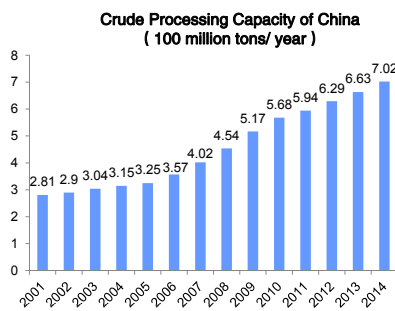




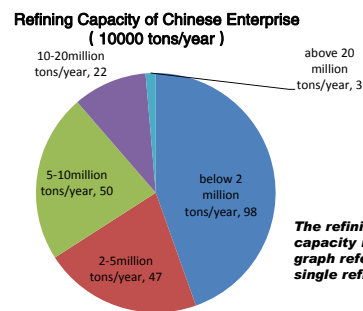


## 1. China's refining capacity has been developing rapidly

- > There are 220 refineries in China, and the total crude processing capacity up to 702 million tons/year. It accounts for 14.5% of the world by the end of September 2015.
- > The average scale of the refinery is 3.2 million tons/year, compared with average 7.18 million tons/ year of the world, there are still a large gap. CNPC has 26 refineries which average scale is 7.46 million tons/year. Sinopec has 35 refineries which average scale is 7.71 million tons/year.



Data Source: CNPC ETRI



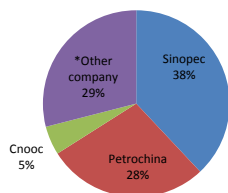
**The refining capacity in the graph refers to single refinery**

CNPC ETRI | Page 3

## 2. China's oil refining industry participant is diversified

- > Central State-owned enterprises: CNPC and Sinopec play the leading role.
  - Refining capacity of CNPC : 194 million tons/year.
  - Refining capacity of Sinopec : 270million tons/year.
  - Refining capacity of Cnooc : 34.5 million tons/year.
  - Refining capacity of ChemChina : 30.2million tons/year.
  - Refining capacity of Sinochem : 17million tons/year.

### Shares of the enterprises



Data Source: CNPC ETRI

- > **local state-owned enterprises:** 10 refineries, total refining capacity is 38.2 million tons/year.
- > **local private enterprises:** 90 refineries, total refining capacity is 98.4 million tons/year.
- > **Capacity of CTL:** 2.7million tons/year.
- > **Foreign investment equity:** total refining capacity is 8.24 million.

### Foreign investment shared refining enterprises in China 10000 tons/year

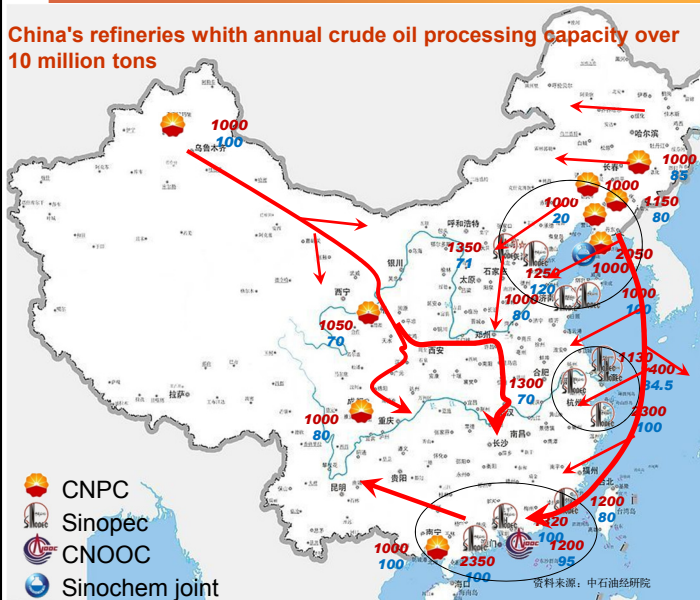
Name	Joint Venture Refinery	Chinese Partner	Location	Capacity	Foreign Share Capacity	Time
Fujiang petrochemical	ExxonMobil Saudi Aramco	Sinopec	Quanzhou	1200	600	2009
West Pacific	Total	Sinochem & Petrochina	Dalian	1000	224	1997
Yunnan petrochemical	Saudi Aramco	PetroChina	Kunming	1000	390	2016
USTC refining	Kuwait Petroleum	Sinopec	Zhanjiang	1500	735	Delayed
Dongfang petrochemical	Rosneft	Petrochina	Tianjin	1600	784	Delayed
Guangdong petrochemical	PDVSA	PetroChina	Jieyang	2000	undetermined	Delayed

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### 3. Large refineries integrated with petrochemicals



#### China's refineries with annual crude oil processing capacity over 10 million tons



- China has 3 refineries whose refining capacity exceeds 20 million tons and 25 million-ton refineries.
- The total refining capacity is 324 million tons/year, 46.1% of the country, while in 2000 only four.
- China now has 16 refining-chemical integration refineries, including Zhenhai and Dushanzi.
- Yangtze River Delta, Pearl River Delta and Bohai Bay area have a high degree of integration of refining, concentrating 70% refining capacity and 60% ethylene capacity.

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### 4. Deep processing capacity of Chinese refining improves fast



- China secondary processing capacity accounted for 95.8% of total primary processing capacity.
- FCC capacity has declined in recent years, but still high.
- Although hydrotreating capacity has increased from 15.6% in 2000 to 37.5% in 2014, it still has a big gap to the world average of 55%.

**Status of Chinese oil refining equipment**

Equipment	2000		2013		2014	
	Million tons/year	Percentage of distillation /%	Million tons/year	Percentage of distillation /%	Million tons/year	Percentage of distillation /%
distillation capacity	274		662.5		702	
catalytic cracking	99	36.13	189.31	28.58	198.01	28.21
delay coking	21.14	7.71	96.41	14.55	98.51	14.03
catalytic reforming	15.58	5.69	46.45	7.01	50.45	7.19
hydrocracking	11.47	4.19	52.34	7.90	62.44	8.89
hydrofining	42.61	15.55	207.75	31.36	263.10	37.48
Total		69.27		89.4		95.8

Source: ETRI

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## 5. Chinese refining forms echelon structure which the east is priority and the west is complementary



- Chinese refining capacity mainly set in North China, northeast and South China. The three spots hold 66% of nationwide quantum.
- In recent years, China's refinery general layout has been further optimized, region refining capacity has increased.
  - South and southwest of China capacity proportion rising, north China northeast capacity proportion reduced. In the long run, this trend will continue.
- From the provinces, Shandong, Liaoning and Guangdong become the first three of the country's oil refining big provinces, the capacity of Shandong accounts for nearly 20% of the whole nation, but Yunnan Guizhou, Tibet, Chongqing have no refining capacity
- The present overall logistics flow of petroleum products are still present "West oil to the East, North oil to the South and East oil to the Southwest propulsion" pattern.

China's refining capacity area layout

Area	2010		2013		2014	
	Capacity	Ratio, %	Capacity	Ratio, %	Capacity	Ratio, %
North China(Jing, Jin, Ji, Jin, Yu, Lu)	14150	27.58	21860	33.00	22960	32.71
Northeast(Liao, Ji, Hei, Meng)	10300	20.08	12210	18.43	12210	17.39
East China(Hu, Zhe, Su)	7030	13.7	9900	14.94	11300	16.11
Central China(Xiang, Wan, Gan, E)	3540	6.9	9690	14.63	10140	14.44
South China(Yue, Min, Qiong, Gui)	8680	16.92	7950	12.00	7950	11.32
Southwest(dian, Chuan, Yu, Gui)	100	0.19	4440	6.70	4440	6.32
Northwest(Xin, Gan, Qing, Shan, Ning)	7500	14.62	200	0.30	1200	1.71
Total	51300	100	66250	100.00	70200	100.00

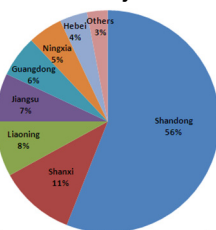
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## 6. Domestic teapot refining capacity is mainly concentrated in Shandong

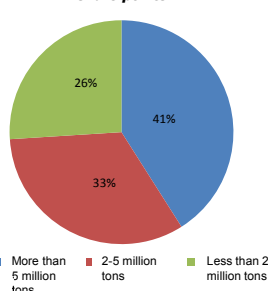


- The total refining capacity of all the more than 100 local refineries is 136.6 million tons/year, which mainly concentrated in Shandong, Shanxi, Liaoning, Jiangsu. Shandong, Shanxi, Liaoning are the top three provinces of the most intensive refining, each covering a total refining capacity 56%, 11% and 8%.
- More than 5 million tons/year refining capacity accounted for 41%, 200 million tons/year to 500 million tons/year refining capacity accounted for 33%, less than 2 million tons/year refining capacity of about 35.1 million tons/year, accounting for 26% .
- At present, Shandong National III standard gasoline and diesel production nearly occupies 20% of national total amount, but backward production capacity is still high.

Domestic refining capacity distribution by Province



Domestic refining capacity share points



Domestic local refinery product share by standard

products	National III standard	National IV standard	National V standard
	share	Share	share
gasoline	11%	73%	16%
diesel	22%	69%	9%

Data Source: CNPC ETRI

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## 7. China crude oil import is deregulated

- In February 2015, the NDRC issued the notice about the use management of import crude oil, which clearly put forward the standard condition to obtain the import crude oil for refineries.
- There were seven companies that have obtained the right—gained a total of 49.19 million tons/year crude oil import quota and closed down backward production amount of 33.57 million tons/year. Until now, there were 6 companies that obtained crude oil import qualification which meant they got through the channels of processing imported crude oil.
- The notice only applied to the refineries which completed before February 9<sup>th</sup> 2015, and the total obtained amount of oil was not limited.

### Qualifications and conditions for importing crude oil

### Authorized Companies 10000 tons/year

Requirements		Time	Company	Province	Allowed using amount	Backward capacity
Existing capacity	Owens at least one single series crude oil distillation unit whose processing capacity is <b>more than 2 million tons / year (excluding)</b> .					
Energy consumption indicators and capacity	(1) Refining (units) comprehensive energy consumption is <b>less than 66 kilograms of standard oil / ton.</b>	1	Dongming Petrochemical	Shandong	750	600
	(2) Fresh water consumption of one ton of oil is <b>less than 0.5 tons.</b>	2	Panjin Northern Asphalt	Liaoning	700	600
	(3) The unit energy factor consumption is <b>not more than 11.5 kg factor standard oil / (t · energy factor)</b>	3	Kent Petrochemical	Shandong	252	210
	(4) Processing loss rate is <b>less than 0.6%</b>	4	Lijin Petrochemical	Shandong	350	250
	(5) <b>Crude oil tank capacity</b> must comply with relevant requirements	5	Hongrun Petrochemical	Shandong	530	330
Processing capacity eliminated	Eliminate all the crude oil distillation unit whose oil processing capacity is <b>less than 200 tons / year (inclusive)</b>	6	Yatong Petrochemical	Shandong	336	230
Product quality control system	Owens improved product quality control system, refined products must meet the <b>newest</b> implemented national or local standards	7	Baota Petrochemical	Ningxia	616	170
Environmental protection and accident prevention & response facilities	Owens completed environmental protection and emergency prevention facilities and make function normally. Pollutant emissions must be in line with national or local standards and requirements. Prepare contingency plans for environmental emergencies, no larger and more sudden environmental incidents occurred <b>in recent 3 years.</b>	8	Huifeng Petrochemical	Shandong	416	180
Safety management system	Owens a completed safety management system and a good safety record history, no larger production safety accidents <b>in recent 3 years.</b> Pass the hazardous chemicals unit safety standardization compliance review	9	Tianhong Chemical	Shandong	439.68	342
Fire safety management system	Owens completed fire safety management system, no accident <b>in recent 3 years.</b> Buildings and facilities are in line with national fire technical standards. Owens full-time or volunteer fire department, staffing, vehicles and equipment.	10	Jingbo Petrochemical	Shandong	331.2	230
		1	Luding Petrochemical	Shandong	258	215
			<b>Total</b>		<b>4919</b>	<b>3357</b>

## 8. Crude oil feedstock increased proportion in local refineries

- 2014 Shandong local refineries processed all types of raw materials 50.835 million tons, of which 38.614 million tons of crude oil, the proportion reached 76%, other raw materials for the 12.221 million tons, accounting for 24%.
- 2015 January-July, Shandong local refineries processed all types of raw materials 32.475 million tons, 25.56 million tons of crude oil, the proportion rose to 79%, other raw materials 6,915,000 tons, accounting for 21%.

2014-2015.7 feedstock of Shandong local refineries (10000 tons)

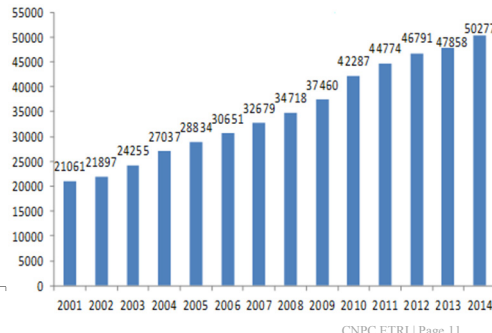
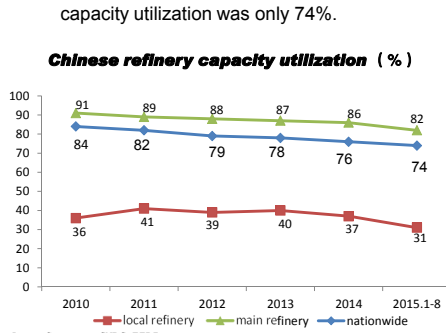
Year	Raw material processing capacity										Total
	Crude oil					Fuel oil etc.					
2014	3861.5 (76%)					1222.1 (24%)					5083.6
2015. 1-7	2556 (79%)					691.5 (21%)					3247.5
2015. 1-7	Shengli Oil	Haiyang Oil	Mariners crude oil	Chemchina imported oil	Others	M 100	L-sulfur 180	Venezuela 380	Diluted asphalt	Domestic residue etc.	
2015. 1-7	238.9	936.7	443	627.4	310	86.9	29	65	380.6	130	3247.5
Percentage of total feedstock	7.4%	28.9%	13.6%	19.3%	9.5%	2.7%	0.9%	2%	11.7%	4%	100%

### 9. China refinery capacity utilization declined consecutively year by year



- 2014 China's crude oil processing capacity was 503 million tons, an increase of 5%, occupied the world's total 3.865 billion tons of 13%.
- Because of supply exceeding demand, Chinese refinery capacity utilization declined from 2010 to 2014. The national average level declined from 84% to 76%. The main refineries declined from 91% to 86%, in contrast the local refineries increased from 36% to 37%.
- From January to August in 2015, with the falling crude oil price, the local refining capacity utilization was only 31%, and the main refinery capacity utilization dropped to 82%, and the national average refinery capacity utilization was only 74%.

Chinese refinery capacity utilization (%)



Data Source: CNPC ETRI

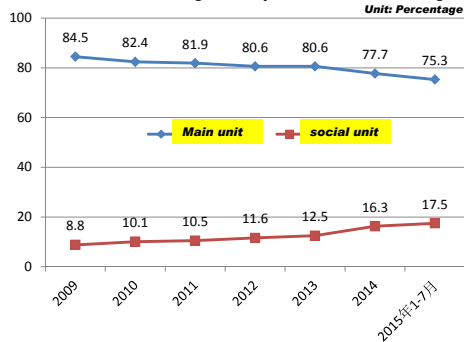
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### 10. SOES' production share declined

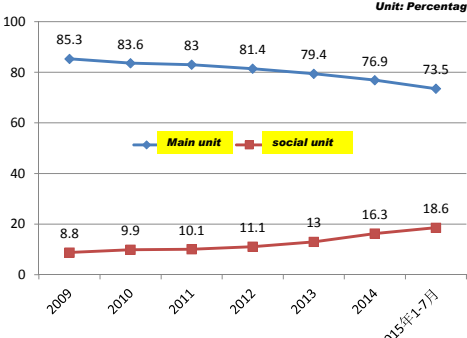


- Since 2009, the domestic refined oil market relaxed posture gradually intensified, the two groups crude oil processing volume fell and the share of gasoline and diesel production decreased.
- Main unit production share of gasoline decreased from 85% in 2009 to 75% in 2015 January - July, a decrease of approximately 9 percent. Social units in the same period increased from 9% to 18%.
- Main unit diesel production share decline is more serious, down from 85% in 2009 to January to July of 74% in 2015, a decrease of approximately 12 percent in the same period increased from 9% in social units to 19%.

Main unit and social unit gasoline production share changes



Main unit and social unit diesel production share changes



Note: All units share = gasoline and diesel production / National Bureau of Statistics caliber gasoline and diesel production

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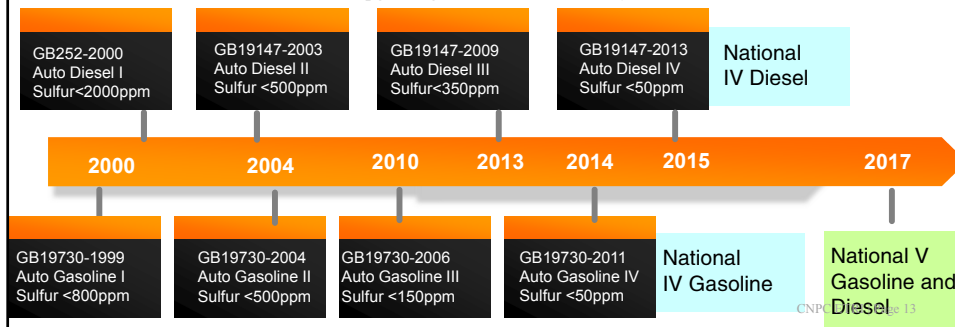


## 11. Quality of refined oil upgrades significantly

Since the new century, China has spent more than ten years to accomplish oil products quality upgrade, which cost America and Europe for twenty to thirty years:

- > In 2000, lead-free gasoline applied nationwide.
- > 2014 is the year of upgrading of refined product quality. on January 1st, fully implement the national IV gasoline standards and execute the national IV diesel standards at the end of 2014. Sulfur content down to 50 micrograms per gram. Beijing, Shanghai, Guangzhou and parts of Jiangsu have been a step ahead into the era of the national V standard.
- > From national I to national V, standard content limits of sulfur decreased by 99%.

Upgrading of China's Fuel Quality



## Outlines



1. Status of Chinese Refining Industry



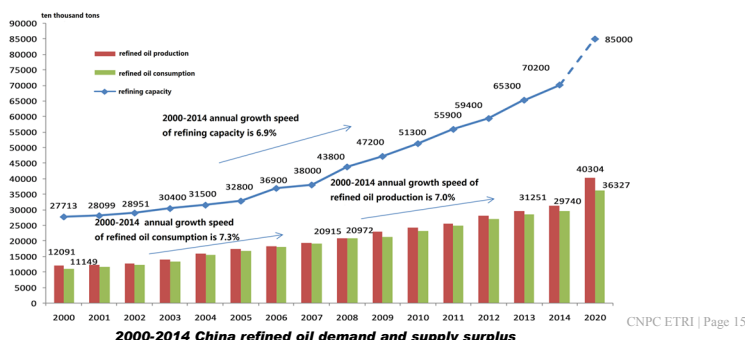
2. Challenges to Chinese Refining Industry

3. Prospects of Chinese Refining Industry Development

## 1. Slow demand increasing speed highlights the refining capacity surplus problem



- Crude oil processing capacity increases from 210.62 million tons to 502.77 million tons, annual growth speed is 6.41%
- Total production of gasoline, diesel and kerosene increases from 120.87 million tons to 316.66 million tons, annual growth speed is 7.12%
- Total consumption of gasoline, diesel and kerosene increases from 111.49 million tons to 301.71 million tons, annual growth speed is 7.37%
- The total consumption is 302 million tons in 2014. The refining capacity of 2014 needed is 546 million tons base on the 85% operation rate. While the current refining capacity is 702 million tons, surplusing 160 million tons per year.



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## 2. More environmental protection pressure, deeper energy conservation and emissions reduction



- Green economy, low-carbon economy put high standard on environmental protection. As a key role, refineries need to conserve energy, reduce emission and produce clean oil.
- According to the *China-US joint statement on climate change*, China plans to peak CO<sub>2</sub> emissions around 2030. China's oil refining industry needs to carry out energy conservation and emission reduction on the production process, the source schedule in advance to supply V standard oil to reduce nitrogen oxide emissions.
- **Two sources of emissions:** 1. **Process unit.** Catalytic cracking, refinery hydrogen production is the main high emission devices; 2. **the energy production process.** Heat, steam and electricity production process will result in a lot of carbon dioxide emissions.
- **Measures:** 1. application of energy-saving technologies; 2. integration of research and development of low-emission production technologies; 3. development of carbon capture technology; 4. positive development of bio-energy.

### Refinery major source of greenhouse gas emissions

Type	sources	
Combustion emissions	Fixed emission	Furnaces, boilers, engines, turbines, flares, etc.
	Mobile emission	Motor vehicles, railway
Process emissions	producing process	F C C catalyst regeneration, hydrogen, fluid coking, etc.
	Other process	Storage and Handling
Leakage emissions	—	

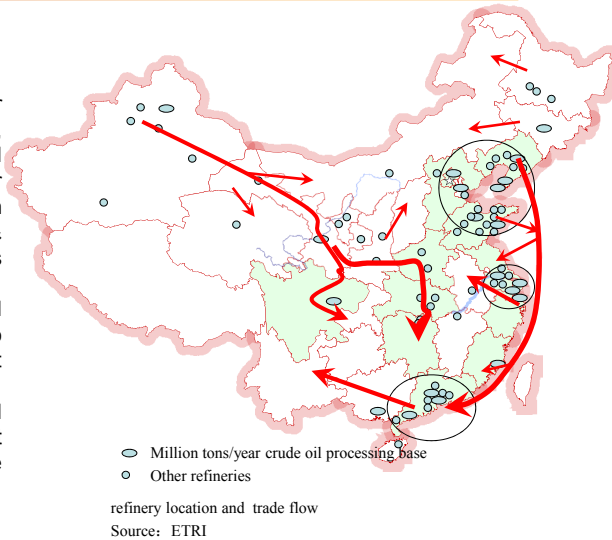


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### 3. Further optimizes Chinese refining industry layout

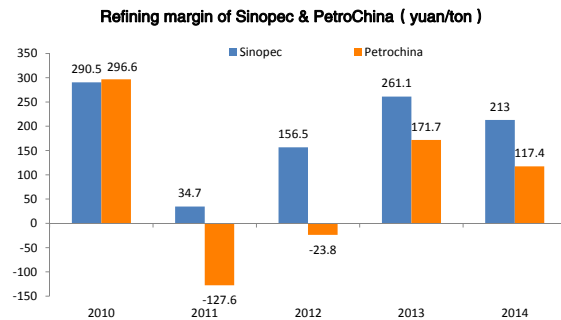
- Based on Yangtze River Delta, Pan-Pearl River Delta, and Bohai Bay, several twenty million tons/year refineries and two million tons/year ethylene refining & chemical production bases were set up in midwest.
- By 2020, oil in northeast and northwest will output to Central China and southwest to meet their need.
- East China, South China and North China develop fast enough to keep the balance between supply and demand.



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### 4. Profit of refineries is still facing great challenges

- 2013 China adopted a new oil pricing mechanism, further rationalize the relationship between the price of crude oil and refined oil. China's main refinery refining margins increased. Overall, China's refining margin of \$ 3-15 lower than the world average of 3\$-15\$/ barrel, and far below the United States.
- The average cost of the three great groups for each refinery equipment modification is over ten million, some of the private refineries may have to face the huge cost of the transformation in advance.

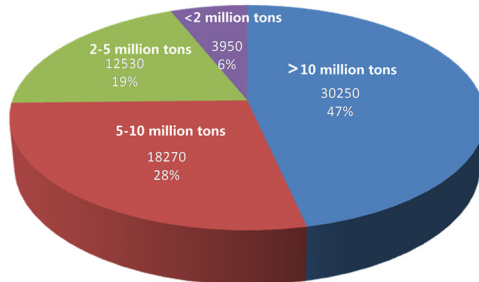


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### 5. Economic and technological indicators unbalance among refineries



- Although there are 25 10million tons level refineries, medium-sized and small refineries occupy 30% and 20% of the national total refining capacity, respectively.
- Few refineries can reach the advanced energy consumption level of the world, but most of them only reach 60-70 kilogram standard oil/ton. Small refineries' high energy consumption reach 80-90 kilogram standard oil/ton.



Comprehensive comparison and analysis of energy consumption (kilogram standard oil/ton)

	CNPC	Sinopec
2013	65.2	58.44
2012	63.58	57.25
2011	64.41	55.02

Domestic refineries' production capacity scale

Source: ETRI

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### 6. The integration level is unbalanced



China's 10million ton integrated refinery distribution (ten thousand tons/year)

- On one hand, 16 of the 24 10million lever large oil refining bases have ethylene plants. On the other hand, there are quite a number of oil refining enterprises failed to realize integration of refining and comprehensive level of processing and comprehensive utilization of resources capacity is relatively weak.
- China's refining capacity is a structural-surplus one, which excess in low lever capacity, not the high lever capacity.

Enterprises	Region	Company	Processing capacity	Notes
CNPC ( 9 )	NE	Dalian petrochemical	2050	
		Fushun petrochemical	1150	With CH <sub>2</sub> =CH <sub>2</sub> plant
		Dalian Xitai	1000	
		Jilin petrochemical	1000	With CH <sub>2</sub> =CH <sub>2</sub> plant
		Liaoyang petrochemical	1000	With CH <sub>2</sub> =CH <sub>2</sub> plant
	NW	Lanzhou petrochemical	1050	With CH <sub>2</sub> =CH <sub>2</sub> plant
		Dushanzi petrochemical	1000	With CH <sub>2</sub> =CH <sub>2</sub> plant
	South China	Guangxi petrochemical	1000	Under plan
	SW	Sichuan petrochemical	1000	With CH <sub>2</sub> =CH <sub>2</sub> plant
Sinopec ( 12 )	Pan-Bohai Bay	Qingdao refinery	1000	Under plan
		Qilu petrochemical	1000	With CH <sub>2</sub> =CH <sub>2</sub> plant
		Tianjin petrochemical	1250	With CH <sub>2</sub> =CH <sub>2</sub> plant
		Yanshan petrochemical	1350	With CH <sub>2</sub> =CH <sub>2</sub> plant
		Changling petrochemical	1150	
	Yangtze River Delta	Zhenhai refinery	2300	With CH <sub>2</sub> =CH <sub>2</sub> plant
		Shanghai petrochemical	1400	With CH <sub>2</sub> =CH <sub>2</sub> plant
		Jinling petrochemical	1300	Facing to Yangtze ethylene plant
	Pearl River Delta	Gaoqiao petrochemical	1130	
		Maoming petrochemical	2000	With CH <sub>2</sub> =CH <sub>2</sub> plant
Fujian refinery	Guangzhou petrochemical	1320	With CH <sub>2</sub> =CH <sub>2</sub> plant	
	Fujian refinery	1200	With CH <sub>2</sub> =CH <sub>2</sub> plant	
CNOOC ( 1 )	South China	Huizhou refinery	1200	With CH <sub>2</sub> =CH <sub>2</sub> plant
Sinochem ( 1 )	South China	Quanzhou petrochemical	1200	With CH <sub>2</sub> =CH <sub>2</sub> plant
Local refineries(1)	Shandong	Dongming petrochemical	1200	
Total ( 24 )			30250	

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## Outlines





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1. Status of Chinese Refining Industry
2. Challenges to Chinese Refining Industry
-  3. Prospects of Chinese Refining Industry Development

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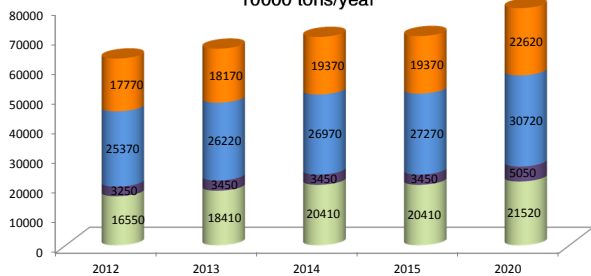
## 1. China oil refining capacity will keep growing with more participants




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- China refining capacity will reach to 800 million tons/year in 2020.
  - ❑ Oil refining capacity of **PetroChina** will increase to 230 million tons/year. **Sinopec** will increase to 310 million tons/year.
  - ❑ **Cnooc's** domestic refining capacity will increase to 50 million tons/year, **ChemChina** will increase to 30 million tons, Sinochem will increase to 20 million tons.
  - ❑ **Local refineries** will increase to 220 million tons/year.
  - ❑ 2015 --2020 the average growth rate of refining capacity will be 2.5%, falling down from 2000--2015 average growth rate of 6.4% .

**Domestic refining capacity forecast in 2020**  
10000 tons/year



Year	Local refineries & other companies	Cnooc	Sinopec	PetroChina	Total
2012	16550	3250	25370	17770	17770
2013	18410	3450	26220	18170	18170
2014	20410	3450	26970	19370	19370
2015	20410	3450	27270	19370	19370
2020	21520	5050	30720	22620	22620

Data Source: CNPC ETRI CNPC ETRI | Page 22



## 2. Teapot refineries will get more crude import

- With more and more local refineries obtain ,it's expected that the available imported crude oil quotas of future will be 50 million tons/year at least . The highest possible amount maybe up to 90 million tons/year.
- Expand the use of qualified oil and eliminate backward production capacity can be in favor of the industrial structure. If all the qualified local refineries have the ability to use imported crude oil, the elimination of backward production capacity can be millions of tons. In this way it can effectively promote backward production capacity elimination, structural optimization and industrial upgrading. As a result, the average size of local refineries, refining capacity utilization as well as high standards of oil production capacity will be increased.

**Part of local refineries which may apply for import qualified right to crude oil in the future (10000 tons / year)**

	Enterprise	Province	Existed distillation capacity
1	Haihua Petrochemical	Shandong	340
2	Shengma Petrochemical	Sichuan	350
3	Wantong Chemical	Shandong	230
4	Wanda Tianhong	Shandong	500
5	Yuhuang Shengshi	Shandong	300
6	Shouguang Alliance	Shandong	200
7	Xinhai Petrochemical	Jiangsu	300
8	Jin'ao Technology	Hubei	200
	Total		2420

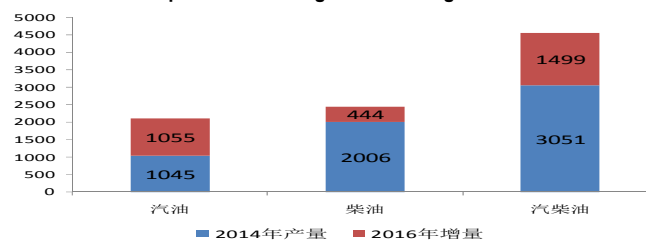
CNPC ETRI | Page 23



## 3. Teapot refineries' operating rate and yield of gasoline and diesel will "double up"

- After optimization, cost will reduce, yield and quality of gasoline and diesel will rise, which enhance the operational efficiency of its production, as well as refining market competitiveness.
- As the quality of raw materials has risen, it is expected to increase rate of 37% in 2014 to 60% in 2016.
- The local refineries' total gasoline and diesel proportion will rise nearly 5 percentage points.
- 2014 Shandong gasoline and diesel production was 30.51 million tons, yield was 60%. 2015 January-July production was 18.92 million tons ,yield was 58%.
- It is expected in 2016 in Shandong gasoline and diesel production will reach 45.5 million tons and yield will be 65%.The proportion of Shandong gasoline and diesel production will rise from 10.6% in 2014 to 15%in 2016.

**Refined oil production change of Shandong local refineries**



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#### 4. Adjust stock and enhance increments to resolve the surplus productivity



- According to the companies currently under construction, and the proposed refinery project planning, production capacity 120 million tons during the Thirteen-five Period.
- Chinese government will gradually strengthen macro-control, management refinery expansion plans."Beijing 2013 - 2017 Clean Air Action Plan" requires to control refinery scale in Beijing, which has canceled Yanshan Petrochemical 8 million tons refinery capacity expansion plans. Construction of Jieyang petrochemical of CNPC and Zhongke refinery of Sinopec is suspended.
- quality of oil upgrading accelerates, enterprises should speed equipment upgrades. The crude oil import right liberalisation prompts refining enterprises polarization.

**Part of currently under construction, proposed and planned domestic large refineries projects**

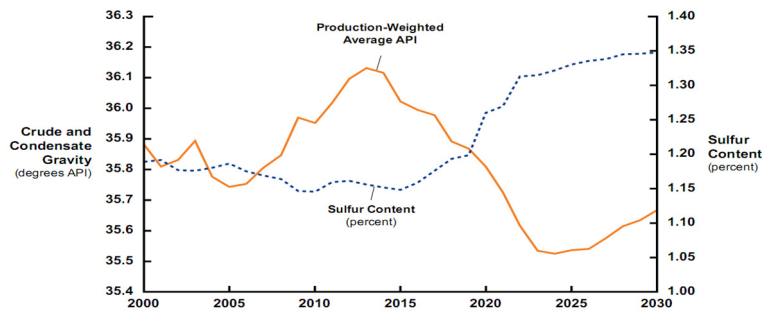
Operation year	Company Name	Group	Changes in refining capacity	Added ability	Region	Remark
2016	Karamay Petrochemical	CNPC	600→900	300	Northwest	Reconst&expans
	Shenhua Ningxia Coal	Shenhua	0→400	400	Northwest	New
2017	North China Petrochemical	CNPC	500→1000	500	Central	Reconst&expans
	Caofeidian I	Sinopec	0→1500	1500	North China	New
2018	Dalian Petrochemical	CNPC	2050→2500	450	Northeast	Reconst&expans
	Qingyang Petrochemical	CNPC	300→600	300	Northwest	Reconst&expans
	Jieyang Petrochemical	CNPC	0→2000	2000	South China	New
	Quanzhou Petrochemical	Sinochem	1200→1500	300	South China	Reconst&expans
	Zhongke Refinery	Sinopec	0→1500	1500	South China	(suspended)
2019	Jinmen Petrochemical	Sinopec	550→1000	450	Central	Reconst&expans
	Luovang Petrochemical	Sinopec	800→1800	1000	Central	Reconst&expans
	Dongfang Petrochemical	CNPC	0→1600	1600	Central	New
2020	Daxie Petrochemical	CNOOC	800→1400	600	East China	Reconst&expans
	Zhenhai Refinery	Sinopec	2300→3800	1500	East China	Reconst&expans
after2020	Huizhou Refinery II	CNOOC	1200→2200	1000	South China	Reconst&expans
	Dalian Nishinakajima I	CNPC	0→1500	1500	Northeast	New
	Lianyungang , Jiangsu I	Sinopec	0→1500	1500	East China	New
	Shanghai Caojing	Sinopec	0→2000	2000	East China	New
	Hainan Petrochemical	Sinopec	920→1300	380	South China	Reconst&expans
	Gulei Petrochemical	Sinopec	0→1600	1600	South China	New
	Sinochem Shandong	Sinochem	1500→2300	800	North China	Reconst&expans

#### 5. China will strengthen its deep refining ability



- Crude oil quality will drop mildly between 2010-2030.
- By far, China has already established more than 20 high-sulfur crude oil processing bases and high-acid/high-sulfur crude oil processing bases occupied 50%, dealing with 80% sulfur-contend and acid-contend oil.

**Worldwide Gravity and Sulfur Trends**  
(sulfur content continuing to rise—crude becomes sour)



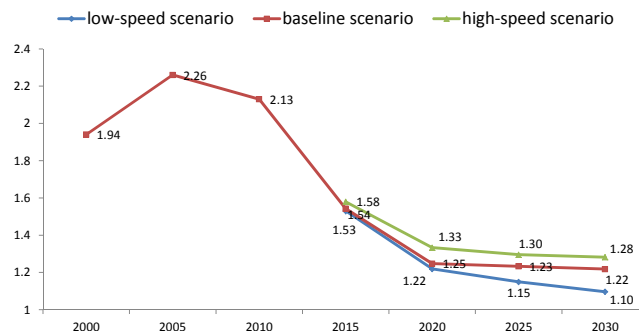
Source: IHS CERA. 20111-2



## 6. Domestic diesel and gasoline ratio will continue to decline

- Consumption growth of refined oil product will be different, gasoline will keep a high speed growth and diesel will remain low growth. China consuming diesel and gasoline ratio will drop to 1.25 in 2020, and fall to 1.22 in 2030.
- The decline of diesel and gasoline ration will need the adjustment of the refining products structure in China.

Domestic diesel and gasoline ratio



## 7. Coordinate "One band, one road" strategy to speed up the "going out" pace



- " One band, one road " cooperation zones covers many overseas projects of China's oil companies, involving 18 countries, 69 oil and gas cooperation projects, as of the end of 2013, the cumulative total investment of 68.7 billion US dollars, accounting for nearly 45 percent of the total overseas investment.
- 2013, our country imported 58 million tons of crude oil by " One band, one road ", accounting for 19% of total crude oil imports.
- ✓ **Central Asia:** Weak refinery industrial base, small scale;
- ✓ **Russia:** large-scale refining industry, but the equipment, technology is old, upgrading is urgently needed;
- ✓ **Middle East:** diversified economy, further development of refining capacity, international advanced technology to help support and stabilize the market;
- ✓ **Southeast Asia, South Asia:** part of the nations' refining scale is large, but some countries lagging behind, still in the initial or infancy.
- China's oil refining industry has now formed a a complete system of research, design, equipment manufacturing, engineering, production refining, storage and marketing. and should be able to play a larger role in the " One band, one road " of crude oil processing.

## 8. Baseline scenario—production of the oil products will grow fast before 2020



- **Baseline scenario:** Assuming in 2020 China refining capacity will be 800million tons/year, the main refineries capacity utilization will be 85%, the local refineries capacity utilization will be 50%, the yield of gasoline will be 25%, yield of kerosene will be 7.5%, yield of diesel will be 34%. It's expected that processing crude oil will be 604 million tons/year, and production of gasoline, kerosene and diesel will be 151 million tons, 205 million tons and 45 million tons respectively.

**Domestic production of refined oil product 10000tons/year**

Year	Crude oil processing capacity	Refined oil production	Gasoline production	Diesel production	Kerosene production
2015	51550	33260	11850	17890	3520
2016	53210	34478	12438	18389	3651
2017	54923	35744	13055	18902	3787
2018	56692	37061	13702	19430	3929
2019	58517	38429	14382	19972	4075
2020	60390	40136	15098	20533	4505
2015–2020 average growth rate	3.22%	3.83%	4.96%	2.79%	5.06%

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## 9. Elimination backward capacity scenario—production of the oil products will still increase before 2020



- The local refineries could import the crude oil, so they must eliminate backward capacity. Considering all the refinery whose scale below 2 million tons will shut down, China refining capacity will decrease. But with the rising refinery capacity utilization, production of oil products will still go up. Assuming in 2020 China refining capacity will be 750million tons/year, the main refineries capacity utilization will be 85%, the local refineries will be 60%. It's expected that domestic processing crude oil will be 594 million tons, and production of gasoline, kerosene and diesel will be 149million tons, 202 million tons and 44million tons respectively in 2020.

**Domestic production of refined oil product under close down backward capacity scenario ( 10000 tons/year )**

Year	Crude oil processing capacity	Refined oil production	Gasoline production	Diesel production	Kerosene production
2015	51550	33260	11850	17890	3520
2016	53040	34368	12399	18330	3686
2017	54573	35517	12973	18781	3860
2018	56150	36708	13573	19243	4042
2019	57773	37942	14202	19716	4233
2020	59430	39496	14857	20206	4433
2015–2020 average growth rate	2.89%	3.50%	4.63%	2.46%	4.72%

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## 10. Under the baseline scenario, China oil products supply and demand gap will expand in 2020



- Baseline scenario: In 2020, the supply of the oil products will exceed the demand 34.57 million tons which include 4.65 million tons gasoline, 22.82 million tons diesel, 7.1 million tons kerosene.

### **Supply and demand balance of China oil products Under the baseline scenario ( 10000 tons/year )**

Year	Gasoline			Diesel			Kerosene			Oil product		
	Output	Consumption	Balance	Output	Consumption	Balance	Output	Consumption	Balance	Output	Consumption	Balance
2015	11850	11076	774	17890	17084	806	3520	2770	750	33260	30930	2330
2016	12438	11821	617	18389	17411	978	3651	2950	701	34478	32182	2296
2017	13055	12582	473	18902	17695	1207	3787	3142	645	35744	33418	2326
2018	13702	13331	371	19430	17912	1518	3929	3346	583	37061	34589	2472
2019	14382	14031	351	19972	18101	1871	4075	3564	511	38429	35696	2733
2020	15098	14633	465	20533	18251	2282	4505	3795	710	40136	36679	3457

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## 11. Under elimination backward capacity scenario, China oil products supply and demand difference will expand slightly in 2020



- Elimination backward capacity scenario: In 2020, the supply of the oil products will exceed the demand 28.17 million tons which include 2.24 million tons gasoline, 19.55 million tons diesel, 6.38 million tons kerosene.

### **Supply and demand balance of China oil products under elimination backward capacity scenario ( 10000 tons/year )**

Year	Gasoline			Diesel			Kerosene			Oil product		
	Output	Consumption	Balance	Output	Consumption	Balance	Output	Consumption	Balance	Output	Consumption	Balance
2015	11850	11076	774	17890	17084	806	3520	2770	750	33260	30930	2330
2016	12399	11821	578	18330	17411	919	3640	2950	690	34369	32182	2187
2017	12973	12582	391	18781	17695	1086	3763	3142	621	35517	33418	2099
2018	13573	13331	242	19243	17912	1331	3891	3346	545	36707	34589	2118
2019	14202	14031	171	19716	18101	1615	4024	3564	460	37942	35696	2246
2020	14857	14633	224	20206	18251	1955	4433	3795	638	39496	36679	2817

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## Conclusion

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- China has become the world's second largest oil refining country after the United States. It has become the world's hot spots and highlights areas of construction and development of oil refining industry. The production scale and technology has seen significant developed. Refinery size rapidly increased. Device structure optimization and adjustment and oil product quality upgrading accelerated.
- At present, China's oil refining industry is in the transition from the old to the new normal. Structural adjustment, restructuring and upgrading has become the main theme of development. Green low-carbon development, transformation and upgrading will be bigger and stronger spirit of "Thirteen Five."
- After the liberalization of the crude oil import right , the degree of diversification of the market will further rise, leading to fierce competition. "Thirteen Five" period ,China gasoline and diesel quality standards will upgrade from Standard IV to Standard V , increasing environmental pressures and further accelerating the pace of energy conservation .Deep processing capacity will further increase, crude processing volume will continue to grow in order to meet the growing domestic demand for refined oil market.

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# Thank you!

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