

Reducing CO₂ Emissions

The global challenge
of the 21st century

Nicole Werner
Hamburg, 24 January 2008

Climate Change – The debate is over

What needs to be done

How emissions trading and CO₂ offsetting work

What Germany is committed to do

Why we all should act quickly

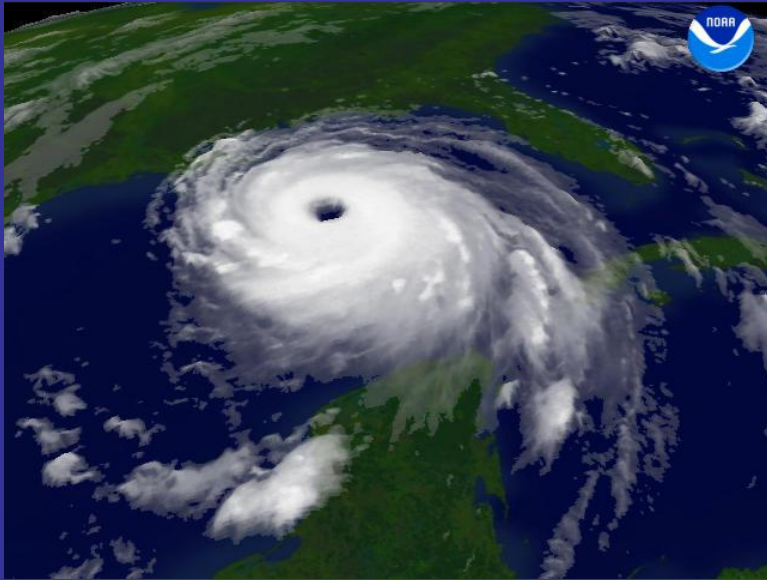
The Situation in 2005

Summer 2005:
Drought in Spain
& Portugal



August 2005: Heavy
rainfalls in Switzerland,
Austria & Germany

Natural Catastrophes 2005



August 2005:
Hurricane Katrina,
USA

October 2005:
Hurricanes &
heavy rainfalls
in Mexico &
Central America



Natural Catastrophes 2007

- Munich Re:
 - “Higher losses despite absence of megacatastrophes”
 - “Overall economic losses of US\$ 75bn”
 - Board member Dr. Torsten Jeworrek: “Loss figures in line with the rising trend in natural catastrophes”
 - “950 events in year is **highest on record**”
- Swiss Re (initial estimates):
 - “More than 20 000 people were killed by natural and man-made catastrophes in 2007. ”
 - “Three insured losses running into the billions in Europe, two in North America and one in Asia”

Results of the IPCC* 2001

- “An **increasing body of observations** gives a collective picture of a warming world and other changes in the climate.”
- “Emissions of greenhouse gases and aerosols due to human activities continue to alter the atmosphere in **ways that are expected to affect the climate.**”
- “There is **new and stronger evidence** that most of the warming observed over the last 50 years is attributable to **human activities.**”

*Intergovernmental Panel on Climate Change

Results IPCC 2007 – WGI

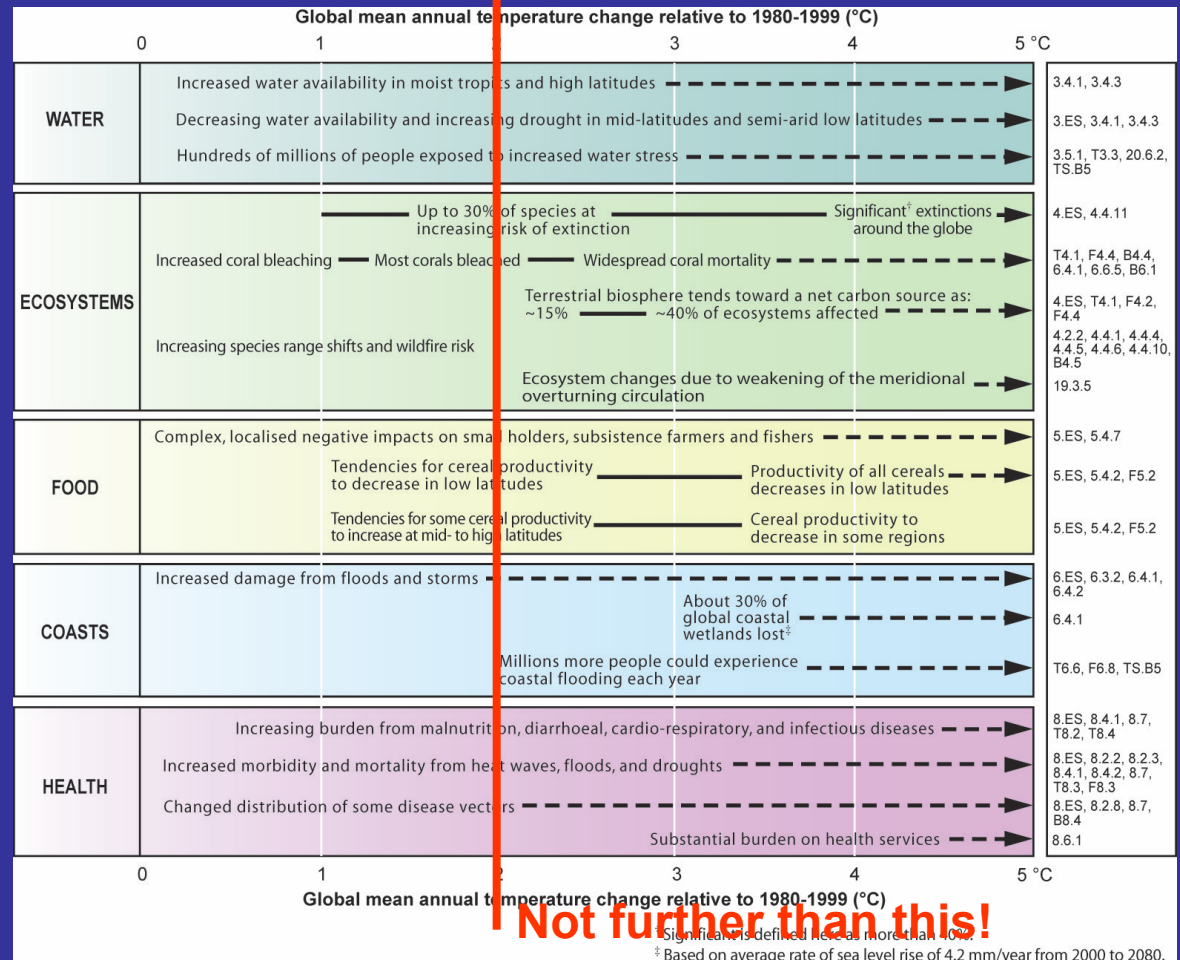
(The Physical Science Basis)

- Warming of the climate system is **unequivocal**: 0.74°C temperature increase over the past 100 years, increase in intense tropical cyclone activity, sea level rise...
- Most of the observed increase in globally-averaged temperatures since the mid-20th century is **very likely** due to the observed increase in anthropogenic GHG concentrations.

▶ Based on “new and more comprehensive data” the weak formulations of 2001 turned into strong statements in 2007, indicating **high probability** of human influence on climate change.

Results IPPC 2007 – WGII (Impacts, Adaptation and Vulnerability)

“Altered frequencies and intensities of extreme weather, together with sea level rise, are expected to have **mostly adverse effects on natural and human systems.**”



Results IPPC 2007 – WGIII (Mitigation of Climate Change)

“... there is *high agreement* and *much evidence* of substantial *economic potential for the mitigation* of global GHG emissions over the coming decades that could offset the projected growth of global emissions or reduce emissions below current levels.”

Table SPM.1: Global economic mitigation potential in 2030 estimated from bottom-up studies.

Carbon price (US\$/tCO ₂ -eq)	Economic potential (GtCO ₂ -eq/yr)	Reduction relative to SRES A1 B (68 GtCO ₂ -eq/yr) (%)	Reduction relative to SRES B2 (49 GtCO ₂ -eq/yr) (%)
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Achim Steiner, Executive Director UNEP:

“The market alone cannot deliver but the market with the right incentives and the right regulatory frameworks is perfectly capable of delivering Gigatons...”

=> GHG emissions must have a price!

50	14-23	21-34	29-47
100	17-26	25-38	35-53

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What needs to be done

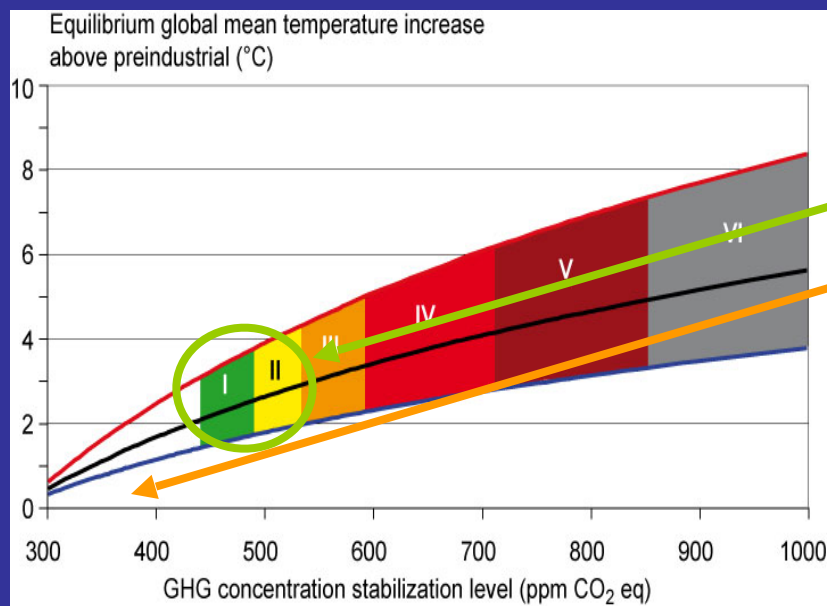
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What do we have to do?

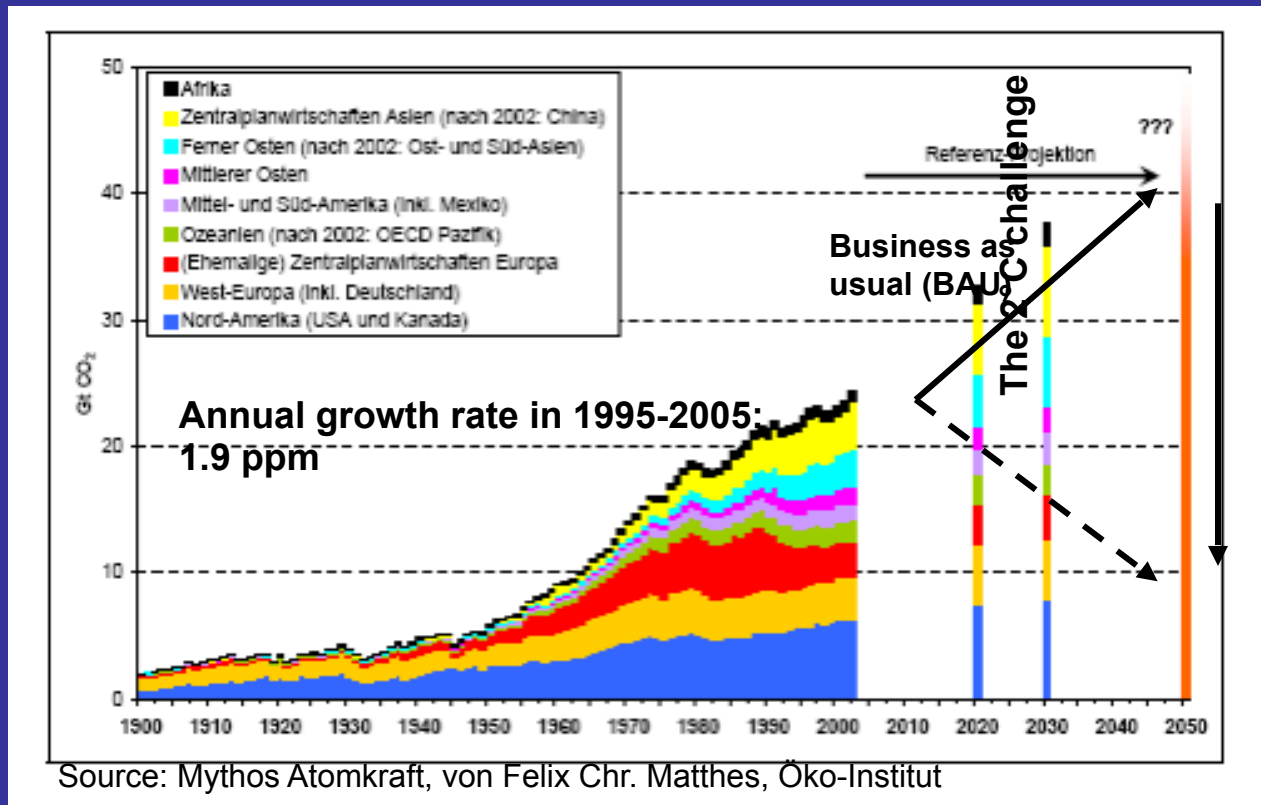
UNFCCC objective is “*stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.*”



Recent research suggests that this corresponds to between 450 and 550 ppm CO₂-eq. (currently ~380 ppm) or 2° C (currently ~0.74°C)

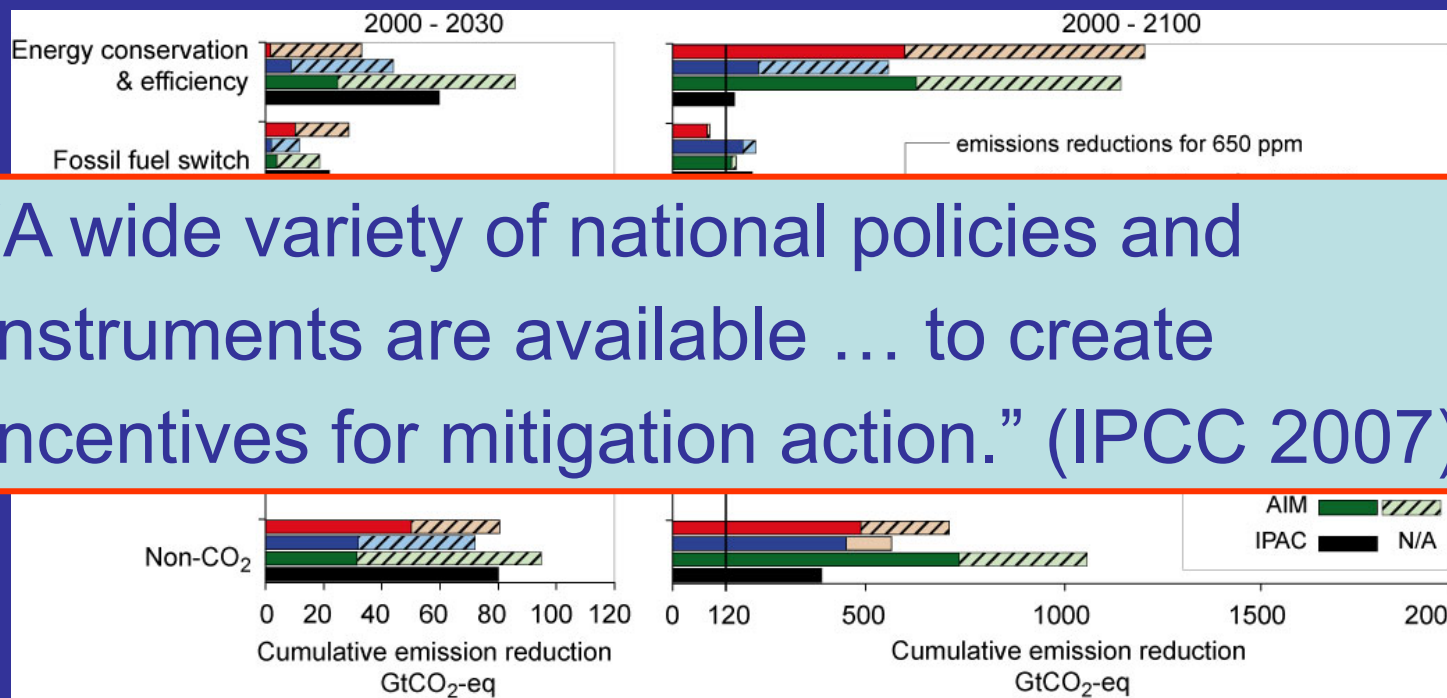
⇒ Global emission reductions of 30% to 60% (490-535ppm) compared to 2000 until 2050 needed!

Fundamental Emission Reductions Needed



Fairness aspect: Industrialised countries need to reduce 80-90% in order to allow developing countries to catch up.

Mitigation Potential of Alternative Measures



“A wide variety of national policies and instruments are available ... to create incentives for mitigation action.” (IPCC 2007)

Source: IPCC 2007, SPM of WG III

There is not THE ONE SOLUTION:
We need to combine all available measures

What has been done? – The Kyoto Protocol

- Signed in 1997; Entry into Force on 16 February 2005
- Ratified by >130 countries
 - Major non-participants: USA and Australia
- Commits industrialised countries to reducing their greenhouse gas emissions by, on average, 5% below 1990 levels in 2008-12
 - Individual, quantified emission targets for each industrialised country
 - Six greenhouse gases covered: CO₂, CH₄, N₂O, HFC/PFC, SF₆
- “Flexibility mechanisms” for financing emission reductions abroad:
 - Clean Development Mechanism (CDM)
 - Joint Implementation (JI)
 - International Emissions Trading



30-60%
globally!

The Kyoto Protocol is only a first – politically important – step.

Kyoto Protocol – Only A First Step

- “With current climate change mitigation policies and related sustainable development practices, global GHG emissions will continue to grow over the next few decades.” (IPCC 2007, WG III)

=> Outcomes of the climate conference 2009 in Copenhagen are pivotal for the next century of our climate system!

Climate Change – The debate is over

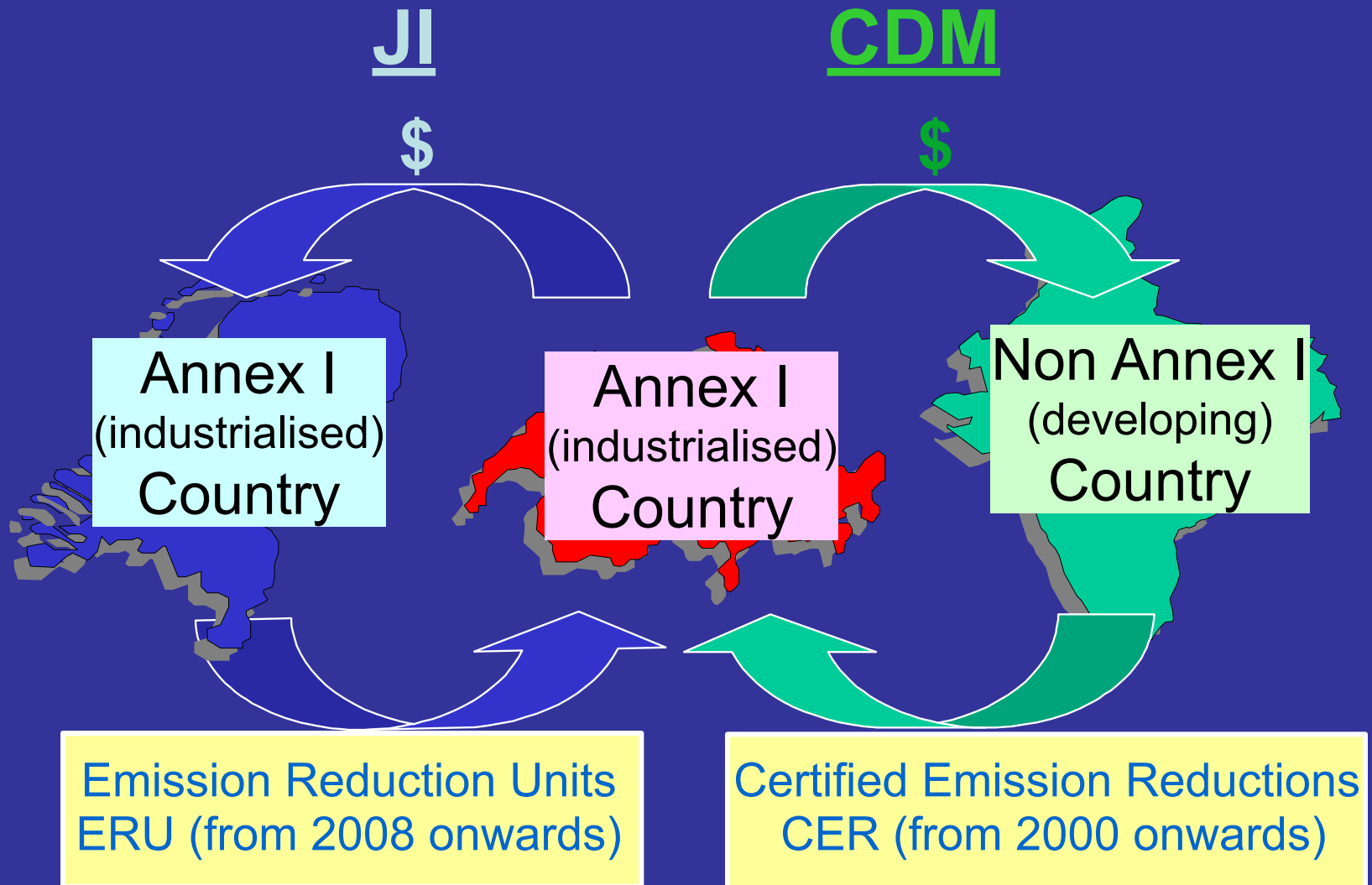
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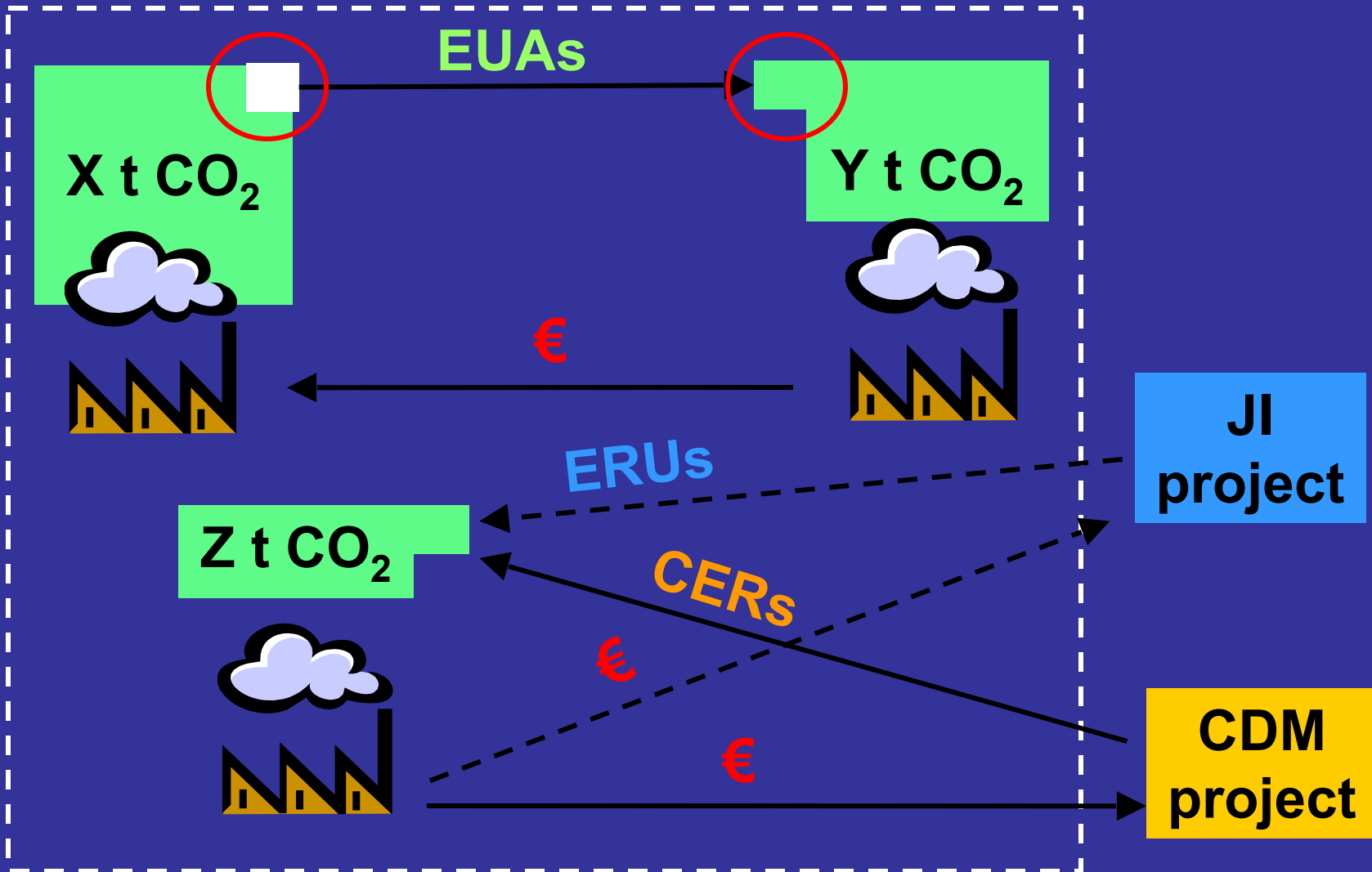
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The Flexible Mechanisms of the Kyoto Protocol



The EU Emissions Trading System (EU ETS)

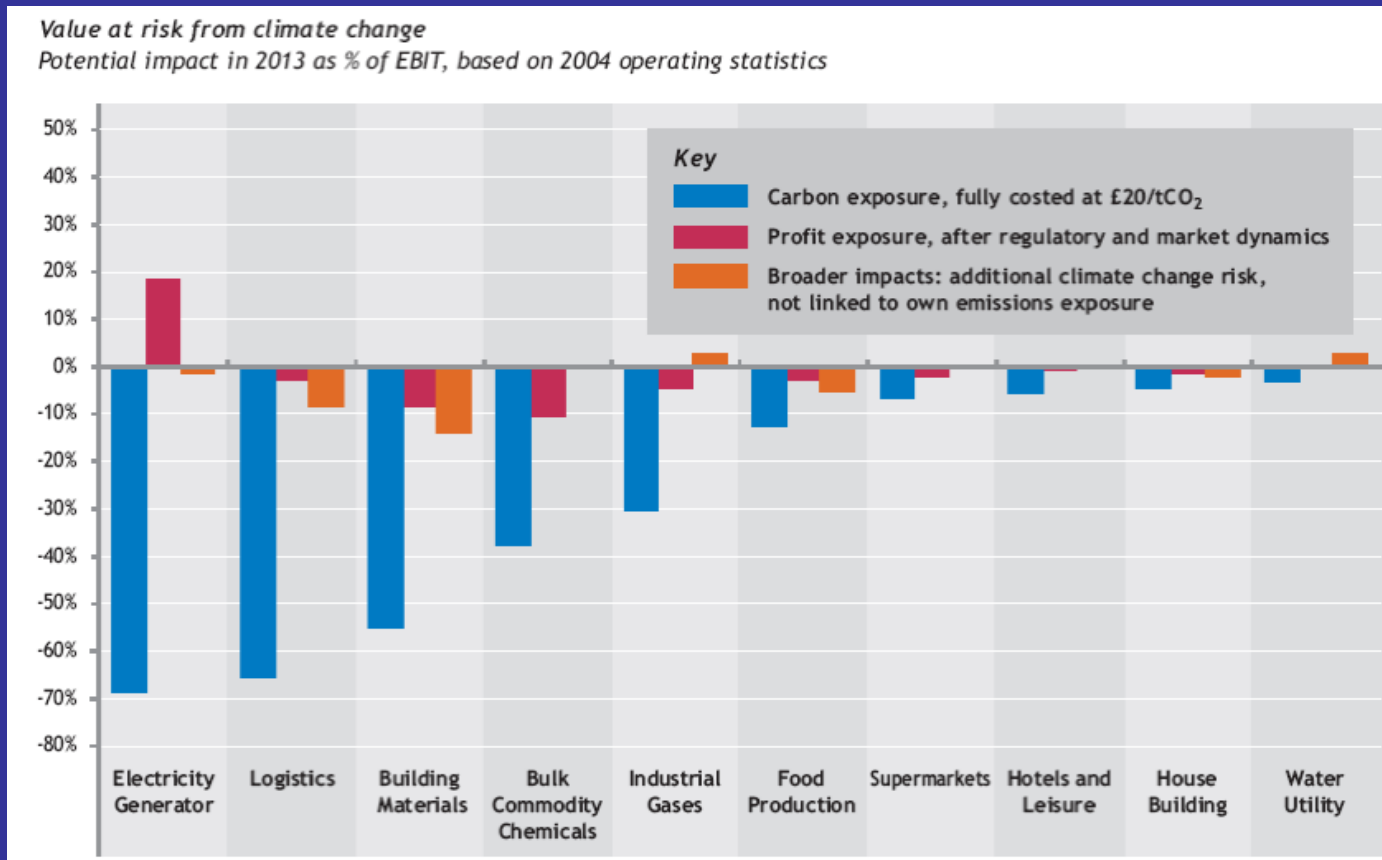


The Jungle of Emission Certificates

- Several types of emissions certificates on the market: ERUs, CERs, EUAs, VERs, quality varies
- ERUs and CERs verified by UNFCCC
- Gold Standard: Quality label for ERUs and CERs supported by 51 NGOs, high degree of sustainability
- EUAs: Emission allowances allocated under the EU Emissions Trading System (EU ETS)
- VERs: Verified by independent verifiers -> Variety of qualities available!

=> CO₂ certificate ≠ CO₂ certificate!

Emission Trading - The Impact on Business



Source: The Carbon Trust, 'Climate Change and Shareholder Value' (2006)

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Climate Goals

EU:

- CO₂ eq. emissions reduction of 20-30% by 2020 compared to 1990
- Increasing energy efficiency by 20%
- Increasing renewables by 20%

Germany:

- CO₂ eq. emissions reduction of 40% by 2020 compared to 1990
- Integriertes Energie- und Klimaprogramm (5 December 2007): 14 measures in Energy Efficiency, Renewable Energy for Electricity and Heating, Biofuels, Transport, Non-CO₂ GHG emissions

Costs and Benefits of CO₂ Reduction in 2020

Maßnahme Nr.	Titel der Maßnahme	Bruttokosten in Mrd. Euro	Jährlich eingesparte (fossile) Energie in Mrd. Euro	Minderungskosten in Euro/ t CO ₂
1	Kraft-Wärme-Kopplung	0,003	-0,3	12,9
2	Erneuerbare Strom	5,55	4,2	27
7	Energiemanagementsysteme und Förderprogramme Klima/Energie	2,30	3,2	-90
8	Energieeffiziente Produkte - Haushalte/Industrie	0,21	4,2	-266
10A	Energieeinsparverordnung	8,43	10,30	-47
10B	Austausch der Nachtspeicherheizungen	1,05	0,90	23
12	CO ₂ -Gebäudesanierungsprogramm	2,43	3,20	-58
13	Energetische Modernisierung der sozialen Infrastruktur	0,49	0,26	163
14	Erneuerbare Wärme	4,42	3,5	77
15	Energetische Sanierung Bundesgebäude	0,06	0,080	-38
16	CO ₂ PKW	6,44	8,7	-128
17	Biokraftstoffe	0,00	-1,0 bis 2,0	84 bis 168
1	Kraft-Wärme-Kopplung	0,003	-0,3	12,9
	Summe	31	36,3	-26

Source: BMU, Fraunhofer ISI (2007)

**Investment costs: 31 bn €, saved energy costs: 36.3 bn €
=> 5.3 bn € profit**

Economic vs. Market Mitigation Potential

Achim Steiner, Executive Director UNEP:

- “Private Sector, Consumer and Markets need signals that governments can give through legislation incentives and subsidies that make sense from a carbon management perspective but may not make sense for me as an individual or me as a corporation.”

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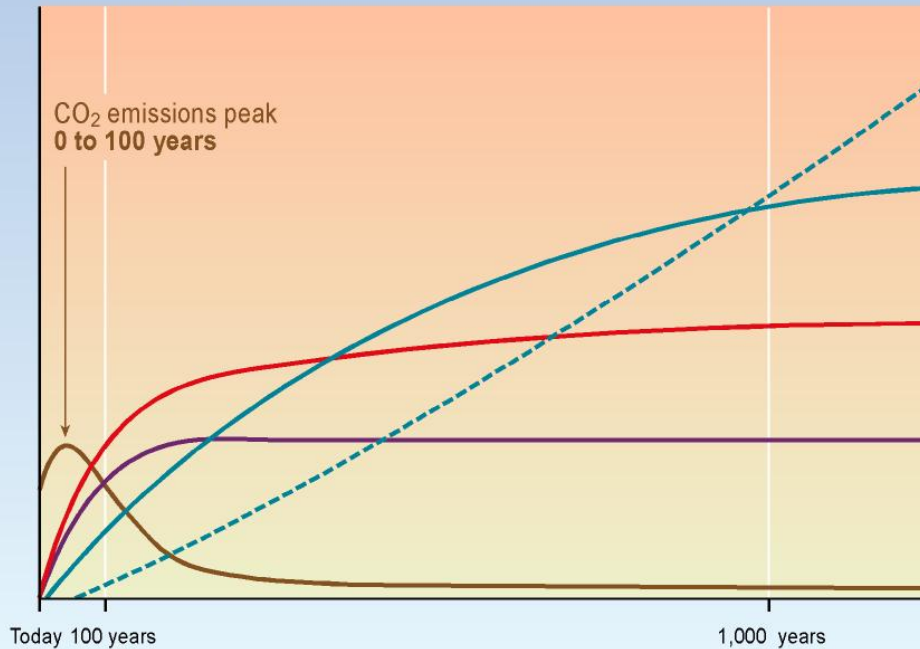
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Inertia of the Climate System

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

3,4

WGI:9,11

WGI:9,11

WGI:11

,9

FIGURE 5-1

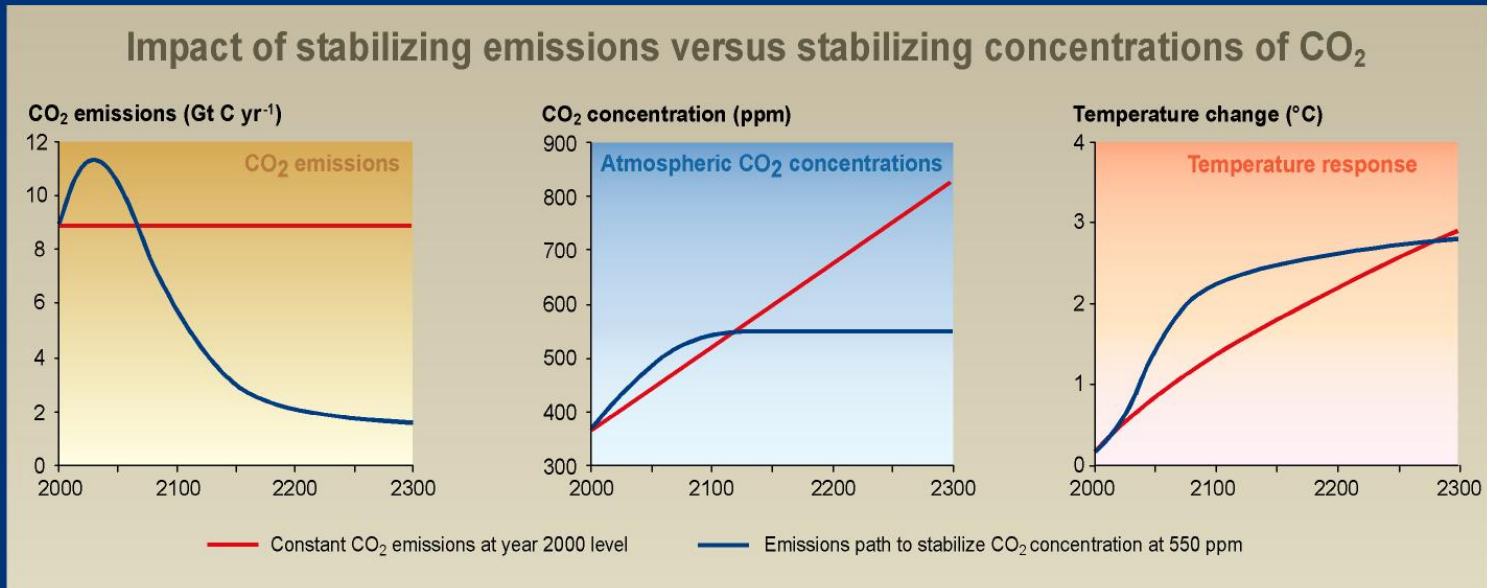
SYR - FIGURE 5-2

IPCC

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



Inertia of the Climate System

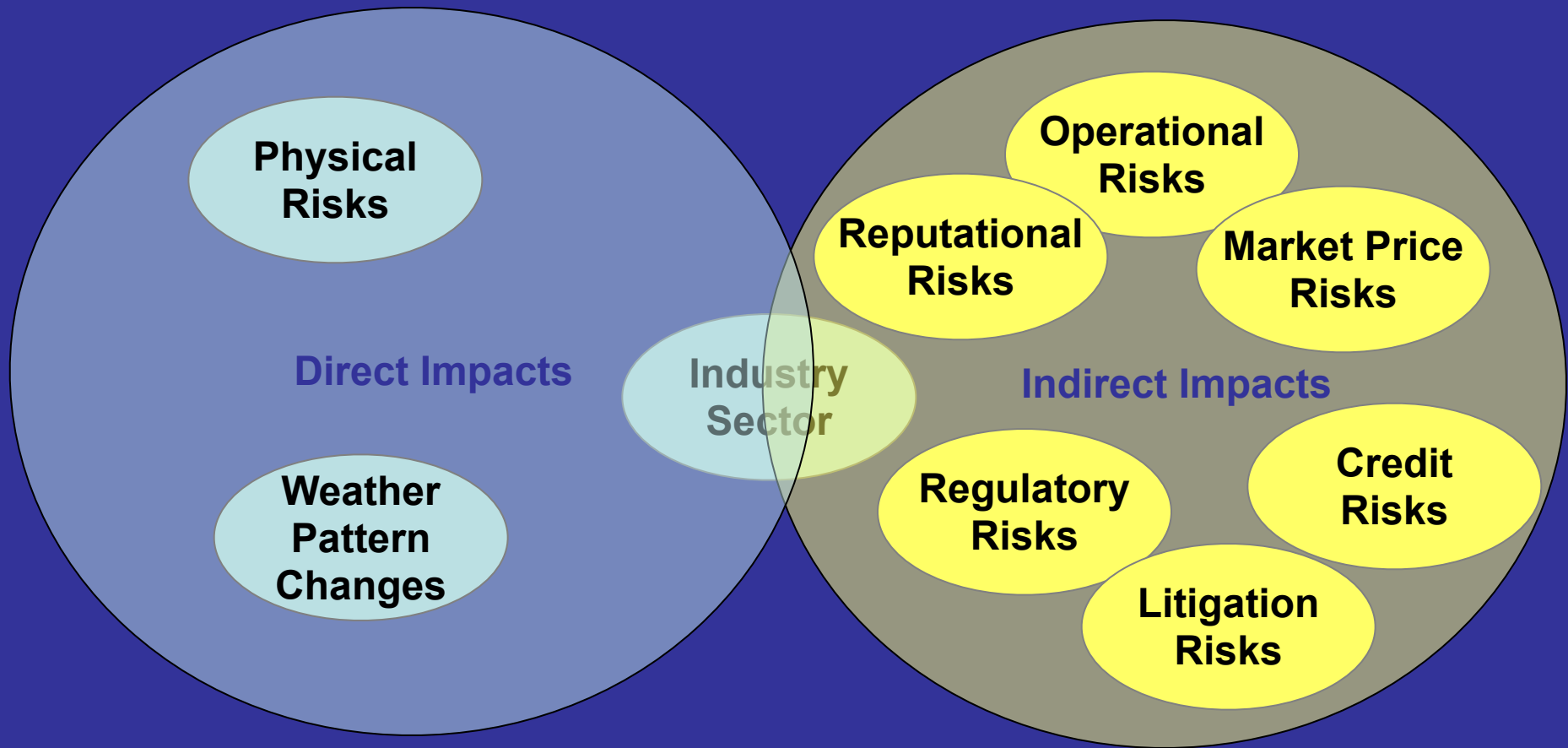


SYR - FIGURE 5-2

Private and Corporate CO₂ Reductions

- “... voluntary actions may limit GHG emissions, stimulate innovative policies, and encourage the deployment of new technologies...” (IPCC 2007, WG III)
- Ways to act:
 - Offsetting own emissions by purchasing emissions reductions from GHG offset projects
 - Save energy by using energy saving light bulbs, switching off computers and stand-by devices
 - Increase efficiency of heating, improve isolation
 - Increase number of video conferences, reduce flying to conferences/meetings
 - ...

Relevance of Climate Change for Corporations

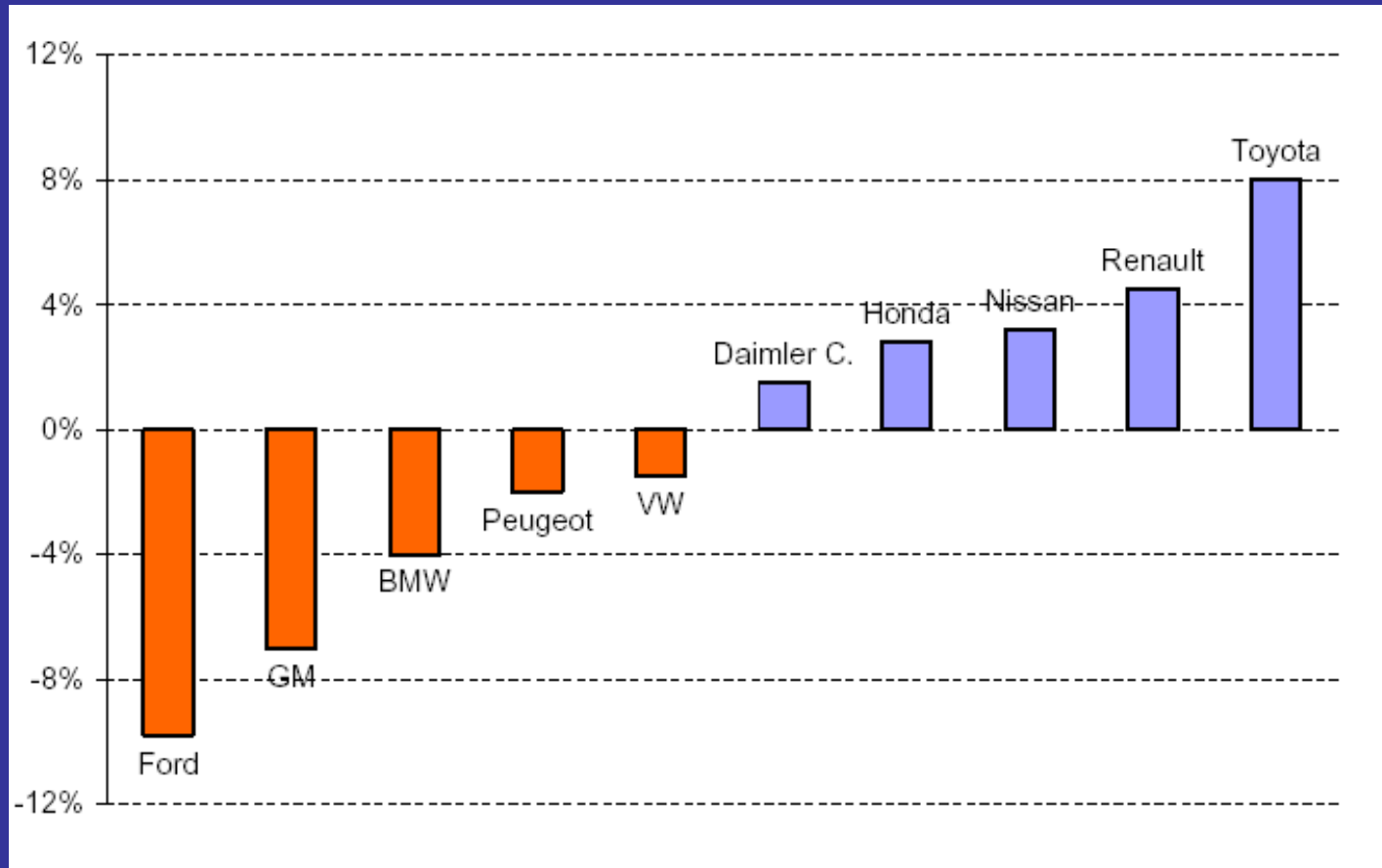


What are we waiting for?

- **Climate laggards** wait for the mitigation policies to be implemented
- **Climate leaders** have already started to consider climate change in their business strategy
- Examples of climate leaders are (Climate savers program of WWF):
 - Johnson & Johnson (health care): saved >\$30 million annually through energy efficiency
 - Lafarge (cement, concrete) reduced > 4 mio. t CO₂ emissions in 2005

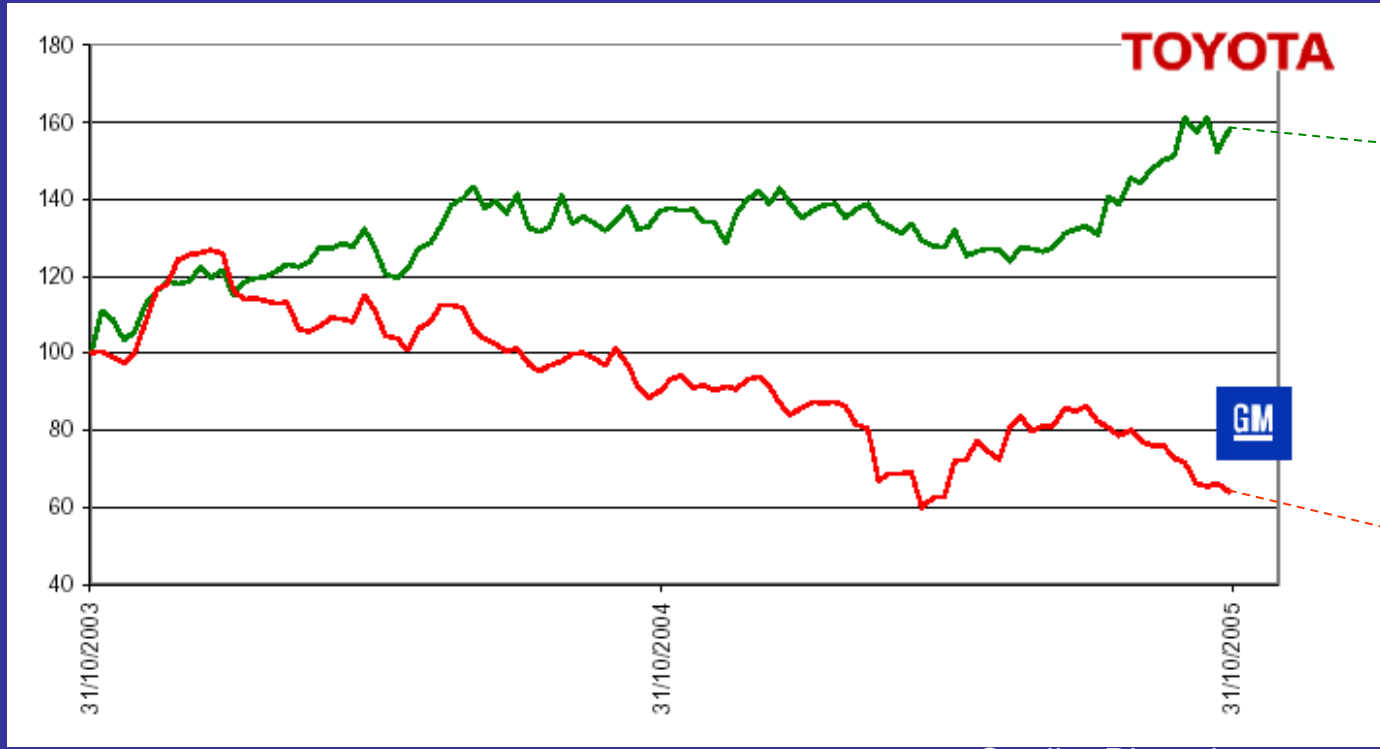
Climate Change and Automobile Industry

Influence of increased CO₂-measures on Earnings (EBIT):



Quelle: SAM Studie: Changing Drivers, 2003

Stock Value of Toyota and General Motors



(18.01.08)

Quelle: Bloomberg

Trend: the bad & the ugly ↔ the leaders

Offsetting Own Emissions

- Many companies/ NGOs offer emission offsets: Myclimate (CH), Atmosfair (D),
- They invest the money into carbon offset projects
- Be careful: **Not all have the same quality standards!**

Electricity from biomass in India

Project name:	100 Village Program, Clean Electricity from Biomass
Project location:	India, Bihar
Project type:	CDM project
Emission reductions:	12,000 t CO ₂ eq (over 10 years) per 100 kW power plant
Situation without project:	Diesel generators
Project status:	Operational
Validation:	DNV
Project start:	September 2007
Documentation:	see at UNFCCC Movie

Many rural communities in India have no secure power supply. The project supported by myclimate uses biological waste from agriculture to generate clean electricity.



Energy from biomass...



...ensures the power supply.

Source: www.myclimate.ch

Wrap up

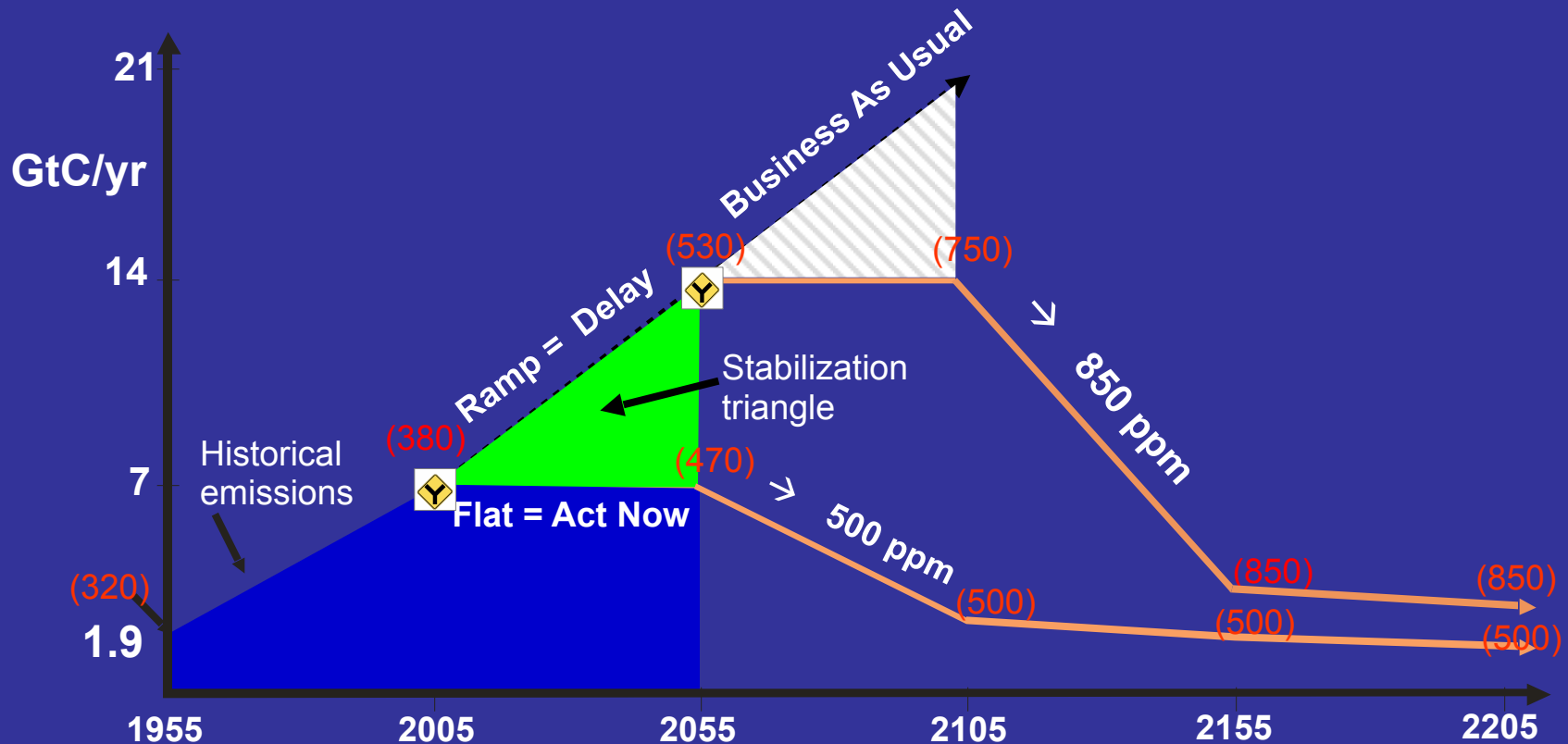
- Climate change is a fact and influence of human action very likely: **WE CAN ACT TO MITIGATE CLIMATE CHANGE.**
- Inertia of the climate system: **WE NEED TO ACT QUICKLY.**
- We need global emissions reductions of 60%: **WE HAVE TO TAKE ALL MEASURES AVAILABLE.**
- Many win-win-win situations: **THE COSTS OF MITIGATION ARE LOWER AS THOSE OF CLIMATE CHANGE IMPACTS.**



Thank you for your attention!

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The Stabilization Triangle: Beat doubling or accept tripling

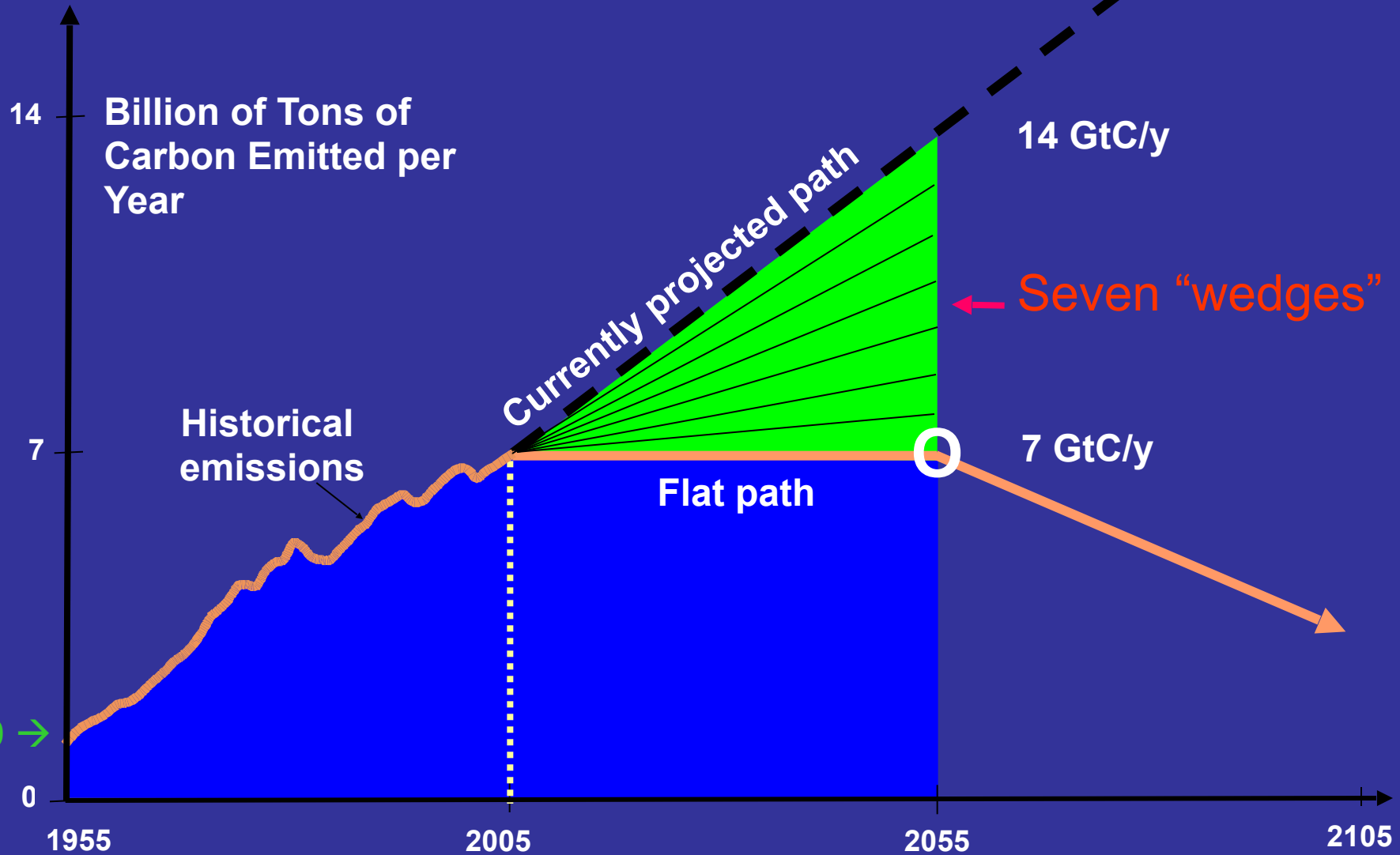


Values in parentheses are ppm. Note the identity (a fact about the size of the Earth's atmosphere): 1 ppm = 2.1 GtC.



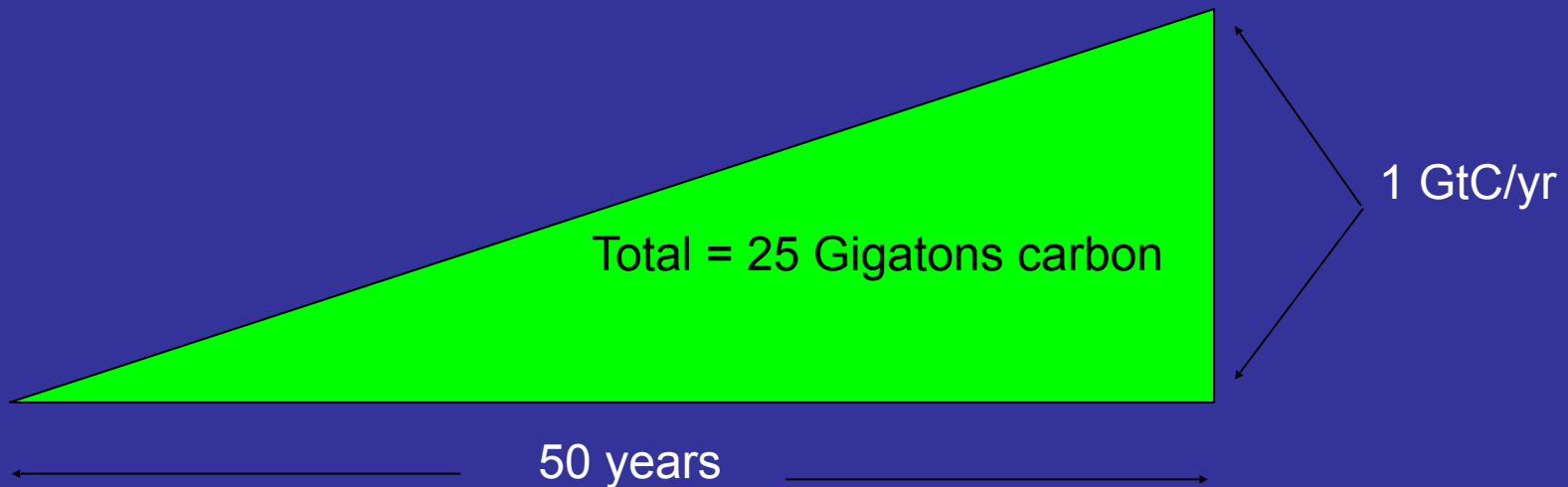
Source: Robert Socolow, Princeton University, 2006

Wedges



What is a “Wedge”?

A “wedge” is a strategy to reduce carbon emissions that grows in 50 years from zero to 1.0 GtC/yr. The strategy has already been commercialized at scale somewhere.



Cumulatively, a wedge redirects the flow of 25 GtC in its first 50 years. This is 2.5 trillion dollars at \$100/tC.

A “solution” to the CO₂ problem should provide at least one wedge.



Fill the Stabilization Triangle with Seven Wedges

