Towards a Global Deal on Climate Change

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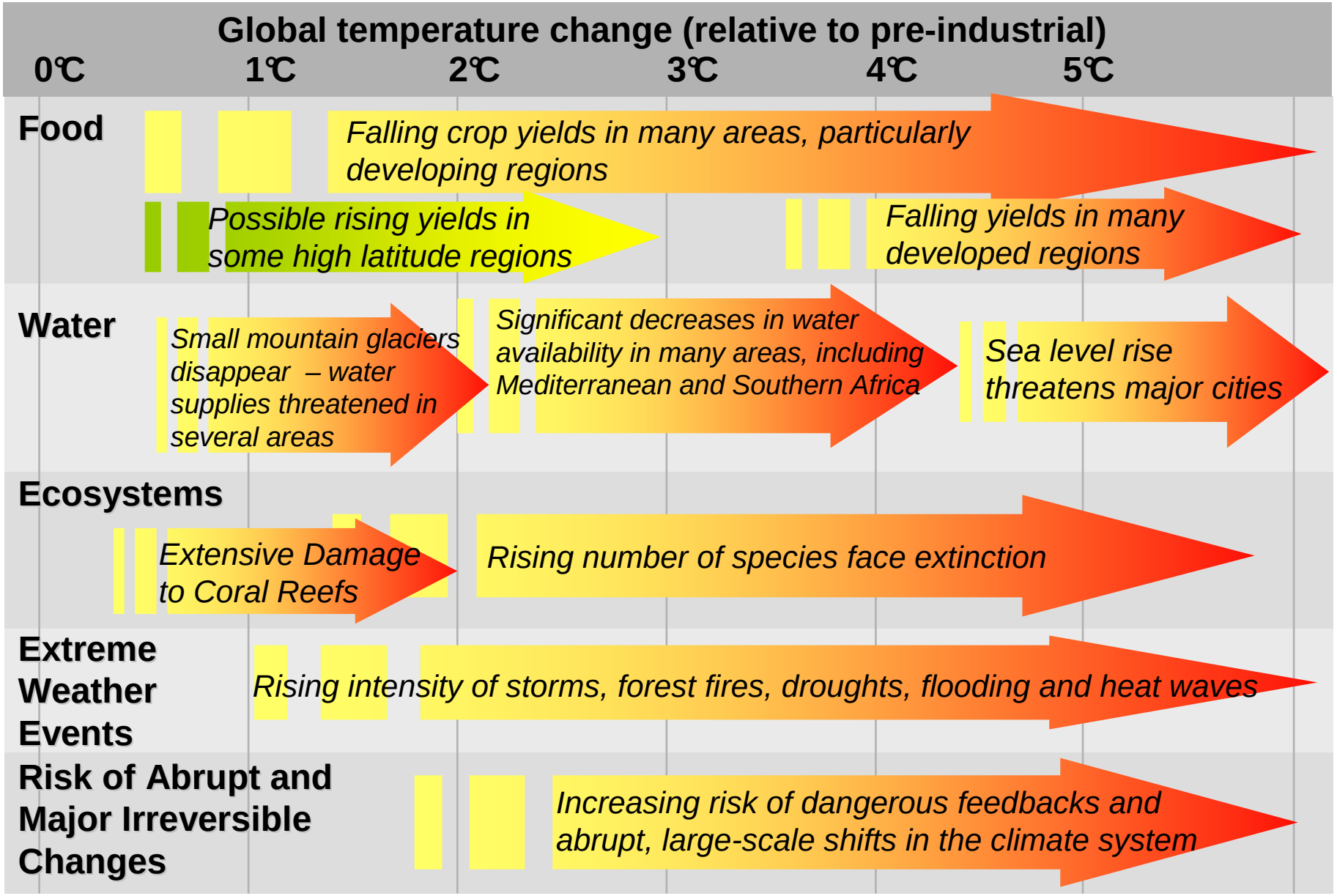
Part One

Risks and Targets

Projected impacts of climate change



‘Probabilities’ (in %) of exceeding a temperature increase at equilibrium

Stabilisation level (in ppm CO_2e)	2℃	3℃	4℃	5℃	6℃	7℃
450	78	18	3	1	0	0
500	96	44	11	3	1	0
550	99	69	24	7	2	1
650	100	94	58	24	9	4
750	100	99	82	47	22	9

Source: Hadley Centre: From Murphy et al. 2004

- Monte Carlo estimates from Hadley Centre
- Model ‘fairly cautious’
- Those who argue e.g. for stabilisation levels of 650ppm CO_2e and above are accepting very big risks of a transformation of the planet
- Figures similar to IPCC AR4 (no probabilities in TAR)

Structure of argument on mitigation objectives (I)

- Risk of going above 5℃ increase are very severe: e.g. would induce massive movements of population
- On basis of implied probabilities of temperature increase, dangerous to go beyond 550ppm CO_2e
- Stabilisation to 550 or 500ppm CO_2e 'buys' sharp reduction in probabilities of dangerous temperature increases relative to BAU
- Cuts of 30-50% by 2050 required for target of stabilisation range 550- 500ppm CO_2e
- Cost of action to get in range looks acceptable relative to reduction of risks and damages avoided

Structure of argument on mitigation objectives (II)

- Whilst considerations of risk steer quantity targets (i.e. cuts), efficiency requires use of market mechanism to keep down costs

- These cuts would need a carbon price of $30 plus per tonne of CO_2e; thus we have a “take” on marginal abatement costs

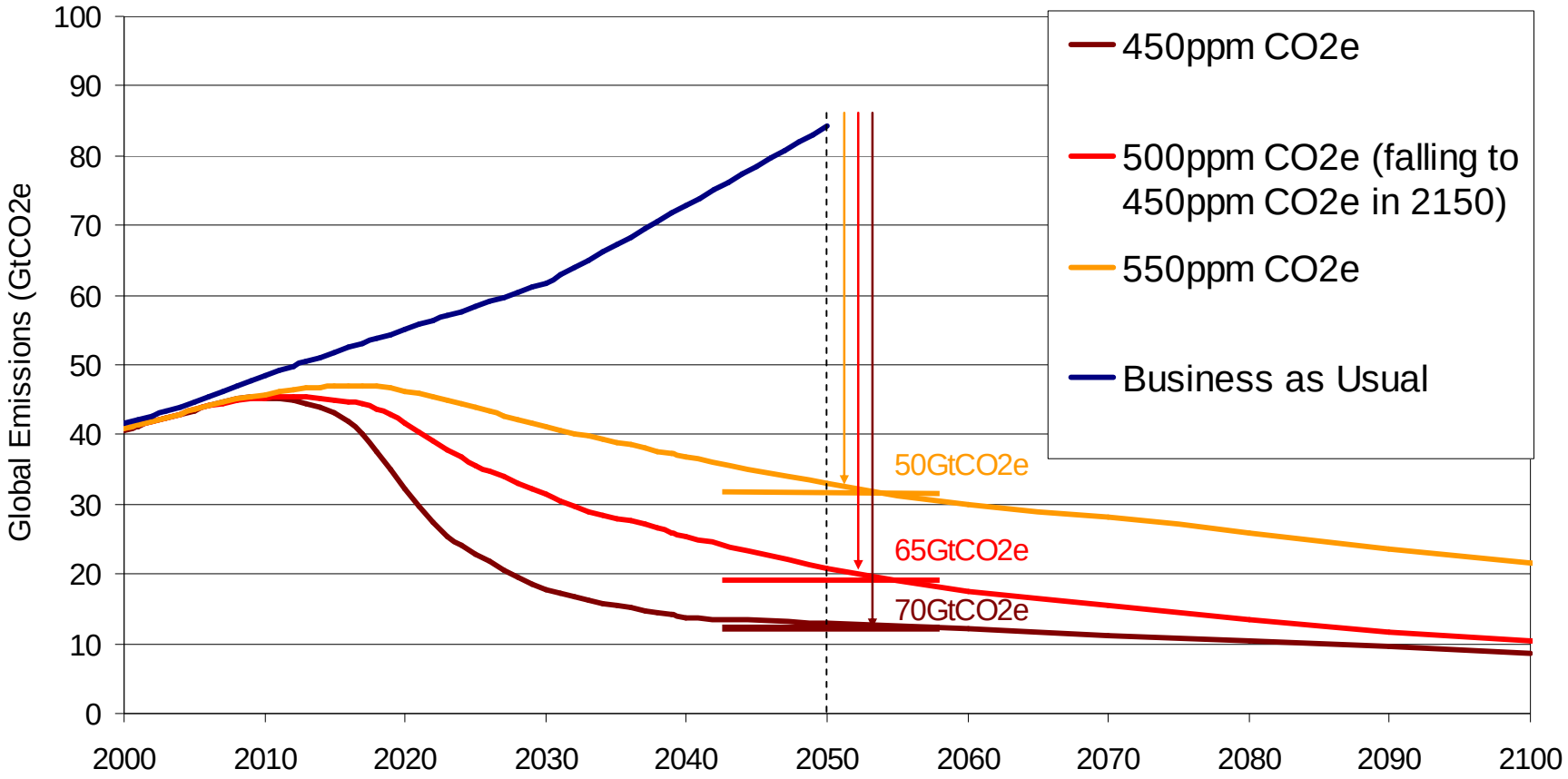
- This is in range of marginal social cost (MSC), for paths associated with 500-550ppm CO_2e but MSC is very sensitive to ethical and structural assumptions

- Equity demands that rich countries take much bigger targets for cuts than poor. Trading can then provide flow of finance to developing countries

Part Two

Flows, Costs and Stern Review
One Year On

Delaying mitigation is dangerous and costly



Source: Stern Review

Cost estimates

- Review examined results from bottom-up (Ch 9) & top-down (Ch 10) studies: concluded that world could stabilise below 550ppm CO_2e for around 1% of global GDP
- Subsequent analyses Edenhofer/IPCC top-down have indicated lower figures
- So too have bottom-up IEA and McKinsey
- Starting planning now with clear targets and good policies allows measured action and keeps costs down. Delayed decisions/actions (or “slow ramp”), lack of clarity, bad policy will increase costs
- Associated co-benefits (energy security, reduced pollution) and opportunities (innovations, new markets)

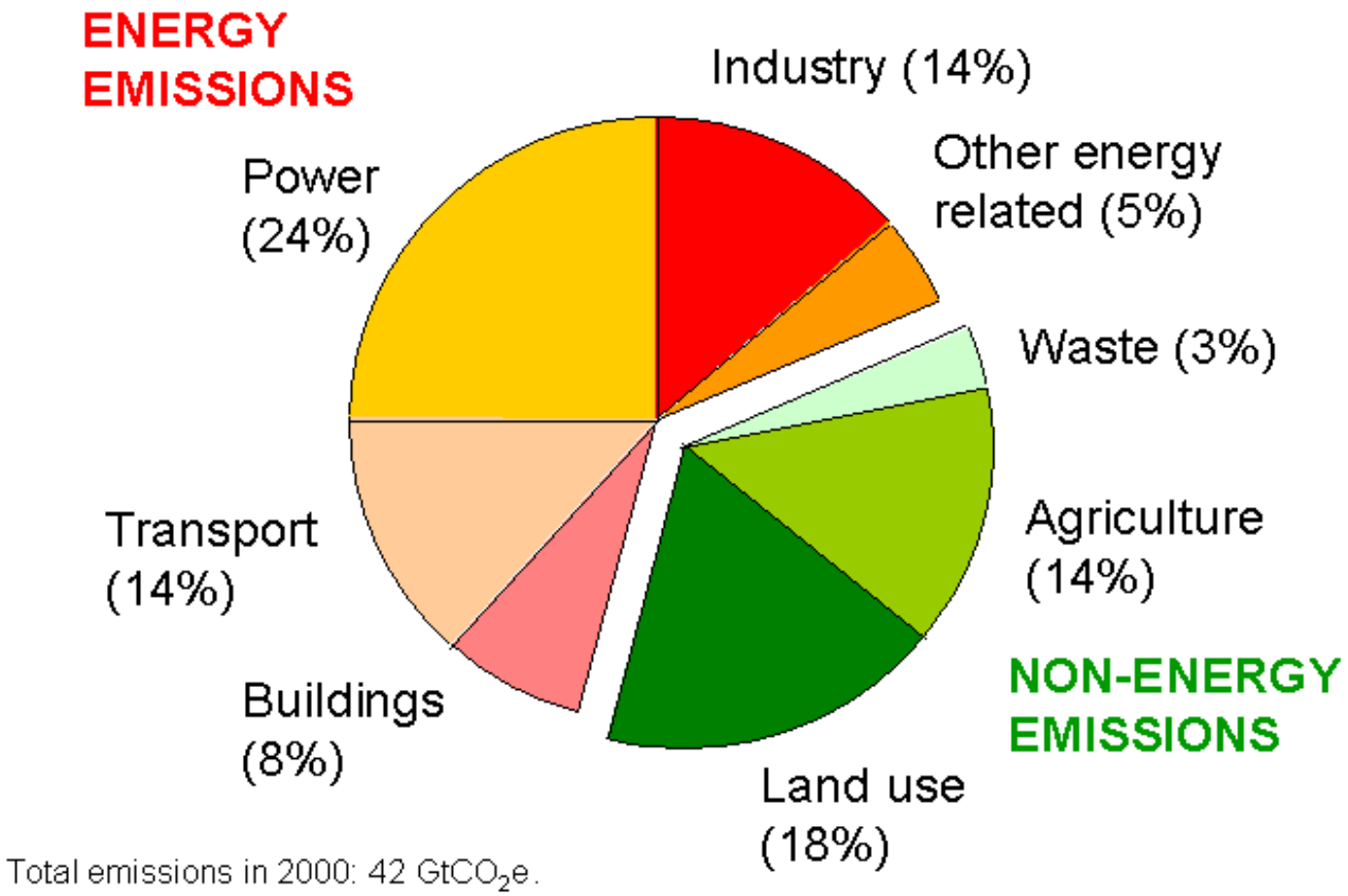
Reflections on damages in Stern Review analysis after one year

- Emphasis on risk avoidance rather than formal modelling well-founded
- Modelling without making risk central misses the point – both ethics and risk crucial
- Probably under-estimated emission growth (growth of emissions from China and India particularly)
- Probably under-estimated risks of high-temperatures (omitted features in climate science modelling) and damages from high temperatures (implausible 'overly linear' extrapolations)
- Thus magnitude of avoided damages under-estimated

Part Three

Emissions and Technologies

Reducing emissions requires action across many sectors



Total emissions in 2000: 42 $GtCO_2e$.

Where energy emissions are headed

- Garnaut. Emissions will greatly exceed the highest of the SRES scenarios if current trends continue

- IEA. Reference scenario: energy emissions increase by 57% between 2005 and 2030
  - Coal now bigger source than oil
  - China and India account for more than half of increase
  - China's emissions 2-3 times as high as India's; both more than double by 2030

- Country 'responsibility' a difficult concept – consumers round the world demand products

Oil/coal running out?

- Years of production left in ground with proven reserves and current consumption leaves

  Oil : 45 years

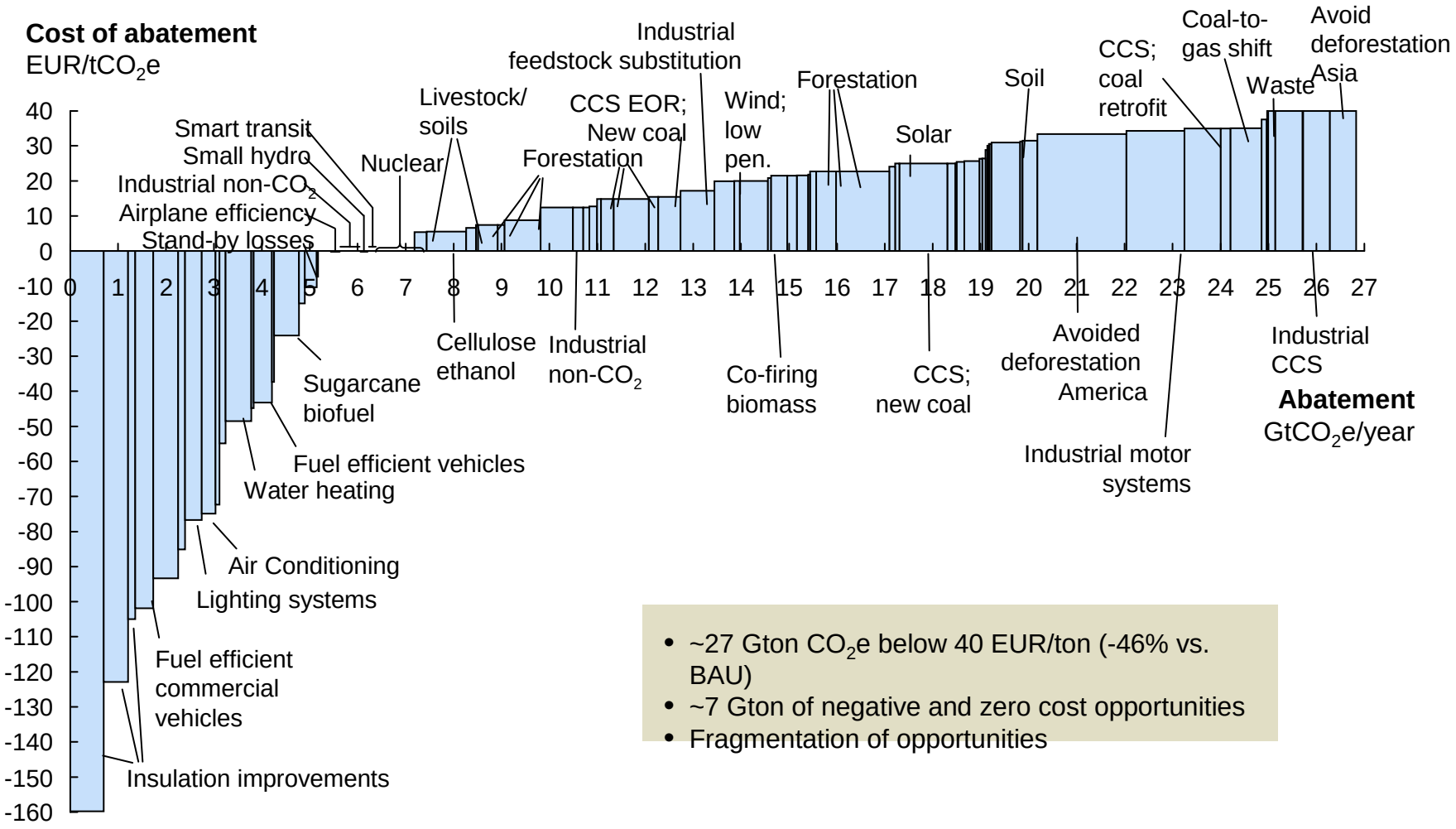
  Gas : 72 years

  Coal : 252 years

- These reserves are enough to take GHG concentrations to very dangerous levels: e.g. if used all the coal it might add around 400ppm to concentrations
- Have to find alternatives this century in any case – better to do it sooner rather than later

Many options: policy matters and prices crucial

2030



- ~27 Gton CO_2e below 40 EUR/ton (-46% vs. BAU)
- ~7 Gton of negative and zero cost opportunities
- Fragmentation of opportunities

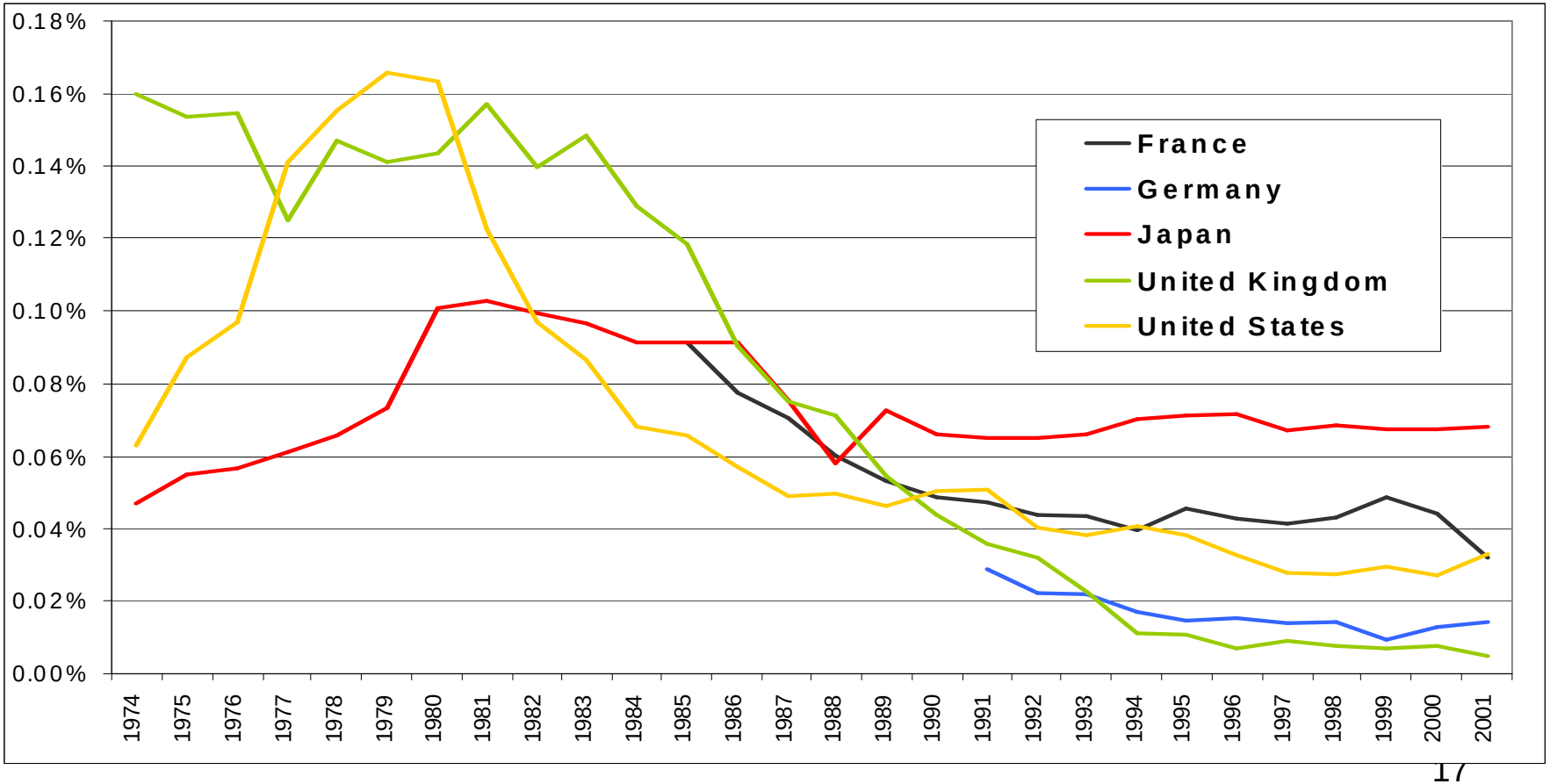
Source: McKinsey

Trade/tax/standards

- Trade/quotas give greater quantity certainty and incentives to bring in developing countries; ambition, transparency, credibility are key
- Tax may be simpler for some countries and/or sectors
- Tax or trade: identify single policy instrument for sector
- With appropriate periodic revisions (and auctioning) tax and trade can be fairly similar
- Regulation may accelerate change and lower costs by reducing uncertainty and achieving economies of scale
- But complications of interactions e.g. renewables targets and size of carbon market

Public-private partnerships for technology

Public energy R&D investments as a share of GDP



Part Four

A Global Deal

Basic Criteria for a Global Deal

- Effectiveness: the scale must be commensurate with the challenge
- Efficiency: we must keep down the costs of emissions reduction
- Equity: the rich countries must take the lead

Commitments: percentages

- G8 Heiligendamm – 50% by 2050 (consistent with stabilisation around 500ppm $C0_2e$)
- California (and US under e.g. Obama/Clinton) - 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

Target: stocks, history, flows

- Current 40-45 $GtCO_2e$ p.a. Current stocks around 430ppm CO_2e; pre-industrial stocks 280ppm
- The United States and the EU countries combined accounted for over half of cumulative global emissions from 1900 to 2005
- 50% reduction by 2050 requires 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
- Requires close to zero carbon electricity and surface transport

The GHG ‘reservoir’

- Long-term stabilisation at 550ppm CO_2e implies that only a further 120ppm CO_2e can be ‘allocated’ for emission, given that we start at 430ppm CO2e (or further 70ppm if targeting 500ppm)

- Can view the issue as the use of a “collective reservoir” of 270ppm (i.e. 550 minus the 280ppm of 1850) over 200 years. Over half of reservoir already used mainly by rich countries. Or could “start the clock” at X_T, the stock when problem was first recognised at T (e.g. around 20 years ago)

- Equity requires a discussion of the appropriate use of this reservoir given past history

- Thus convergence of flows does not fully capture the equity story, from emissions perspective

- Equity issues arise also in adaptation, given responsibilities for past increases

Key elements of a global deal / framework (I)

Targets and Trade

- Confirm Heiligendamm **50%** cuts in world emissions by 2050 with rich country cuts at least **80%**
- Rich country reductions and trading schemes designed to be **open to trade with other countries**, including developing countries
- **Supply side from developing countries** simplified to allow much bigger markets for emissions reductions: ‘carbon flows’ to rise to $50-$100bn p.a. by 2030. Role of sectoral or technological benchmarking in ‘one-sided’ trading to give reformed and much bigger CDM market

Key elements of a global deal / framework (II)

Funding Issues

- Strong initiatives, with public funding, on **deforestation** to prepare for inclusion in trading. For $10-15 bn p.a. could have a programme which might halve deforestation. Importance of global action and involvement of IFIs
- Demonstration and sharing of **technologies**: e.g. $5 bn p.a. commitment to feed-in tariffs for CCS coal would lead to 30+ new commercial size plants in the next 7-8 years
- Rich countries to deliver on Monterrey and Gleneagles commitments on **ODA** in context of extra costs of development arising from climate change: potential extra cost of development with climate change upwards of $80bn p.a.

Nature of deal / framework

- Combination of the above can, with appropriate market institutions, help overcome the inequities of climate change and provide **incentives for developing countries to play strong role** in global deal, eventually **taking on their own targets.**
- Within such a framework **each country can advance** with some understanding of global picture.
- Individual country action **must not be delayed** (as e.g. WTO) until full deal is in place.
- Main enforcement mechanism, country-by-country, is **domestic pressure**.
- If we argue that, “it is all too difficult” and the world lets stocks of GHGs rise to 650, 700 ppm or more must be **clear and transparent** about the great magnitude of these risks