



ENERGY POLICIES: THE GOOD, THE BAD & THE UGLY

28th October 2010

Lecture Theatre 1, Judge Business School

Statement 1:

National policies to promote renewable electricity are an effective way to achieve the EU's carbon reduction targets.

Michael Pollitt

Two binding EU legislations

- ***The EU Emissions Trading Scheme (2005)***
 - Caps CO₂ emissions of the electricity sector and energy intensive industry
 - Puts a price on CO₂ emissions

- ***The EU Renewable Energy Directive (2009)***
 - 15% of UK energy from renewables by 2020
 - From 3% at the end of 2009

...at war with each other

- ***Extra renewable electricity***
 - Depresses the carbon price
 - Encouraging extra burning of fossil fuels elsewhere
- ***No change to total CO2 production***
- ***How to fix it***
 - Adjust the CO2 cap downwards as renewables expand

Statement 2:

**Early stage low carbon
energy technologies
should be subsidised.**

Good reasons for subsidies

- ***High initial barriers***
 - Risk
 - Difficult for innovators to capture benefits
- ***High learning benefits***
 - Costs come down rapidly
 - Or we quickly learn technology not going to work

Bad reasons for subsidies

- ***Green jobs***
 - Capital intensive industries requiring skilled labour
 - Jobs will likely be in China
- ***We know we ‘need’ this technology***
 - Governments can’t pick winning technologies
 - They don’t know what will work, at what cost

Statement 3:

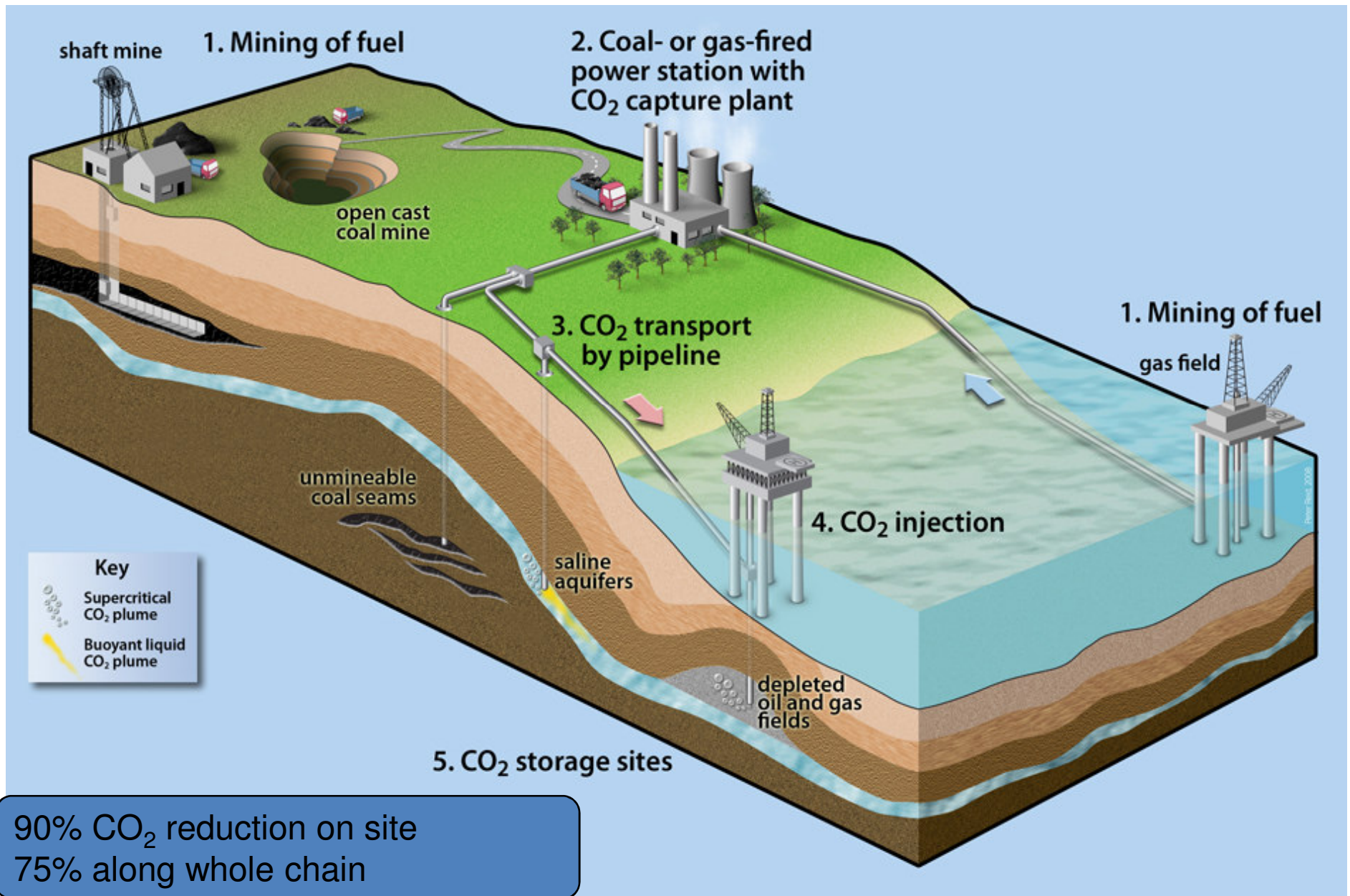
We should support carbon dioxide capture and storage (CCS) because the technology is essential for engaging China and the United States to take action on climate change

David Reiner

Coal, Climate, USA and China

- Coal is the most carbon-intensive fossil fuel
- China and USA are both responsible for 20% of global CO₂ emissions
- The two largest coal producers in the world are China and USA
- USA has coal reserves of 250 billion tons and China over 100 billions tons and energy security is deemed a national priority in US & China
- USA has only recently re-engaged with the international climate negotiations and coal-rich states have disproportionate influence in the US Senate
- China made its first commitment to reduce its CO₂ emissions in 2009 which was also the first time it had to import coal

What is carbon capture and storage (CCS)?



Investment predictions from the IEA CCS Roadmap (2009)

	Number of projects in 2020	Number of projects in 2050	Additional cost 2010-2020 (USD bn)*	Additional cost 2010-2050 (USD bn)*	Total invest. 2010-2020 (USD bn)**	Total invest. 2010-2050 (USD bn)**
OECD NA	29	590	23.6	1 635	61.7	1 130
OECD Europe	14	320	6.8	590	15.8	475
OECD Pacific	7	280	5.9	645	14.1	530
China & India	21	950	7.6	1 315	19.0	1 170
Non-OECD	29	1 260	9.7	1 625	19.8	1 765
World	100	3 400	54	5 810	130	5 070

* Includes cost of transport and storage

** Does not include investment in transport and storage

Notes: OECD NA = USA, Canada, Mexico; OECD Europe = Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, UK; OECD Pacific = Australia, Japan, New Zealand, South Korea; Non-OECD = the rest of the world.

If we do not take CCS seriously we are not taking climate change seriously

- China continues to add roughly 50-100 GW each year (equivalent to entire UK generation)
- Although each of the elements has been conducted at scale, CCS is subject to several uncertainties and concerns
 - cost
 - access to storage sites
 - impacts of coal mining
 - system integration
 - continued reliance on non-renewable fossil fuels
- CCS may not be attractive solution for many reasons and US and China may never take effective action, but if we cannot reduce CO₂ emissions from current and future coal-fired power plants we cannot solve the problem of climate change

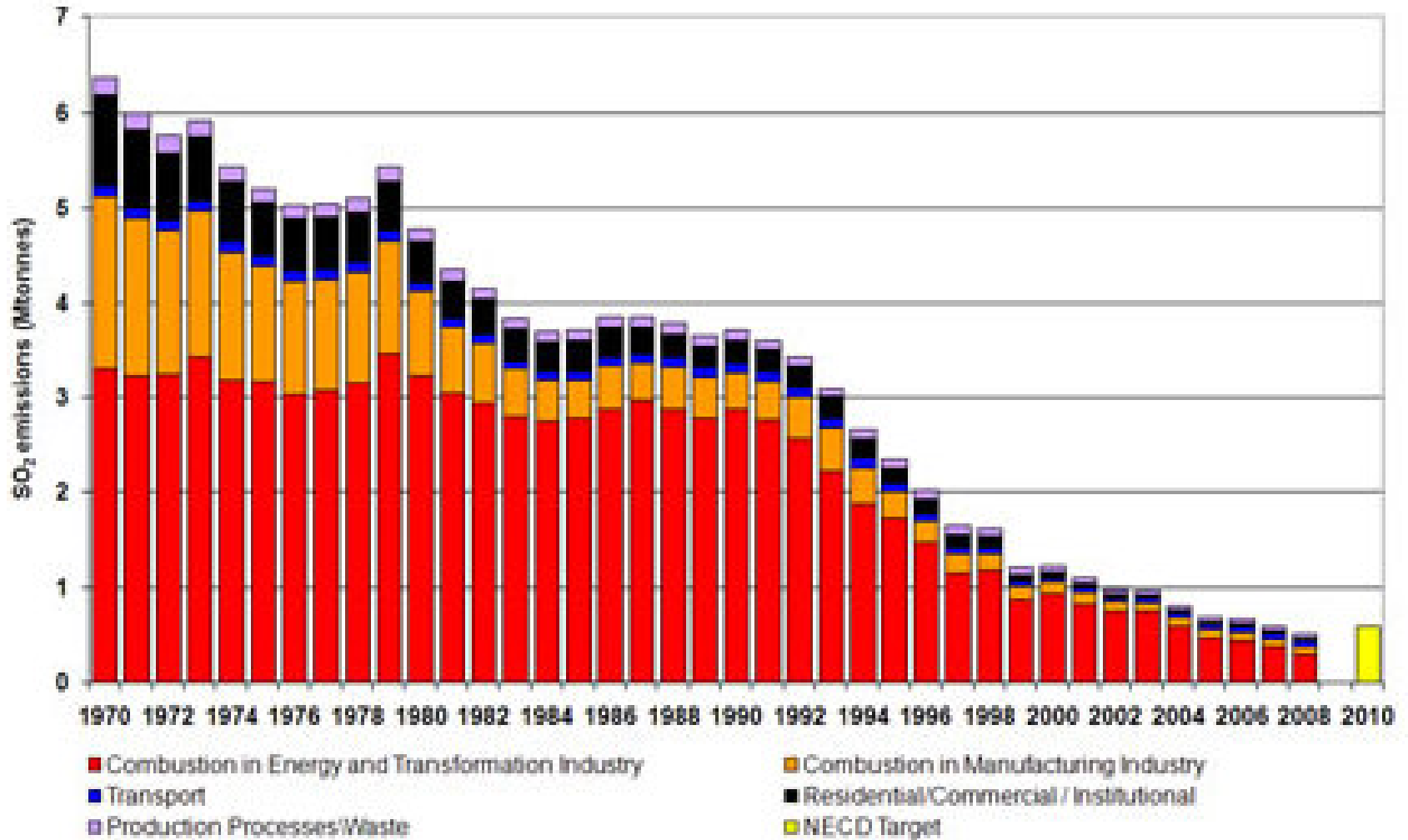
Statement 4:

No matter how ambitious the actions to reduce global CO₂ emissions significant climate change is inevitable and so more effort should be put on adaptation and geoengineering

Climate change is inevitable and **will** get worse no matter how much we reduce emissions

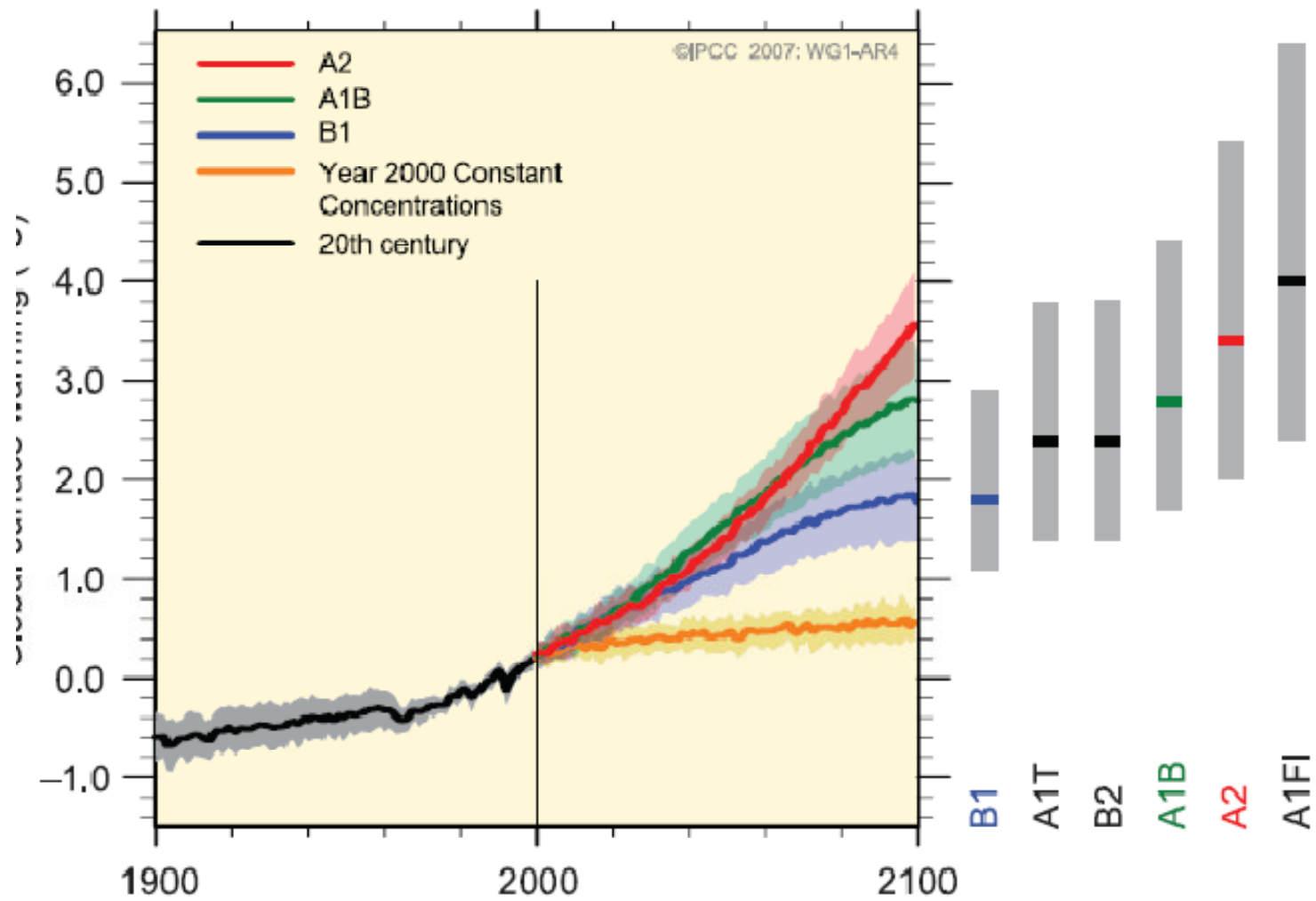
- Previous environmental problems such as lead, sulphur dioxide, ozone depletion and smog saw dramatic reductions
- By contrast, even under the most aggressive climate change policies, the impacts of climate change are expected to worsen
- Even if did succeed in dramatically reducing emissions the inherent lags in the system means that impacts (such as sea level rise) will continue to be worsen for centuries to come
- Therefore, more attention is needed for both adaptation and geoengineering that have received relatively less attention , R&D, and funding

Sulphur Dioxide Emissions in the UK – 1970-2008



Source: UK National Atmospheric Emission Inventory

Projected Temperature Change under Alternative Scenarios

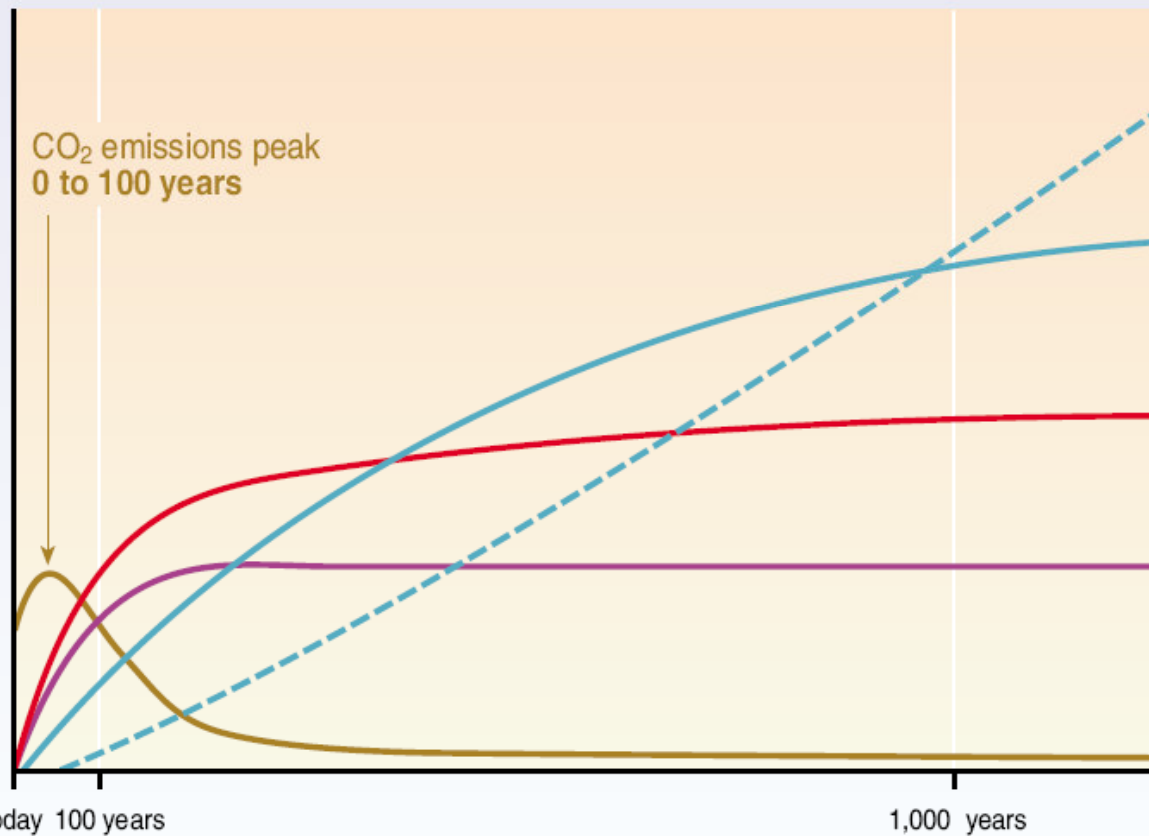


Source: IPCC WGI AR4, Figure SPM.5

Time Lags of Impacts

CO₂ concentration, temperature, and sea level continue to rise long after emissions are reduced

Magnitude of response



Time taken to reach equilibrium

Sea-level rise due to ice melting:
several millennia

Sea-level rise due to thermal expansion:
centuries to millennia

Temperature stabilization:
a few centuries

CO₂ stabilization:
100 to 300 years

CO₂ emissions

Source: IPCC, TAR, Synthesis Report, SPM, Figure SPM-5

Will it be too late before we begin to deploy the last lines of defense?

- Neither adaptation nor geoengineering are a panacea and geo-engineering involves still more global experiments
- Both options encourage uncoordinated responses and dispense with the need for a global approach
- Adaptation is expensive and geoengineering is almost completely unexplored
- Even without abandoning the international and national processes to reduce emissions, adaptation will need many billions and geoengineering needs at least millions
- The real challenges are how to avoid adaptation being restricted to the wealthy and geoengineering becoming an international security problem



Statement 5:

For security of supply and climate change reasons we should ban new gas-fired power plants.

Statement 6:

To maintain security of supply Britain should limit gas exports to continental Europe.

Pierre Noel

Favourable gas markets

- UK/EU very worried about gas supply security. However:
- Global supply boom – North America; global LNG
- Gas now competitive against coal, even without C price
- UK well placed to benefit
 - Huge, diversified import capacity
 - ‘Liquid’ market makes it easy to trade
- EU benefits as well -- further liberalisation would help

Switching to gas saves carbon

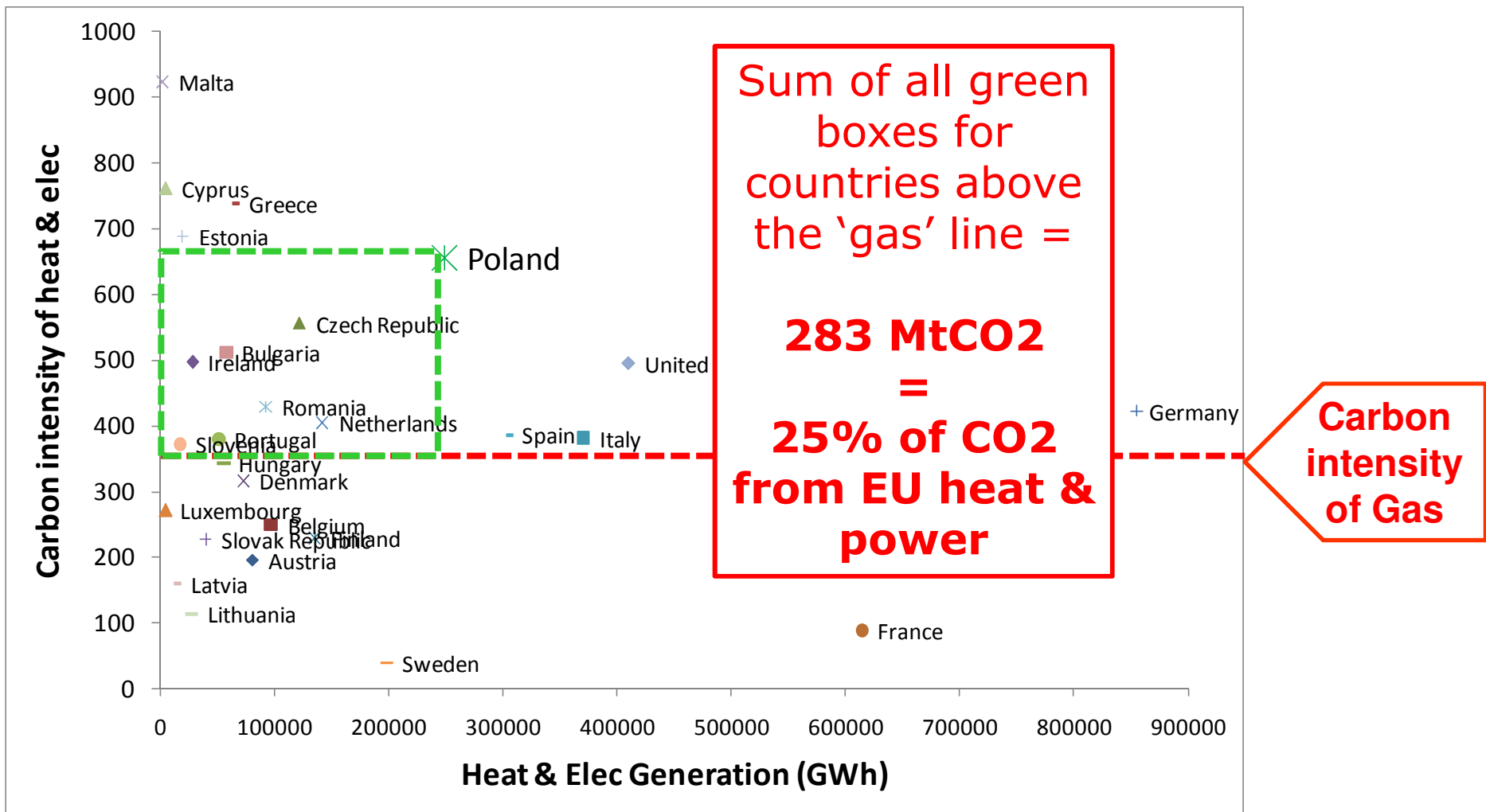
- CO2 emissions from coal in EU27 power plants:

931 Mt

- Gas less than half as carbon intensive as coal
- Displacing 25% of coal with gas saves:

1/8 of 931 Mt = **116 Mt CO2**

Many countries above C-intensity of gas



Data sources; IEA

Don't limit gas trading with the Continent

- Gas interconnector with continent flows at full capacity

makes UK politicians nervous

- Ability to trade with the continent makes the UK market attractive for LNG, Norway

stimulates investment in new import infrastructure

- Limits on trading with continent would send LNG to USA

Let's not shoot ourselves in the foot!

Conclusion: let the gas flow!

- Into the UK (and Europe)

Affordable, short-term decarbonisation – compatible with deeper, long-term decarbonisation is carbon properly priced

- From the UK to continental Europe

UK is now the EU's 'Western gas corridor' – and benefits from it



Statement 7:

Our competitive energy markets can deliver investment in new nuclear plants.

Statement 8:

Britain should hand energy policy to the European Union.

Bill Nuttall

Our competitive energy markets can deliver investment in new nuclear plants.

- Nuclear power stations stopped being planned in the UK after Chernobyl (1986) and moves towards electricity privatization and competition (1990 onwards).
- The cost of nuclear electricity mostly relates to the cost of funding the building of the power station itself (both engineering and capital)
- Nationalized industries can get cheap loans
- But can nuclear be financed in a market environment at market interest rates?

Our competitive energy markets can deliver investment in new nuclear plants.

- Nuclear power is low carbon and good for energy security
- Policy should emphasise technology-neutral measures to support lower carbon and more secure energy supplies.
- A stable and credible carbon price would help and be market friendly, but by itself would need to be much higher to motivate new nuclear power.
- If we can put a price on energy security, then nuclear power would become more economically attractive.
- Markets can build big things, even nuclear power stations, if they are properly set up

Britain should hand energy policy to the European Union.

- Climate change is a global threat
- Energy security increasingly concerns European energy imports
- But the generation mix is a matter for each member state
- In some countries nuclear power stations are a source of national pride, while in others they are illegal.

Britain should hand energy policy to the European Union.

- Some countries drive renewables with feed-in tariffs while others use local tradable permits.
- Member states call for one voice on European energy security, while building pipelines just for themselves.
- Energy is a large and complex policy problem – do we really need 27 different energy ministries and 27 different policies?
- If given real power, Brussels would soon replace its utopian visions with more realistic and effective policies.
- Then we could have real global leadership from Europe