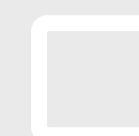




Coal Market Study

JICA STUDY

2017



Contents

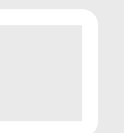
DEMAND SIDE

SUPPLY SIDE

PRICING ISSUES

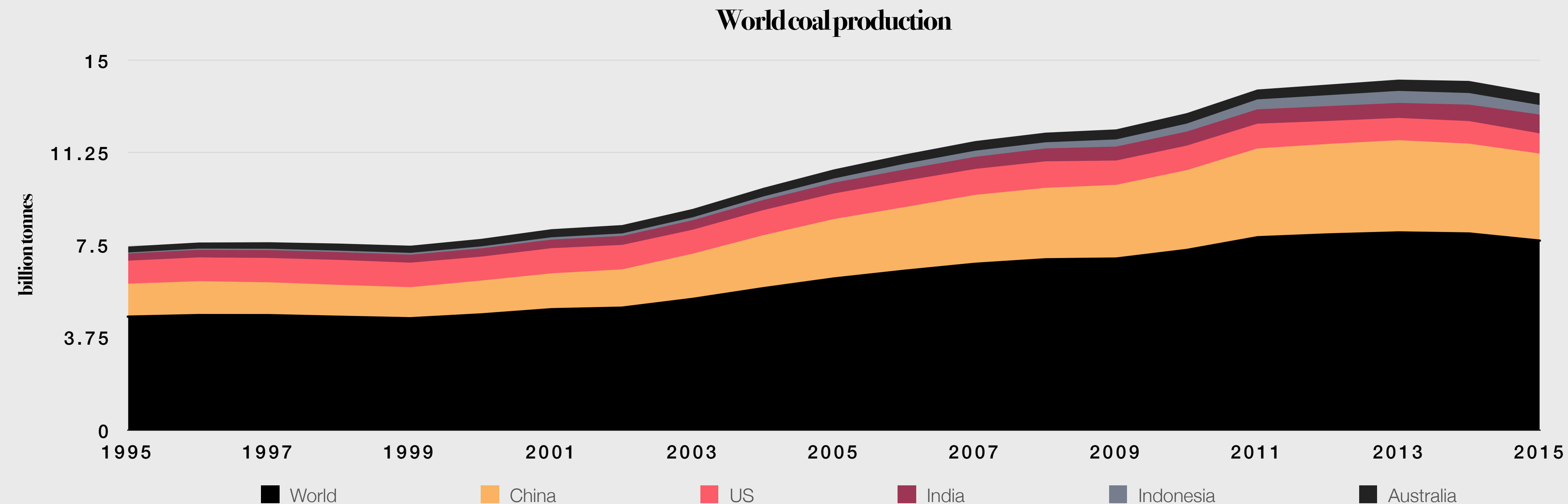
FINDINGS

CONCLUSION

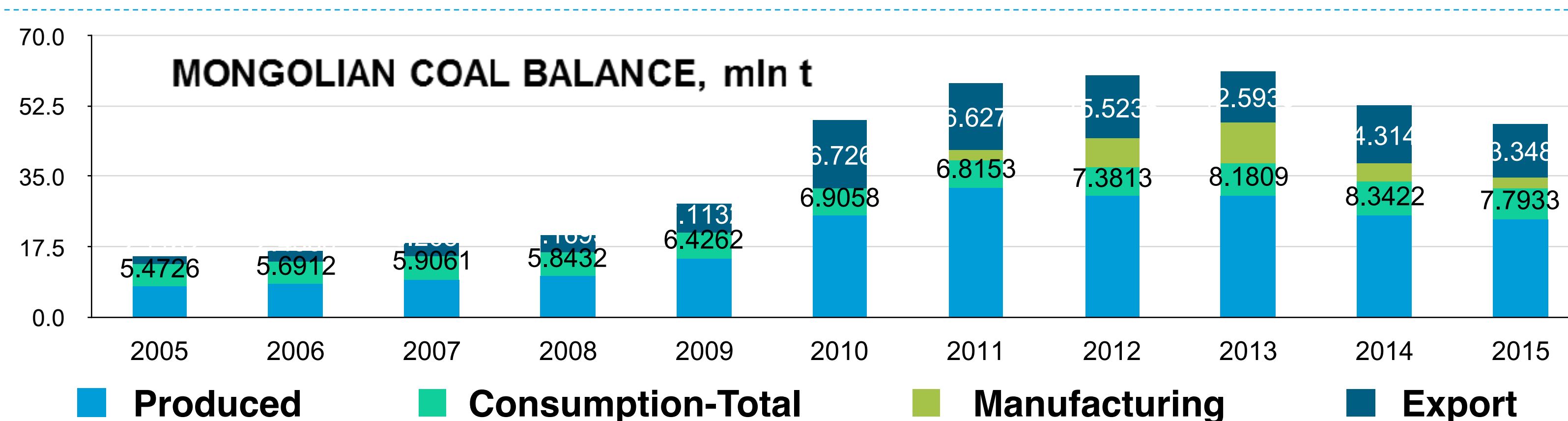


Background

- Coal trade – coking coal and thermal coal
- Coking coal – steel manufacturing as a raw material
- Thermal coal – electricity generation (2nd), heat and steam
- 5 countries produce more than 70 percent

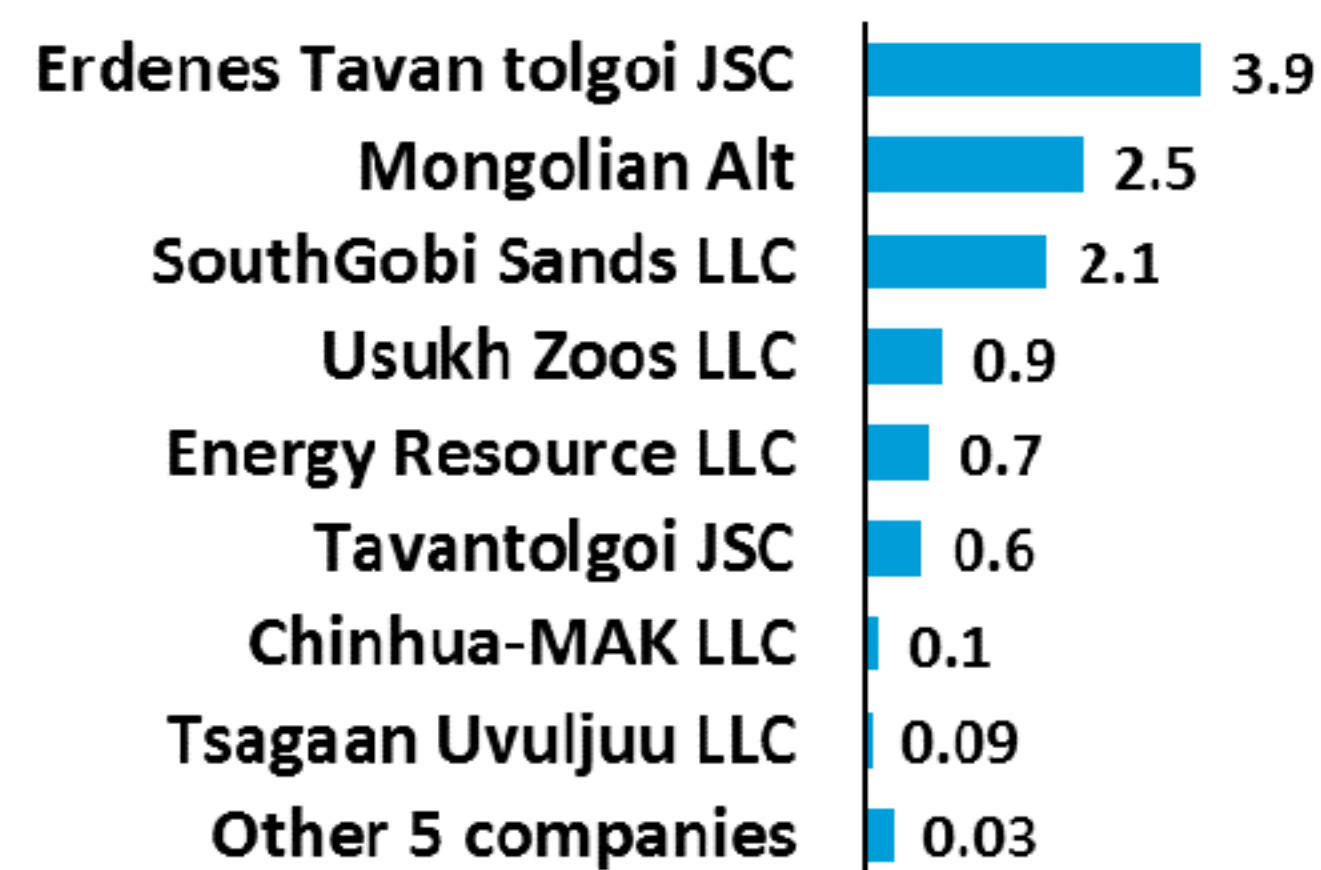


Demand for Mongolian coal



Source: National Statistics Office

EXPORTS OF TOP COMPANIES, 2016



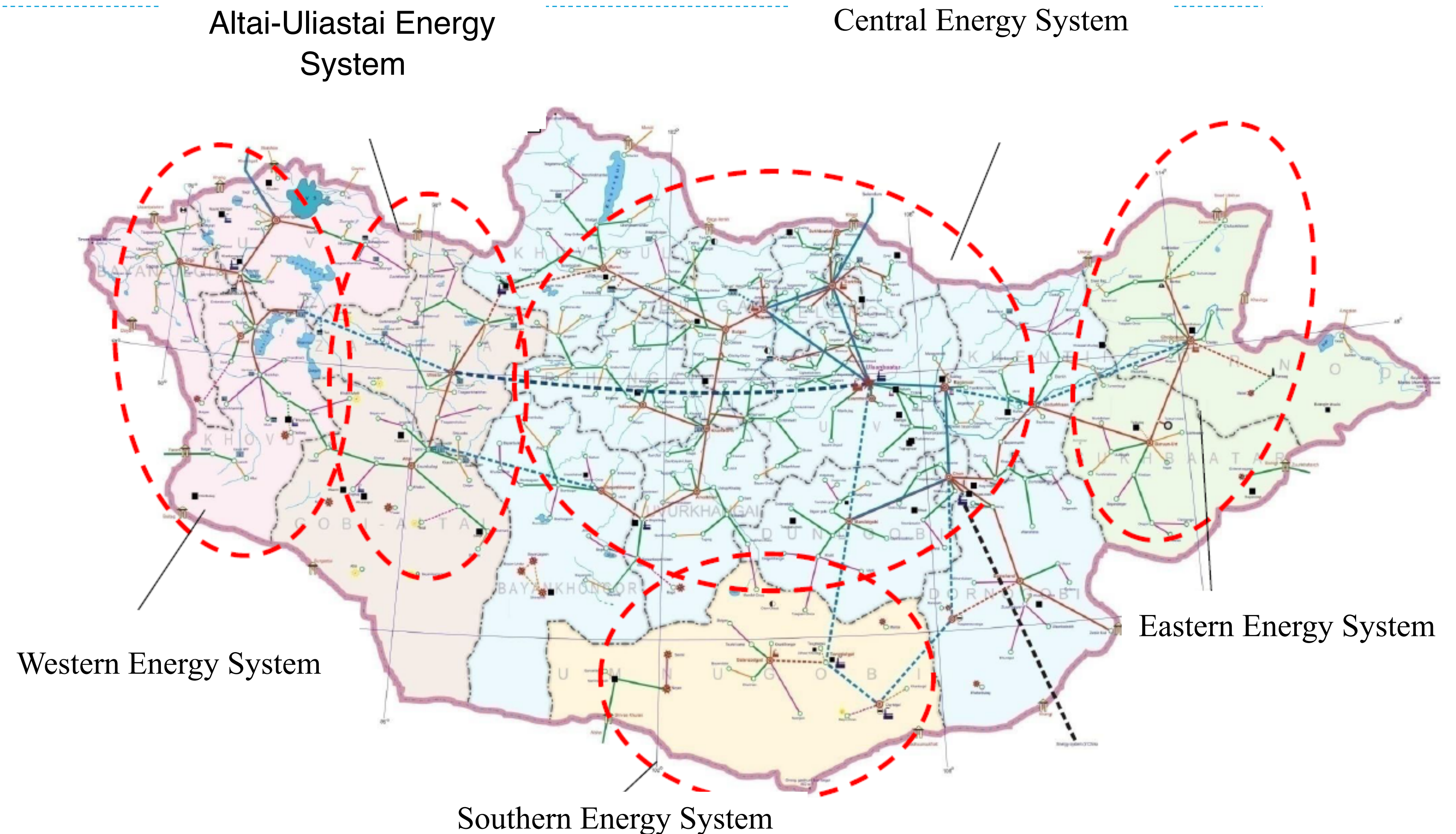
IN 2016, EXPORTED 25.6 MLN T
 MAIN EXPORTER IS CHINA
 96% OF MONGOLIAN COAL EXPORT
 MONGOLIA ACCOUNTED 24% OF CHINESE
 COKING COAL IMPORT IN 2014
 COAL % IN TOTAL EXPORT
 2015-11.9%
 2016-16.3%

DEMAND SIDE



Demand For Domestic Energy

- ▶ In 2015
- ▶ For TPPs: 6.7 mln tonnes
- ▶ Central Energy System -5.4 mln tonnes
- ▶ The main suppliers-
 - I. Baganuur,
 - II. Shivee-Ovoo,
 - III. Sharyn Gol



Source: Overview of Energy/Electricity demand and Renewable energy potential in Mongolia, **Asia Super Grid (ASG) Workshop**, 25-27th May 2016

Demand Side: Domestic Consumption

Domestic Power Stations (Tpps)

► In 2015, mln tonnes

► TPPs-6.7

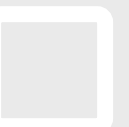
► Central sys-5.2

► Households-0.5

► Enterprises-0.6

► TOTAL-7.8 mln tonnes

No	Name	Public or Private	Mine-1	Mine-2
1	Darkhan TPP	Pub	Sharyn Gol	Baganuur
2	Erdenet TPP	Pub	Sharyn Gol	Baganuur
3	IV TPP	Pub	Baganuur	Shivee-Ovoo
4	Amgalan TP	Pub	Shivee-Ovoo	Baganuur
5	III TPP	Pub	Baganuur	-
6	II TPP	Pub	Baganuur	-
7	Choibalsan TPP	Pub	Aduun Chuluu	-
8	Dalanzadgad TPP	Pub	-	-
9	Uvs TP	Priv	Khartarvagatai	-
10	Bayan-Ulgii TP	Priv	Nuurst Khotgor	-
11	Khovd TP	Priv	Khartarvagatai	-
12	Selenge TP	Priv	Sharyn Gol	Ulaan-Ovoo
13	Sharyn Gol TP	Pub	Sharyn Gol	-
14	Dornogovi TP	Priv	Shivee-Ovoo	-
15	Sukhbaatar TP	Priv	Talbulan	-
16	Khuvsgul TP	Pub	Mogoin Gol	-
17	Baganuur TP	Pub	Baganuur	-



Outlook: Demand-Domestic

No	Name	Planned location	Mine-1	Mine-2	Capacity, thous.t
Public investment-Only Thermal Plants					
1	Thermal plant	Bayankhongor soum, Bayankhongor	Uvurchuluun	Bayanteeg	28.0
2	Thermal plant	Arvaikheer soum, Uvurkhangai	Bayanteeg	-	21.0
3	Thermal plant	Undurkhaan soum, Khentii	Chandgana Tal	-	27.6
4	Thermal plant	Uliastai soum, Zavkhan	Mogoin Gol	-	21.0
5	Thermal plant	Tsetserleg soum, Arkhangai	Bayanteeg	Ereen	24.0
6	Thermal plant	Mandalgovi soum, Dundgovi	Tevshiin Govi	-	32.2
7	Thermal plant	Zuunmod soum, Tuv	Baganuur	Nalaikh	28.0
8	Thermal plant	Altai soum, Govi-Altai	Zeegt	Maanitiin	29.8
TOTAL					211.6
Private investment-Only Power Plants					
9	Telmen	Telmen soum, Zavkhan	Mogoin Gol	-	270.0
10	Tavantolgoi	Tsogttsetsii soum, Umnugovi	Tavantolgoi	-	1420.0
11	Tsaidam	Bayan soum, Tuv	Tsaidam Nuur	-	1530.0
12	Buuruljuut	Bayan soum, Tuv	Tugrug Nuur	-	2490.0
13	Chandgana	Murun soum, Khentii	Chandgana Tal	-	3160
14	Erdentsogt	Altanshiree soum, Dornogovi	Chandgana Tal	-	2970
15	Shivee-Ovoo	Shiveegovi soum, Govisumber	Shivee-Ovoo	-	700
16	Erdentsagaan	Erdenetsagaan soum, Sukhbaatar	Erdenetsagaan	-	72
TOTAL					12612.0

Coal Exports In 2015

- China consumed 99% of Mongolia's coal exports in recent years
- In 2015, total Mongolia's coal exports-13.3 mln tonnes
 - China-12.88 mln tonnes
 - China coal imports-204.1 mln tonnes
 - Coking coal- 48.0 mln tonnes
 - Of which, Mongolia- 10.9 mln tonnes



Outlook: Demand

- World coal consumption will slightly grow in 2017
- Asia-coal (thermal+coking) market is shifting to it
- India, Vietnam, Indonesia and other emerging countries
- China's consumption (also the USA) will decrease due to CPP
- In the first half of 2016, 114 gigawatts
- In the third quarter, China has over 200 gigawatts under construction
- Japan is shifting from nuclear to safety one (but Long term energy strategy* on April 11, 2014)

	2015	2016*	2017*	2018*
China	3,625	3,596	3,542	3,460
India	906	960	1,008	1,056
United States	730	666	676	679
Russia	230	234	240	247
Germany	225	220	217	215
Japan	202	203	202	201
Others	1,141	1,149	1,177	1,208
World total	7,631	7,608	7,656	7,670
% change	-2.9	-0.3	0.6	0.2

Source: IEA and EIU

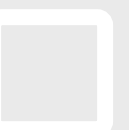
* Fukushima Accident Experienced On 11 March 2011. But Environment, According To The Strategy, Is Important As Well

Outlook: Demand (Cont)

- Europe
 - UK-phasing out coal-fired plants by 2025
 - Germany-even in longer term (nuclear is phasing out now)
- Coking coal is used as a raw material of steel production
- China is main player of this market because of its share (over 50 percent)
- 13th Five-Year Plan-On April 29, 2016 → Infrastructure projects
 - Constructing 3000 kilometres of new urban rail lines
 - Investing over 800 billion yuan in railway construction etc.,
 - One belt, One road
 - Moscow-Kazan high-speed railway
 - Khorgos-Aktau railway
 - China-Kyrgyzstan-Uzbekistan railway etc.,
 - The USA will use more steel due to Donald Trump's victory

	2016*	2017*	2018*
China	3,596	3,542	3,460
India	960	1,008	1,056
United States	666	676	679
Russia	234	240	247
Germany	220	217	215
Japan	203	202	201
South Africa	185	192	199
South Korea	135	139	142
Poland	135	135	135
Australia	127	128	128
Others	1,149	1,177	1,208
World total	7,608	7,656	7,670
% change	-0.3	0.6	0.2

Source: Ica And Eiu



SUPPLY SIDE

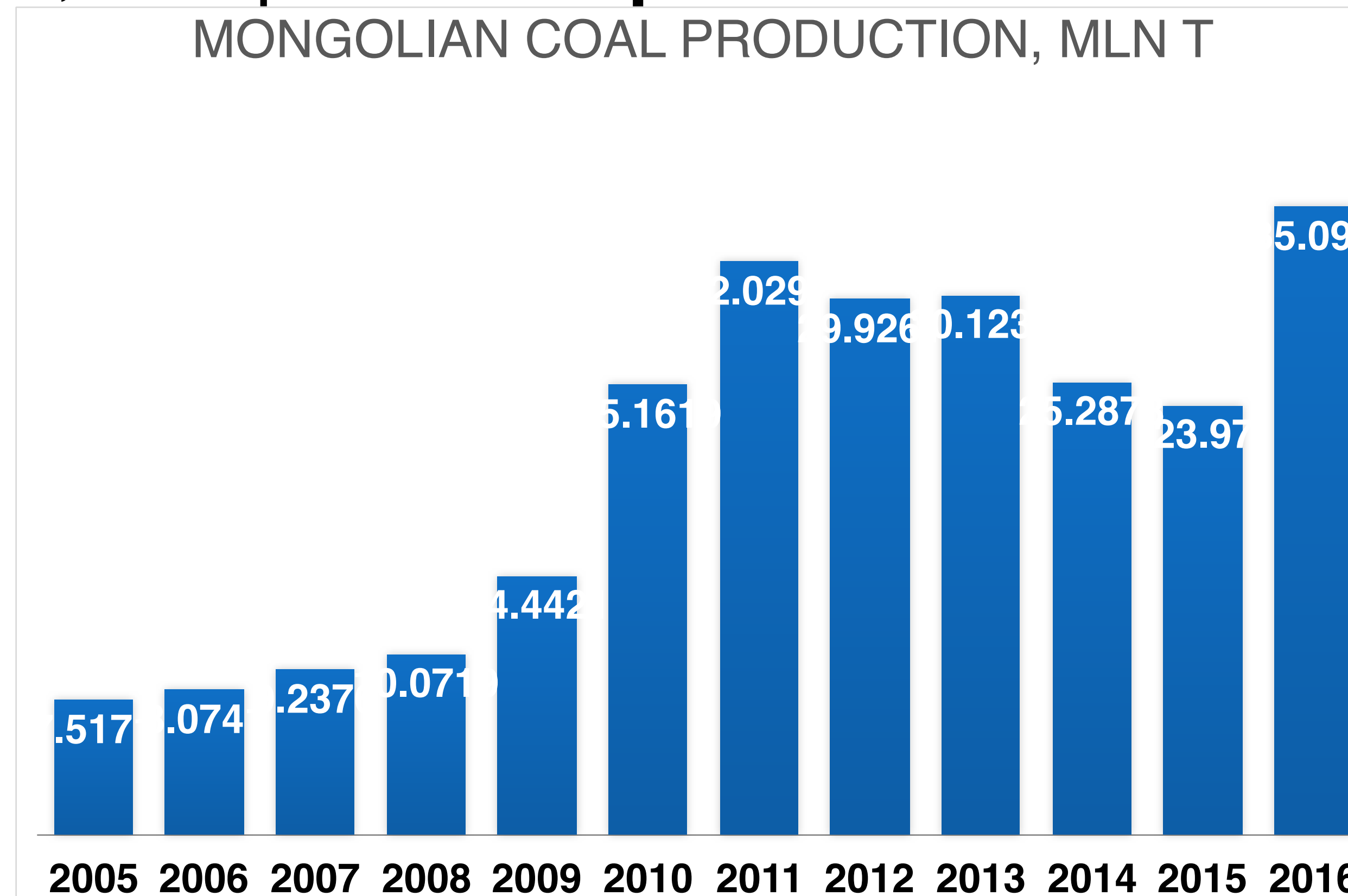


- **Mongolia**
- **Supply side**

- **There are 3724 licenses (2154 companies) in mining**
- **Of which:**
- **coal licenses- 242 (mines-82);**
- **22 companies-Annual Report 2015**
- **Coal production was 23.9 million tonnes**
- **Of which:**
 - **15.9 million for foreign market (including processed at CPPs)**
 - **7.8 million for domestic market**

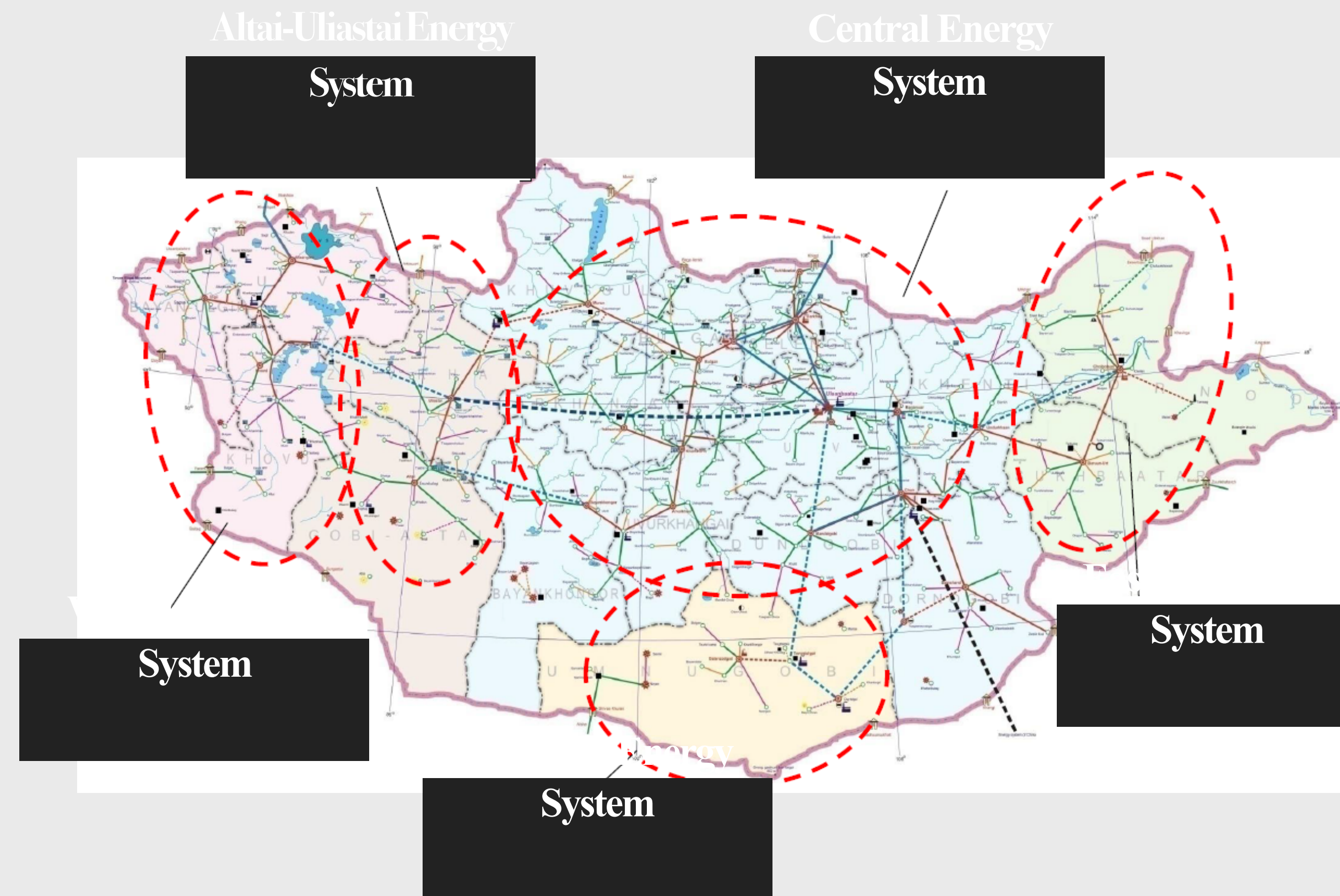
Supply for Mongolian coal

- ▶ Mongolia ranked 15th in the major coal producing countries
- ▶ In 2016, coal production **peaked** at 35.1 mln t



Supply Side: Domestic

- In 2015
 - For TPPs: 6.7 mln
 - Of which, 5.4 mln (Ba, ShO, ShrGo)
 - For washing plants: 2.6 mln (ShrGo, TT-ERes)
- Sum of them as a share of domestic-89.4% (total-10.4 mln)



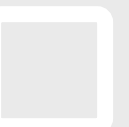
Supply Side: Internationally

- In 2015
- China's coal production 3.3 bln tonnes (for domestic)
- These countries as a share of world market – 98.3%
- Top 7, excluding China,
- Newcomers: N.Korea and Mongolia
- China policy (-):
- Import tariff-Oct 2014
- 3%-anthracite, coking
- Coal quality regulation*

Country	2006		2015		
	Rank	Mln tonnes	Rank	Export in dollars	Share of world market
Australia	I	255.0	I	\$28.4 bln	36%
Indonesia	II	192.2	II	\$16.4 bln	20.8%
Russia	III	103.4	III	\$9.3 bln	11.7%
United States	VII	51.2	IV	\$5.7 bln	7.2%
South Africa	V	75.8	V	\$4.3 bln	5.4%
Colombia	VI	68.3	VI	\$4.3 bln	5.4%
Netherlands	-		VII	\$3 bln	3.8%
Canada	VIII	31.2	VIII	\$2.7 bln	3.4%
North Korea	-	-	IX	\$1.1 bln	1.4%
Poland	IX	25.4	X	\$737.2 mln	0.9%
Mongolia	-	-	XI	\$542.6 mln	0.7%
China	IV	85.6	XII	\$498.2 mln	0.6%
Czech Republic	-	-	XIII	\$327.9 mln	0.4%
Vietnam	X	23.5	XIV	\$265.1 mln	0.3%
Belgium	-	-	XV	\$232.9 mln	0.3%

Source: www.Worltopexports.Com

* For Instance, Thermal Coal-Ash Content Under 30%, Sulphur Content Under 2% And Energy Greater Than 18Mj/Kg



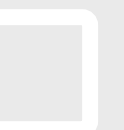
Outlook: Supply

- World coal production will slightly grow in 2017
- China's production will decrease
- Small mines closed, notably in Inner Mongolia* (in 2016)
- Coal mining restrictions were cancelled on November 17, 2016
- after restructuring large mines
- In the USA, increase of price → the biggest coal producers (+)
- Mongolia will produce 31.3 mln t in 2017
- Of which: exports-23.0; domestic-8.3 (MoF, 2016)

	2016*	2017*	2018*
China	3,280	3,257	3,245
India	705	744	778
United States	655	680	691
Australia	476	479	483
Russia	364	367	369
Indonesia	361	351	360
South Africa	253	254	255
Germany	184	184	175
Poland	133	132	131
Kazakhstan	105	107	109
Others	689	694	699
World total	7,204	7,248	7,295
% change	-2.4	0.6	0.6

Source: Iea And Eiu

* Mines With 700 Mln T Capacity Will Be Closed Until 2019 (1 Mln Worker Will Become Unemployed)



A photograph of a coal train in a desert landscape. The train consists of several grey hopper cars filled with black coal, moving along a gravel track. In the background, there are rolling hills and power lines under a cloudy sky. A white rectangular text box is centered over the middle of the image.

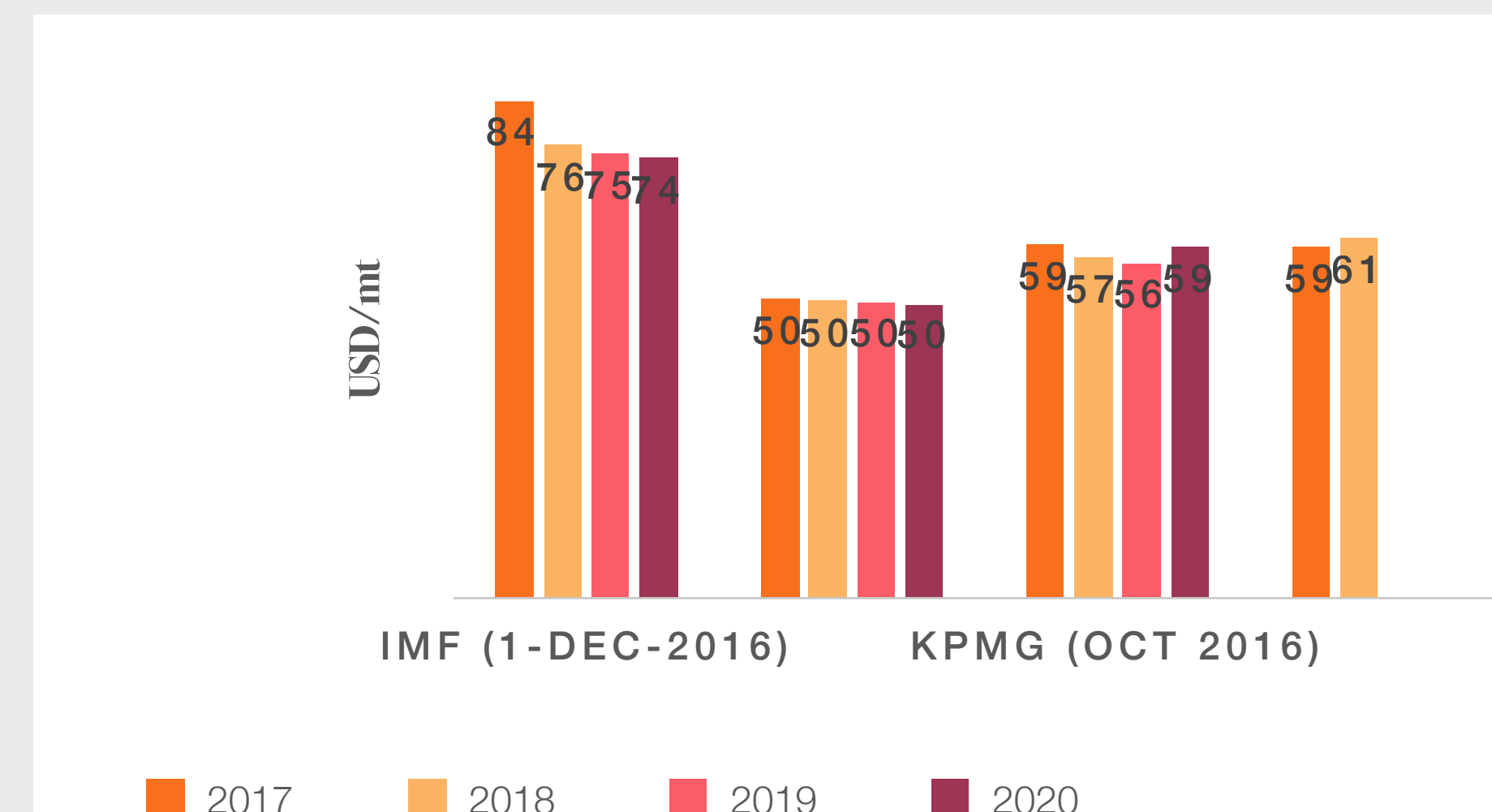
PRICING ISSUES

World Price Side

- Demand & Supply → Price
- (from 2012 until autumn 2016)
- Coking & thermal coal
- Demand (C) - fall in steel price due to oversupply led by China's exports
- Steel usage reached at peak
- Demand (Th) – coal-fired plants closed by Government & the decrease of steel production
- Supply - coal supply from Australia, Indonesia, Russia, China itself and Mongolia

Outlook: Thermal Coal Price

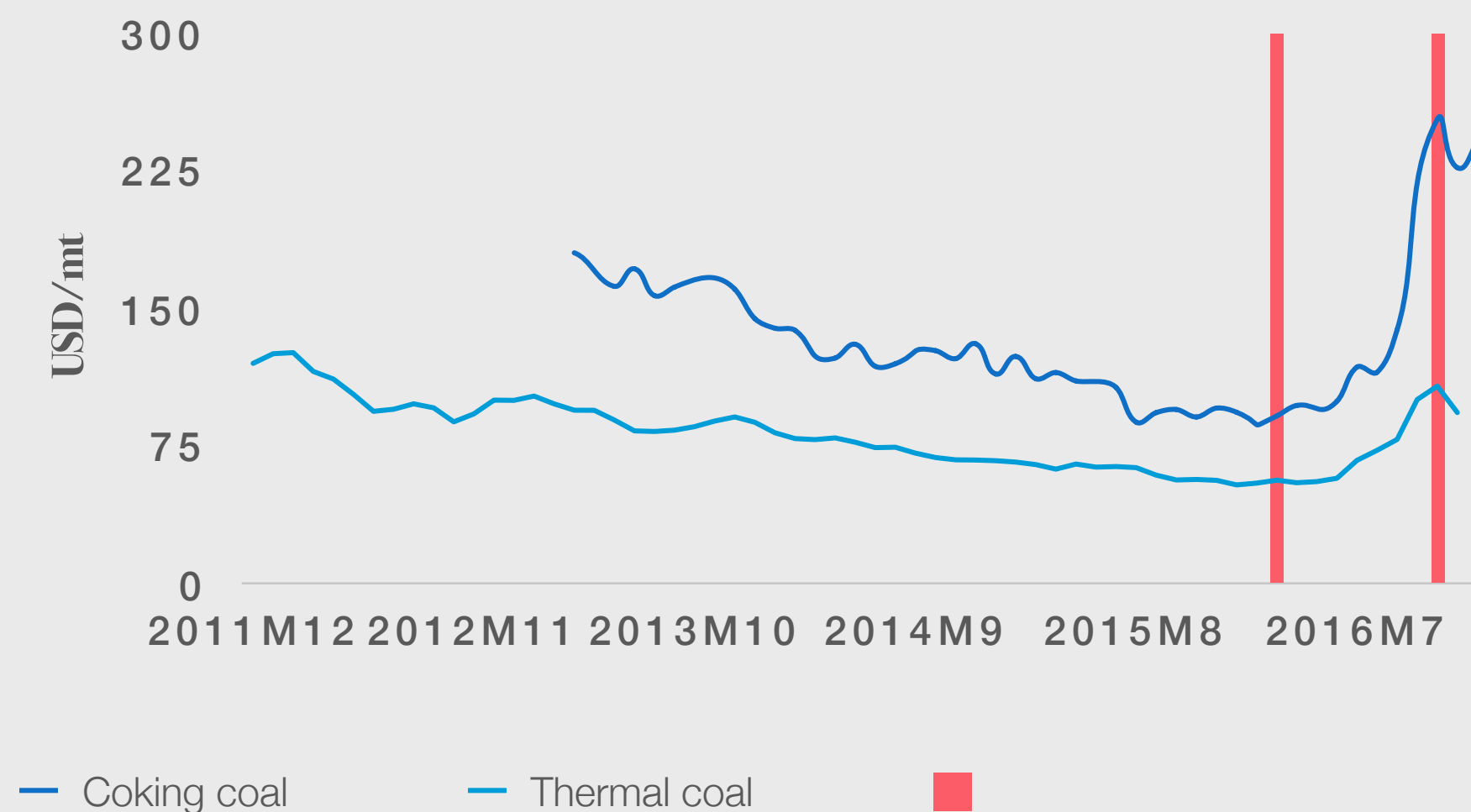
- Thermal coal price will slightly decrease in 2017 (\$92.74 in December 2016) because
- production days restrictions in China (on November 2016)
- by 2020, renewables' share – 15 percent of total energy
- some coal-fired plants (112 gigawatts) closed in 2016, also in 2017 (200 gigawatts-uncertain)
- Overall, CPP's pressures on coking and thermal coal



Source: Wb, Imf, Eiu, Kpmg

Price Side: ↑ Coking Coal

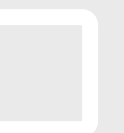
- The increase of coal price (due to supply shock)
- the fall in prices led to restructuring in industry
- weaker and costlier suppliers leaving the market
- deciding not to invest in coal, especially in Africa
- world large supplier entered bankruptcy (Peabody Energy Corp., Arch Coal Inc., Alpha Natural Resources Inc., Murray Energy Corp., the largest privately in the USA)
- Chinese government restrictions cutting domestic supply (in March 2016- to 276 days; & small mines in 2016)
- On November 17, 2016
- to 330 days due to
- a cost structure

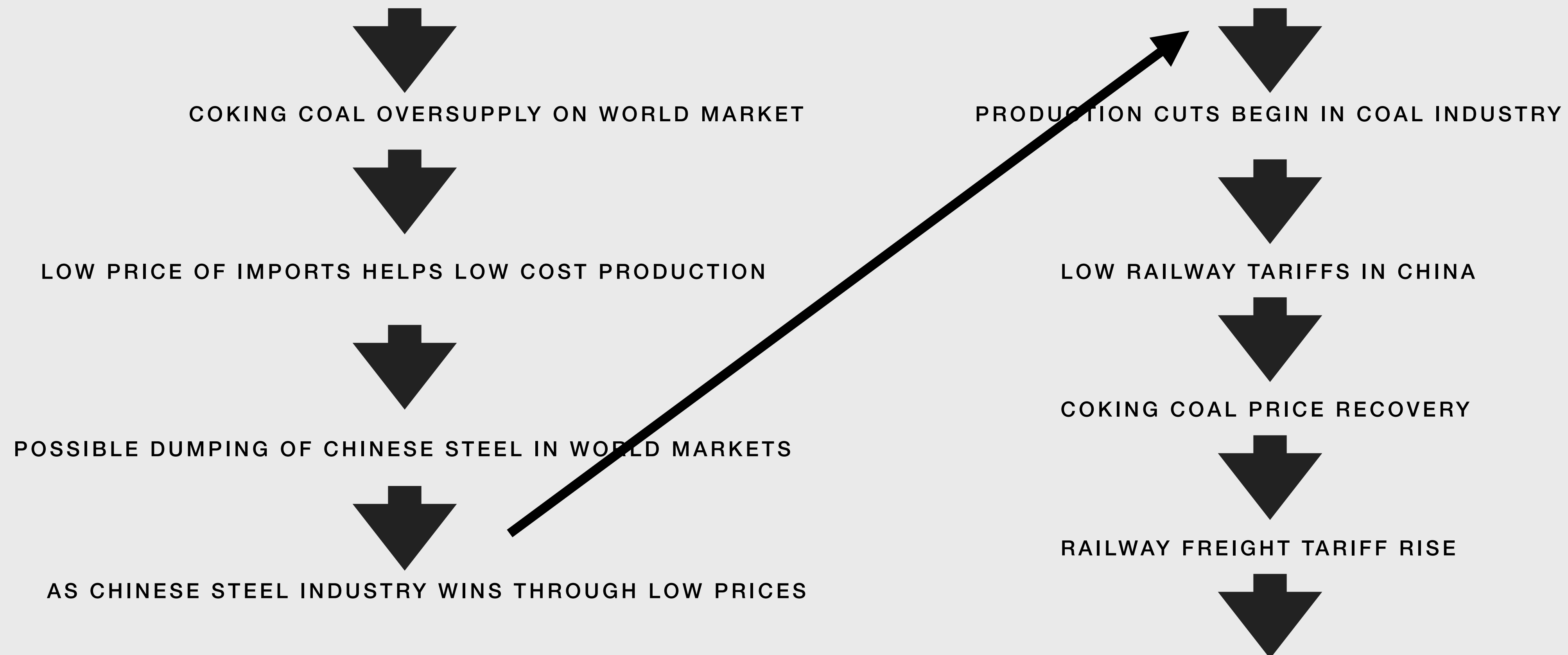
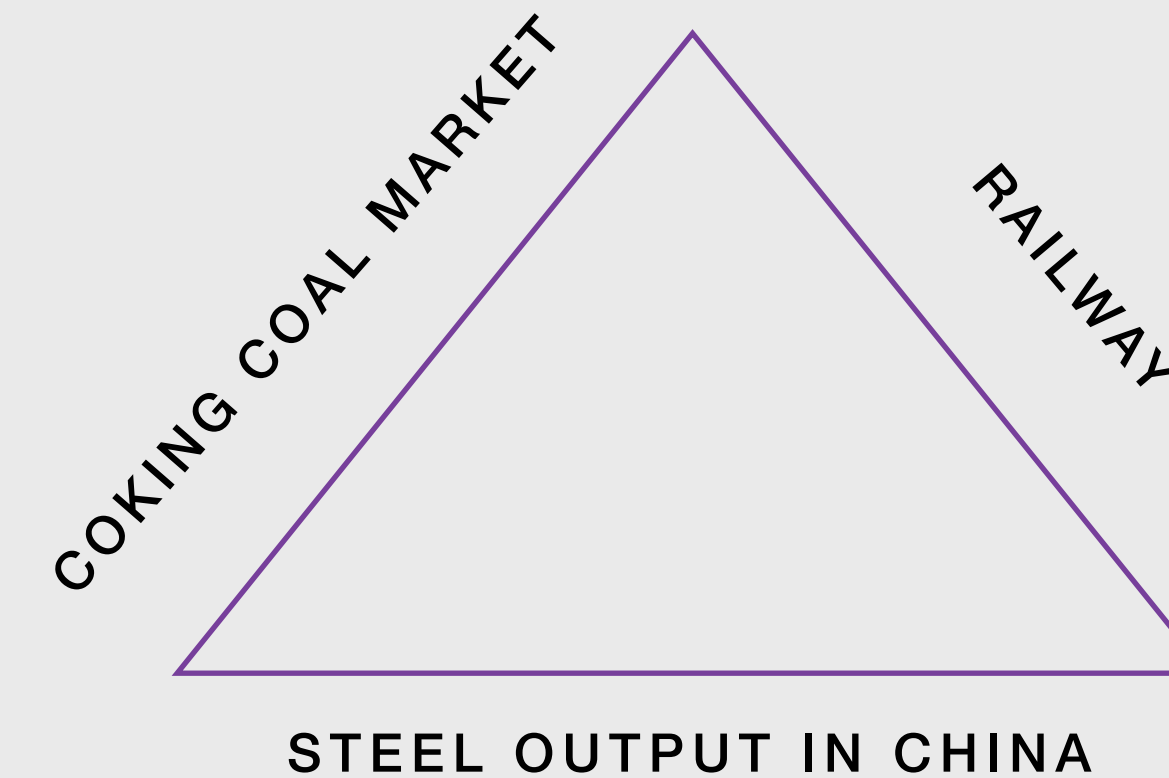
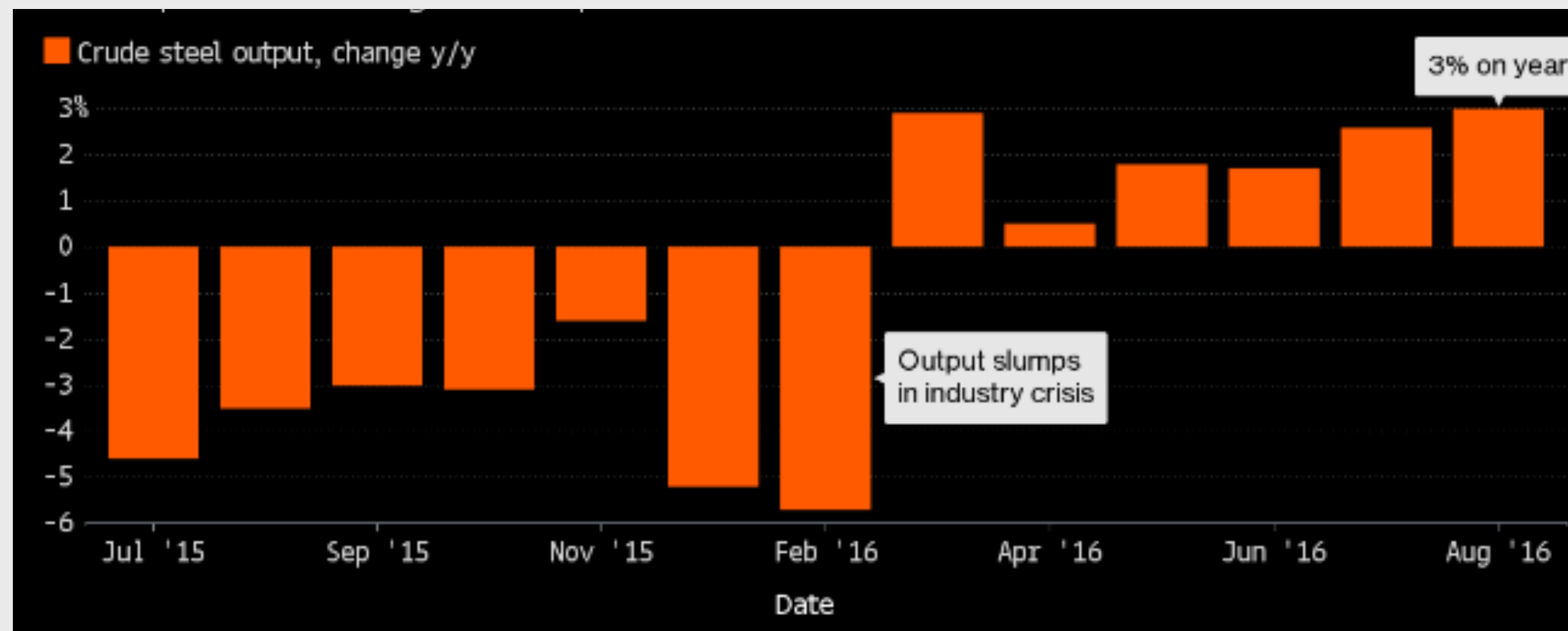


Source: Bloomberg Terminal And China Customs Statistics

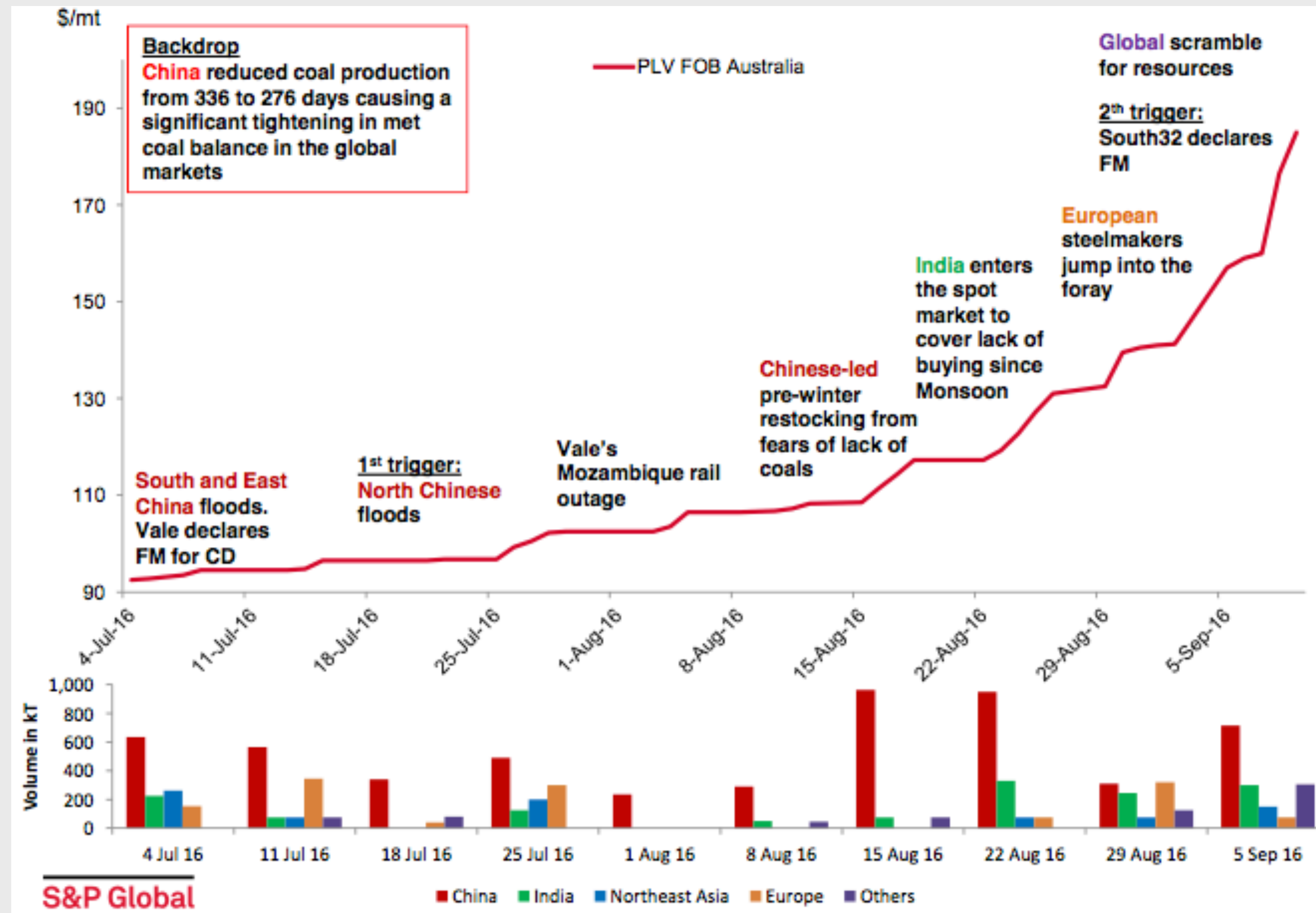
Pricing Issues

- Steel industry linkage: for coking coal, the main factor is steel industry
- Steel industry has been backbone of Chinese industry and receives strong government support. Therefore, the oversupply problem of steel industry in 2013 was eased by reduction of coking coal prices
- Railways and freight: reduction of railways freight tariffs in 2015 and increase in late 2016 (U shaped tariff changes)
- Government regulation of coal industry in China: reduction of supply and closure of mine to raise the prices in 2016
- Transition to spot pricing
- Economic difficulties with renewables: increasing economic difficulties make renewables less attractive
- Long term cost of substitute energy sources: price of oil and gas has stabilized





Price Recovery For Coking Coal



MAIN FINDING

Coal price

- ▶ Demand↓ & Supply↑ → World coal price↓
 - ▶ Demand (Coke) - fall in steel price due to oversupply led by China's exports- Steel usage reached at peak
 - ▶ Demand (Thermal) – coal-fired plants closed by Government & the decrease of steel production in China
 - ▶ Supply - coal supply from Australia, Indonesia, Russia, China itself and Mongolia

SALES PRICES

	Energy Resource	Erdenes Tavantolgoi
2012	\$108.4	\$83.4
2013	\$92.1	\$29.6
2014	\$80-85	\$88.6
2015	-	\$63
2016	\$120\$ (2017.02)	\$62.1

COST ADVANTAGE: APPROXIMATELY 20-25% CHEAPER THAN AUSTRALIAN COAL (PRELIMINARY)

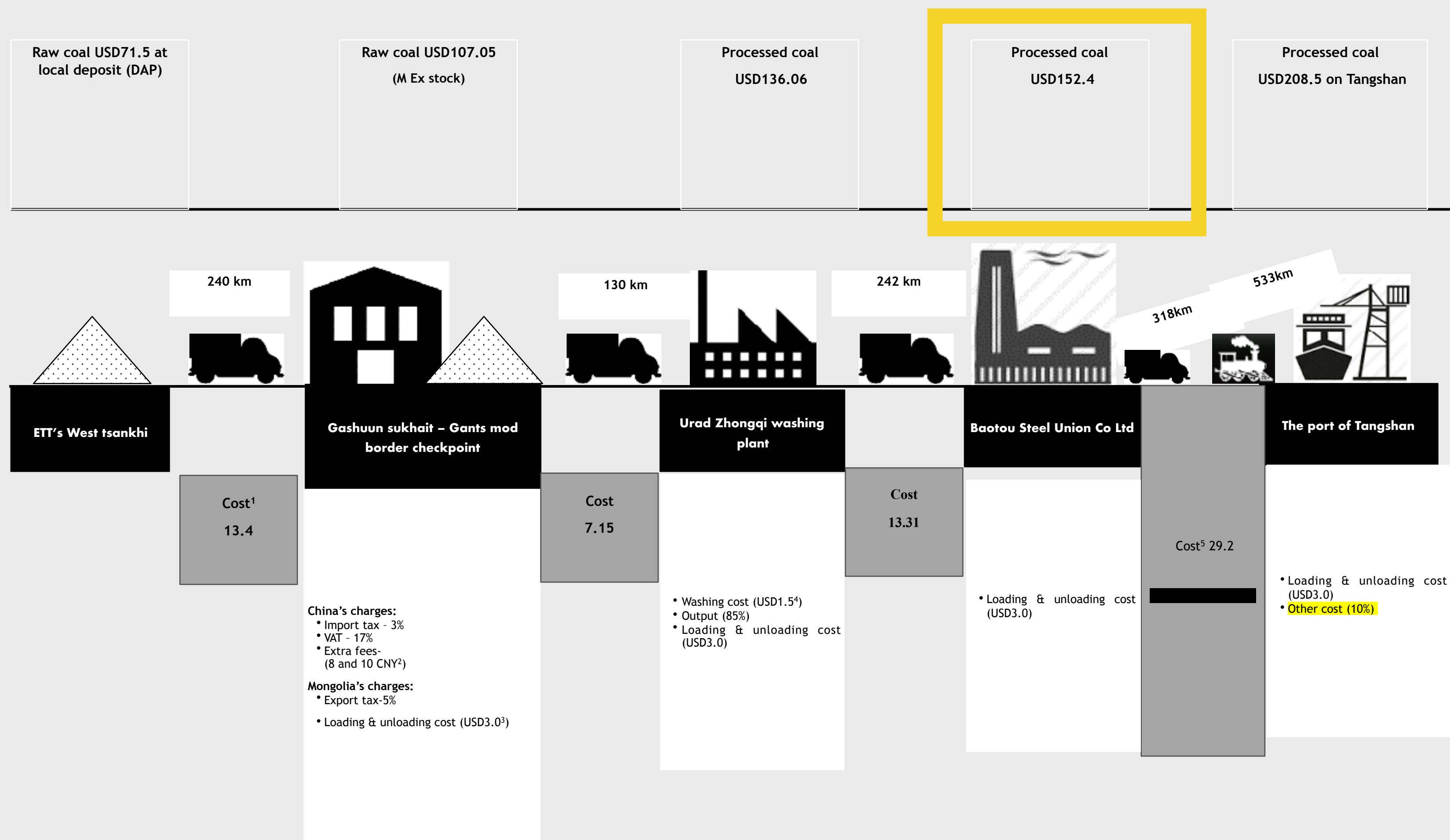
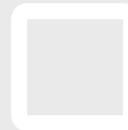


Figure 1. Estimated price of ETT's coking coal on the port of Tangshan, on December 31, 2016



OUTLOOK

- Competitiveness and rising possibilities for Mongolian coal
- Baogang Steel linkage and new railway:
 - a new very competitive cluster
- Implications for steel market
- Baogang will be a leading steel producer
- Implications for Australian coal: more expensive
- Implications for Mongolian economy: exports of iron ore and coking coal have very good perspectives



Conclusion

- Mongolian coal will gradually replace Australian coal due to cost advantage of at least 25%
- its cost advantage will improve with railways built across border to 30% and more
- its total export potential is about 60 million tonnes per annum
- its most realistic export potential 40 million tonnes per annum in near future
- it can be exported at lower profit margin and still be attractive for investors
- Baogang steel will enjoy highest cost advantage