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China - Peoples Republic of

Biofuels Annual

Approved By:
Michael Riedel
Prepared By:
Ryan Scott and Jiang Junyang

Report Highlights:
The Office of Agricultural Affairs forecasts that China's 2013 fuel ethanol production will reach 2.6 billion litres (2.08 million metric tons), a five percent increase from the previous year due primarily to blend mandates in selected provinces**.** China's 2013 biodiesel production is estimated to also increase by five percent to 966 million litres (850,000 metric tons). According to its Five Year Plan to reduce reliance on fossil fuel and limit factors related to climate change, China will reduce its share of fossil fuel energy use and increase non-fossil energy consumption through adjustments to its energy mix. China's non-fossil energy resources include hydropower, wind, nuclear, solar and biofuels.

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I. Executive Summary:

Although China's 2013 fuel ethanol production is forecast to reach 2.6 billion litres (2.08 million metric tons), a five percent increase from the previous year due primarily to blend mandates in selected provinces, it still only accounts for less than one percent of China's liquid fuel production. China's 2013 biodiesel production is estimated to increase by five percent to 966 million litres (850,000 metric tons). China implemented a trial biodiesel program in Hainan, but that trial program has been confined to only two counties since 2010, largely due to inconsistent supplies of feedstocks (mainly waste cooking oil). China identified advanced biofuels as an emerging and strategic industry and is committed to further development in the 12th five year plan (2011-2015). The government set a target of 4 million tons for fuel ethanol production by the end of 2015. However, given inadequate supplies of non-grain feedstocks and slow progress in creating advanced technology, experts are pessimistic about reaching this target.

According to its Five Year Plan to reduce reliance on fossil fuel and limit factors related to climate change, China will reduce its share of fossil fuel energy use and increase non-fossil energy consumption through adjustments to its energy mix. China's non-fossil energy resources include hydropower, wind, nuclear, solar and biofuels. According to China's goals and objectives for 2015 and 2020, consumption of non- fossil energy is expected to account for 11.4 percent and 15 percent of total energy use, respectively, compared to 9.1 percent in 2012. Coal accounted for 66.4 percent of total energy mix, and oil and natural gas accounted for 18.9 percent and 5.5 percent respectively, according to the National Energy Administration.

II. Policy and Programs

Starting in the early 2000's, China' implemented fuel ethanol policies and programs to address an abundance of grain production. The government approved the construction of four ethanol plants to use corn or wheat as feedstocks for fuel ethanol production.

In 2008, when domestic grain prices escalated and triggered concerns over short domestic grain supplies, China issued government guidelines that biofuel development (including fuel ethanol and bio-diesel) should not compete with crops intended for human consumption and land used for (food or feed) crop production. This principle has spurred China's government and industry research in alternative crops, like sweet sorghum or cassava, that grow on marginal land. However, these crops, with relatively low yields and small-scale production, are unable to support large-scale industrial ethanol production.

To date, China has approved one cassava ethanol plant which is located in Guangxi province. Reportedly, in 2012, the government approved the construction of two plants in coastal provinces of Zhejiang and Guangdong; however, sources note that these plants will rely on imported cassava for their initial feedstock supplies due to limited domestic production.

The National Energy Administration (NEA), which is under China's National Development and Reform Commission, oversees the development of China's energy sector. For biofuels, NEA's main responsibility includes developing China's overall energy strategic plan, drafting general law and regulations, contributing to industry regulations, technology regulations and standards, and providing guidance on science and technology research. Bioenergy is viewed as one of the nation's strategic emerging industries. According to the 12th Five Year Plan (2011-2015) for strategic emerging industries, China will develop biomass electricity and other biomass energy sources to strengthen technology development for second generation biofuels and promote industrialization of cellulosic ethanol and algae-based biodiesel. This plan, which was approved by the State Council, outlines the following targets by the end of 2015:

Biomass Electricity	Biomass Gas Annual Utilization	Solid Biomass Fuel Annual Utilization	Liquid Biofuels Annual Utilization
13 million kilowatts capacity	30 billion cubic meters	10 million tons	4 million tons.

Note: See additional information in the biomass for heat and power section.

Below are several plans and initiatives currently undertaken by the State Council in an effort to improve China's energy and industry sectors:

- NEA's 12th five year plan on Biomass Energy states that China will develop non-food grain supplies used for liquid biofuels and establish production and demonstration bases for non-grain liquid bio fuels.

- Chinese ministries have also issued 12th Five Year Plans for energy and industry sectors that provide general guidance and targets for energy efficiency improvement, reductions to greenhouse gases emissions, and development of new energy sources for China's automobile sector.

- The transportation sector (especially road transportation) will reduce its energy consumption per unit by five percent from the current 7.9 kilograms of standard coal use to 7.5 kilograms per 100 ton-kilometres. Industry sources note that this action will improve better engine performance.

- To achieve greater energy saving and reductions to greenhouse gas emissions, the auto sector will further reduce pollutant emissions and promote the development of new fuel automobiles. By 2015, the average fuel use by passenger car will be reduced to 6.9 litres per hundred kilometres from 8 litres per hundred kilometres in 2010. Sources note that new fuel autos are primarily electricity and natural gas powered. For city buses, taxis, intercity passenger or cargo transport vehicles, the government encourages use of natural gas and coal gas as fuel. For biodiesel or alcohol fuel use, each province or city has the authority to implement its own market policies and practices. All auto manufacturers are required to meet the average fuel consumption target set by the Ministry of Information and Industries.
- This year, the State Council approved a trial program to use methanol in transportation fuel in Shanxi, Shanghai and Shaanxi. This action is an effort to explore other sources of alternative

fuels to secure national energy security, according to the Ministry of Information and Industries.

- For electrical automobiles, the State Council, according to its development plan on energy saving and new energy autos (2012-2020), considers electrical automobiles as the main strategic goal for new energy auto development and transformation in the near future. The government is targeting annual sales of electric cars at 500,000 units in 2015, which is a significant increase from less than 10,000 units in 2011. The government also aims for production capacity of electric auto to reach 2 million units in 2020. (There is no publicly available data on current production capacity levels.) Furthermore, for energy efficiency goals, the average fuel consumption by passenger car will drop to 6.9 litres per 100 km by 2015 and drop to 5.0 litres per 100 km by 2020.

Policies on Ethanol: China's ethanol policy is unchanged from last year's annual report: The government continues its tight control on the grain processing sector (including ethanol) and lower financial support for grain-based ethanol production. For example, the government has cut subsidies for fuel ethanol production from 19 cents/liter ($241/MT) in 2009 to 6 cents/liter ($79.4/MT) in 2012. The mandatory blend rate for gasoline remains unchanged at 10 percent, however, in practice, the blend rate ranges between 8-12 percent, according to industry sources.
China's Ministry of Finance announced that by 2015, the government will remove the Value Added Tax rebate of 17 percent and impose a five percent consumption tax for grain-based ethanol production to encourage improvement in efficiency at the ethanol plants.

Policies on Biodiesel: There continues to be no national or provincial mandate for biodiesel usage due to the lack of large scale production of fuel resources. In 2010, China removed a five percent consumption tax to stimulate biodiesel production.

Table 1: China Fuel Use Projection (Million Liters)

Calendar Year	2015	2016	2017	2018	2019	2020	2021	2022	2023
Gasoline Total	151,292	160,370	169,992	180,191	191,003	202,463	212,586	223,215	234,376
Diesel Total	241,080	256,750	273,439	291,212	310,141	330,300	346,816	364,156	382,364
On-road									
Agriculture									
Construction /mining									
Shipping/rail									
Industry									
Heating									
Jet Fuel Total									
Total Fuel Markets	392,372	417,120	443,431	471,404	501,144	532,763	559,401	587,372	616,740

Notes:

- The 2015 Gasoline and Diesel total is estimated by the Energy Research Institute, National Development & Reform Commission (ERI, NDRC)
- The 2020 Gasoline and Diesel total is estimated by a private research institute.
- Conversion rate for gasoline is 1,388 liters=1 Metric tons, conversion rate for diesel is 1,176 liters =1 Metric tons, which is used by Chinese Customs and Chinese Taxation Bureau .
- Growth rate for gasoline between 2015 and 2020 is estimated at 6 percent annually, and at 5 percent for 2021-2023.

The growth rate for diesel for 2015-2020 is estimated at 6.5 percent annually, and at 5 percent for 2021-2023. These growth estimates are in tandem with China's GDP growth rate, which was projected at around 7 percent annually during the 12th five year plan.

- During the previous years, the annual growth rate for diesel consumption ranges from 2-8 percent. For gasoline, it ranges from 1-16 percent.

Annual Growth Rate (by Percentage) for Overall Gasoline and Diesel Consumption: [Additional Information for Table 1]							
	2006	2007	2008	2009	2010	2011	2012
Diesel	7.9	5.6	8.3	1.7	6.4	6.8	8.1
Gasoline	8.0	5.3	11.3	0.4	11.6	8.8	15.9
Source: China Energy Statistical Yearbook							

III. Ethanol

Fuel Ethanol: China's 2013 fuel ethanol production is forecast to reach 2.6 billion liters (2.08 million metric tons), a five percent increase from the previous year, mainly driven by blend mandates in selected provinces. As noted previously, the blending rate for ethanol (in gasoline) is between 8 and12 percent. According to industry sources, the blending rate falls to eight percent if ethanol production is lower than expected.

China currently has five plants licensed for fuel ethanol production (sourced from corn, wheat and cassava). In 2012, 64 percent of fuel ethanol production was sourced from corn, 30 percent from wheat and 6 percent from cassava. With the exception of the cassava plant, industry sources suggest that the four grain-based ethanol plants are expected to reach full production capacity by 2013. Fuel ethanol production accounted for less than one percent of China's liquid fuel production in 2012.

During the 11th Five-Year Plan (2006-2010), China pledged to improve non-grain based ethanol production by expanding production technology for cassava-based ethanol and the industrial demonstration of sweet sorghum ethanol. The world's first cassava ethanol plant was built in Guangxi in 2007, with an annual production capacity of 200,000 tons. A sweet sorghum ethanol plant (with capacity of 50,000 tons) was completed in Inner Mongolia in 2012. Despite these new developments, the ethanol sector is still recovering from the scrutiny of its contribution to China's tight grain supply since 2008. Since then, the government decided to control domestic production plans. [Note: Available production data (dated after 2011) is based on industry estimates.]

Table 2: A Historical Look at China's Fuel Ethanol Production		
Year	Production Quantity	% Increase from Previous Year
2003	25.3 million liters (or 20,000 MT/year)	
2004	380.1 million liters (or 300,000 MT/year)	1400%
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%
2011	2,255 million liters (or 1,780,000 MT/year)	6%

2012	2,509 million liters (or 1,980,000 MT/year)	11%
2013	2,635 million liters (or 2,080,000 MT/year)	5%
2014	2,767 million liters (or 2,180,000 MT/year)	5%
Source: NEA and industry sources		

Overall Ethanol Production: China's 2012 ethanol production was estimated at 7.4 billion litres (or 5.85 million tons): ethanol used for beverages and hard liquor accounts for 40 percent, and ethanol for fuel and other industrial chemicals accounts for 60 percent, or 4.4 billion litres. With exception of fuel ethanol, the growth in ethanol production for 2013 and 2014 remains unchanged due to China's economic slowdown and declining consumption of hard liquor.

In 2012, China reported 159 ethanol plants nationwide, which use a variety of feedstocks such as grains (corn, wheat, rice), tubers (cassava and sweet potatoes), and molasses. Corn and cassava are the main feedstocks, each accounting for 70 percent and 25 percent, respectively. Molasses (from cane or beet sugar plants) accounts for the remaining five percent. Industry sources reported that due to high domestic corn prices, imported cassava is becoming a competitive feedstock. For example, China's 2012 cassava imports reached a record high of 7 million tons, up 42 percent from the previous year. About 20 percent of imported cassava is used for ethanol production, and the rest is for feed consumption, according to industry sources.

Trade: Ethanol

Denatured/Undenatured ethanol: China continues to impose a temporary import tariff of five percent on denatured ethanol (HS code: 220720) in 2013. This tariff has been lowered over the past few years (from 30 percent in 2009) to encourage additional imports of by-products and raw materials. Imports of denatured ethanol are only used in the chemical processing sector. The government has control over fuel distribution, so without government approval, no imported denatured fuel ethanol is allowed in the transportation sector.

With the government continuing to lower tariff rates on denatured ethanol imports, reportedly, some state companies or coastal provinces have begun internal discussions with the central government for a trial program of importing fuel ethanol for domestic fuel use. Industry sources noted that unstable international prices could potentially discourage the government to consider the imported ethanol as a secured supply.

For undenatured ethanol, the import tariff remains unchanged at 40 percent. There is a value added tax for imports of 17 percent, and a consumption tax of five percent for both denatured and undenatured ethanol. [Note: In 2012, China's Customs and Ministry of Finance implemented a zero import tariff (both Undenatured and Denatured ethanol) for ten ASEAN countries, Chile, Singapore and Pakistan, due to free trade agreements with these countries.]

Tax and tariffs on ethanol and biodiesel

Tariff and Taxes on Ethanol Trade

HS#		Import Tariff Rate	VAT on Import	Consumption Import Tax	VAT Rebate on Export
220710	Undenatured	40%	17%	5%	0%
220720	Denatured	5%*	17%	5%	0%
* Temporary rate					

Tariff and Taxes on Biodiesel Trade				
HS#		Import Tariff Rate	VAT on Import	VAT Rebate on Export
382600	Biodiesel and mixtures	6.5%	17%	0%
For biodiesel from ASEAN countries, the Tariff rate is zero since 2012				

Source: Ministry of Finance

Table 3: Ethanol Used as Fuel and Other Industrial Chemicals (Million Liters)									
Calendar Year	2006	2007	2008	2009	2010	2011	2012	2013	2014
Beginning Stocks	0	0	0	0	0	0	0	0	0
Fuel Begin Stocks	0	0	0	0	0	0	0	0	0
Production	3,801	3,923	4,082	3,953	4,333	4,675	4,450	4,550	4,700
Fuel Production	1,647	1,736	2,002	2,179	2,128	2,255	2,509	2,635	2,767
Imports					4	5	15	1	2
Fuel Imports	0	0	0	0	3	5	3	1	1
Exports		130	108	108	156	43	45	40	35
Fuel Exports	0	19	8	16	12	8	7	2	1
Consumption									
Fuel Consumption	1,647	1,736	2,002	2,179	2,128	2,255	2,509	2,635	2,767
Ending Stocks									
Fuel Ending Stocks	0	0	0	0	0	0	0	0	0
Production Capacity (for fuel ethanol only)									
Number of Refineries	4	4	4	5	5	5	5	5	5
Nameplate Capacity	1,824	1,824	2,065	2,243	2,500	2,500	2,600	2,700	2,800
Capacity Use (%)	90%	95%	97%	97%	85%	90%	97%	98%	99%
Co-product Production (1,000 MT)									
DDGS	1,002	1,070	1,158	1,252	1,252	1,377	1,565	1,612	1,722
Corn Oil	50	56	65	70	71	81	88	95	100
Wheat Gluten	45	45	45	45	45	45	45	45	45
Feedstock Use (1,000 MT)									
Corn	3,200	3,420	3,700	4,000	4,000	4,400	5,000	5,150	5,500
Wheat	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050
Cassava			364	467	392	336	336	476	560
Market Penetration (Million Liters)									
Fuel Ethanol	1,647	1,736	2,002	2,179	2,128	2,255	2,509	2,660	2,793
Gasoline	66,423	69,927	77,864	78,208	87,248	93,732	99,356	105,317	111,636
Blend Rate (%)	10.0%	10.0%	10.0%	8-12%	8-12%	8-12%	8-12%	8-12%	8-12%
Corn to ethanol ratio 3.2, dried cassava's ratio 2.8, and wheat ratio 3.2, based on estimate by industry sources.									
Sources: Industry Sources									

Table 4: Ethanol Trade							
Ethanol Imports by Origin							
Partner Country	Unit (in 1,000 liters	2008	2009	2010	2011	2012	%Change
World		402	159	3,611	5,305	15,308	188.56
Pakistan		194	0	0	1,973	7,854	298.08
Vietnam		0	0	0	0	4,995	
Thailand		0	0	0	24	2,066	8675.02
Ethanol Exports by Destination							
Partner Country	Units (1,000 L)	2008	2009	2010	2011	2012	%Change
World		108,110	107,895	156,019	43,333	44,962	3.76
Korea, North		8,467	3,282	7,547	9,848	27,187	176.07
Japan		12,560	11,362	14,743	15,276	8,529	-44.17
Taiwan		14,556	13,708	21,312	13,778	7,365	-46.55

IV. Biodiesel

China's 2013 bio-diesel production is estimated at 966 million litres (850,000 MT), five percent higher than the previous year. Currently, the main input for biodiesel is used/waste kitchen oil. Biodiesel producers may use residue oil from vegetable oil crushers, but the prices are more expensive than used-cooking oil. Residue oil can be priced at RMB5,000 per ton ($820), while waste cooking oil price ranges from RMB4,000 to 5,000 per ton ($655-$800). There is no mandatory regulation on collection or use of waste cooking oil, so some processors recycle waste cooking oil and sell it to restaurants for human consumption. In 2012, a government crackdown on the illegal use of recycled cooking oil for human consumption contributed to rise in additional supplies for biodiesel production, according to industry sources.

In 2010, the government announced the standard for Biodiesel Fuel Blend (B5). The release of this standard created technical conditions for biodiesel production and sale. As a result, the Hainan provincial government mandated a trial use of biodiesel; to date, that trial program is confined to two counties. Sources note that unstable supply of feedstocks (used cooking oil) hinders the full potential of large-scale biodiesel production. With a low profit margin due to high production costs, plant owner's expectations are that the government should adjust the pricing mechanism or provide a subsidy for biodiesel production. Production and sale of biodiesel are seasonal and considered a high risk business for most biodiesel producers who do not reach their full plant capacity. Please see Table 5 below.

Sources also note that the lack of official mandated use programs has caused state petroleum companies to have minimal interest in biodiesel distribution or purchases. To date, biodiesel is mainly consumed in small cities or rural areas.

Trial Program in Hainan

Hainan is the first and only province to initiate a biodiesel blending program. This project started in November 2010 at 23 gas stations with a blending rate that ranged from two to five percent. This program was not considered successful among producers, distributers and end users for the following

reasons, according to industry sources:

- Low blending rates reduced profit margins for retailers. For example, the market price for biodiesel (B5) is RMB 7,650 per ton ($1254 per ton), while regular diesel is priced at RMB 7,680 per ton ($1259 per ton). The profit margin is only RMB 30 per ton ($5 per ton).

- The tested biodiesel did not meet the new emission diesel standards (dated July 2011), which were revised with stricter controls on sulphur emission.

- Hainan currently uses waste cooking oil as its main source, but, due to inconsistent supplies, is planning to switch to Jatropha seeds, which may take several years to reach large scale production, according to industry sources.

Table 5: Biodiesel (Million Litres)									
Calendar Year	2006	2007	2008	2009	2010	2011	2012	2013	2014
Beginning Stocks	0	0	0	0	0	0	0	0	0
Production	273	352	534	591	568	852	909	966	970
Imports	0	0	0	0	0	0	19	15	15
Exports	0	0	0	0	0	0	0	0	0
Consumption	273	352	534	591	568	852	909	966	970
Ending Stocks	0	0	0	0	0	0	0	0	0
Production Capacity									
Number of Biorefineries	65	96	84	62	45	49	52	55	56
Nameplate Capacity	1,761	3,124	3,351	2,670	2,556	3,181	3,408	3,499	3,550
Capacity Use (%)	15.5%	11.3%	15.9%	22.1%	22.2%	26.8%	26.7%	27.6%	27.3%
Feedstock Use (1,000 MT)									
Used Cooking Oil	267	344	522	578	556	833	889	945	949
Market Penetration (Million Litres)									
Biodiesel, on-road use	82	106	160	177	170	426	454	483	485
Diesel, on-road use									
Blend Rate (%)	1%-20%	1%-20%	1%-20%	1%-20%	1%-20%	1%-20%	1%-20%	1%-20%	1%-20%
Diesel, total use	134,446	141,966	153,735	156,280	166,242	177,614	188,270	199,567	211,541

Trade: Biodiesel

The majority of China's biodiesel imports are sourced from Indonesia due to low international prices for palm oil (used for based biodiesels), according to trade sources.

China Biodiesel Imports			
Commodity: 3826, Biodiesel And Mixtures, in 1,000 Ltrs			
	2010	2011	2012
World	0	0	19,691
Indonesia	0	0	19,675
China Biodiesel Exports			
	2010	2011	2012
World	0	0	66
South Africa	0	0	65
Source of Data: China Customs			

[Note: As noted above, in 2012, China's Customs and Ministry of Finance implemented a zero percent import tariff (both Undenatured and Denatured ethanol) from ten ASEAN countries, Chile, Singapore and Pakistan, due to free trade agreements with these countries.]

Vehicle and fuel use in China

China's total number of passenger vehicles in 2012 reached 89.4 million units, up 19.6 percent year on year, as passenger vehicles became more affordable to urban households. Passenger vehicles have the following categories: large-sized vehicles (e.g. buses) account for 10 percent; small-sized vehicles (sedans, sport utility vehicles (SUVs), or taxis) account for 90 percent.

In 2012, China's total trucks are estimated at 18.9 million units, up 6 percent year on year, according to the National Statistical Bureau. Electric vehicles, viewed as China's new energy vehicles and a high priority in the 12th Five Year Plan, receive government subsidies at purchase and are encouraged for public transportation (city bus) in major cities. The electric auto market is still in its infancy, so its growth is minimal compared to gasoline and diesel-based automobiles. Sources estimate that annual sales for electric vehicles accounted for less than 0.1 percent of 2012's total vehicle sales.

China's 2012 diesel consumption was 1.6 times that of gasoline. Overall diesel consumption was 198,744 million litres, while gasoline consumption was 120,534 million litres. Despite the growth of five to six percent from the previous year for each consumption category, there is no official growth projection for fuel use. Industry sources report that the annual growth rate for gasoline and diesel consumption (between 2015 and 2020) is estimated at 6 percent and 6.5 percent respectively.

China's automobile sector is improving its energy efficiency, and the government encourages purchases of small-sized vehicles. As public transportation systems (such as subways, buses, or intercity buses) become more convenient, travelers and commuters are driving less. China's development of mass transportation is improving in energy efficiency and use of alternative fuels. For example, China's Auto Energy Research Centre at Tsinghua University estimates that 25 percent of taxis and 16 percent of city buses are fully or partially driven by compressed natural gas (CNG), which is clean and cheaper than diesel (about half the price of diesel per millage cost).

V. Advanced Biofuels

China has one government-approved, commercial cellulosic ethanol plant in operation that supplies ethanol (sourced from corn cobs) to gas stations in Shandong province since October 2012. Reportedly, the production level will reach approximately 32 million liters (or 25,000 metric tons) in 2013, but the plant has an annual capacity for 63.4 million liters (or 50,000 tons) on an annual basis. The government has yet to announce the subsidy level for cellulosic producers, but industry sources estimate that the rate for cellulosic ethanol will be higher than grain-based ethanol to promote advanced biofuels.

Sources note that other fuel ethanol plants are preparing to build demonstration scale cellulosic ethanol projects (with a capacity exceeding 10,000 tons for each plant and different feedstocks such as corn stovers or wheat straws).

VI. Biomass for Heat and Power

According to the 12th Five Year Plan on New Energy Development approved by the State Council, biogas production will reach 30 billion cubic meters by 2015, an increase of 114 percent from 2012. The government will continue to support the construction of biogas digesters at both rural households and scale animal farms. Biogas is used for cooking, heating, and generating electricity for households and facilities.

Biogas (million cubic meters)									
Calendar Year	2006	2007	2008	2009	2010	2011	2012	2013	2014
Landfill									
Sewage Sludge									
Field Crops/Manure									
Total	9,000	9,170	11,000	13,300	14,000	16,000	17,500	20,100	23,000
Source: Biogas Institute of Ministry of Agriculture. Data after 2012 is estimated by Post. The growth rate from 2012 to 2014 is estimated at 15 percent annually.									

According to China's National Energy Administration's 12th Five Year Plan, the biomass capacity for electricity generation will reach 13 million kilowatts in 2015, up 160 percent from 2010. To help biomass power plants generate profits, the government set aprice of RMB 0.75 per kilowatts for biomass electricity, which is slightly above the reported production cost of RMB 0.7 per kilowatts. This policy has contributed to the rapid expansion of the biomass electricity plants.
Feedstocks include crop residues (such as corn stover, wheat/rice straw, husks, and cotton stalks), woody residues and municipal waste . In 2011, the electricity generated by crop and woody residues reached near 3 million kilowatts, according to China's Energy Research Institute.

Electricity generation capacity by biomass (million kilowatts)					
2010	2011	2012	2013	2014	2015
5.5	7.5	8	9.2	10.6	13
Source: China Energy Research Institute					
Data for 2013 and 2014 is Post's estimate, which grows 15 percent annually.					

VII. Notes on Statistical Tables

Table 1: China Fuel Use Projection

- Gasoline and diesel total by 2015 is estimated by Energy Research Institute, National Development & Reform Commission (ERI, NDRC). Gasoline total and diesel total by 2020 is estimated by a private research institute. No official data for annual fuel use projections.

- Conversion rate for gasoline is 1388 litres for 1 metric tons conversion rate for diesel is 1176 liters for 1 metric ton which is used by China Customs and Chinese Taxation Bureau on sales tax for gas stations.

Table 3: Fuel Ethanol

- Corn (or wheat) to ethanol conversion ratio is 3.2 to 1; cassava (dried) to ethanol conversion ratio is 2.8 to 1.
- Categories for production, by-products, and feedstock use refer to the five fuel ethanol plants.

Table 5: Biodiesel

- Nearly 30 percent of biodiesel is for on-road transportation, the rest is for shipping and agricultural machinery.

- The blend rate for biodiesel could reach as high as 20 percent. Higher the blending rate, higher the profit for gas stations. Hainan's trial program has a blending rate of only 2-5 percent.