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Global Agricultural Information Network

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China - Peoples Republic of

Biofuels Annual

2011Annual Report

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Report Highlights:

China's fuel ethanol production is forecast to reach 2,217 million liters (1.75 million tons) in 2011, an increase of four percent compared to 2010. Although the ethanol sector only accounts for one percent of China's total grain production, this sector has been criticized for contributing to China's escalating food and grain prices. Realizing a need for sustainable feed stock for bio-fuel production, the industry is developing alternative feed stocks such as energy forestry for biodiesel production and partnering with international organizations on research and development of second generation cellulosic ethanol.

Post:
Beijing

Executive Summary:

China's fuel ethanol production is forecast to increase by four percent to 2,217 million liters (1.75 million tons) in 2011. China's five ethanol plants use grain (corn and wheat) and tuber (cassava) for ethanol production. Over the past few years, China has been actively experimenting with non-grain feed stocks such as cassava and sweet sorghum for ethanol production. Due to China's rising food prices, the government stopped approval of new fuel ethanol plants and fell short of reaching its production target in the 11th five year plan (2005-2010). There is no specific production target for fuel ethanol or biodiesel production for the 12th five year plan (2011-2015) period. A goal for China's bio-fuel policy is to become less reliant on foreign oil, so imports of bio-fuels and its feed stocks are currently not encouraged.

Production:

Ethanol: China's five ethanol plants use grain (corn and wheat) and tuber (cassava) for ethanol production. In 2010, four of the plants produced a total of 1,951 million liters (1.54 MMT), which included 80 percent from corn and 20 percent from wheat and rice. The cassava plant is estimated at 177.4 million liters (140,000 MT).

Although the government mandates that 10 provinces implement an E10 program (10 percent ethanol blended into fuel), industry sources stated that the blending rate is within the range of 8-12 percent, depending on the market prices between fuel ethanol and petroleum. With rising prices for feed stocks and the lack of sufficient government support, ethanol producers lowered the blending rate to help offset cuts in their profit margin.

The official government guideline for the bio-fuel sector remains unchanged. As noted in last year's Annual report, bio-fuel development (including fuel ethanol and bio-diesel) should not compete with crops intended for human consumption; and, the land for developing feed stocks should not compete with land for (food or feed) crop production. The government and the industry have been experimenting with alternative crops such as sweet sorghum and cassava for new ethanol plants.

Biodiesel: In 2010, China's capacity for bio-diesel production is estimated at 3.408 million liters (3 MMT), unchanged from the previous year; but, actual biodiesel production only reached 227.2 million liters (200,000 MT). Currently, the main feed stock for biodiesel is used/waste kitchen oil or residue from vegetable oil crushers. Due to high demand from animal feed or other chemical processing sector, the prices for these feed stocks are too expensive for biodiesel production. The restaurant and catering industry is another competitor for waste cooking oil as it's used as a substitute when prices for edible oil are relatively high. The renewable energy often loses when competing against a need for human consumption in China.

As the government continues to control the price of transportation fuel, there will be a fixed price ceiling for bio diesel. With production cost for biodiesel higher than regular diesel and the lack of government subsidies for

biodiesel production, industry sources reported that some biodiesel producers stopped their operations. To develop bio-diesel feed stock, several government agencies and state companies have begun planting energy trees that bear oil nuts for bio-diesel production, but, progress has been slow and it will take years before these energy trees reach a growth stage suitable for industrialization of bio-diesel production.

Due to scarcity of feed stocks for bio-diesel production, China has not mandated bio-diesel use for transportation fuel nationwide. Earlier this year in Hainan province, there was a pilot program in two counties where the blending rate of 2-4% was used for biodiesel in transportation fuel. The provincial government and petroleum companies are still evaluating the results, which will determine the announcement of implementing the mandatory use of biodiesel in Hainan. Two factors will determine if Hainan will impose a mandatory program for biodiesel usage: the level of sustainable supplies from feedstock production and favorable subsidies provided by central or provincial governments. (See Policy)

Policy and Programs for Ethanol Production:

Reportedly, for the 12th five year plan (2011-2015) period, the government has set a target for non- fossil energy consumption at 11.4 percent by 2015, an increase of 3.1 percent from 2010. China aims to account for 15 percent of energy consumption with non-fossil fuels by the end of 2020. The targeted non-fossil energy in China includes hydropower, solar energy, wind power, and biomass energy. According to the 2010 Energy Yearbook, China's reliance on foreign oil increased 2 percent to 55%, so they are diversifying their energy supply and consumption mix. Compared with other renewable energy sources, bio-fuel is expected to take a minor part in China's diversified energy policy because of lack of sustainable supply of feed stocks and technology breakthrough.

The government continues to provide subsidies for fuel ethanol production to all five designated ethanol plants within the 10 mandated provinces. The central government's average subsidy for fuel ethanol production is slowly moving downward. In 2010, the average subsidy was 17 cents/liter (\$215/MT); in 2009, 19 cents/liter (\$241/MT); and, in 2008, 20 cents/liter (\$253/MT), which was the highest in the past five years. Government subsidies for fuel ethanol production have been criticized and held accountable for rising food and grain prices. Some extreme criticism urges the government to abolish subsidies. Subsidy adjustments reflect current production cost and price changes to feed stock and gasoline prices. Since 2008, the government has implemented a flexible subsidy program for all five fuel ethanol producers. The program's subsidy level is based on the actual evaluation of each individual plant's performance, which is scheduled in November of each year, and designed to make more efficient use of government funding to the sector.

The GOC is revising the 2011 Foreign Investment Guidance Catalogue. According to China's Ministry of Commerce, new investments on liquid bio-fuel (fuel ethanol and bio diesel) plants should continue to be controlled by the Chinese government. There has been no foreign investment in the current five ethanol plants and all of them are 100 percent state owned, indicating a government's preference for state ownership over the private ownership in the energy sector. This policy is unchanged from the previous catalogue issued in 2007.

Policy and Support Programs for Bio-Diesel Production:

In 2010, the government announced its Diesel-Engine Fuel Blend Standard (containing 5% Biodiesel -- B5). This national voluntary standard was implemented on February 1, 2011. The standard serves as technical criteria for production and usage of biodiesel and promotes a healthy and orderly development of the sector. According to industry contacts, Hainan province is the first pilot province to use B5 in 2011. Currently, there is a bio diesel plant operated by CNOOC (China National Offshore Oil Company) with an annual capacity of 60,000 tons. This is the largest demonstration project on bio diesel in China. As part of the province's efforts in building an international ecological island, the provincial government is planning to make B5 a mandatory standard.

Currently, B5 is only feasible in Hainan as the economy ranks far behind most of other provinces and its diesel fuel demand is only 600,000 tons (as of 2007), the lowest in 30 provinces (excluding Tibet), according to China's 2008 National Energy Yearbook. However, industry contacts report that due to the high demand and price for feed stocks such as waste/used cooking oil, bio diesel production is not price competitive with regular diesel. As a result, biodiesel producers are requesting subsidies to cover operational costs. A mandatory program for B5 must address the following: whether there are sustainable feedstock supplies of *Jatropha* or other oilseeds (not competing with human consumption) for large industrial scale of biodiesel production; adequate subsidies from the central or provincial governments for production. Hainan producers reported that current cost for biodiesel production is about 10 percent higher than regular diesel.

In June 2011, China's Ministry of Finance and General Administration of Taxation jointly issued a notice that temporarily removes the five percent consumption tax for bio diesel producers who use the following feed stocks: used cooking oil that is not allowed for human consumption, non-edible lipid from the animal slaughtering houses, leather and meat processing sectors, the acid residue oil from crushers, and other lipids that are not suitable for human consumption.

Update on Tax Incentives for Fuel Ethanol and Biodiesel Production in 2011

Comparison of Tax Incentives for Fuel Ethanol and Bio-diesel Production		
Type	Consumption Tax	Value Added Tax (VAT)
Fuel Ethanol	0	0
Bio-diesel	5% was removed in 2011	*17%
*Interpretation by local taxation authority varies.		

Support programs for forestry feed stock for future bio-diesel production:

The State Forestry Administration (SFA) continues to build demonstration bases for energy forestry, but lack of additional financial support still hinders plantation. The planned acreage by end of the 11th five year plan (2006-2010) was 2.0 million acres. However, by end of 2010, only 500,000 acres were actually planted. In February 2011, SFA announced the guidance on the cultivation of sustainable energy trees such as *Jatropha* (guidance for other energy trees will be issued in the future). This guidance explains the definition of "energy

trees” as well as the goal of producing high yield oilseeds. Previously, SFA guided Jatropha plantation as part of its national forestation program, but the survival rate was the key performance measure, not whether Jatropha varieties could bear high yield oilseeds.

Revision in Bio-ethanol Production for 2010:

The fuel ethanol production in 2010 is revised to 2,128 million liters (1.68 million tons), down 2 percent from the previous year. Lower production is mainly due to high grain prices and reductions in subsidies for fuel ethanol.

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.	N/A
2003	< 25.3 million liters (or 20,000 MT/year)	
2004	380.1 million liters (or 300,000 MT/year)	1,400%
2005	1,165.6 million liters (or 920,000 MT/year)	206%
2006	1,647.1 million liters (or 1,300,000 MT/year)	41%
2007	1,736 million liters (or 1,370,000 MT/year)	5%
2008	2,002 million liters or (1,580,000 MT/year)	13%
2009	2,179 million liters (or 1,720,000 MT/year)	8%
2010	2,128 million liters (or 1,680,000 MT/year)	-2%

Source: Industry Sources

Table 2. Current Fuel Ethanol Production

Location (Province, City)	Company Name	Principal Feedstock	2008 Production (1000 liters/year)	2009 Production (1000 liters/year)	2010 Production Capacity (1000 liters/year)	Supply Location
Heilongjiang, Zhaodong	China Resources Alcohol Co.	Corn/Rice	228,060	240,730	253,400	Heilongjiang
Jilin, Jilin	Jilin Fuel Ethanol Co.	Corn	595,490	633,500	570,150	Jilin Liaoning

Henan, Nanyang	Henan Tian Guan Fuel- Ethanol Co.	Wheat	519,470	561,281	570,150	Henan
						Hubei (9 cities)
						Hebei (4 cities)
Anhui, Bengbu	Anhui BBCA Biochemical Co.	Corn	506,800	532,140	557,480	Anhui
						Shandong (7 cities)
						Jiangsu (5 cities)
						Hebei (2 cities)
Guangxi	Guangxi COFCO Bio- Energy Co.	Cassava	152,040	211,589	177,380	Guangxi
Total:			2,001,860	2,179,240	2,128,560	

Source: Industry Sources

Consumption, Trade, and Stocks:

Fuel ethanol production runs in tandem with the mandated use (or planned consumption) prescribed by the government. This state-running management system prohibits the private sector to import fuel ethanol or biodiesel despite favorable market prices. Feedstock imports are not currently considered for biodiesel production. China is the largest importer of oilseeds for human consumption. Oilseeds such as crude palm oil are not price competitive for biodiesel production without government subsidy. As noted above, the renewable energy sector often loses when competing against a need for human consumption in China.

Denatured/Undenatured ethanol: China temporarily lowered the import tariff on denatured ethanol (HS code: 220720) to 5 percent in 2010, a drastic decrease from 30 percent in 2009. This tariff cut only benefited imports of denatured ethanol for chemical use (not fuel consumption). The government tightly controlled domestic distribution of denatured ethanol, so its use (or demand) has been confined to selected provinces and cities. For undenatured ethanol, the import tariff remains unchanged at 40 percent. The 17 percent VAT and 5 percent consumption tax are levied on both denatured and undenatured ethanol. In early July 2010, China announced

the elimination of VAT tax rebates on ethanol and corn starch exports, mainly due to rising domestic grain prices.

Tariff and Taxes on Ethanol Trade						
HS#		Import Tariff Rate	VAT on Import	Consumption Tax on import	VAT Rebate on Export/1	VAT Rebate on Export/2
220710	Undenatured	40%	17%	5%	5%	0%
220720	Denatured	*5%	17%	5%	5%	0%

1/ Before July 15, 2010; 2/ After July 15, 2010. *Tariff cut is a temporary rate (in 2010, it was 30 percent).

Source: Ministry of Finance

Table 3: Conventional & Advanced Bio ethanol (million liters)						
CY	2006	2007	2008	2009	2010	2011
Production	1,647	1,736	2,002	2,179	2,129	2,217
Imports	0	0	0	0	0	0
Exports	0	0	0	0	0	0
Consumption	1,647	1,736	2,002	2,179	2,129	2,217
Ending Stocks	0	0	0	0	0	0
Production Capacity (Conventional Fuel)						
No. of Bio refineries	4	4	5	5	5	5
Capacity	1,824	2,065	2,243	2,179	2,357	2,534
Production Capacity (Advanced Fuel)						
No. of Biorefineries	0	0	0	0	0	0
Capacity	0	0	0	0	0	0
Co-product Production (1,000 MT)						
DDGS	800	800	928	1,000	1,020	1,070
Corn Oil	56	56	65	70	69	72
Wheat Gluten	45	45	45	45	45	45
Wheat Bran	150	150	150	150	150	150
Feed stock Use (1,000 MT)						
Corn	3,200	3,200	3,700	4,000	3,900	4,120
Wheat	1,050	1,050	1,050	1,050	1,050	1,050
Cassava	0	0	340	470	392	336
Rice	NA	NA	NA	NA	NA	NA

Source: Industry Sources (Corn to ethanol ratio 3.15, dried cassava's ratio 2.8, and wheat ratio 3.5.)

Table 4: Conventional & Advanced Biodiesel (million liters)						
CY	2006	2007	2008	2009	2010	2011
Production	NA	NA	NA	341	341	341
Imports	0	0	0	0	0	0
Exports	0	0	0	0	0	
Consumption	0	0	0	less than 170	less than 150	less than 150
Ending Stocks	0	0	0	0	0	0
Production Capacity (Conventional Fuel)						
No. of Biorefineries	NA	NA	NA	10	10	10
Capacity	0	0	0		0	
Production Capacity (Advanced Fuel)						
No. of Biorefineries	0	0	0	0	0	0
Capacity						
Feed stock Use (1,000 MT)						
Spent Kitchen Oil	NA	NA	NA	NA	NA	NA
Waste Residue from Oil Crushing Plants	NA	NA	NA	NA	NA	NA

Source: Industry Sources

Advanced Bio-Fuels:

Sustainable Aviation Fuel Cooperation between China and United States:

In January 2011, a Memorandum of Understanding was signed between Chinese and U.S. companies on the US-China International Trans Pacific Sustainable Aviation Bio-Fuel Flight. To supply biodiesel for a demonstration flight in China, the Chinese government designated China's National Petroleum Cooperation (PetroChina) to develop biodiesel production using Jatropha. Reportedly, the demonstration flight is scheduled in the second half of 2011. PetroChina is working actively with State Forestry Administration and provincial governments to develop Jatropha production in Sichuan and Yunnan provinces. Jatropha trees were planted in these provinces since 2006; however, due to poor management and growing conditions on marginal land, most trees are still in early stages of development and are not sufficient for large scale production for industrial use. Sources have noted that, in June, PetroChina provided 15 tons of biodiesel to a U.S. company for further processing, which, reportedly, has been the largest production (to date) for this pilot program. For this delivery, around 50 tons of Jatropha seeds were processed. PetroChina is looking for new high-yielding Jatropha varieties and has invested in demonstration farms. If successful, PetroChina will increase Jatropha production in coming years.

Sweet Sorghum:

Industries view sweet sorghum as a non grain feed stock, suitable for production on marginal land, which does not compete with crop for human production. Some provincial governments have been lobbying the central government to approve sweet sorghum as feedstock for new ethanol plants. Researchers are improving the yield and fermentation procedures, while provincial governments are funding small scale demonstration projects. Due to its high biomass output, sweet sorghum is also considered a potentially ideal crop for cellulosic ethanol production.

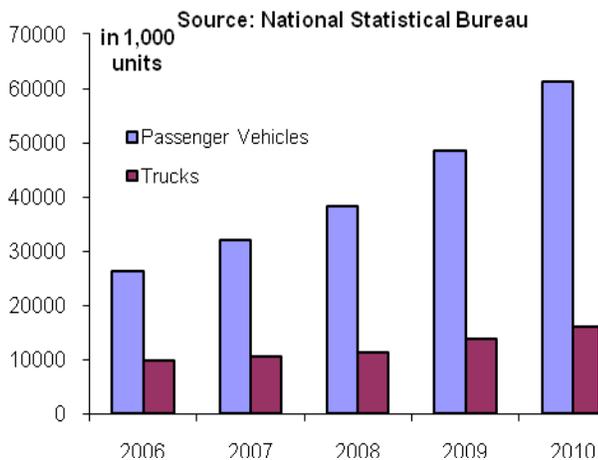
Agricultural residues such as crop straw/stalk and forestry residues are the two main feed stocks for cellulosic ethanol. In June 2011, National Development & Reform Commission (NDRC) released Guidance Catalogue for Industry Structural Adjustment. This new catalogue replaces the 2005 catalogue and functions as a guide to investment management. It is used as an important reference in implementing financial, tax and trade policies. According to this catalogue, the government encourages technology development and application for biomass cellulosic ethanol and bio diesel from non-grain feedstock.

In July 2010, the government granted 22 national energy research centers to promote renovation in energy sector and integrated efforts between research and industry. Among them, the government granted National Energy R&D Center for Liquid Biofuel. In 2011, the government plans to grant another national research center on bio fuels based non- grain feed stocks. The establishment of these centers highlights government commitment for breakthrough in technology in sustainable biomass energy.

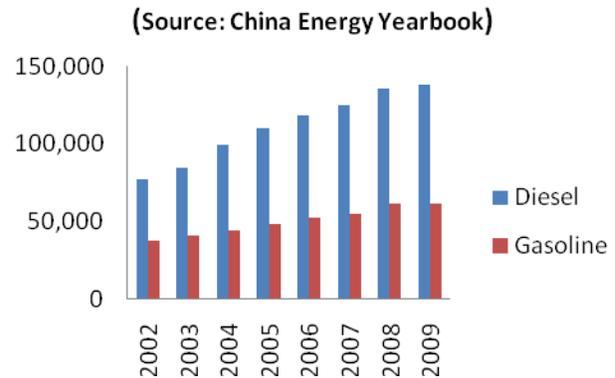
Following a 2007 Memorandum of Understanding between U.S. and China to establish a partnership on bio-fuel research and development, government officials, researchers, and private companies from both sides have been working together to discuss technology and research on shared interests and challenges. In 2011, the U.S. Departments of Agriculture and Energy and China's National Energy Administration (NEA) agreed to conduct technical exchanges and site visits focusing on establishing an efficient, coordinated and sustainable supply system of non-food biomass feedstock. The two sides are planning to focus on the progress of feedstock research and development for the second generation liquid biofuel at the 2011 Sino-US Advanced Biofuels Forum. Topics discussed will include, but not limiting to, sustainable development of feed stocks for crop and forest residues, herbaceous, woody non-food energy crops, and microalgae for biodiesel.

Auto market and Fuel use in China:

China Total Civil Motor Vehicles in 2006-2010



Gasoline, Diesel Use in China (in 1,000 metric tons)



Auto sales in China in 2011 are estimated to grow over 15 percent. Due to rising fuel prices, car manufactures and consumers are turning to more energy efficient car, as the same time, government encourages renovation in electricity cars. FAS/Beijing estimates that transport fuel (diesel and gasoline) demand will grow 5 percent in 2011. Diesel is the primary fuel consumed in China with close to 156,768 million liters (or 138 MMT) consumed in 2009. Gasoline consumption was approximately 78,200 million liters (61 MMT in 2009). Both diesel and gasoline consumption in China have increased substantially as China's economy expands.

China Ethanol Exports in 2005-2011 in 1,000 LTR								
HTS#	Description	2005	2006	2007	2008	2009	2010	2011
	Total Ethanol	162,204	1,017,779	129,973	108,110	107,895	156,020	19,169
220710	Undenatured	158,654	970,721	110,718	100,064	91,787	143,740	16,607
220720	Denatured	3,550	47,058	19,256	8,047	16,108	12,280	2,562
China Ethanol Imports 2005-2011 in 1,000 LTR								

HTS#	Description	2005	2006	2007	2008	2009	2010	2011
	Total Ethanol	19,590	7,972	678	402	159	3,611	3,850
220710	Undenatured	15,936	5,930	154	293	28	392	68
220720	Denatured	3,654	2,042	524	109	130	3,220	3,783
Data for 2011: Jan-May 2011								

Source: World Trade Atlas

<u>China Exports</u>	220710, Undenatured in 1000 LTR			220720 Denatured in 1,000 LTR			
Partner Country	Quantity			Partner Country	Quantity		
	2008	2009	2010		2008	2009	2010
World	100,064	91,787	143,740	World	8,047	16,108	12,280
Korea South	32,599	50,336	80,636	Korea South	2,334	8,199	4,825
Philippines	4,297	2,464	19,064	Taiwan	4,449	3,478	3,890
Taiwan	10,106	10,230	17,422	Korea North	238	10	3,207
Japan	12,560	11,174	14,743	Macau	327	176	196
Korea North	8,230	3,272	4,340	Singapore	625	0	56
Australia	17,685	3,705	3,699	United Arab Emirates	0	97	49
<u>China Imports</u>	220710, Undenatured in 1,000 LTR			220720, Denatured in 1,000 LTR			
Partner Country	Quantity			Partner Country	Quantity		
	2008	2009	2010		2008	2009	2010
World	293	28	392	World	109	130	3,220
United Kingdom	0	0	160	Indonesia	0	0	3,004

Myanmar	0	0	146	Japan	81	99	140
Netherlands	0	0	46	United States	11	23	32
Japan	49	10	13	Brazil	0	0	24
Germany	18	9	12	Netherlands	7	6	9
United States	2	1	12	United Kingdom	1	2	6

Source: World Trade Atlas