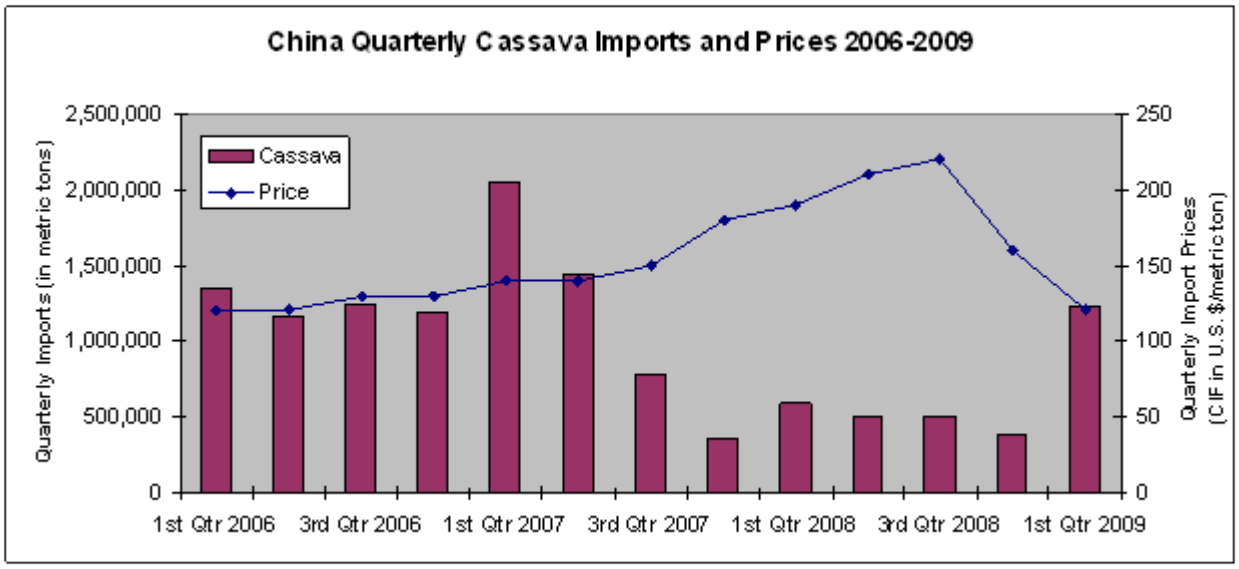
Overall Ethanol Production

Total ethanol production in 2008 is estimated at 6.5 MMT. Of this total, 1.6 MMT is intended for fuel ethanol use, and about 2.8 MMT for food use. The reminder is used for industrial and surgical purpose. About 50 percent of total ethanol production is based on grains (mostly corn, but also including sorghum, wheat, and rice) with the remainder based on tubers, including cassava and sweet potatoes. Overall, total ethanol production in 2008 accounted for less than 60 percent of total capacity, estimated at more than 11 MMT.

The top five ethanol producing provinces are Jilin, Henan, Guangxi, Heilongjiang and Anhui, which are also major grain (or tuber) production regions. These five provinces also host the current five licensed fuel ethanol plants. (For grain and cassava production data, refer GAIN CH9013, CH8052)



Imported cassava is also used for ethanol production in coastal regions. Due to a zero tariff on cassava from southeastern Asian (ASEAN) Countries, imported cassava sometimes is more price competitive over domestically produced grains or tubers. As shown by the following table, China's cassava imports volume fluctuates with price movement. In 2009, being price competitive, cassava imports from Vietnam and Thailand rebounded substantially as Chinese grains price were artificially boosted by the government purchase program.



Source: World Trade Atlas

The imported cassava price averaged about $120/ton in the first quarter of 2009, while it was $190/ton in the first quarter in 2008. As a result, China's cassava imports from January- May 2009 rose 160 percent from the previous year, reaching 2.5 MMT.

China's Cassava (071410) Imports from the World by Metric Ton 2003-2009							
	2003	2004	2005	2006	2007	2008	2009
Total Imports	2,368,260	3,442,412	3,335,415	4,950,435	4,625,427	1,976,418	2,495,359
Thailand	1,874,362	2,734,389	2,695,576	3,864,203	3,202,647	1,247,513	1,462,211
Vietnam	453,132	522,296	411,573	941,274	1,279,470	610,679	995,880
Indonesia	40,766	185,728	228,265	144,784	139,124	110,820	34,189

**Note: 2009 data is for January-May only*

Biodiesel

Overall biodiesel production capacity in 2008 is estimated at three MMT. Actual biodiesel production in 2008 is estimated at 250,000 MT, due to lack of feedstock availability.

Feedstock for biodiesel production is scarce in China, given that China is a net importer of vegetable oil such as soy and palm oil for food consumption. The most common feedstock for biodiesel production in China is used cooking oil. However, there is no standard or scale collection of used cooking oil. The spotted supply of domestic used cooking oil cannot meet plants' desired capacity. Currently, biodiesel plants are small-scale, ranging from 100 to 20,000 MT of production. These plants usually operate for only a few months out of the year due to lack of a sufficient supply of feedstock. The lack of feedstock is the result of the short supply of edible vegetable oils. China is the world's largest importer of soybeans and imports

significant quantities of other oil based products.

In addition, the biodiesel sector competes with other sector when purchasing feedstock because used cooking oil can also be used as animal feed ingredient or other chemical material.

Industry sources report that when fuel prices are high, there is potential for expanded use of biofuels. However, as fuel prices fall, all profit margins are narrowed; producers can barely turn a profit without government subsidies or tax incentives. If market conditions become unfavorable, most biodiesel plants will suspend operation to avoid negative cash flow.

Biodiesel prices are primarily influenced by benchmark prices set by NDRC as well as the supply and demand for petroleum-based diesel fuel. NDRC sets this benchmark price in accordance with international fuel prices swings. However, as fuel prices constitute a large proportion of production costs for all sectors, for the purpose of controlling or stabilizing the overall domestic prices, this benchmark price sometimes does not follow closely with the international market. In a time of high international fuel prices, domestic fuel prices might be much lower than the international prices. If this pricing regime creates losses for gasoline or diesel producers (which are state owned), the government will offer subsidy to partially compensate their losses.

Supportive Government Policy, a Must for the Biodiesel Sector

For private biodiesel producers to be competitive, biodiesel prices have to be lower than the NDRC benchmark price on diesel. However, the price for feedstock is market driven. There are no national or provincial programs to promote the use of biodiesel as transportation fuel and no government subsidy is provided to biodiesel producers. Due to government control on fuel prices (which virtually functions as price ceiling for bio-diesels), profit margins for private biodiesel producers are not guaranteed.

Given the current production scale, Post forecasts that the Chinese government will not promote large-scale fuel biodiesel use in the near future.

On December 9, 2008, the State Administration of Taxation and Ministry of Finance jointly issued Policies for Products Generated from Comprehensive Utilization of Resources (Cai Shui [2008] No. 156), a circular on Value-added Tax ("VAT"), which stipulated that a VAT refund would be applicable to enterprises that produce biodiesel by making use of wasted animal oil or plant oil as at least 70 percent of their raw materials. This VAT incentive policy is effective July 1, 2008. To obtain the VAT refund, an enterprise must first apply for and obtain the relevant "Comprehensive Utilization of Resources Verification Certificate" and then apply for the refund. Industry sources report that this policy is not very well implemented at the provincial level due to different interpretation by local taxation authorities. Even for some

qualified products, the local authorities did not hand out the refund in a timely manner.

A new revised consumption tax effective January, 2009 stipulated that diesel (biodiesel included) is subject to a five percent (or 12 cents/LTR) consumption tax, this adversely impacted the profitability for biodiesel producers. The biodiesel industries (mostly private ownership) are currently lobbying the government for an exemption to this consumption tax, however, compared with the state owned fuel ethanol producers, this sector's lobbying power is less effective.

Comparison of Tax Incentives for Fuel Ethanol and Biodiesel Production		
	Consumption Tax	Value Added Tax (VAT)
Fuel Ethanol	0	0
Biodiesel	5% (or 12 cents /LTR since January 2009.)	*17%
*Interpretation by local taxation authority varies		

Major Biodiesel Plants Production Capacity		
Company Name	**Location**	**Annual Production Capacity**
China Biodiesel International Holding Co., LTD	Fujian Province	100,000 MT
Wuxi Huahong Biofuel Company	Jiangsu Province	100, 000 MT
Hainan Zhenghe Biofuel Energy Company	Hebei Province	300,000 MT
Gushan Environmental Energy Limited	Sichuan, HeBei, Fuzhou, Beijing	340,000 MT
Source: China New Energy and Renewable Energy Industry Report 2008 and Post's Estimate		

Non-Grain Feedstock for Biofuel Production

As the government has announced a total ban on grains for use in new fuel ethanol plants, industry and researchers are working on the feasibility of substitute crops or tree nuts for future fuel ethanol or biodiesel production. The potential substitution and production regions are listed below, according to industry sources.

Potential Feedstock and Production Region for Ethanol or Biodiesel Production	
Crops	**Province**
Oil Bearing Tree Seeds (Or Energy Trees)	Yunnan, Sichuan, Hunan, Anhui, Hebei, Inner Mongolia and Shaanxi
Tuber (Sweet Potato)	Hubei, Hebei, Jiangsu, Jiangxi and Chongqing
Sweet Sorghum	Heilongjiang, Inner Mongolia, Xinjiang, Liaoning and Shandong

A recent NDRC evaluation shows that in these provinces, the development of such feed stocks will not compete with the land use for- grain production. However, most of the available land for these crops will have to be marginal, less fertile land.

A separate report by State Forestry Administration (SFA) in 2008 outlined the following three steps prior the commercialization of biodiesel production:

- Variety breeding demonstration on energy trees: the government needs to work with industry to develop variety breeding demonstration, by 2010, SFA plans to complete 14 demonstration projects nationwide for variety breeding.
- Cultivation demonstration on energy trees: by 2010, SFA plans to complete 22 demonstration projects nationwide on the cultivation and harvesting of energy forestry.
- Demonstration projects on biodiesel production: In 2008 NDRC approved three demonstration projects on bio-diesel.

Three Biodiesel Demonstration Projects approved by NDRC in 2008			
Participants	**Production Capacity (MT)**	**Location**	**Feedstock**
Petro China	60,000	Sichuan Province	Jatropha
SinoPec	50,000	Guizhou Province	Jatropha
CNOOC	60,000	Hainan Province	Jatropha

According to a notice by NDRC in 2008, "the construction of the three demonstration biodiesel projects will help support and regulate the biodiesel sector's development and avoid duplicated construction and investment. Three state-own petroleum companies were selected for the construction of these three projects."
(Source: NDRC website)

So far, there is no timetable on when the projects will be completed. However, jatropha has been designated as the feedstock and it normally takes up to five years before the trees to reach prime harvest stage. State media reports that some trial planting for jatropha started in 2007, but Post estimates jatropha production will not be able to sustain any scale industrial production in 2009 and 2010. In the long term, through these demonstration projects, NDRC plans to accumulate more management experience and form methodologies for biodiesel production, storage, marketing and usage, and thus lay a sound foundation for the future trial use of fuel biodiesel in the country.

MOU on Biofuel Cooperation Activities between the United States and China
In December 2007, the United States Department of Agriculture (USDA), Department of Energy (DOE) and NDRC signed a Memorandum of Understanding (MOU) on cooperation in biofuel development. Based on this MOU, the two countries have proposed to cooperate closely in the scientific, technical, and policy aspects of biofuel development.

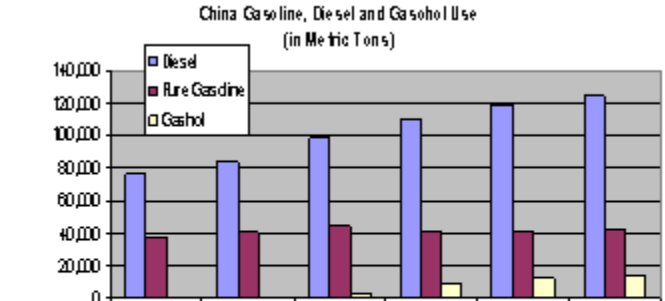
Both sides agree that agriculture will play a more important role in low-carbon economy in the future. Biofuel and energy agriculture are of vital importance to the development of a low-carbon economy and rank as one of the major agricultural measures to cope with climate change.

Currently, USDA, DOE, and NDRC are working on cooperation proposals, which cover the

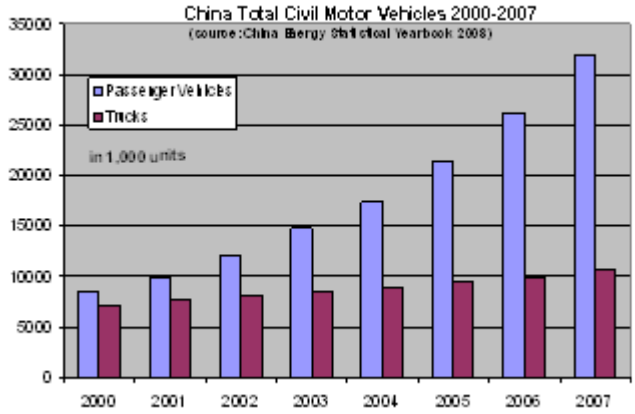
following areas: cellulose ethanol, algae biodiesel, non-grain based ethanol production (using sweet potato and sweet sorghum as feedstock), and thermo chemical conversion of biomass. With more industry participation expected in the future, this cooperation might bring more concrete progress in technical breakthroughs.

Fuel Use in China

Auto sales in China in 2009 are estimated to grow six percent. Post estimates that transport fuel (diesel and gasoline) demand will grow five percent in 2009. Diesel is the primary fuel consumed in China with close to 125 million MT consumed in 2007. Pure gasoline consumption was approximately 42 MMT in 2007. Both diesel and gasoline consumption in China have increased substantially as China's economy expands. Pure gasoline use has plateaued somewhat over the last five years as gasohol (E10) consumption has grown. During this timeframe, automobile use in China has increased on average 15 percent during 2003-2007 annually, according to China Energy Statistical Yearbook 2008.



	2002	2003	2004	2005	2006	2007
Diesel	76,672	84,098	98,852	109,725	118,359	124,930
Pure Gasoline	37,497	40,720	44,258	40,253	40,717	42,591
Gashol			3,000	9,200	13,000	14,000



(Source: China Energy Statistical Yearbook 2008)