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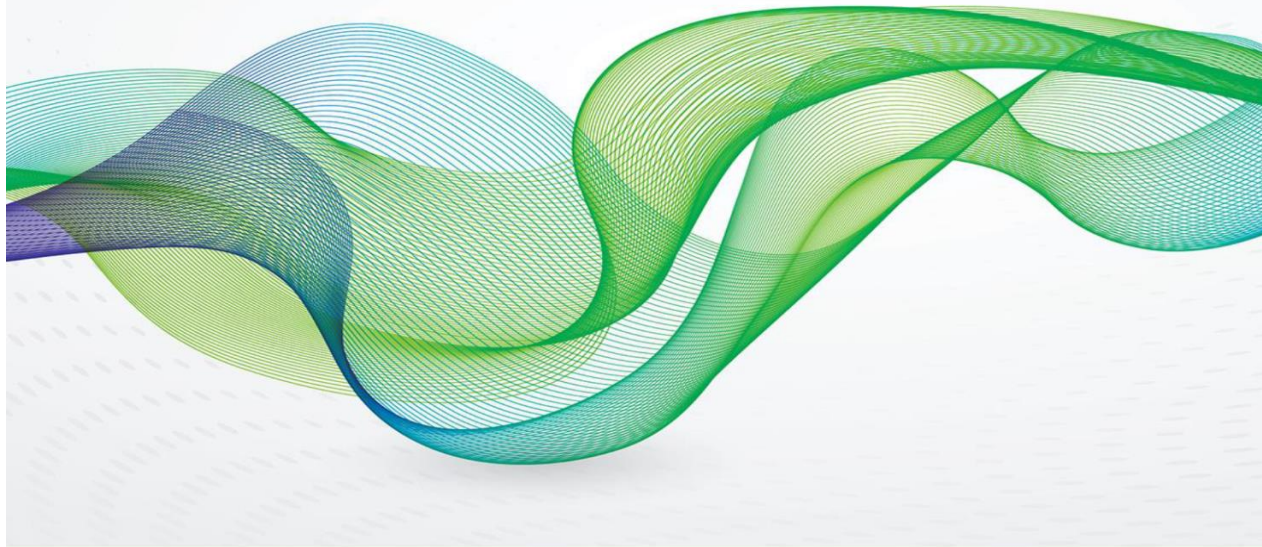


The Future of Gas in Decarbonising European Energy Markets

Jonathan Stern

Sedigas Annual Meeting, Madrid, May 30, 2017

The Future of Gas in Decarbonising European Energy Markets: the need for a new approach



OIES PAPER: NG 116

Jonathan Stern

Published in January 2017, reaction has been general agreement with the main thesis, but inability to think/plan longer term. This is not good news for the future of gas in Europe!



The Failure of European 'Gas Advocacy': failure to convince policy makers (and public opinion) that gas should be considered a 'transition' or 'destination' fuel

The industry was confident that gas was lower carbon than coal and cheaper than renewables, and therefore 'the obvious low carbon solution' BUT failed to recognise that:

- Renewables were politically popular because of environmental benefits and meeting targets; subsidies not as important as fossil energy community believed
- Coal was politically popular because of local employment
- Gas was not popular because:
 - ❖ 2011-14 it was very expensive
 - ❖ the Putin factor and 'security'
 - ❖ lack of employment connection in most countries (and still)

Not much time to reverse this before policy leads in different, non-gas directions

1a. European Gas Advocacy Groups have consistently argued that gas should be regarded as a transition or destination fuel for a low carbon energy economy. Do you believe that:

Source: FLAME 2017

1. These arguments have been convincing and will eventually prevail **32%**
2. These arguments have not been convincing and will become decreasingly relevant **26%**
3. These arguments could be convincing if carbon capture and storage was adopted on a significant scale **32%**
4. These arguments do not matter because transition to a low carbon economy will gradually fade from the political/energy agenda **10%**

Did COP 21 change anything for European gas?



- Decarbonisation already confirmed in Europe from previous targets/budgets
- Nothing specific 'changed' with COP 21 except that policy is even more publicly committed to decarbonisation..

MESSAGE FROM COP 21: DECARBONISATION IS ONGOING AND UNSTOPPABLE!!

- Meaning that unless CCS can be introduced on a large scale, all fossil fuels have a limited future (albeit one which could still last for several decades) but CCS has made very little (no?) progress beyond the upstream
- CO2 targets mean decarbonisation of power by 2030, decarbonisation of heat 2030-50

1. Will Carbon Reduction (COP21) Commitments by governments have a decisive influence on European gas demand by 2025-2030?

Source: FLAME 2017

1. Yes, COP 21 commitments will make European gas demand higher than it would otherwise have been **23% (2016 – 41%)**
2. No, COP 21 commitments will make no difference to gas demand **9% (2016 - 17%)**
3. Technological progress of renewables and battery storage will have a greater influence on gas demand **52%**
4. Governments are likely to abandon their carbon commitments as 2030 approaches because the cost of achieving them will become too great **16%**



Mismatches in Time Horizons Partly Account for Lack of Advocacy Traction

POLICY-MAKERS:

- Must respond to COP21 with concrete decarbonisation plans for power and heat
- This means 2030-50 are the relevant time horizons BUT..
- lead times may mean policies will be introduced in the next 5-10 years

COMPANIES:

- Focussed on short term results/prices/ contracts current perceptions of commercial viability
- Find it difficult to plan for more than a few years ahead (2030 and especially 2050 are too far ahead)

But this is only part of the story, a larger part are problems within the gas community itself



European Gas: what has gone wrong in the 2010s?

FIVE DIFFERENT PROBLEM AREAS:

- **COMMERCIAL:** utilities, networks, upstream producers and exporters
- **SECURITY**
- **BUSINESS MODEL**
- **ENVIRONMENTAL**
- **FRAGMENTATION**



1. Commercial Problems for Utilities and Networks post-2008

UTILITIES (with long term supply contracts):

- Lower (and declining) energy, power and gas demand
- Residential, commercial and industrial demand declining due to efficiency measures
- High gas prices during 2011-14 [especially in relation to coal and renewables with government support], low carbon prices
- Long term contracts: stranded assets, out of the money, renegotiation/arbitration now completed(?)
- Billions of Euros (in some cases >€10bn) of asset write-offs in power generation and storage

NETWORK COMPANIES:

- Declining demand means declining throughput but protected by ship or pay contracts and regulation
- May experience greater difficulties when ship or pay contracts expire



1. Commercial Problems for Upstream (Oil and) Gas Companies

- The cost challenge: projects with delivered costs in excess of \$8/MMbtu (€25/MWh) may be unaffordable/unfinanceable in a low price era (and even this cost level may be too high!)
- This means that high cost (eg Arctic, deep water, remote) discoveries may be 'stranded' assets
- Mid/downstream companies are unwilling/able to sign a traditional long term contract except at hub-minus prices
- The new IOC development model for greenfield projects has to include market development

By the next price cycle renewables and storage technology likely to have further reduced their cost of delivery



2. Security Problems: reality versus perceptions

REALITY:

- European gas production is declining – by 2030 European gas production will be ~100 Bcm (43%) less than in 2014; low gas prices may mean this happens faster than anticipated; new production likely to be uncompetitive at low gas prices
- Diversification of pipeline gas has failed:
 - ❖ North Africa: export prospects are poor
 - ❖ Southern Corridor: 16 Bcm west of Turkey in the early 2020s is maximum (and could be less)
 - ❖ East Mediterranean: political gridlock
 - ❖ European shale gas: failed – politically toxic
- LNG can disappear in the 2020s if Asia needs it

PERCEPTION: Russia is the major problem of European gas security:

- ❖ For many Europeans: Gas = Gazprom/Putin = Bad: this is generally presented as an `energy/gas security problem' but in many cases is a metaphor for Russophobia/Putinphobia ie national/military security



3. The Search for a New Utility Business Model

SEPARATION OF FOSSIL FROM LOW CARBON ASSETS - E.ON/Uniper and RWE as examples:

- clarity for investor community especially if..
- renewables no longer need support and..
- low cost electricity storage becomes reality then...
- fossil assets are 'legacy' ie managed decline, maximising remaining asset life backing up renewables

REGULATORY CONTRACTS - forget about markets, go for regulated returns:

- networks – low risk/low return
- power generation = central planning and regulatory handouts (FiTs, capacity charges, strike prices) for all new capacity; no handout = no new build

4. Environmental Problems

- Gas is still a 'fossil fuel'
- CCS is making very little progress anywhere in the world, so decarbonisation of gas is currently unlikely in any timeframe
- Methane emissions from the gas chain are poorly (or un-) documented and challenged by very high figures from some (extreme?) environmentalist estimates; and in a political/media context this is intimately connected with...
- the unconventional gas 'fracking debate' which is not a 'debate' but two sides talking about extremes; 'fracking' is a politically toxic issue in Europe (and problematic even in North America and elsewhere)

5. Fragmentation Problems

Up to 2000 (late 1980s in UK) – a cohesive industry:

- IOCs/NOCs
- Merchant Gas Transmission Companies (MGTCs)
- Local Distribution Companies (LDCs)

By the 2010s post-liberalisation:

- Fewer IOCs/same NOCs
- Utility asset holders
- Midstream energy traders: IOC/NOC, utility, independent
- Network TSOs/DSOs
- LDCs (with or without networks)
- Storage owners and operators

There is no longer a `European gas industry' which can lobby coherently and `speak with one voice'



Impact of Fragmentation on Commercial Interests Along the Value Chain

PRODUCERS AND EXPORTERS:

- want to sell large quantities of methane over long time periods (if possible) underpinned by long term contracts

NETWORK COMPANIES:

- Want to prolong the life of their assets not necessarily transporting methane (also biogas, biomethane, hydrogen)

SUPPLIERS AND TRADERS:

- Supply power as well as gas and (unless they are producer affiliates) can switch from gas to power

OWNERS OF POWER, REGAS AND STORAGE ASSETS:

- Maximise life of assets: shorter for power than regas/storage; may be stranded if others decarbonise

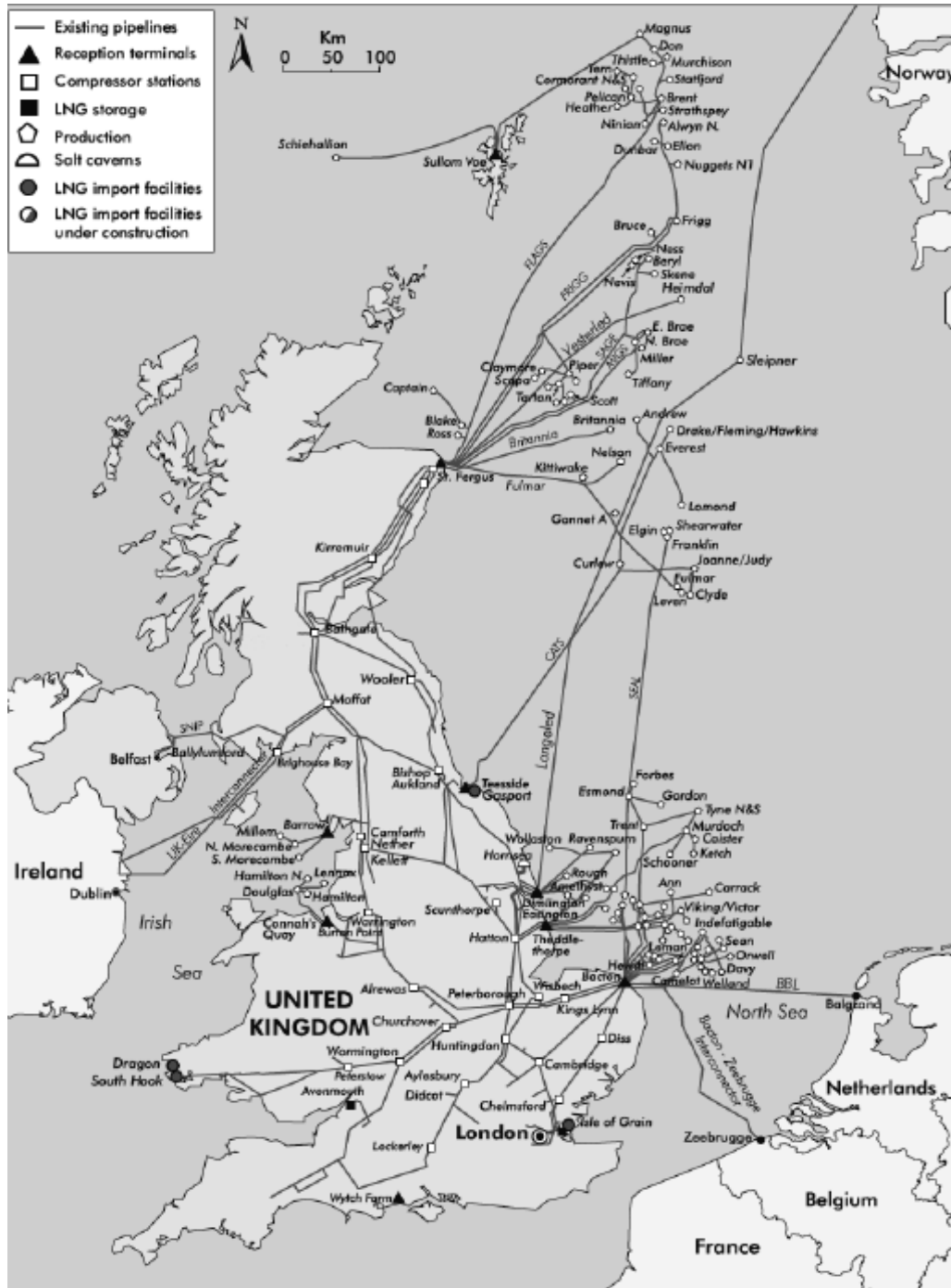


Carbon Capture and Storage (CCS) requires unprecedented value chain cooperation

- Assuming decarbonisation (faster or slower) is a serious policy commitment which is going to happen
- Likely consequence is progressive gas phase-out in power sector to 2030, and beyond 2030 phase-out in heat sector
- This means CCS must be developed by the industry for gas to survive in European energy balances AND...
- require unprecedented value chain cooperation in a fragmented gas community

UNRESOLVED ISSUES:

- Who will lead CCS development?
- Will CCS advantage coal as much as/more than gas?
- Will gas with CCS be competitive with renewables with electricity storage in the 2030s and beyond?

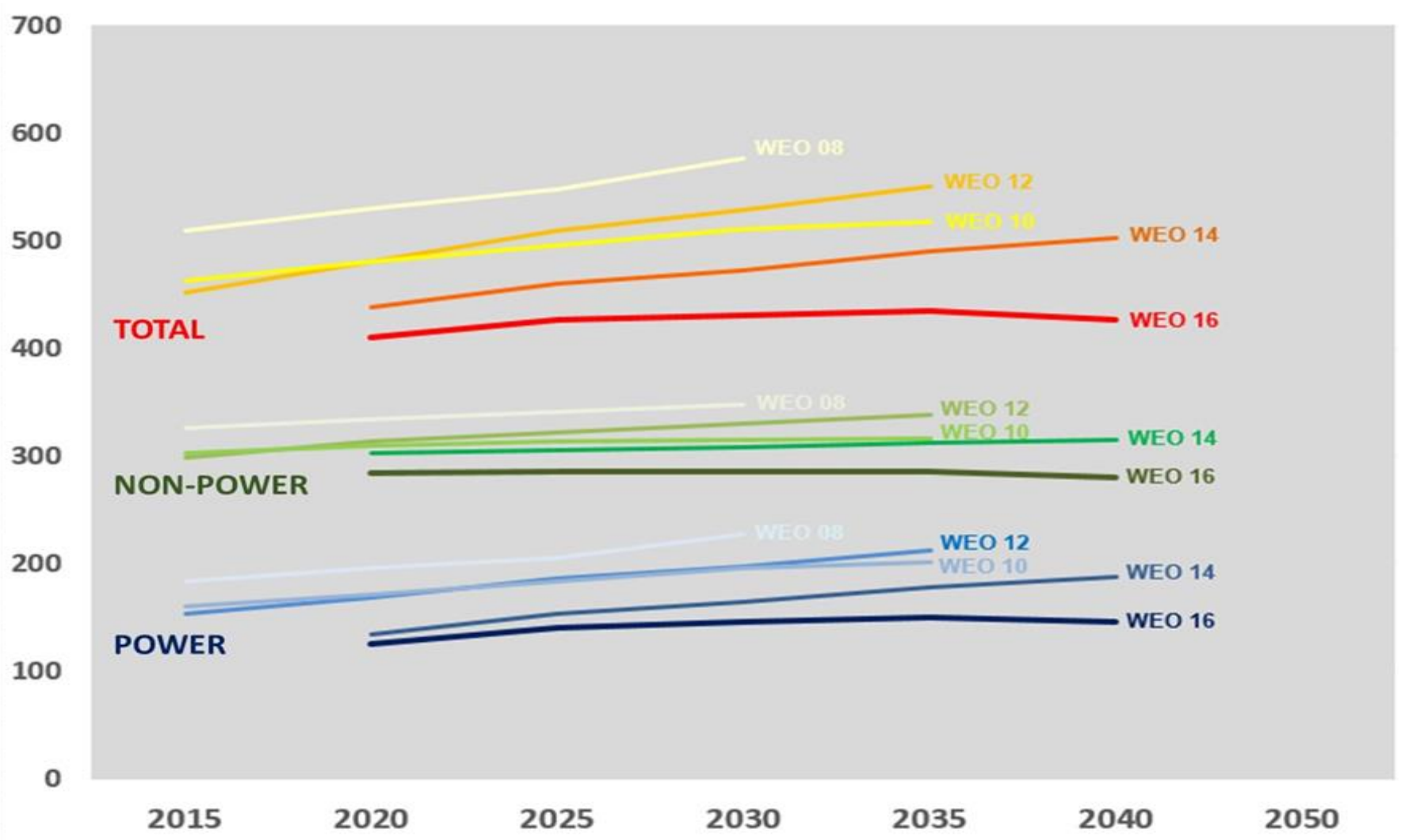


The UK is one of the few countries with onshore and offshore gas pipeline networks, and large numbers of suitable offshore structures for carbon storage

Source: Digest of UK Energy Statistics 2015

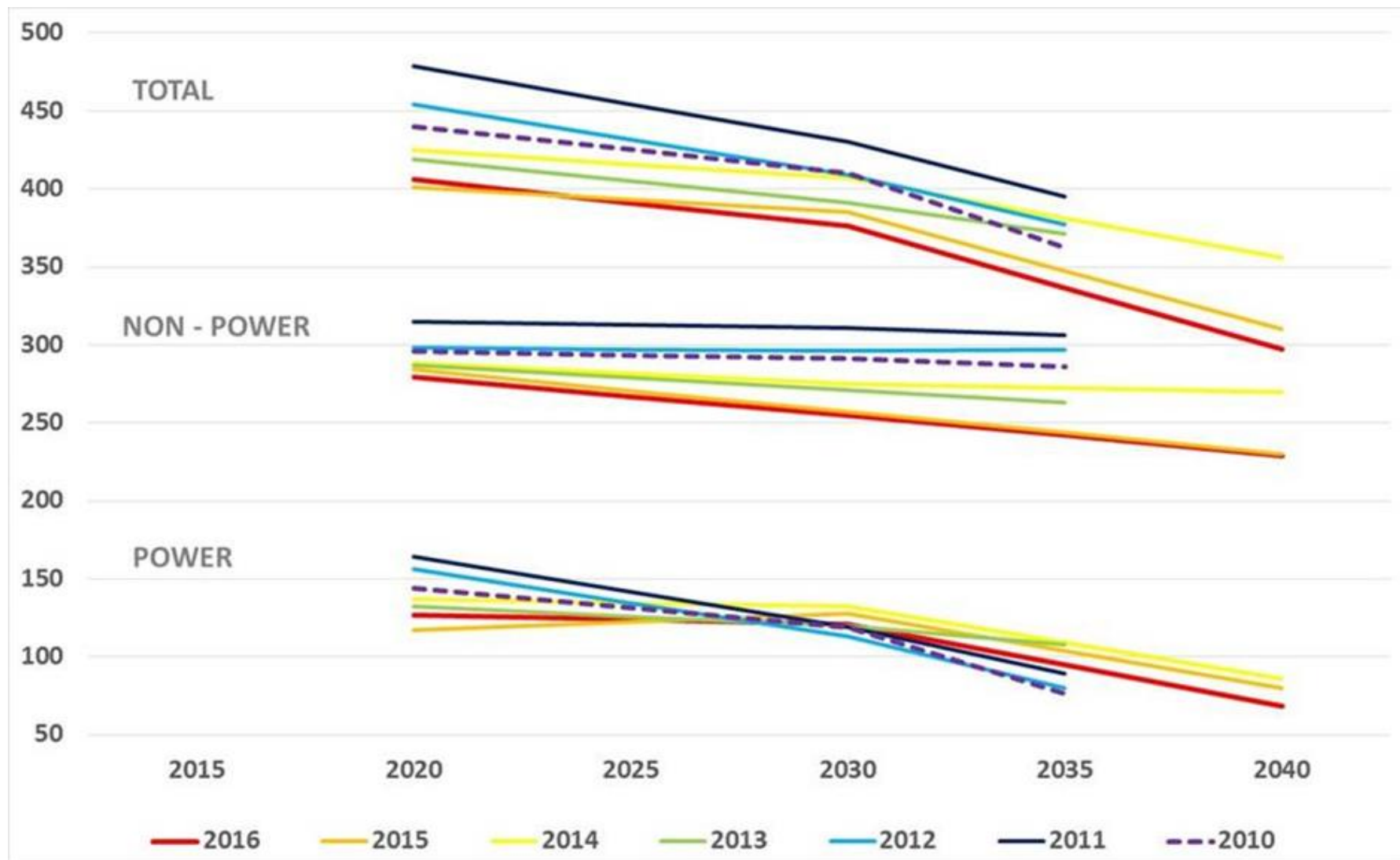
**Pre- and post-2030
times frames:
modelling outcomes,
industry messages
and strategy**

IEA World Energy Outlook 'New Policies Scenario' for OECD Europe Gas Demand 2020-40



Source: Honoré/OIES using data from IEA, World Energy Outlook, 2010-16

IEA '450 Scenario': European Gas Demand 2020-40



Source: Honoré/OIES using data from IEA, World Energy Outlook, 2010-16



Short term gas industry actions and a new message

- Develop credible methane emissions data
- Recognise that shale/fracking developments in Europe are damaging the image of gas
- Promote biogas and biomethane development although they are likely to remain small scale
- Develop a credible security of supply message
- Continue to campaign for higher carbon prices

**Change the European gas advocacy message:
from 'available, affordable, acceptable' to
"Gas (methane) Can (Will?) Decarbonise"
but this must be backed up by actions**



Future of Gas in Europe – not all ‘Gloom and Doom’

- European gas has another 10 years of stable or slowly declining demand but will need more imports as domestic production declines; these could be good years for the gas community
- But post-2030 the future is decline, which will accelerate if governments adopt more aggressive decarbonisation policies

Therefore failure to develop an active decarbonisation strategy (including commercial scale CCS) is a signal to governments that:

- either the gas community does not believe decarbonisation will happen (little evidence of this)
- or it has accepted a future of decline post-2030

SENDING A DIFFERENT SIGNAL WILL REQUIRE ACTION TO BE TAKEN WITHIN 5 YEARS

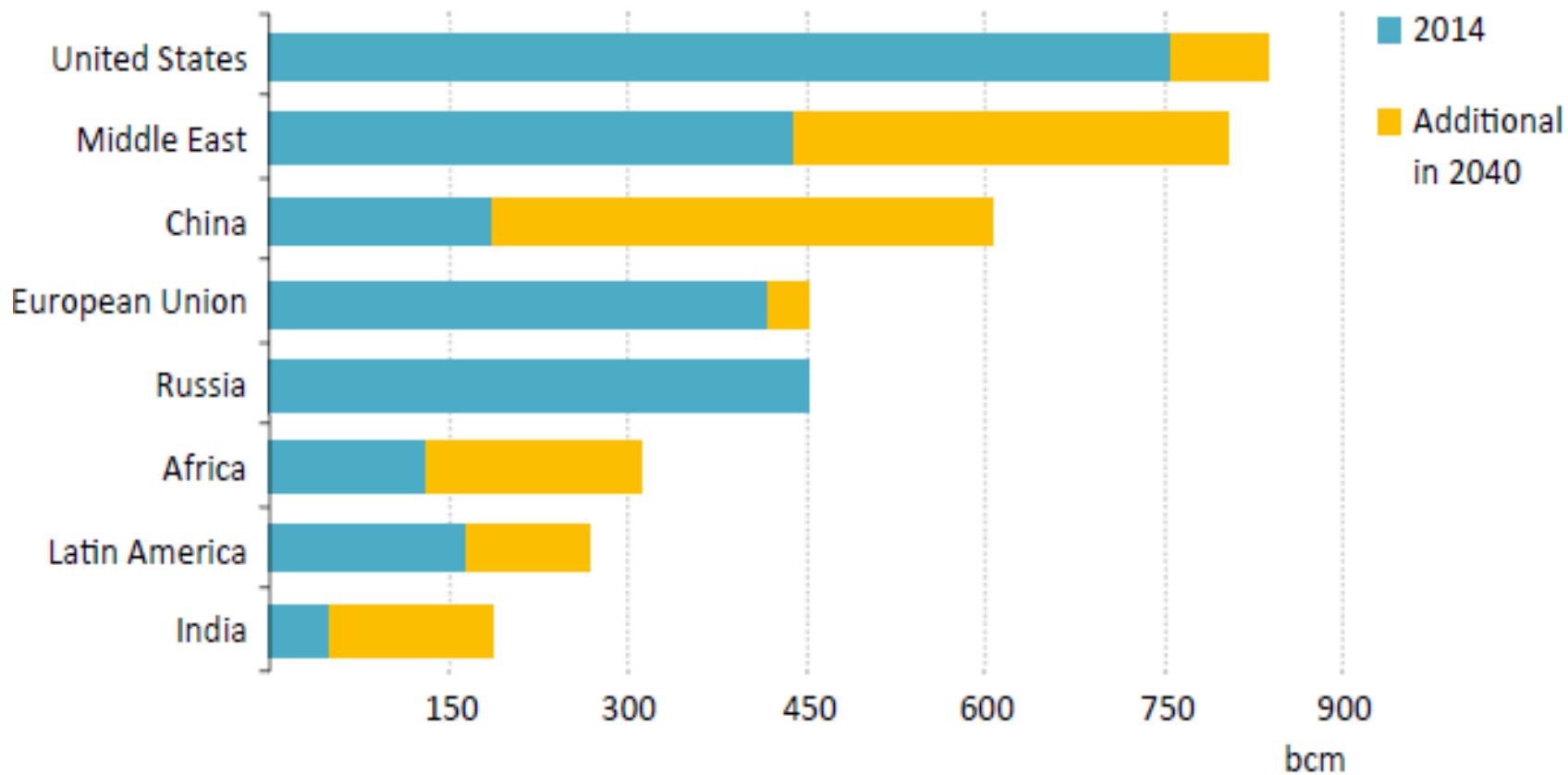


Outside Europe: different futures for gas (but a similar trend if carbon reduction targets are to be achieved)

Carbon reduction is lower down the agenda in all regions; air quality could be a key driver for gas, as will affordability



IEA New Policies Scenario: gas demand growth everywhere except Russia (minimal in Europe)

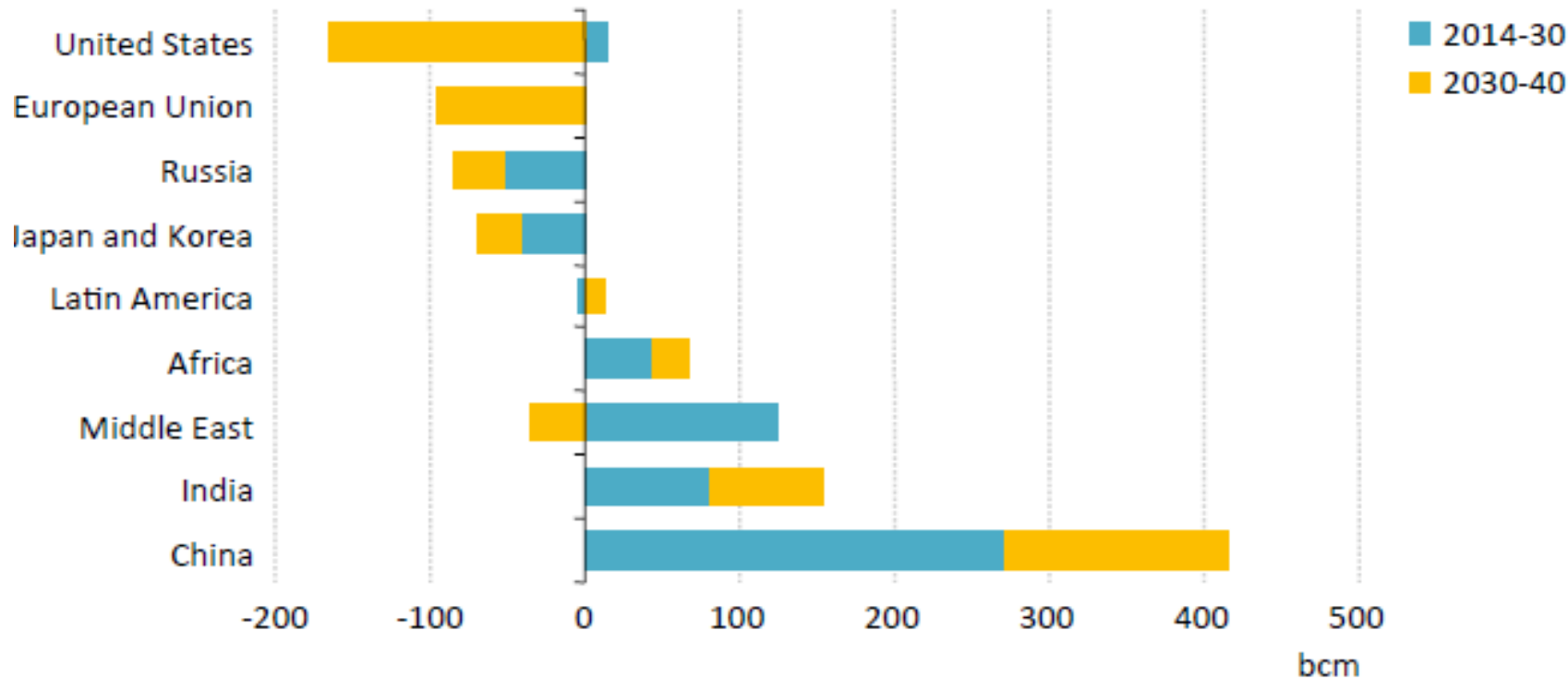


Developing countries lead the growth in global gas demand

Source: IEA WEO 2016, Figure 4.4, p.171



IEA 450 Scenario: no gas demand growth post-2030 except in China and India (minimal in Africa)



Fuel switching plays a key role in the period to 2030 but efficiency gains and power sector decarbonisation reduce gas demand growth in the long term

Source: IEA WEO 2016, Figure 4.3, p.168



NEXT STEPS: analysis needs to look at individual countries (and regions of countries) rather than 'regions'

Key issues are the environmental and affordability agenda, and progress of low carbon alternatives to gas

THANK YOU

jonathan.stern@oxfordenergy.org