

26th World Gas Conference

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ANALYSIS ON MAJOR MARKET FACTORS

- Brief Look on Many Uncertainties -

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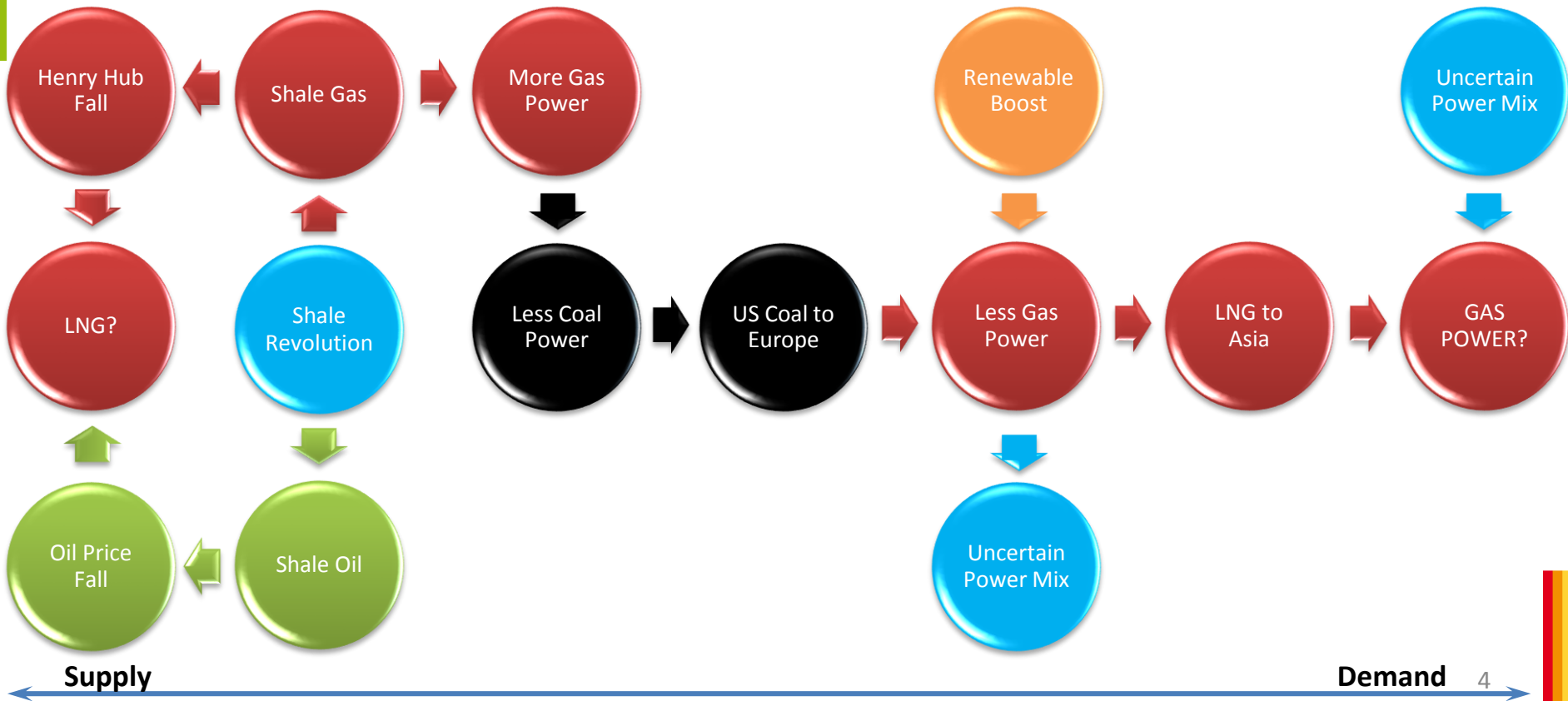
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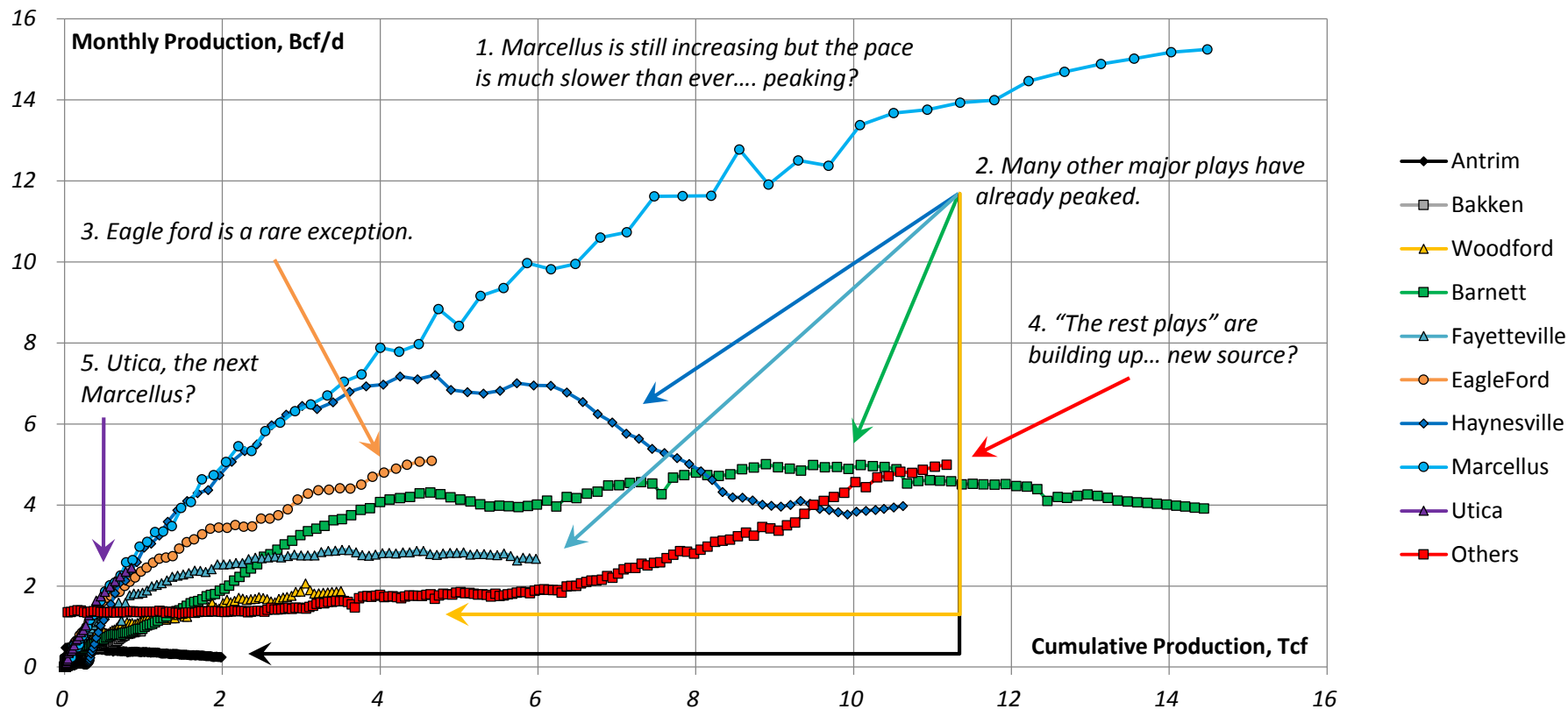
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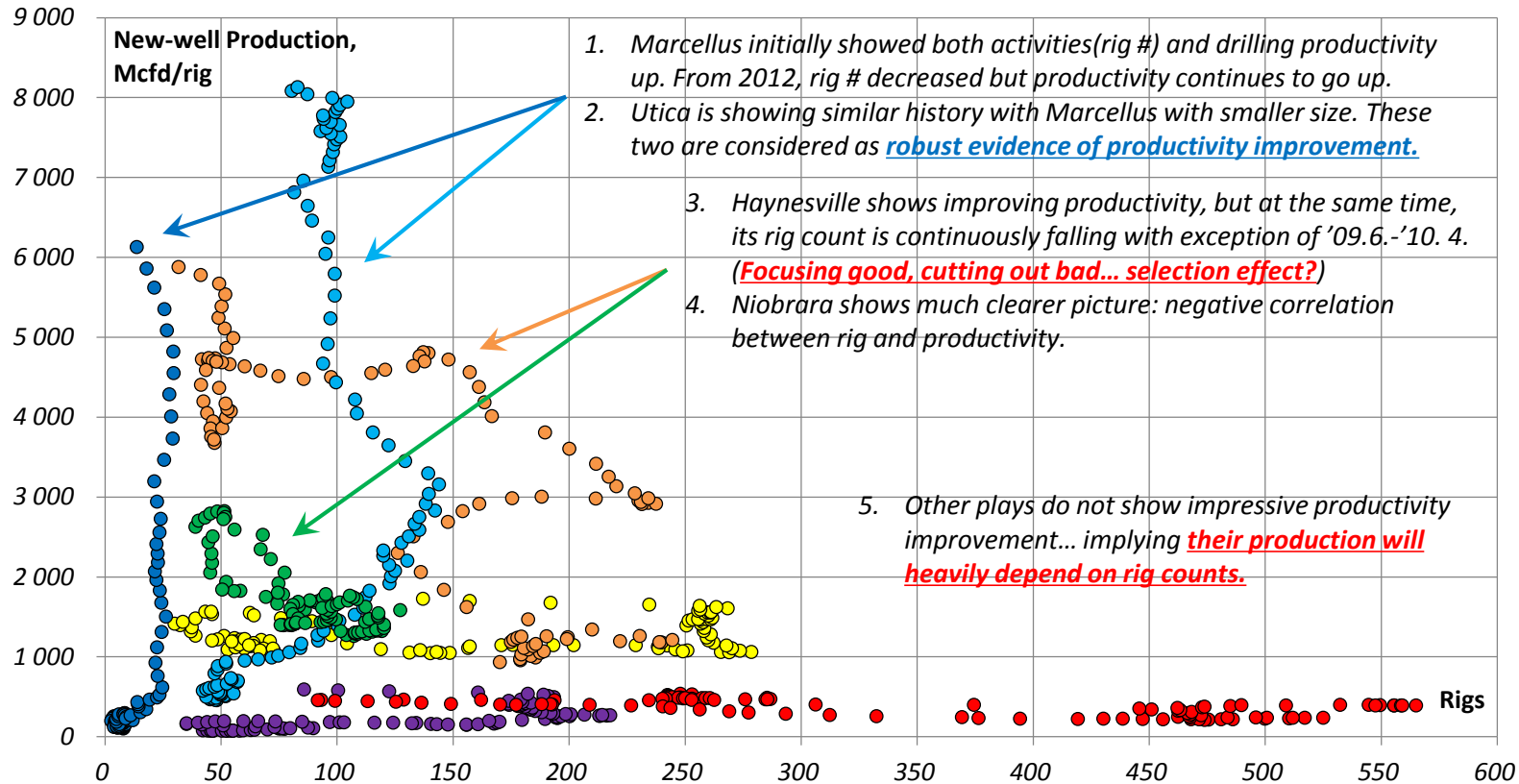
Recap: Last Several Years



Marcellus dependency continues...

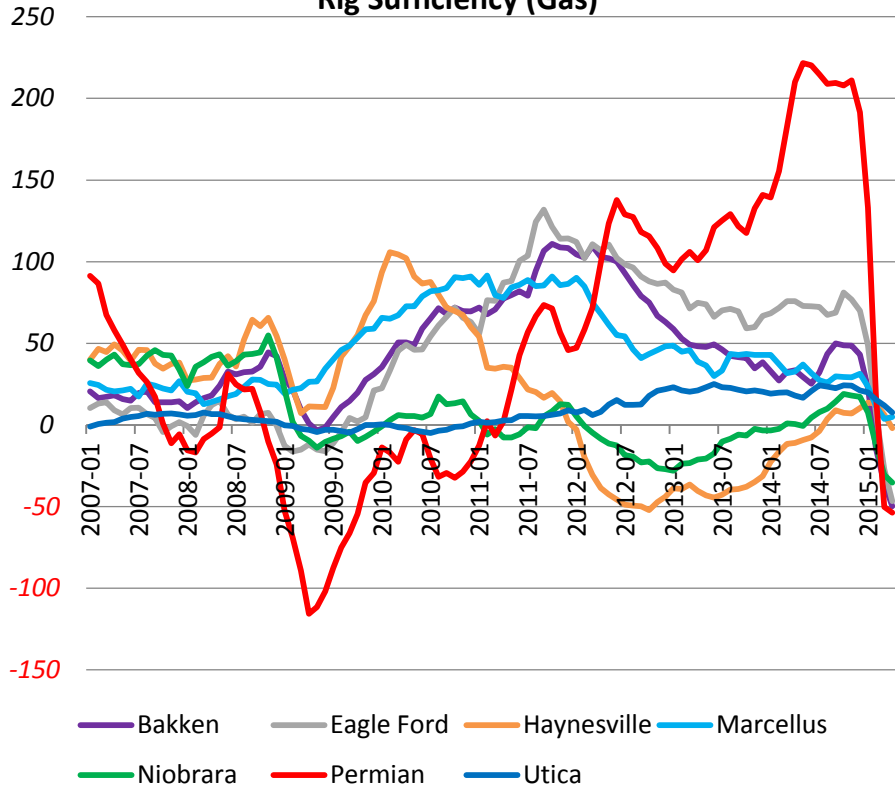


Most plays depends on rig count...

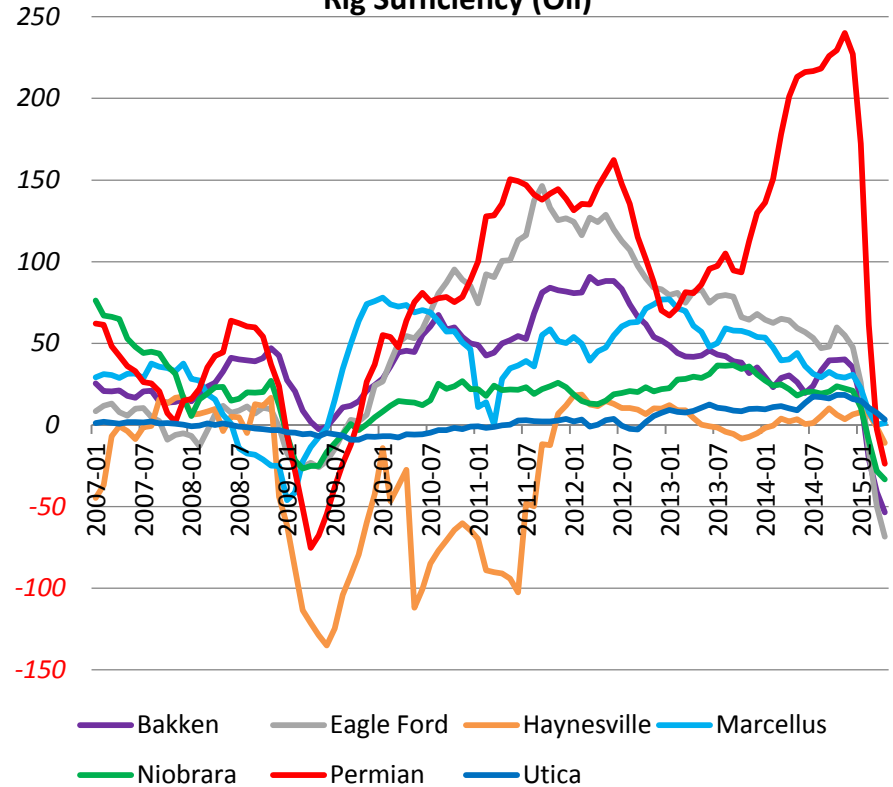


Rig count check

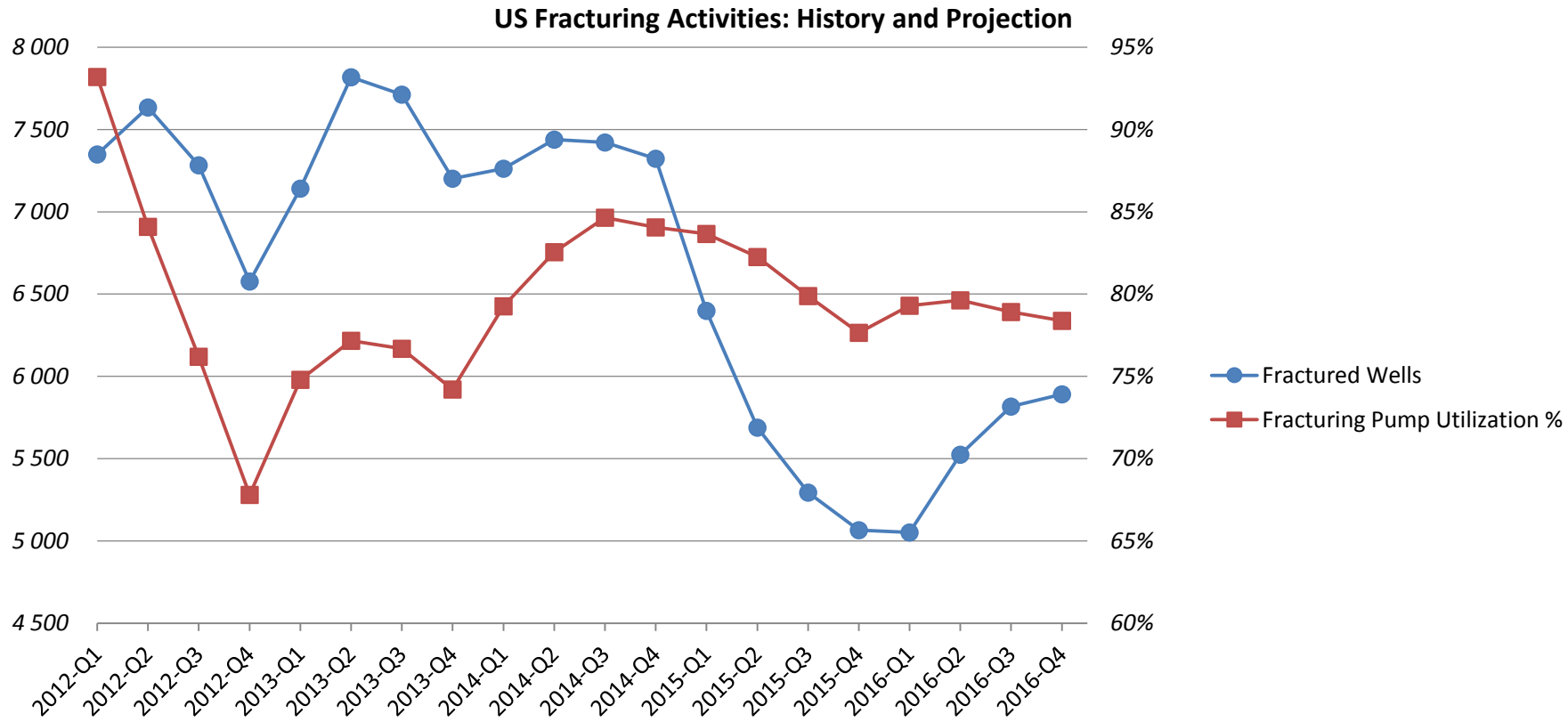
Rig Sufficiency (Gas)



Rig Sufficiency (Oil)



Shale Development: Activities Shrink?



Source: PacWest, *Pumping Pressure Analysis*

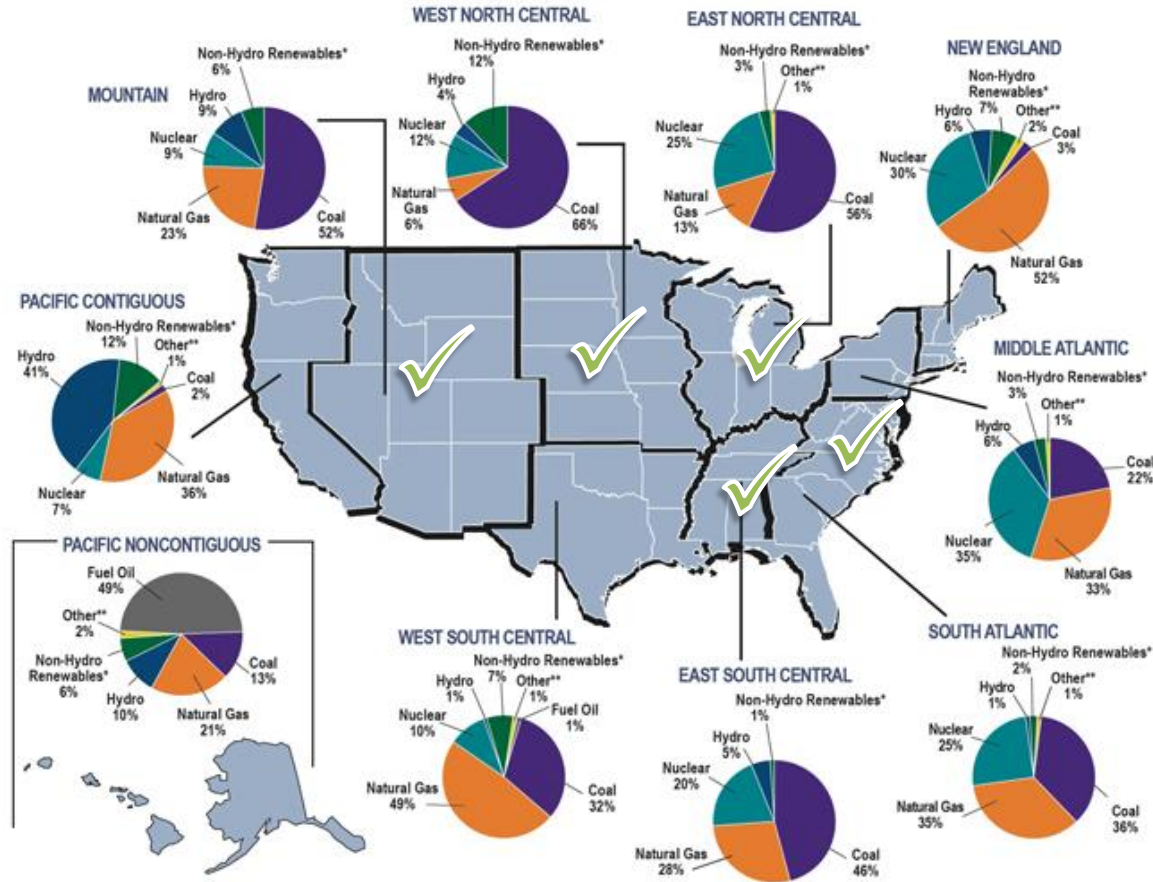
US Power Sector Regulations

- Clean Power Plan
 - Target : Thermal power plants > 25MW
 - Existing : Gas power utilization rate to 75%
 - New : Must comply with CO₂ intensity

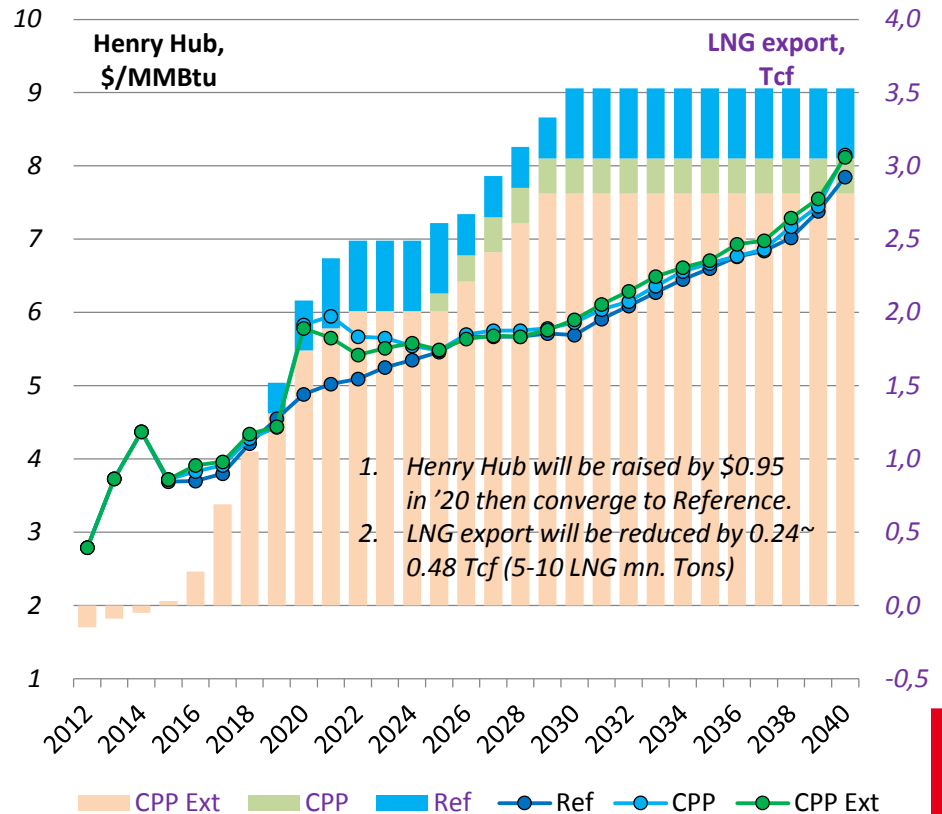
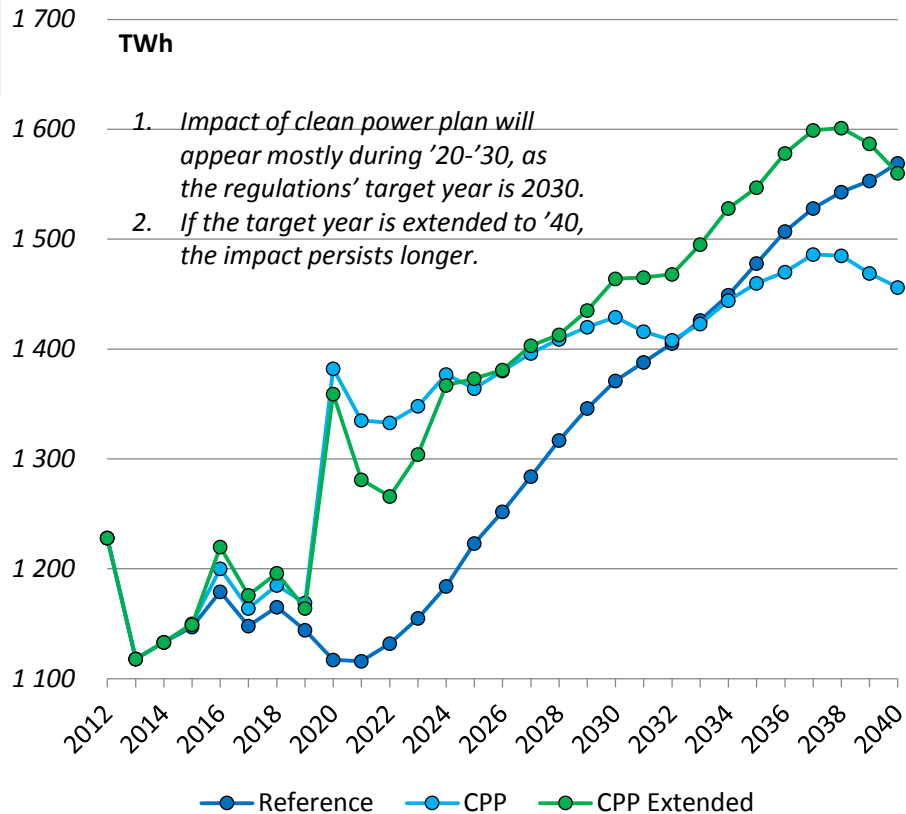
New Units Regulation	Limit
Gas-fired > 850 MMBtu/h* input	453.59 kg-CO ₂ /MWh
Gas-fired <= 850 MMBtu/h input	498.95 kg-CO ₂ /MWh
Conventional coal & IGCC	498.95 kg-CO ₂ /MWh (12-months rolling average)
	476.27 kg-CO ₂ /MWh (72-months rolling average)

* 850 MMBtu = 249.11 MWh

Detailed Look

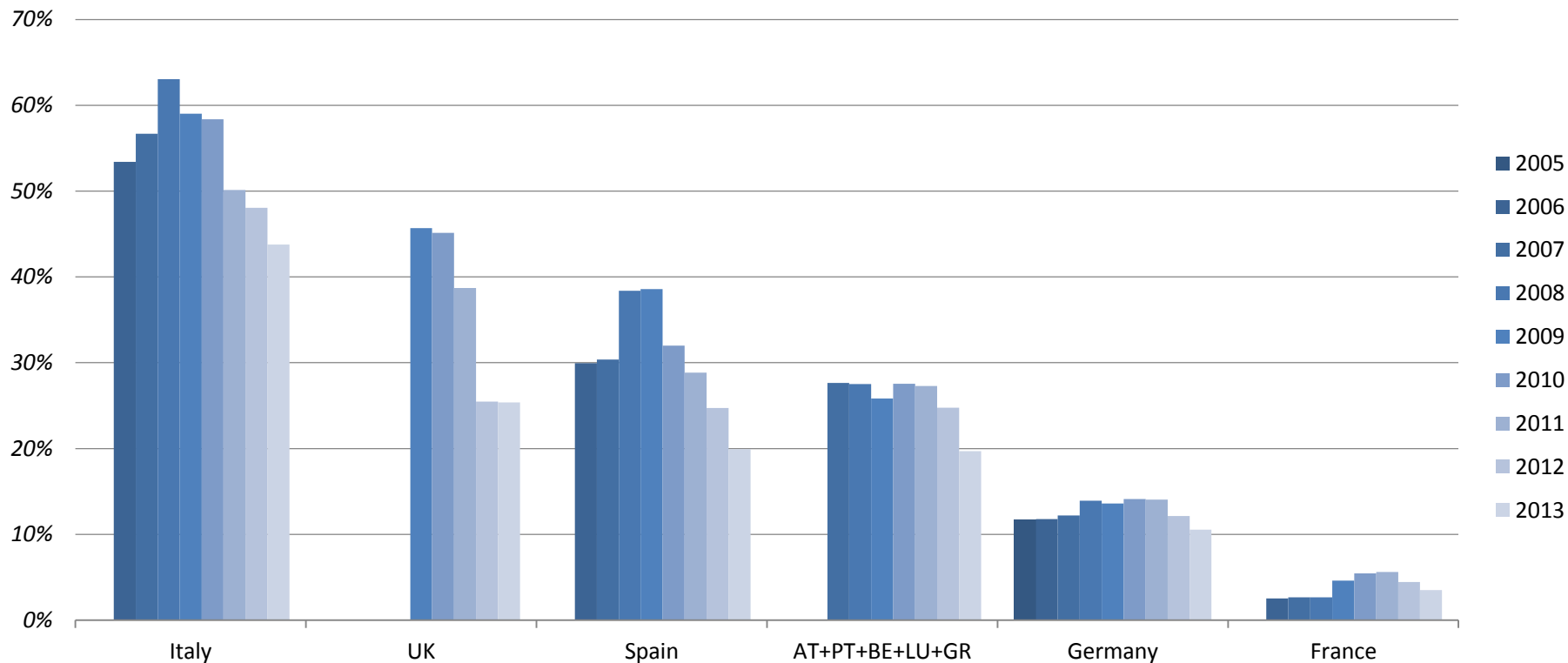


Gas demand from power sector to come



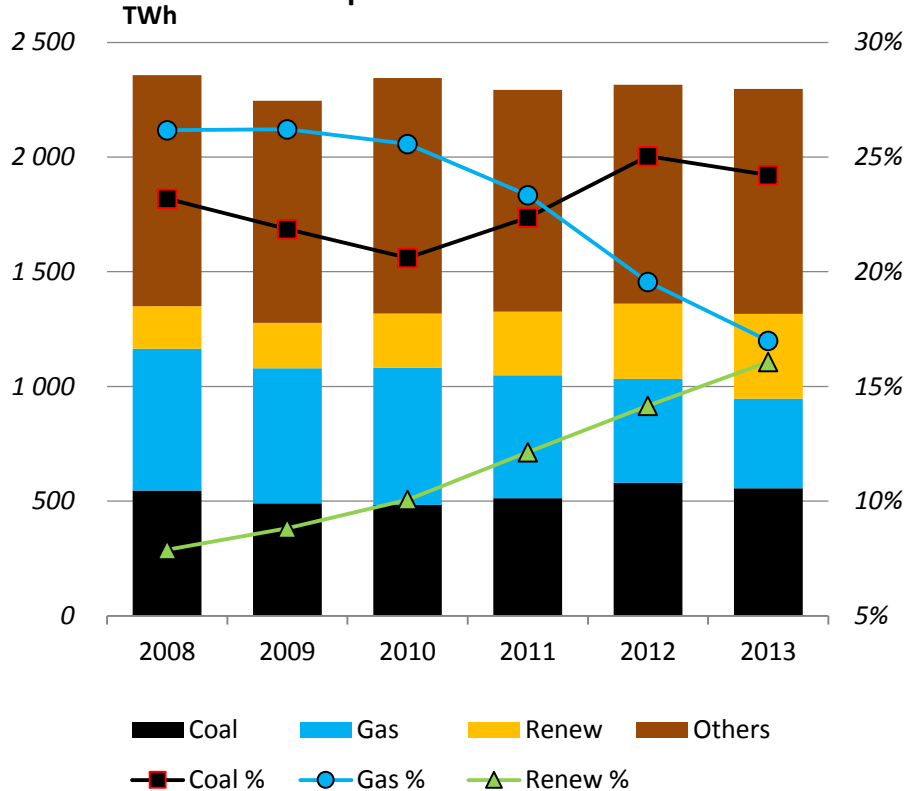
Gas Power Forced Out from Europe?

Gas Power Generation %

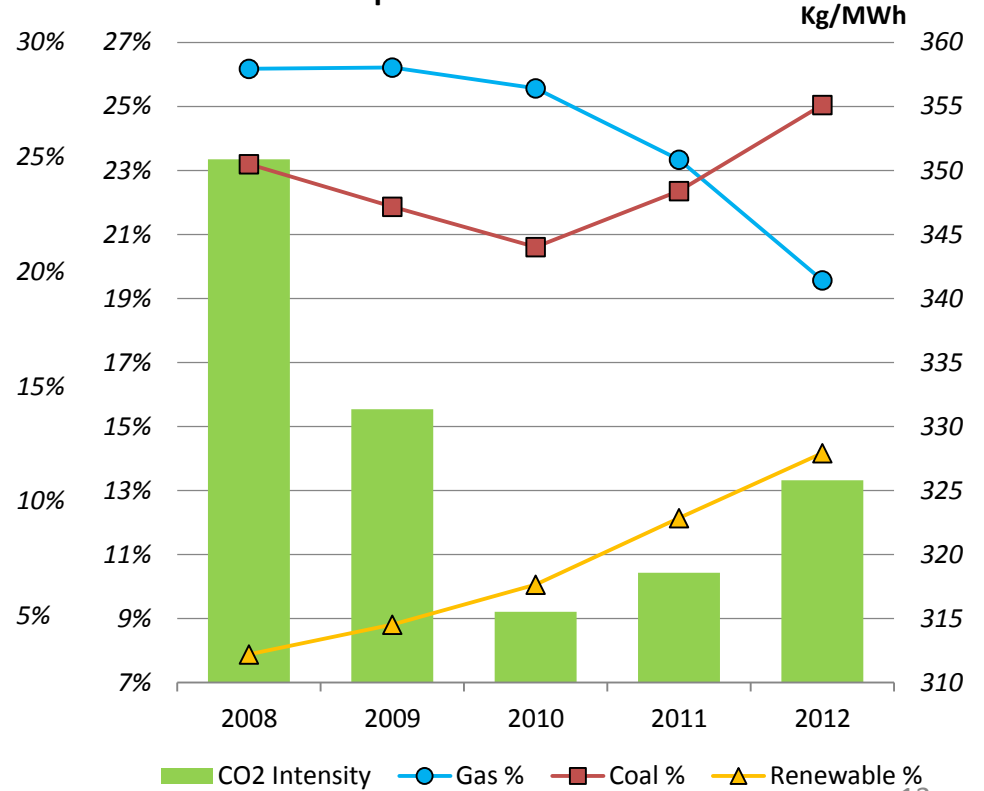


Implications to Policymakers

European 10 Generations

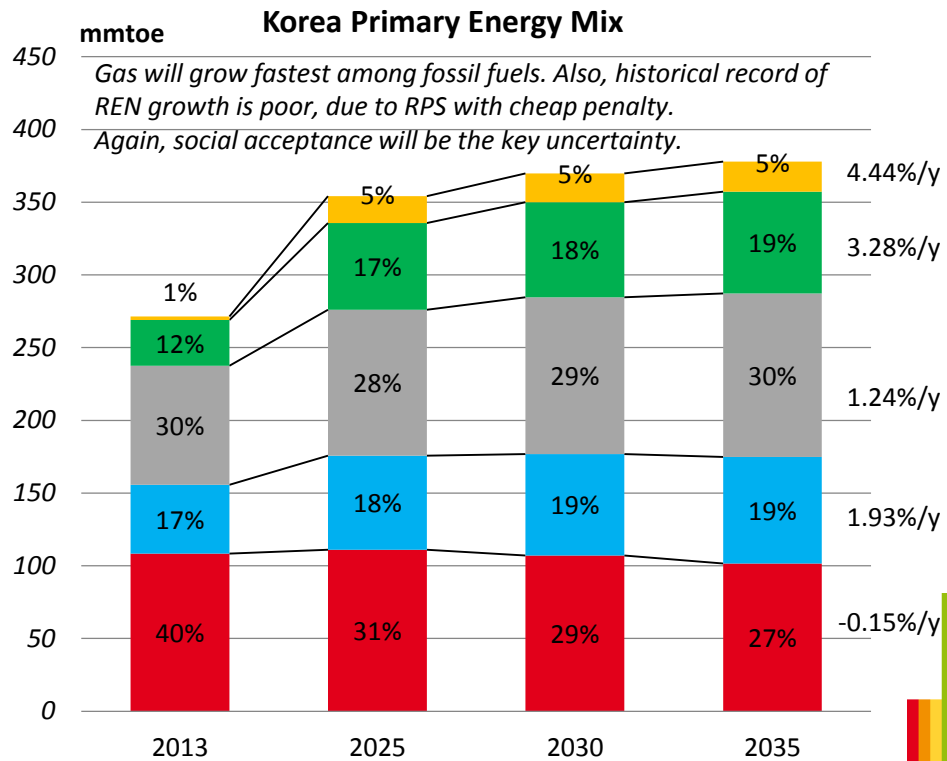
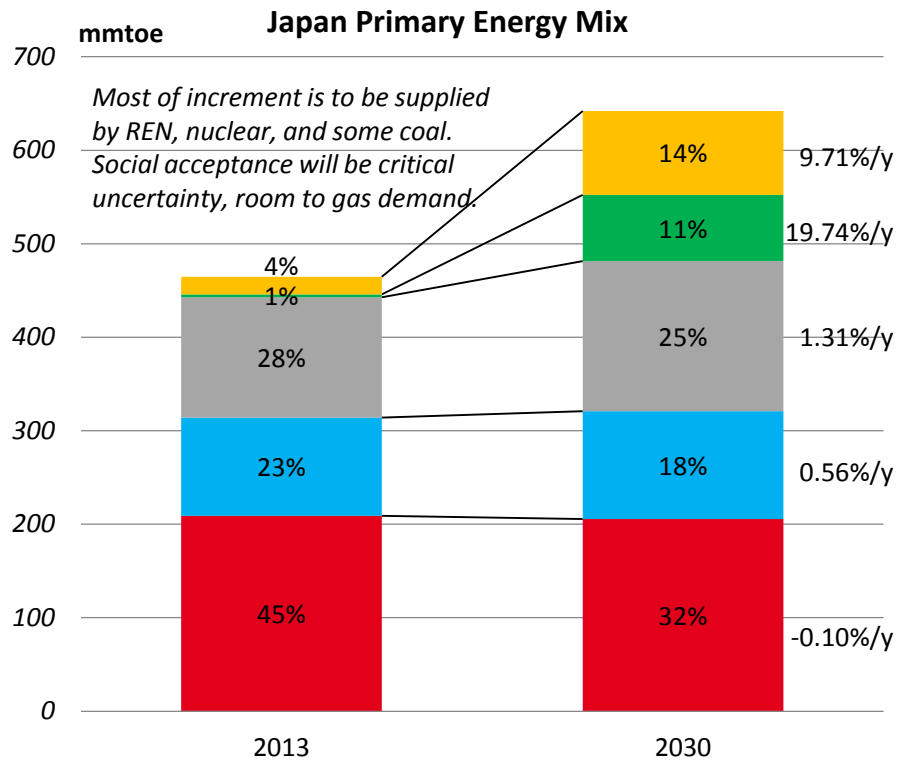


European 10 Green Performance



Sources: CDC Climat, ENTSOE, ELEXON

Japan/Korea: Energy policy and their uncertainty

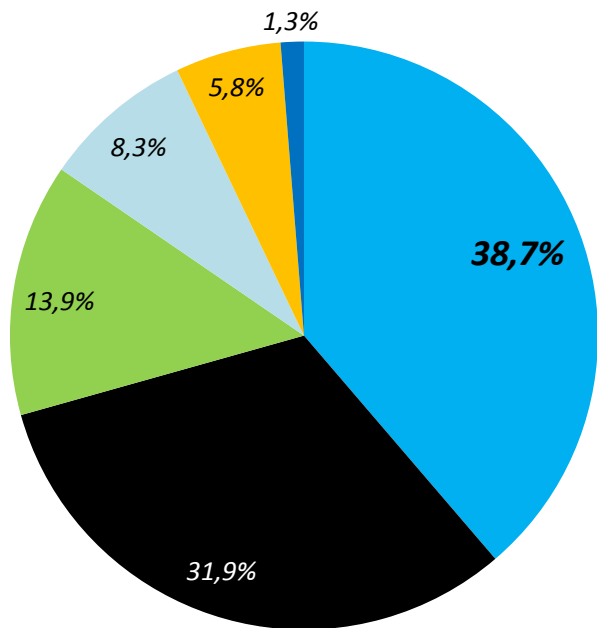


Oil Natural Gas Coal Nuclear Renewables

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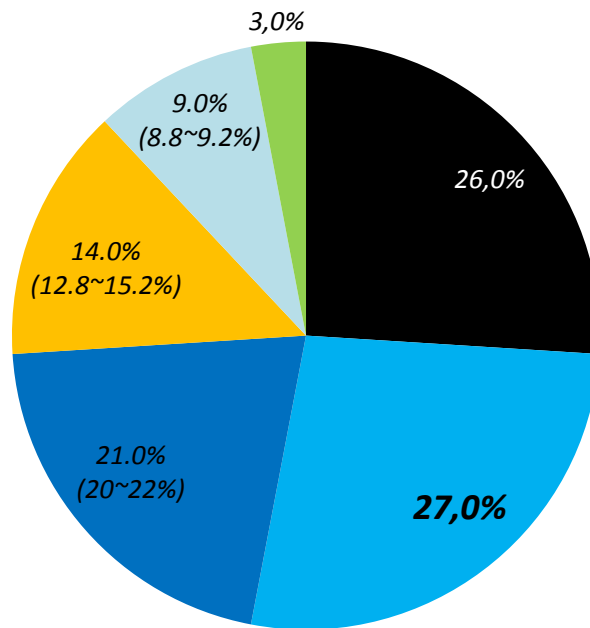
Japan: Power Mix

Power Mix in 2013



Total : 966.6TWh

Proposed Power Mix in 2030



Total : 1,065TWh

BAU : 1,278TWh



Energy Saving
(213TWh, 17%)

■ LNG ■ Coal ■ Oil ■ Hydro ■ Renewables ■ Nuclear

■ Coal ■ LNG ■ Nuclear ■ Renewables (incl. Hydro) ■ Hydro ■ Oil

Korea: Long Delays...

- Never-ending Delays
 - National Basic Plan under discussion
 - Schedule continued to fail to meet
 - By the law, should've been announced 2014
 - No release yet
 - Various reasons working to hold
 - Social acceptance, overlapping government plans, grid limitation issue, and so on...

Wrap-up 1

- Uncertainty & Their Impact
 - U.S
 - Robustness of shale gas production
 - Marcellus dependency persists... what if it peaks?
 - Rig dependency of most other plays implies possibility of volatility in production
 - And rig count is declining... What to come?

Wrap-up 2

- Clean Power Plan impact
 - Will require more gas to power, cutting room to export and raising price up
- Europe
 - Power without gas
 - Power without gas saw CO2 intensity rebound and increasing burden
 - How long this trend to persist?

Wrap-up 3

- JK market
 - Energy policy without social acceptance
 - Both are considering nuclear as important option, but social license seems still hard to get
 - Fukushima (JP) and series of fake scandals (KR)
 - Coal is another issue in terms of environment
 - Feasibility of current energy policy will add more rooms of gas demand

THANK YOU

