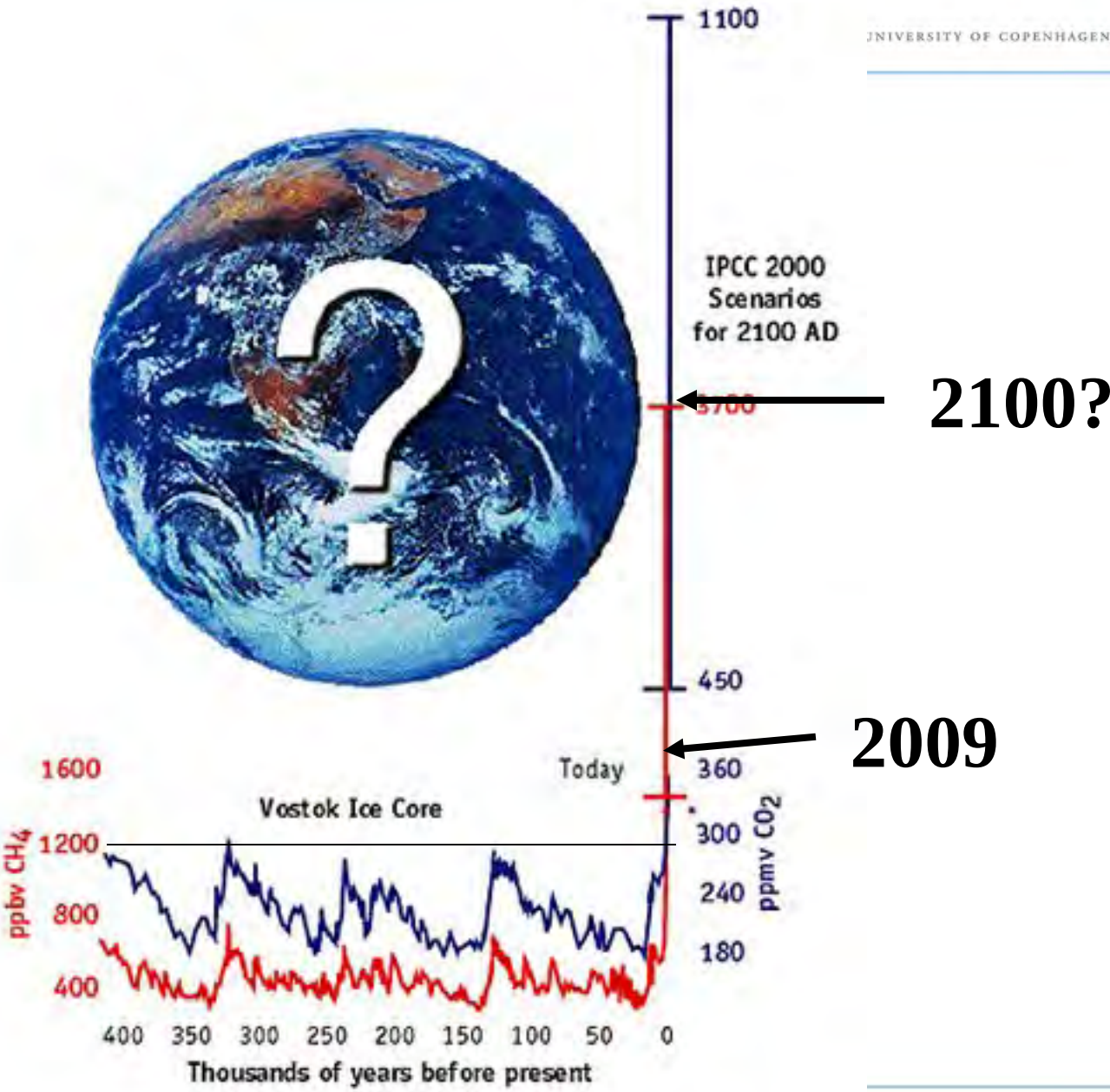
1100
IPCC 2000
Scenarios
for 2100 AD
450
2100?
2009
Today
360
300
240
180
ppmv CO_2
1600
1200
800
400
ppbv CH_4
Vostok Ice Core
400 350 300 250 200 150 100 50 0
Thousands of years before present

UNIVERSITY OF COPENHAGEN

The International Scientific Congress on Climate Change

CLIMATE*CHANGE*

Global Risks, Challenges & Decisions

COPENHAGEN 2009

10-12 March

www.climatecongress.ku.dk

INTERNATIONAL ALLIANCE OF RESEARCH UNIVERSITIES

The Congress is sponsored by:

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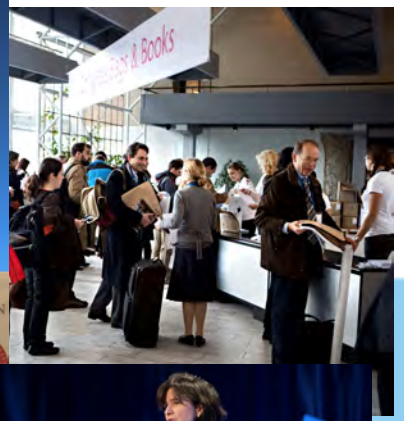
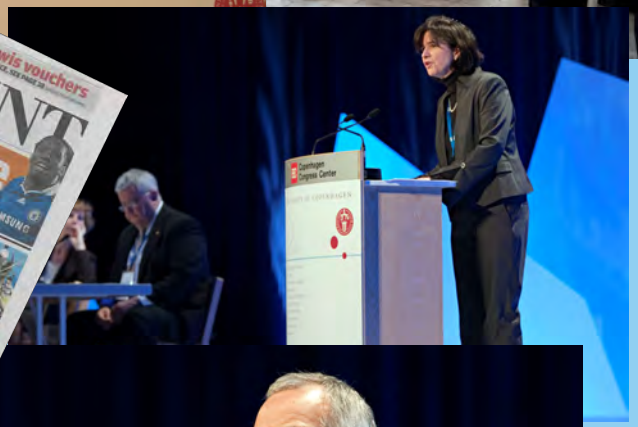
CLIMATE CHANGE

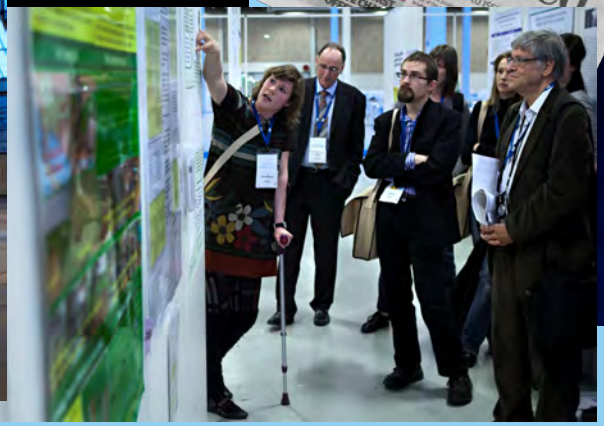
COPENHAGEN 2009

CLIMATE CHANGE

Global Risks, Challenges & Decisions







The Congress & Some Statistics…

- More than 2500 participants
- More than 300 volunteers
- 58 parallel sessions
- More than 1600 scientific contributions
- Participants from nearly 80 countries
- 215 journalists
- 1800+ articles online in more than 40 countries

Synthesis (Peer reviewed) June 2009 – 30 pages written for the non-scientist

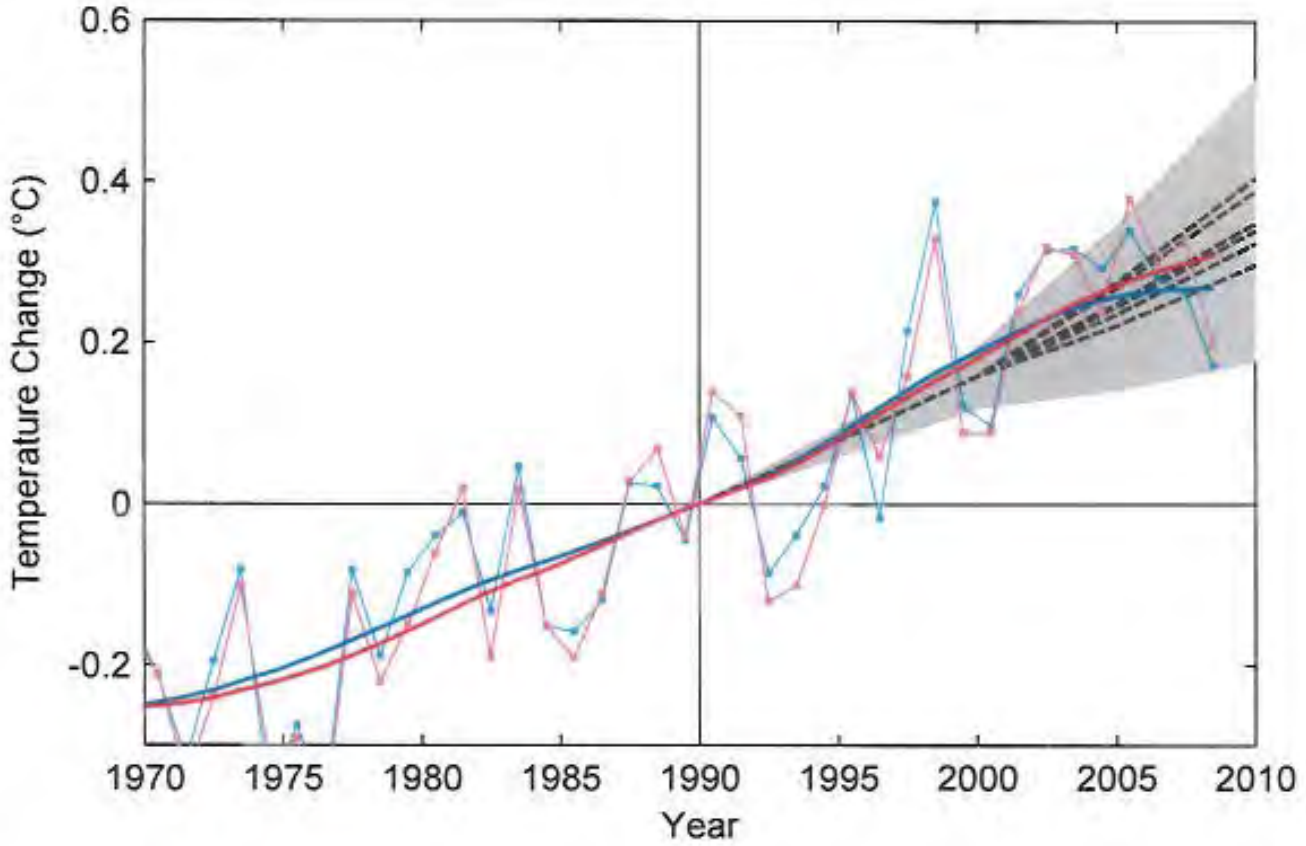
Book (Cambridge University Press, 250 pages 2010)

KEY MESSAGE 1:

CLIMATIC TRENDS

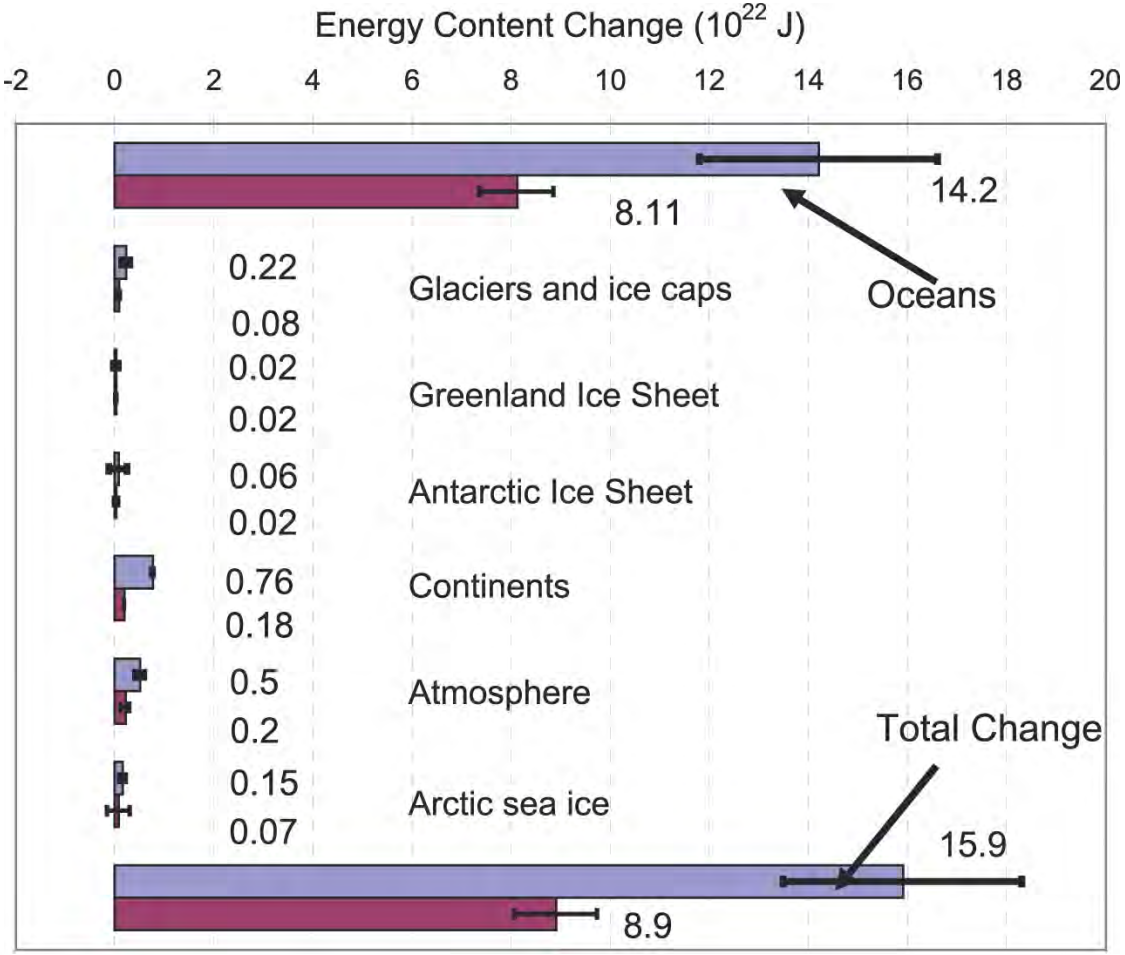
- *Worst-case IPCC scenario trajectories (or even worse) for greenhouse gas emissions and development of many components of the climate system are being realized.*
- *Many key components of the climate system are already moving beyond the patterns of natural variability within which our society and economy have developed and thrived. These components include global mean surface temperature, sea-level rise, global ocean temperature, polar ice sheet extent, ocean acidification, and extreme climatic events.*
- *There is a significant risk that the rates of change for some of these parameters will accelerate, leading to an increasing risk of abrupt or irreversible climatic shifts.*

AIR TEMPERATURE CHANGE

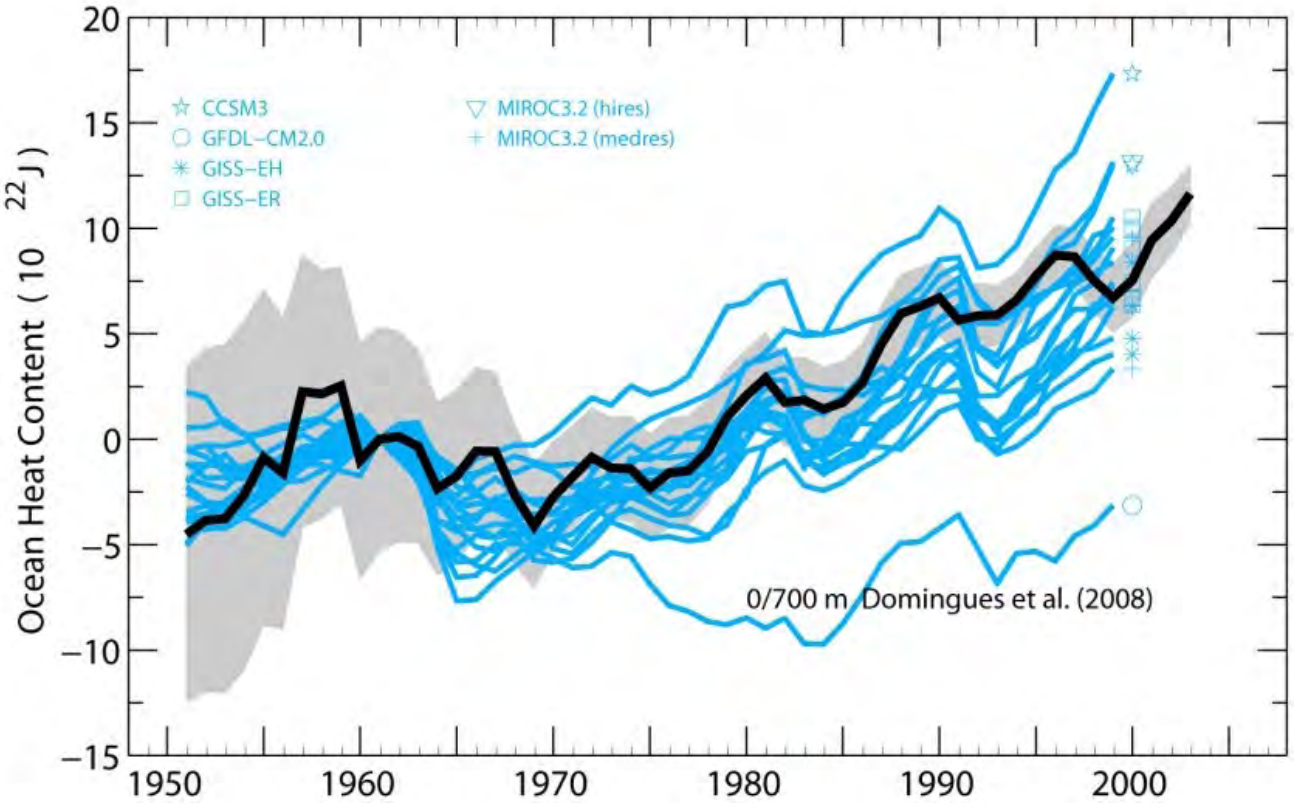


Blue:1961-2003

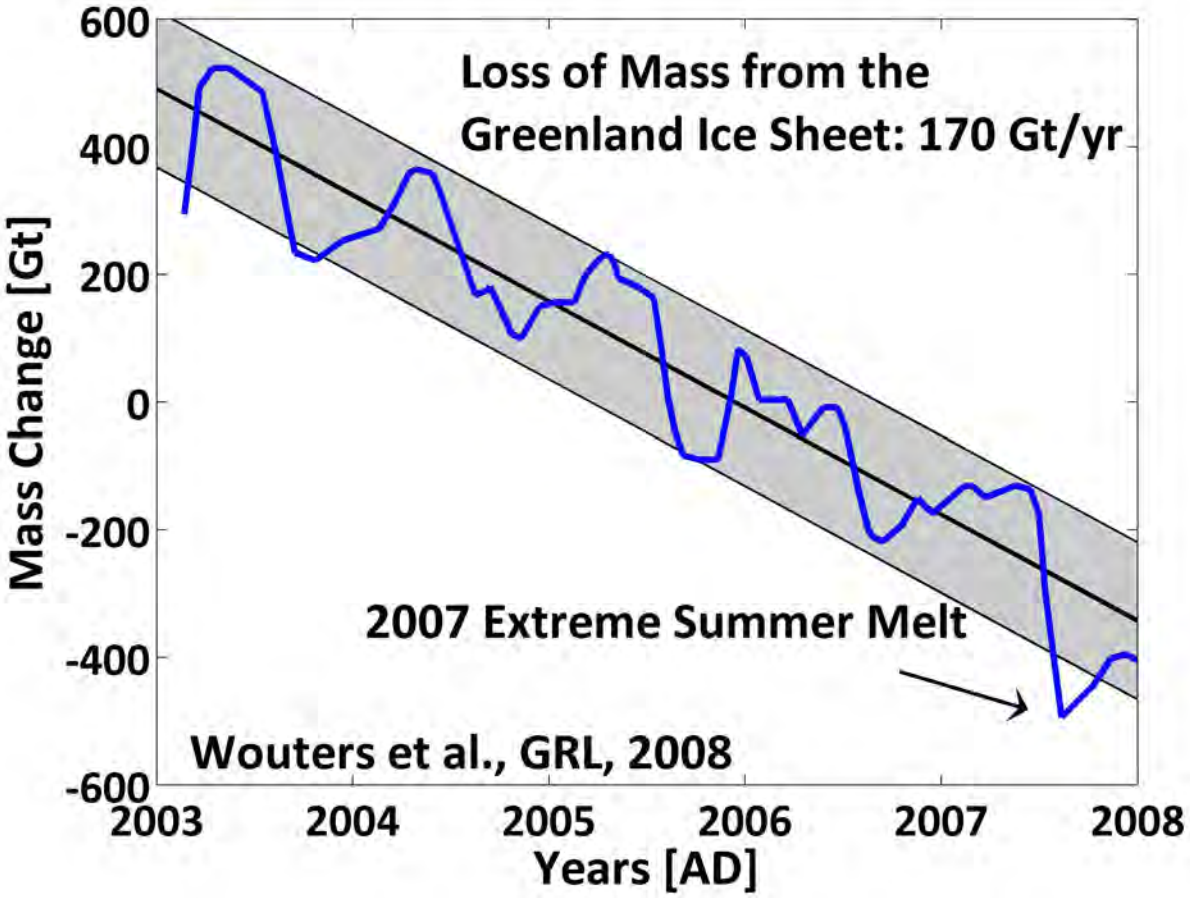
Red:1993-2003



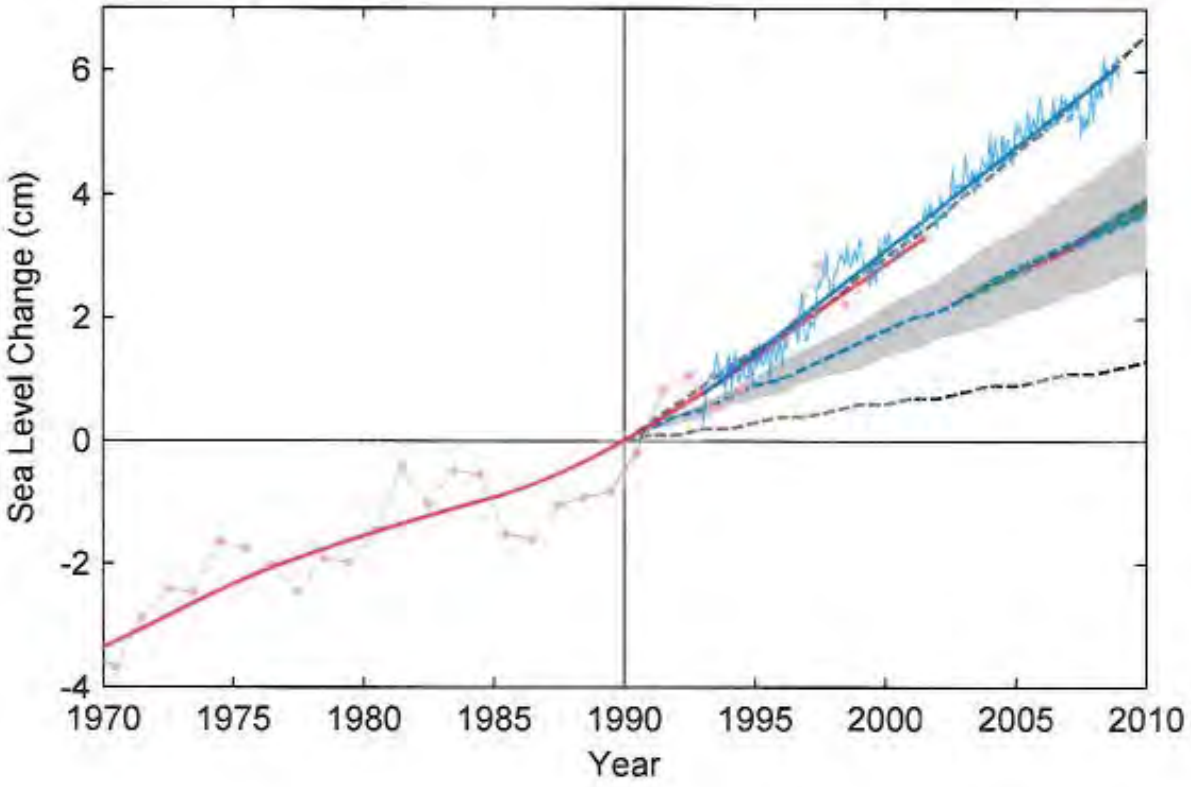
Surface ocean temp rising 50% faster than predicted



Polar Ice sheets melting faster than predicted at last IPCC

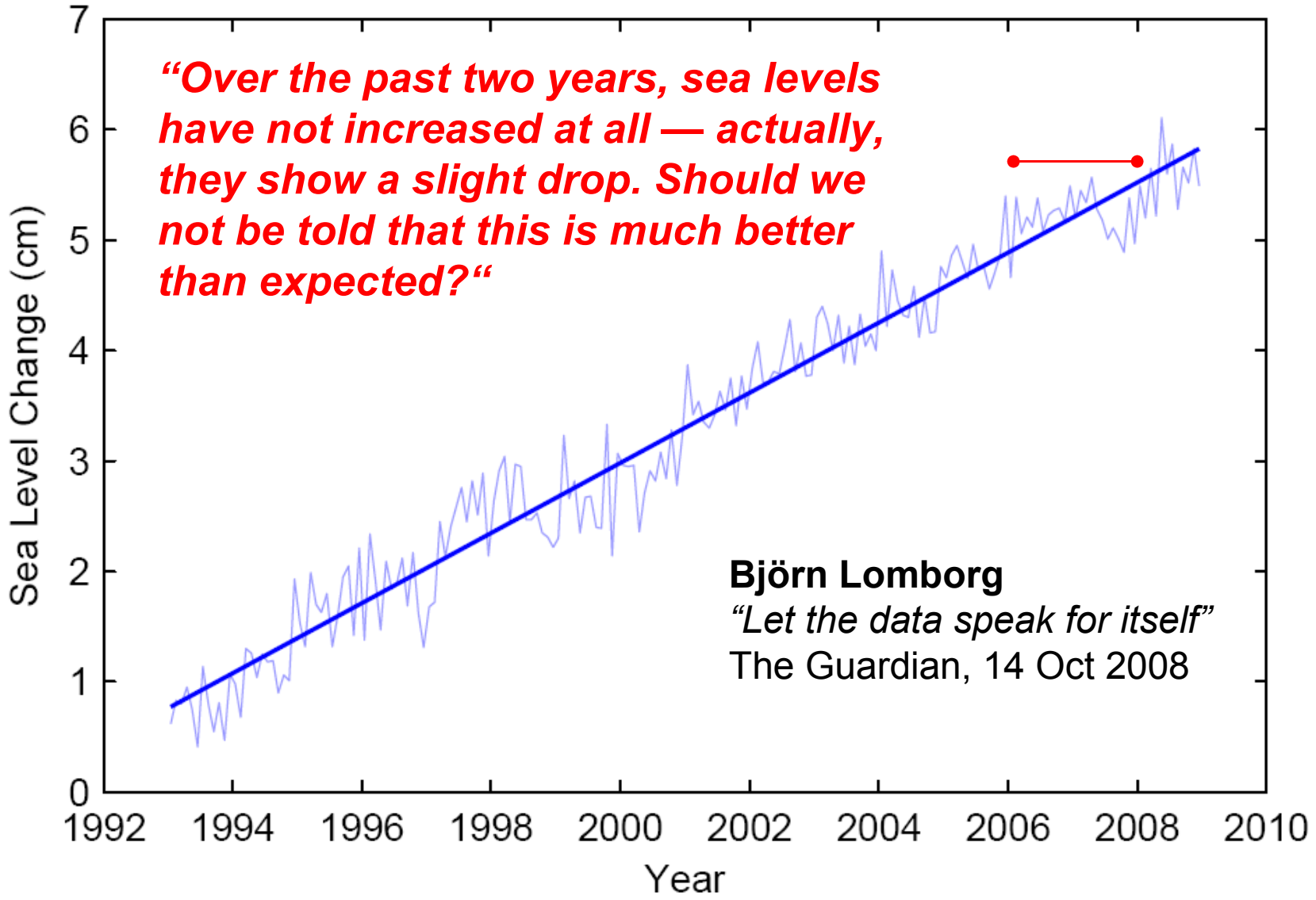


Sea-level rising faster than predicted

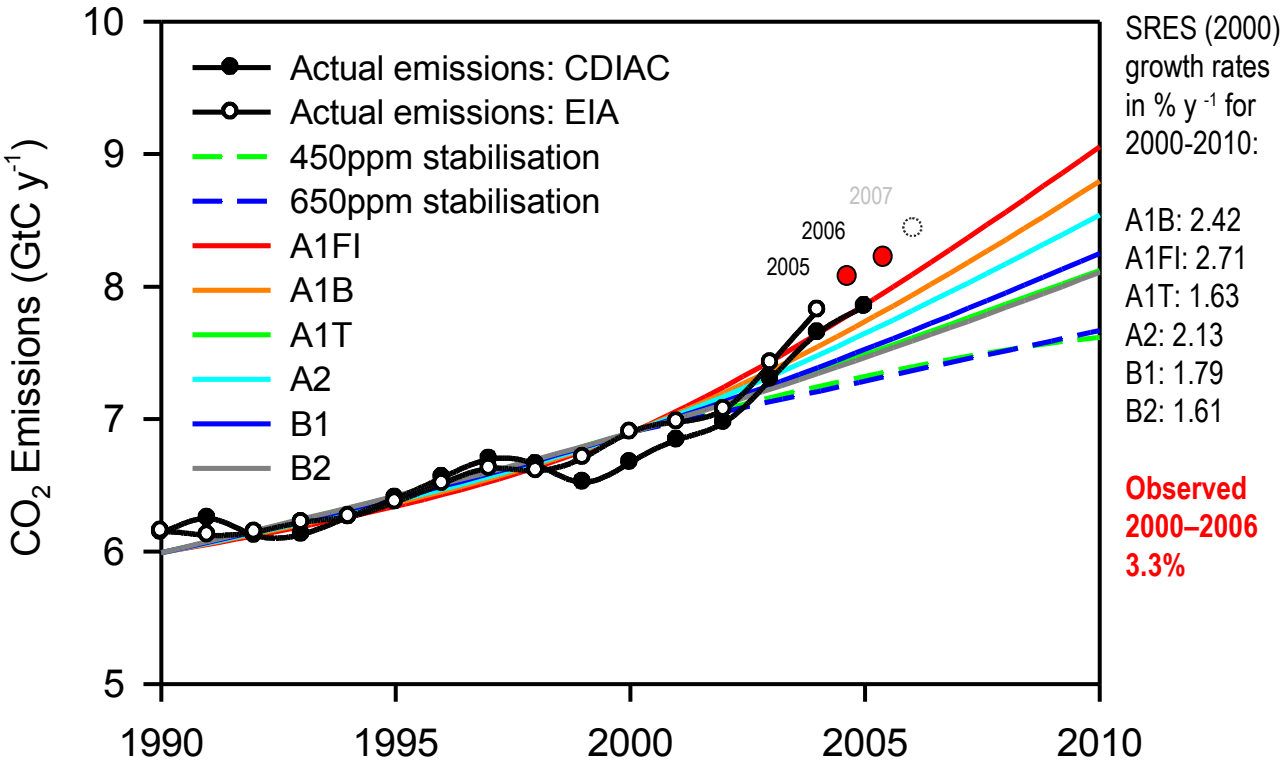


Rise of approx. 1 m or more expected by 2100

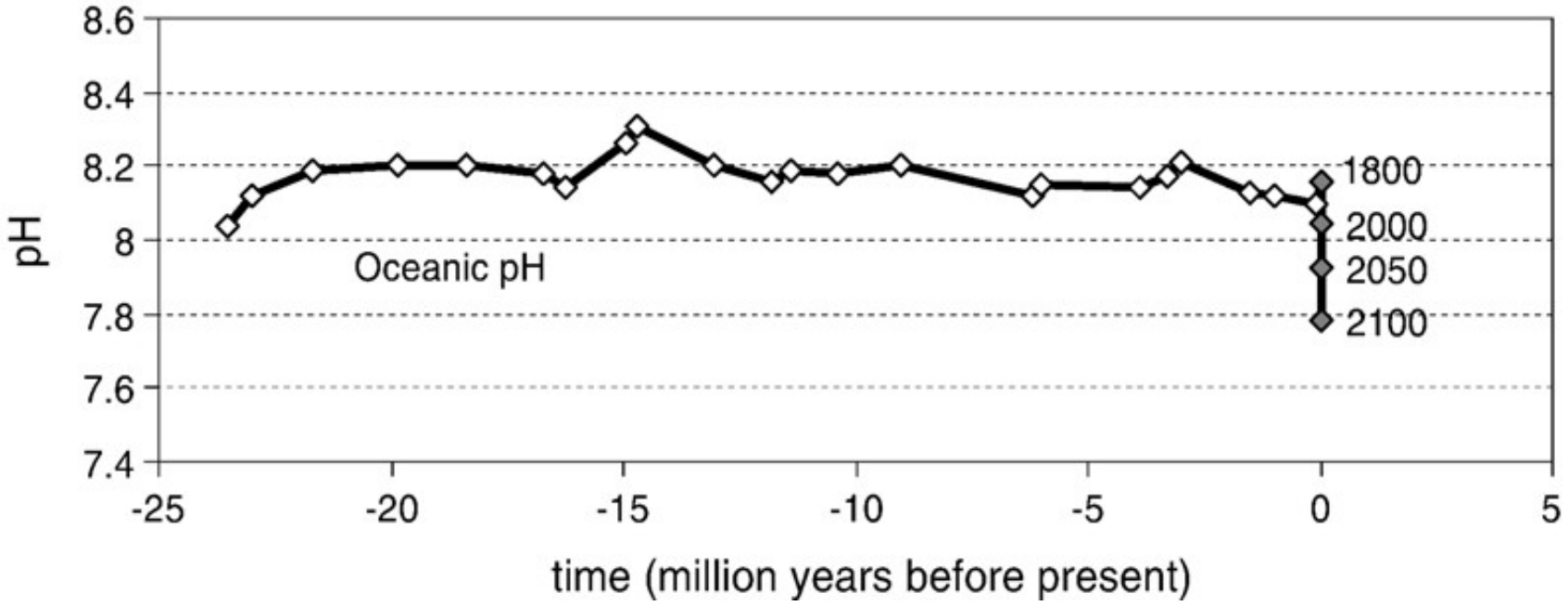
"much better than expected"?

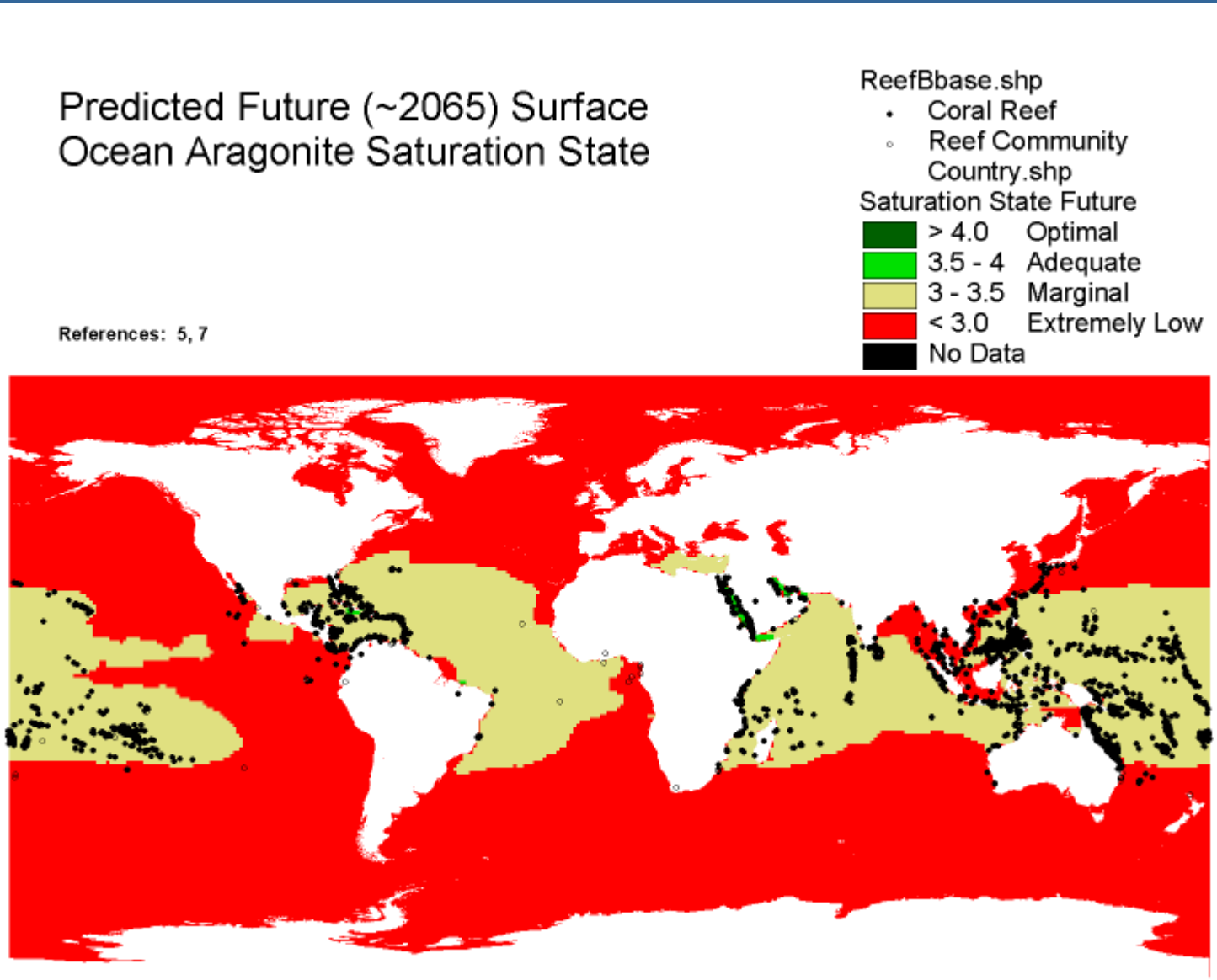


Emissions rising faster than predicted



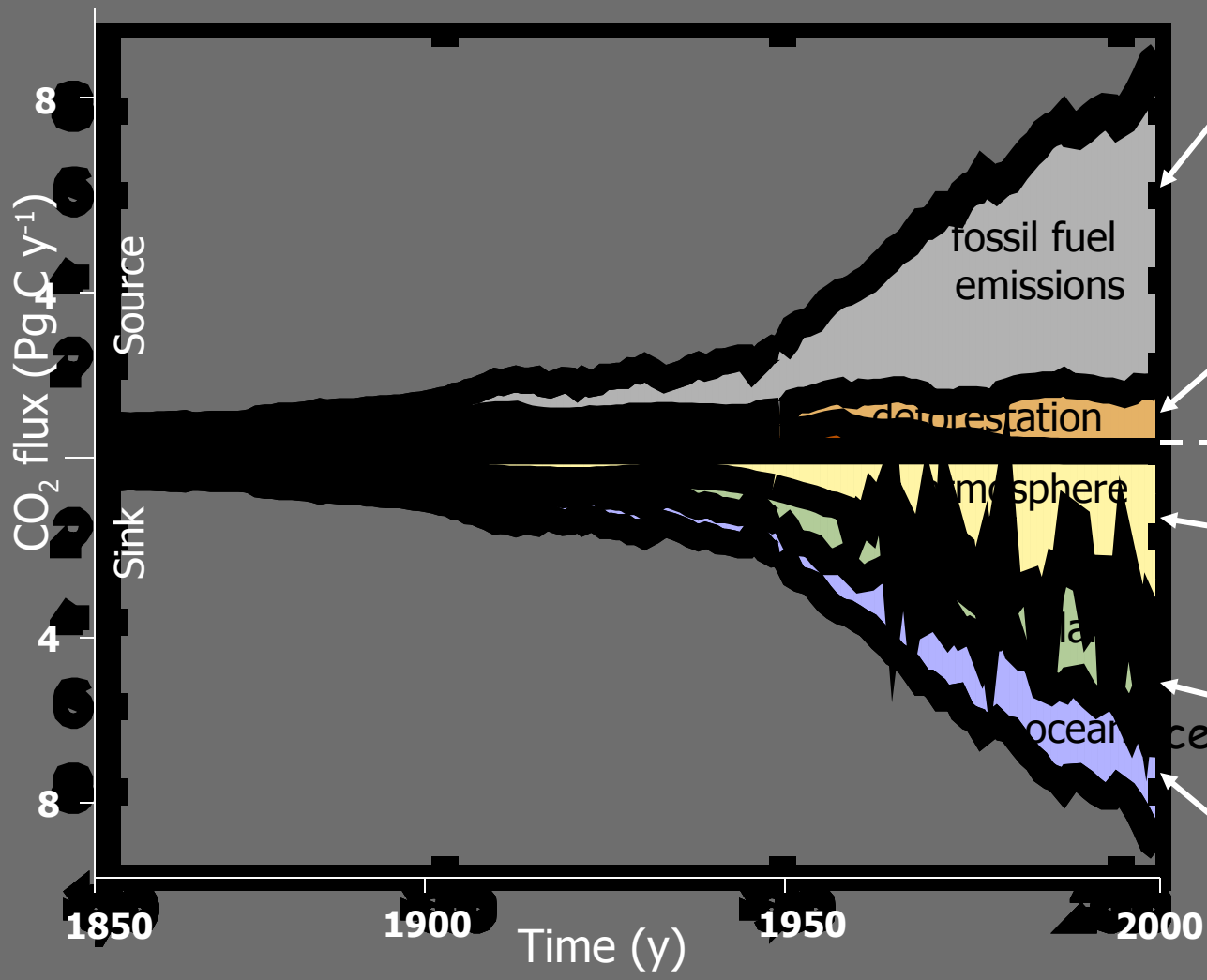
High CO_2 causing ocean acidification

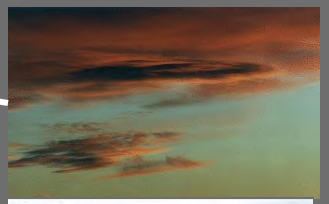


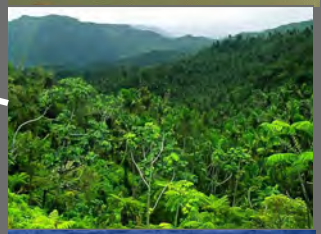


From R. Buddemeier, based on Kleypas et al. 1999

The Global Carbon Budget (1850-2006)







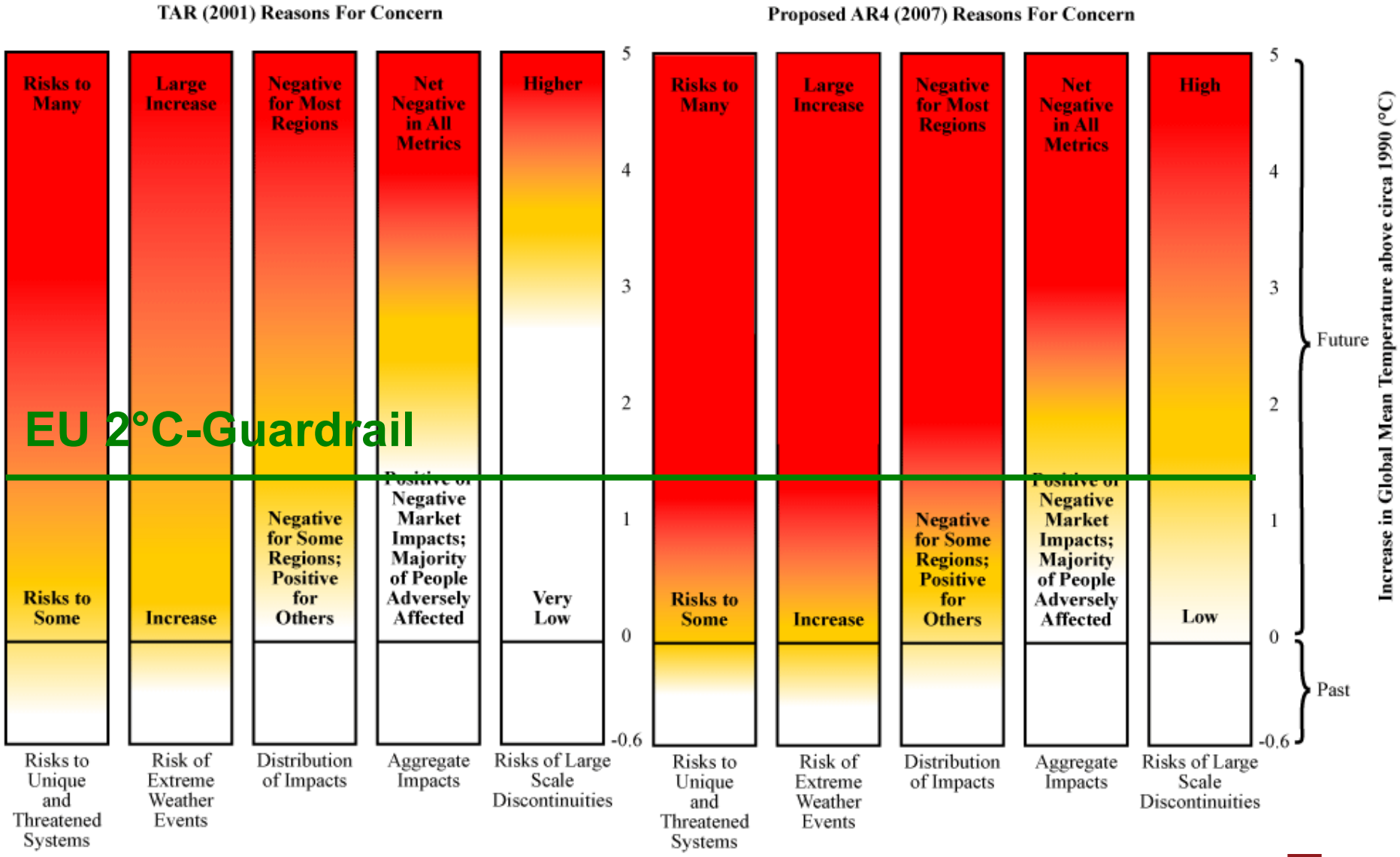
Le Quéré, unpublished; Canadell et al. 2007, PNAS: **Global Carbon Project**

KEY MESSAGE 2:

SOCIAL DISRUPTION

The research community is providing much more information to support discussions on "dangerous climate change". Recent observations show that societies are highly vulnerable to even modest levels of climate change, with poor nations and communities particularly at risk. Temperature rises above 2°C will be difficult for contemporary societies to cope with, and are likely to cause major climatic disruptions through the rest of the century and beyond.

Updated Reasons for Concern



(Smith et al. 2009 PNAS)

Source: H.J. Schellnhuber

KEY MESSAGE 3:

LONG-TERM STRATEGY

Rapid, sustained, and effective mitigation based on coordinated global and regional action is required to avoid "dangerous climate change" regardless of how it is defined. Setting a credible long-term price signal for the use of carbon is central to any effective mitigation strategy. Weaker targets for 2020 increase the risk of crossing tipping points and make the task of meeting 2050 targets more difficult. Delay in initiating effective mitigation actions increases significantly the long-term social and economic costs of both adaptation and mitigation.

Temperature rise	CO_2	CO_2-eq.	Year of peak emissions	% change in global emissions
Global average temperature increase above pre-industrial at equilibrium, using "best estimate" climate sensitivity	CO_2 concentration at stabilisation (2005 = 379 ppm)	CO_2 -eq. concentration at stabilisation including GHGs and aerosols (2005 = 375 ppm)	Peaking year for CO_2 emissions	Change in CO_2 emissions in 2050 (percent of 2000 emissions)
°C	ppm	ppm	year	percent
2.0 - 2.4	350 - 400	445 - 490	2000 - 2015	-85 to -50
2.4 - 2.8	400 - 440	490 - 535	2000 - 2020	-60 to -30
2.8 - 3.2	440 - 485	535 - 590	2010 - 2030	-30 to +5
3.2 - 4.0	485 - 570	590 - 710	2020 - 2060	+10 to +60
4.0 - 4.9	570 - 660	710 - 855	2050 - 2080	+25 to +85
4.9 - 6.1	660 - 790	855 - 1130	2060 - 2090	+90 to +140

Table 1

Characteristics of various emission trajectories to achieve stabilisation of atmospheric greenhouse gas concentrations, in CO_2 and CO_2-eq. The equilibrium global average temperature increase above pre-industrial is given for each stabilisation target. Only the first scenario, shown in the first row, has a possibility to meet the 2°C guardrail. Note that current atmospheric greenhouse gas concentrations are about 385 ppm CO_2 and 396 ppm CO-eq (including the cooling effect of aerosols). Modified from[1] (table 5.1, p. 67).

Mitigation Pathways

With Different Probabilities of Holding the 2°C-Line

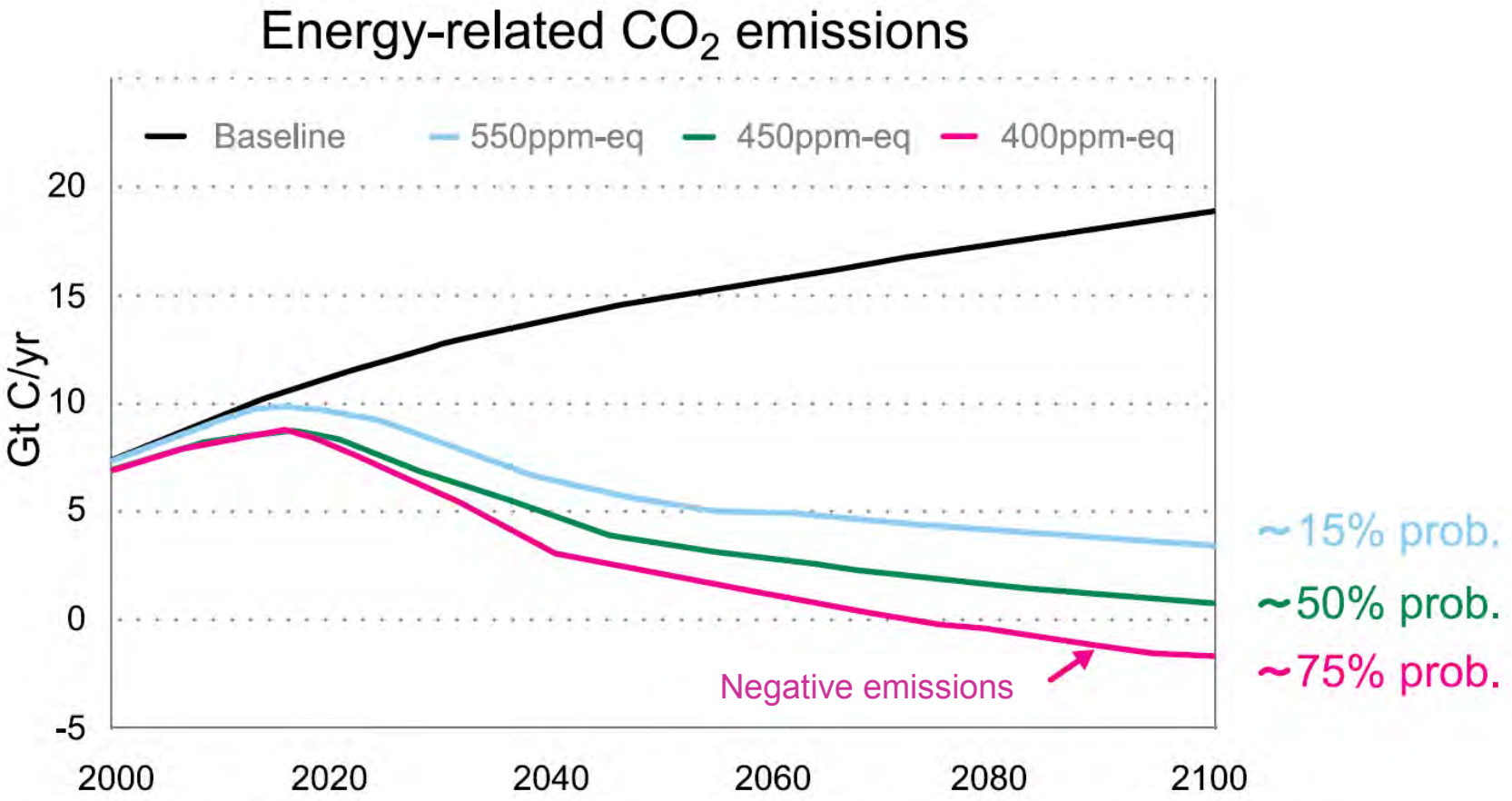
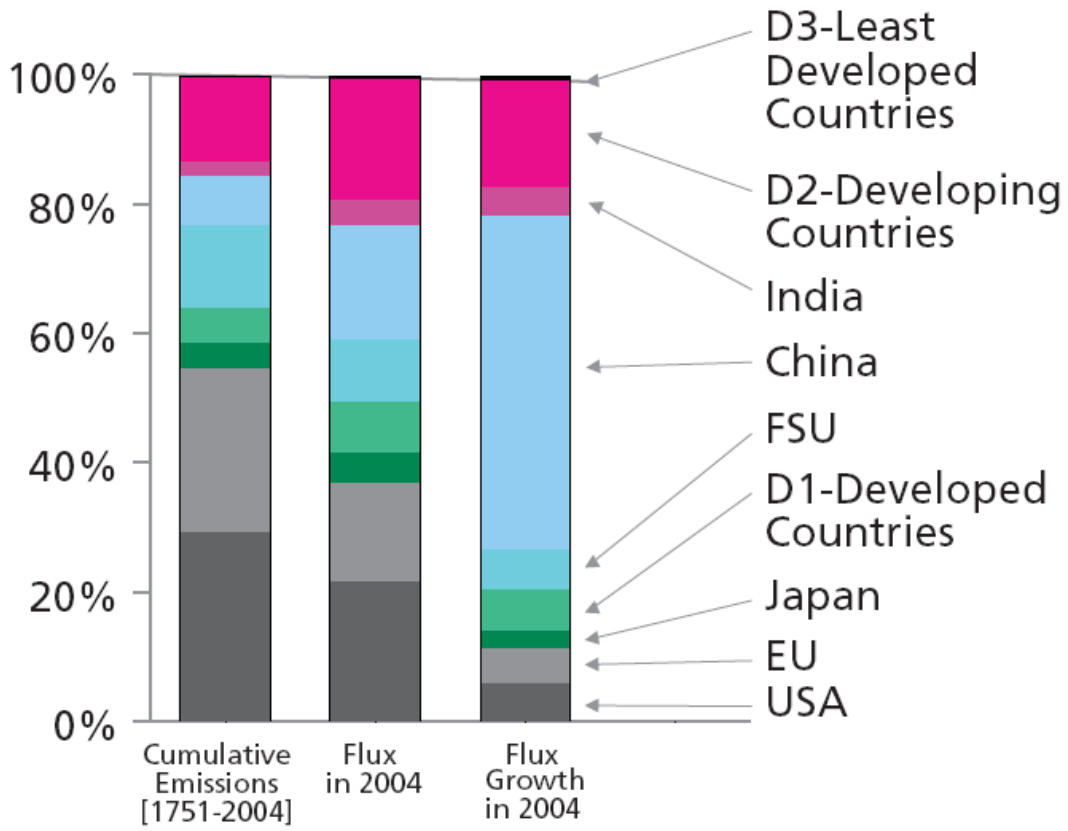


Figure 9 Synthesis Report (Knopf et al. 2009 in press)

KEY MESSAGE 4:
EQUITY DIMENSIONS

- ***Climate change is unfair***
- ***An effective, well-funded adaptation safety net is required***
- ***Tackling climate change should be seen as integral to the broader goals of enhancing socioeconomic development and equity throughout the world.***


100%
80%
60%
40%
20%
0%
Cumulative Emissions [1751-2004]
Flux in 2004
Flux Growth in 2004
D3-Least Developed Countries
D2-Developing Countries
India
China
FSU
D1-Developed Countries
Japan
EU
USA

KEY MESSAGE 5:
INACTION IS INEXCUSABLE

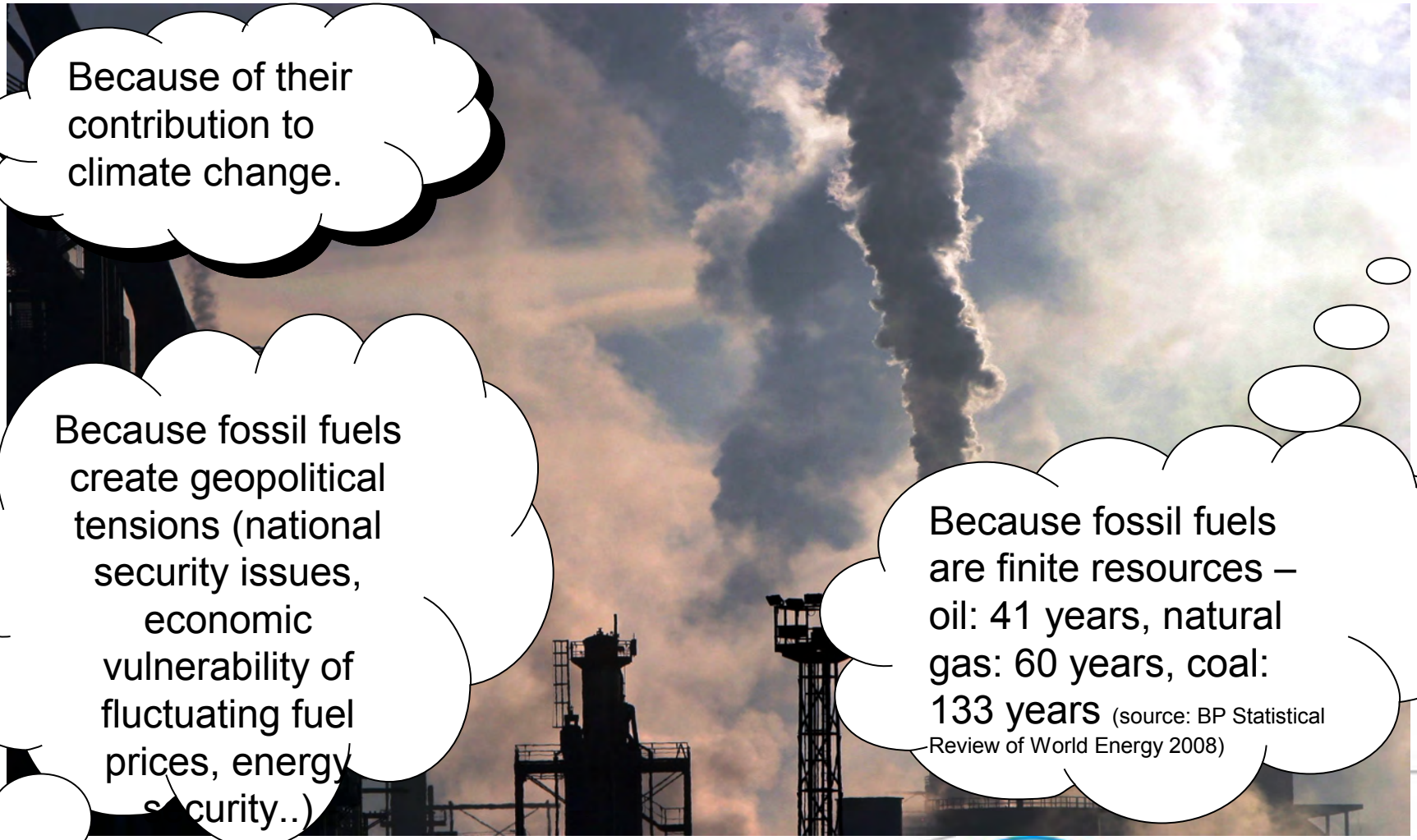
- ***We have the tools!***
- ***A wide range of benefits will flow from a concerted effort to achieve effective and rapid adaptation and mitigation. These include job growth in the sustainable energy sector; reductions in the health, social, economic and environmental costs of climate change; and the repair of ecosystems and revitalisation of ecosystem services.***

KEY MESSAGE 6:

MEETING THE CHALLENGE

Vi mangler bare ”den politiske vilje”!

Why should we stop burning fossil fuels?



Because of their contribution to climate change.

Because fossil fuels create geopolitical tensions (national security issues, economic vulnerability of fluctuating fuel prices, energy security..)

Because fossil fuels are finite resources – oil: 41 years, natural gas: 60 years, coal: 133 years (source: BP Statistical Review of World Energy 2008)

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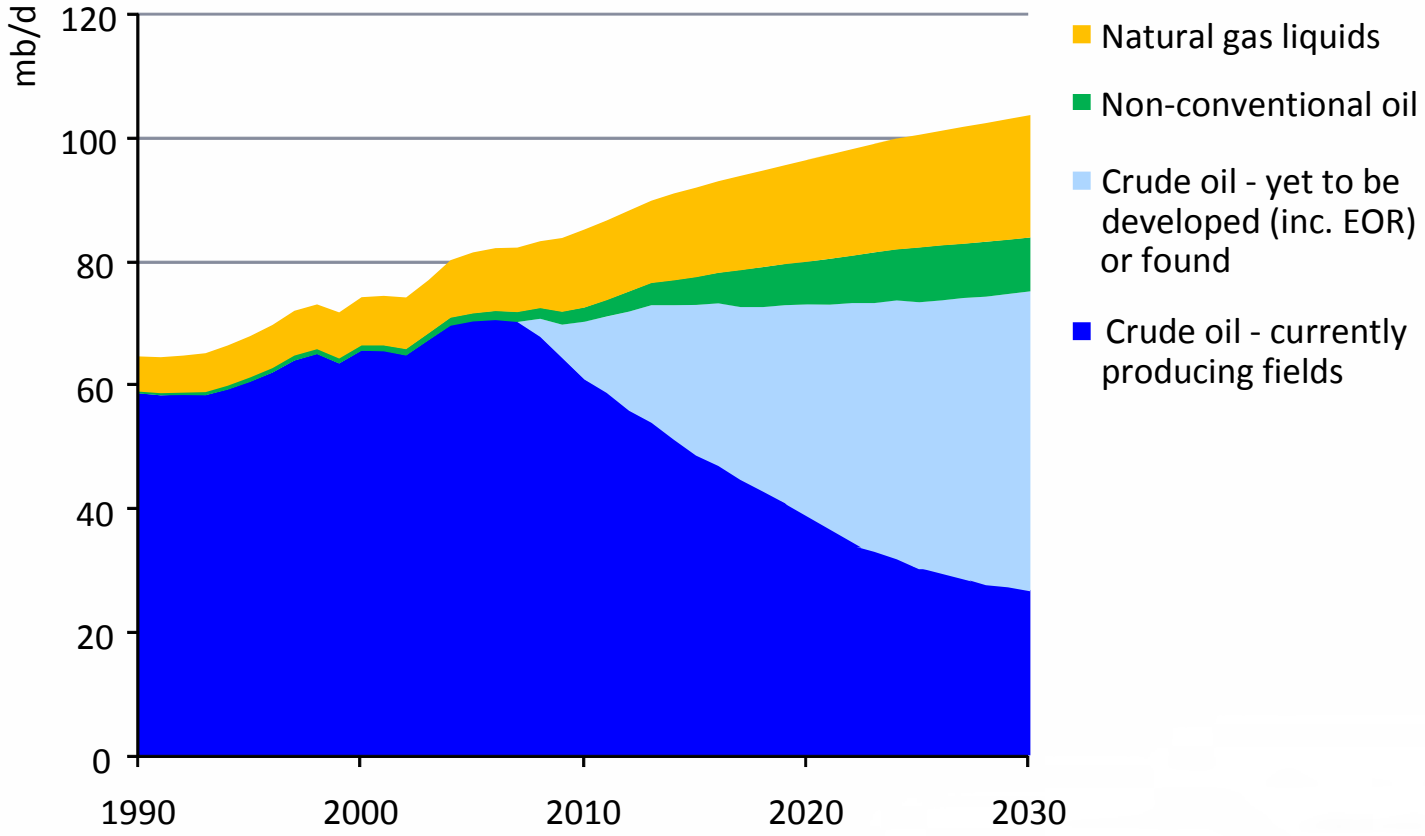
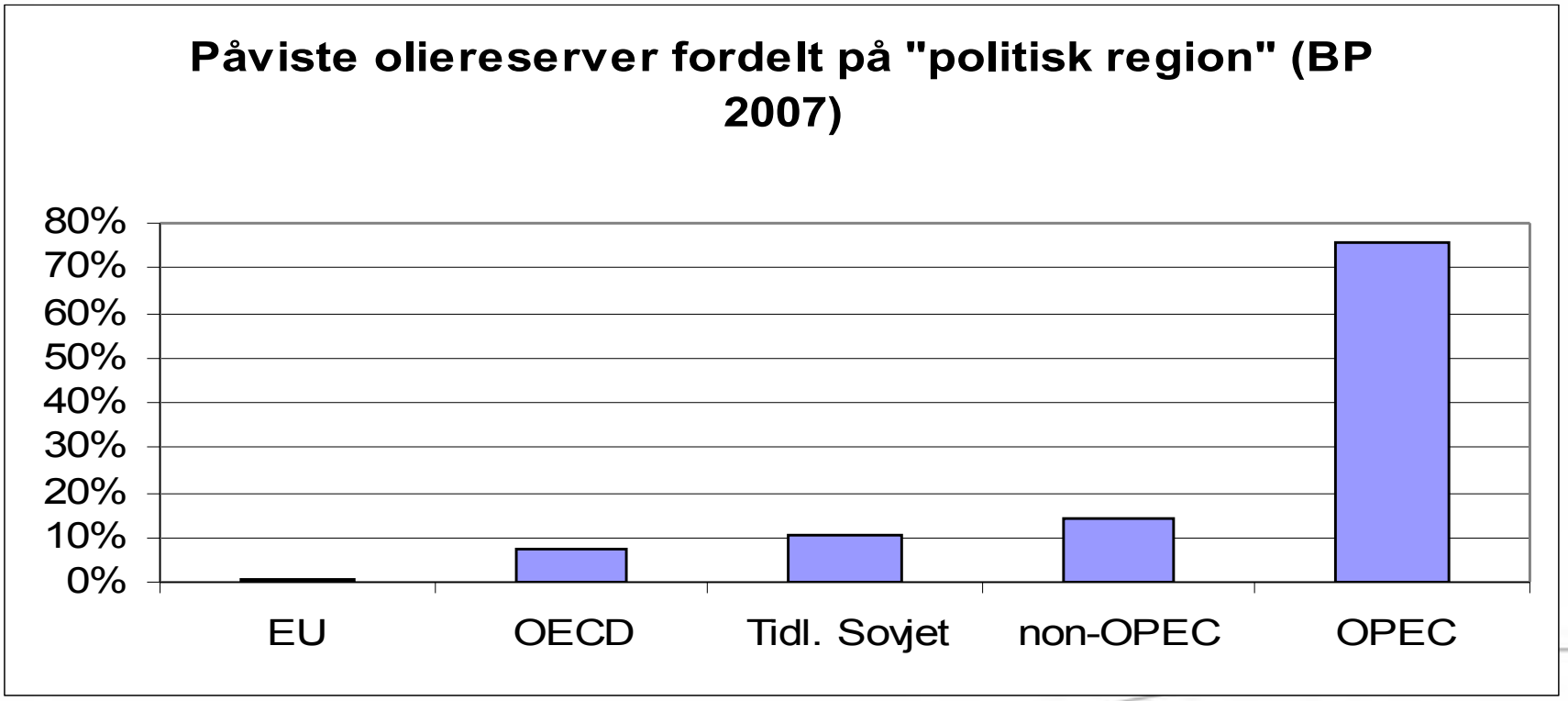
International Energy Agency: World oil production in the Reference Scenario



64 mb/d of gross capacity needs to be installed between 2007 & 2030 – six times the current capacity of Saudi Arabia – to meet demand growth & offset decline

Why fossil fuels create geopolitical tensions.

- Proven reserves - oil (source:BP)



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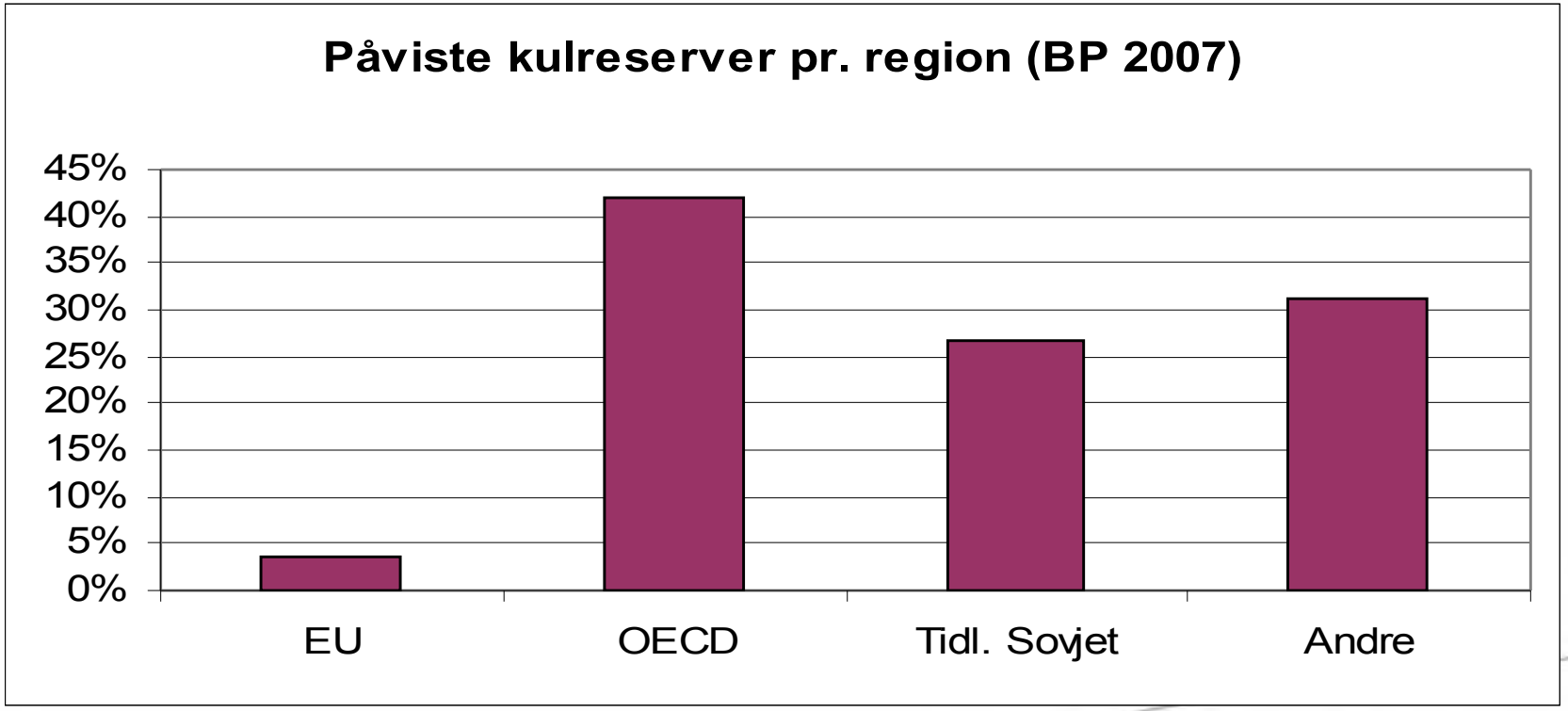
Coal

- Least problematic global distribution of reserves
- Most problematic for climate change



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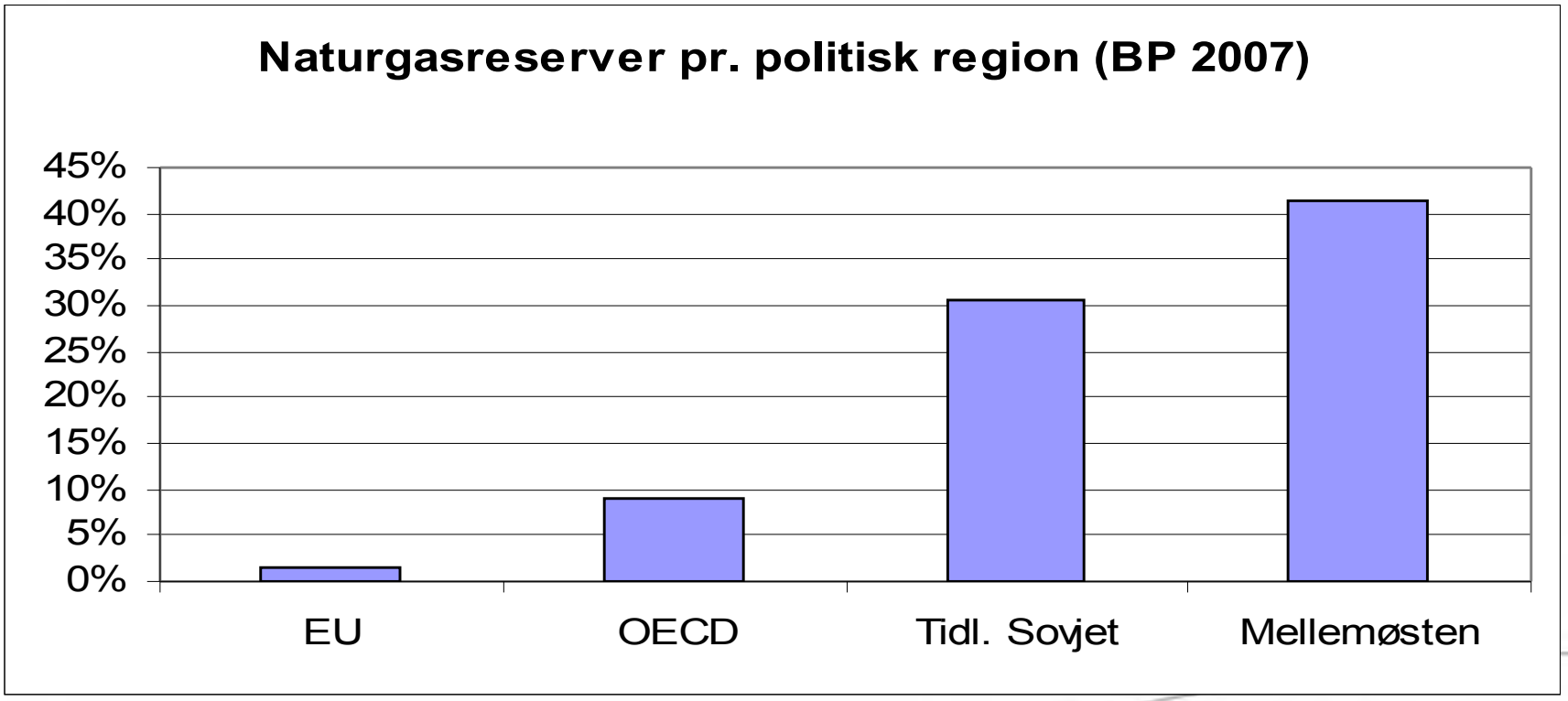
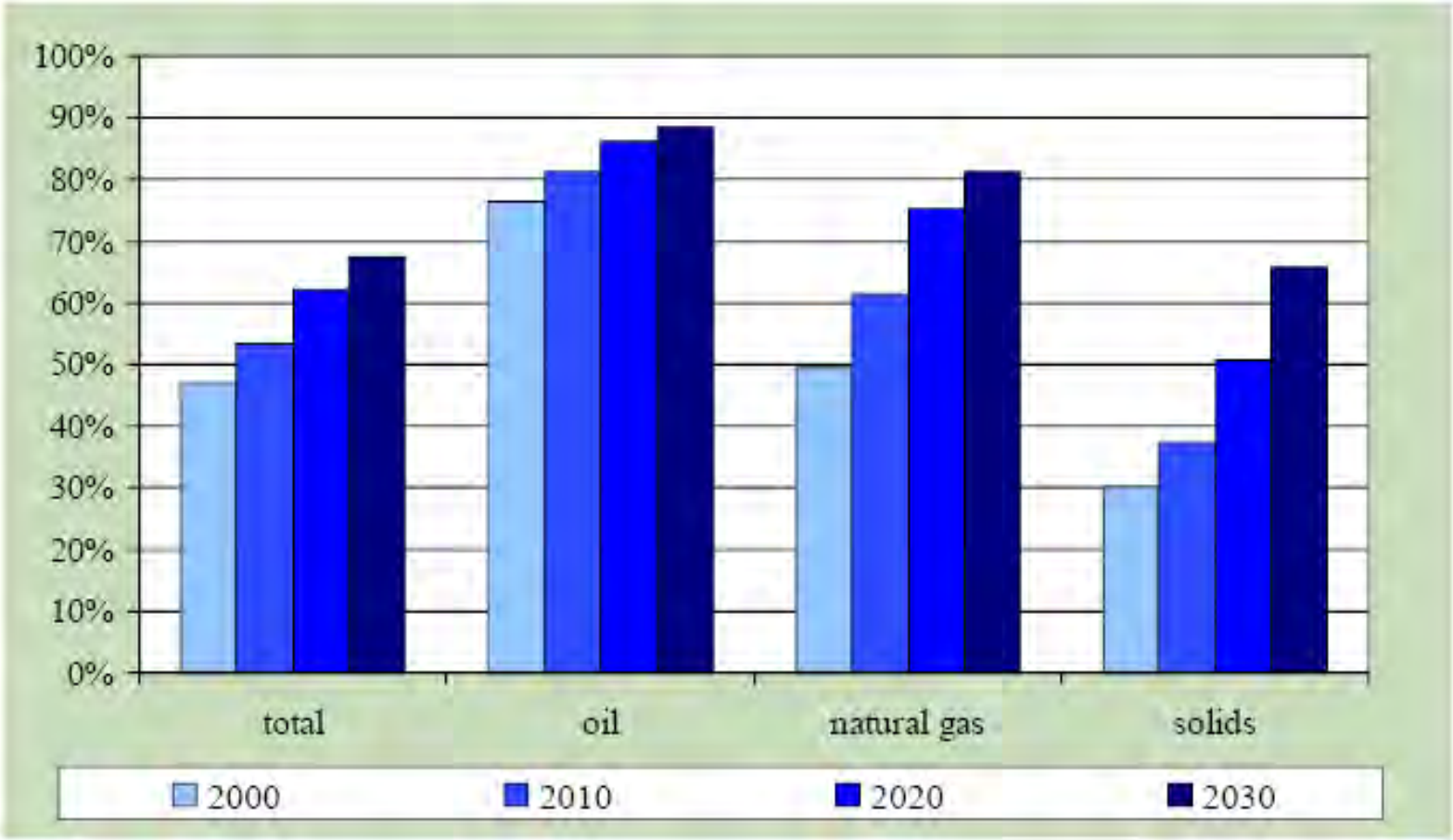
Natural Gas

- 40 percent better than coal for the climate
- National security issues.. (Russia, Iran….)



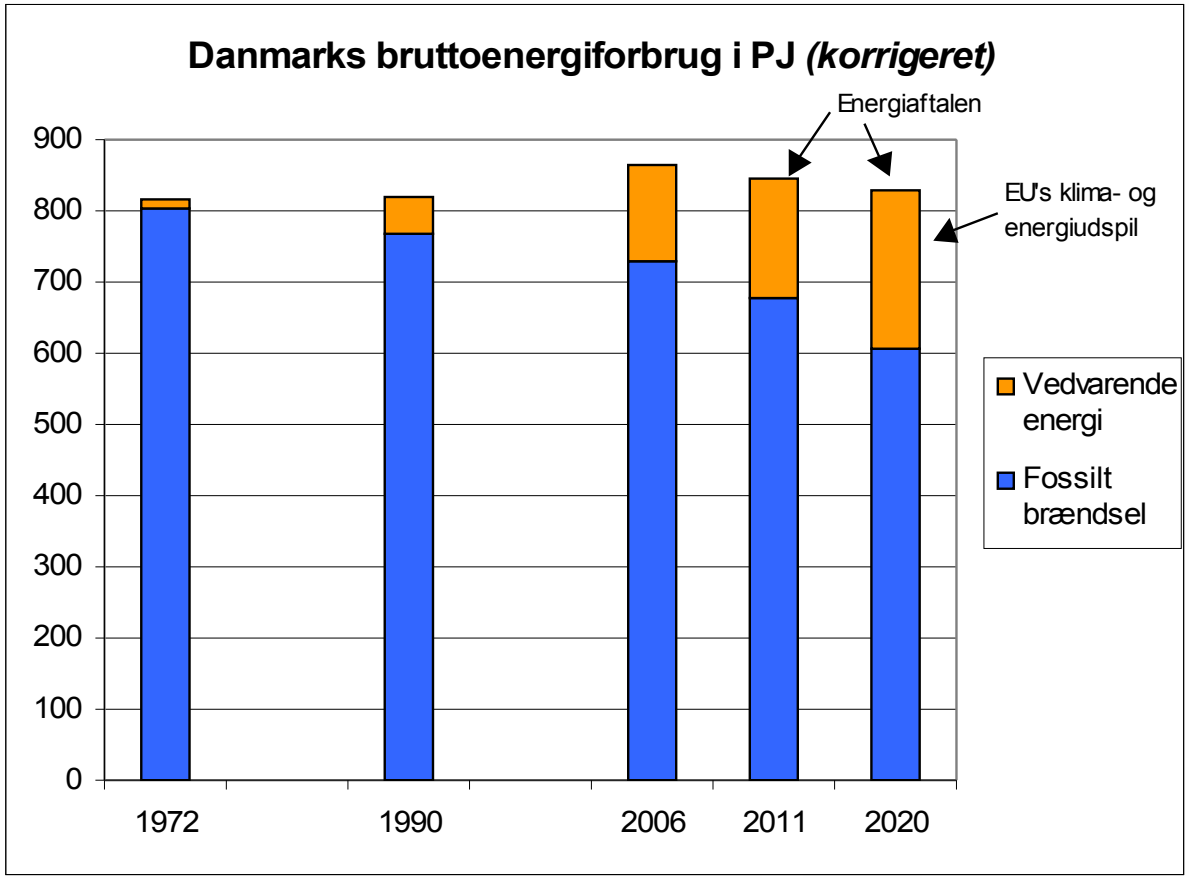
EU: Growing import dependency over the next 25 years.



KEY MESSAGE:

Future energy supplies are not secure...

Danmark's energy source: world expert in renewable energy but there's a long way to go!



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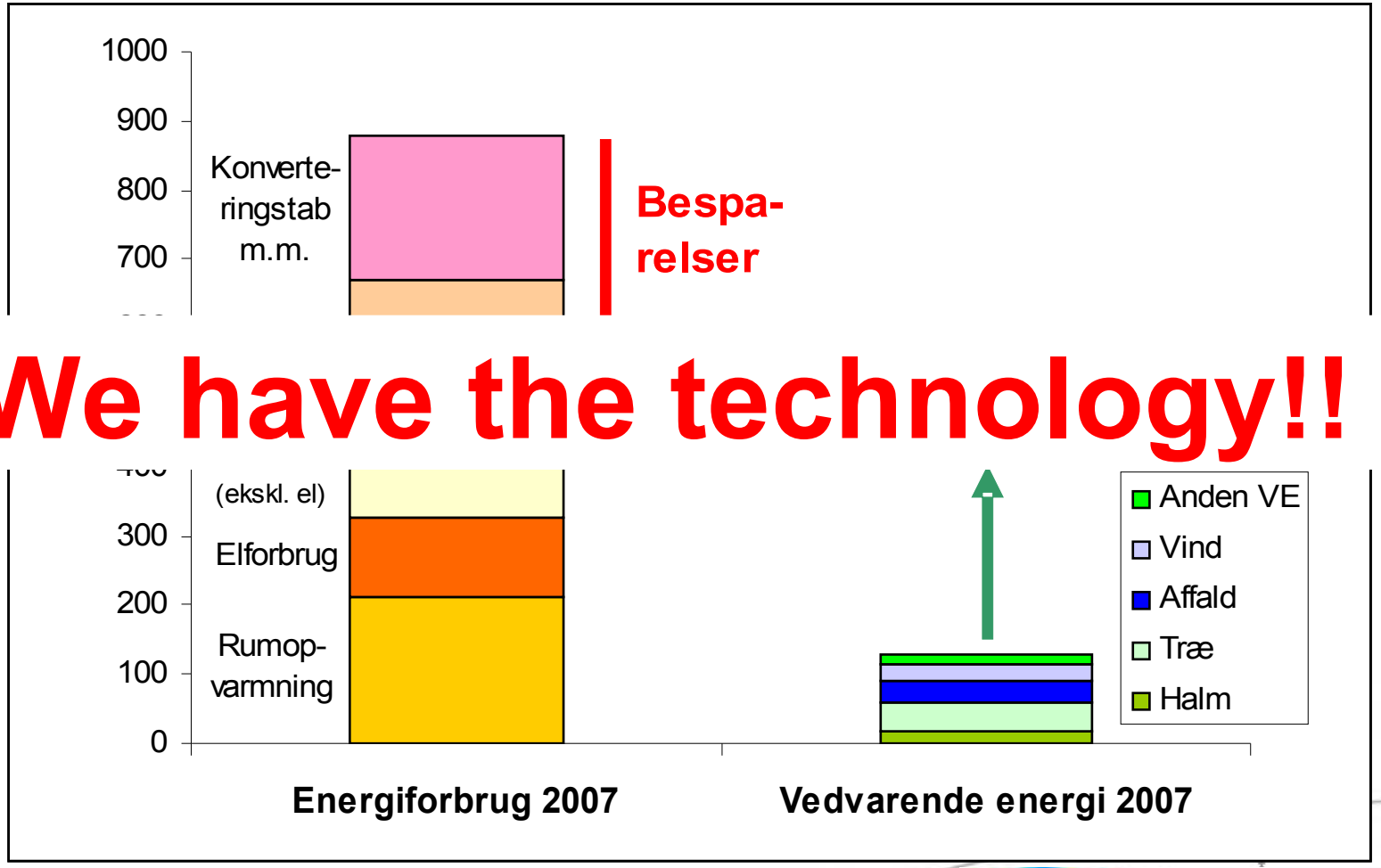
Key message 2: A double challenge - to reduce energy use and replace fossil fuels as the primary energy source



We have the technology!!

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We have to mainstream climate considerations – also in data collection and managment

- ICT's greatest potential contribution comes in changing behaviour (meetings, smart work place, etc)

- "Business as usual is dead" (can we afford to save ALL data?)

We have to change the way we think and talk about responding to climate change!!

- *”reductions” ”burdens”*
- ***Switching to non-fossil fuel energy supplies is a necessity and a prerequisite for future social and economic stability in future.***
- ***Without a stable energy supply, there will be no economic growth!***

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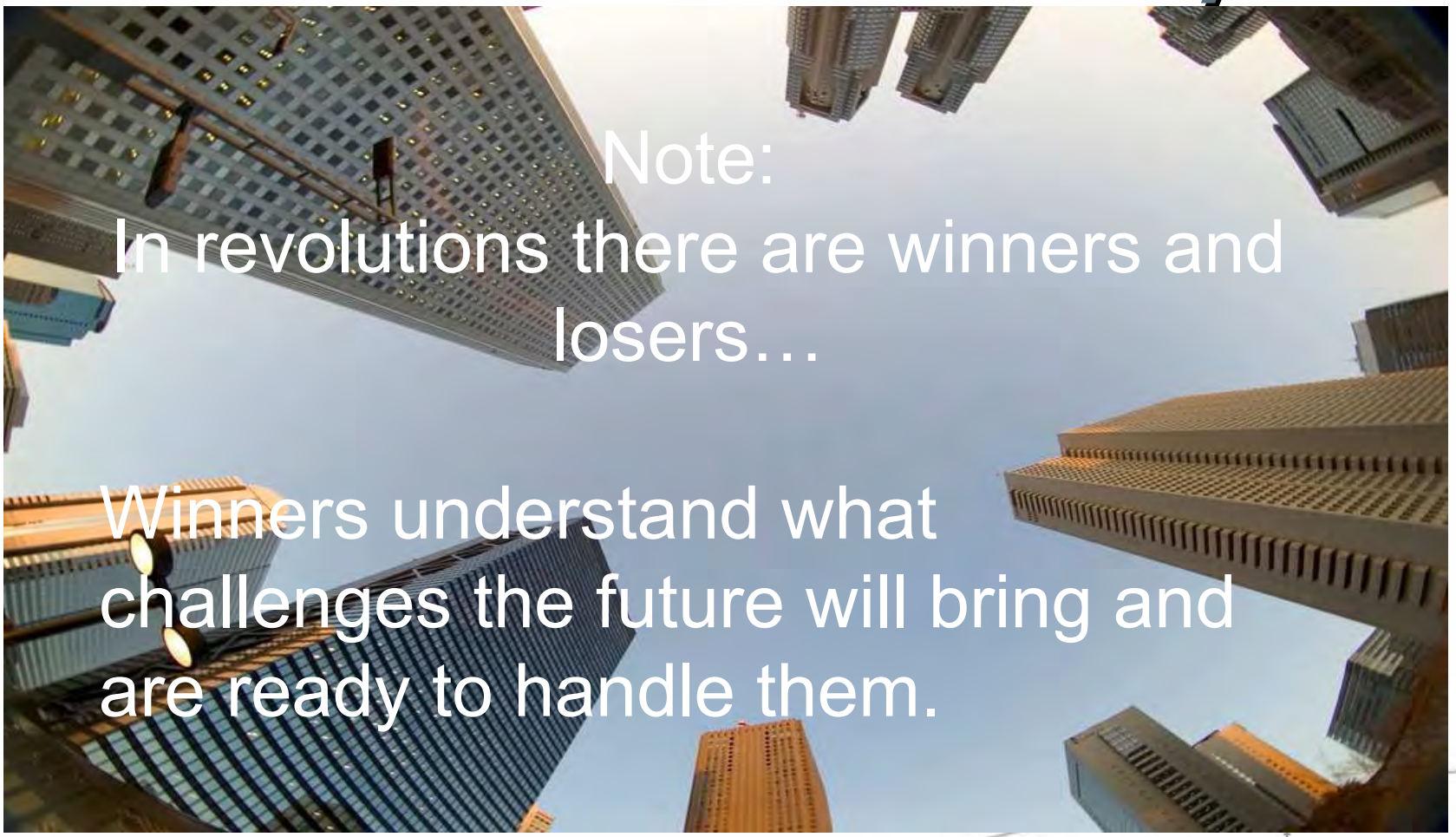
Even the International Energy Agency says that an "Energy Revolution" is necessary



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