



# **How Space Affects Russian-Chinese Energy Relations?**

**——Past/Present/Future**

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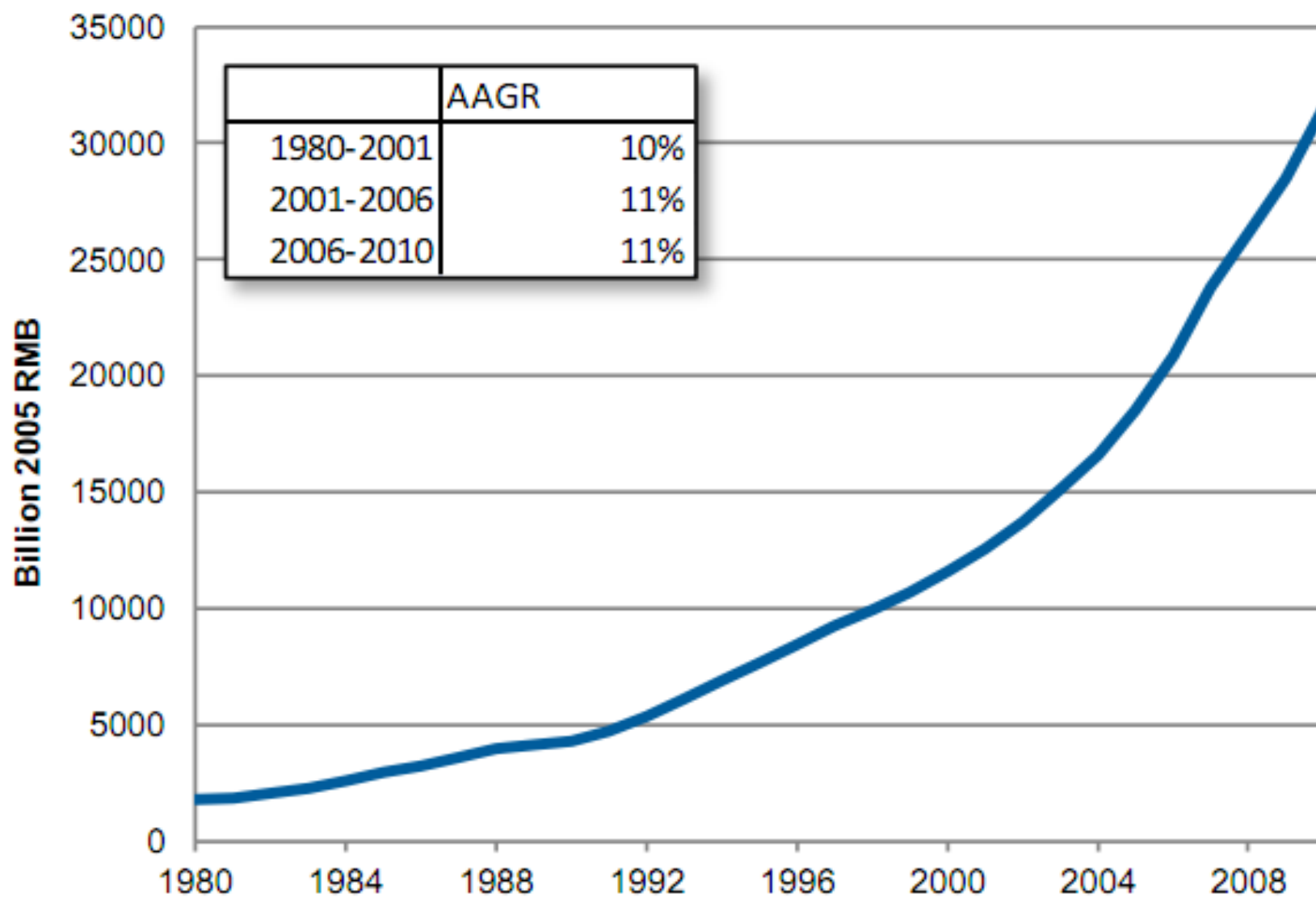
Alternative Energy

## **Part 1**

# **General Introduction**

**YangXiaona**

## China's Gross Domestic Product (1980-2010)



## Preface

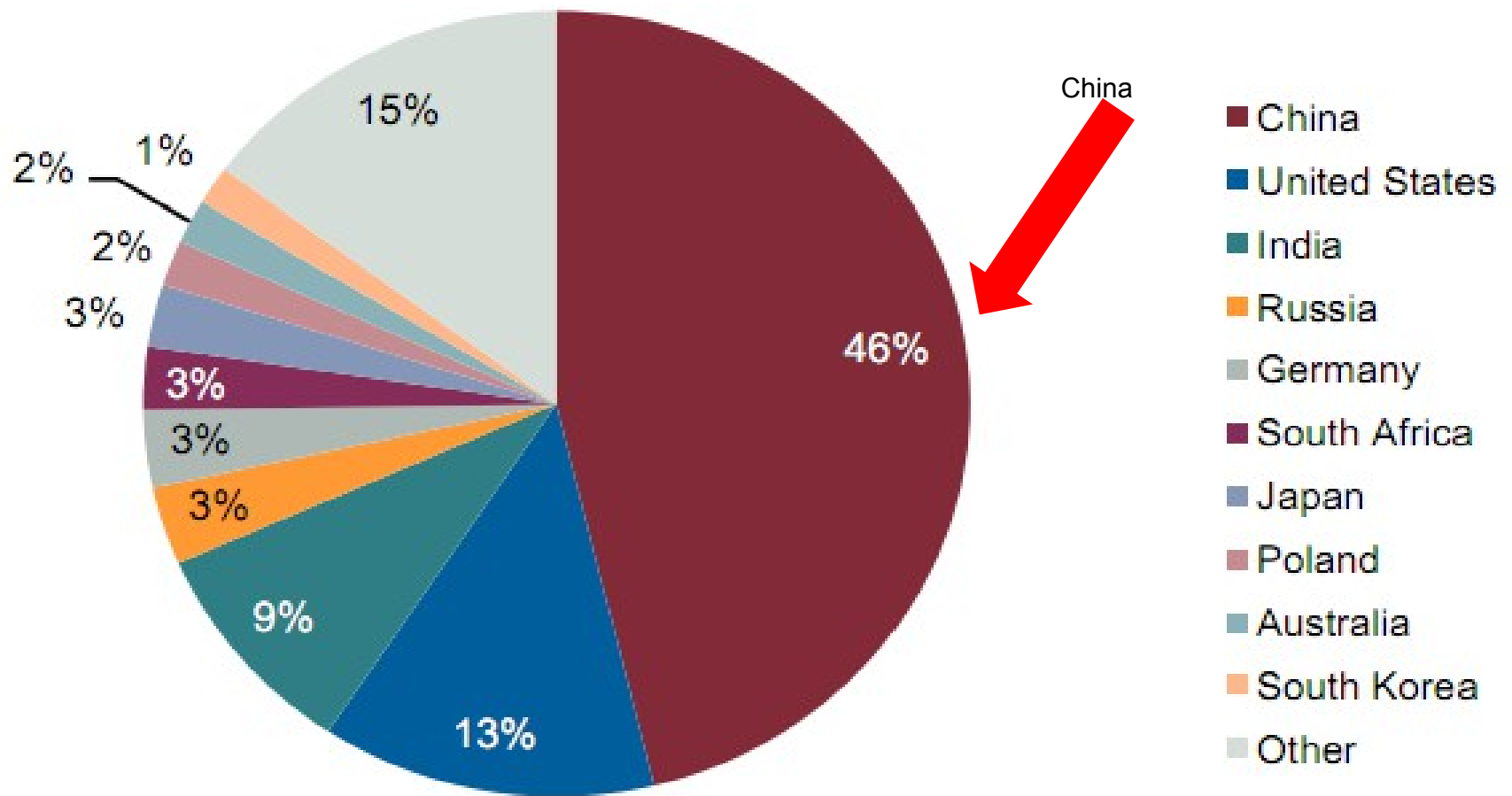
- The rapid development of economy in China brings vast consume of energy, which makes China's current oil and gas over seas operations spread throughout the world's major oil and gas producing areas.
- However, the complicated international situation and the high cost of long distance transport increase the difficulty of oil and gas supply to Africa and the Middle East.
- As a neighbour of China , Russia have a unique advantage in both geography and energy reserves.
- Due to the twenty year energy cooperation , the development between two countries has been going on the track of sound progress.

Russia is closer to China than any of the world's major energy suppliers

While it takes **35 days** to deliver commodities from **Brazil** to Shanghai by sea, more than **20 days** from **South Africa**, and more than **two weeks** from **Australia**, it takes only **one day** to deliver commodities from **Eastern Siberia** to China by rail via Mongolia, or **4-8 days** to Shanghai from Russia's eastern ports like **Vanino**.

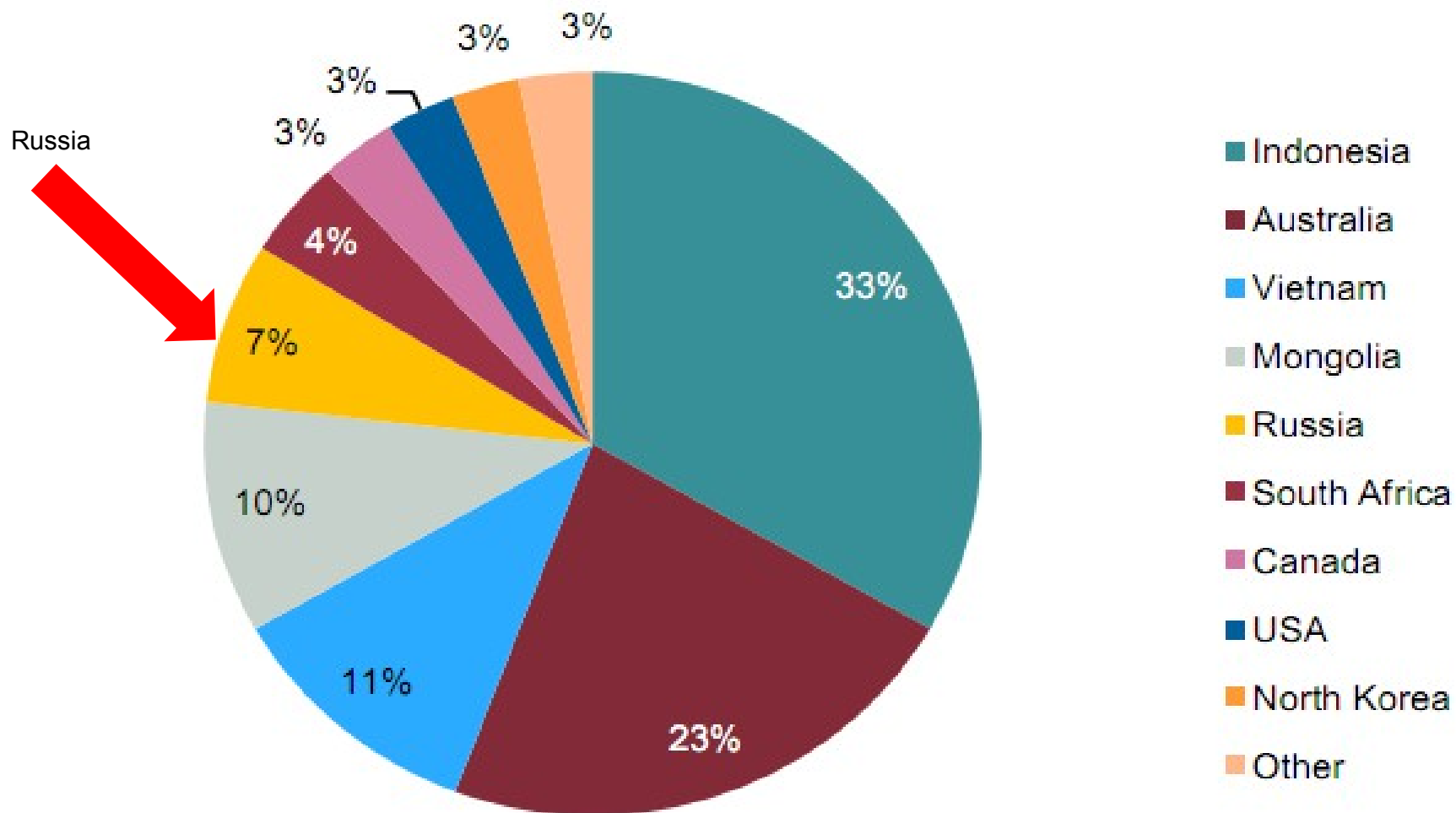


# World's Coal Consumption (2010)



Total Coal Consumption : 7.25 Gt  
Total China Coal Consumption 3.38 Gt

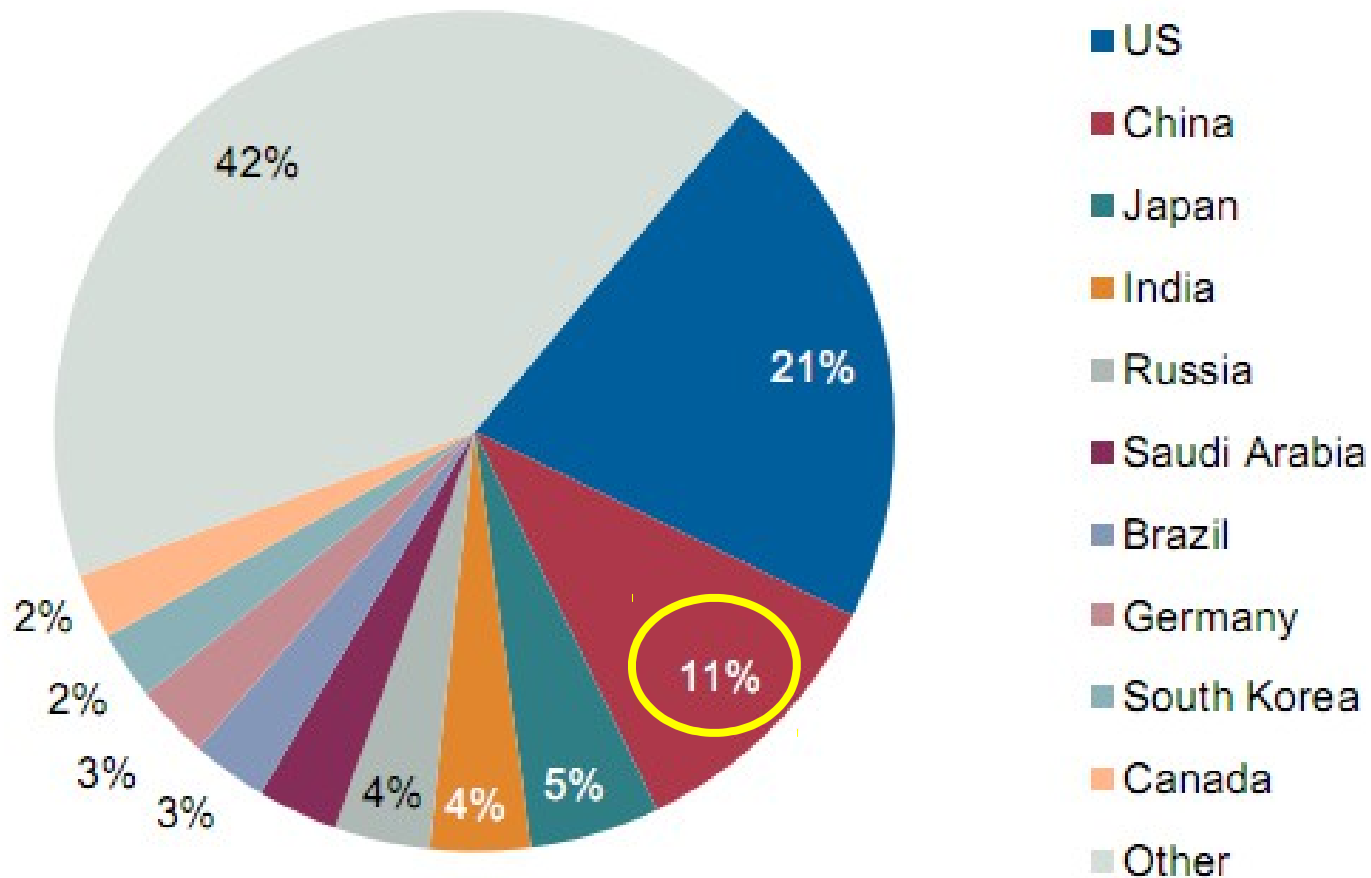
## China's Coal Imports (2010)



Total Coal Imports : 165 Mt

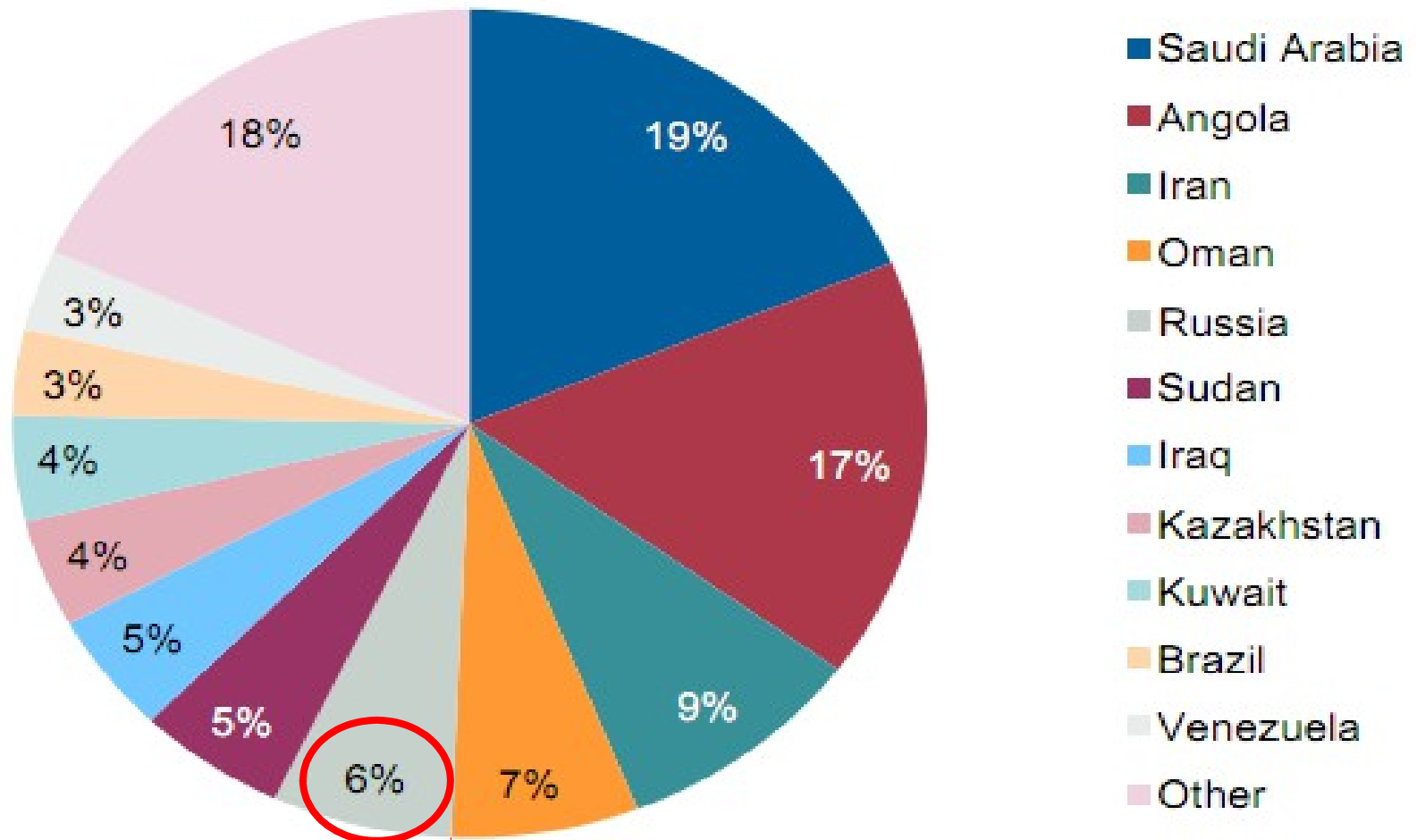


## World's Oil Consumption (2010)



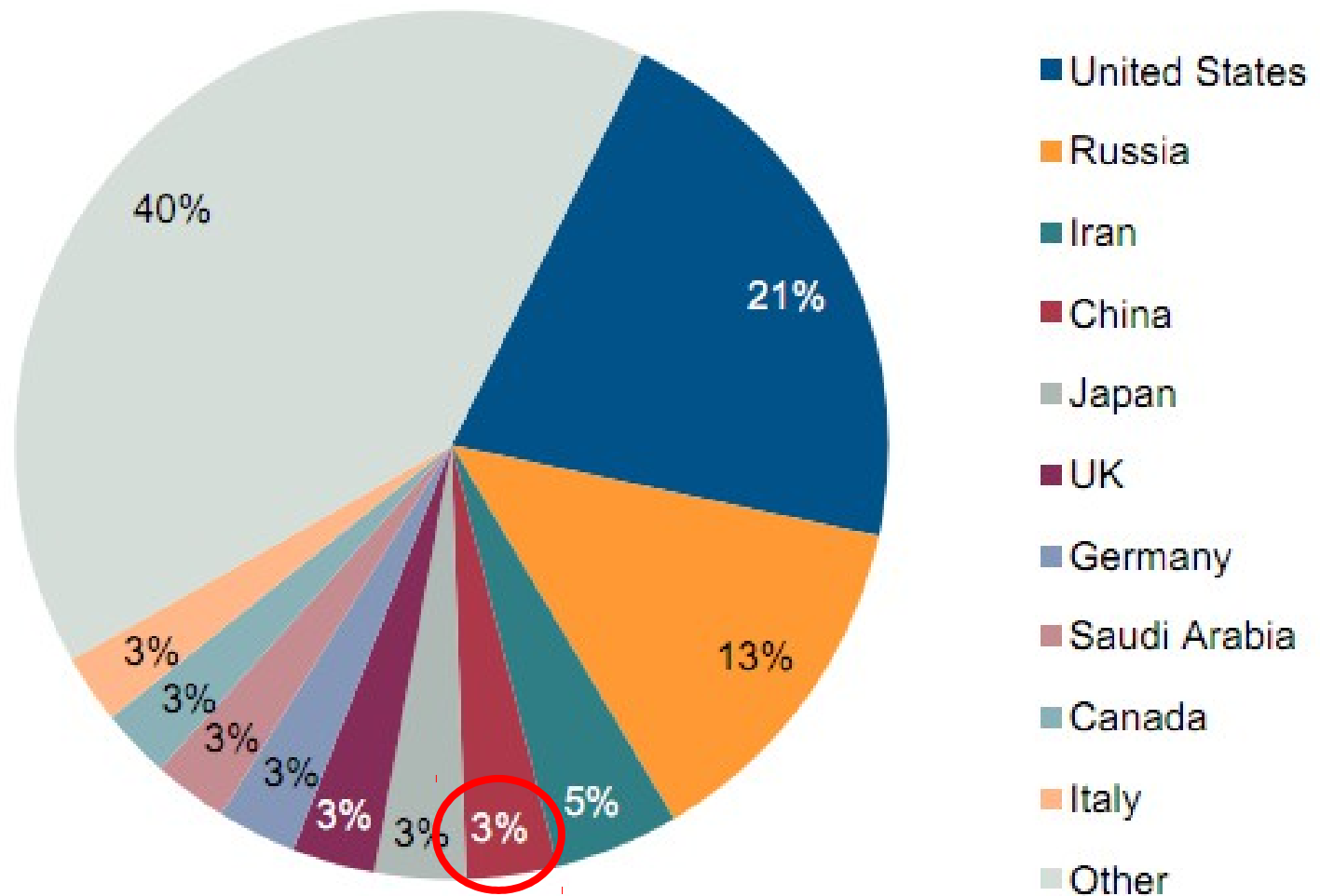
**Total World Oil Consumption: 4,028 Mt**  
**Total China Oil Consumption: 445 Mt**

# China's Crude Oil Imports (2010)



Total Crude Oil Imports: 239 Mt

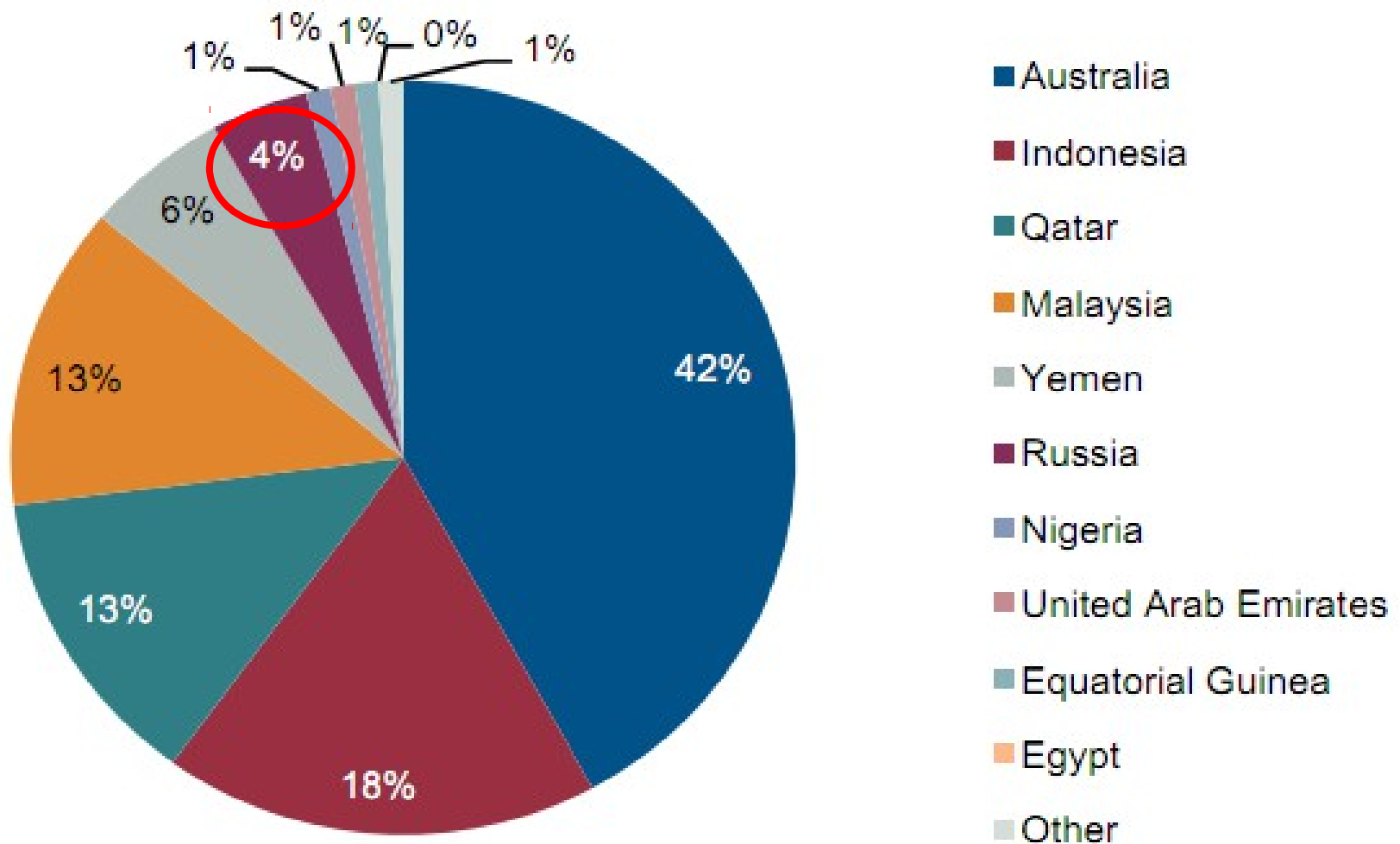
## World's Natural Gas Consumption (2010)



**Total World Natural Gas Consumption: 3,160 billion m<sup>3</sup>**

**Total China Natural Gas Consumption: 126 billion m<sup>3</sup>**

# China's Liquefied Natural Gas Imports (2010)



Total Liquefied Natural Gas Imports: 9.34 billion m<sup>3</sup>

# Bilateral Trade Volume(2011)

表2 俄罗斯对主要贸易伙伴出口额

(2011年)	billion US\$		
国家和地区	金额	同比%	占比%
总值	378,688	8.7	100.0
荷兰	50,735	-8.2	13.4
乌克兰	27,742	29.2	7.3
中国	26,877	39.5	7.1
土耳其	24,946	28.8	6.6
意大利	24,191	-10.0	6.4
德国	23,448	4.5	6.2
日本	13,845	9.1	3.7
波兰	13,272	-3.4	3.5
法国	12,872	12.1	3.4
美国	12,571	15.0	3.3
英国	11,941	29.8	3.2
芬兰	10,541	-12.9	2.8
韩国	10,464	3.1	2.8
瑞士	10,023	27.7	2.7
拉脱维亚	7,068	28.5	1.9

表3 俄罗斯自主要贸易伙伴进口额

(2011年)	billion US\$		
国家和地区	金额	同比%	占比%
总值	278,690	31.8	100.0
中国	45,451	20.3	16.3
德国	35,172	46.8	12.6
乌克兰	18,865	39.4	6.8
日本	14,876	51.0	5.3
美国	14,703	37.8	5.3
法国	12,630	33.6	4.5
意大利	12,440	36.0	4.5
韩国	11,386	61.2	4.1
英国	6,893	55.9	2.5
波兰	6,283	19.4	2.3
土耳其	6,124	30.3	2.2
荷兰	5,651	44.3	2.0
芬兰	4,857	28.9	1.7
西班牙	4,263	47.1	1.5
巴西	4,190	3.5	1.5

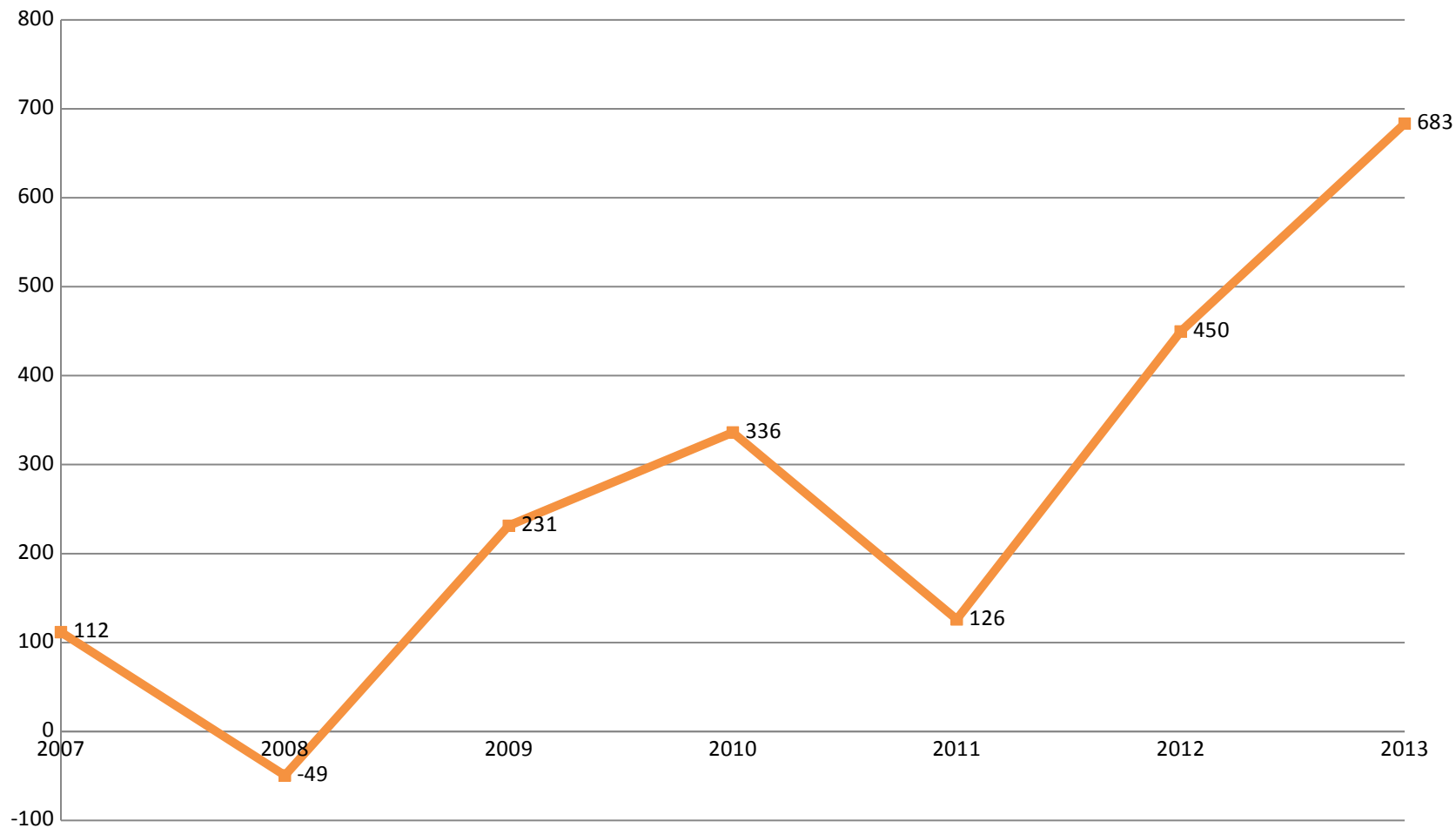
## Main COMMODITIES Export from Russia to China

(2011年)

: billion US\$

HS编码	商品类别	2011年	上年同期	同比%	占比%
章	总值	26,877	19,265	39.5	100.0
27	矿物燃料、矿物油及其产品；沥青等	15,166	9,978	52.0	56.4
44	木及木制品；木炭	2,585	2,230	15.9	9.6
26	矿砂、矿渣及矿灰	2,422	963	151.6	9.0
29	有机化学品	1,086	758	43.2	4.0
31	肥料	1,080	821	31.6	4.0
03	鱼及其他水生无脊椎动物	1,059	898	17.9	3.9
47	木浆等纤维状纤维素浆；废纸及纸板	860	615	39.9	3.2
84	核反应堆、锅炉、机械器具及零件	565	802	-29.6	2.1
39	塑料及其制品	373	405	-7.9	1.4
40	橡胶及其制品	340	329	3.4	1.3
85	电机、电气、音像设备及其零附件	169	109	55.9	0.6
72	钢铁	167	195	-14.6	0.6
88	航空器、航天器及其零件	166	235	-29.5	0.6
75	镍及其制品	124	246	-49.7	0.5
48	纸及纸板；纸浆、纸或纸板制品	118	85	38.9	0.4
25	盐；硫磺；土及石料；石灰及水泥等	109	63	74.7	0.4
74	铜及其制品	79	61	31.1	0.3
76	铝及其制品	60	63	-4.2	0.2

## Russian Federation: Inward Foreign Direct Investment from CHINA,(2007~2013 USD)



## Part 2

### Crude Oil & Natural Gas

VladimirBeskhodarni





# Delivery Issue

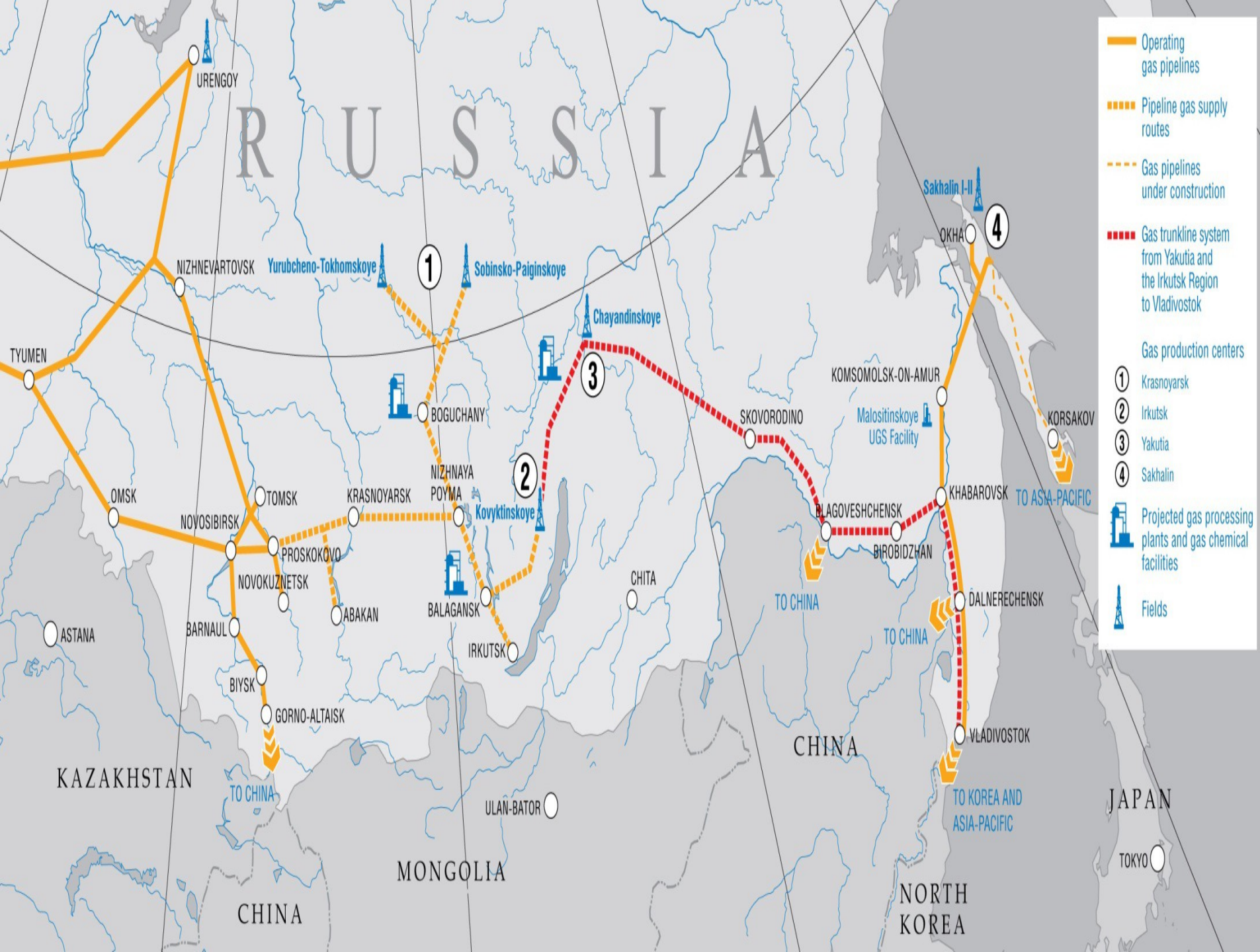
- ◆ The main obstacle-the question of the direction of delivery
- ◆ The Russian side wanted to use the western route , because it required to build only a 1,400 km pipeline on territory of Russia, however, the representatives of China for a long time rejected the offer, citing the fact that in Central Asia enough suppliers.
- ◆ the Russian gas is uncompetitive compared with Turkmen gas (160-180 dollars per thousand cubic meters).
- ◆ Gazprom is based on the price of European exports, intends to sell it at a price of 280 dollars per thousand cubic meters. However, Chinese government insisted on making supplies in northeastern China, because to solve the problem of shortage of gas — more than 4000 km pipeline.

# Russian-Chinese Agreement

- In 2009 was signed Russian-Chinese Agreement about main conditions of cooperation in delivering of natural gas. According to them Russia had to supply 68 billion cubic kilometers of gas.

- Now decided to supply 30 billion cubic kilometers through western route ("Altai" project) and 38 billion cubic kilometers through the east route to China (which became later Power of Siberia pipeline).

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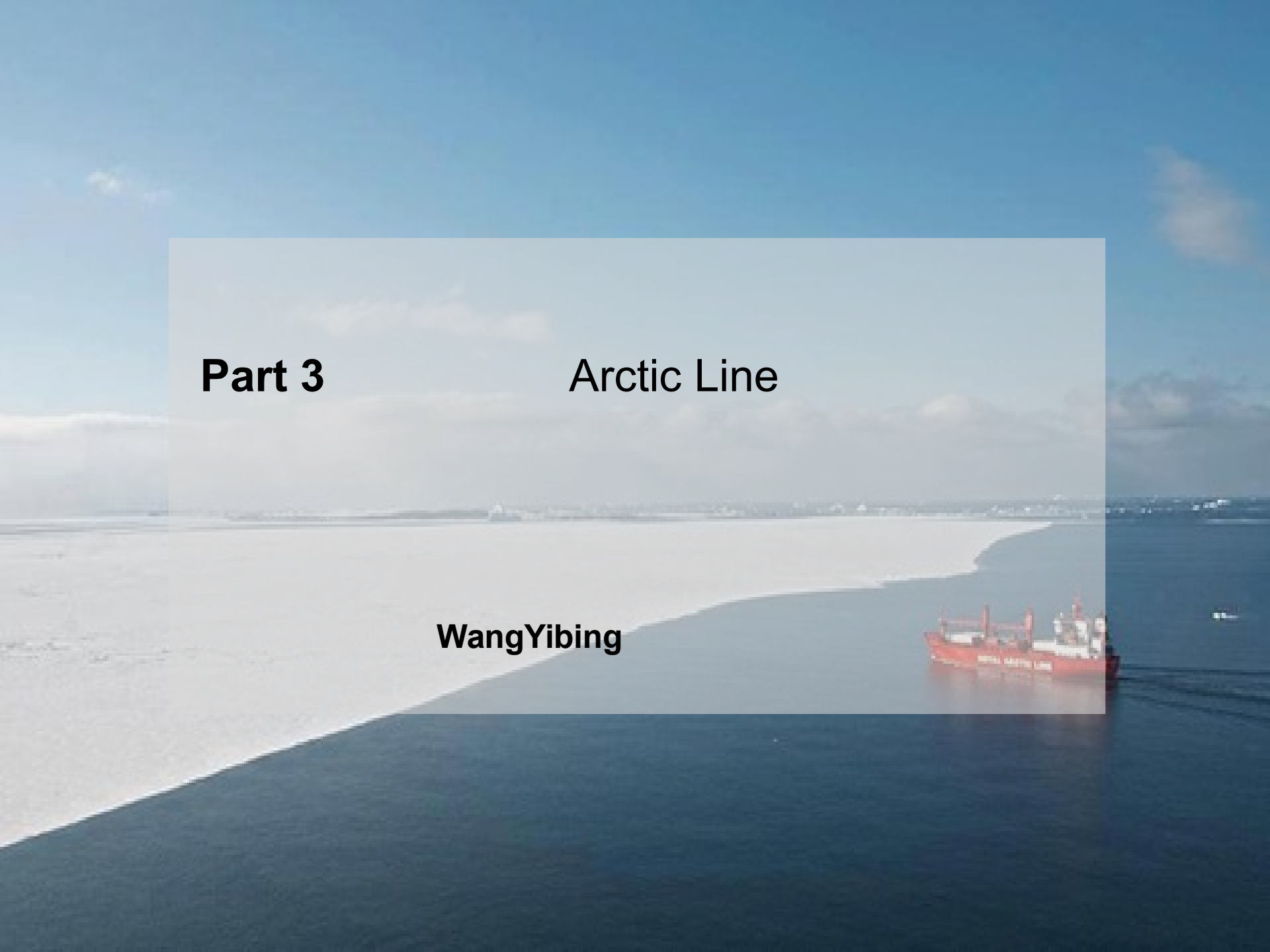
# The Power of Siberia

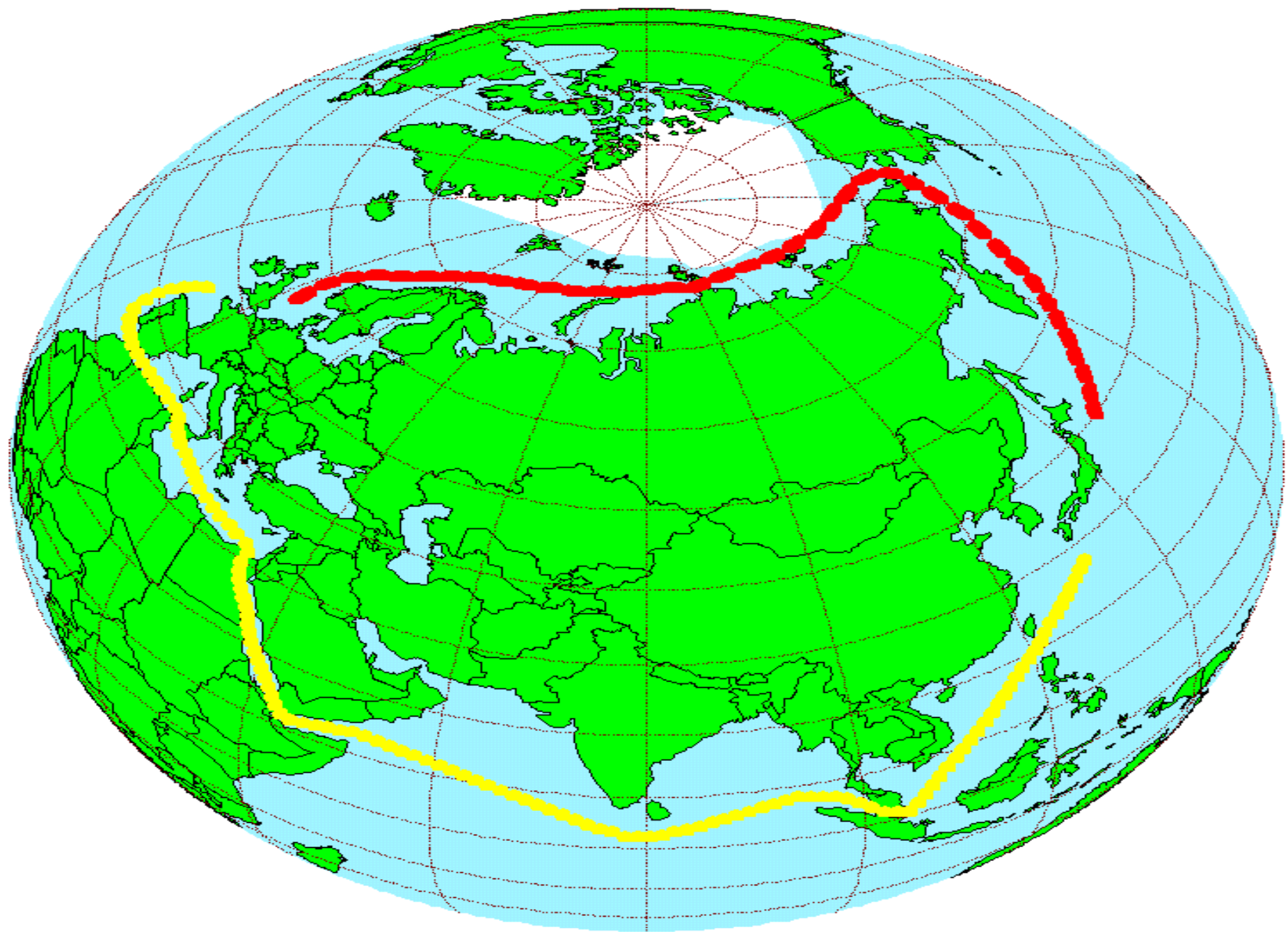
- "The Power of Siberia" - estimated future gas transmission system (GTS) for two gas production centers: Irkutsk (based on Kovykta with gas reserves of 1.5 trillion cubic m.) and Yakutsk (Chayandinskoye field - 1.2 trillion cubic meters of gas).
- As in contract declared length of the pipeline should be about 4000 km. The 3,200 km pipeline will start from the Chayanda oil and gas field in Yakutia. Later the Kovykta field, which would come operational by 2021, will be connected to the pipeline.

## Part 3

## Arctic Line

WangYibing





Northern sea route :

a promising and alternative route

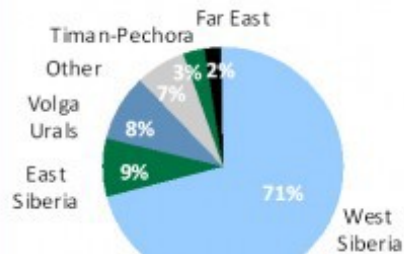
- Russia has adopted 《 2020 Russian Federation arctic state policy principles and vision 》
- The global warming effect
- Time-saving and money-saving
- The consideration of the safety problem in ocean shipping



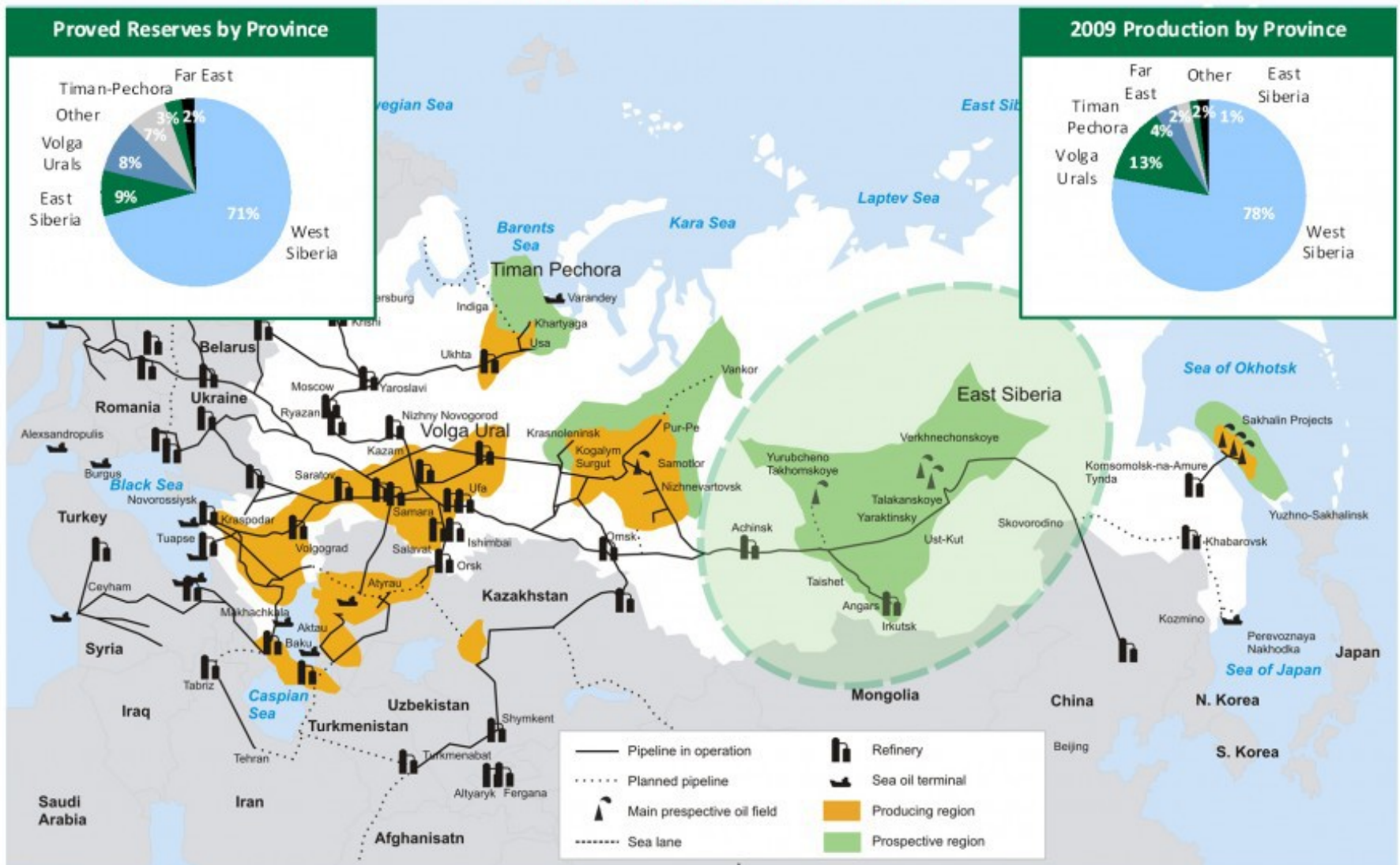
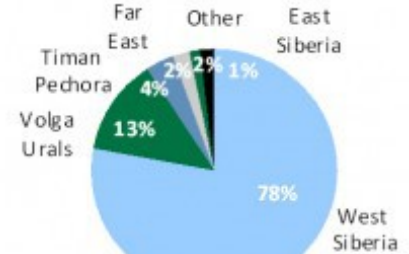
## The Arctic area : a place with abundant energies

### Map of Russian Oil & Gas Provinces

#### Proved Reserves by Province



#### 2009 Production by Province







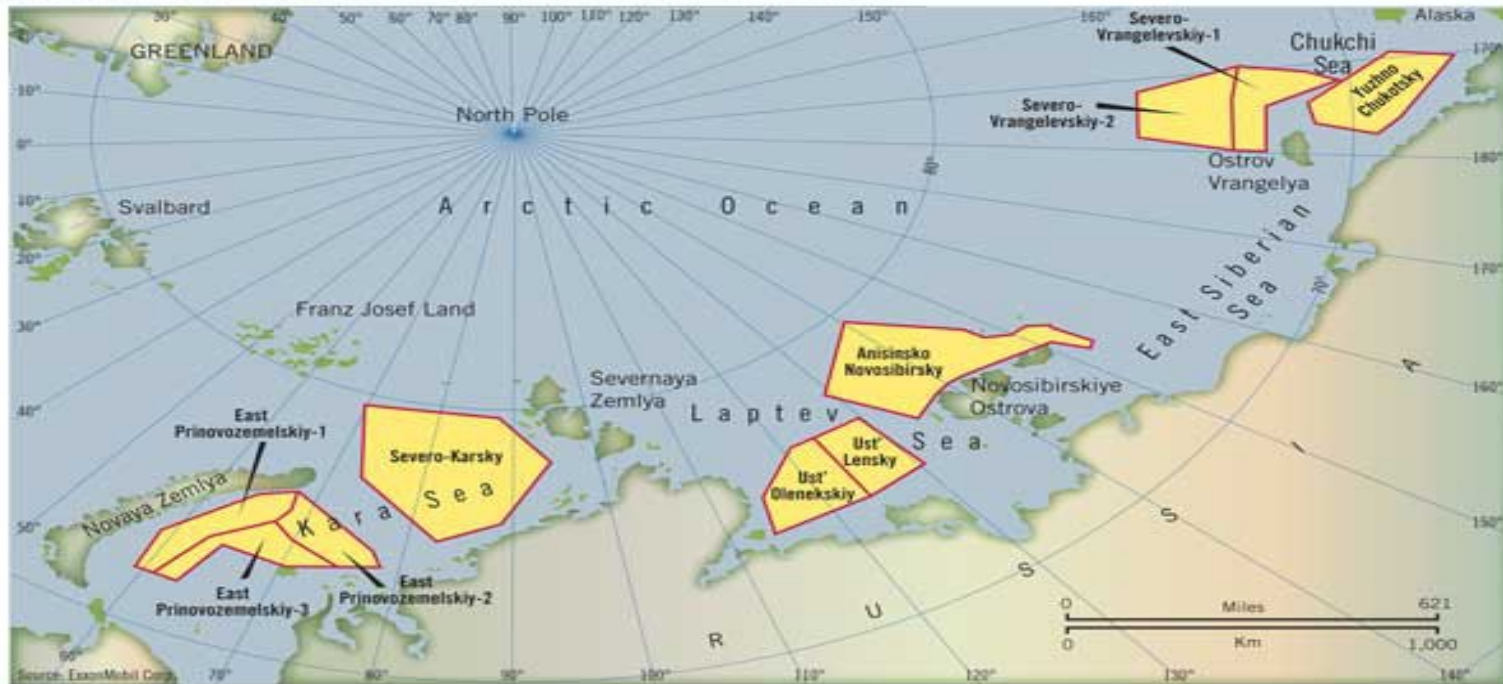
**CNPC**

A Drill cooperation with CHINA(CNPC) and RUSSIA(Rosneft) in arctic region



**ROSNEFT**  
OIL COMPANY

### ROSNEFT-EXXONMOBIL STRATEGIC COOPERATION AGREEMENT AREAS



Location : three different areas located in the Barents Sea and Pechora Sea.

Share : CNPC will get a 33 percent stake in a joint venture and bear all costs for initial exploration and drilling

# How space affect therussiaand china energy?

The northern sea route shortened the miles  
fromrussiato china

The northern sea route tightened the cooperation of thesino-russiaenergy issues

The northern sea route make it easier for  
Russia to drill oil in arctic region.

## Part 4

### Nuclear Power

ZlataSergeeva



## Nuclear Power in Russia

- Russia is moving steadily forward with plans for much expanded role of nuclear energy, including development of new reactor technology
- Efficiency of nuclear generation in Russia has increased dramatically since the mid-1990s. Over 20 nuclear power reactors are confirmed or planned for export construction.
- Exports of nuclear goods and services are a major Russian policy and economic objective.
- Russia is a world leader in fast neutron reactor technology.

## **Nuclear Power in China**

- Mainland China has 20 nuclear power reactors in operation, 28 under construction, and more about to start construction.
- Additional reactors are planned, including some of the world's most advanced, to give more than a three-fold increase in nuclear capacity to at least 58 GWe by 2020, then some 150 GWe by 2030, and much more by 2050.
- The impetus for increasing nuclear power share in China is increasingly due to air pollution from coal-fired plants.
- China's policy is for closed fuel cycle.
- China has become largely self-sufficient in reactor design and construction, as well as other aspects of the fuel cycle, but is making full use of western technology while adapting and improving it.
- China's policy is to 'go global' with exporting nuclear technology including heavy components in the supply chain.

# Current Russian-Chinese nuclear energy relations

1. Two units of Tianwan nuclear power plant (TNPP) were constructed and put into commercial operation
2. In 2007 there was an agreement in principle signed between "Atomstroyexport" and Tszyansunskaya Nuclear Power Corporation on cooperation in the construction of the second stage of TNPP consisting 3 and 4 reactors
3. In 2008 the State Corporation "Rosatom" and the China National Nuclear Industry Corporation signed a memorandum on cooperation in the construction of two expanded units of the TNPP and demonstration of fast reactor
4. In accordance with the Protocol to the Russian-Chinese agreement on cooperation in the construction in China of a gas centrifuge uranium enrichment plant (1992) "TENEX" contracts with China Nuclear Energy Industry Corporation (CNEIC) for technical assistance in the construction of stage IV gas centrifuge plant in China and the supply of uranium products for Chinese nuclear power plants in the period 2010-2020
5. The scope of the obligations of "TENEX" under the Contract was to design the main production, the supply of basic technology and of the auxiliary equipment, consulting services in the course of erection and commissioning, field supervision, and training Chinese specialists in Russia.
6. Assistance in finding and development of uranium deposits was claimed by previously mentioned papers.
7. Russia and China are conducting joint research in the field of nuclear fusion within the international project ITER (International Thermonuclear Experimental Reactor)



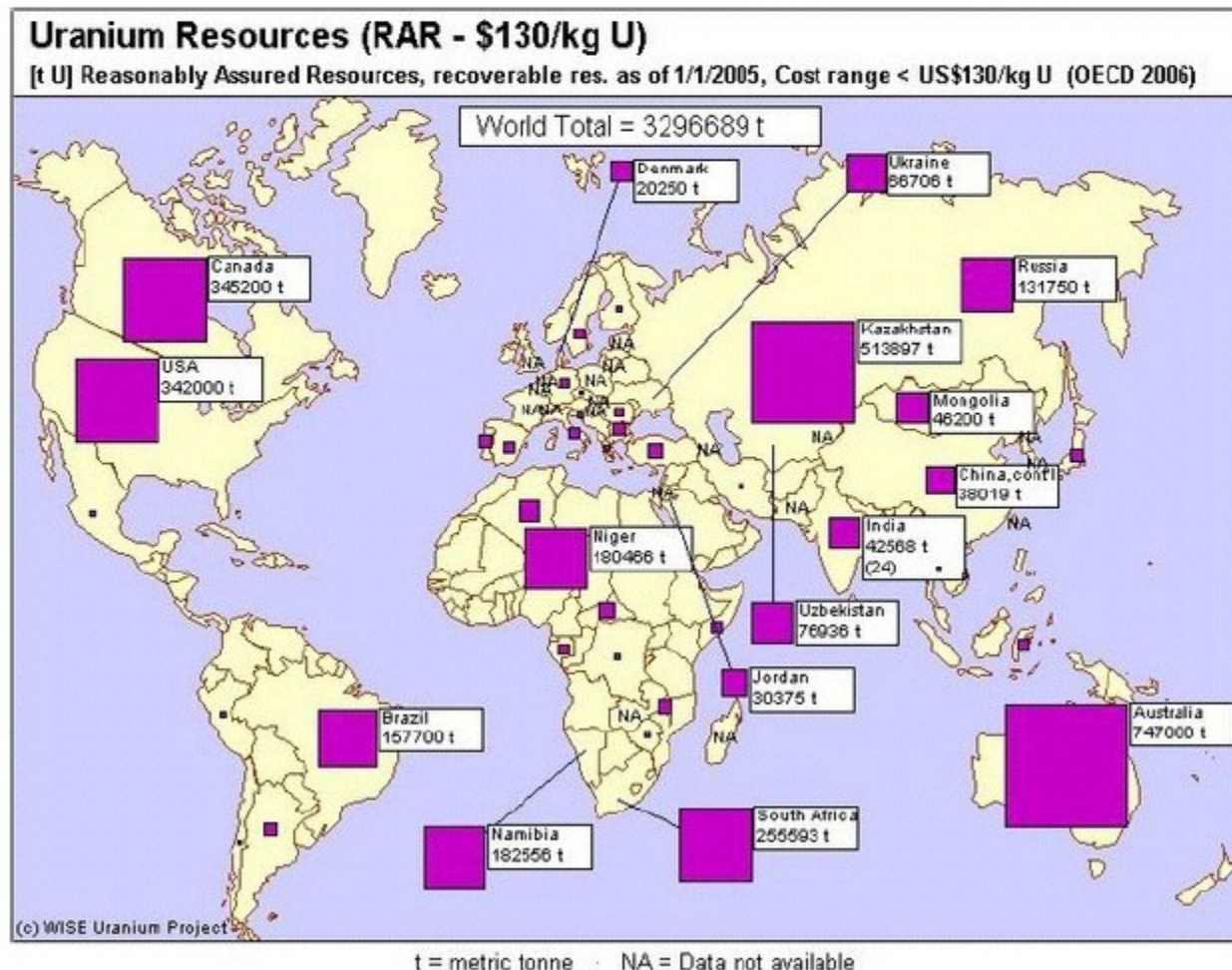
# The biggest working NPPs of China

## КРУПНЕЙШИЕ ДЕЙСТВУЮЩИЕ АЭС КИТАЯ



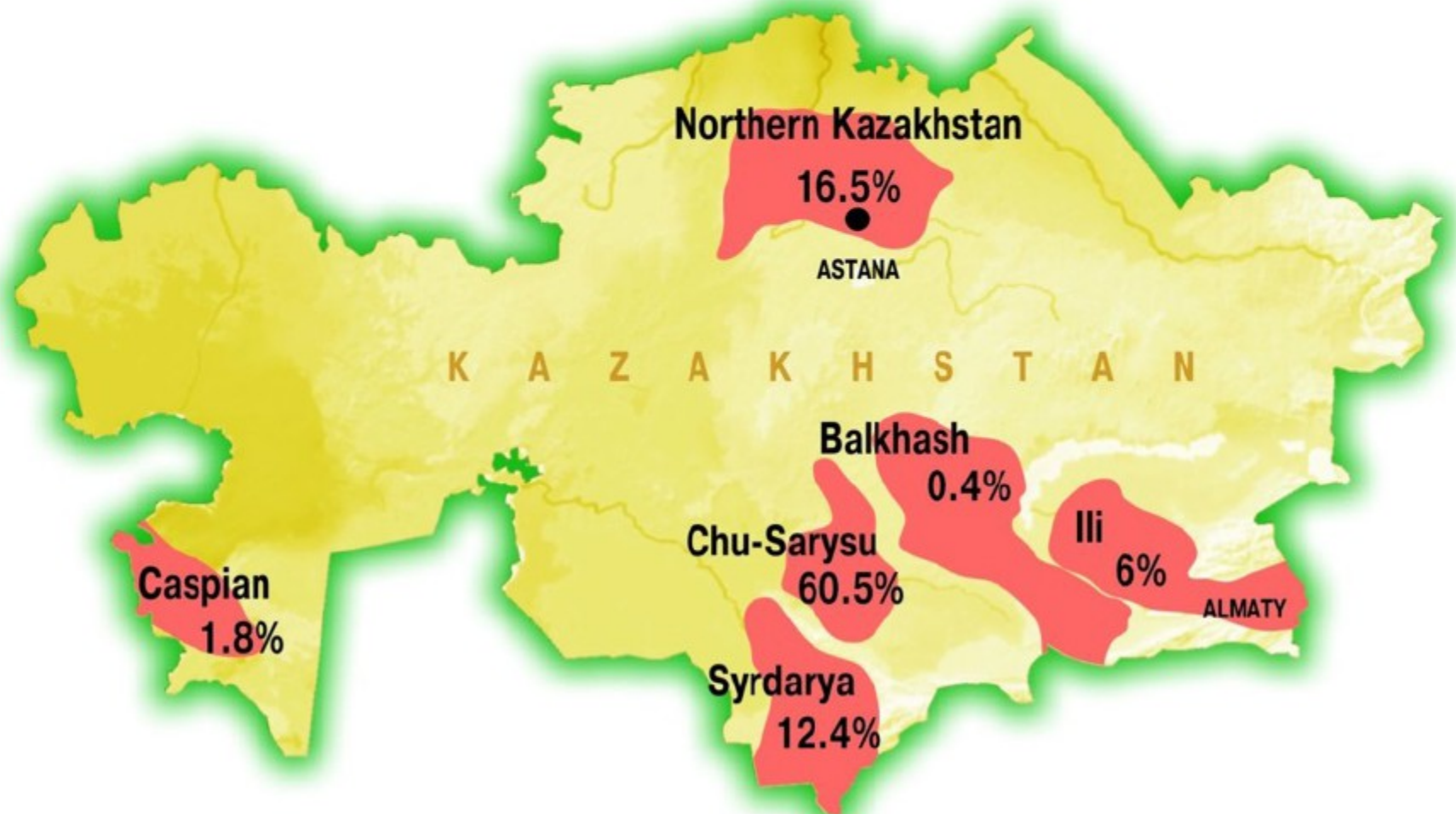
# Possible problems

## 1. Export of uranium from Kazakhstan

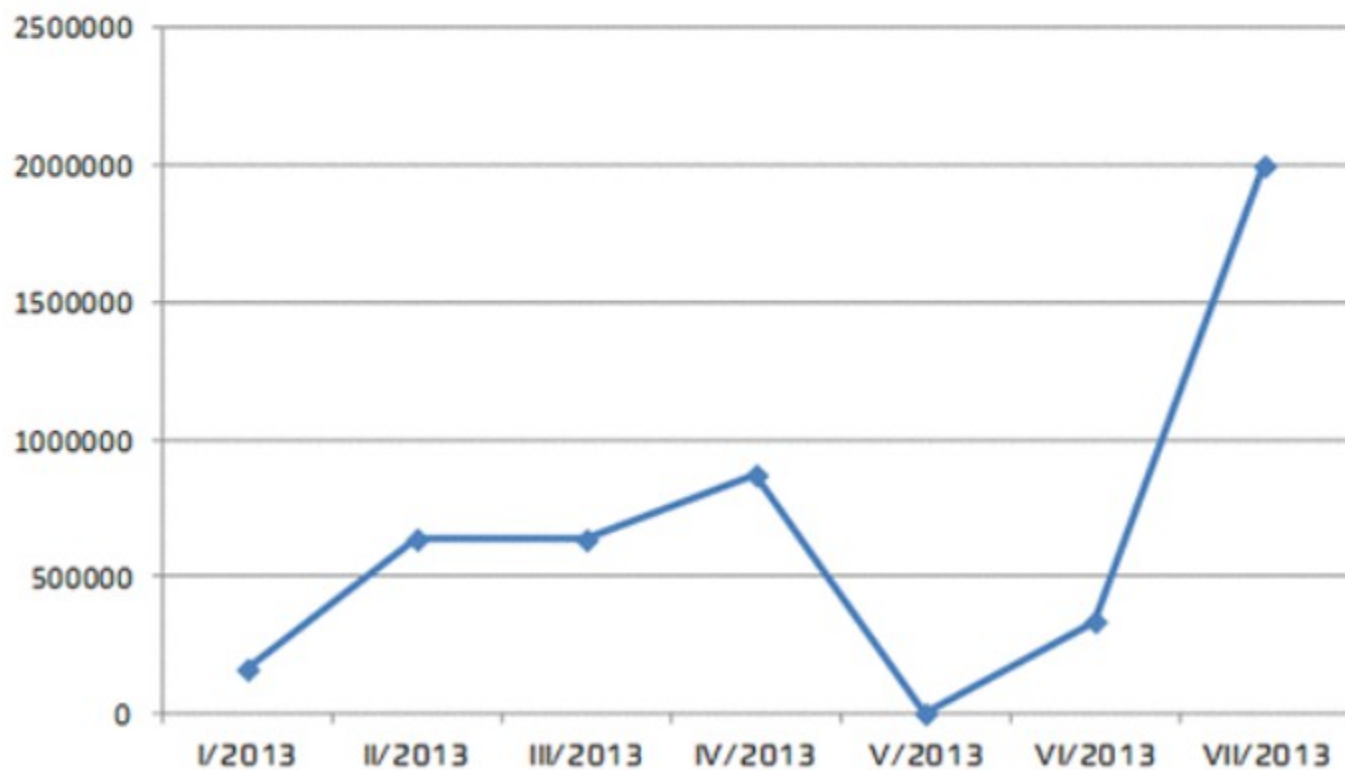




# Uranium resources in Kazakhstan



The volume of exports of uranium to China during January-July 2013, in kg



## 2. Gazprom shortcuts of gas supply to Russian NPPs

In 2009 Gazprom has cut back on the very high level of natural gas supplies for electricity generation because it could make about five times as much money by exporting natural gas to Europe.

# Conclusion

On the one hand, nuclear energy sphere is less dependent on space (compared to oil & gas). In the situation with vast spaces between Russia and China it plays for their cooperation, which may become fruitful.

On the other hand, our countries are still dependent on the geographical factor - the place of the uranium-containing ore and the competition over it may create serious problems for both partners.

A background image showing five white wind turbines on a rolling green hill under a clear blue sky with some light clouds. The turbines are spaced out across the landscape, with their shadows cast onto the grass. The overall scene is bright and clean, representing renewable energy.

## **Part 5**

# **Alternative Energy**

**Anna Sokolova**

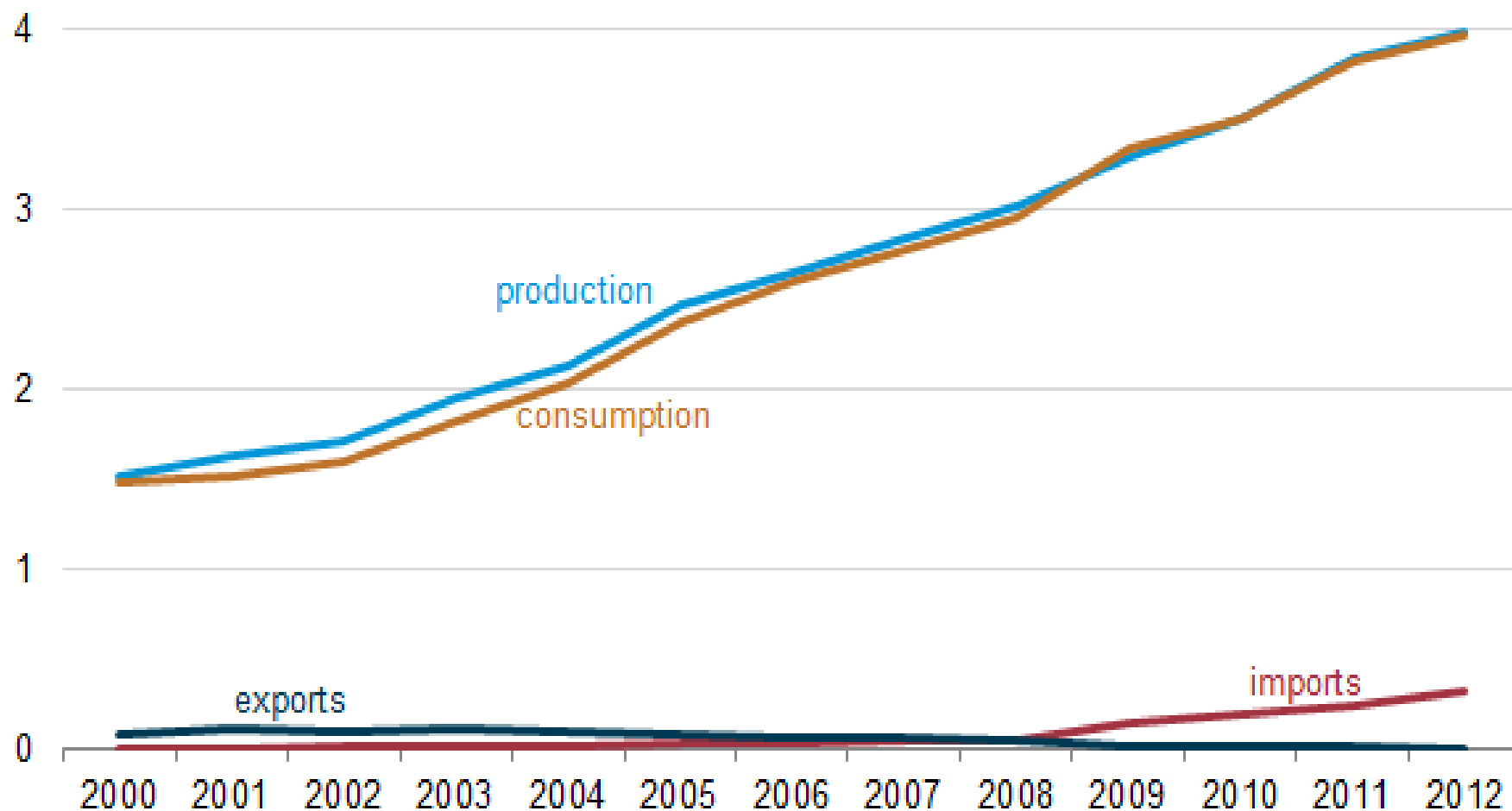
# Coal& Environment

- 69% of China's total energy consumption
- China's future coal consumption is estimated to increase
- Indonesia and Australia - more than 60% of China's imports
- Carbon intensity:-17% (2010 -2015)
- Lower-quality coal prohibition in China
- Replacement of older coal-fired stations
- a leader in carbon-capture technology
- the largest producer of electricity by wind farms

But the country needs to seek other clean solutions for its energy sector, and Russia can provide a potential answer

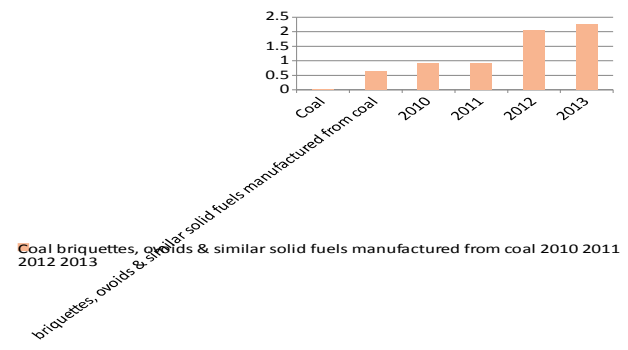
□ renewable energy?

# China's coal production and consumption, billion short tons



# Russian coal exports to China

billon US\$





# Renewables

- ◆ 2010 -**China Yangtze Power** and **EuroSibEnergo**- a cooperation agreement.
- ◆ 2011 -**EuroSibEnergo** and **China Yangtze Power Co.**- an investment framework agreement
- ◆ 2014 –**Rushydro** and **Power China** (\$5bln investments)

But there are some obstacles:

- Lack of infrastructure
- Logistics

**THANK YOU FOR YOUR ATTENTION!**