

**THE THIRD
IEA-IEF-OPEC SYMPOSIUM ON
GAS AND COAL MARKET
OUTLOOKS**

Deep dive into the Asian market

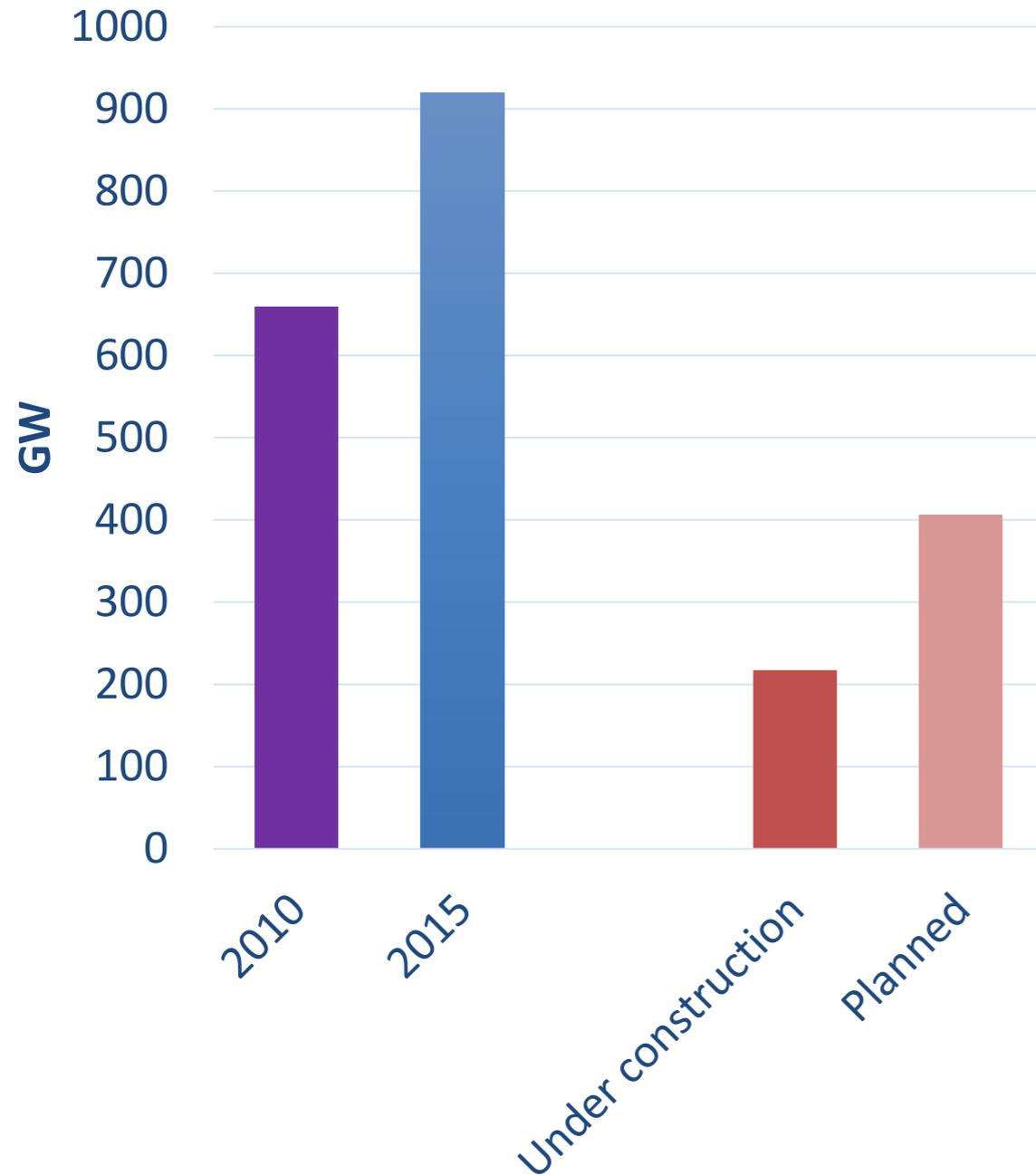
Sylvie Cornot-Gandolphe
Paris, 14 December 2016

Key Coal Market Trends in Asia

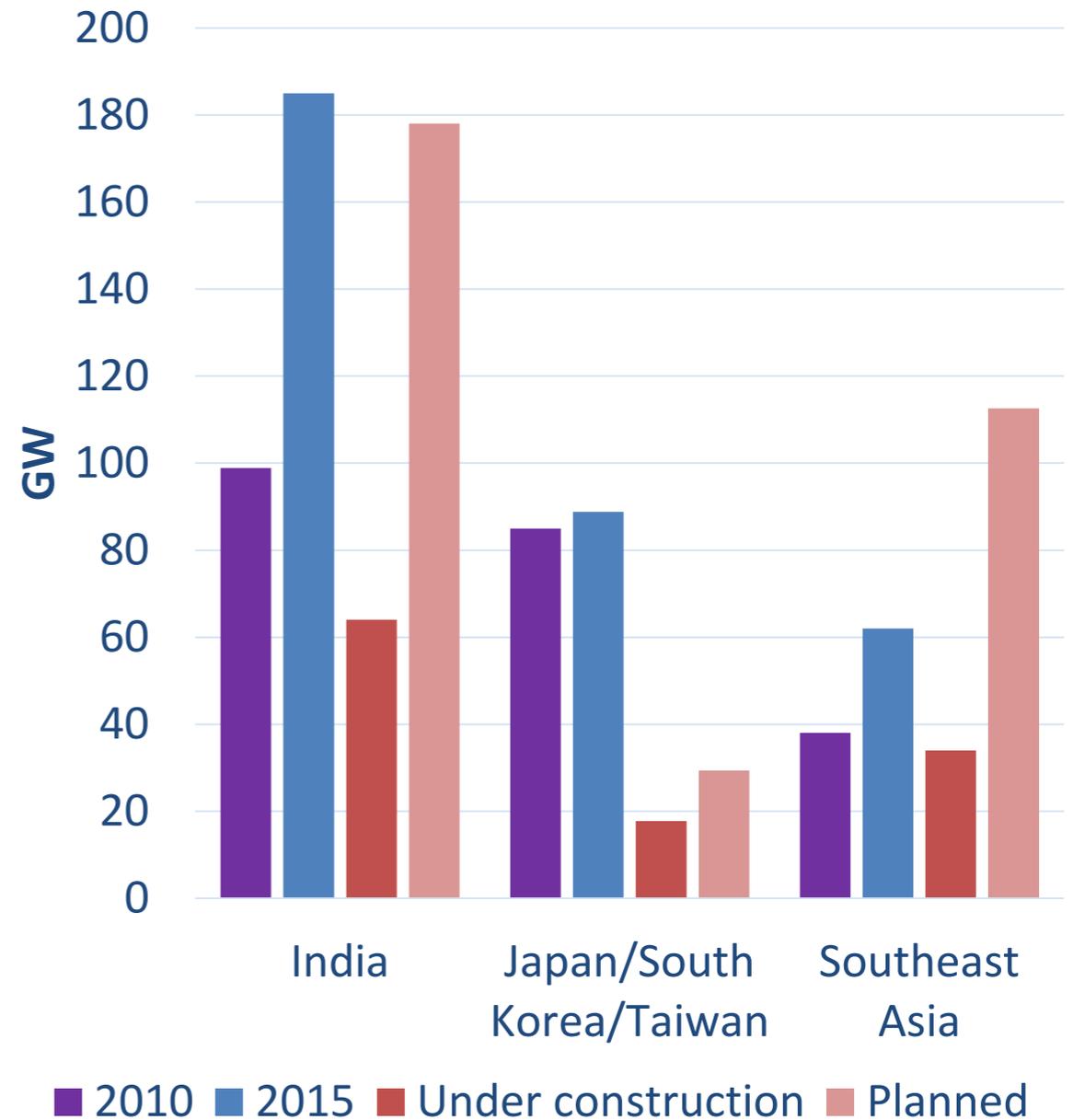


Coal dominance to continue: In all Asia, a huge coal buildout

Coal-based capacity in China



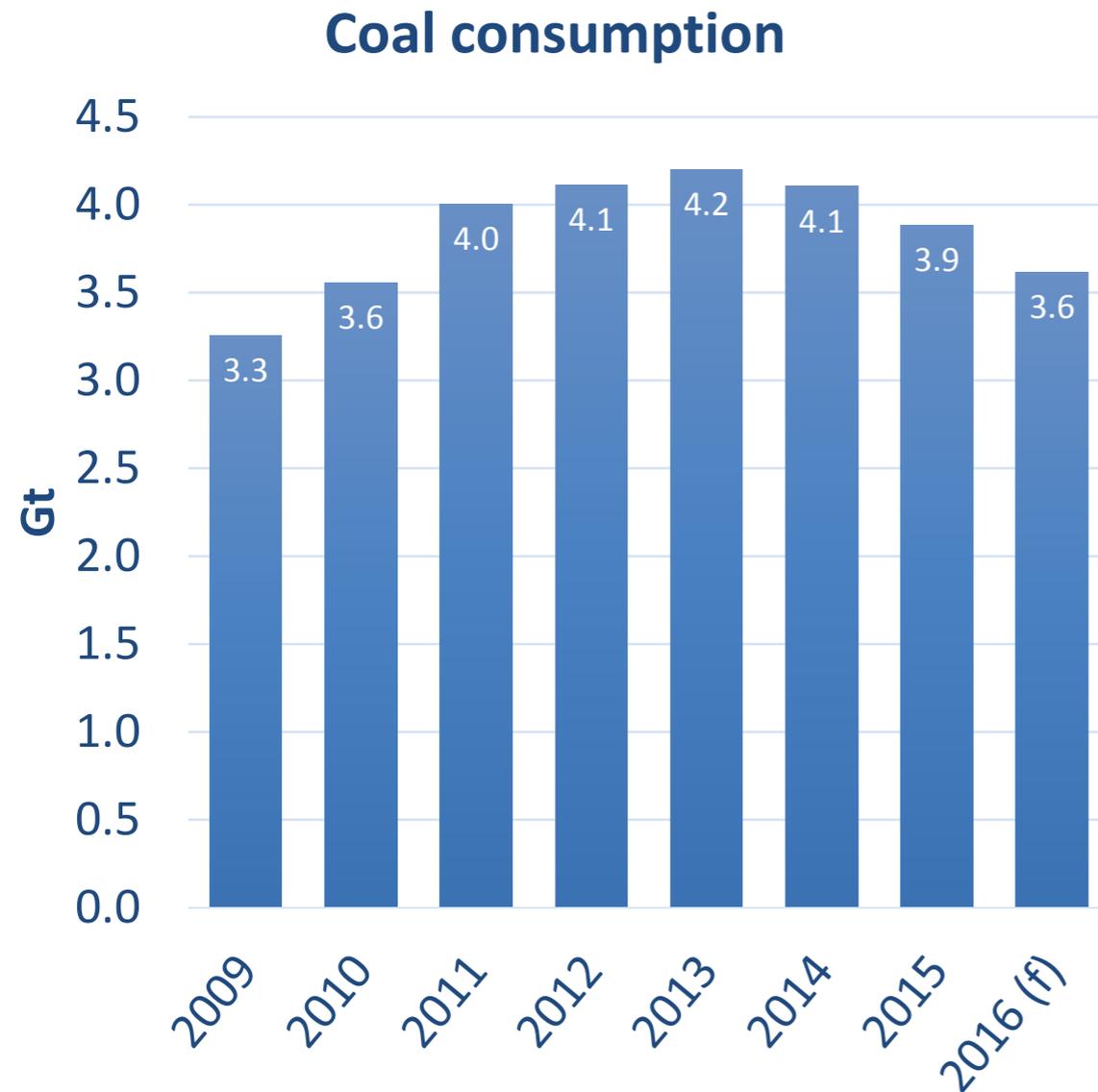
Coal-based capacity in other major Asian countries



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**IF all capacity under construction is built: +330 GW
(would require 1 Gt of coal)**

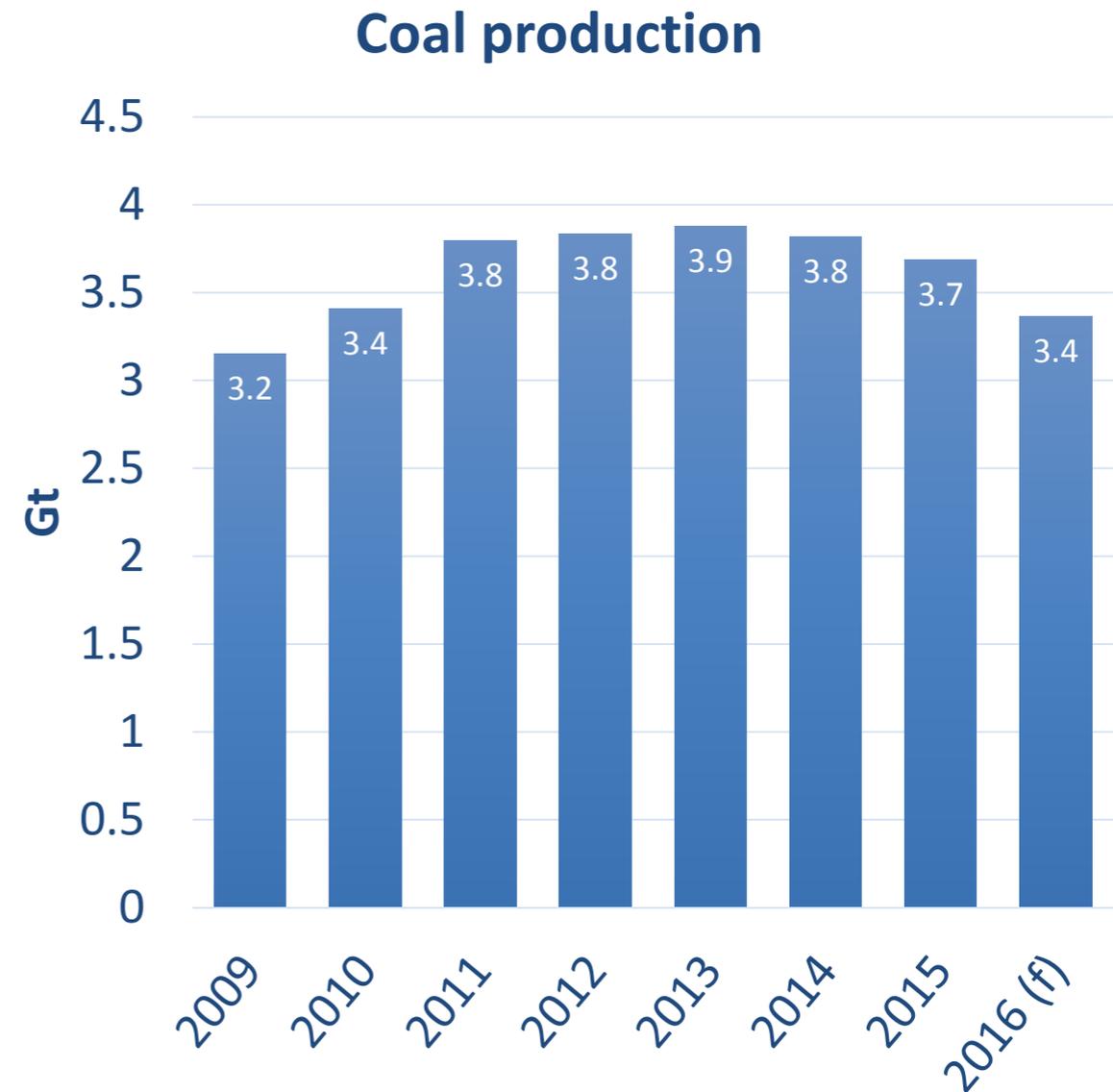
Coal Consumption and Production Trends in China



Apparent consumption

The new “normal”

Fight against air pollution
Renewables/Hydro development



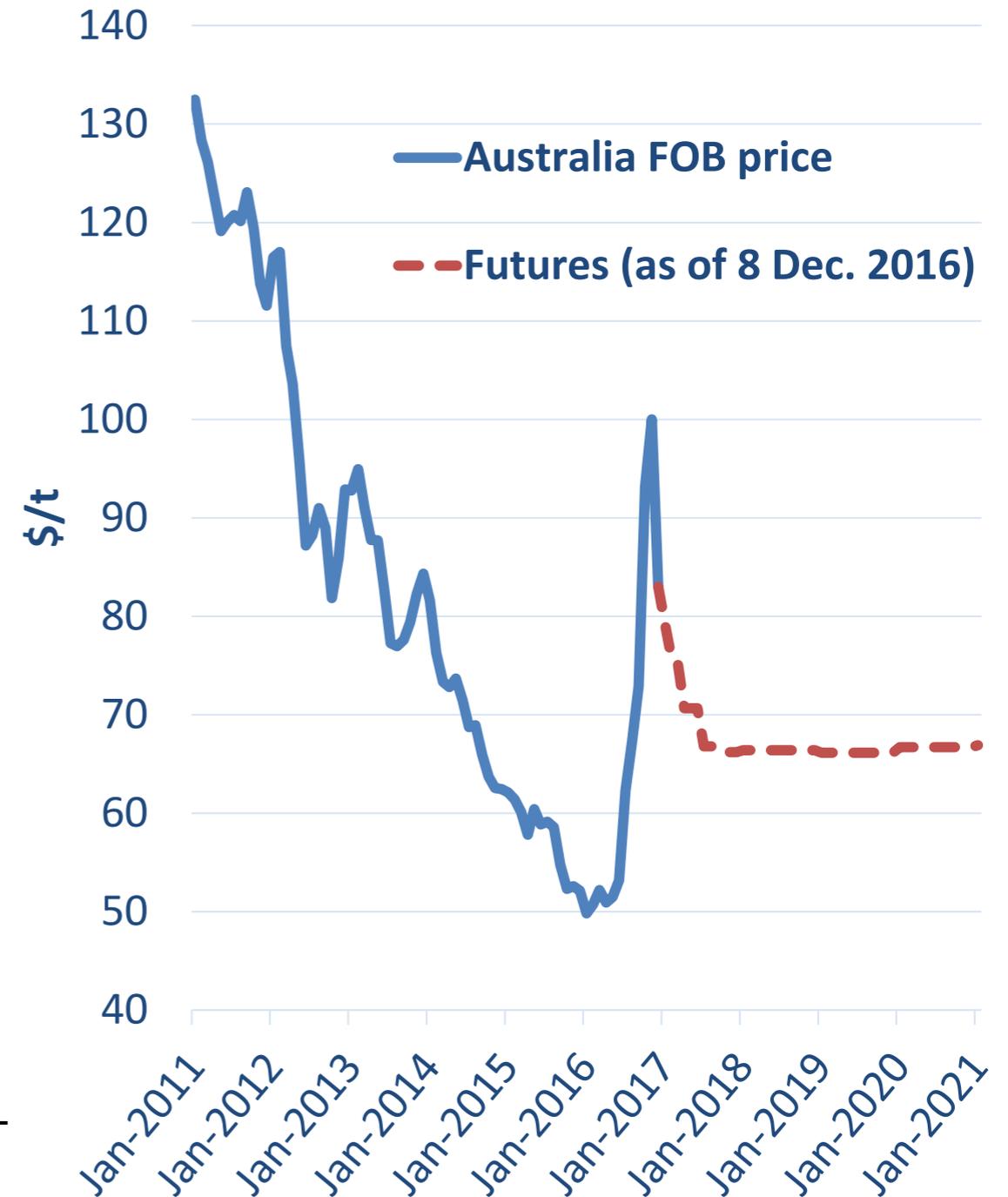
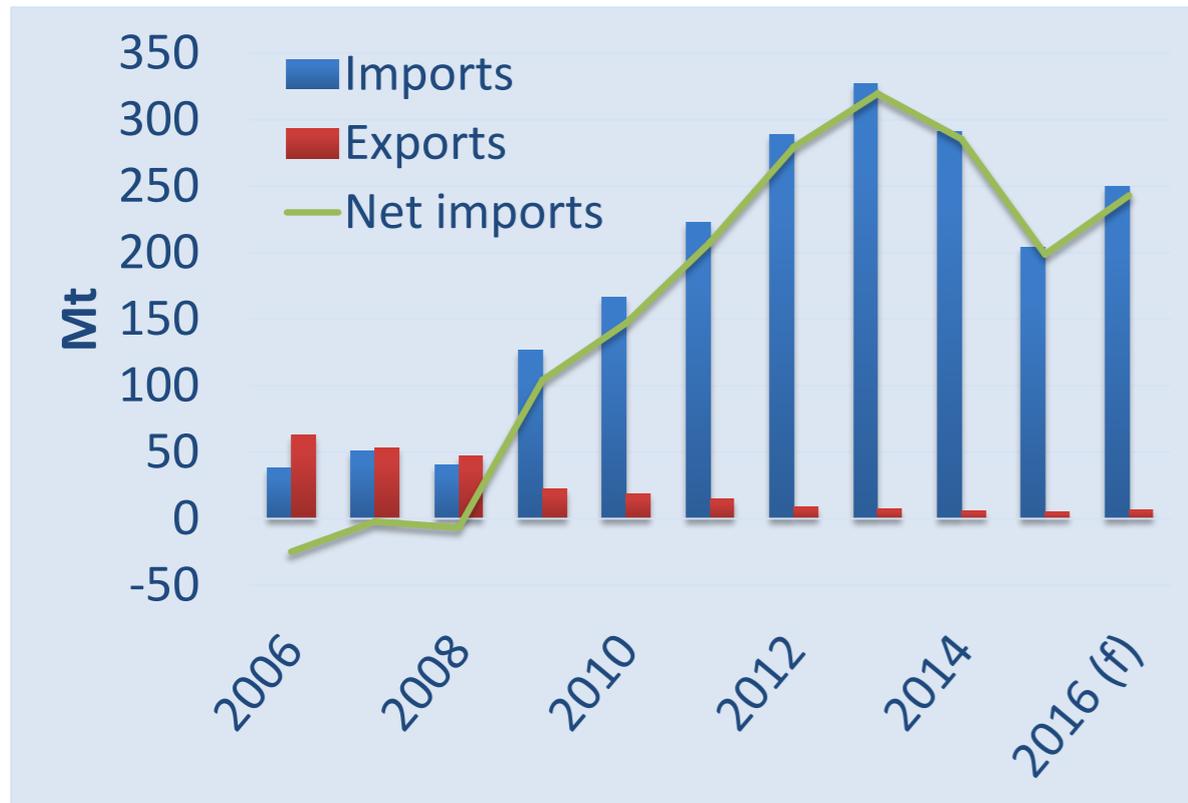
Beg of 2016: Coal supply reforms

Moratorium on new coal mines

Closing of small coal mines

In April 2016, reduction of operating days in coal mines from 330 to 276 days

China is the price setter for international steam coal



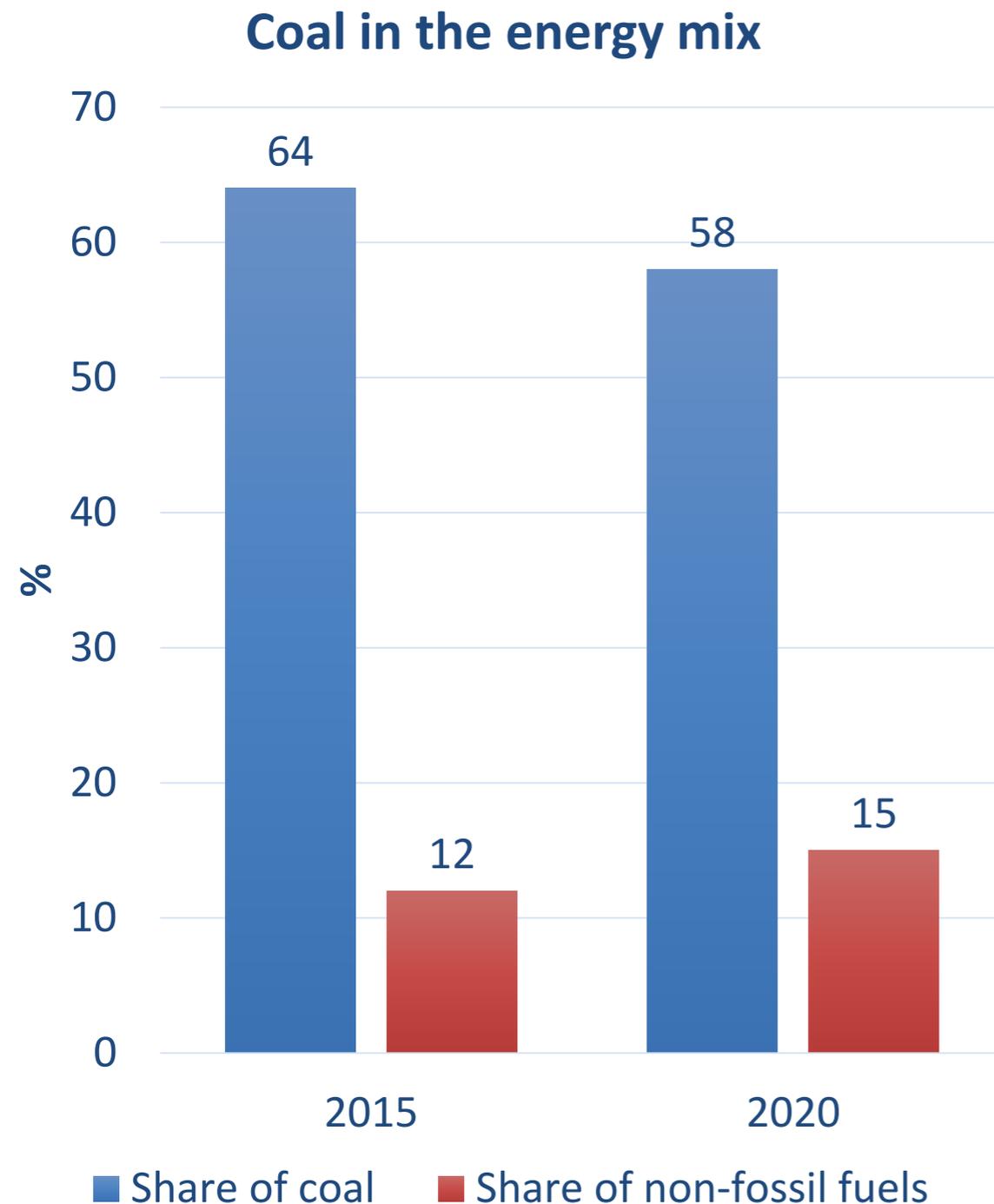
Coal imports account for only 5% of Chinese supplies...but 16% to 20% of global steam coal imports

Chinese imports are driven by price arbitrage
Regulation on coal imports (2014/2015)

The government wants **'reasonable' coal prices**
 The increase in coal imports/coal prices may be short-lived

But coal prices are not expected to return to the low levels of beg. 2016

China's 13th Energy Plan (2016-2020)



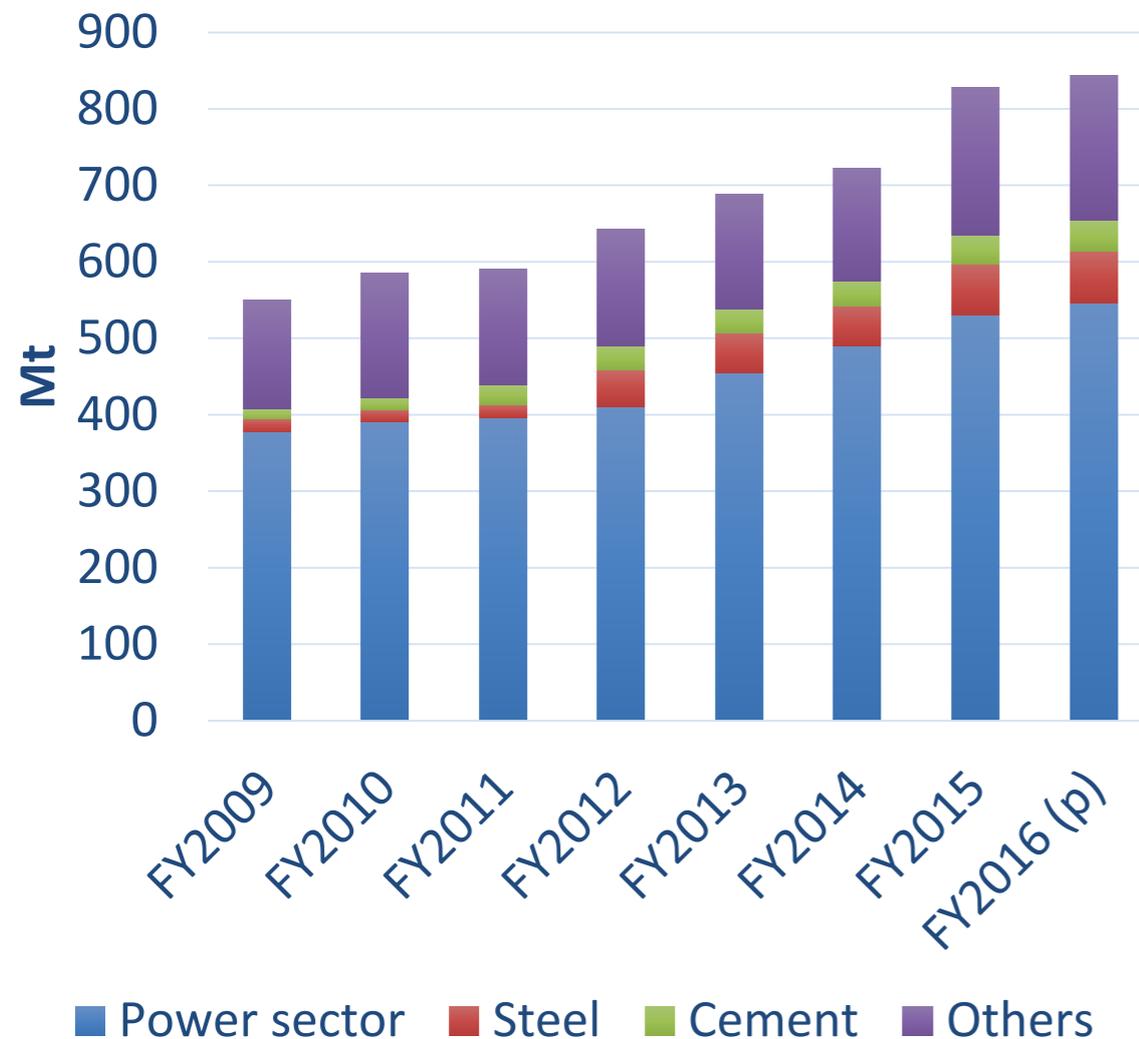
- **Energy demand is capped**
- Share of coal: 58% by 2020 (reduction is steeper than previously planned)
- Energy intensity: -15%
- Carbon intensity: -18%

- Coal share in power capacity to decrease to 55% (making room for renewables)
- **Coal-based additions: 180 GW over the planning period** (compared to 300 GW in the 12th FYP)

- **Current low utilization rates** of coal-fired power plants (less than 50%)
- **Rationalization of the power fleet** (“new” coal to displace old inefficient coal → early retirement) and delays/cancellations
- China has just cancelled 17 GW of under construction capacity

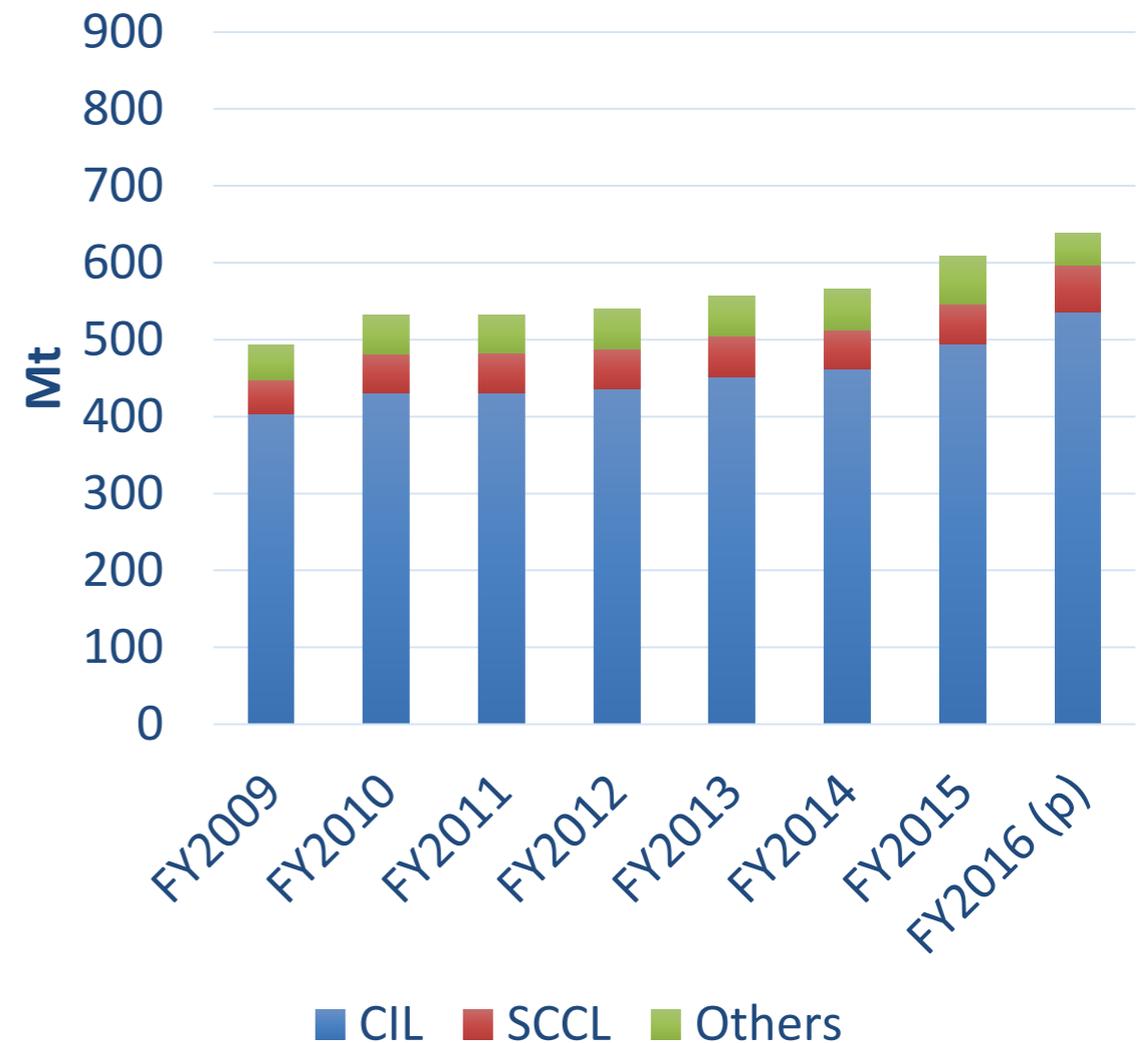
Coal Consumption and Production trends in India

Hard coal consumption



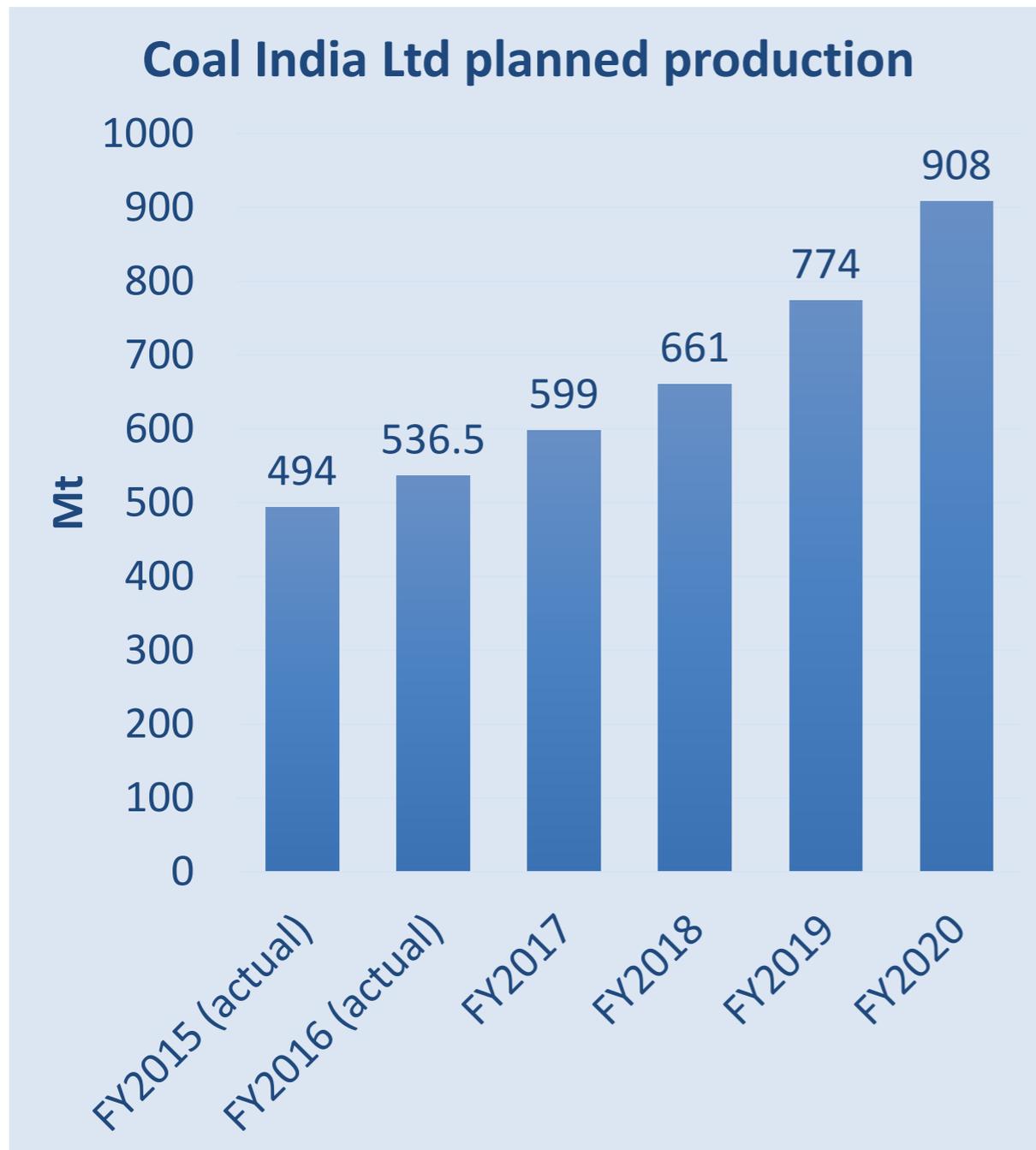
FY2016: Total coal demand much lower than planned (830 Mt vs. 910 Mt)

Hard coal production



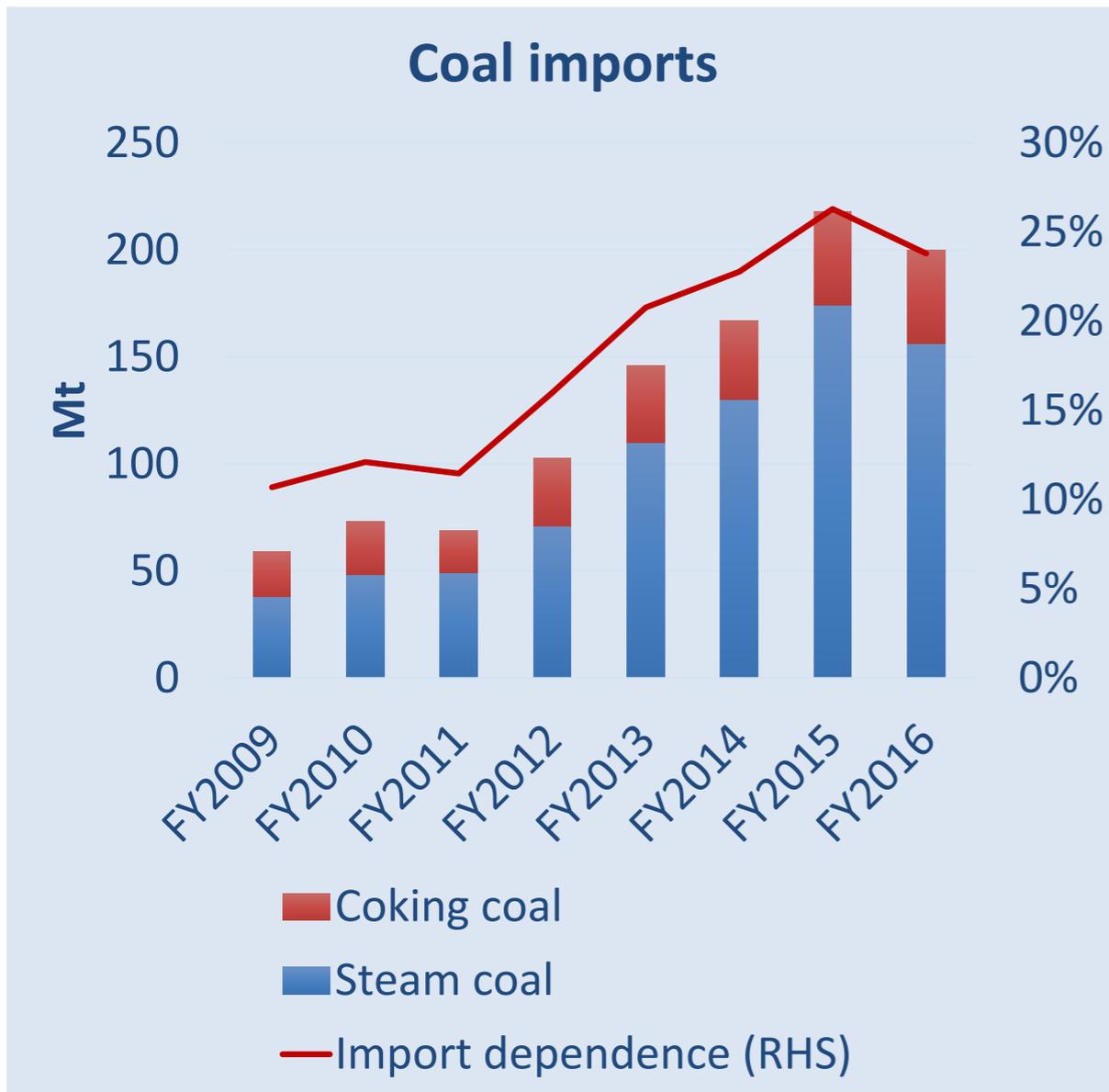
Coal production on the rise again (even if less than planned)

The government intends to stop steam coal imports by end 2017



- **Major reforms in the coal sector to boost efficiency of Coal India Ltd, and introduce competition and transparency in the sector**
- **New Mining Law opens the sector to private operators**
- **Government targets:**
 - **Coal India Ltd to double its production by 2020 to 1,000 Mt (but was relaxed recently)**
 - **Private and other producers: 500 Mt by 2020**

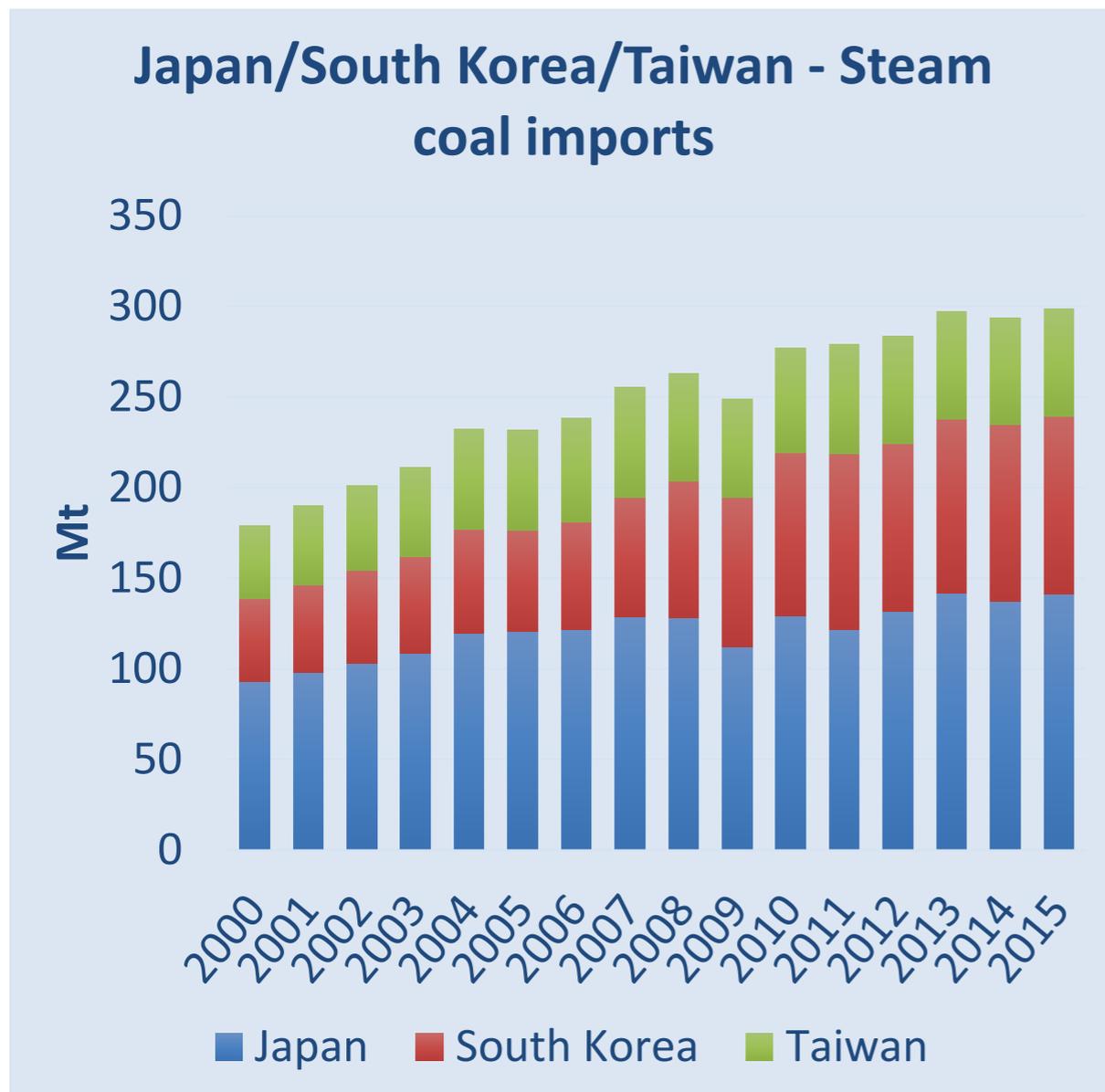
Indian coal imports



Imports projected to decrease to 160 Mt in FY2017...(unlikely)

- **Domestic or imported coal?**
- Major efforts to increase domestic coal production AND strong political willingness to be independent (for steam coal)
- But still many hurdles (land acquisition, transportation bottlenecks, green clearance, poor quality of coal)
- Coal power plants built to burn imported coal
- Environmental regulation (limit on transport of coal with high-ash content)
- Prices of domestic vs. International coal
- There are still some room for regulation to decrease steam coal imports...
- And coal demand not expected to rise as steeply as planned ('over-building' in the coal power sector and low utilization factor)

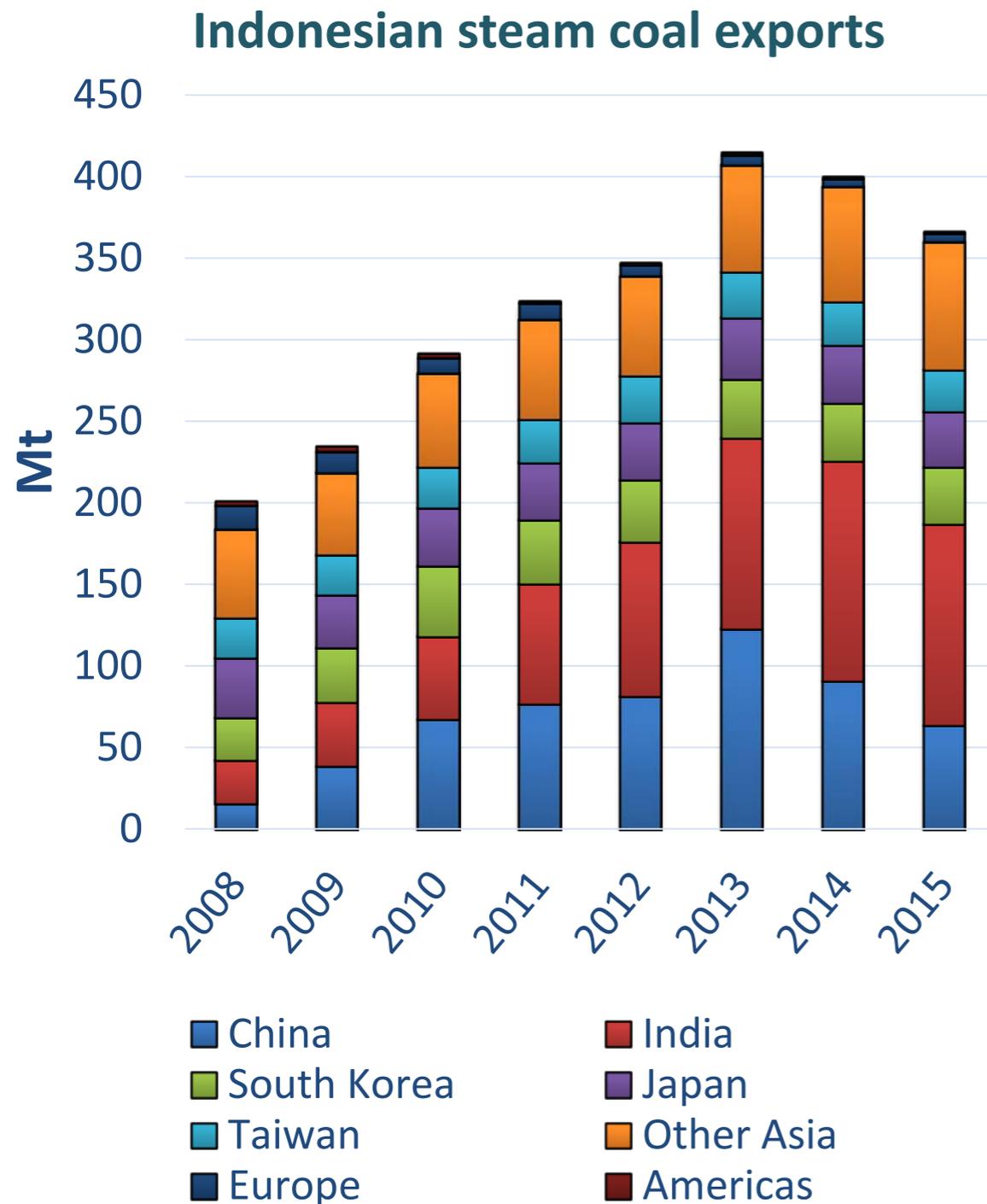
Other importing markets



Stable demand. Some new coal PP replacing aging capacity
Coal tax favors imports of higher calorific value coal

Increase in coal imports secured by the building of 25 GW of new coal capacity

The key role of Indonesia on the supply side



- Indonesia still the top steam coal exporter (2015)
- A large part is low-ranked coal (future market?)
- Exports to China have declined sharply since 2014. Those to India also fell in 2015
- Consolidation of the coal mining sector and crack down on illegal mining and exports (production cap)
- Domestic sales are prioritized
- Fast Track Program to add 35 GW of capacity by 2019 (20 GW coal-based)
- **Coal demand expected to double by 2019 → less coal available for exports**

Sustainability issues in Asia



Huge coal buildout but local pollution and CO₂ emissions → 1. Adopt Clean Coal Technologies

- Meaning **High-Efficiency/Low Emission Ultra-Supercritical plants**

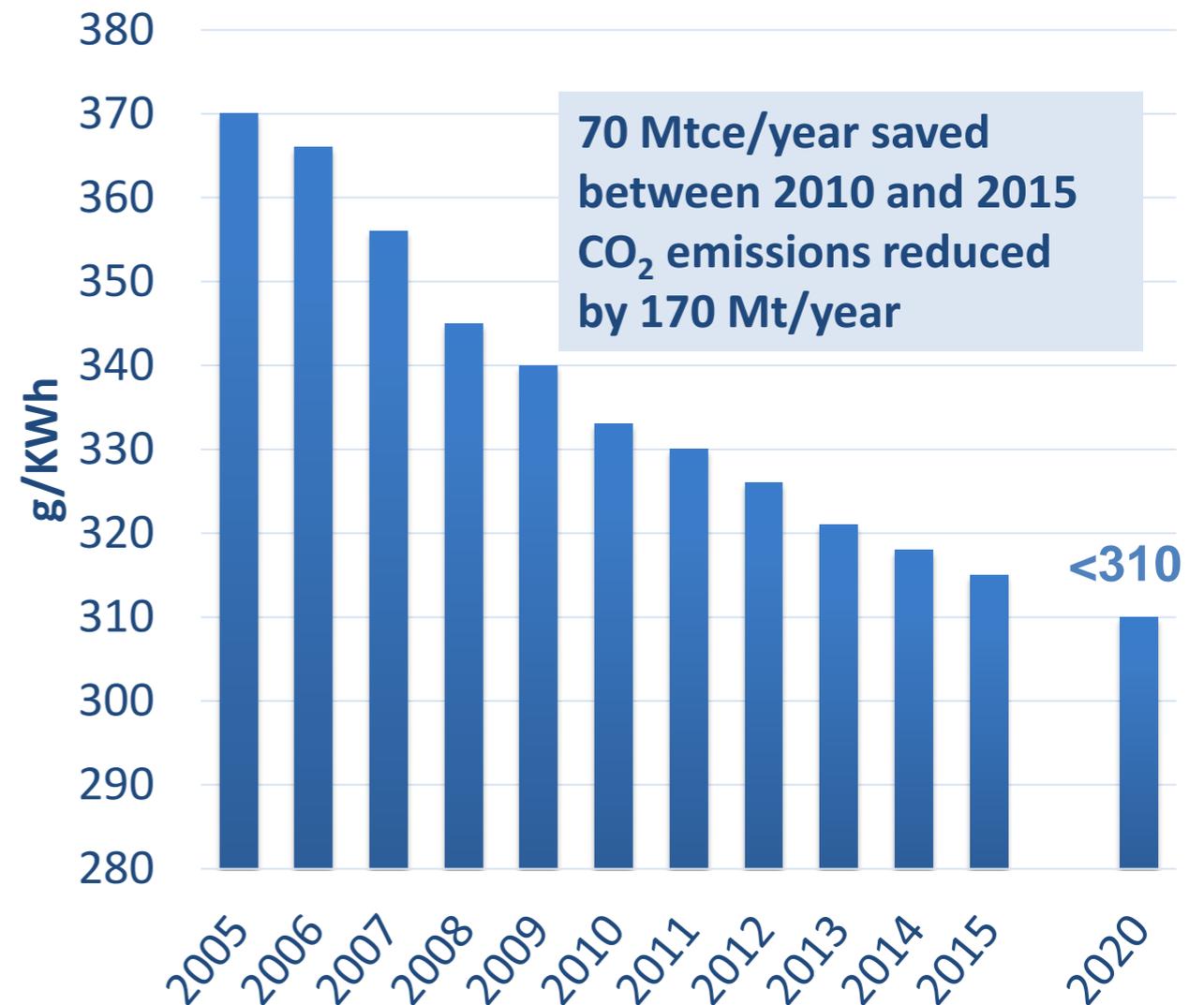
- To reduce local pollution and CO₂ emissions per kWh

Ultra-low emission plants in China

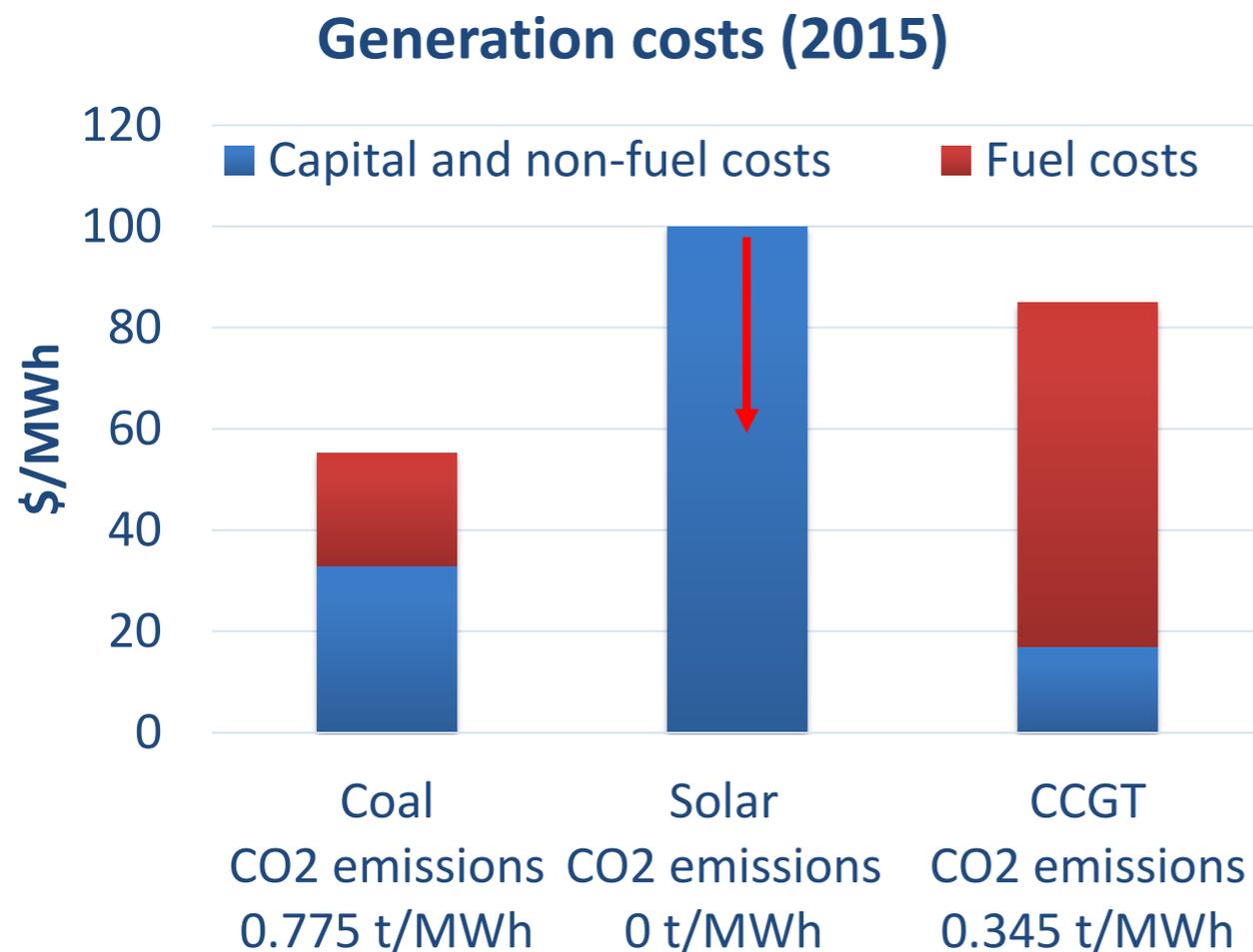
	Typical emissions	Regulation
Dust	1 -10 mg/Nm ³	≤ 10 mg/Nm ³
SO ₂	16-32 mg/Nm ³	≤ 35 mg/Nm ³
NO _x	21-50 mg/Nm ³	≤ 50 mg/Nm ³

- Ultra-low emission coal PP nearly equivalent to natural gas for non-carbon emissions
- CO₂ emissions reduced...but still too high (CCSU?, but costs and huge investment required)
- **Rationalization of the power fleet** (“new” coal to displace old inefficient coal → early retirement) and delays/cancellations

Average coal consumption by coal power plants in China



→ 2. Add renewables (and nuclear) to decrease the overall carbon footprint of the power sector



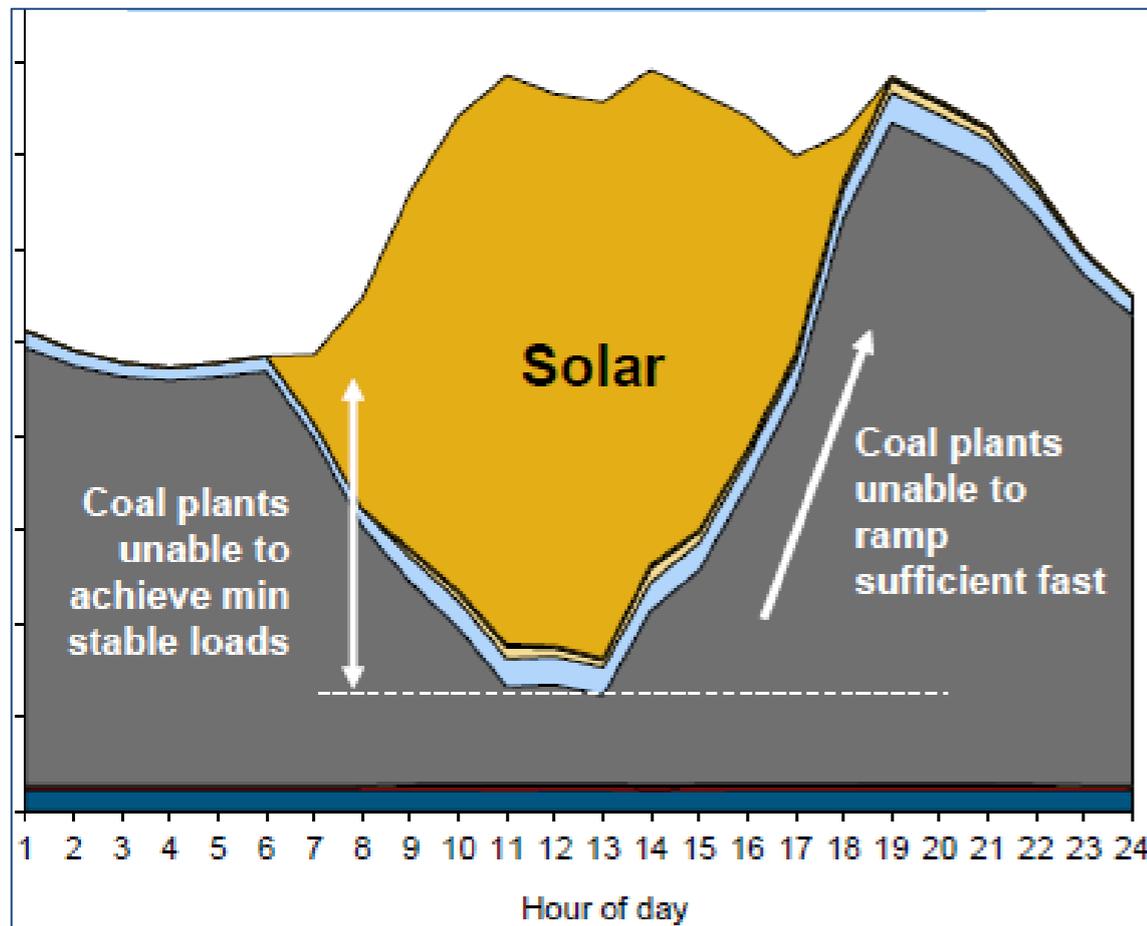
Strong RE push everywhere in Asia

- **China (13th FYP): 210 GW of wind, 110 GW of solar by 2020**
- **India: 175 GW by 2022, mainly solar**
- **Southeast Asia: + 75 GW by 2025, mainly hydro and solar**

Total cost of 45% of coal and 55% of solar is cheaper than an equivalent 100% gas-based strategy, with the same amount of CO₂ emissions

But the current coal fleet is not flexible enough to accommodate (future) RE variability

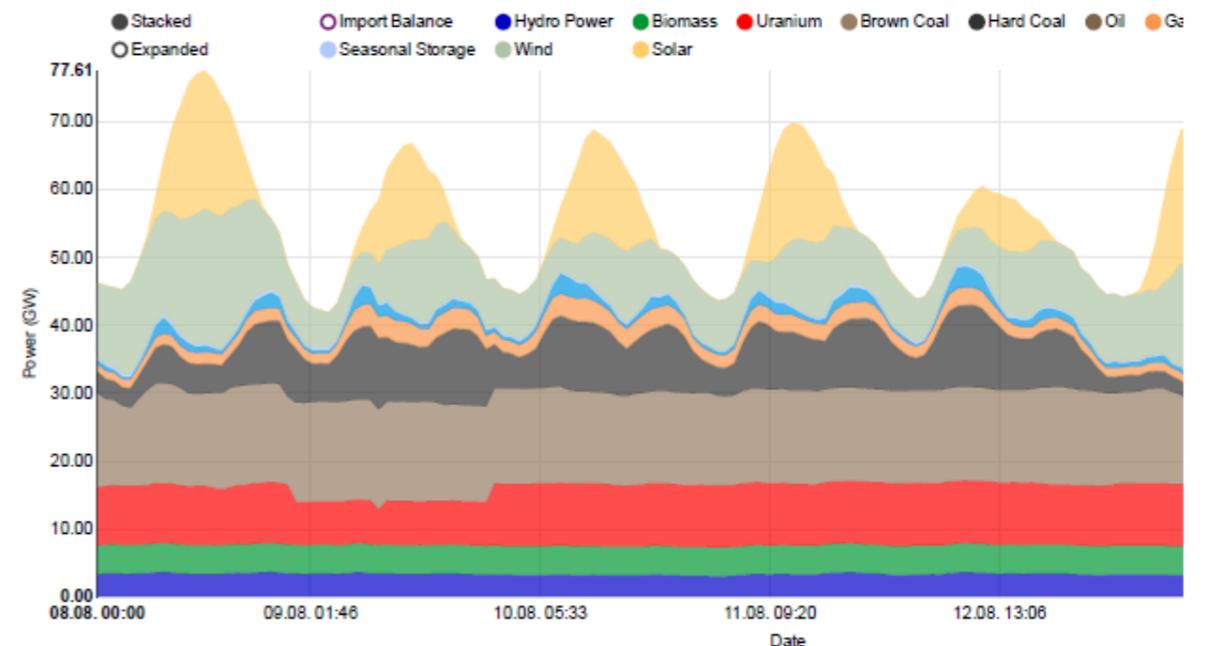
Solar + Coal in Luzon (Philippines)



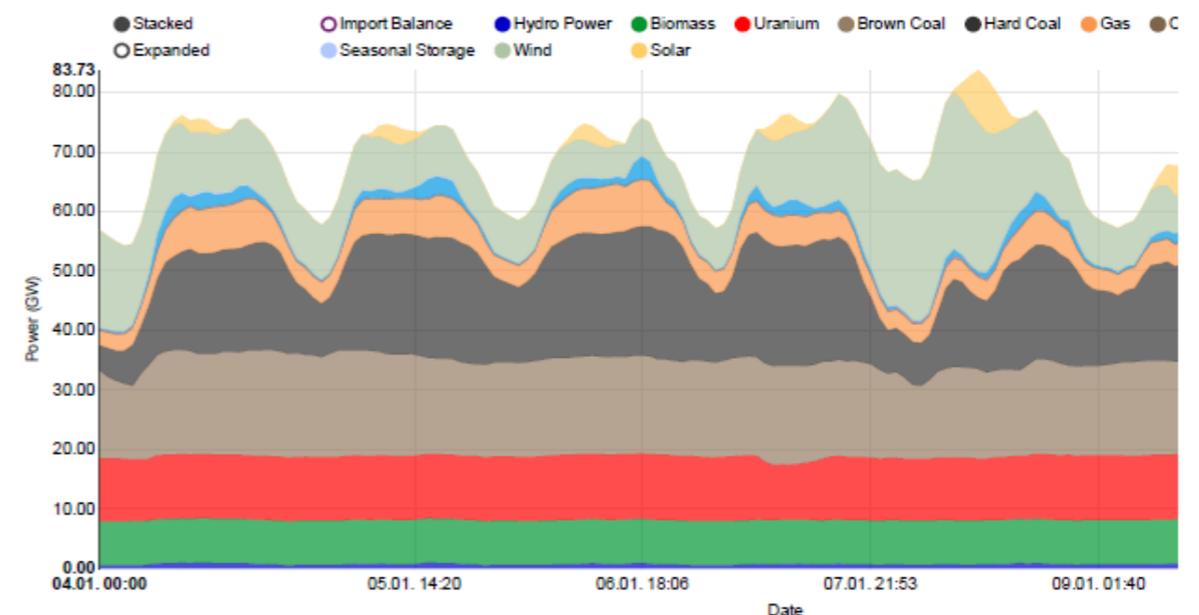
- **Add flexible plants: hydro storage (when available) and Gas (LNG) peak units**
- **Also retrofit coal-fired power plants to allow more flexibility (China)**
- **Integrate the grid (ASEAN Power Grid)**

Experience in Germany

Electricity generation in Germany Week 32 2016



Electricity generation in Germany Week 1 2016





Conclusion

Conclusion

More than ever, energy policy/regulation in China is dictating the price of coal

- And therefore the price of electricity in coal importing countries: Southeast Asia, and Europe!
- Rebalancing a huge market, such as the Chinese one, is not an easy task.

Volatility of coal prices to stay

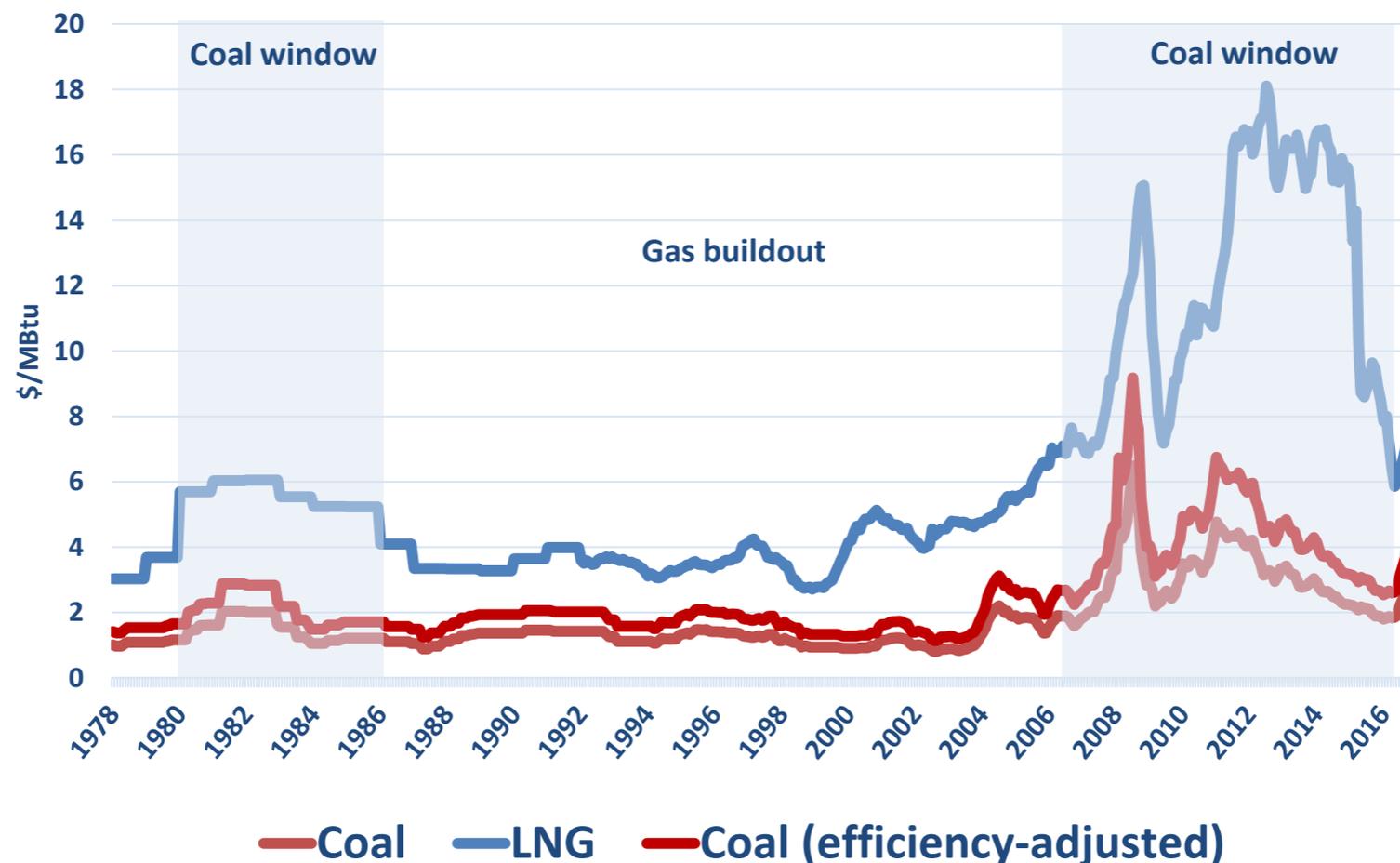
- Potentially exacerbated by 5 years of lack of investment in the mining sector
- On the supply side, the role of Indonesia is key in the short/medium term

Conclusion

In most Asian countries, the current least-cost strategy is towards ‘new coal’ and renewables + nuclear + some gas

- The relatively low gas prices and high coal prices have not (yet?) been translated into gas-power investment
- Two perceived issues: security of gas supply (despite ample availability) and lack of gas infrastructure (grid). LNG can help provided it remains affordable
- Additions to the coal fleet in Asia are being reassessed (not only in China)

LNG prices vs coal prices: **The coal window is closing?**





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Thank you for your attention

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