Approaches to informed and balanced debate about shale gas in the UK – How we are working with the Communities

Fracking and our Gas Future

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What is on your mind?

- What is the UK shale market and its resources
- What are the challenges UK developers are facing in exploring?
- What is being done in UK to alleviate community concerns surrounding fracking?
- What can Australian producers learn from the UK market?

Agenda

- Overview of the story so far and exploration plans
- Cuadrilla's vision of Sustainable Development
- What does this mean for Australian developers
- Discussion

Who is AJ Lucas?

- Foundation investor in Cuadrilla Resources & Bowland Shale project since 2007
- Founded in Sydney in the 1950's, now ASX (AJL)
  - specialist, niche engineering and construction in energy and water sectors
  - world leader in coal seam gas drilling,
  - oil & gas pipelines, water processing and water pipelines,
  - world leader in horizontal directional drilling
  - Investor in coal seam gas, shale – owner operator
- Strategic partnerships:
  - Spiecapag – world leader in major high pressure cross country pipelines,
  - Groupe Marais – specialist micro trenching technology,
  - Xtreme Coil – North American coil drilling company
  - CNPC subsidiary, China Petroleum Pipeline Bureau

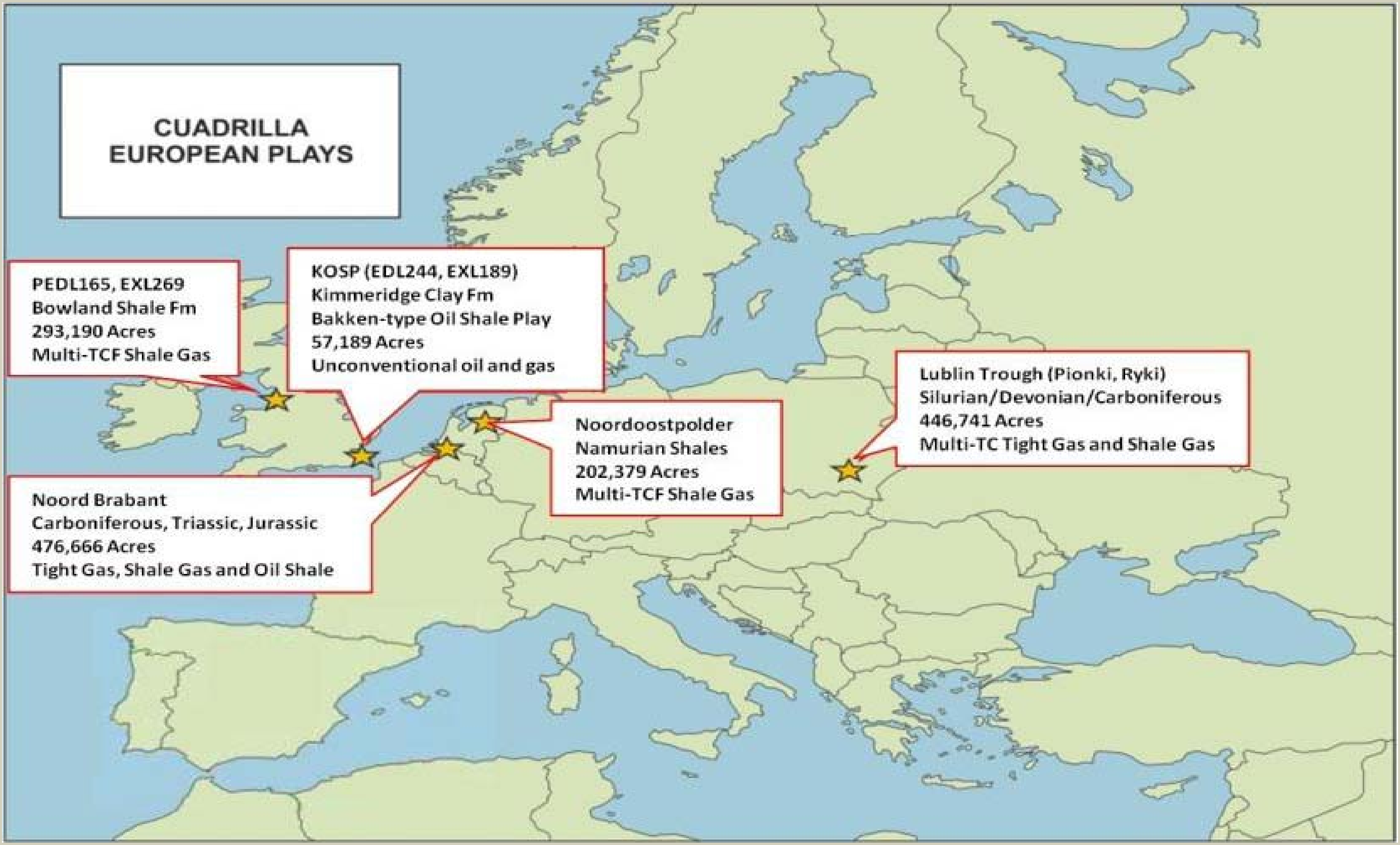
Who is Cuadrilla?

- Formed in 2007, UK based explorer
- Early entrant to shale gas in Europe
- Prospective and diversified acreage portfolio UK & Western Europe
- Major shareholders are AJ Lucas and industry-specialist fund Riverstone
- Lancashire licence farm-in by Centrica
- Ownership of drilling rig, cementing and fracturing spreads

Exploration assets

- Netherlands ≈ 680,000 acres
- Bowland UK ≈ 293,000 acres
- Weald UK ≈ 57,000 acres
- Poland ≈ 440,000 acres
- Hungary ≈ 32,591 acres

Licenses in the UK, Holland, Poland



Bowland in summary

(bearing in mind the UK consumes around 3 tcf of gas annually)

- "The lower limit of the range is 822 tcf and the upper limit is 2281 tcf, <u>but the central estimate for the resource is 1329 tcf</u>" (British Geological Survey)
- Over 1000m (>3300 ft) thickness of shale
  - 1000's feet below aquifers
  - Very close to major gas pipeline infrastructure
  - UK Market ready for this gas
  - DECC/ HSE / EA / LCC , in alignment to move exploration forward
- **AJ Lucas 18.75% - Centrica 25% - Cuadrilla 56.25% (Lucas also has 44% Cuadrilla)**

As of June 2013, three exploration wells drilled – one partially flow tested

- Preese Hall-1 drilled to 9,100 feet (partially fractured)
- Grange Hill-1 drilled to 10,700 feet
- Becconsall-1 drilled to 10,500 feet
- Acquired detailed 3D subsurface mapping of 100 KM^2 through seismic survey

- Existing: Elswick-1 producing from 3,500 feet (existing sandstone well, vertical fracture)
- Balcombe-2 (West Sussex) conventional oil in limestone (vertical with sidetrack)

2013-2015 Exploration plans

- Conduct Environmental Impact Assessments for eight sites in the Fylde area, within our 100 KM^2 3D survey area
- Submit applications to drill, fracture and flow-test
- Will also apply to drill up to three further vertical exploration wells at sites located *outside* the area covered by the 3D survey
- The above activity will run through end 2015

The Landowner Challenge

- In US, landowners say:

  “Great – they are going to drill on my land”

- In UK (and Australia) they say:

  “Oh no – they are going to drill on my land”

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Community benefits announcement – transformational potential

- Communities receive £100,000 for every exploration well site that is hydraulically fractured

- Communities receive 1% of revenues from future shale gas production
  – Potentially, more than £1 billion over a 20 to 30 year shale gas production timescale could be returned to Lancashire communities within the Bowland Basin license area alone

- The above is (broad brush) paid 2/3 locally, 1/3 to the county (many specifics to be worked out)

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Main argument map

Issues

Environment
- Water, seismic
- Landscape

Carbon
- New source of CO_2

Health
- Local impact from operations

Economy
- Bubble effect
- Not cheap gas

Benefits

Economy
- Jobs, Taxes, Industry
- Energy security
- Competitive energy

Community Benefit
- Direct payments for exploration and production
- Local spend

Environment
- Gas for coal
- Better than imports

How locals see the benefits and issues

Benefits

- Community benefits (or bribe?)
- General regional benefits (not well understood)
- Individual land leases benefits
- No sudden windfalls, but general upside

Issues

- Migration of water into the aquifer
- Impact on surface water
- Impact of flaring, NORM
- Landscape and traffic disturbance

Want to focus on these

Beyond the risks….

Shale gas is about *sustainable development*

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Sustainable development

Meeting present needs without compromising the future

Environmental sustainability

Security & diversity of supply

Sustainable development

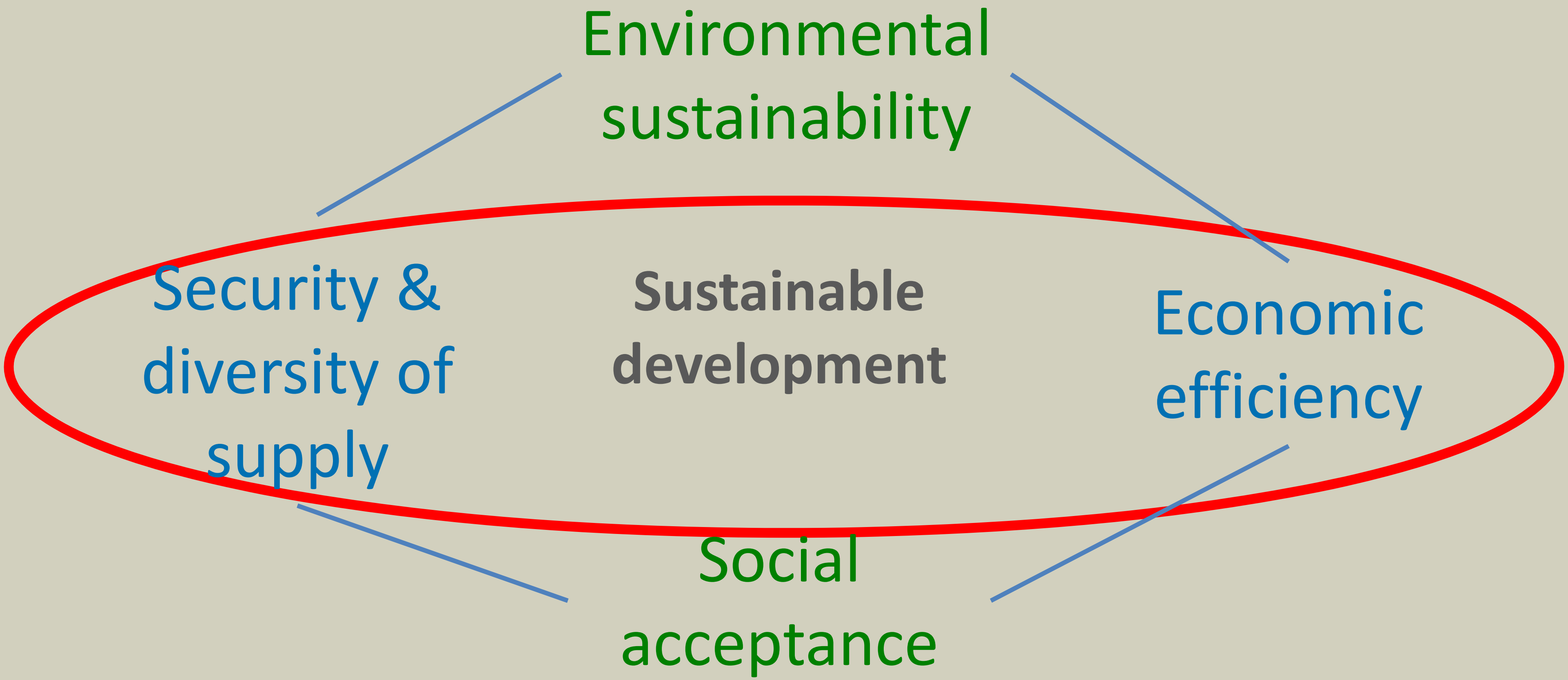
Economic efficiency

Social acceptance

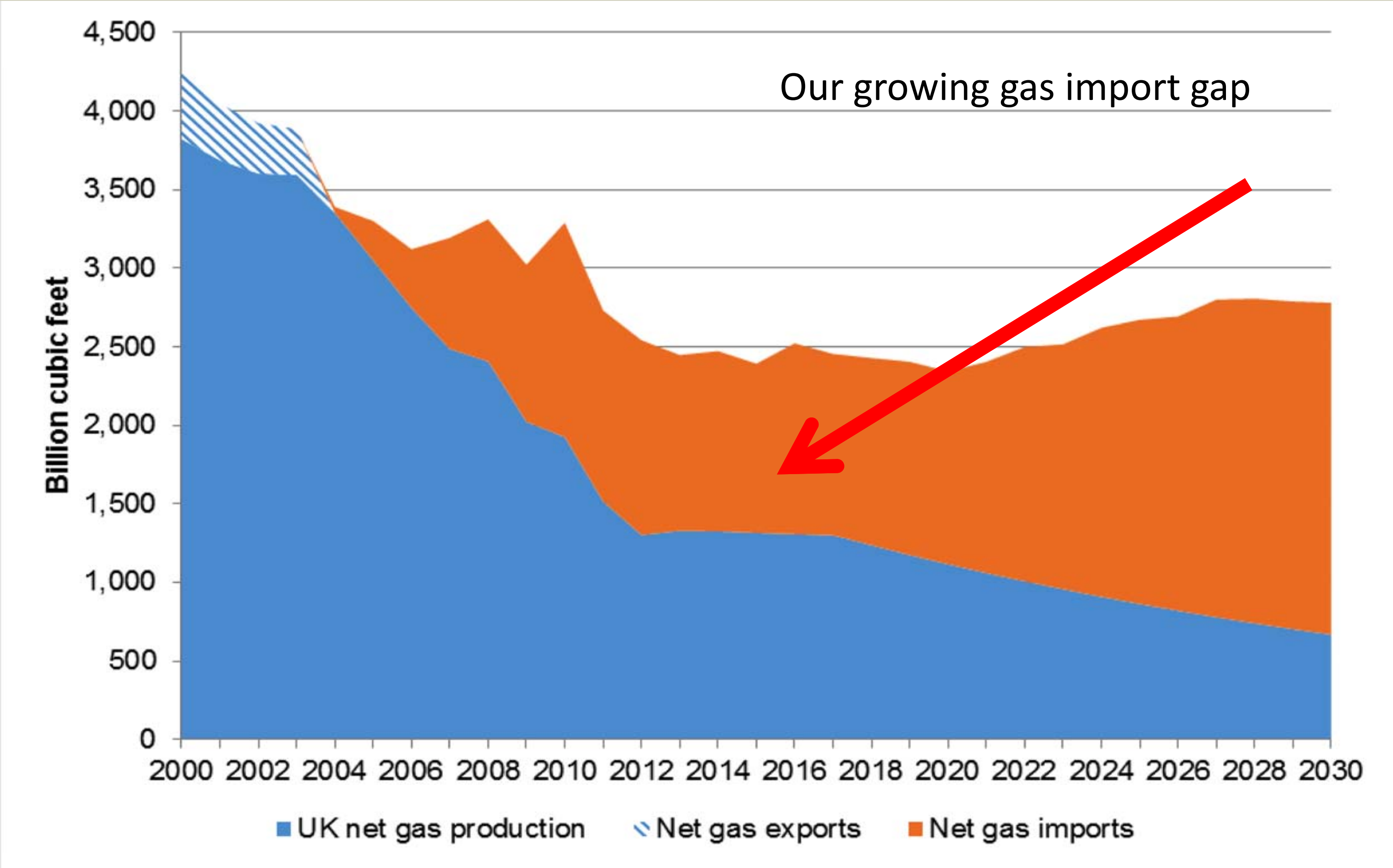
(Framework -- Brian Horsfleld, Helm Holtz GFZ Center Potzdam 2013)

Sustainable development

Meeting present needs without compromising the future



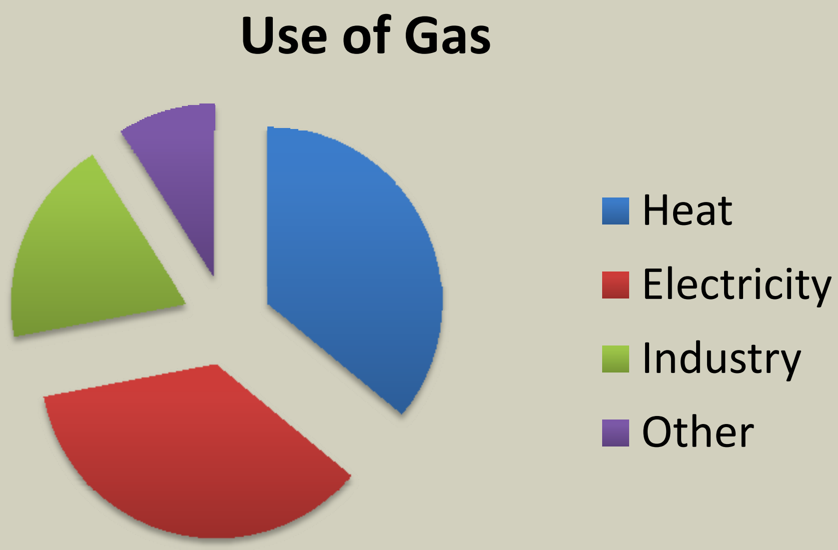
UK is running out of indigenous gas



(Source: Department of Energy and Climate Change)

Its much more than "keeping the lights on" 55% of gas goes to heat and industry

- 36% gas goes to heat
- 36% of gas goes to electricity and associated uses
- 19% to industry and other customers



(Department of Energy and Climate Change)

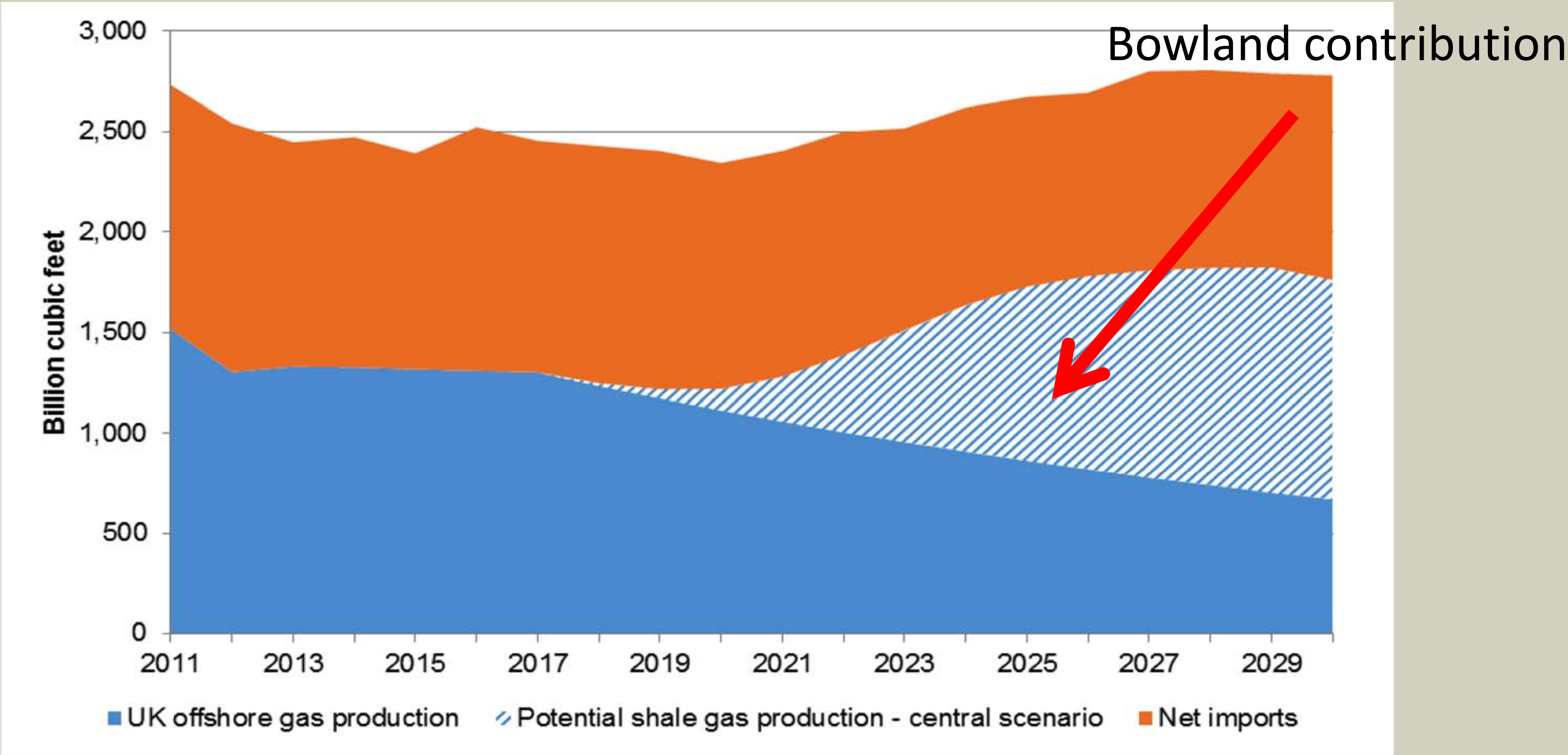
What a successful shale gas industry has to offer

Taking just the Bowland, a 100 pad/ 4000 well scenario

- £50 billion in unsubsidized private investment
- Meaningful job creation (up to 75,000 at peak)
- Meaningful energy security contribution (up to 1tcf per annum)
- Small industrial surface footprint, just 2km^2
- Opportunity for "Aberdeen effect"

(Source: IoD calculations)

There is a way out of the valley



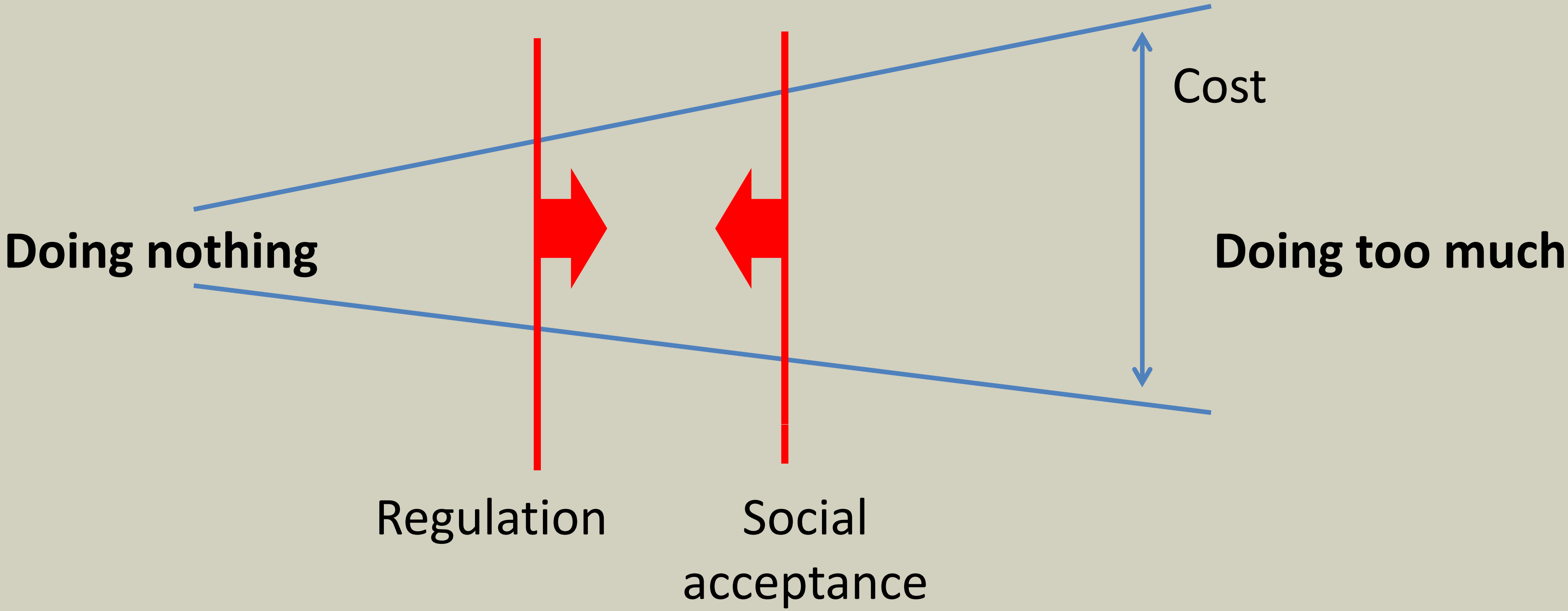
(Source: IoD calculations)

Sustainable development

Meeting present needs without compromising the future

Environmental sustainability

- Getting the balance between the right "clinical" outcomes, and the public perception of risk



(Simon Talbot, GGS, 2013)

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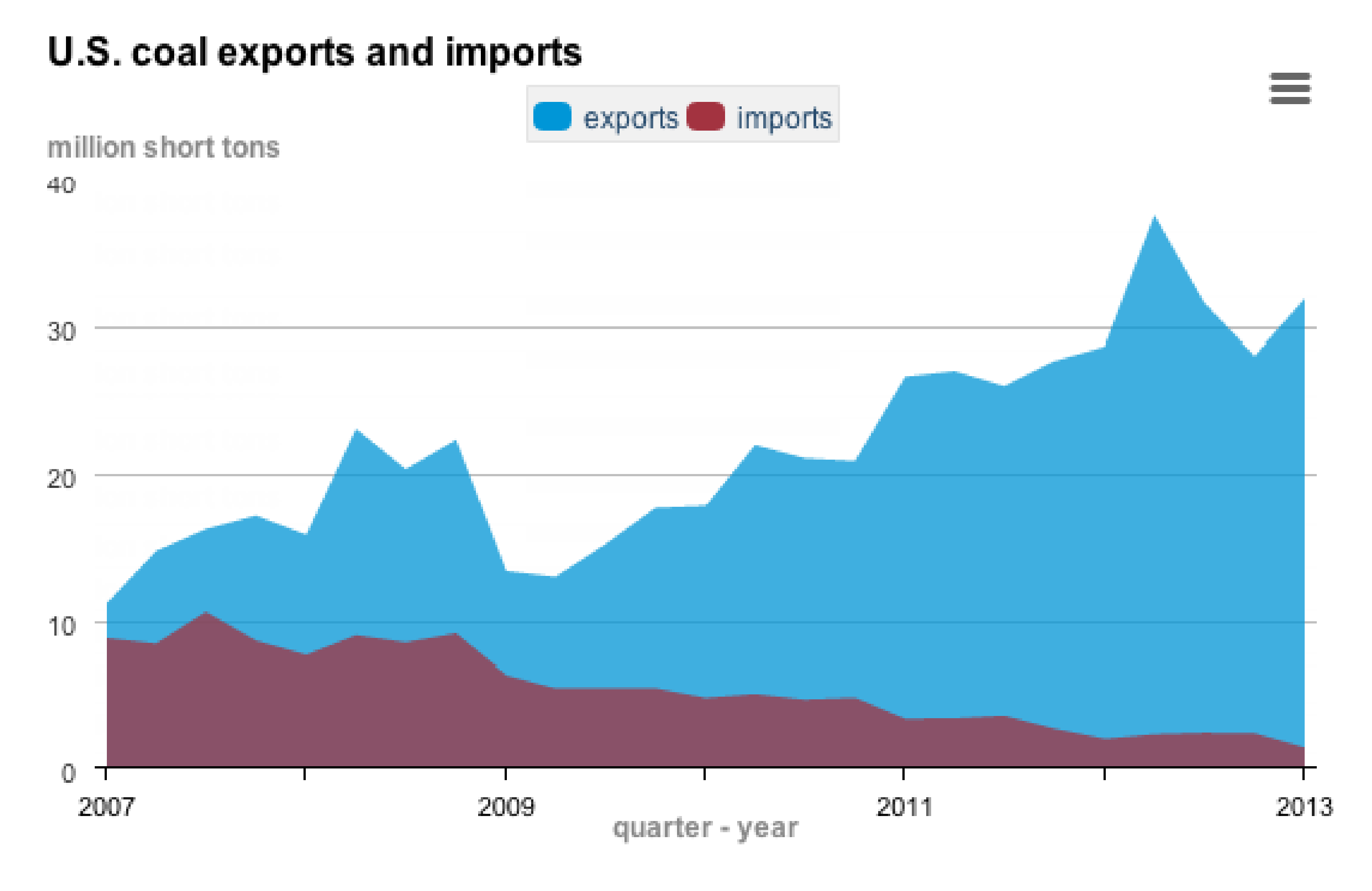
Carbon Impact

Some people say the problem is new shale gas adds to the carbon problem

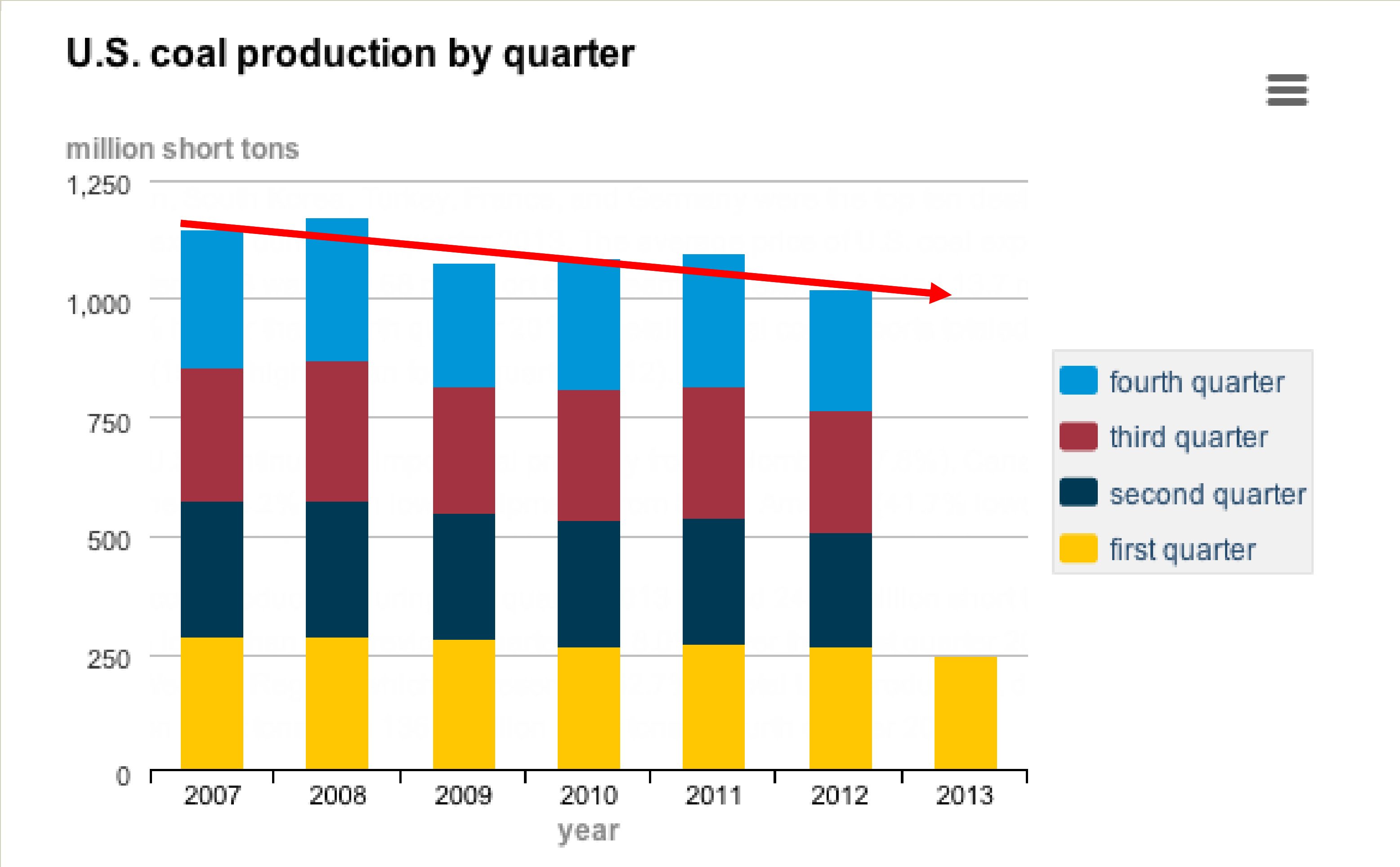
Actually, shale gas is the only way to deal with the coal problem

It is often said the US exports the coal that shale gas has displaced



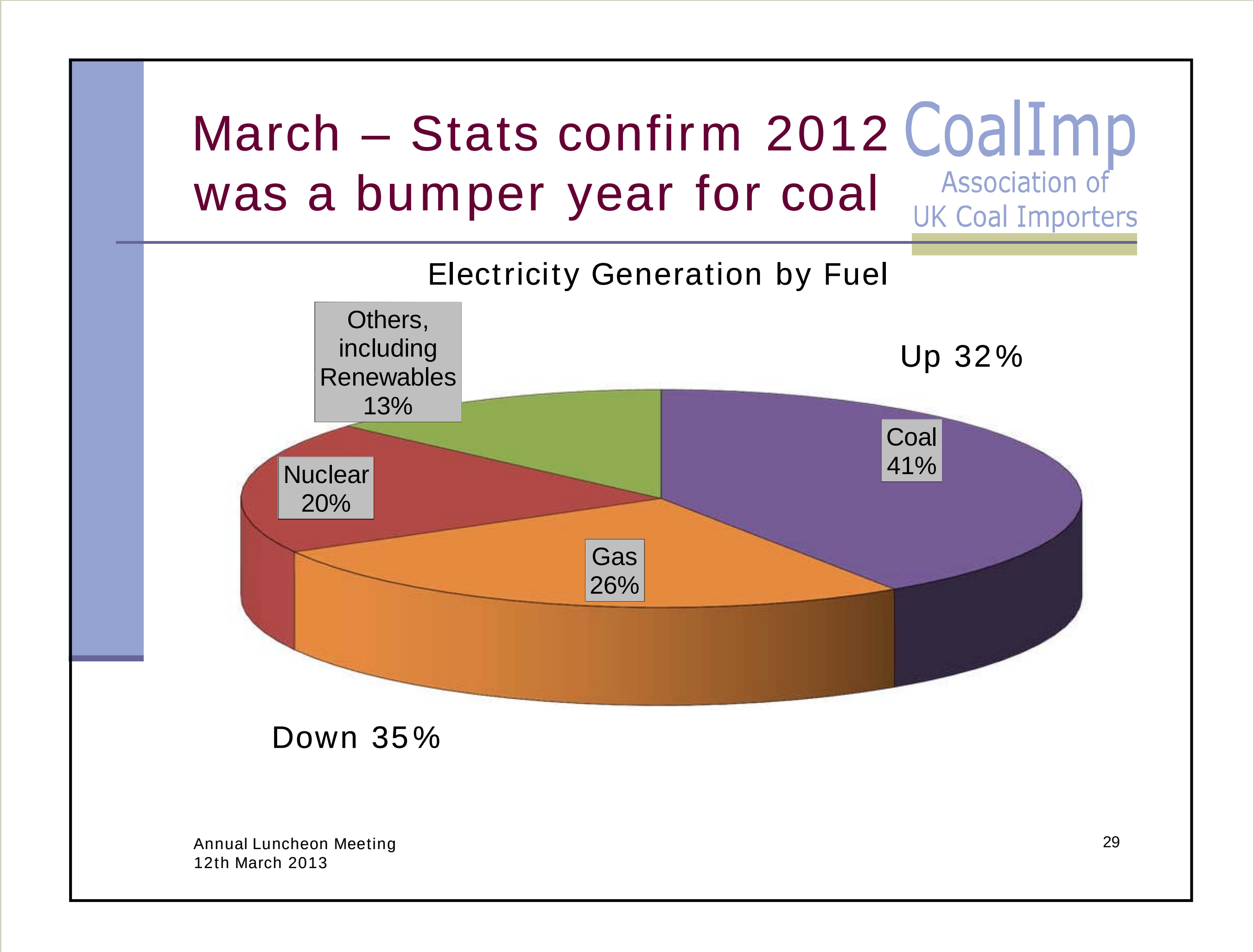
(EIA, 2013)

Actually, total US coal production is falling



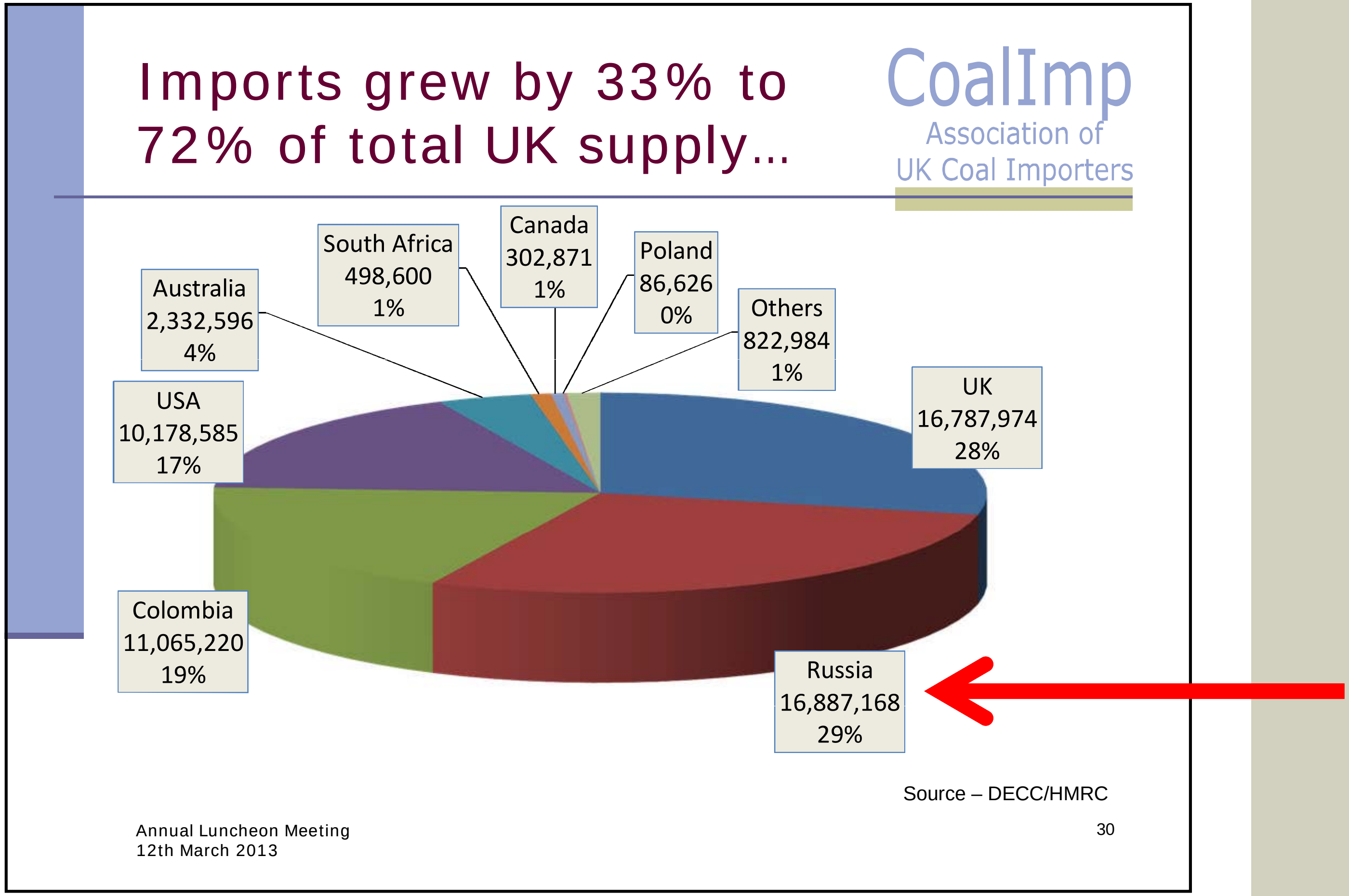
(EIA, 2013)

The UK coal industry is proud of how much coal is being imported here



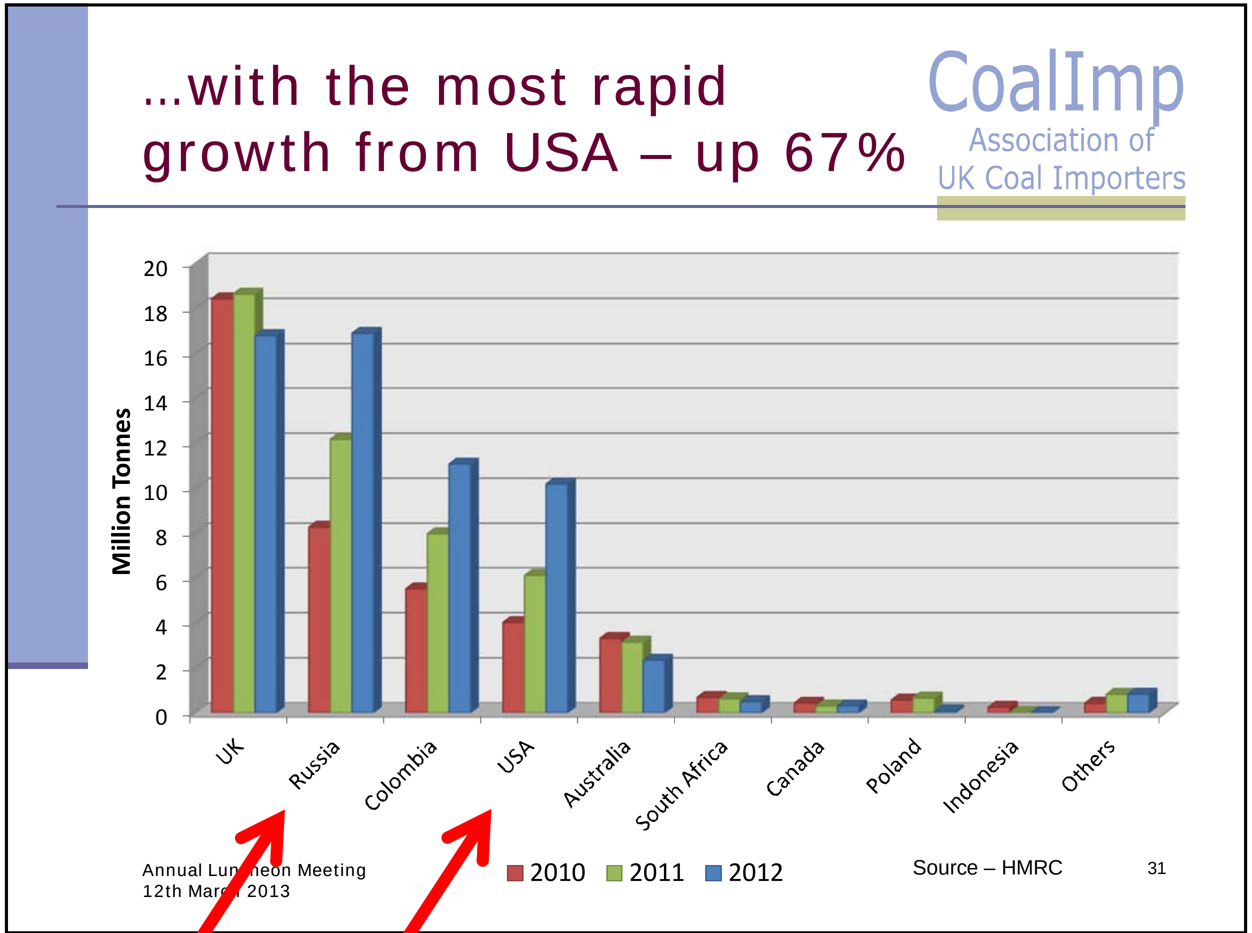
(CoalImp, 2013)

The UK may not buy Russian gas, but they sure buy Russian coal



(CoalImp, 2013)

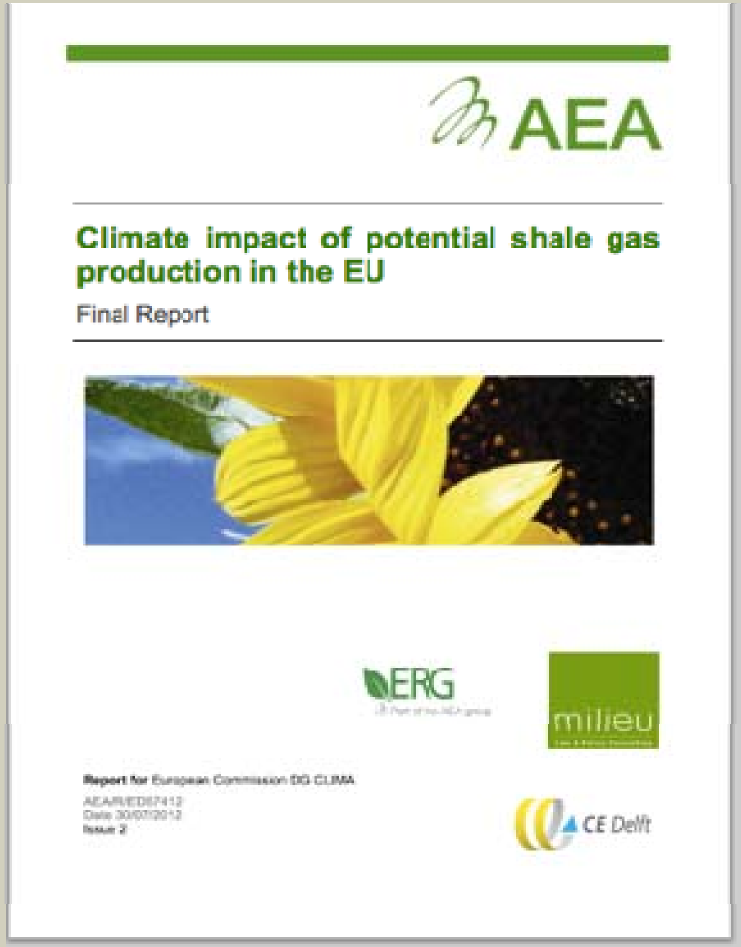
The US and Russia have more than doubled their UK coal business



(CoalImp, 2013)

Some say shale gas is a methane emitter… but not in comparison with pipeline or LNG

“The analysis suggests that the emissions from shale gas generation (base case) are 2% to 10% lower than emissions from electricity generated from sources of conventional pipeline gas located outside of Europe (Russia and Algeria), and 7% to 10% lower than that of electricity generated from LNG imported into Europe.”


AEA

Climate impact of potential shale gas production in the EU

Final Report

ERG

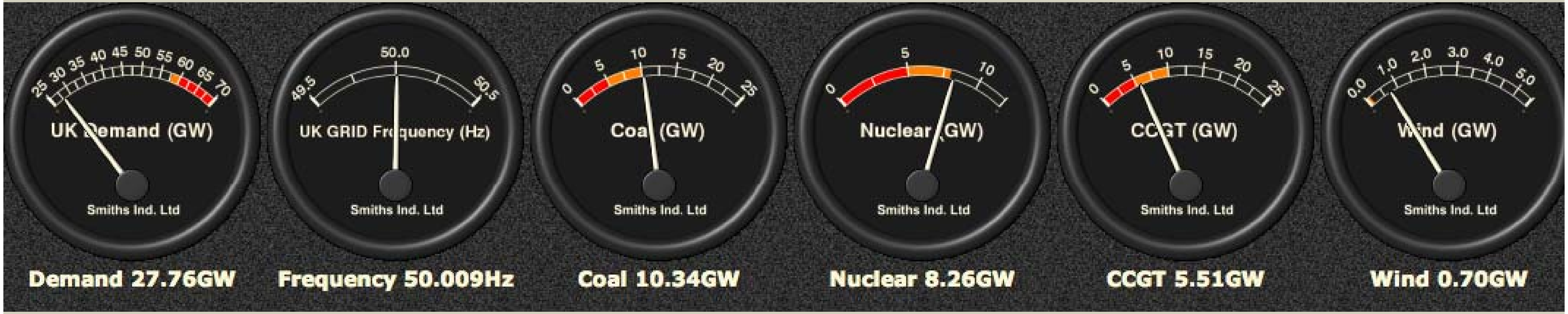
milieu

Report for European Commission DG CLIMA

CE Delft

(AEA 2012)

The UK “dash for gas”

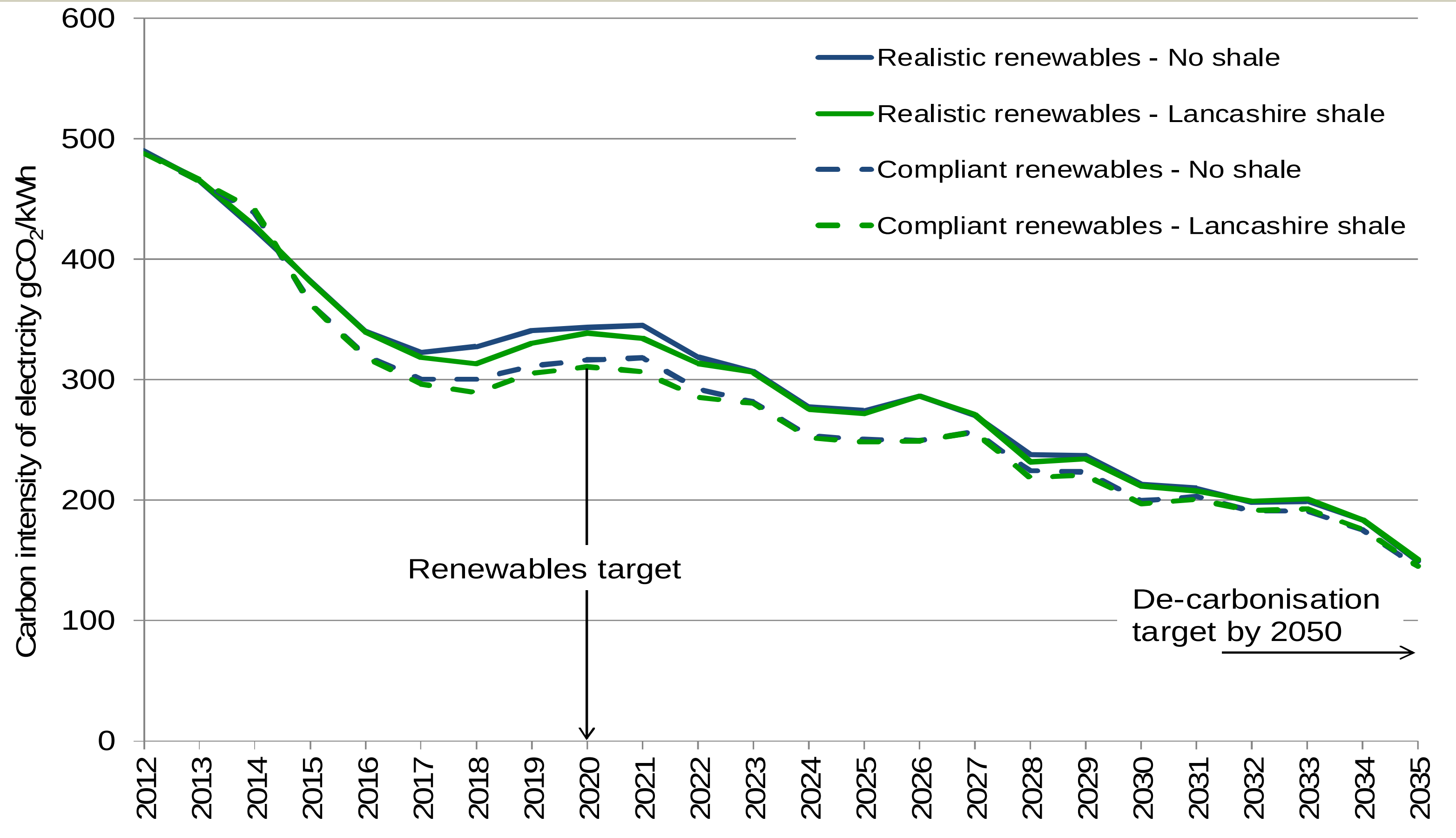


	GW	%
Coal	10.34	42
Nuclear	8.26	33
Gas	5.51	22
Wind	0.70	3

(Gridwatch July11 2013, 06:21)

A new source of domestic gas does not disrupt low carbon investment

Renewables investment driven by mandate and subsidy



(Pöyry 2012)

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Cuadrilla mission

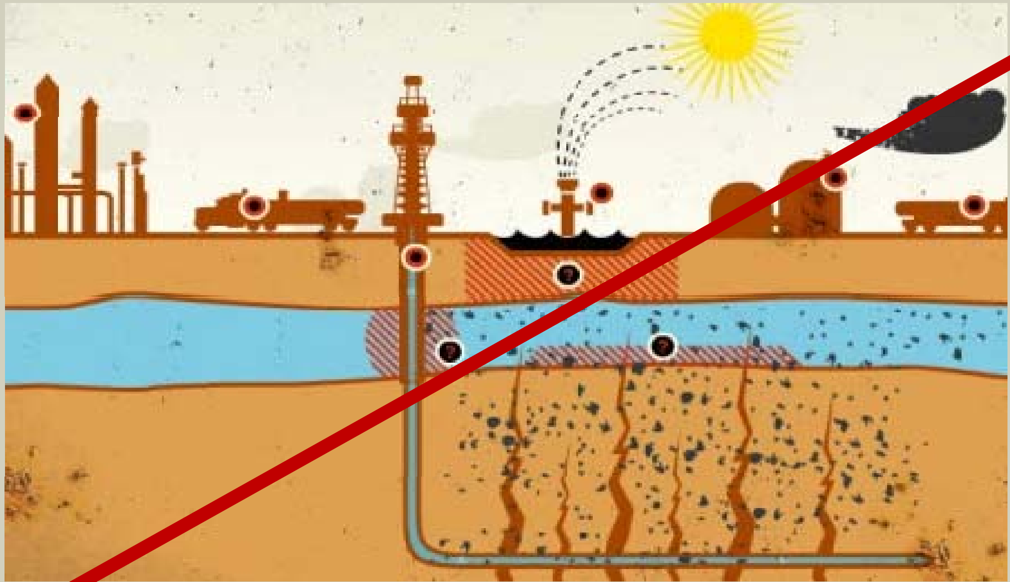
- To create value for all stakeholders,
- *including the communities where we work,*
- by identifying, securing and responsibly operating exploration opportunities in unconventional hydrocarbons in the UK and Europe

How Cuadrilla engages

- Many forms of consultation
  - Small and large meetings
  - Site tours
  - Presentations, participation
- Research, to better understand how the issues are seen
- Communications – “early and often” -- before, during, and after permitting and operations

Bad imagery


The User's Guide To Fracking
How To [redacted] Over Mother Earth As Many Ways As Possible




Do Not Drink

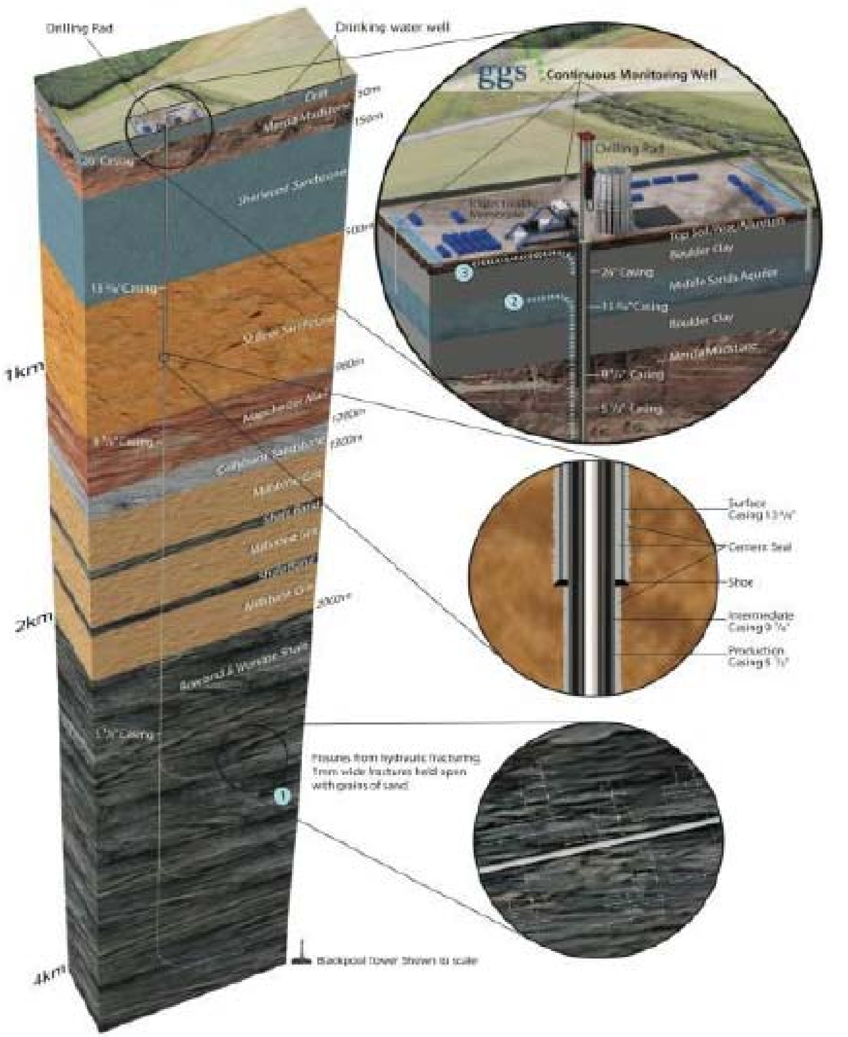
Water Reality

Water reality

Potable aquifer
– 5-50 meters
Saline aquifer
– 100-300 meters

Shale target
--4 KM

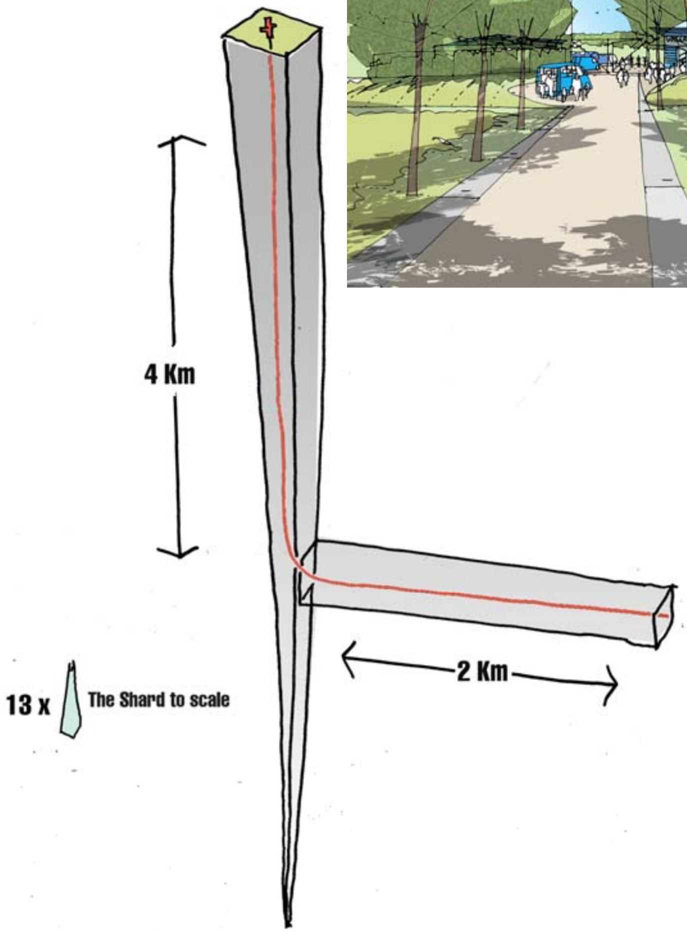
SHALE GAS OPERATIONS AND ENVIRONMENTAL MONITORING

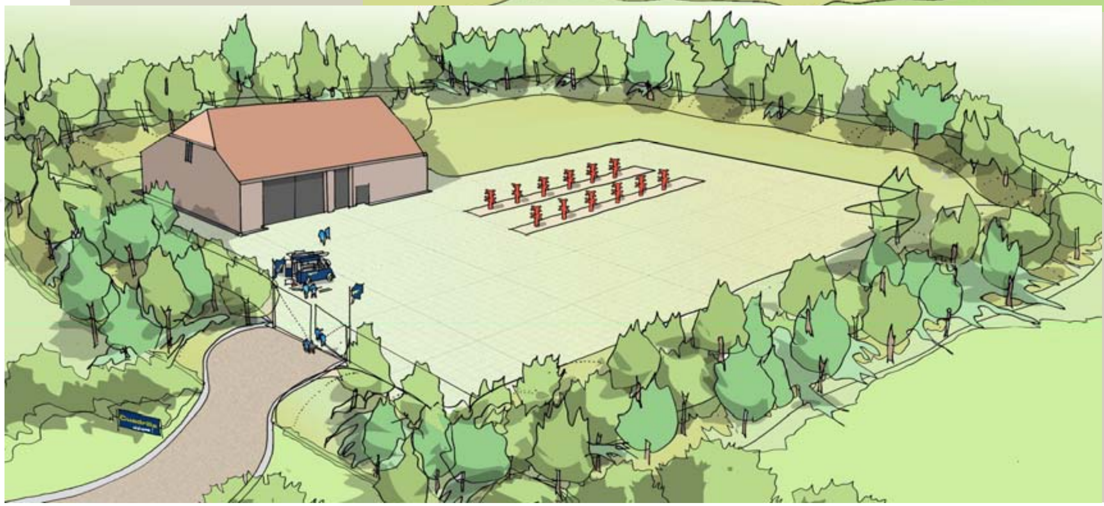


Cuadrilla

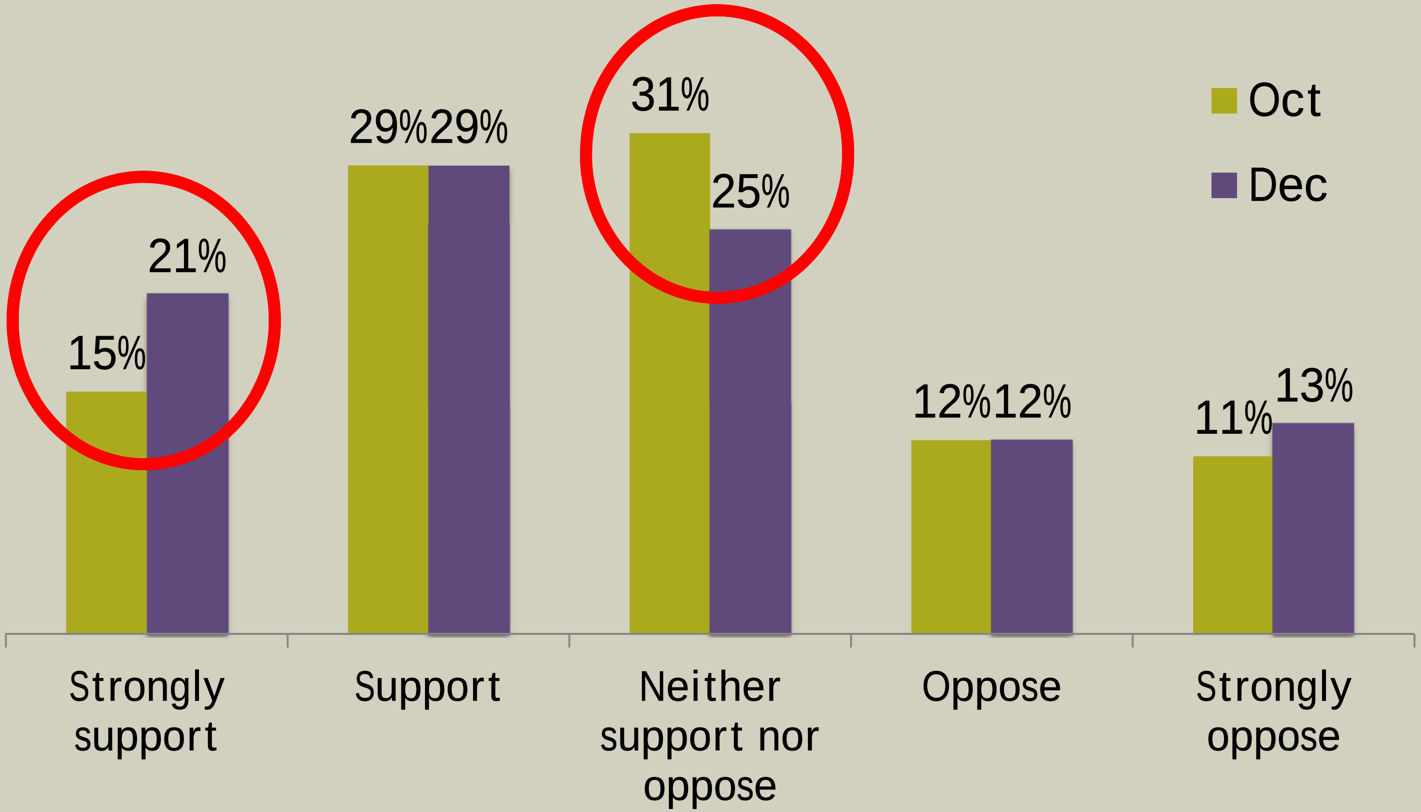
Source: GGS and Cuadrilla 2012

Getting better imagery





We believe that support for exploration is growing



Q: How much do you support continuing exploration, in your area, to understand the potential for natural gas from shale in the UK?

Base: All respondents (n=503)

(BritainThinks 2012)

Forces at work – all parties need to work together

<u>The goal</u>

Sustainable development of shale gas

<u>Hijacking dialogue</u>

<u>Required support</u>

Government leadership

Planning and permitting authorities

Grid authorities

Community parish councils

Skill and supply chain

Industry itself

Lessons learned

1. Find a hook to hang it on
   - US – energy anxiety
   - South Africans – the next gold industry
   - Brits – protecting lifestyle (growing Govt & Ind.energy anxiety)
2. Engage early and often
3. Work out economic participation locally as well as nationally (this has not been done in the UK)
4. Avoid name calling

Who is out there

- General observations
  - Great story-tellers
  - Don’t have the same standards for accuracy
- Local protest
  - Anti-shale is often a fig leaf over anti-development
- National NGOs
  - Can be both low-brow and high-brow

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Boris says…

THE AUSTRALIAN | Welcome David | NEWS.COM.AU | FOX SPORTS | CAREERONE | CARSGUIDE | REALESTATE | NEWS N

NEWS

Boris Johnson backs London shale drill

The Times July 03, 2013 12:00AM

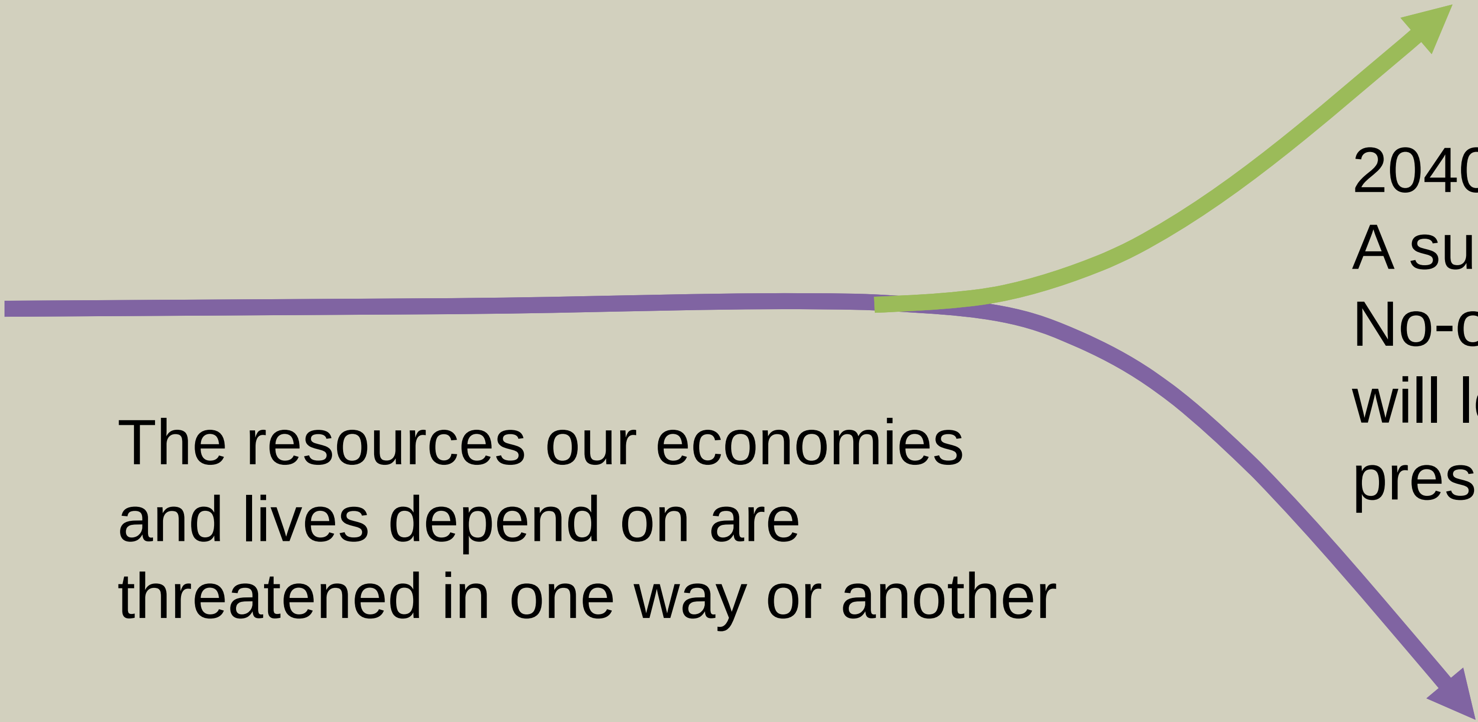
MAYOR Boris Johnson says he is willing to offer up the streets of London to companies hoping to solve Britain's energy crisis by drilling for shale gas.

"It is time for maximum boldness in energy supply. I fully support the government's drive for nuclear power, and if reserves of shale can be exploited in London we should leave no stone unturned, or unfracked, in the cause of keeping the lights on."

In summary

- Cuadrilla is at the early stages of exploration, which will take **another 2.5 years** or more in UK and Holland
  – *This includes a thorough EIA and consultation process*
- Imperative to **work with** – not against -- with regulators and local County Councils – **they are learning too**
- Shale gas development **offers** landowner /local/community **benefits** as well as protection of lifecycle
  – *"If shale gas lives up to its potential, this could have a transformative effect on opportunity for your children and theirs"*
- Who provides the local benefits? Company, Government, both?
- We have to work together on getting accurate **information** to all stakeholders

The world must change
We can lead. Or we can follow



The resources our economies and lives depend on are threatened in one way or another

2040
A sustainable future
No-one knows what it will look like. But it presents opportunities

UK shale gas can make a difference

Thank you.