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

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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
- **CO₂** penalties and prices

**Gas vs. coal**

- Market drivers:
  - Gas price
  - Coal price
  - CCGT CAPEX
  - Coal plant CAPEX

**External factors**

- **Regulatory drivers**
  - 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

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

- **Regulatory drivers**
  - Unclear state energy policy concerning gas and coal capacity additions
  - CO₂ penalties and prices

- **External factors**
  - 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)

**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

• Slower electricity demand growth (function from the economic growth)
• Growing part of the incremental electricity demand covered by RES and nuclear (state energy policy after Fukushima)

Gas vs. coal

External factors

Regulatory drivers

Market drivers

- State energy policy promoting gas capacity additions
- CO₂ penalties and prices
- Gas price
- Coal price
- CCGT CAPEX
- Coal plant CAPEX

In non-OECD Asia gas vs coal competition will depend largely on the state policies regarding CO2 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

Source: WEO2011. IEA.
...and the price relation between gas and coal is changing all the time

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

*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

- Turkmenistan-Myanmar-China pipeline
- Yakutiy-Sakhalin-2 LNG (3 Train)
- Sakhalin-1 LNG
- US LNG
- East Africa
- Australia

Sources: NEXANT, ERI RAS
Are we going to see more expensive coal in Asia?

**Coal production and consumption scenarios in India**

**Coal production and consumption scenarios in China**

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.

**Power generation by fuel in Europe**

- 2010-2040: Oil, Natural gas, Coal, Nuclear, Hydro, Renewables

**Power generation by fuel in OECD Asia**

- 2010-2040: Oil, Natural gas, Coal, Nuclear, Hydro, Renewables

**Power generation by fuel in non-OECD Asia**

- 2010-2040: Oil, Natural gas, Coal, Nuclear, Hydro, Renewables

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