



POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH

The EU, the IPCC and 2oC



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Overview of talk

- Timeline of developments on 2oC limit and emission pathway and relationship between EU, IPCC and science.
- Conclusions

 P I K	<h2>Timeline</h2>
POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH	<ul style="list-style-type: none"> • 1989 UNEP Advisory Group Reports <ul style="list-style-type: none"> – 2oC limit emerges • 1990 IPCC First Assessment Report <ul style="list-style-type: none"> – EU pushes dangerous interference message at Second World Climate Conference • 1992 UNFCCC concluded <ul style="list-style-type: none"> – 1994 AOSIS submits Protocol proposal for 20% reduction by 2005 for CO₂ • 1995 COP1, Berlin agrees to negotiate Kyoto protocol pushed by EU and AOSIS • 1995 IPCC Second Assessment Report • 1996 EU Adopts 2oC limit linked to concentration pathway • 1997 COP3 Adopts Kyoto Protocol • 2000 COP6 Den Haag collapses • 2001 President Bush rejects Kyoto Protocol • 2001 Marrakech Accords Adopted • 2005 Kyoto enters into force • 2007 Bali COP and IPCC Fourth Assessment Report

 P I K	<h2>1989 UNEP Advisory Group</h2>
POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH	<ul style="list-style-type: none"> • Greater than 1.0°C above pre-industrial levels “may elicit rapid, unpredictable and non-linear responses that could lead to extensive ecosystem damage”. • 2°C increase was determined to be “an upper limit beyond which the risks of grave damage to ecosystems, and of non-linear responses, are expected to increase rapidly”.

	<h2 style="text-align: center;">IPCC First Assessment Report - 1990</h2>
POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH	<ul style="list-style-type: none"> • Assessment Report completed in Sundsvall, Sweden, provides a trigger for UNFCCC. • Found that 60 to 80% cuts in CO2 emissions would be needed to stabilise the concentration of this greenhouse gas in the atmosphere • CO2 levels already 25% higher than they were before industrialisation started the intensive use of fossil fuels. • IPCC report feeds in to Second World Climate Conference

	<h2 style="text-align: center;">Second World Climate Conference - 1990</h2>
POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH	<ul style="list-style-type: none"> • November 1990 Second World Climate Conference provides political momentum from Heads of Government and Ministers: <ul style="list-style-type: none"> – "where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent such environmental degradation." – "ultimate global objective should be to stabilise greenhouse gas concentrations at a level that would <u>prevent dangerous anthropogenic interference with climate</u>".



May 1992 INC5 Part II Adopts UNFCCC

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- George Bush I - US successfully opposed legally binding targets for UNFCCC and forces obscure “return to 1990 levels” target in Articles 4.2(a) and (b)
- EU and AOSIS fall back to secure first review of the adequacy of these emission commitments at the first Conference of the Parties (COP1)
- This set the stage for the battle to get targets for the next 3 years



IPCC criticises UNFCCC targets

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- "The scenarios show that more far reaching efforts are required than are now being contemplated in order to achieve a major reduction in the rate of carbon dioxide increase in the atmosphere"
- Report to the Fifth Session Part I of the INC/FCCC by Prof. Bert Bolin, Chairman, Intergovernmental Panel on Climate Change, 20 February 1992.



UNFCCC - Climate Convention, Adopted at UNCED, Rio, June 1992

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- Article 2: Ultimate objective to prevent dangerous anthropogenic interference with the climate system ... within a time frame sufficient to allow:
 - - ecosystems to adapt naturally to climate change
 - - ensure that food production is not threatened
 - - enable economic development to proceed in a sustainable manner
- Developed countries to adopt policies and measures that aim to bring their emissions back 1990 levels by the year 2000.
- First review at COP1





1994 Pre-COP1 Negotiations Heat Up


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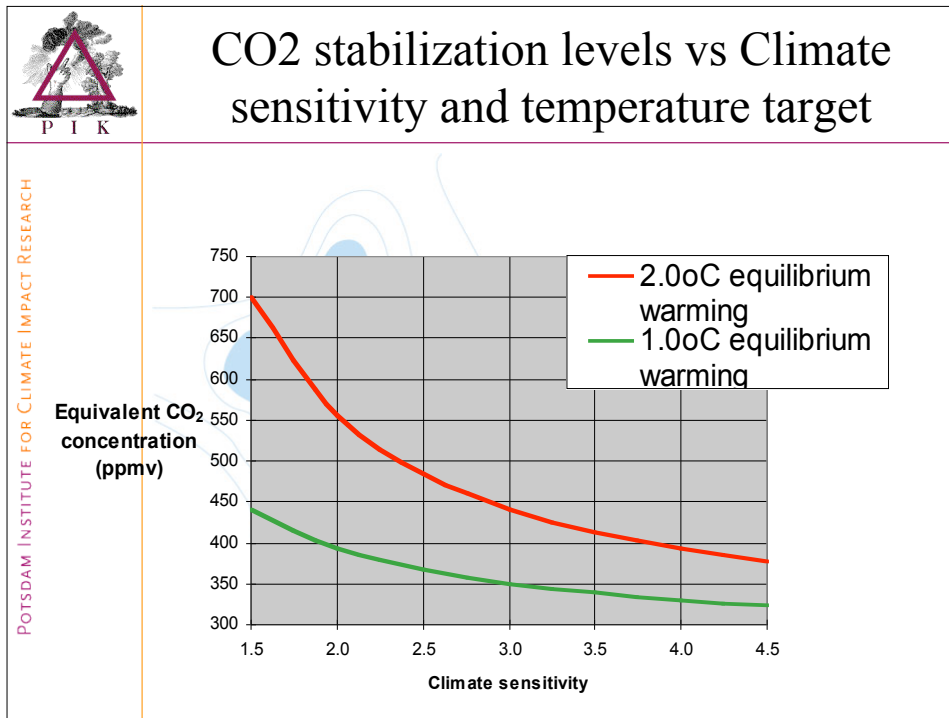
- JUSCANZ group resists efforts to
 - Tighten the UNFCCC emission limits e.g. by an amendment to Articles 4.2(a) and (b).
 - Find emission commitments to be inadequate
 - OPECs and G77 support JUSCANZ
- AOSIS and Germany (EU) submit protocol proposals calling for substantial reductions in emissions (September 1994)
 - AOSIS calls for 20% reduction by 2005 for CO₂ emissions (Toronto target)
- .

	<h2 style="text-align: center;">1995 COP1: The Berlin Mandate</h2>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH</p>	<ul style="list-style-type: none"> • EU/AOSIS win major confrontation with JUSCANZ group over review of „adequacy“ of emission commitments. <ul style="list-style-type: none"> – Split in G77 led to the formation of the „Green Group“ and alliance with EU, leaving OPECs to one side. • Berlin Mandate agreed to negotiate a protocol with quantitative limits for the industrialized countries „As a matter of urgency“ under the Chairmanship of Ambassador Estrada of Argentina.

	<h2 style="text-align: center;">1995 IPCC Second Assessment Report</h2>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH</p>	<ul style="list-style-type: none"> • “the balance of evidence suggests a discernible human influence on global climate”. <ul style="list-style-type: none"> – Rates and magnitude of climate change projected for next century are larger those experienced in the last 10,000 years • Framed around CO2 doubling (550 ppmv CO2) <ul style="list-style-type: none"> – Doubling CO2e within forty to seventy years. – Impacts reported for doubling and pervasive. – Deep reductions in CO2 emissions to avoid doubling are technically and economically feasible. • Early action (within 1-2 decades) is needed to significantly reduce global emissions below projected growth levels on order to avoid doubling CO2

	<h2 style="text-align: center;">Fossil Fuel Industry Attacks IPCC science</h2>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH</p>	<ul style="list-style-type: none"> • World Energy Council described IPCC report: <ul style="list-style-type: none"> – “deficient and of little value to policy makers.” – “unrealistic and influenced by academics seeking to attract funding for their work” • WEC represents the energy industries of more than 100 countries

	<h2 style="text-align: center;">1996 European Union 2°C limit Adopted by Environment Council</h2>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH</p>	<ul style="list-style-type: none"> • “[...] the Council believes that global average temperatures should not exceed 2 degrees above pre-industrial level and that therefore concentration levels lower than 550 ppm CO₂ should guide global limitation and reduction efforts. [...]” <small>(1939th Council meeting, Luxembourg, 25 June 1996)</small>



-
- ### Implications of 2oC target for international climate policy
- Bottom up approach cannot work: international coordination essential
 - Legally binding targets and trading system are essential (necessary but not sufficient)
 - Need for early and rapid decarbonization in the large emitters of the developing world.
 - Need for complex regime architecture
 - Mixture of legally binding targets for growing group of richer and more able countries and policies for decarbonization in other developing countries
 - Need for very rapid technological change



1997 EU reduction proposals

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- March Environment Council adopts „negotiating“ target of 15% reduction by 2015 for CO₂, CH₄ and N₂O
 - F- gases NOT included (HFCs, PFCs, SF₆)
 - Criticised by NGOs for failure to adopt 2005 target and for not including the F-gases
- June Environment Council adopts 7.5% reduction target by 2005 for CO₂, CH₄ and N₂O




1997 AGBM 8 Specific Proposals for Emission Reduction Targets

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	2005	2010	2020
Proposed by Non Annex I Parties			
AOSIS	20%	-	-
Peru	15% reduction in CO ₂ (20%) from 1990	Further reduction of 15-20% for all GHGs (20-25%)	-
Philippines	20% (25%)	Further reduction of 20% (25%)	-
Zaire	10% (15%)	15% (20%)	20% (25%)
Proposed by Annex I Parties			
European Union	at least 7.5%	15%	-
Czech Republic	5%	15%	-
Hungary, Poland, Slovakia et al	return to 1990 levels		

	<h2>COP 3 1997</h2> <h3>Kyoto Protocol Adopted</h3>
POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>UNCCC in Kyoto ©Greenpeace/Kiryu 1 December 1997</p> </div> <div style="text-align: center;">  <p>Carbonosaurus in COP3. © Greenpeace/Kiryu December 1997</p> </div> </div>

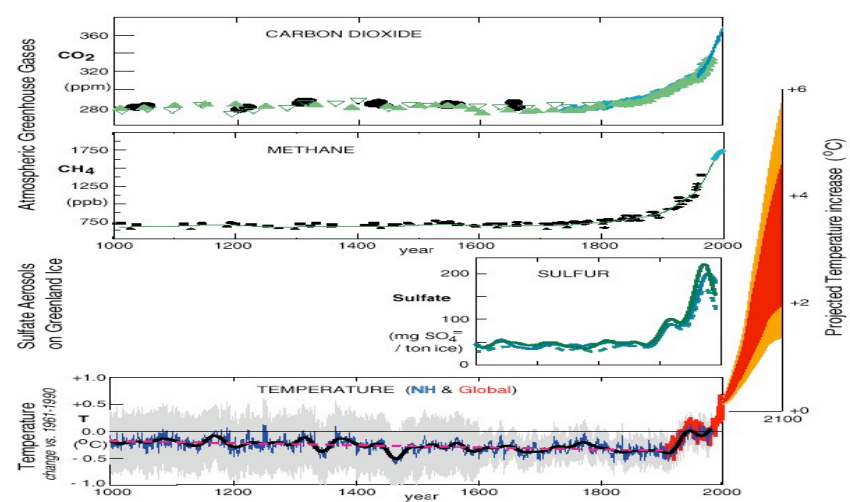
	<h2>2001: Kyoto hangs in the balance</h2>
POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH	<ul style="list-style-type: none"> • December 2000/January 2001: Efforts to „fix“ the COP6 collapse fizzle out. • March 2001 Bush Rejects Protocol <ul style="list-style-type: none"> • Presidency begins with hopeful signs at G8 Environment Ministers Meeting in Trieste... • March 2001 Bush rejects Protocol as „fatally flawed“, unfair to the USA and „because it exempts 80 percent of the world, including major population centers such as China and India“ • With exception of Australia rejection of protocol is universally criticised • EU mounts global diplomatic campaign to save the Protocol.



IPCC TAR 2001: Climate System in Uncharted Territory

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THE HUMAN INFLUENCE ON ATMOSPHERE & CLIMATE (IPCC/WG1: Climate Change 2001, SPM & Chapters 2, 3, 4, 5, 9)



IPCC TAR 2001: warming due to human activities

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“There is new and stronger evidence that most of the observed warming over the last 50 years is attributable to human activities.”

“..it is very likely that the 20th century warming has contributed significantly to the observed sea level rise...”

Source: IPCC WGI TAR
Summary for Policy Makers



IPCC TAR 2001: Climate change is already having an impact

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- *“Thus, from the collective evidence there is high confidence that recent regional changes in temperature have had discernible impacts on many physical and biological systems”.*

Source :IPCC Working Group II TAR
Impacts of Climate Change



IPCC TAR 2001: Increased Warming Projections

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- Projected increase in temperature over the next century has increased from a range of 1 – 3.5° C in the IPCC’s Second Assessment Report, to 1.4 – 5.8°C.
- *“The projected rate of warming is much larger than the observed changes during the 20th century and is very likely without precedent during at least the last 10,000 years... ”.*

Source: IPCC WGI TAR
Summary for Policy Makers



IPCC 2001: Impacts: developing countries most at risk

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- Global increases in temperature produce net economic losses in many developing countries for all magnitudes of warming - losses greater the higher the warming.
- *"The effects of climate change are expected to be greatest in developing countries in terms of loss of life and relative effects on investment and the economy."*
- *"The projected distribution of economic impacts...would increase disparity in well-being between developed countries and developing countries.."*

Source :IPCC Working Group II
TAR Impacts of Climate Change



IPCC TAR 2001 Stabilization of CO₂ and Energy Policy

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- *"The choice of energy mix and associated investments will determine, whether and if so at what level and cost greenhouse gas concentrations can be stabilized."* (IPCC Third Assessment Report WGIII Summary for Policy Makers)



IPCC TAR 2001 Lines of Evidence – Reasons for Concern

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Summary of Lines of Evidence

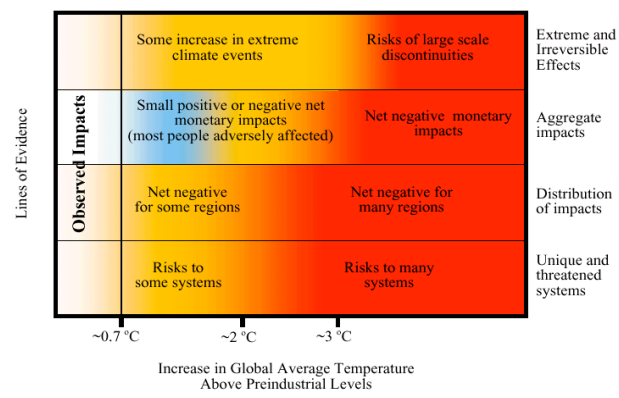
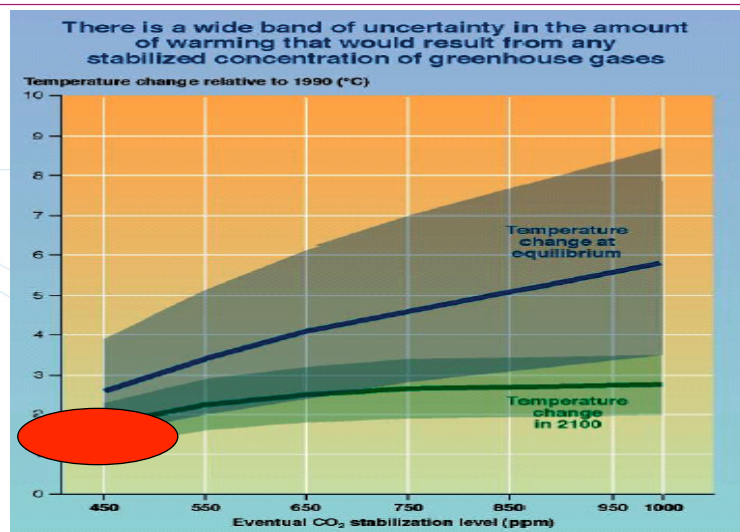


Figure 19-9-1: Risks are summarized by line of evidence with each row corresponding to a line of evidence and compared to changes in global average temperature above preindustrial levels by 2100. The color transition from blue to yellow to red corresponds to increasing risk.






In 2001 2oC was not on the science-policy map....?

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The upper end of the projected temperature range eg above 3-4°C has not been assessed....

	<h2>2001 Rescuing Kyoto</h2>
POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH	<ul style="list-style-type: none"> • COP6 bis, July 2001: Main political decisions on Kyoto Ratification adopted <ul style="list-style-type: none"> – US press stunned • IPCC TAR Adopted September 2001 • COP7 Marrakech Accords, Oct/Nov. 2001 <ul style="list-style-type: none"> – Blocking of Umbrella group continues to the end • Kyoto Protocol Enters into Force, 2005

	<h2>2005 EU 2oC limit adopted by Heads of Government</h2>
POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH	<div style="text-align: center;">  </div> <div style="text-align: center; margin-top: 10px;"> <p>COUNCIL OF THE EUROPEAN UNION</p> <p>Brussels, 23 March 2005 (OR. fr)</p> <p>7619/05</p> </div> <ul style="list-style-type: none"> • Presidency Conclusions – Brussels, 22 and 23 March 2005 <ul style="list-style-type: none"> – 43. The European Council acknowledges that climate change is likely to have major negative global environmental, economic and social implications. It confirms that, with a view to achieving the ultimate objective of the UN Framework Convention on Climate Change, the global annual mean surface temperature increase should not exceed 2°C above pre-industrial levels. – “reductions” for group of developed countries ... of 15 30% by 2020, compared to the baseline envisaged in the Kyoto Protocol, and beyond



2005 March Environment Council and 2oC

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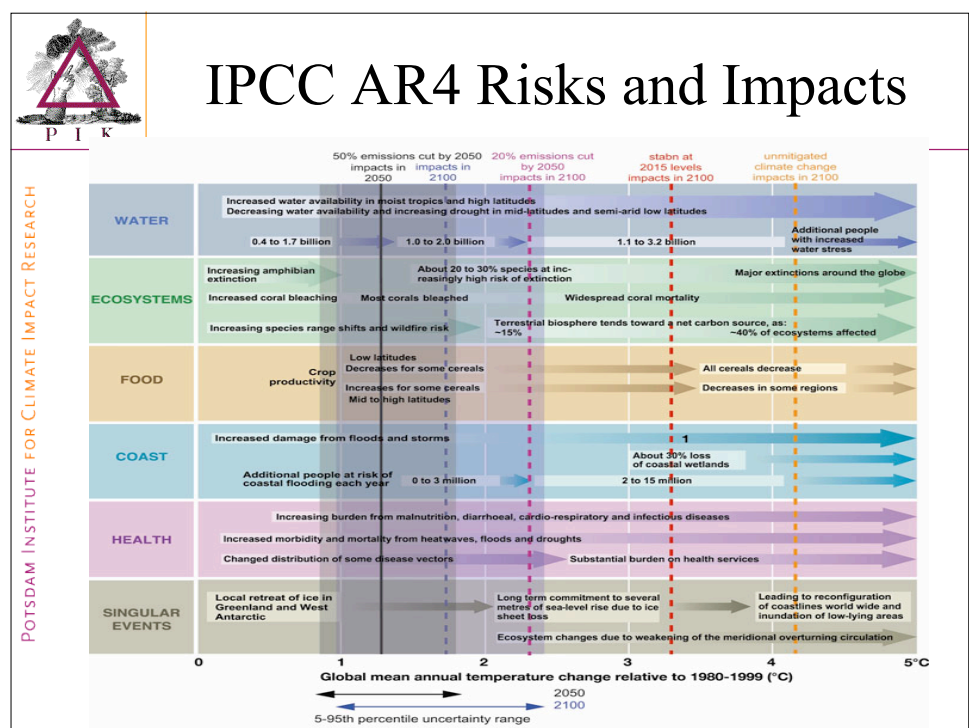
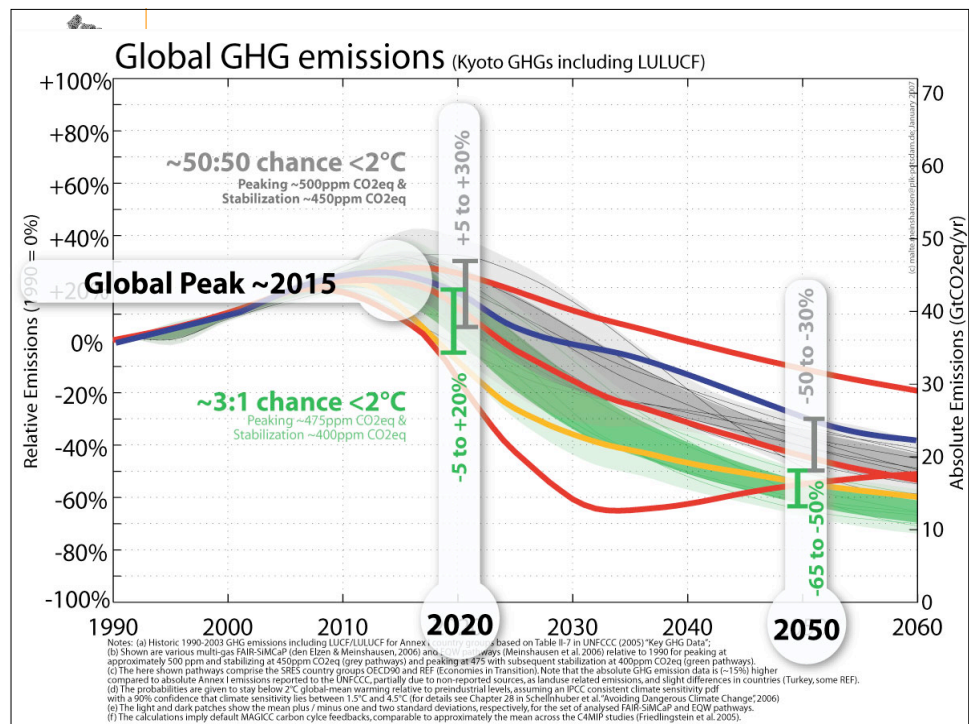
- Recent scientific research ... IPCC indicate ... unlikely that stabilisation of concentrations above 550 ppmv CO₂ equivalent would be consistent with meeting the 2°C objective
- In order to have a “reasonable chance” to limit global warming to no more than 2°C, **stabilisation of concentrations well below 550 ppmv CO₂ equivalent may be needed;**



2005 March Environment Council and 2oC Pathway

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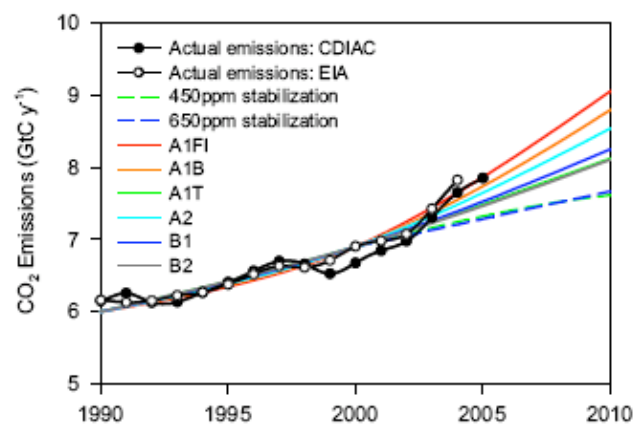
- Recent scientific research ... IPCC indicate that keeping this long-term temperature objective within reach will require
 - Global greenhouse gas emissions to peak within 2 decades, followed by substantial reductions in the order of **at least 15% and perhaps by as much as 50% by 2050 compared to 1990 levels**
 - Reduction pathways by the group of developed countries in the order of **15-30% by 2020 and 60-80% by 2050** compared to ... baseline .. in the Kyoto Protocol





2007 Emissions now towards top of projection range

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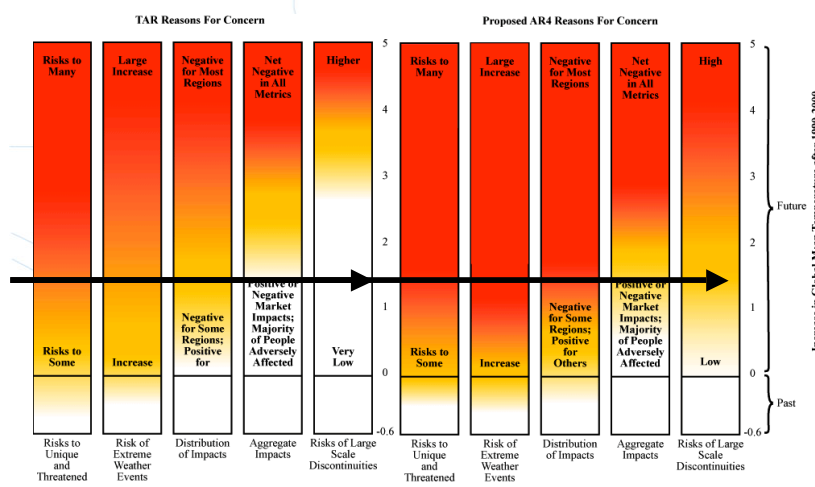



Raupach, M. R., G. Marland, et al. (2007). "Global and regional drivers of accelerating CO₂ emissions." PNAS 0700609104.






IPCC AR4 Finds Greater Risks

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	<h2 style="text-align: center;">2007 IPCC AR4 Especially affected regions</h2>
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	<h2 style="text-align: center;">IPCC AR4 Implications of 2oC limit</h2>				
POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH	CO ₂ -equivalent Stabilization level (2005 = 375 ppm CO ₂ e)	Global Mean temperature increase at equilibrium (°C)	Global average sea level rise at equilibrium <u>from thermal expansion only</u>	Year global CO ₂ needs to peak	Reduction in 2050 global CO ₂ emissions compared to 2000
445 – 490	2.0 – 2.4	0.4 – 1.4	2000 – 2015	-85 to -50	
Scenario category	Region		2020	2050	
A-450 ppm CO ₂ -eq ²⁾	Annex I		-25% to -40%	-80% to -95%	
	Non-Annex I		Substantial deviation from baseline in Latin America, Middle East, East Asia	Substantial deviation from baseline in all regions	
					



January 2007 Communication

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- Limiting Global Climate Change to 2 degrees Celsius The way ahead for 2020 and beyond (Brussels, 10.1.2007 COM(2007) 2 final
- 30 % reduction in greenhouse gas emissions by developed countries by 2020 (compared to 1990 levels) “necessary to ensure that the world stays within the 2°C limit”
- *2050 global emissions must be reduced by **up to 50 % compared to 1990**, implying reductions in developed countries of 60-80 % by 2050.*




JRC POLES scenario -50% chance at 2oC

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- Global Climate Policy Scenarios for 2030 and Beyond
- “Probability of the GHG reduction pathway meeting 2oC target is 50%”
 - Essentially 450 CO2 stabilization

 P I K	<h2>2007 October Environment Council</h2>
POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH	<ul style="list-style-type: none"> • IPCC Working Group III to the AR4...demonstrates that keeping the 2°C objective within reach, ... requires stabilisation of the concentration of greenhouse gases in the ...atmosphere in line with the lowest stabilisation level assessed, i.e., 450 ppmv CO2 eq; • UNDERLINES that this will require global greenhouse gas emissions to peak within the next 10 to 15 years, followed by substantial global emission reductions to at least 50% below 1990 levels by 2050; • <u>Dec 2007 European Council recalls these conclusions</u>

 P I K	<h2>2008 October Environment Council?</h2>
POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH	<ul style="list-style-type: none"> • Reference to 450 ppmv seems to have disappeared due to questions raised about its validity • Global reductions of at least 50% below 1990 levels by 2050 are not contested



Overview

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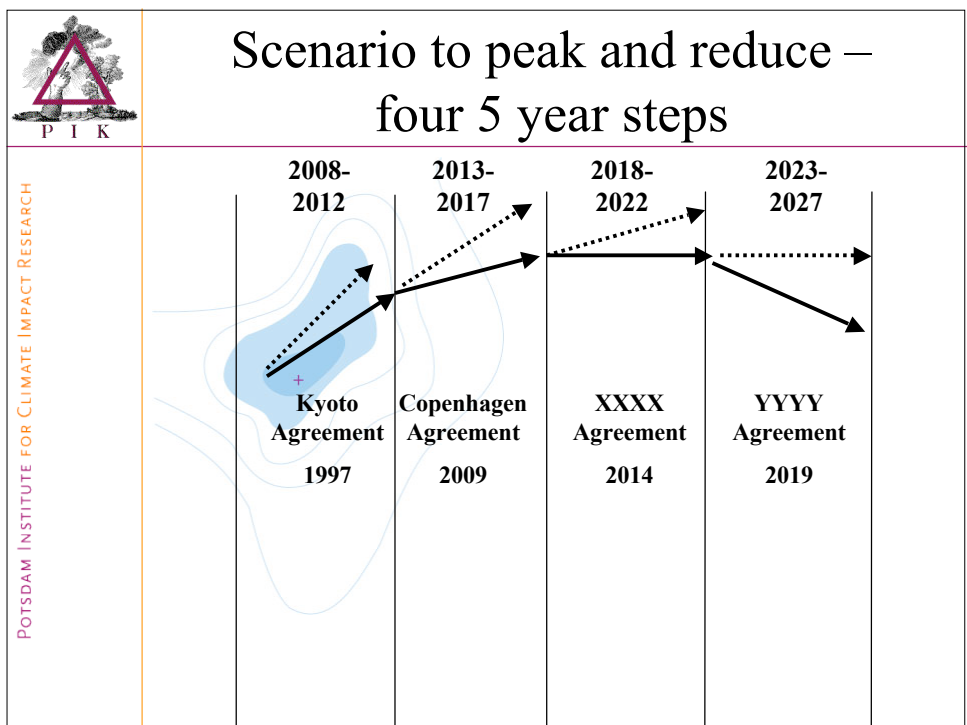
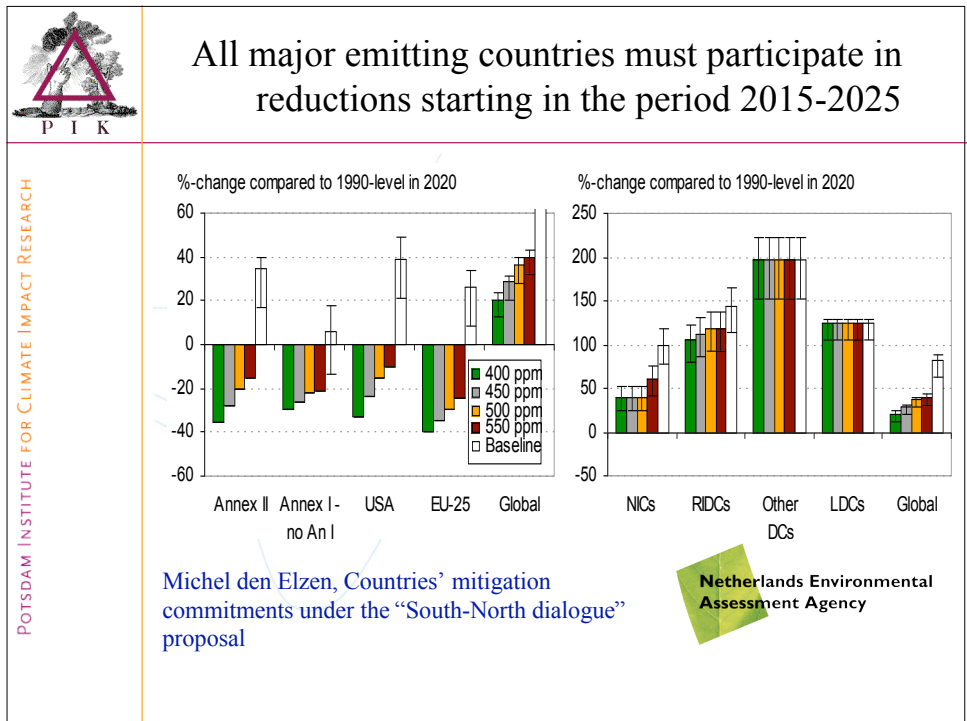
- 1996 EU Position on 2oC did not lead immediately to a high probability pathway for emissions or GHG concentration levels
- Gradual convergence has occurred that has closed gap between science and emission pathways
 - EU Ministers have responded to IPCC assessments
- Realization that likelihood of reaching 2oC is major factor



2007 and 2008: Support grows for 2oC limit

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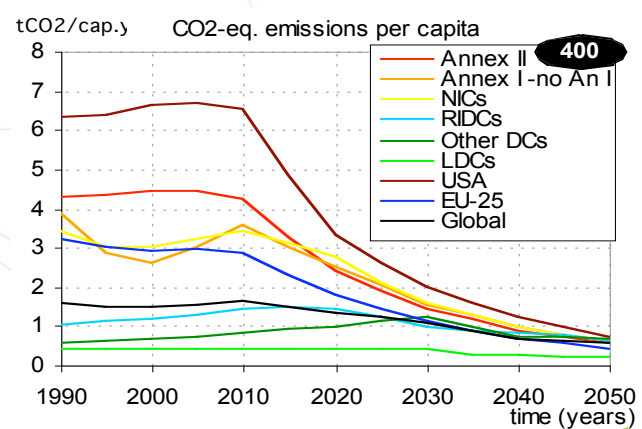
- Chile, New Zealand, Norway, South Africa, Switzerland
- Least Developed Countries (LDCs) and Small Island Developing States (SIDS)
 - The least developed countries and vulnerable small islands have argued that 2°C degrees may indeed be too much warming if their safety and survival in the future is to be guaranteed.





How to allocate emissions?

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Michel den Elzen, Countries' mitigation commitments under the "South-North dialogue" proposal

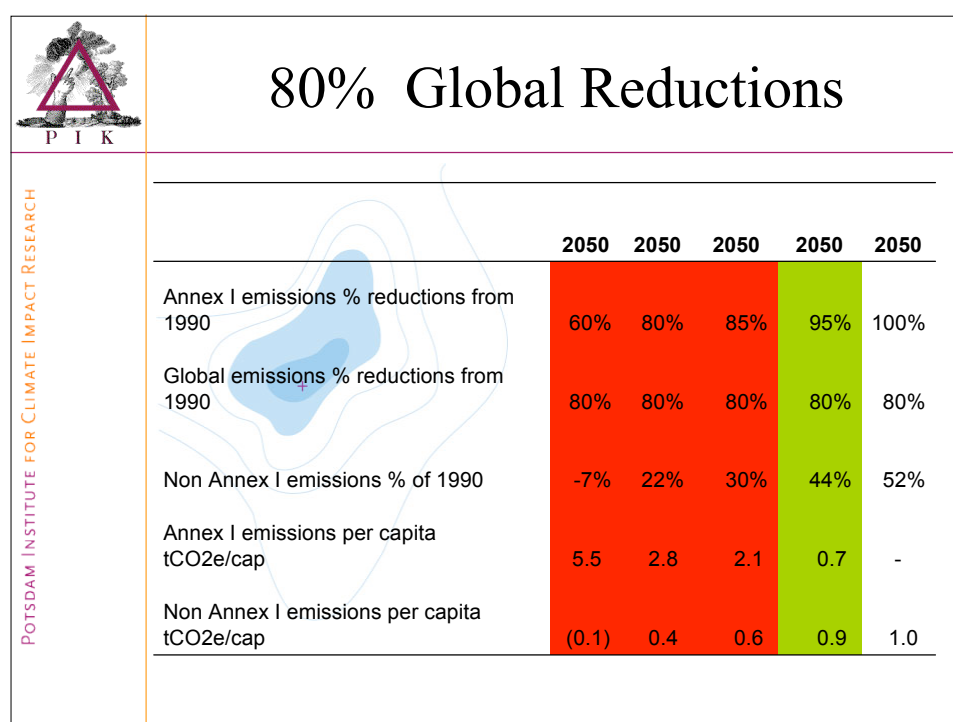
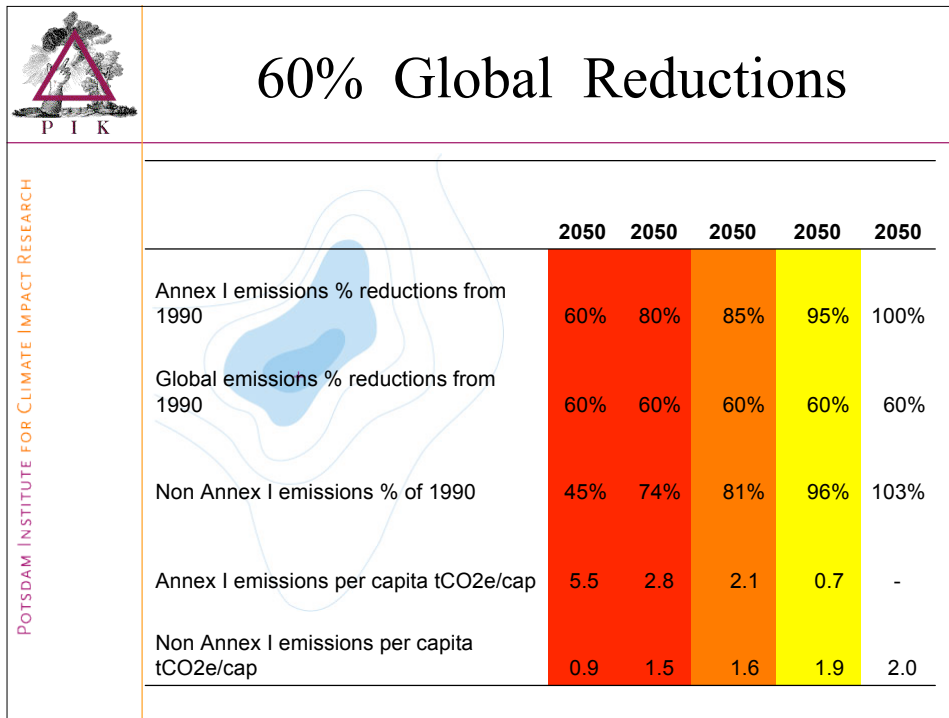
Netherlands Environmental Assessment Agency




50% Global Reductions

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	2050	2050	2050	2050	2050
Annex I emissions % reductions from 1990	60%	80%	85%	95%	100%
Global emissions % reductions from 1990	50%	50%	50%	50%	50%
Non Annex I emissions % of 1990	70%	100%	107%	122%	129%
Annex I emissions per capita tCO ₂ e/cap	5.5	2.8	2.1	0.7	0.0
Non Annex I emissions per capita tCO ₂ e/cap	1.4	2.0	2.1	2.4	2.5






85% Global Reductions

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	2050	2050	2050	2050	2050
Annex I emissions % reductions from 1990	60%	80%	85%	95%	100%
Global emissions % reductions from 1990	85%	85%	85%	85%	85%
Non Annex I emissions % of 1990	-20%	9%	17%	31%	39%
Annex I emissions per capita tCO2e/cap	5.5	2.8	2.1	0.7	-
Non Annex I emissions per capita tCO2e/cap	(0.4)	0.2	0.3	0.6	0.8

- 
- ## EU Leadership Critical but not Certain
- POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH
- EU leadership critical to global effort to change trajectory of emissions
 - Drives market and political expectations which influence investments far from the EU
 - EU domestic measures - ETS, Renewable are a model that rest of the world is watching and learning from
 - Emissions growth in south and in the east of Europe has potential adverse consequences
 - But - 30% target in 2020 is not enough for 2oC and nor is 2050 ambition