

Role of the Ports Industry in Coal and Gas

Mike Garratt & Gail Bradford

MDS Transmodal

Tuesday 4th March 2014, London

1. UK Ports in the coal & gas markets

- Provide strategic infrastructure to stockpile and transport fuel
- Ensure security of energy supplies
- Facilitate diversification of sources of supply
- Support development of the low carbon economy
 - in the context of avoiding any reliance on the public purse!



2. Commercial reality bites...



- Investments require hard-nosed commercial decisions to be made based on tangible demand
 - backed by contracts and guarantees
- A business case needs reliable forecasts
- Any planning case has to prove need
- Are aspirational energy policies enough?



3. Coal and Gas worldwide

- Coal production +75% since 1990
- Gas production +65% since 1990

In 2013

- Coal production: about 5.9 billion tonnes
- Gas production (LNG equiv.): about 2.7 billion tonnes

UK share of global demand:

- 1.1% of coal (70% imported)
- 2.7% of gas (17% imported by sea)

4. Trends in international trade: Bituminous coal

	million tonnes
2000	416
2008	597
	+37%
2013	819

Bituminous Coal continues to grow – almost double since 2000

Shares in 2012 million tonnes			
Exporters		Importers	
Australia	278	China	189
Indonesia	143	Japan	173
Russia	106	S. Korea	116
USA	91	Germany	39
Colombia	51	UK	32
South Africa	42	Turkey	25

UK fifth largest world importer

5. Trends in international trade: Gas

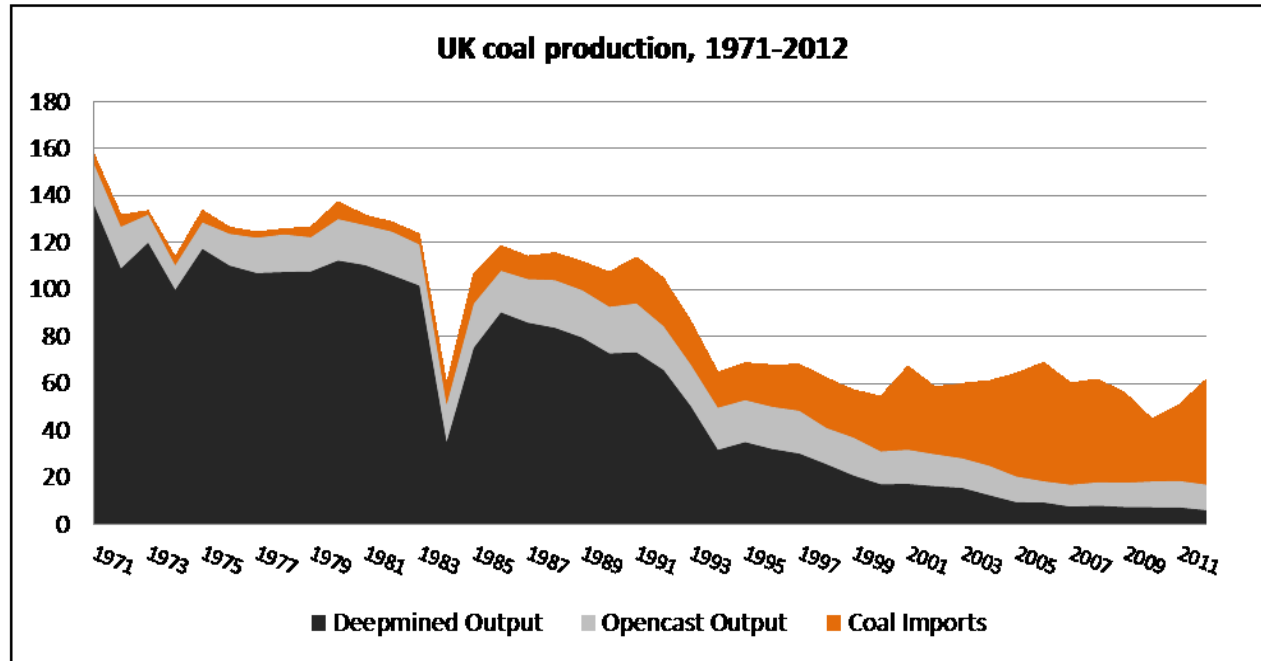
million tonnes LNG equivalent			
	Piped	LNG	Total
2000	211	91	302
2008	342	141	483
		+50%	+11%
2013	324	212	536

LNG growth remorseless

		Shares in 2012 million tonnes					
LNG Exporters		LNG Importers					
		Piped		LNG		Overall	
Qatar	65	Italy	79	Japan	87	Japan	87
Malaysia	21	USA	50	S. Korea	39	Italy	83
Australia	20	France	31	Spain	16	USA	51
Nigeria	17	UK	21	China	15	France	38
India	17	China	15	India	14	UK	31
Russia	11	Ukraine	13	UK	10	China	30

UK features in top 6 for piped and maritime gas

6. UK Coal imports – a brief history

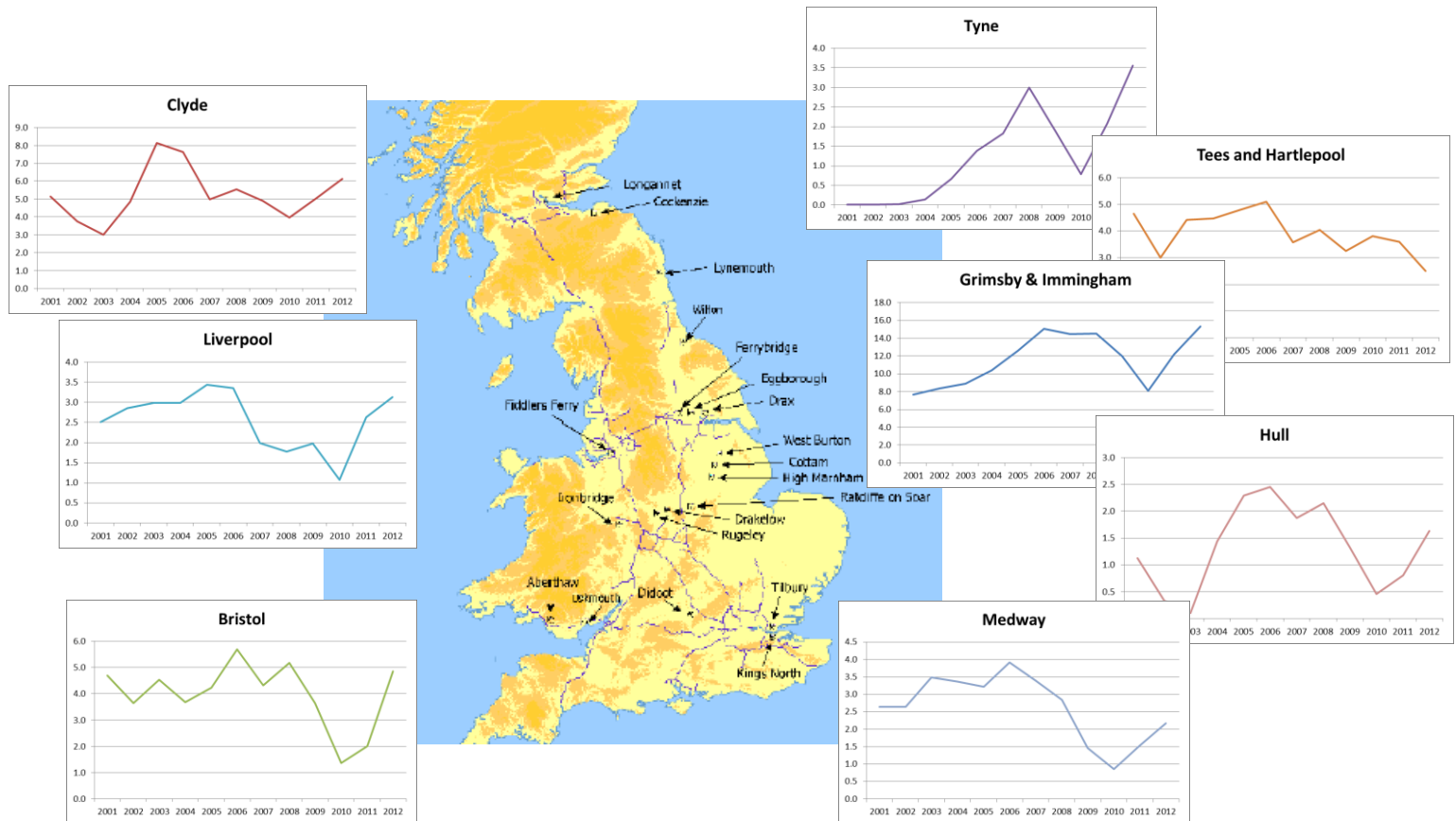


- At the time of WWI Britain operated more than 3,000 deep mines and produced almost 300 million tonnes of coal per year with **zero imports**.
- In 2012 the number of deep mines had reduced to 10 and production to 17 million tonnes with nearly two-thirds supplied from open cast mines
- Imports totalled 45 million tonnes, the highest level since 2006

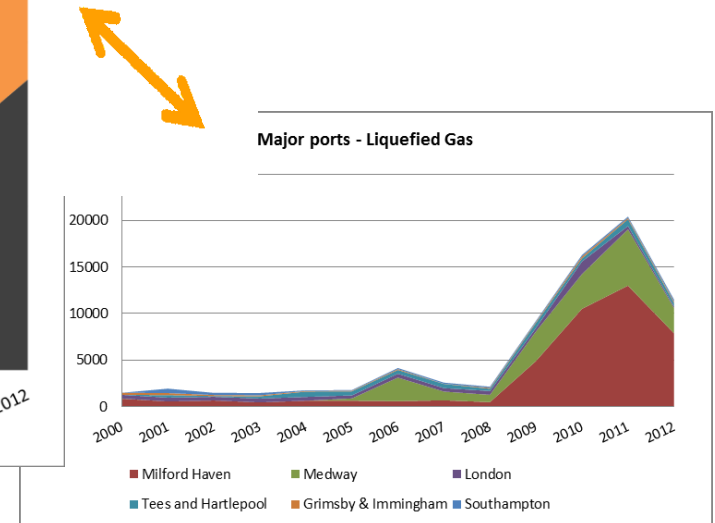
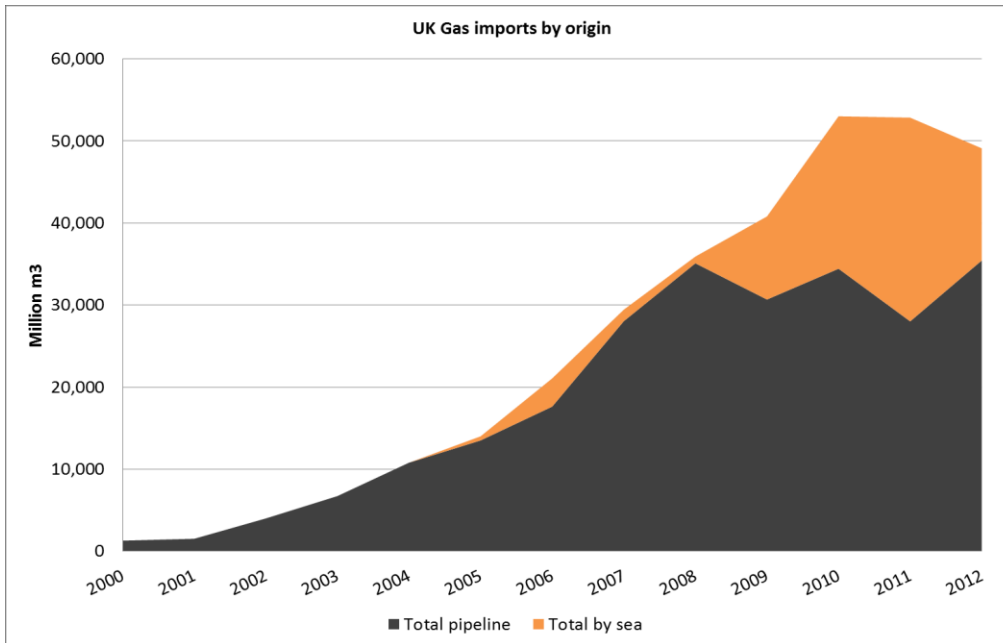
7. Coal ports

- All experienced the recent price related dip & kick
- High fluctuations imply low levels of utilization!

UK coal power stations & port locations

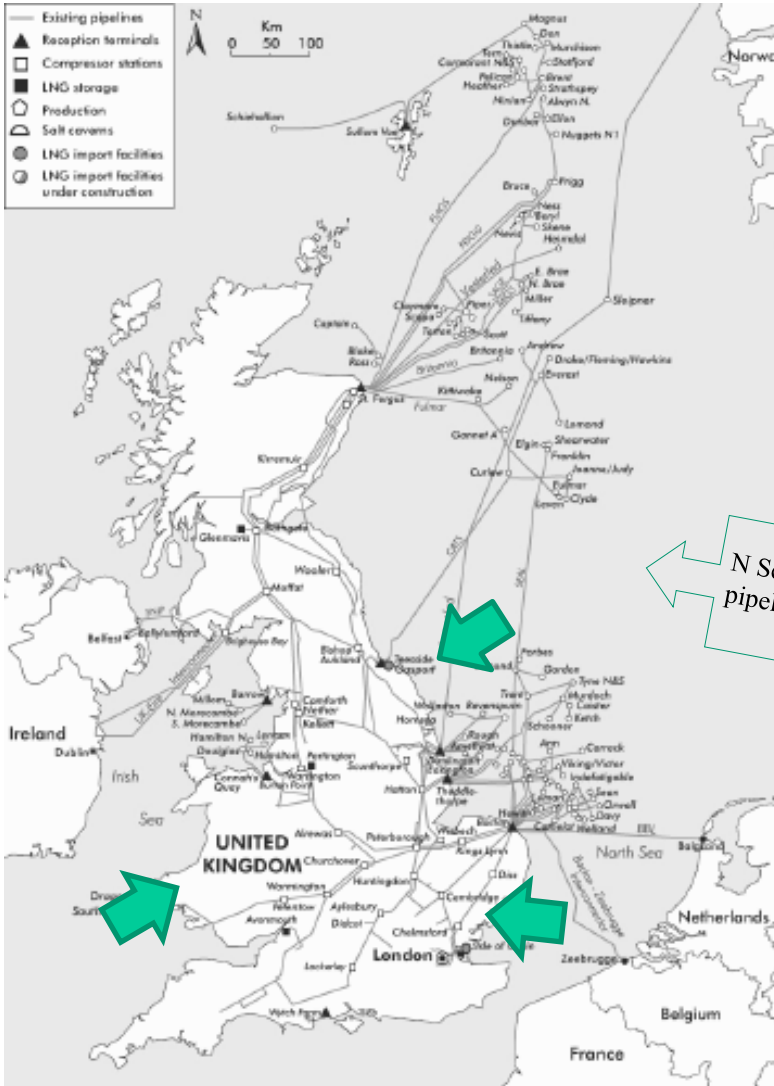


8. UK LNG imports – a briefer history



- LNG Imports not a significant feature pre-2000
- Imports by sea did not feature until 2005
- Port volumes depressed recently by competition from cheaper coal and increased delivery by pipeline ; 75% from Norway (two-thirds of which via Langed pipeline to Easington - opened 2006.)

8. Gas supply and role of ports



- 3 ports of entry for LNG
- Ports perform conservancy functions providing safe navigation for the largest LNG carriers, facilitating diversification of supply sources
- **Milford Haven**
 - Dragon/Qatar Petroleum, ExxonMobil
 - South Hook/BG Group, Petronas
- **Medway**
 - Isle of Grain/National Grid
- **Teesport**
 - Teesside GasPort/Excelerate

9. UK Energy Ports Market 2012

- Imported energy goods represent 39% of GB Port traffic while 43% of all energy sources for the UK are imported
- 10% of fuel for electricity imported through the Ports

million tonnes 2012	
Total UK major ports	490
Total mainland exc. pipelined exports	428
Unitised	137
Non energy bulk	108
Semi-bulk	17
Total non energy goods	262
Total energy goods	166
For electricity generation <i>of which:</i>	42
<i>Coal</i>	37*
<i>Gas</i>	3*
<i>Biomass</i>	2

166m tonnes of energy goods through ports – of which 25% imported gas, oil and biomass for electricity

*based on 19% gas (net) and 70% steam coal being imported

10. UK energy budget 2012 (Mtoe)

		Mtoe			
UK energy goods demand		214			
Non energy use		(8)			
Net energy demand		206			
Transformation/losses		(66)			
Net residual demand for energy		140			
of which:			Mtoe as:		
			electricity	gas	other
Transport (98% oil)	53				
Industry	25	of which:	8	10	7
Public sector/commercial/misc.	19	of which:	9	9	1
Domestic	43	of which:	10	29	2
			27	48	10
		Made from:			
	Coal		43%		
	Gas		26%	100%	
	Other		31%		

UK demands approximately 140 Mtoe energy p.a. – 20% as electricity

69% electricity from gas and coal

11. Coal and gas budget 2012

Million tonnes				
	Imported by sea	Total	electricity	
Coal supply	45	64		
Industrial demand		(9)	GWh	Mtoe
For electricity		55	→ To produce:	140 12
Gas supply – if all LNG	12	65 (net)		
Industrial demand		(10)		
Domestic/commercial		(38)		
For electricity		17	→ To produce:	86 7
Other sources of electricity				102 8
Total				328 27

Total imported

57 of 129 million tonnes (if all gas LNG)

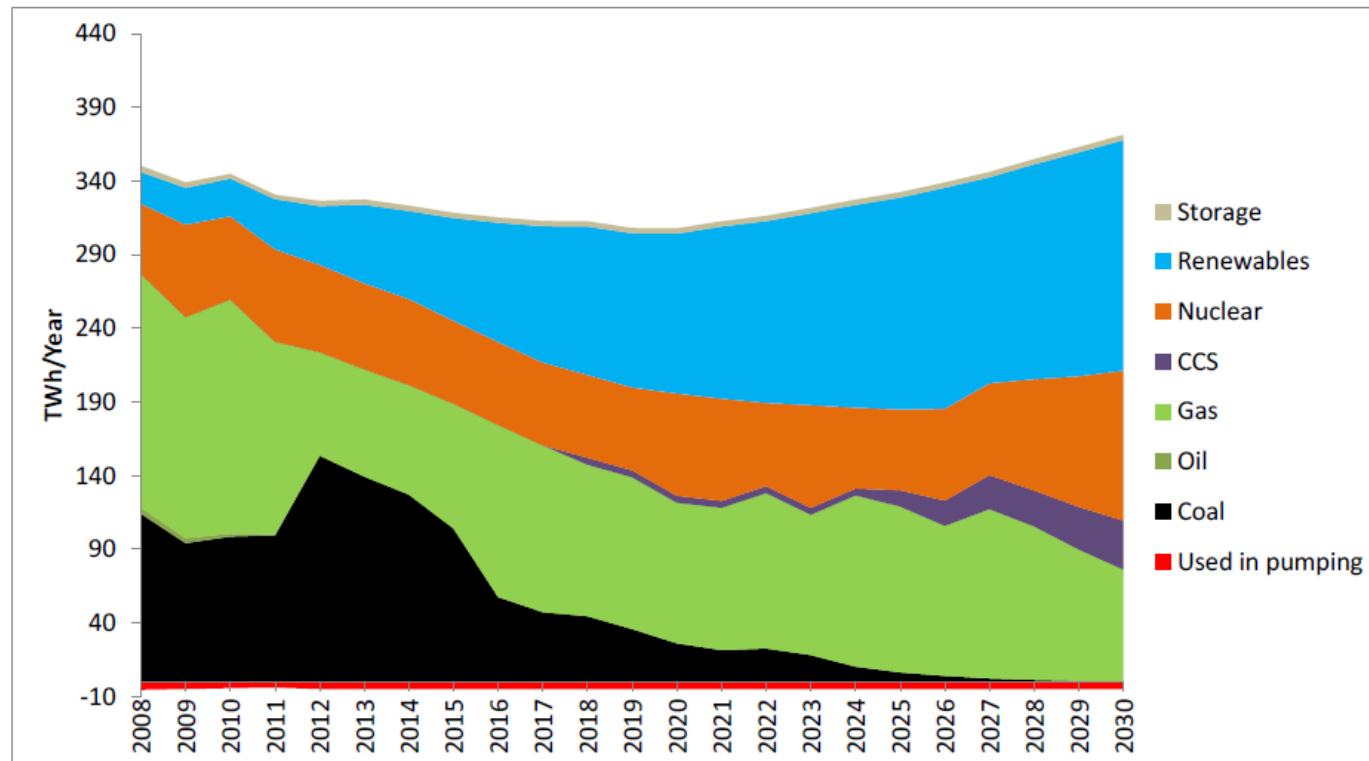
12. A steady state worked example

- UK population expected to grow by 0.6% p.a. to 2040
 - implies +12% between 2012 and 2030
 - no efficiency gain OR industrial growth
 - result would be 10% increase in energy demand
- If domestic coal and domestic/pipelined gas supply fixed.....
 - increased demand for 5m tonnes coal and 6m tonnes LNG.
- But page 43 of updated **UK energy and emissions projections 2013** forecast that by 2030:
 - energy demand will fall by 9%
 - electricity demand will grow by only 7%
 - overall gas demand will fall by 11%
 - **coal demand will be squeezed out altogether**
 - non carbon renewables grow from 10% to 44% of supply.

13. By fuel: UK energy projections 2013

- Coal almost disappears and only 19% electricity from coal and gas
- Future projections appear driven by emission targets

Energy supplied to MPPs by fuel type – forecasts to 2030



Source: DECC updated Energy & Emissions projections 2013

14. UK energy & emissions forecasts

	(Mtoe)	2010	2015	2020	2025	2030
Industry		28	24	24	24	24
<i>Of which electricity</i>		9	8	8	8	9
<i>gas</i>		11	9	9	9	8
Domestic		48	43	41	43	46
<i>Of which electricity</i>		10	9	8	9	10
<i>gas</i>		33	30	29	31	33
Transport		43	40	39	37	36
Services and agric		19	18	16	16	17
Total		137	125	120	120	124
<i>Of which electricity</i>		28	26	26	28	30
<i>gas</i>		53	47	44	45	47
<i>renewables</i>		3	4	6	5	5

Demand in all sectors falls

Market share for electricity rises from 20% to 24% - no choice if switch to renewables

15. International Energy Agency forecasts

- OECD provides an alternative perspective.
- IEA (within OECD) projects on a global basis
- Considers range of alternative scenarios
- Its 'New policy' scenario assumes extensive 'greening' in the west and anticipates:

to 2030 (new policies)

- global increase in energy demand of +27%
- global increase in electricity demand +54%
- increase in EU total energy demand of -6% (UK projects -9%)
- Increase in EU electricity demand of +8% (UK projects +7%)

But a very different view on role of coal and gas.

16. IEA forecasts overview

International Energy Agency (OECD) "new policies Scenario"

	1990	2011	2020	2025	2030
World energy (Mtoe)					
Total	8769	13070	15025	15877	16623
of which from					
Coal	2230	3773	4202	4312	4379
Gas	1668	2787	3273	3576	3846
World Electricity Generation (TWh)					
Total	11818	22113	27999	31121	34058
of which from					
Coal	4426	9139	10618	11236	11797
Gas	1730	4847	5983	6860	7589
European Union energy (Mtoe)					
Total	1642	1659	1614	1584	1556
Of which from					
Coal	456	286	249	210	175
Gas	297	404	407	430	442

Demand for global energy
+90% in 40 years

Demand for coal to grow by
96% in same period!

Demand for gas to grow by
130%!

EU demand for energy STABLE

EU Coal and gas demand 18%
down in 40 years

BUT COAL SURVIVES!

17. UK and IEA for EU projections compared

International Energy Agency (OECD) "new policies Scenario"
for the EU versus local UK projections

	1990	2011	2020	2025	2030
European Union electricity generation (TWh)					
Total	2577	3257	3357	3443	3516
of which					
Coal	1051	884	764	622	501
Gas	193	696	577	696	749
Coal and gas share	48%	49%	40%	38%	36%
UK Government projected electricity generation (TWh)					
Total		325	308	333	370
of which					
Coal		95	25	10	-
Gas		130	100	110	70
Coal and gas share		69%	41%	36%	19%

IEA for EU

- Electricity from coal in gradual decline
- Electricity from gas rising marginally
- Overall 36% by coal and gas by 2030

UK

- Coal to disappear
- Gas to decline by 30%
- Overall 19% by coal and gas by 2030

Does not imply a single market in energy!

18. Energy by fuel: OECD view

- World view to 2030 (energy source)
 - Coal +16%
 - Gas +38%
- World view to 2030 (fuel for electricity)
 - Coal +29%
 - Gas +42%
- European Union to 2030 (energy source)
 - Coal -39%
 - Gas +9%
- European Union to 2030 (fuel for electricity)
 - Coal -39%
 - Gas -8%

EU share of electricity from coal and gas to be 36% in 2030

- but UK projects only 19%

19. Explanations?

- Working backwards?
 - only by assuming coal's role disappears can CO2 targets be met
- Energy demand to fall
 - But is there evidence?
- Very rapid growth in renewables
 - OECD 'New Policies' anticipates renewables growing from 21% to 40% of electricity generation by 2030
 - UK assumes growth from a lower base (10%) to 44%.

Are these aspirations credible?

- Will current UK policies stick?

20. The role of the ports industry

- Not to dictate energy policy!
 - but a clear need and requirement to respond to market demand
 - an implied deal whereby State stands back if industry delivers capacity in a competitive environment.
- Ports to maintain unsubsidised commercial viability
 - which implies a need to address market (not political) demand
- To address demand may require planning/development order consents
 - will such consents be predicated on UK, OECD or other projections?
- Joined up policy development required to inform market activity
 - yet in 2013 Network Rail (with ORR) proposed raising infrastructure charges for coal to exploit coal's price advantage over gas
 - distorting competition between ports

21. Forecasting and planning

- Up to 2-3 years ago the expectation was for biomass power stations in ports.
- Carbon capture implies new coal stations in ports
- Growth in renewables implies large areas for turbine & blade manufacture and assembly areas
- Should some port areas be more heavily dedicated to energy
 - keeping open the option of manufacturing requirements
 - perhaps nuclear stations should also be in deep water harbours to share the cost of grid upgrade
- If Carbon capture or biomass station developments within port estates
 - should ports also be allocated space to develop related industry and agricultural development (waste heat)?

So that, for ports, does energy policy become a land use planning exercise?

22. Coal, gas and forecasts

- Port managements need to make the right decisions to protect and enhance their investments and retain investor confidence
 - Should they invest (with partners) in biomass silos, carbon capture, on-site power stations or wind or wave power?
 - What role will gas and coal retain?
- 10-15 years ago forecasts were needed to justify container terminal expansion in the context of the Habitats Directive....job done.
- The sector NOW requiring forecasting attention to inform the planning process and clarify 'need' is energy
 - but confusion between demand, aspirations and policy.
- Arguments therefore required to deal with this uncertainty
 - whereby ports can make a planning case based on catering for a wide range of potential outcomes?

Should this include the potential for coal to retain a role in the UK as anticipated for other European countries

Thank you!

mike.garratt@mdst.co.uk