China's Energy Transition

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September 11, 2017

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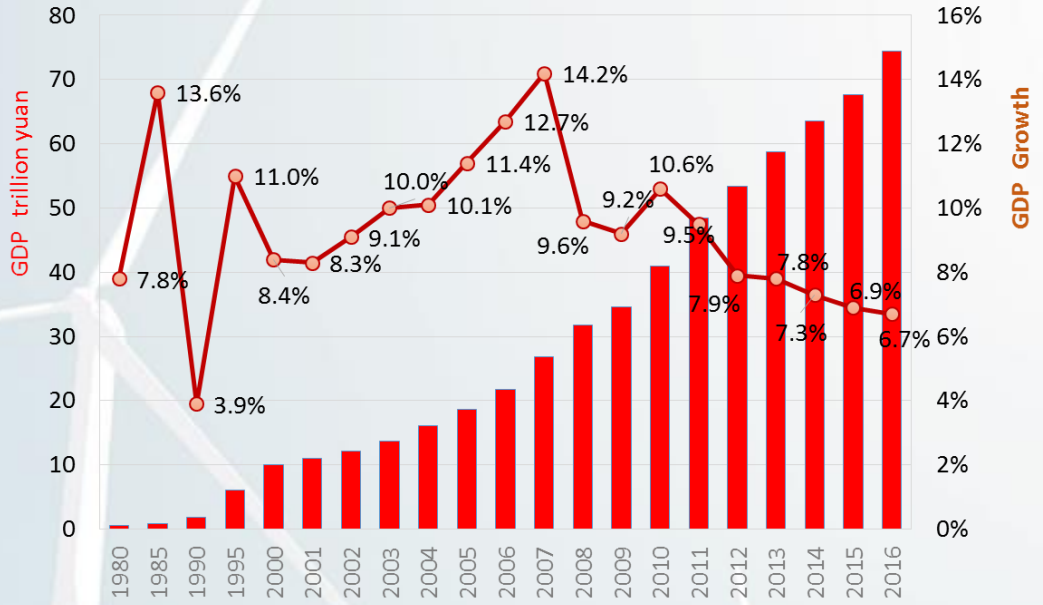
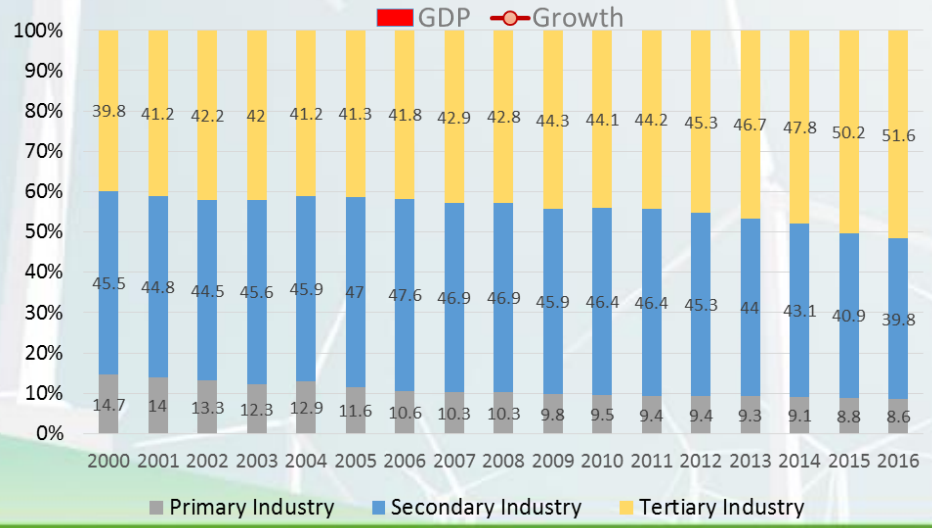
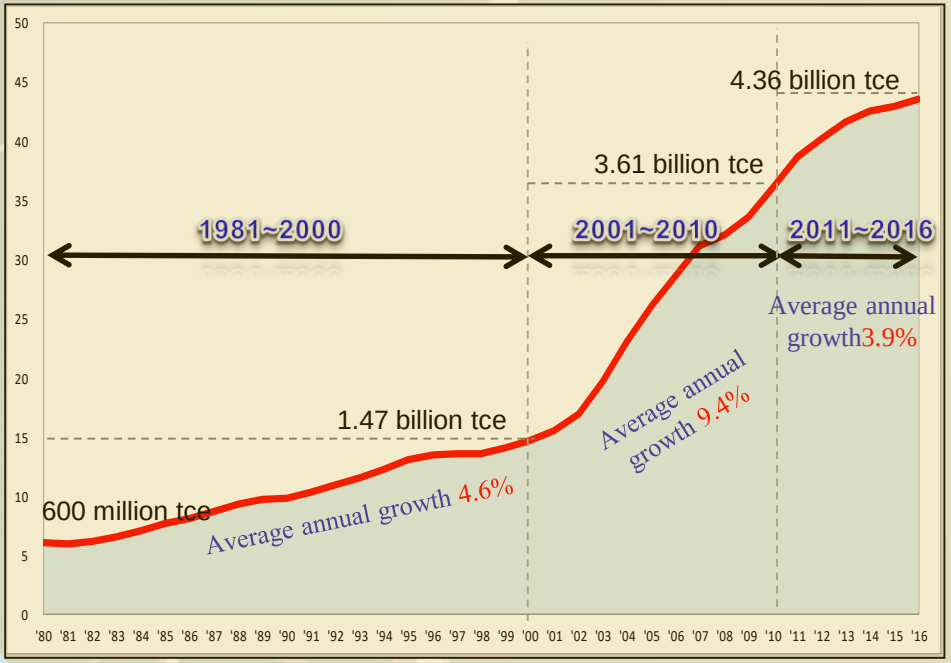
China's economy steps into the "new normal" phase



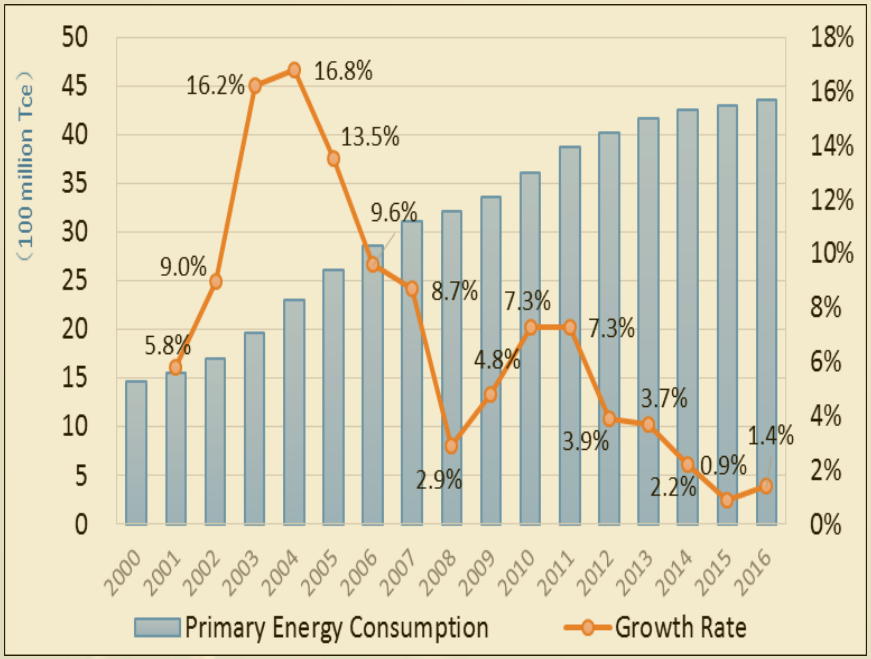


Growth rate of PEC reduced obviously

Primary Energy Consumption from 1980 to 2016

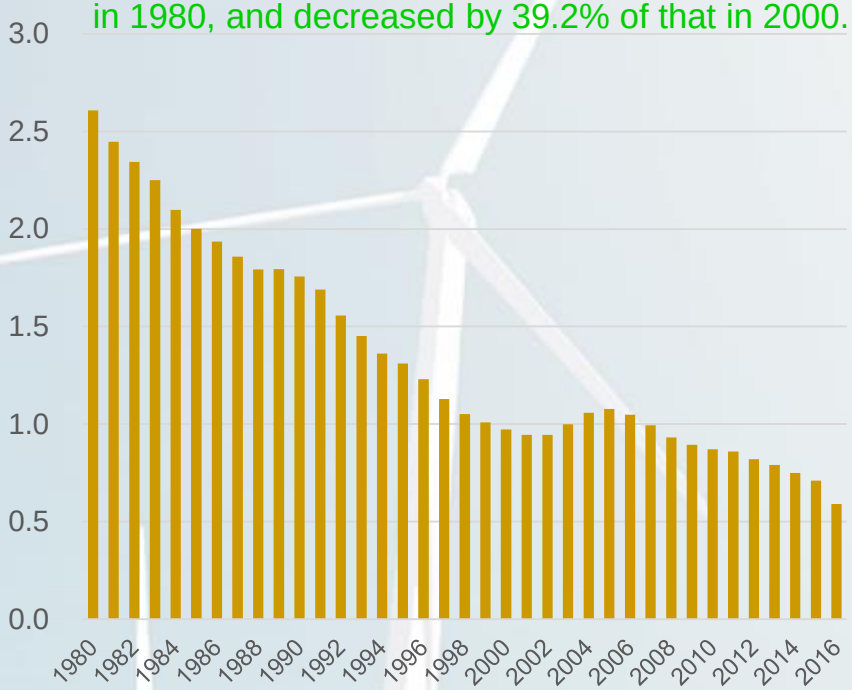


Growth Rate of Primary Energy Consumption

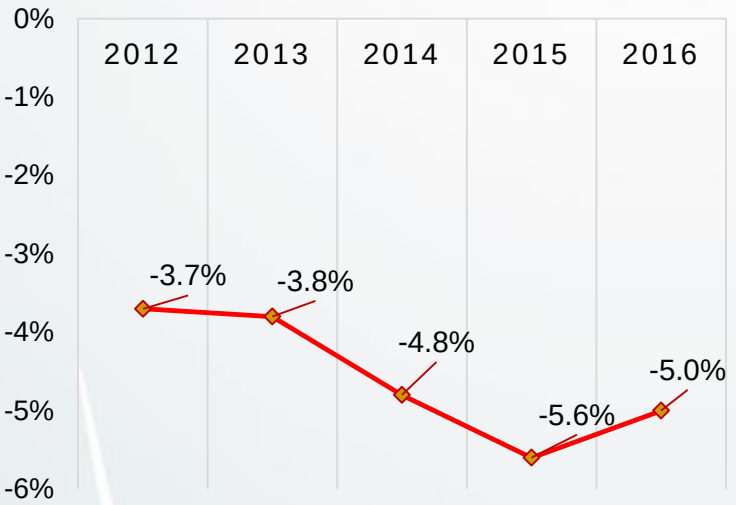


Energy Intensity decreased significantly

Energy intensity in 2016 decreased by 77.4% of that in 1980, and decreased by 39.2% of that in 2000.



2012-2016 Energy Intensity Decrease rate

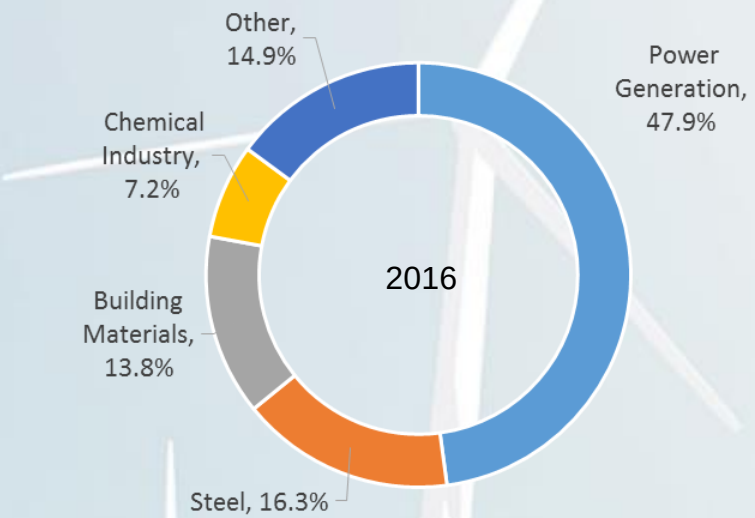


	Energy Intensity Decrease Rate
1990 compares to 1980	32.8%
2000 compares to 1990	44.8%
2010 compares to 2000	9.6%
2016 compares to 2010	32.2%
2016 compares to 1980	77.4%
2016 compares to 2000	39.2%

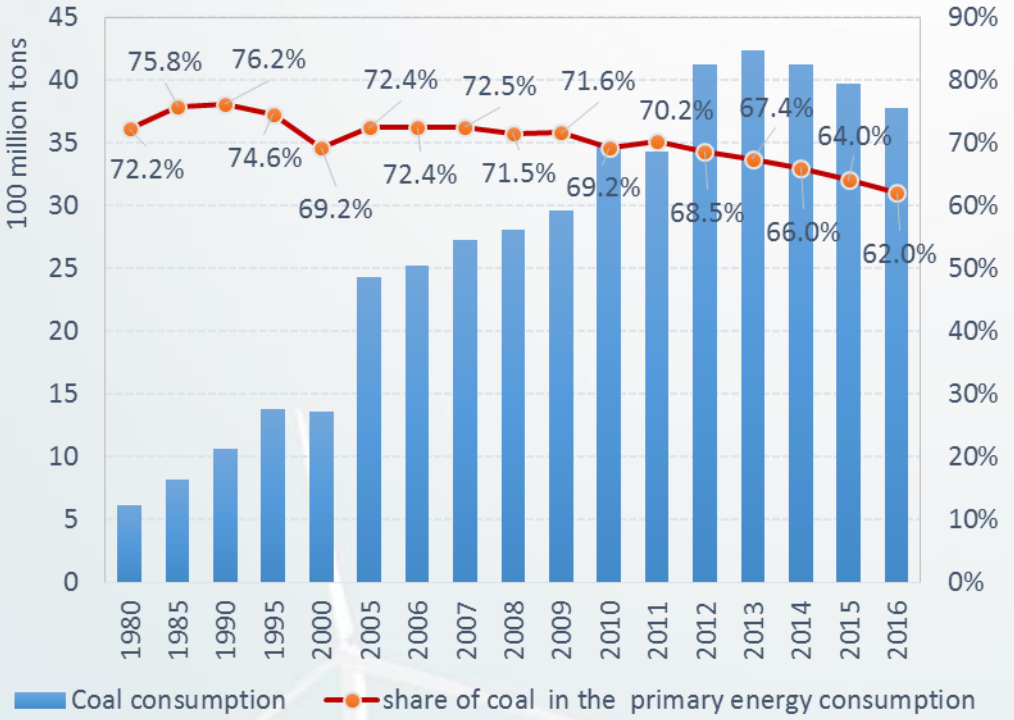
Adjustment of energy structure has been speeding up

year	China's energy consumption structure (%)					
	Coal	Petroleum	Natural Gas	Hydro Power	Nuclear Power	other
2000	68.5	22.0	2.2	5.7	0.4	1.2
2001	68.0	21.2	2.4	6.7	0.4	1.3
2002	68.5	21.0	2.3	6.3	0.5	1.4
2003	70.2	20.1	2.3	5.3	0.8	1.3
2004	70.2	19.9	2.3	5.5	0.8	1.3
2005	72.4	17.8	2.4	5.4	0.7	1.3
2006	72.4	17.5	2.7	5.4	0.7	1.3
2007	72.5	17.0	3.0	5.4	0.7	1.4
2008	71.5	16.7	3.4	6.1	0.7	1.6
2009	71.6	16.4	3.5	6.0	0.7	1.8
2010	69.2	17.4	4.0	6.4	0.7	2.3
2011	70.2	16.8	4.6	5.7	0.7	2.0
2012	68.5	17.0	4.8	6.8	0.8	2.1
2013	67.4	17.1	5.3	6.9	0.8	2.5
2014	66.0	17.4	5.7	7.7	1.0	2.6
2015	64.0	18.3	5.9	8.0	1.2	2.6
2016	62.0	19.0	6.3	8.6	1.6	2.5

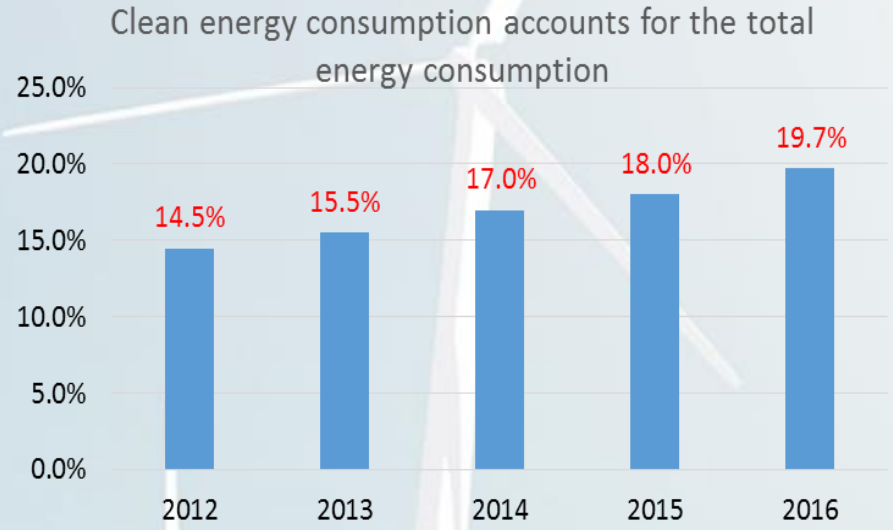
Share of coal consumption in the PEC continues to decline

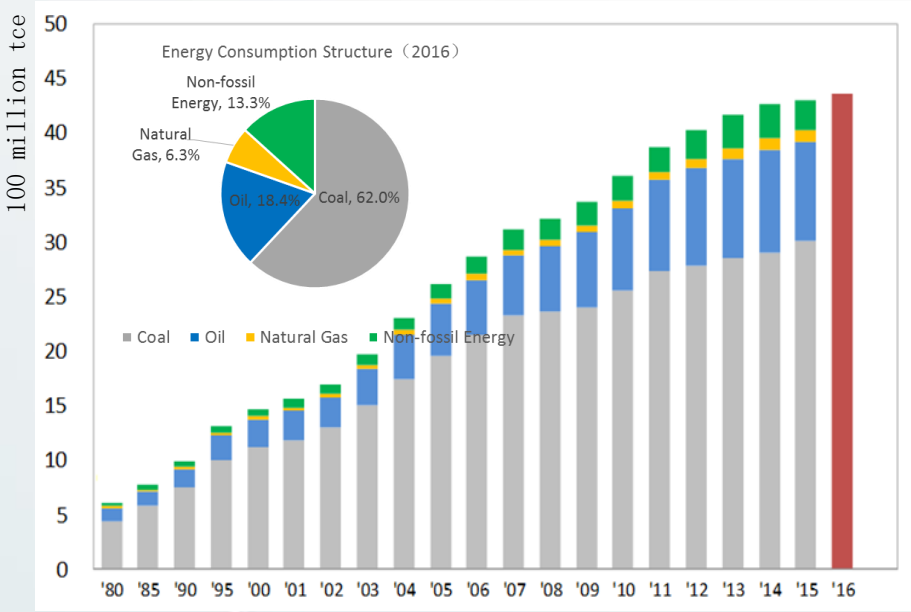


China's Coal Consumption Structure (2016)

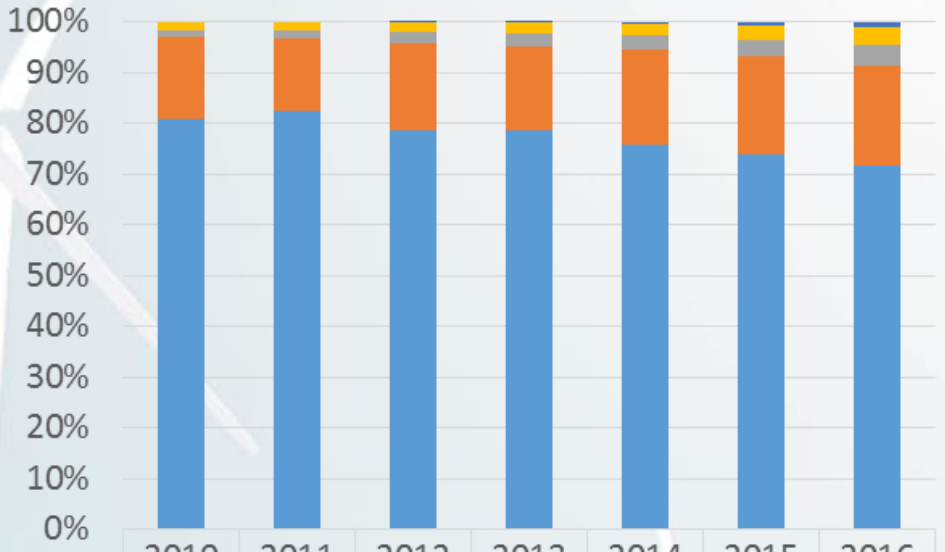


Share of clean energy in the PEC continues to increase



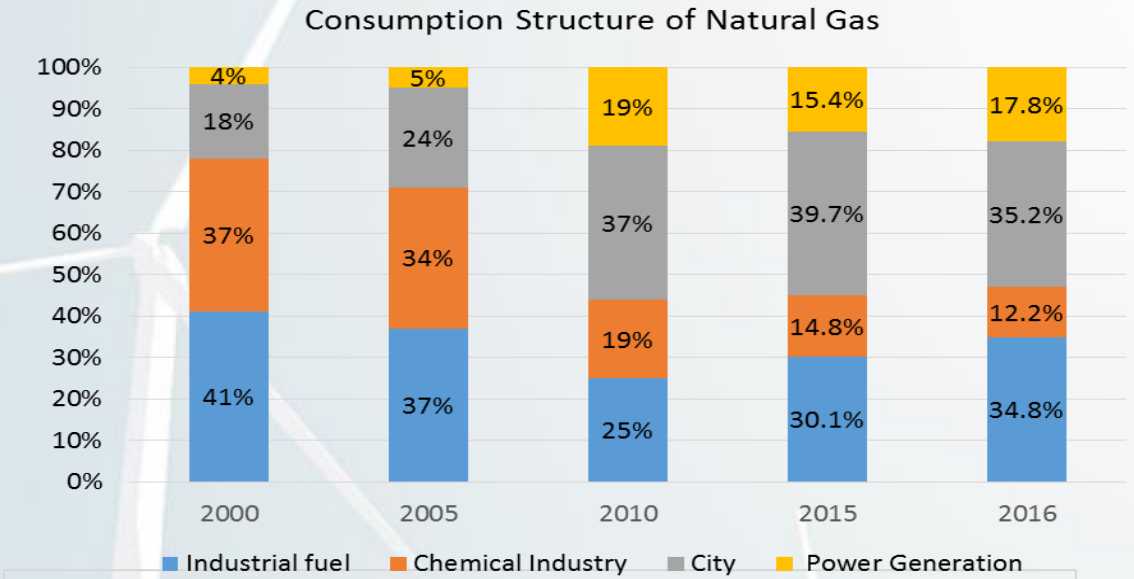


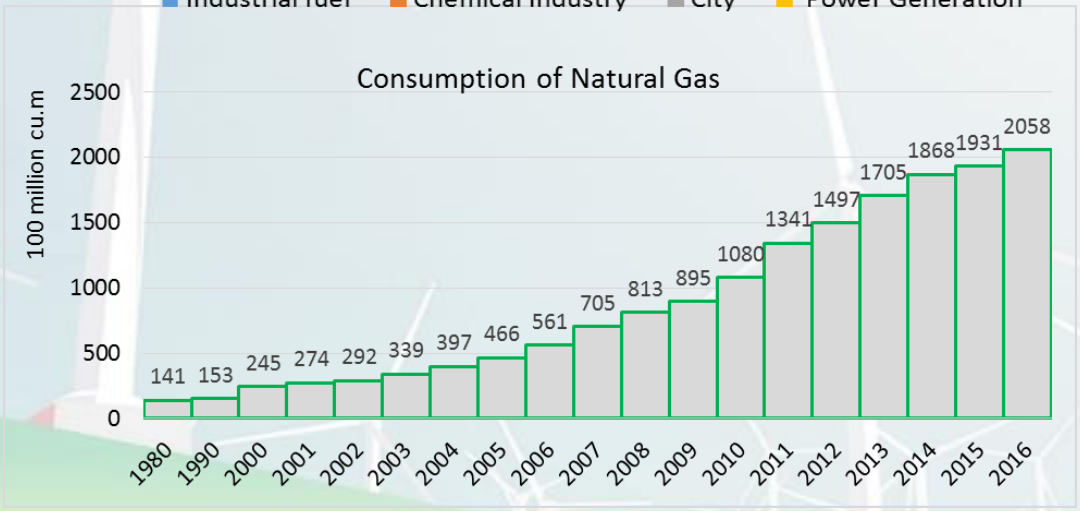
Structural adjustment of power supply has been speeding up



	2010	2011	2012	2013	2014	2015	2016
Solar power	0	0	0.1	0.2	0.4	0.7	1.1
Nuclear Power	1.8	1.8	2	2.1	2.3	3	3.6
Wind power	1.2	1.6	2.1	2.6	2.8	3.2	4
Hydro Power	16.2	14.1	17.2	16.6	18.7	19.4	19.7
Coal-fired power	80.8	82.4	78.7	78.6	75.8	73.7	71.6

The consumption structure of natural gas tends to optimize





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Energy Development in the 13th FYP

Energy Index in the 13th FYP of Energy Development				
	unit	2015	2020	Average annual growth rate
Primary Energy Production	10^8 tce	36. 2	40	2. 0%
Power Installed Capacity	10^8 kilowatts	15. 3	20	5. 5%
Energy Consumption	10^8 tce	43	<50	<3%
Coal Consumption	10^8 ton raw coal	39. 6	41	<0. 7%
Electricity Consumption	trillion kilowatts	5. 69	6. 8-7. 2	3. 6-4. 8%

Index of Energy Mix in the 13th FYP of Energy Development				
	unit	2015	2020	proportion change
Proportion of non-fossil energy installation	%	35	39	4
Proportion of non-fossil energy generation	%	27	31	4
Proportion of non-fossil energy consumption	%	12	15	3
Proportion of natural gas consumption	%	5. 9	10	4. 1
Proportion of Coal consumption	%	64	58	-6
Electric coal accounts for coal consumption	%	49	55	6

The Strategy for Energy Production and Consumption Revolution (2016-2030)

- 【Strategic objectives】： Adhere to the "security oriented, saving first, green, low-carbon, active and innovative" strategic orientation, China's energy strategic transition will be fully realized. From the view of total energy consumption, energy structure, energy efficiency and carbon emissions, the overall goal of energy transition is clearly defined.
- 【 Overall objectives 】：
  - By 2020,the total energy consumption was below 5 billion tce , significant progress was made in energy structure adjustment, non fossil energy accounted for 15%; carbon emission intensity decreased by 18% compared with 2015, energy consumption per unit of GDP decreased by 15% compared with 2015.
  - By 2030, The total energy consumption controlled within 5 billion tce , non fossil energy accounts for about 20% of the total energy consumption, natural gas consumption accounts for about 15%. Carbon emission intensity decreased by 60%-65% compared to 2005; carbon dioxide emissions peaked around 2030 and reached peak as soon as possible.
  - Looking forward to 2050 ,the total energy consumption is basically stable, and non fossil energy accounts for more than 50%.

The Strategy for Energy Production and Consumption Revolution (2016-2030)

- **Implementation of major strategic actions to promote breakthroughs in the key areas**
  - （01）National energy conservation action
  - （02）Total energy consumption and intensity control action
  - （03）Demonstration action on near zero carbon emissions
  - （04）Electricity demand side management action
  - （05）Clean use of coal action
  - （06）Natural gas promotion and utilization
  - （07）Non-fossil fuels leap development action
  - （08）Rural new energy action
  - （09）Energy internet promotion action
  - （10）Breakthrough in energy technology and equipment action
  - （11）Energy supply-side structural reform action
  - （12）Energy standards improve and upgrade action
  - （13）OBOR energy cooperation action

Innovative Action Plan for Energy Technology Revolution（2016-2030）

- 【Strategic objectives】： Adhere to the national strategic demand, on the one hand , to provide technical means and solutions for solving major issues related to the protection of resources, structural adjustment ,pollution emissions, utilization efficiency, emergency peaking capacity ; on the other hand, to provide technical support and sustained impetus for achieving economic and social development, addressing climate change, environmental quality and other national goals.
- 【 Overall objectives 】：
  - By 2020, in the energy field, the capability of independent innovation significantly enhanced , a number of key technologies will make breakthrough, the foreign dependence of technology ,equipment, key components and materials significantly reduced, the international competitiveness of China’s energy industry significantly enhanced , the innovation system of energy technology initially formed.
  - By 2030, build a perfect energy technology innovation system which adapts to China's national conditions, the capability of energy independent innovation comprehensively improved. As a whole, China’s energy technology will reach international advanced level, and provide technical support for the coordinated and sustainable development of China’s energy industry and ecological environment.

Accelerating the utilization of natural gas

- Natural gas has become an important force for China‘s energy transition. In order to speed up the use of natural gas and increase the proportion of natural gas in China’s primary energy consumption, in June 2017, NDRC and other 13 Ministries and Commissions jointly issued “The Opinions on Accelerating the Utilization of Natural Gas”.
- 【General objectives】:
  - To cultivate natural gas as one of the main energy sources in China‘s modern clean energy system.
  - By 2020, the proportion of natural gas in the primary energy consumption structure will reach about 10%, the underground natural gas storage with effective working gas capacity of 14 billion 800 million cubic meters.
  - By 2030, the proportion of natural gas in the primary energy consumption structure will reach about 15%, the underground natural gas storage with effective working gas capacity of 35 billion cubic meters.
- 【Key tasks】:
  - Implementation of urban gas project
  - Implementation of natural gas power generation project
  - Implementation of industrial fuel upgrading project
  - Implementation of transport fuel upgrading project

Cut Overcapacity in Coal Industry

- In 2016, the State Council of China issued "The State Council's Opinions on Eliminating Overcapacity and Getting Out of Trouble for the Coal Industry."

  - 【Objectives】: From the beginning of 2016, with 3 to 5 years, cut about 500 million tons of coal capacity, restructure 500 million tons of coal capacity , greatly compressed coal production capacity, moderately reduce the number of coal mines, overcapacity of coal industry will be effectively resolved.

  - In 2016,China cut 290 million tons coal production capacity. In the first 7 months of 2017, China cut 128 million tons coal production capacity , completed 85% of the annual target.Inner Mongolia, Liaoning, Jiangsu, Fujian, Henan, Guangxi, Chongqing completed their annual target.

Guard against and defuse the risks of overcapacity in coal-fired power

- In this year's Government Work Report, Premier Li Keqiang specifically referred to the elimination of overcapacity in coal-fired power. In 2017， China will suspend or postpone construction on or eliminate no less than 50 million kilowatts of coal-fired power generation capacity in order to guard against and defuse the risks of overcapacity in coal-fired power, improve the efficiency of this sector, optimize the energy mix, and make room for clean energy to develop.
- In August 2017, NDRC ,MIIT and other 16 ministries jointly issued "The Opinions on Promoting the Supply-side Structural Reform , Guarding Against and Defusing the Risks of Overcapacity in Coal-fired Power".
  - During the period of 13th Five-Year , suspend or postpone construction 150 million kilowatts of coal-fired power capacity, shut down outdated production facilities more than 20 million kilowatts, ultra low emissions retrofit 420 million kilowatts, energy-saving retrofit 340 million kilowatts, flexibility retrofit 220 million kilowatts
  - By 2020， the installed scale of China's coal-fired power controlled no more than 1 billion 100 million kilowatts .

Promotion of electric energy substitution

- In 2016, NDRC and other 8 ministries jointly issued "Guidance Opinions on the Promotion of Electric Energy Substitution."

- 【General objectives】:

  From 2016 to 2020, the energy consumption in the terminal sector use scattered coal and fuel replaced by electricity reached about 130 million tce.

- 【Key fields】:
  - Residential heating field
  - Manufacturing field
  - Transportation field
  - Power supply and consumption field

Thank you for your attention！