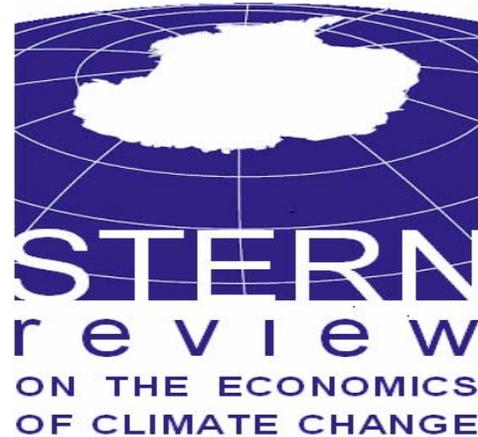




Dr Mattia Romani
Office of Climate Change, UK Government



Main conclusions:

1. Cost of inaction: between 5 and 20% of GDP, now and forever
2. Cost of action to go to 550ppm CO₂e: 1% of GDP in 2050
3. There is a case for urgent action
4. Carbon market + technology policy + shared understanding
5. A global deal based on markets is desirable and in reach

Structure of the presentation

- Cost of inaction – risk, uncertainty and ethics
- Cost of action – mitigation and technology
- Towards a global deal? The European experience

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How to estimate cost of inaction

Analytic foundations:

Climate change is an externality with a difference:

- Global
- Long-term
- Uncertain
- Potentially large and irreversible

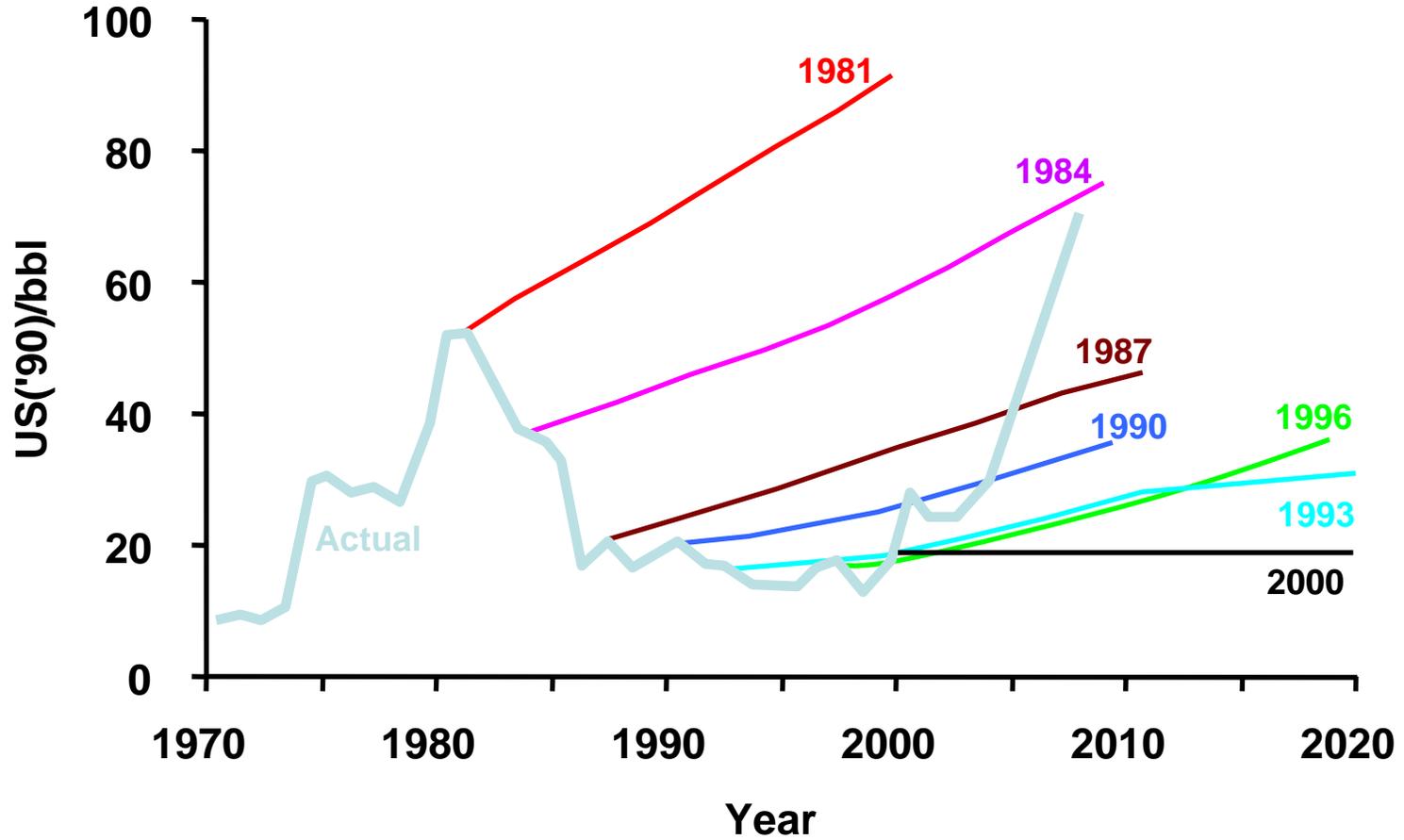
Hence key roles in the analysis of:

- Economics of Risk
- Ethics

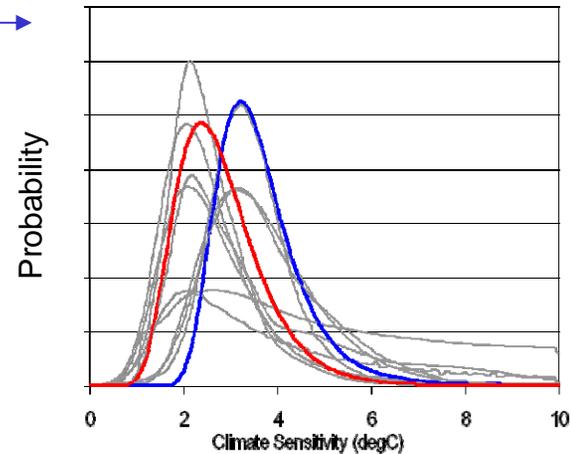
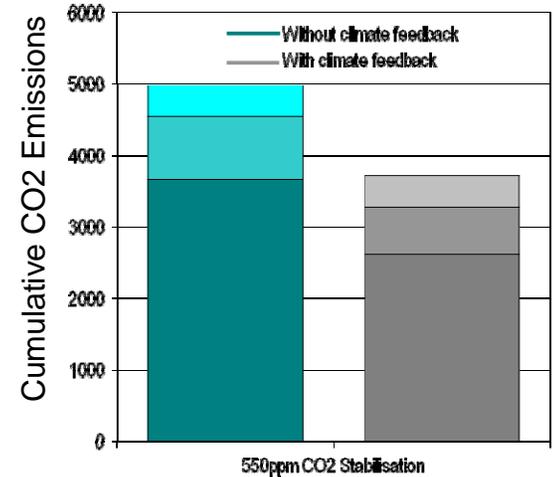
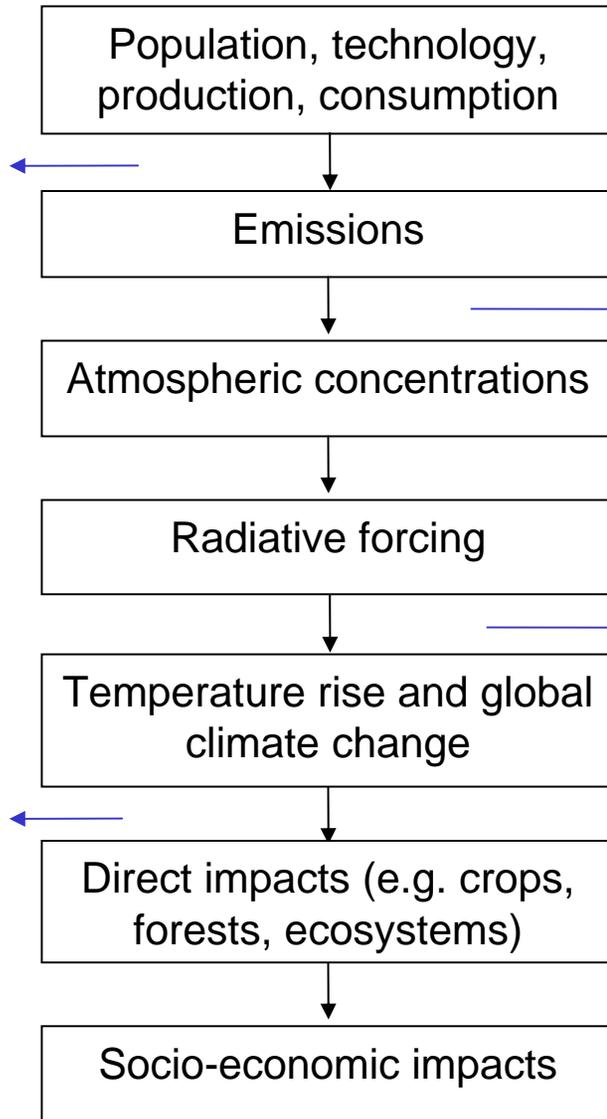
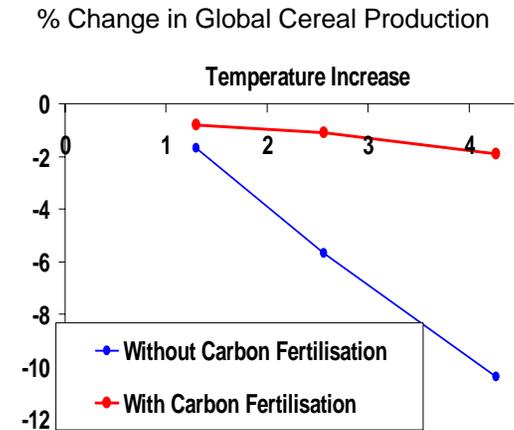
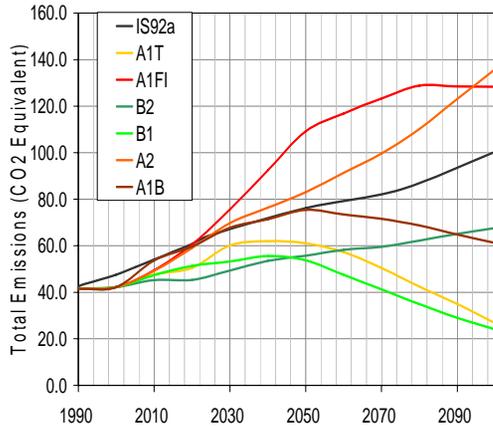
How to estimate cost of inaction

- Stream of **future damages** from inaction taking **risk** into account
- **consumption** as the 'common denominator'
- **BGE** as a way of taking into account all streams of cost
- Decide on **discount factors** on the basis **of ethics**

Expert forecasts can be wrong...



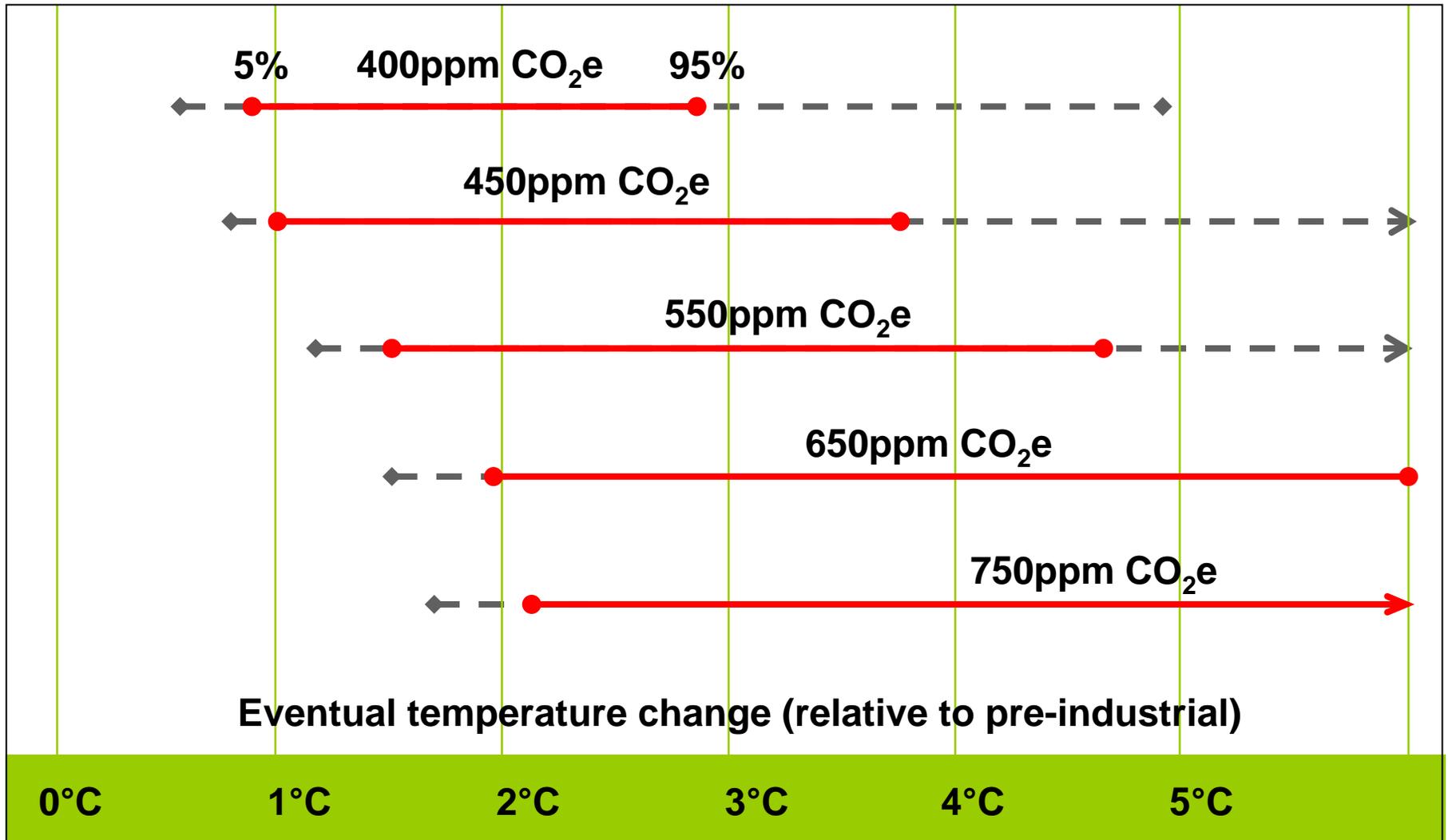
Working with Uncertainty



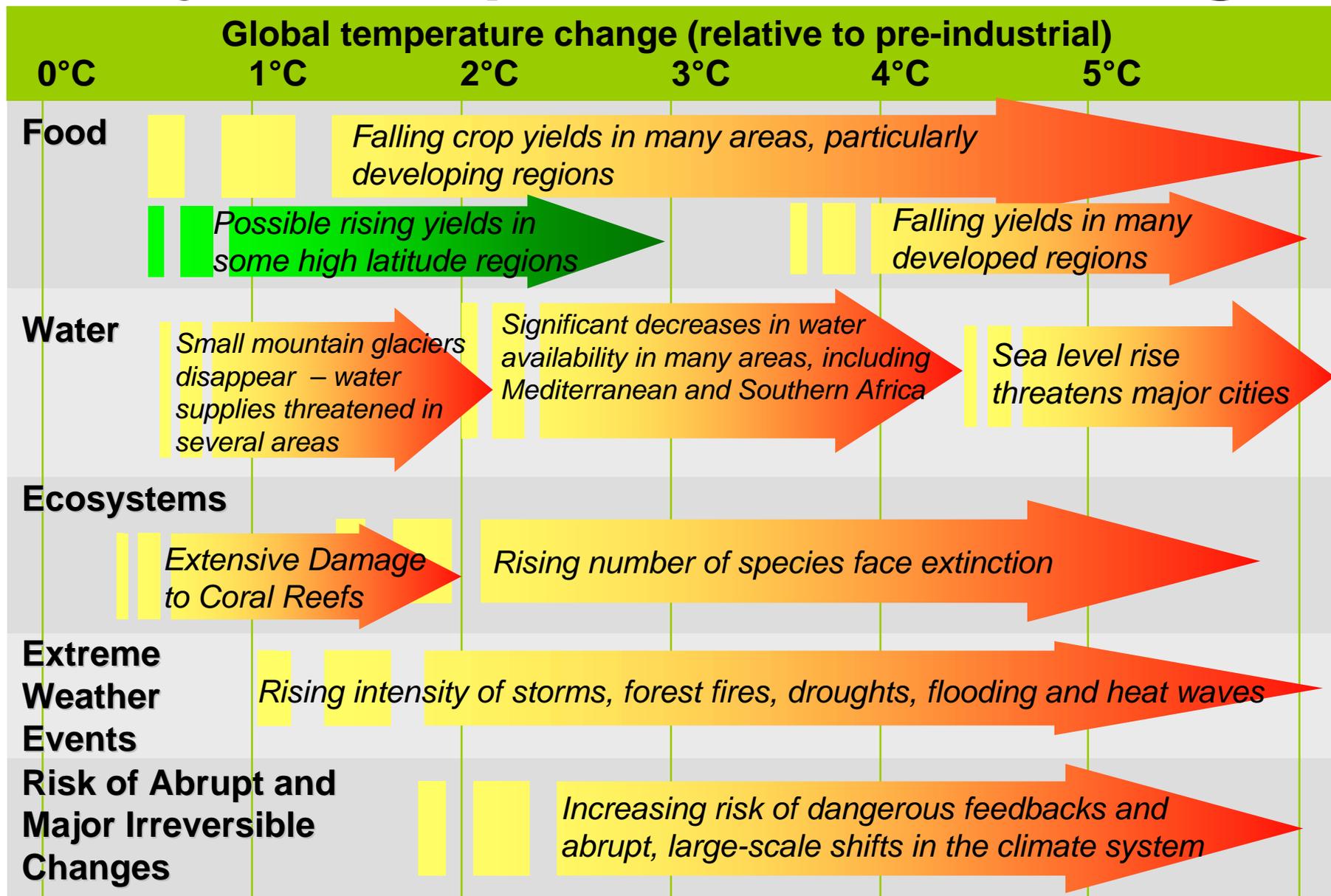
Uncertainty, risk and action

- **Uncertainty does not excuse inaction**
- When stakes are large, decisions are taken under uncertainty, and **insurance** is obtained
- Example of large scale insurance:
 - Nuclear technology for power sector (Price Anderson Act)
 - Avian Flu (\$2 billion worth of Tamiflu in the US)
 - Defence
 - Fire insurance
 - Etc...

Stabilisation and eventual change in temperature



Projected impacts of climate change



Total cost of inaction

- 5 to 20% now and forever
- **Central prediction is 10%**
- Now and forever involves an **ethical judgment** on discounting future flows
- Changing the ethics and damages weights strengthens the case for action



Oslo

Copenhagen

Rotterdam

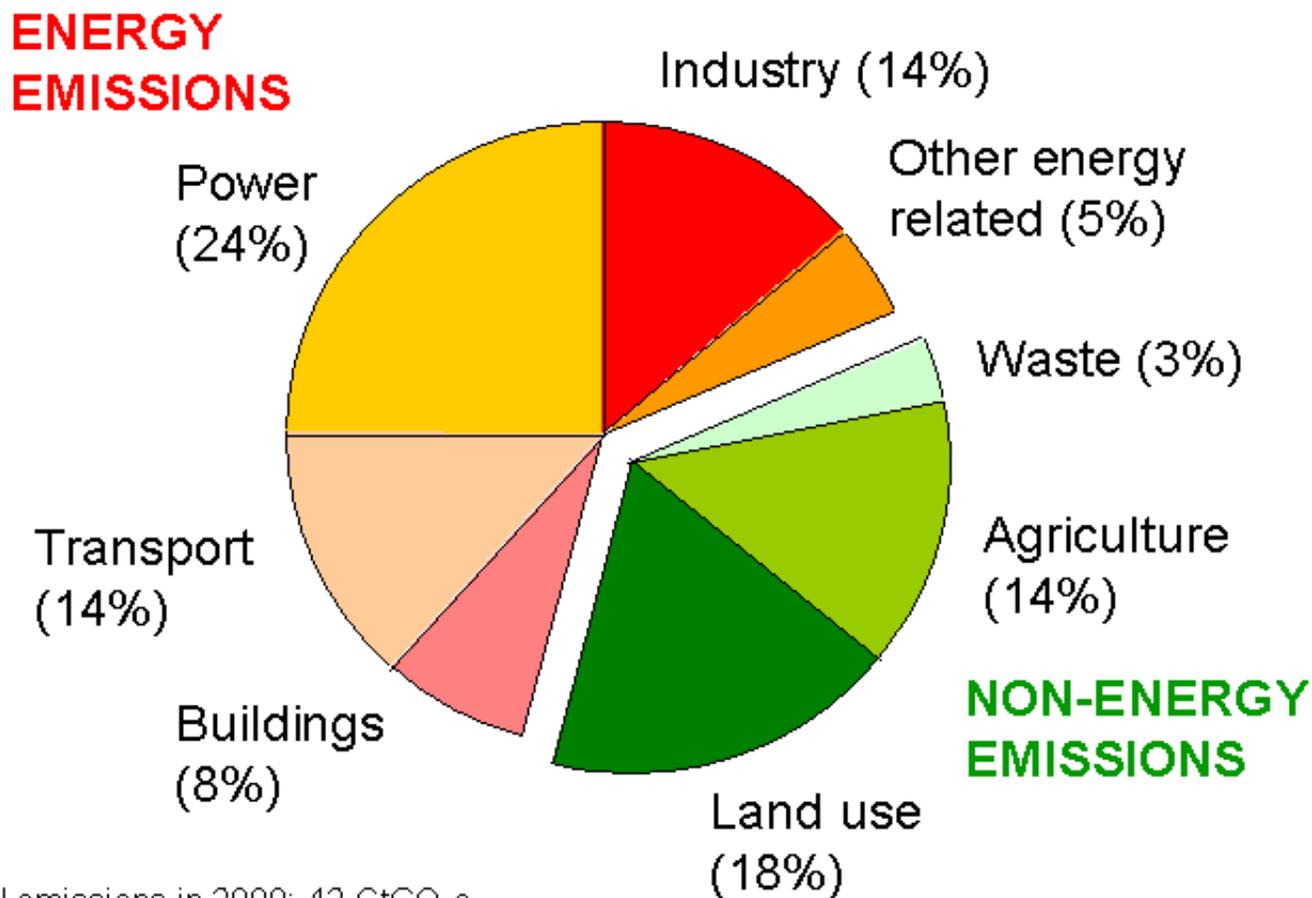
London

Paris

Structure of the presentation

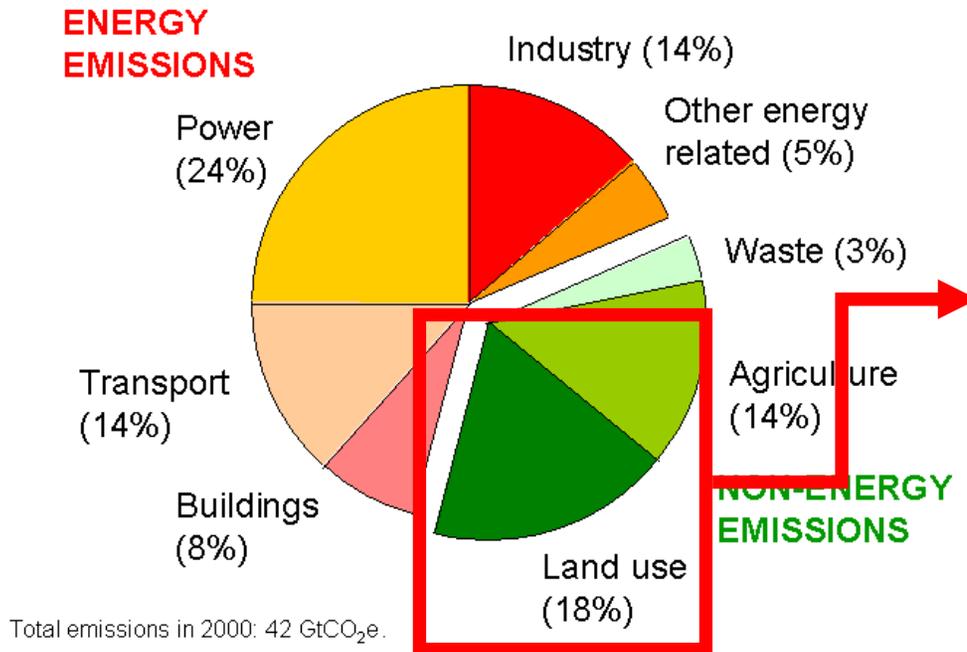
- Cost of inaction – risk, uncertainty and ethics
- Cost of action – mitigation and technology
- Towards a global deal? The European experience

Reducing emissions requires action across many sectors



Total emissions in 2000: 42 GtCO₂e.

Avoiding deforestation



- Curbing deforestation is highly cost-effective, and significant
- Forest management led by nation where the forest stands
- Large-scale pilot schemes with effective international support

Substantial capital flows to forest management

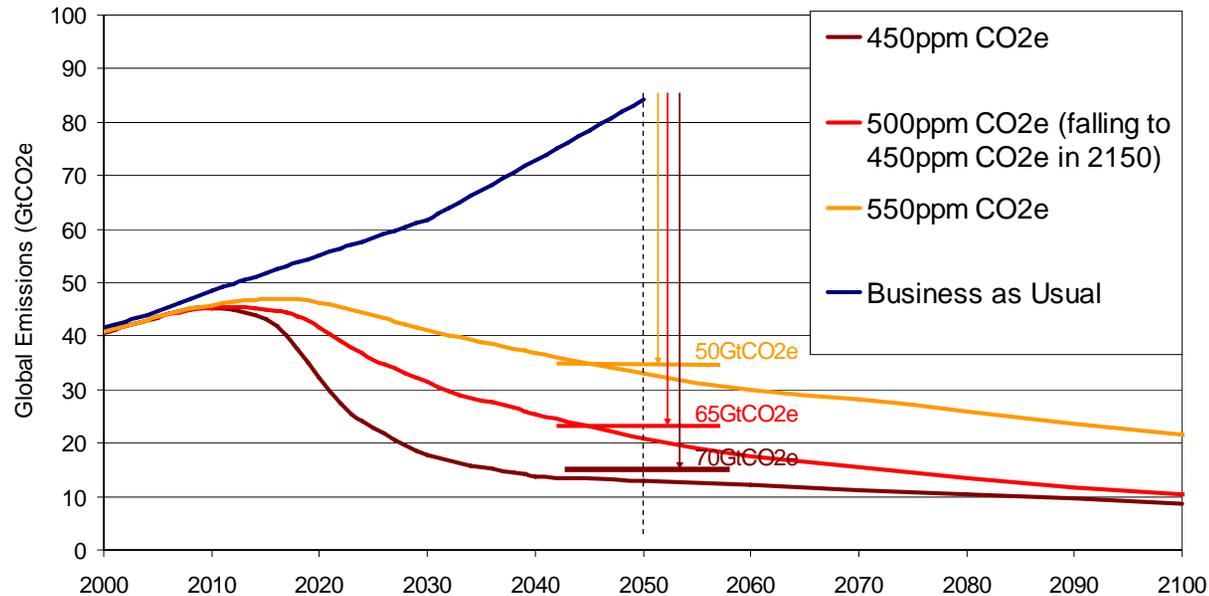
Growth, change and opportunity

- Mitigation costs around 1% p.a. worldwide
- Mitigation fully consistent the aspirations for growth and development in poor and rich countries.
- **Business as usual is not.**
- Costs will not be evenly distributed:
 - Competitiveness
 - New markets will be created
- Mitigation policy and potential win-wins:
 - energy - air quality, energy security and energy access
 - forestry - watershed protection, biodiversity, rural livelihoods

Target: stocks, history, flows

- **US and the EU** countries accounted for over half of cumulative global emissions from 1900 to 2005
- Total current emissions: **40-45 GtCO₂e p.a.**
- **50% reduction by 2050** implies 20-25 Gt, which means per capita global GHG emissions of 2-3T /capita (20-25 Gt divided by 9 billion population)
- Currently **US ~ 20+, Europe ~10+, China ~5+, India ~2+** T/capita
- Thus 80% reductions would bring Europe, but not US, down to world average. Many developing countries would have to cut strongly too if world average of **2-3 T/capita is to be achieved**

Delaying mitigation is dangerous and costly



Stabilising below 450ppm CO₂e would require emissions to peak by 2010 with **6-10% p.a.** decline thereafter

If emissions peak in 2020, we can stabilise below 550ppm CO₂e if we achieve annual declines of **1 – 2.5% afterwards.**

A **10 year delay** almost doubles the annual rate of decline required

Structure of the presentation

- Cost of inaction – risk, uncertainty and ethics
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Four Policy principles

- **Pricing the externality**- carbon pricing via tax or trading
- **Bringing forward lower carbon technology**- research, development and deployment
- **Overcoming information barriers and transaction costs**– regulation, standards
- Promoting a **shared understanding** of responsible behaviour across all societies – beyond sticks and carrots

The path to Copenhagen

2007

2008

2009

2010



COP 12



COP 13
Indonesia



COP 14,
Poland



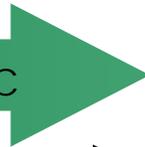
COP 15,
Denmark



COP16, Lati
America



Science 4th AR IPCC



Convention Dialogue



Follow-Up
Convention Dialogue



BALI ROADMAP



Post-2012
Deal



Review of Kyoto
Protocol (Art 9)



Follow-Up
Review



G20 Gleneagles Plan of Action



G8 GER



G8 JAP



US Major
Economies



G8 ITA





Bracketing text

- ‘The Parties [are urged to] [shall] [must] [should] [may] submit their reports to the Secretariat [before] [no later than] [January 1, 2005] [June 30, 2005] [the Xth session of the Subsidiary Bodies].’
- Text adopted once brackets are cleared.

Key elements of a global deal

Targets and Trade

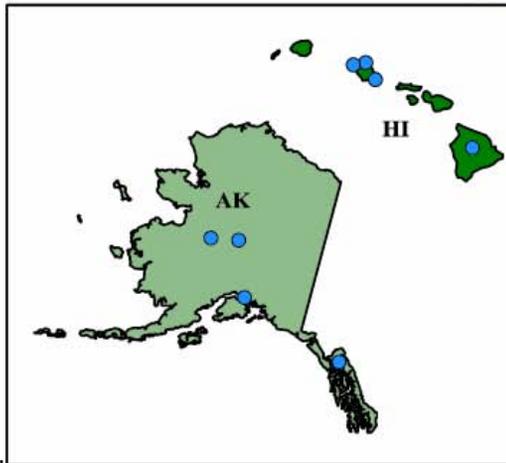
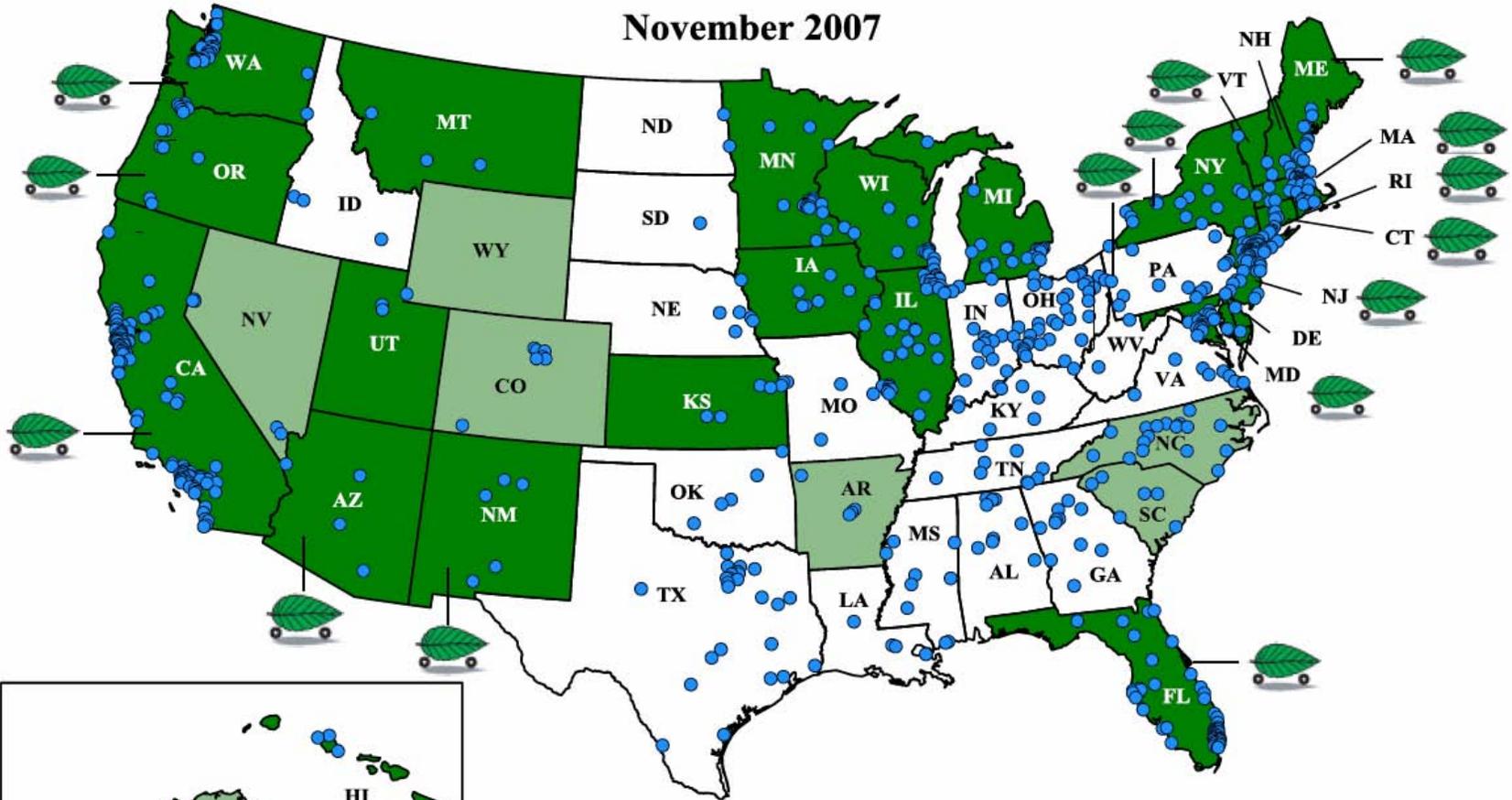
- Confirm Heiligendamm 50% cuts in world emissions by 2050 with rich country cuts at least 75%
- trading schemes **open to trade with other countries, with special supply side from developing countries**
- Funding schemes for **deforestation, CCS, ODA**
- **incentives for developing countries** to play strong role in global deal, eventually taking on **their own targets**.
- Main way forward: **domestic action**

Commitments: percentages

- G8 Heiligendamm – 50% by 2050 (consistent with stabilisation around 500ppm CO₂e)
- California (and US under most presidential candidates)
- 80% from 1990 levels by 2050
- France – 75% by 2050 (Factor 4), relative to 1990
- EU Spring Council: 60-80% by 2050 and 20-30% by 2020, relative to 1990
- Germany – 40% by 2020, relative to 1990

There is a rising tide for action to combat global warming within the US

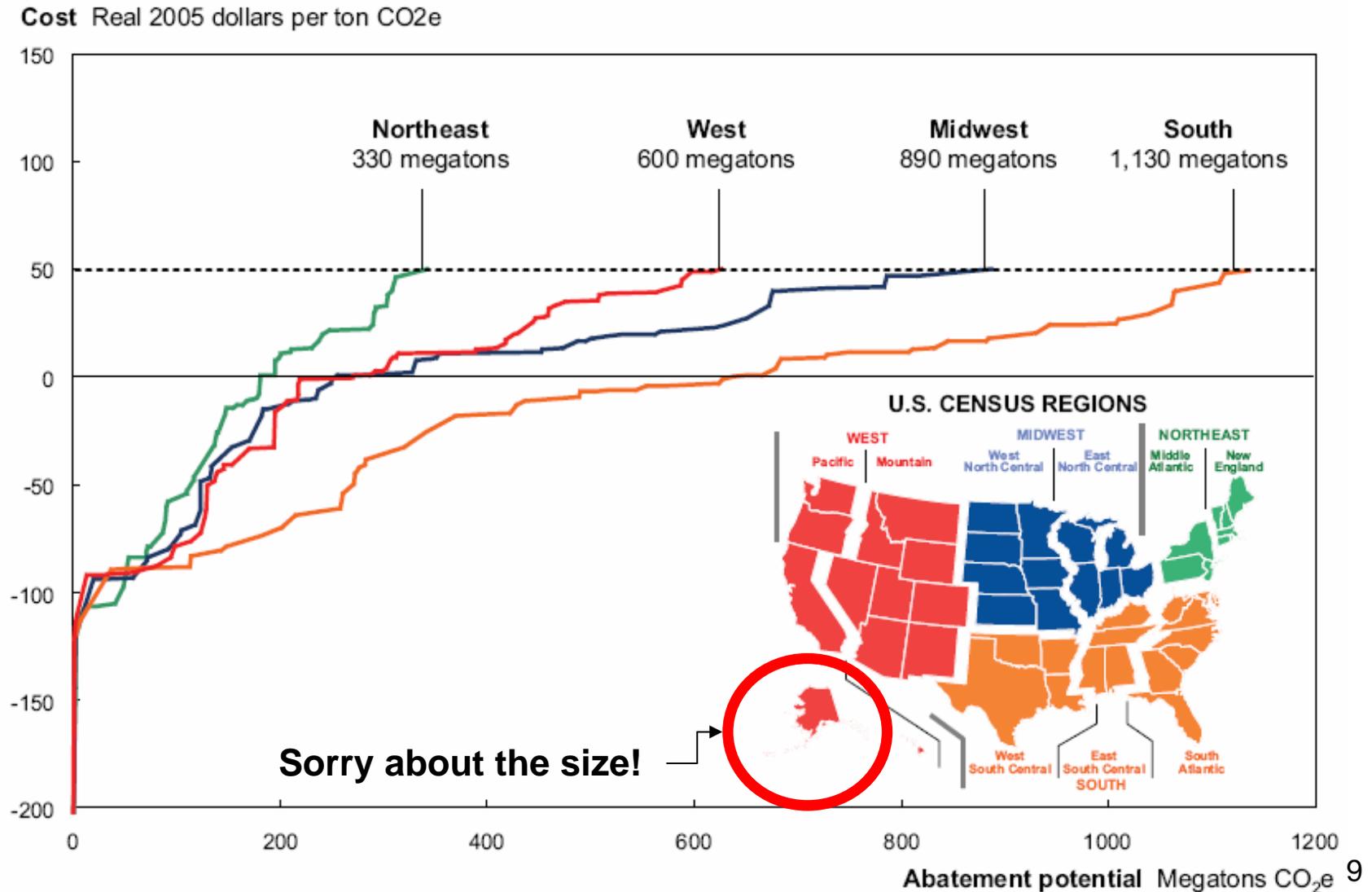
November 2007



- Commitment to Mandatory Cap (25 States)
(41% of total US emissions)
- Considering Mandatory Cap (7 States)
(9% of total US emissions)
- Mayors Signed on to Climate Agreement (691)
- Cap on Vehicle Emissions (15 States)
(40% of US vehicle emissions)



Potential varies by region: value of a federal system



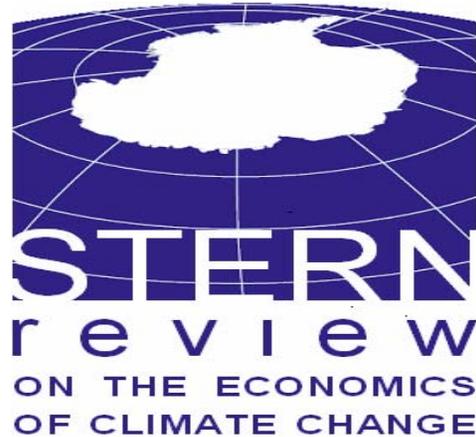
Coal to gas switch potential in the US

- **Coal accounts for 43% of power production in the US and ~ 60% of emissions** (which is currently ~ 1.5bn CO2 tonnes/year)
- **Gas fired power plants emit 45% less CO2 than coal fired ones** (same heat). Substantial gains from switching to clean coal.
- Under a cap and trade scheme, at a price of \$50/tonne of CO2, the yearly liability of coal power plants is \$75bn

• **Switching to gas would decrease the liability of 34bn/year .
Clean coal would also create big savings in carbon fees.**



POTENTIAL OPORTUNITY FOR ALASKA?



Main conclusions:

1. **Cost of inaction:** between 5 and 20% of GDP, now and forever
2. **Cost of action** to stabilize at 550ppm CO₂e: 1% of GDP in 2050
3. There is a **case for urgent action, waiting is costly**
4. **Carbon market + technology policy + shared understanding**
5. A global deal based on markets and incentives is **desirable** and offers **opportunities. It won't stop the world economy.**

“No matter what happens, the US Navy is not going to be caught napping”

Frank Knox, U.S. Secretary of the Navy

4th December 1941



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