SJWS # 4

23 February 2016

ENTSOG Offices

Data Source of Commodity Prices

Gas, Coal, CO2

Merit order of sources in

WEO 2013 and WEO 2015

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Image Courtesy of Thyssengas

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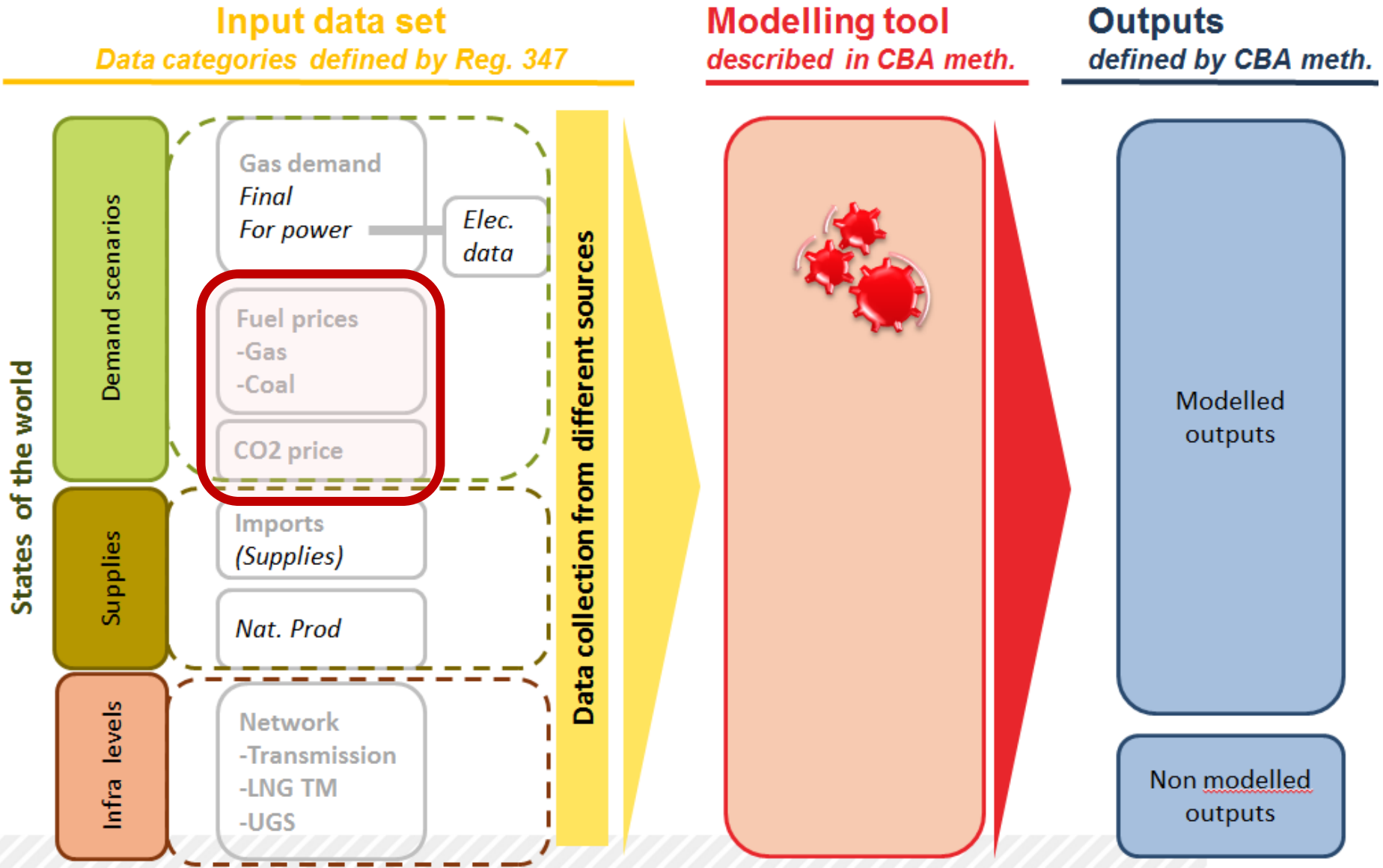
1) Background



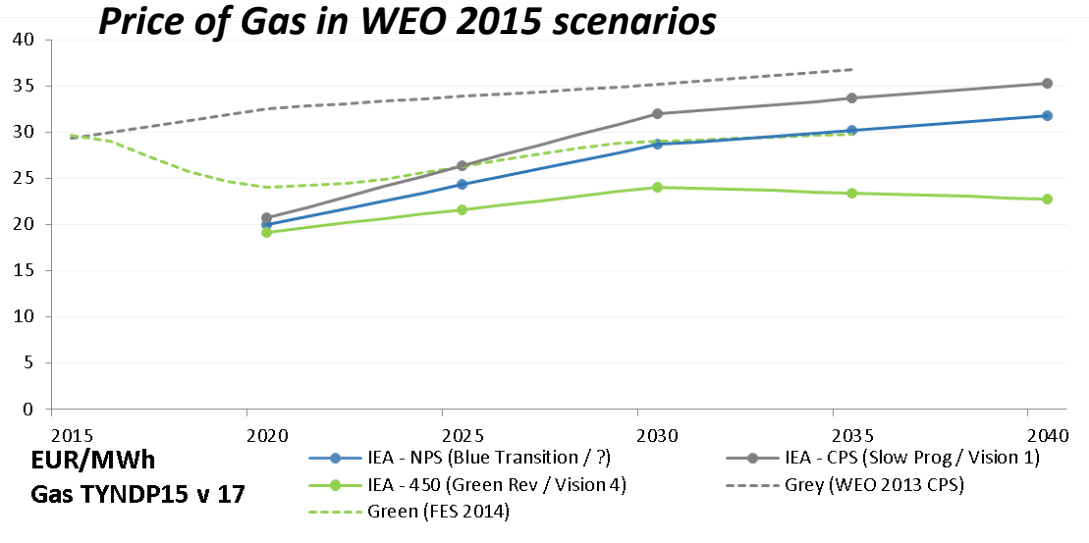
2) Proposal

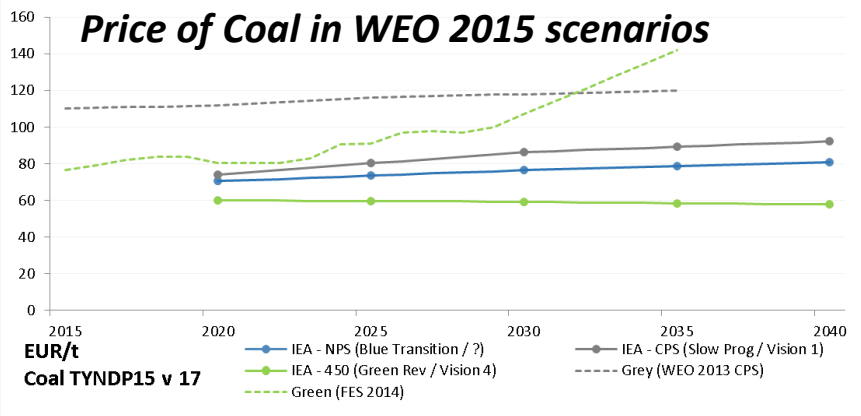
Proposal:

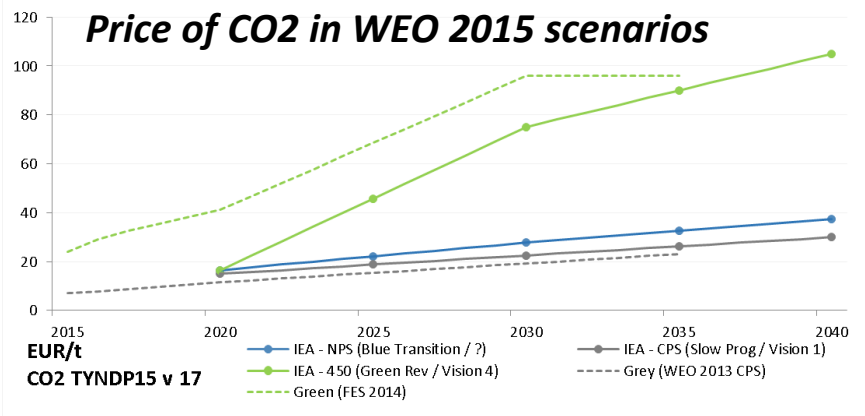
1. To use WEO 2015 as data source for commodity (gas and coal) and CO2 prices in the TYNDP 2017
2. To align our scenarios with the WEO scenarios on the following way:

ENTSOG Scenario	Short Description	ENTSOG Data Source
Slow Progression	Coal before gas; Not on path with EU Targets	WEO 2015 - Current Policies
Blue Transition	Gas before coal based on Regulation; Mainly on path with EU Targets	WEO 2015 - New Policies
Green Revolution	Gas before coal based on Regulation; On path with EU Targets	WEO 2015 - 450

2) Comparison with TYNDP 2015







2) Proposal

The actual data from WEO2015

Table 1.6 ▷ Fossil-fuel import prices by scenario

		New Policies Scenario			Current Policies Scenario			450 Scenario			Low Oil Price Scenario		
	2014	2020	2030	2040	2020	2030	2040	2020	2030	2040	2020	2030	2040
Real terms (2014 prices)													
IEA crude oil imports ($/barrel)	97	80	113	128	83	130	150	77	97	95	55	70	85
Natural gas ($/MBtu)													
United States	4.4	4.7	6.2	7.5	4.7	6.3	7.8	4.5	5.7	5.9	4.7	6.2	7.5
Europe imports	9.3	7.8	11.2	12.4	8.1	12.5	13.8	7.5	9.4	8.9	5.9	8.9	11.4
Japan imports	16.2	11.0	13.0	14.1	11.4	14.9	16.0	10.7	11.8	11.1	8.8	10.7	12.4
OECD steam coal imports ($/tonne)	78	94	102	108	99	115	123	80	79	77	88	97	102
Nominal terms													
IEA crude oil imports ($/barrel)	97	89	153	210	92	176	246	85	131	156	61	95	140
Natural gas ($/MBtu)													
United States	4.4	5.2	8.3	12.3	5.2	8.6	12.8	5.0	7.6	9.7	5.2	8.3	12.3
Europe imports	9.3	8.6	15.1	20.3	9.0	16.9	22.6	8.4	12.7	14.6	6.6	12.1	18.7
Japan imports	16.2	12.2	17.6	23.1	12.6	20.1	26.3	11.9	15.9	18.2	9.8	14.4	20.3
OECD steam coal imports ($/tonne)	78	104	138	178	110	155	202	89	106	126	98	130	168

Notes: MBtu = million British thermal units. Gas prices are weighted averages expressed on a gross calorific-value basis. All prices are for bulk supplies exclusive of tax. The US price reflects the wholesale price prevailing on the domestic market. Nominal prices assume inflation of 1.9% per year from 2014.

2) Proposal

The actual data from WEO2015

Table 1.4 ▷ CO_2 price assumptions in selected countries and regions by scenario ($2014 per tonne)

	Region	Sectors	2020	2030	2040
Current Policies Scenario	European Union	Power, industry and aviation	20	30	40
	Korea	Power and industry	20	30	40
New Policies Scenario	European Union	Power, industry and aviation	22	37	50
	Chile	Power	6	12	20
	Korea	Power and industry	22	37	50
	China	Power and industry	10	23	35
	South Africa	Power and industry	7	15	24
450 Scenario	United States and Canada	Power and industry	20	100	140
	European Union	Power, industry and aviation	22	100	140
	Japan	Power and industry	20	100	140
	Korea	Power and industry	22	100	140

3) Alignment with ENTSO-E

We have identified the alignment between ENTSOG Scenarios and ENTSO-E Visions

> Story lines for selected WEO scenarios match story lines of both ENTSOG Scenarios and ENTSO-E Visions

ENTSOG Scenario	ENTSO-E Vision	ENTSOG Data Source
Slow Progression	Vision 1	WEO 2015 Current Policies
Blue Transition	?	WEO 2015 New Policies
Green Revolution	Vision 4	WEO 2015 450

ENTSOE has described the data input for commodity prices for its TYNDP

> TYNDP 2016 - Scenario Development Report pg.41.

> The **Gas vs. Coal merit order is the same** for ENTSO-E data source than for selected WEO 2015 Scenarios

Use of WEO 2015 ensures up-to-date data consistent with retained ENTSO-E Visions

4) Gas vs Coal for power generation

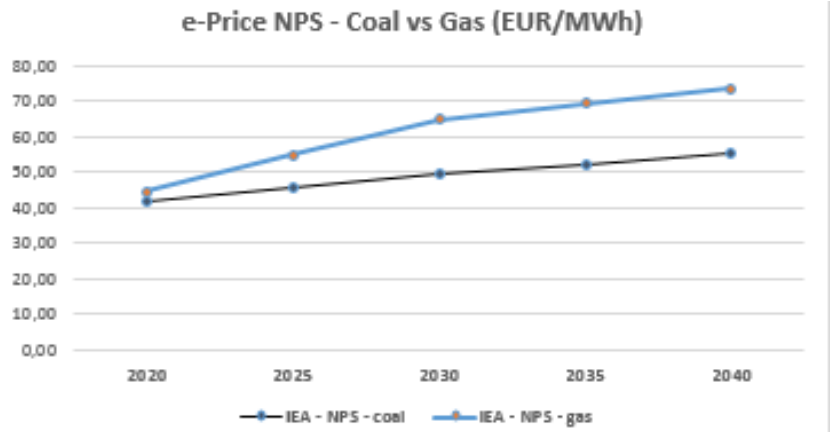
Gas price vs coal price for power generation

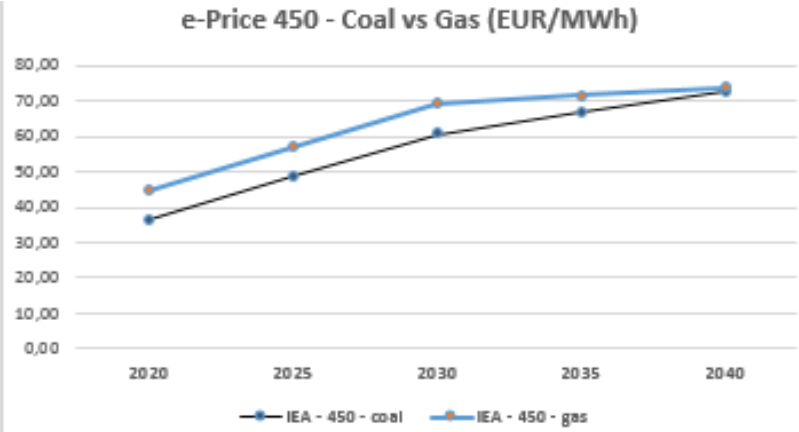
- For all 3 scenarios electricity from gas is higher than electricity from coal
- The evolution of the CO2 price –even in the 450 scenario – is not high enough to switch the merit order

- For Blue Transition and Green Revolution: scenarios consider that coal is displaced by gas on regulatory basis - ***as the gas and CO2 prices from WEO 2015 cannot be taken as relevant prices for the Blue Transition scenario***

5) What about current Gas Prices?

Suppose a scenario with the current gas prices as starting value all along the time horizon, keeping the trend of price evolution from WEO2015

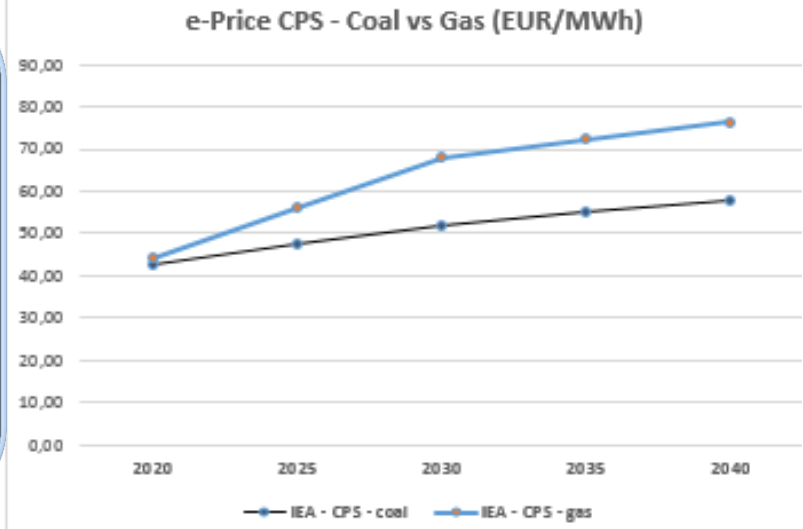




With current gas prices and WEO 2015 trend kept, electricity produced from Gas starts from parity with electricity produced from Coal.

The merit order does not change.

Should current prices be considered for the Blue Transition Scenario?



Current gas price: *Average of Day-Ahead Product for 2015 on 9 Major EU HUBs*
EUR/USD : *ECB average in 2015*

Thank You for Your Attention

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