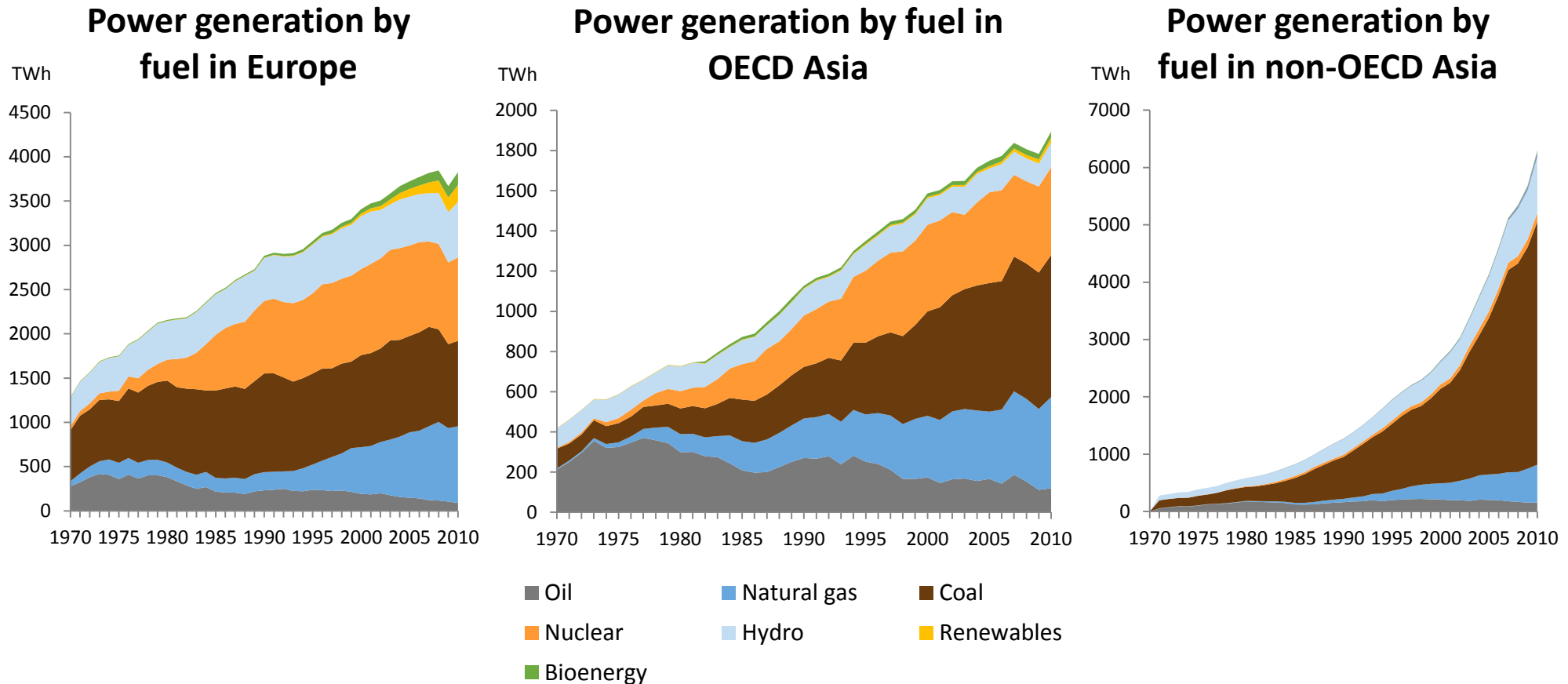


# GAS AND COAL COMPETITION IN THE POWER MARKET: Asian developments and trends

Dr. Tatiana Mitrova  
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Energy Research Institute of the Russian Academy of Sciences

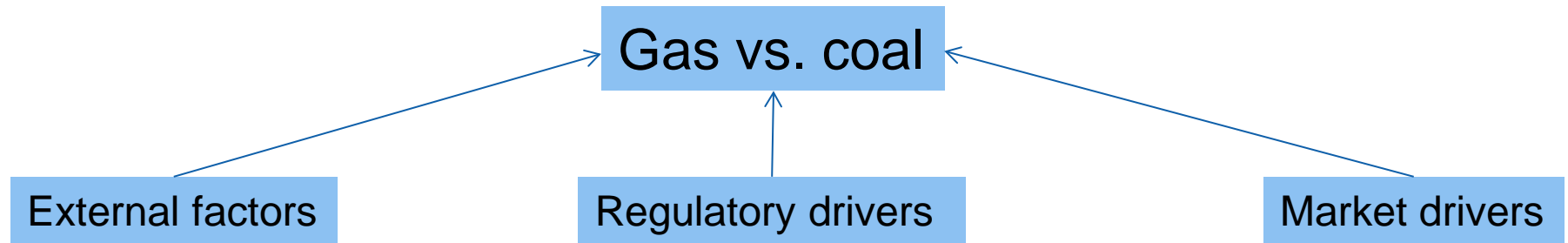


# Asian power sector is traditionally coal oriented due to the abundant cheap local coal resources both in OECD and non-OECD Asia



Sources: IEA, ERI RAS

# Drivers of the gas-to-coal competition (general approach)



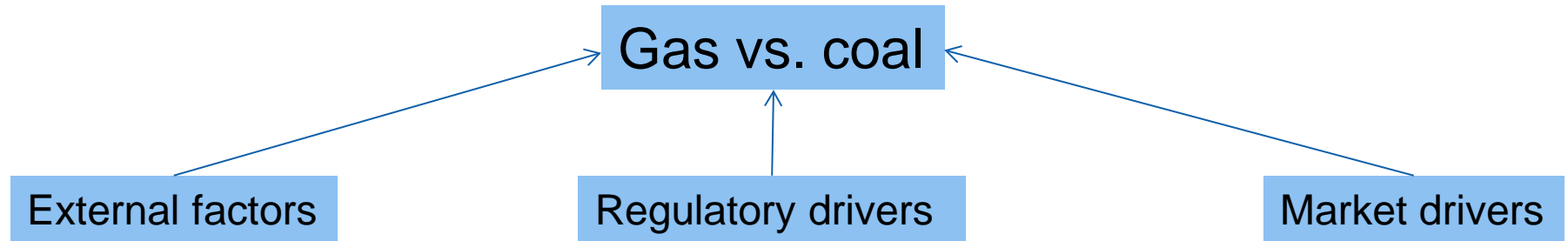
- **Electricity demand**  
(function from the economic growth)
- Part of the incremental electricity demand covered by **RES** and **nuclear**  
(state energy policy)






- **State energy policy**  
concerning gas and coal capacity additions
- **CO<sub>2</sub>** penalties and prices

- **Gas price**
- **Coal price**
- **CCGT CAPEX**
- **Coal plant CAPEX**

Coal and gas have lower LCOE, but find themselves in the expensive part of the merit order, behind renewables and nuclear, which have much lower marginal production costs, once they are built.

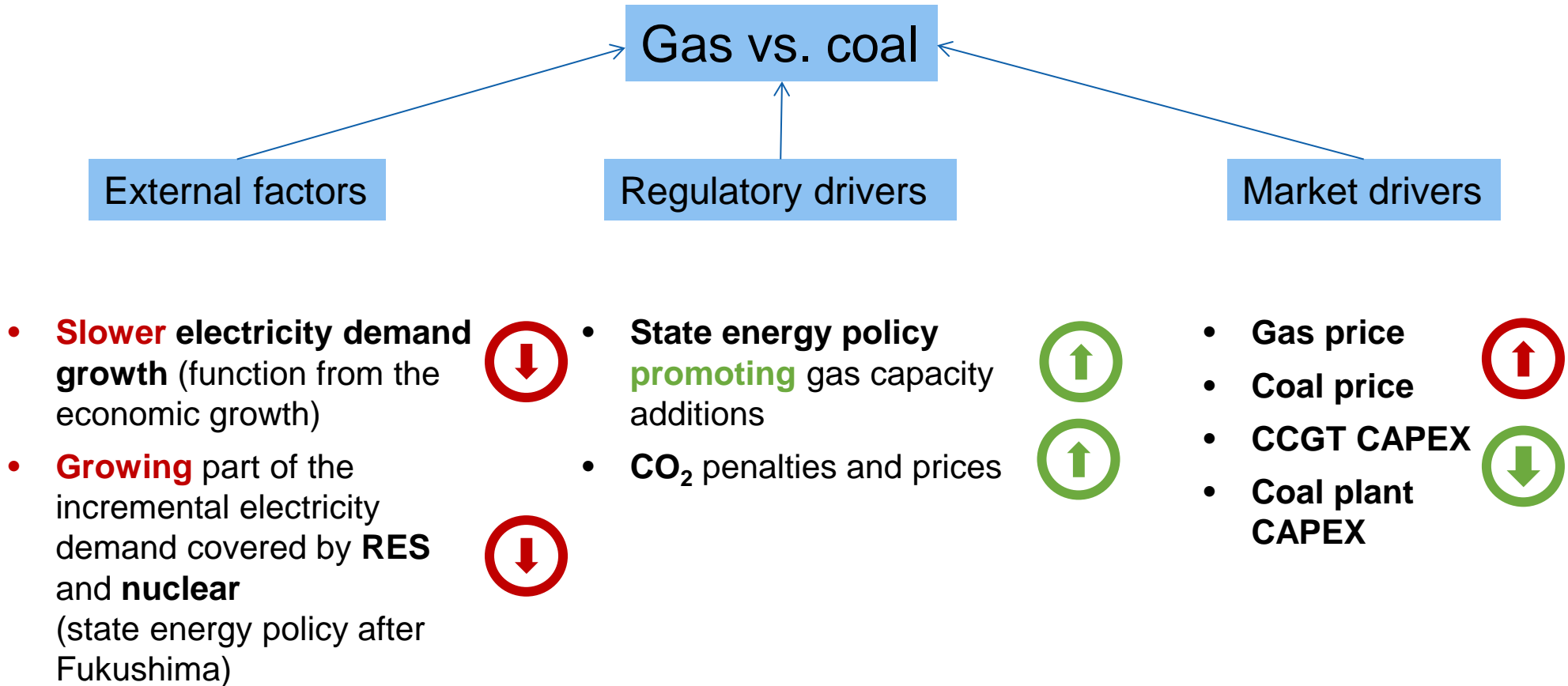
# Drivers of the gas-to-coal competition in OECD Asia in the medium-term future



- **Electricity demand stagnation** (function from the economic growth) 
- **Growing** part of the incremental electricity demand covered by **RES** and **nuclear** (state energy policy after Fukushima) 
- **Unclear** state energy policy concerning gas and coal capacity additions 
- **CO<sub>2</sub>** penalties and prices 
- **Gas price** 
- **Coal price**
- **CCGT CAPEX**
- **Coal plant CAPEX**

*In OECD Asia thermal generation might have to struggle hardly with nuclear and RES (which are driven by the state policy decisions)*

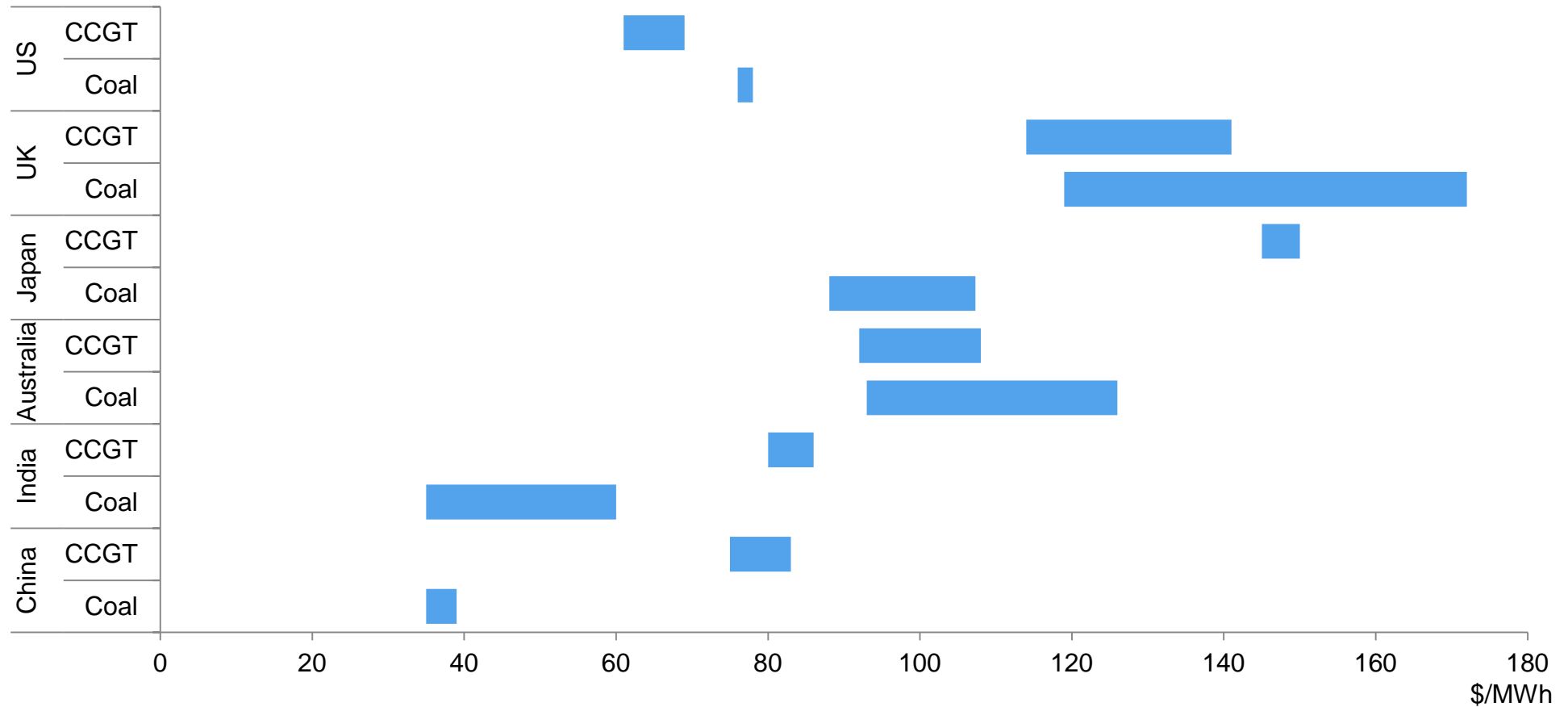
# Drivers of the gas-to-coal competition in non-OECD Asia in the medium-term future



***In non-OECD Asia gas vs coal competition will depend largely on the state policies regarding CO<sub>2</sub> and coal capacities additions as well as gas price reforms***

# The difference in gas and coal LCOE in Asian countries is huge...

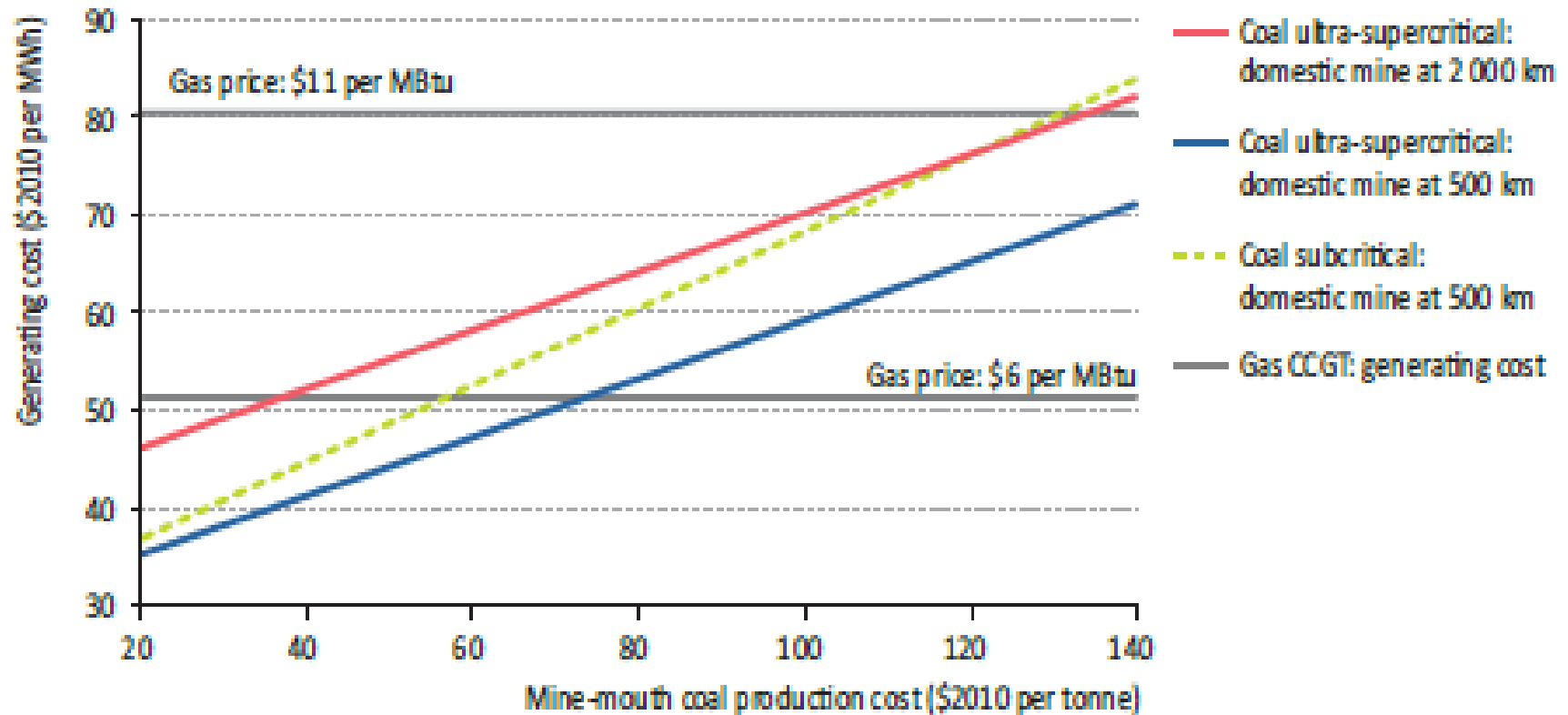
Levelised cost of CCGT and coal electricity by region



Sources: *World Energy Perspective - Cost of Energy Technologies* (WEC, 2013),  
data on CCGT in China, CCGT and coal in India and coal in Japan (WEO, 2011)

...though gas vs coal cannot be judged by the same standard even across one country...

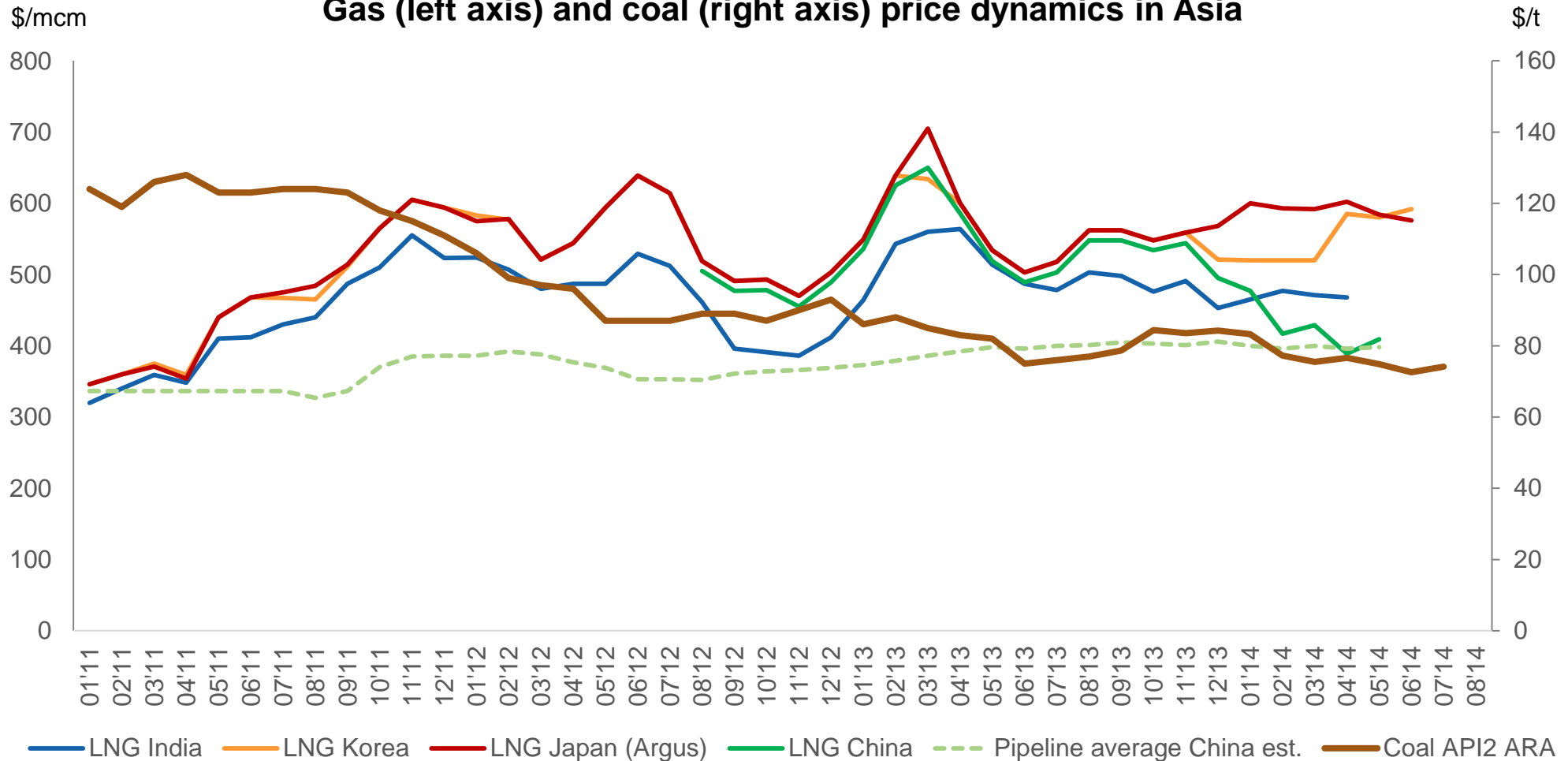
### Breakeven price of coal versus natural gas for power generation in China, 2020



Note: Coal plant costs include flue-gas desulphurisation and NO<sub>x</sub> emission control equipment.

...and the price relation between gas and coal is changing all the time

Gas (left axis) and coal (right axis) price dynamics in Asia



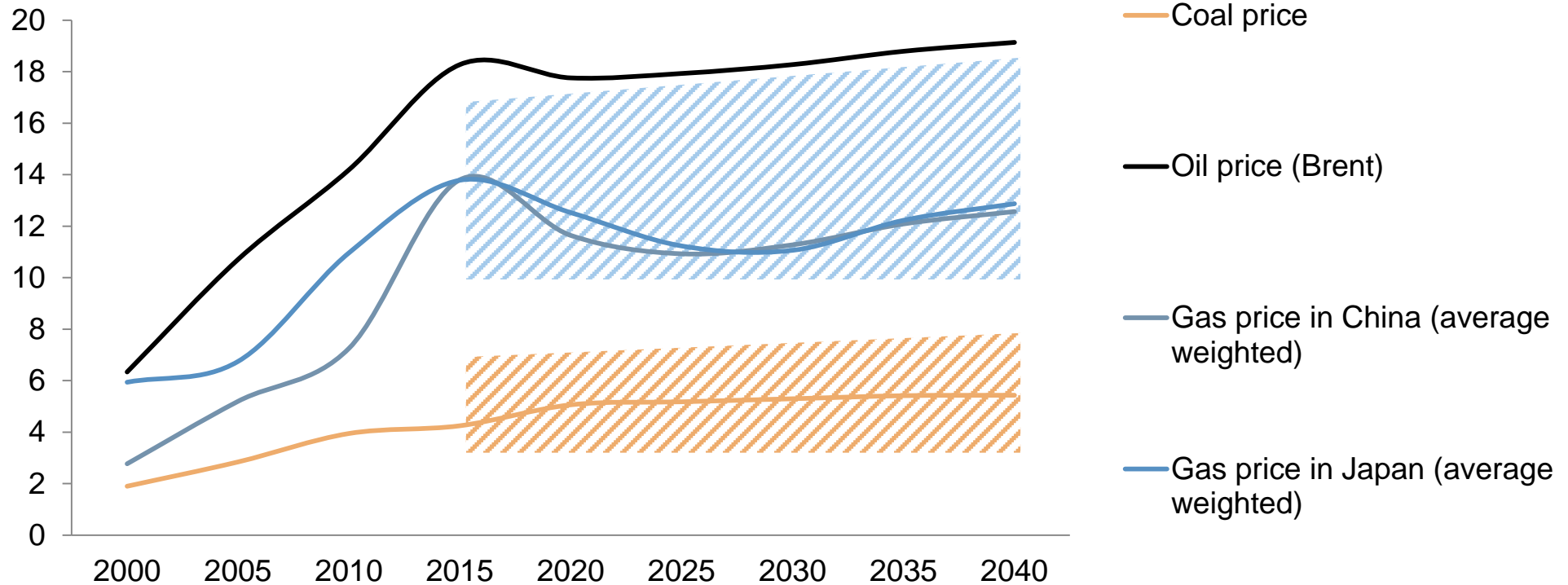
Sources: Bloomberg, Argus, Platts, ERI RAS estimations.



# There is huge uncertainty concerning the future ranges of gas and coal prices

Forecasted average weighted price\* of gas and coal

\$2010/Mbtu

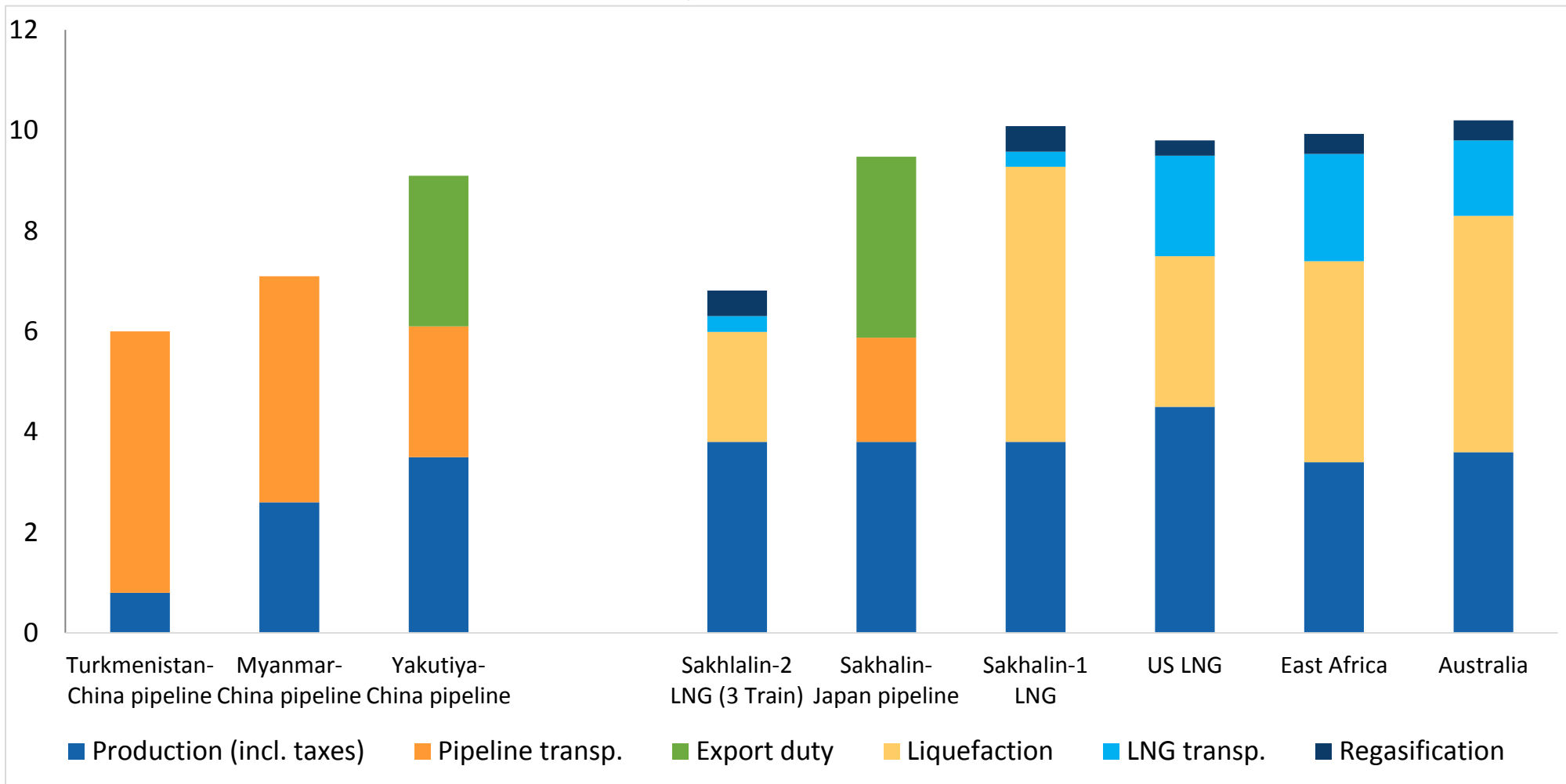


\* Weighted average price between the prices of long-term contracts linked to alternative fuels, and spot prices.

Source: Global and Russian Energy Outlook up to 2040. ERI RAS-AC. 2014.

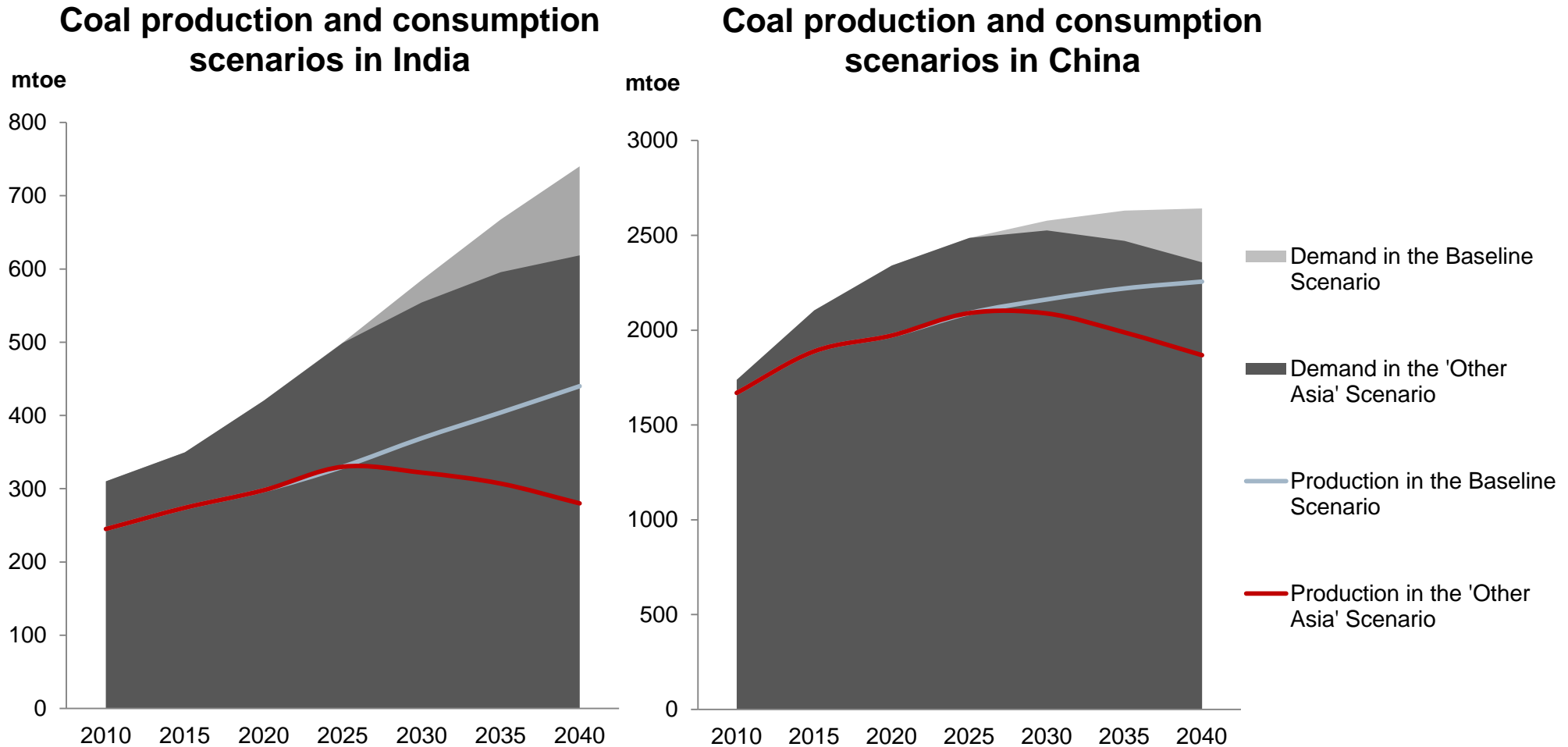
# Are we going to see cheaper gas in Asia?

Gas supply costs to Asia, \$/MBtu



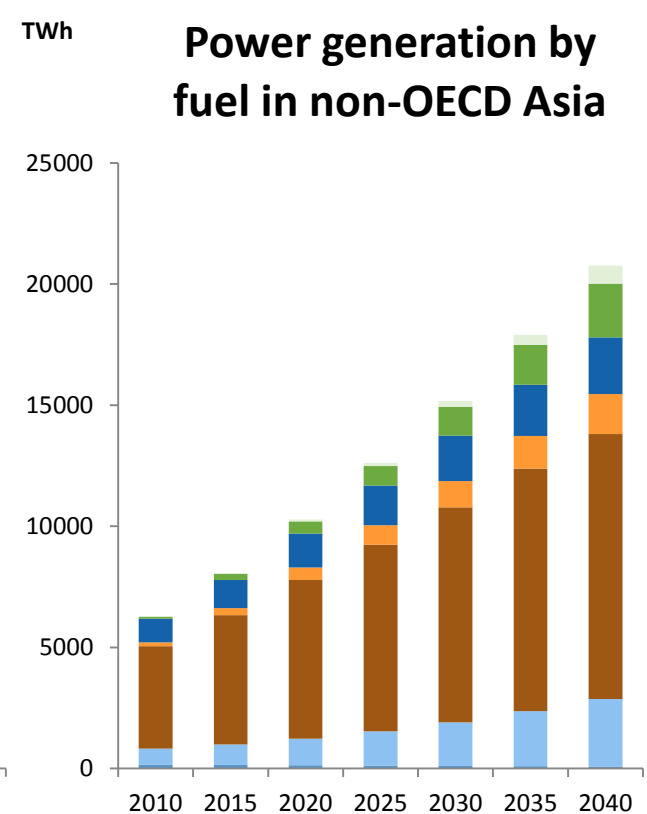
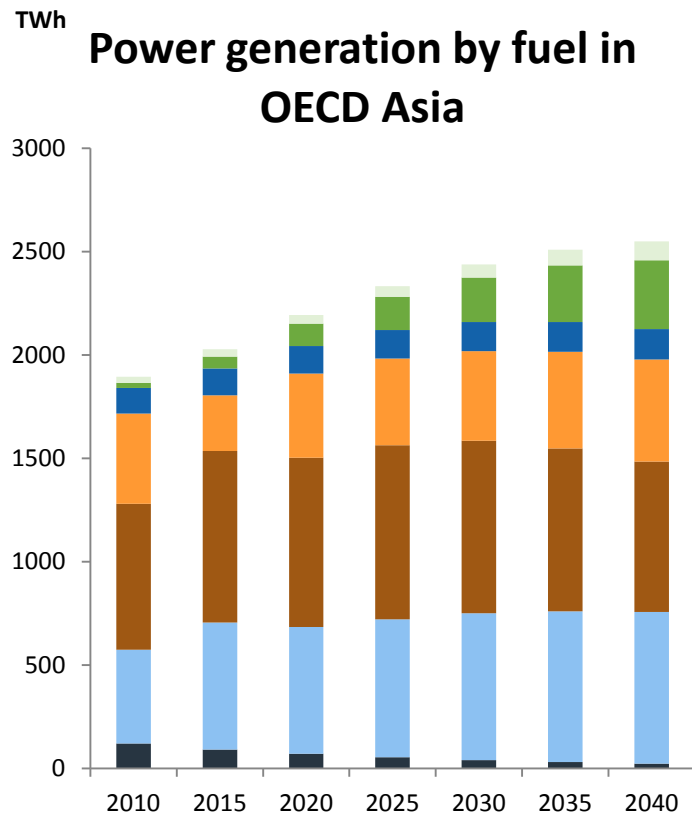
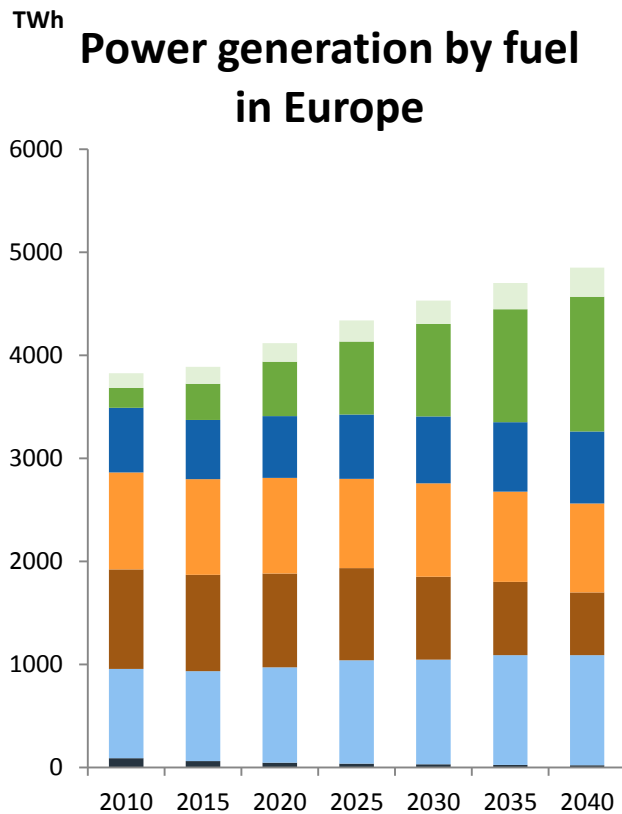
Sources: NEXANT, ERI RAS

# Are we going to see more expensive coal in Asia?



Source: Global and Russian Energy Outlook up to 2040. ERI RAS-AC. 2014.

# Future power generation fuel mix evolution: different factors will most likely counterbalance each other



Source: Global and Russian Energy Outlook up to 2040. ERI RAS-AC. 2014.

# Contacts

## **Energy Research Institute of the Russian Academy of Sciences**

"Global and Russian Energy Outlook up to 2040"

[http://www.eriras.ru/files/Global\\_and\\_Russian\\_energy\\_outlook\\_up\\_to\\_2040.pdf](http://www.eriras.ru/files/Global_and_Russian_energy_outlook_up_to_2040.pdf)

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