



Capacity Building Seminar
Balliol College, University of Oxford,
7 – 11 April 2008

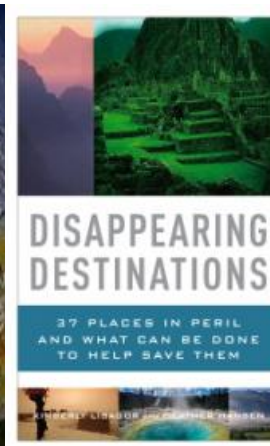
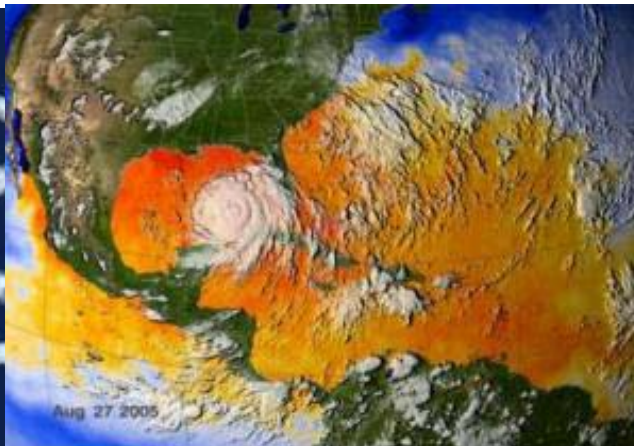
Climate Change and Tourism: State of the Art

Dr. Daniel Scott

Canada Research Chair in Global Change and Tourism

Dr. Murray C. Simpson

Senior Research Associate Oxford University Centre for the Environment



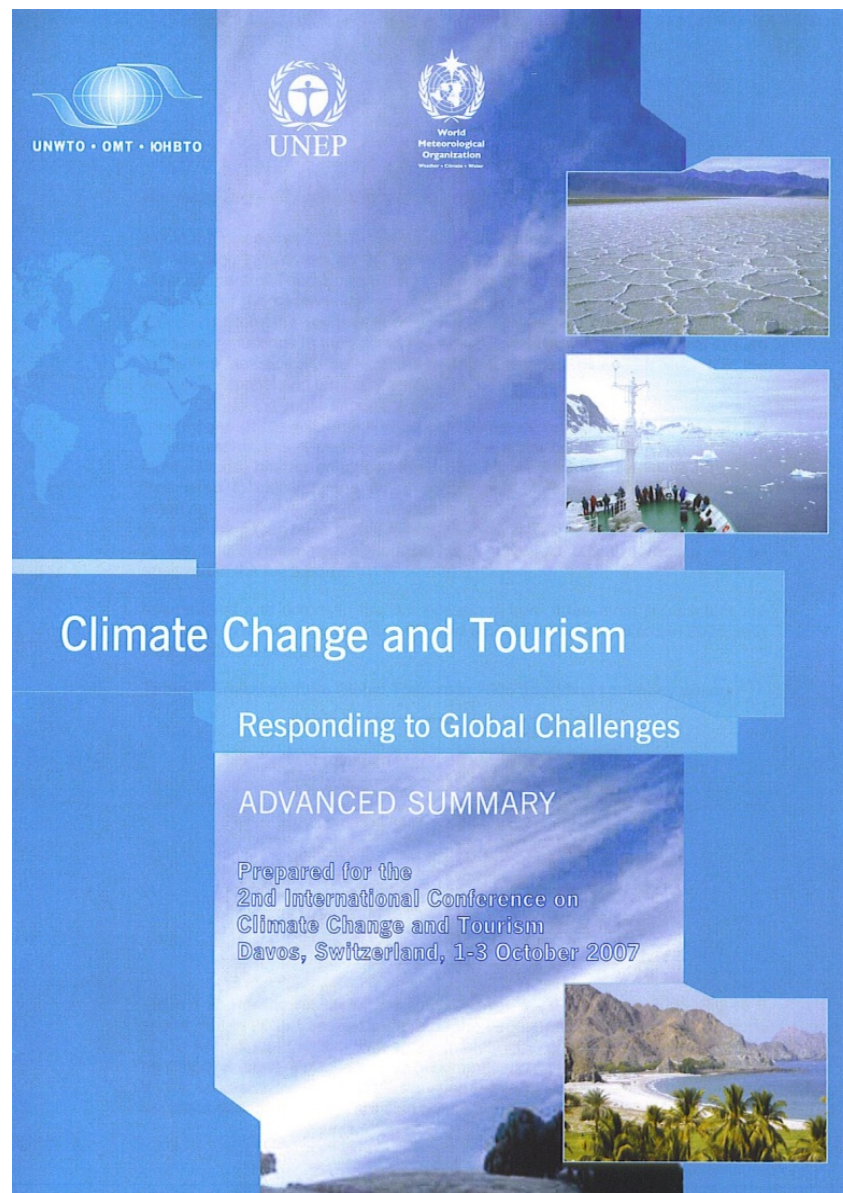


Technical Report

Commissioned by
UNWTO-UNEP-WMO

2nd International Conference on
Climate Change and Tourism
(Davos, Switzerland – 1-4 Oct.)

Science Background Report
to UNWTO-UNEP-WMO
Davos Declaration





Authors:

- » Dr. Daniel Scott (Lead Author) - University of Waterloo, Canada *
- » Dr. Bas Amelung - University of Maastricht, Netherlands
- » Dr. Susanne Becken - Lincoln University, New Zealand *
- » Dr. Jean-Paul Ceron - Limoges University, France
- » Ghislain Dubois - TEC Conseil, France
- » Dr. Stefan Gossling - Lund University, Sweden
- » Paul Peeters - Breda University, Netherlands
- » Dr. Murray C. Simpson - University of Oxford, England

■ **Reviewed by over 20 experts on tourism and climate**
(UNWTO, UNEP, WMO, IATA, and others)

* Members of WMO Expert Team on Climate and Tourism



Climate Change Science

■ The Climate is Changing

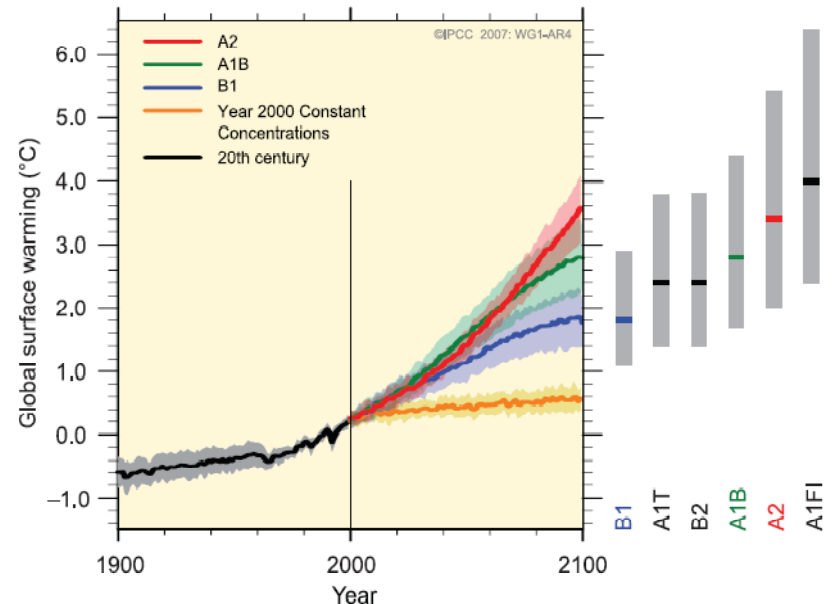
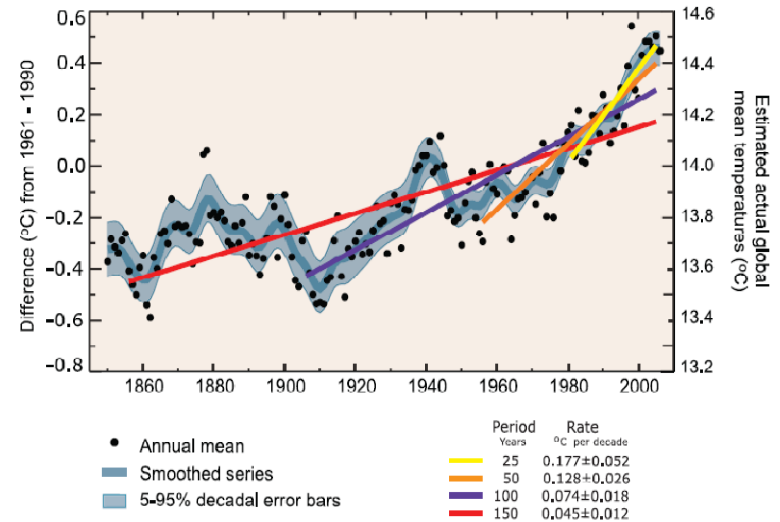
‘The warming of the climate system is unequivocal’ (IPCC-AR4 2007)

Globally +0.8°C from 1906 to 2005

■ Climate Change Has Just Begun

The pace of climate change is ‘very likely’ to increase over the 21st century

+1.8 to 6.4°C by 2100





Nov 2007

United Nations Secretary General Ban Ki-Moon



‘This year through the IPCC, the world's scientists have spoken, clearly and in one voice. Not some scientists. Not leading scientists. But the world's scientists - united.

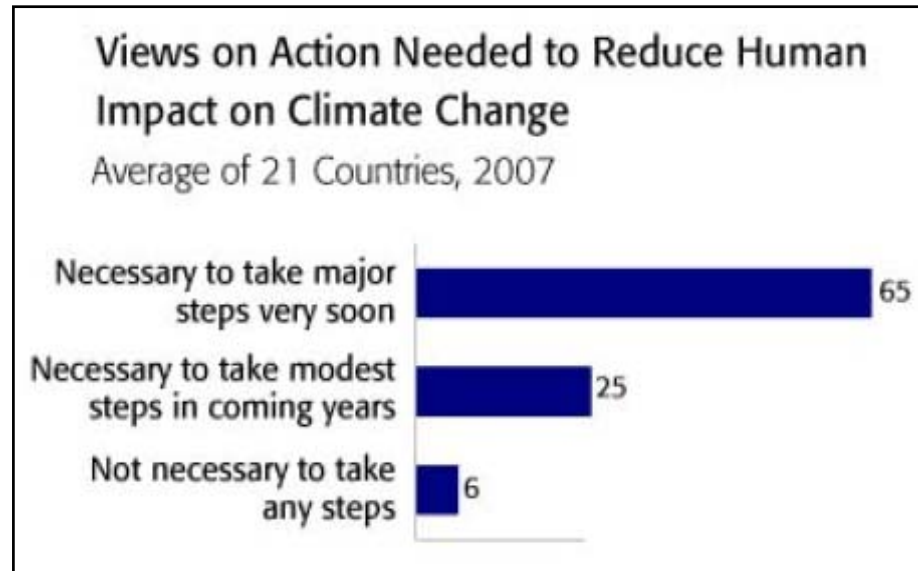
Global warming is the defining challenge of our age. Not ‘of the decade’ or even ‘our life.’ And not any mere challenge of our age -- but the one that defines us.’



BBC poll of 22,000 people in 21 countries



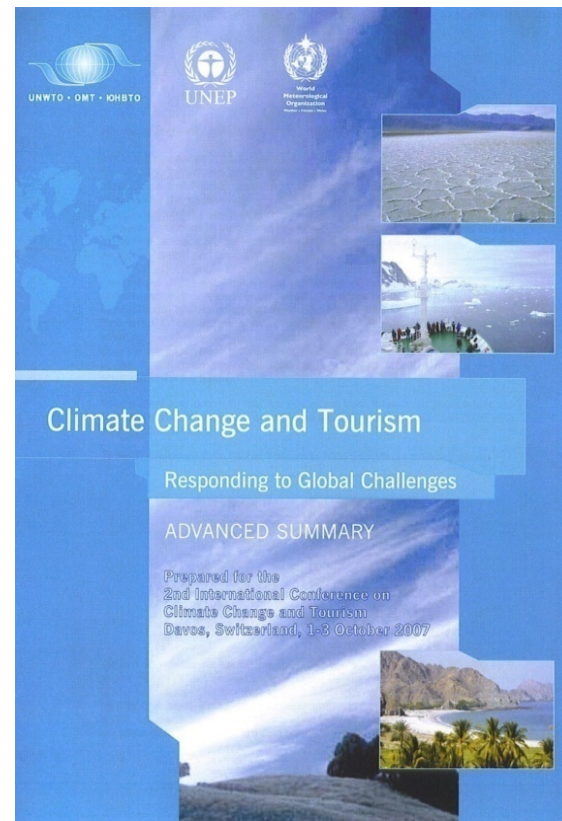
- 79% believe “human activity, including industry and transportation, is a significant cause of climate change.”
- 9 out of 10 believe action is necessary to address global warming





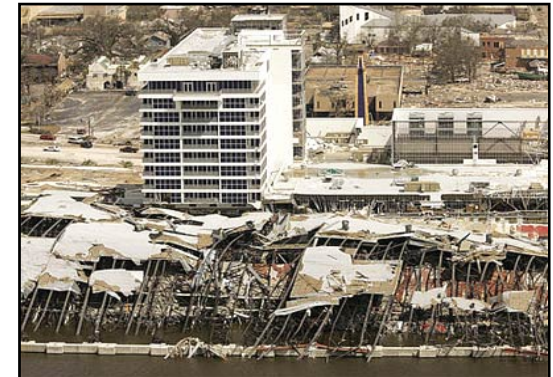
The New Realities of Tourism in an Era of Global Climate Change

- Impacts & Adaptations at Tourism Destinations (50 pgs)
 - » *Mountain regions*
 - » *Coastal regions and islands*
 - » *Natural and cultural heritage*
- Implications for Tourism Demand (20 pgs)
 - » *Geographic and seasonal shifts*
 - » *Perceptions and media influence*
- Emissions from Tourism: Status & Projections (23 pgs)
 - » *Results for 2005 baseline and 2035 projection*
- Mitigation Measures in Tourism (32 pgs)
 - » *Mitigation potential for 2035*





Climate Change Impacts at Tourism Destinations





Assessment of Major Impact Types at Tourism Destinations

- **Direct climatic impacts**
 - » Warmer Summers
 - » Warmer Winters
 - » Precipitation Changes (water supply)
 - » Increased Extreme Events

- **Indirect environmental change impacts**
 - » Biodiversity Loss (terrestrial and marine)
 - » Sea Level Rise
 - » Disease

- **Impact of mitigation policy on tourist mobility**
 - » Travel Costs and Destination Choice

- **Indirect societal change impacts**
 - » Global/Regional Economic Impacts
 - » Increased Security Risks (social/governance disruption)



Winter Sports Destinations: Are \$Billions at Risk ?



Switzerland
Christmas 1998

'Global Warming Forces Sale of
Scottish Winter Sports Resorts'
The Guardian – 14 Feb 2004

'Global Meltdown Hits Skiing'
Denver Post – 16 Oct 2005

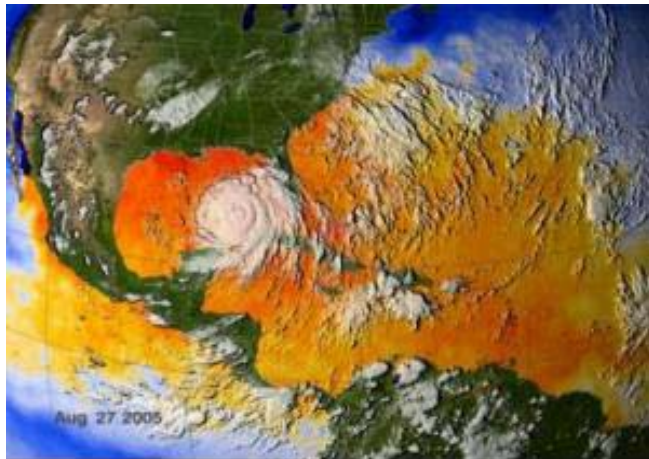
'Global Warming could close half of Alpine ski resorts by 2050'
Telegraph UK – 3 Dec 2003

'Warming Threatens Ski Resorts'
CNN – 2 Dec 2003



Extreme Events and Insurability

'Hurricane Katrina Blows
Away 'Big Easy' Tourism'
31 Aug 2005 - USA Today



Association of British Insurers

US Gulf Coast & Caribbean Region (Mid to Late-21st Century)

- Estimated premium increase 20-80%
- Increase deductibles (order of magnitude)
- Drop coverage in high risk areas



Ecotourism - Coral Reef Bleaching

Percent of Coral Reef Experiencing Bleaching at Least Every 2 Years

Ocean region	HadCM3	PCM
Indian Ocean	94-95	60-71
	100	98-99
SE Asia	90-94	67-77
	100	94-96
Micronesia	100	91-99
	100	100
GBR/Coral Sea	95-99	60-71
	99-100	96-98
Polynesia	75-99	67-84
	81	95-97
Caribbean	94-99	48-88
	100	92-95
World	93-94	70-80
	98	95-97

2030s = top row; 2050s = second row

Donner et al. 2005



Globally - all major coral reefs are expected to be severely degraded by 2050 ... 32% at risk of die-off by 2050

INTERNATIONAL
Herald Tribune Wednesday, June 7, 2006
PUBLISHED BY THE NEW YORK TIMES

Oceans II • By Thomas E. Lovejoy

Rising acidity threatens marine life

WASHINGTON
The problems of acid rain and acid lakes, which came to public attention in the 1980s, have been addressed to a considerable degree. Today we face a far more profound challenge: increasingly acid oceans.

It is little known outside of scientific circles that a fundamental change has already taken place in the chemistry of the two-thirds of the earth's surface occupied by oceans. The change, of 0.1 of a pH unit, sounds trivial when expressed in the logarithmic scale that science uses, but it translates to the upper layers of the oceans already being 20 percent more acid than in preindustrial times.

The change is being caused by increased atmospheric levels of greenhouse gases, in particular carbon dioxide. In addition to forcing climate change, more carbon dioxide combines with water and produces carbonic acid. The consequences for marine ecosystems are only beginning to be understood, but an ominous future is being



Tom Donnan (from Alcheton) / Corbis Outlines via AP



WORLD TOURISM ORGANIZATION
ORGANISATION MONDIALE DU TOURISME
ORGANIZACION MUNDIAL DEL TURISMO
مُنظَمَةُ السَّيَاحَةِ الْعَالَمِيَّة



World
Meteorological
Organization
Weather • Climate • Water





Economic Risks of Climate Change

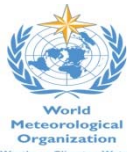
‘Our actions over the coming few decades could create risks of major disruption to economic and social activity, later in this century and in the next, on a scale similar to those associated with the great wars and the economic depression of the first half of the 20th century.’



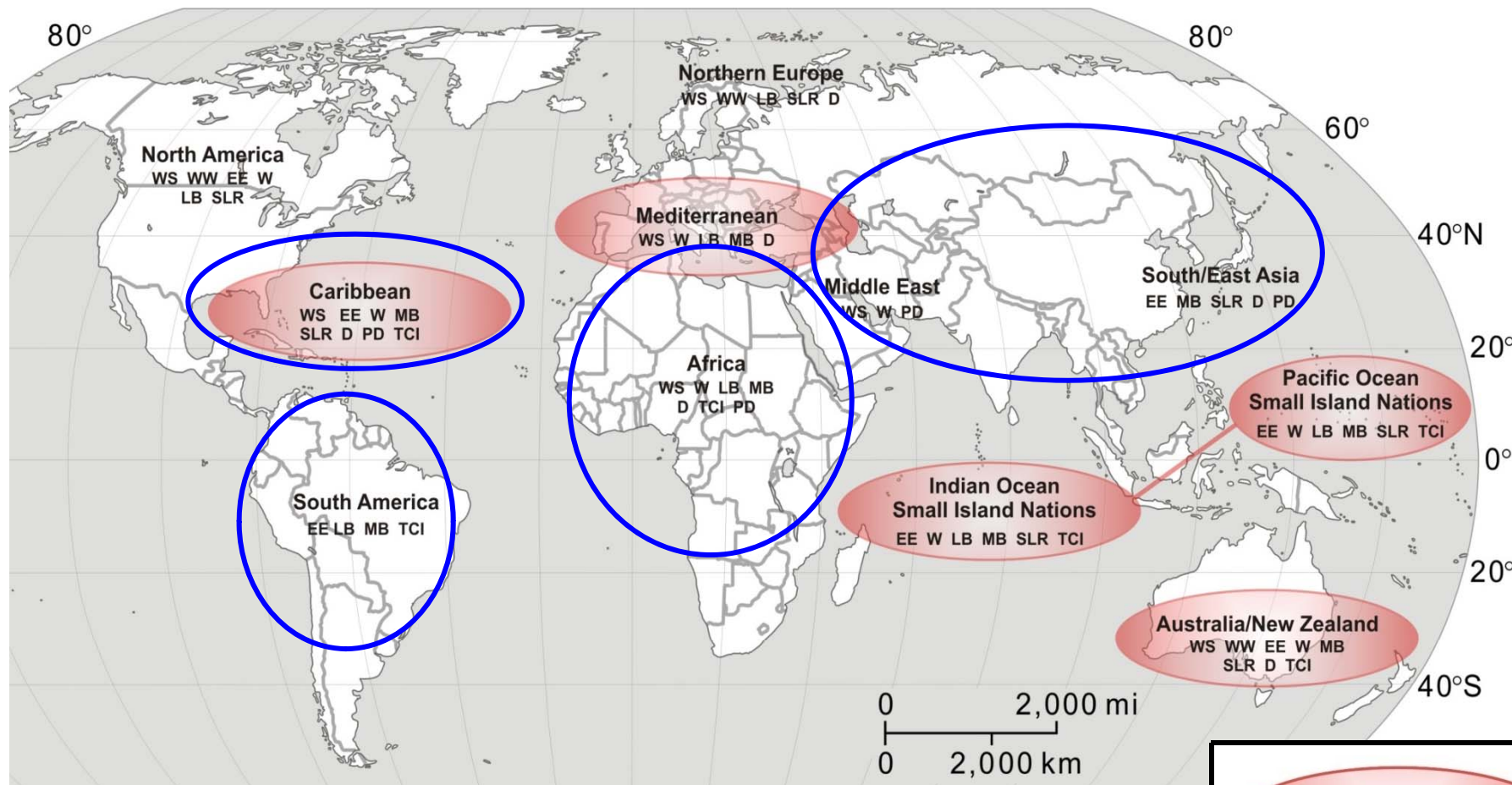
Human Development
Report 2007/2008
Fighting climate change:
Human solidarity in a divided world



‘Climate change is the greatest challenge facing humanity at the start of the 21st century. Failure to meet this challenge raises the spectre of unprecedented reversals in human development.’



Tourism Vulnerability 'Hotspots'



WS = warmer summers

LB = land biodiversity loss

D = increase in disease outbreaks

WW = warmer winters

MB = marine biodiversity loss

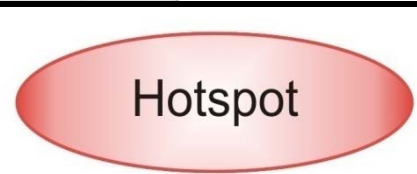
TCI = travel cost increase from mitigation policy

EE = increase in extreme events

W = water scarcity

SLR = sea level rise

PD = political destabilization

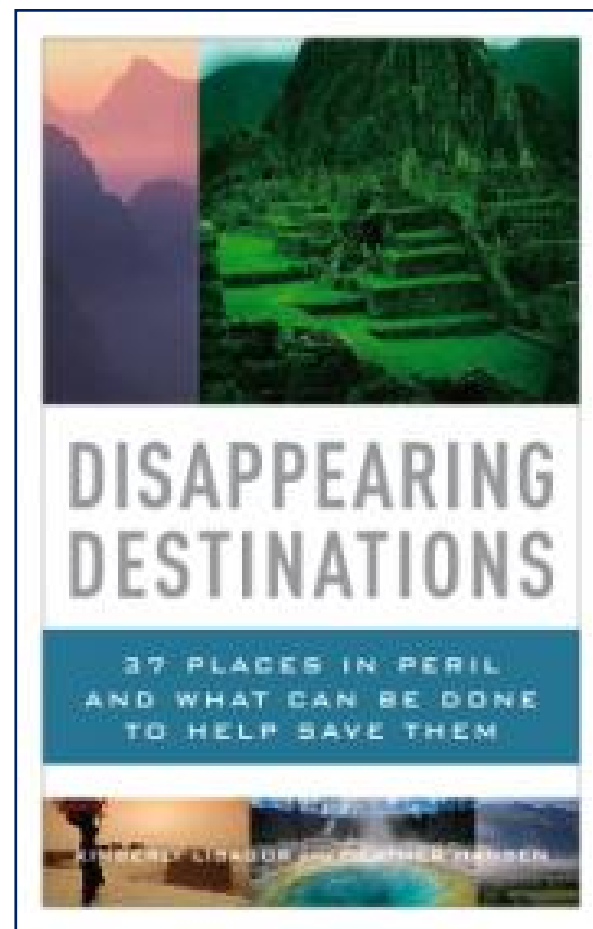




'See Them Now: Endangered Wonders' Places to Visit Before they Vanish



- Arctic and Antarctic Wildlife – *Polar Bears*
- Cloud Forests – *Costa Rica's Cloud Forest*
- Coral Reefs – *Great Barrier Reef, Caribbean*
- Mountain Glaciers/Snow Caps
 - *in Andes, Alps, Himalayas, Rockies, Kilimanjaro*
- Low-lying Islands and Cities
 - *Maldives, Tuvalu, Venice*
- Mangrove Forests
 - *Florida Everglades, Bangladesh*





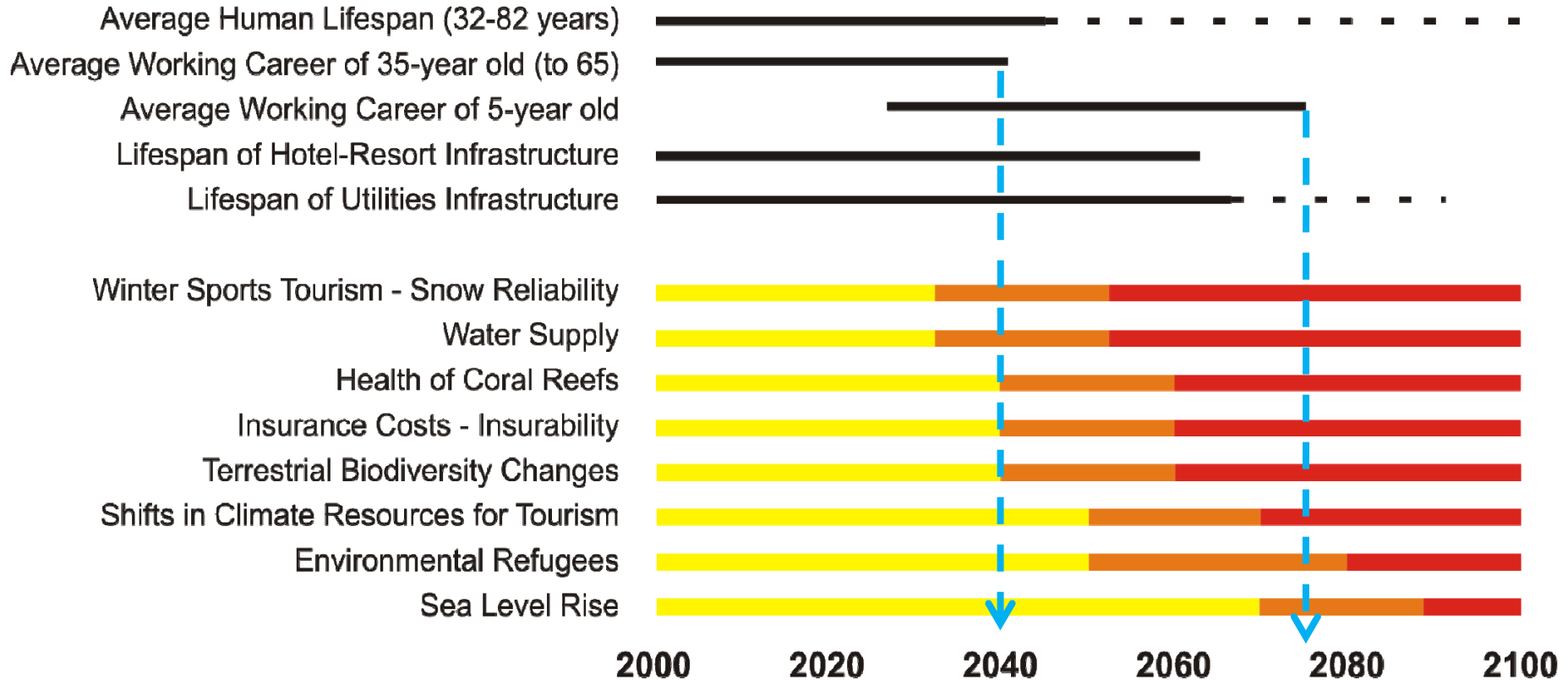
Destination Level Adaptation

- **All tourism businesses and destinations will need to adapt in order to minimize risks and capitalize on an new opportunities in an sustainable way**
 - » it is no longer sufficient to rely on past experience

- **Very limited knowledge of the capacity of current adaptations to cope successfully with future climate change**
 - » *some evidence that tourism operators are over-estimating adaptive capacity*
 - » *some tourism stakeholders-regions will require assistance to adapt effectively to climate change*
 - » *in the early stages of identifying what type of assistance is needed in the tourism sector and priority regions*



Time Horizons for Adaptation



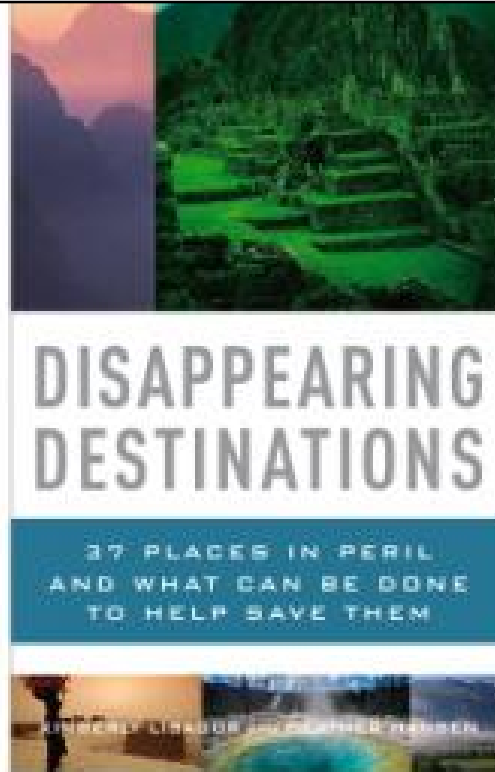
- The process of adaptation needs to start now
 - » information requirements for successful adaptation will increase substantially over the next 25 years
 - » Infrastructure and market transitions will take decades in some cases



Implications of Climate Change for Tourism Demand

Travel: the new tobacco

The founder of Rough Guides now believes that our addiction to 'binge flying' is killing the planet





- **Changes in climate resources for tourism:**
 - » Alter geographic and seasonal distribution of demand
 - *proportionately more tourism spending in temperate nations*
 - » No impact on demand at global scale

- **Indirect environmental change:**
 - » Impact demand at destination-regional level
 - » No impact on demand at global scale

- **Indirect societal change:**
 - » Impact demand at destination-regional level
 - » Reduce demand growth at global scale if economic growth adversely affected (*reduced discretionary income*)

- **Mitigation policy and travel costs:**
 - » Increased travel cost and environmental concern over tourism travel may impact long-haul and air travel
 - » Market research is required to better estimate impact



- Tourist perceptions of destination impacts and of the environmental consequences of travel will likely play a central role in travel decision-making

- » Important influence by the media

- Accurate information on tourism and climate change is essential

- » Speculation and misinformation on impacts exists and is dangerous

Example: 'The likelihood [is] that Mediterranean summers may be too hot for tourists after 2020' -The Guardian, 28 July, 2006

- » Improved science on impacts is in the best interest of the tourism industry and decision-makers



Impacts of Mitigation Policy on Tourism Demand

Revealed: The real cost of air travel



Climate change already kills over 160,000 people a year. In Africa, 185 million people will die of diseases directly attributable to climate change. Drought will leave hundreds of millions without food. You may have turned down your thermostat, but did you know aviation is the UK's fastest growing source of greenhouse gas emissions? One person's emissions for a return flight from London to Dublin are the same as leaving your kettle to boil continuously for 6 days... New York is 75 days... Sydney is 272 days.

Flights taken by UK citizens already create the equivalent of almost 20% (twenty) of the UK's climate damage.

The UK Government wants passenger numbers to double by 2030 and treble by 2050, destroying all other efforts to reduce emissions.

Fly less. Take trains when you can. Use video conferencing.
Email 'Halt Aviation Expansion' to david.miliband@defra.gsi.gov.uk

[airportwatch](http://airportwatch.org) enoughenough.org

Health Warning – Aviation Growth Will Destroy Our Chance of Tackling Global Warming



It's growing. But it'll still be small in 2050

People love to travel. So it's no surprise that air transport is growing.

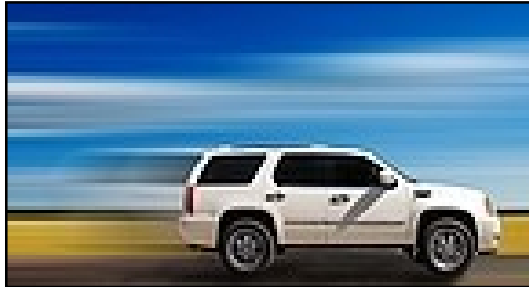
Aviation contributes 2% of global CO₂ emissions. This is a figure that we are working hard to limit with new, fuel-efficient aircraft, shorter routes and better air traffic control.

So, even as more people see more of the planet, our share of emissions will remain small. The UN calculates that our contribution will be 3% by 2050.

Flying's a wonderful thing



This advertisement is supported by Airbus, The Boeing Company and Pratt & Whitney



Emissions from Global Tourism: Status in 2005 & Projection to 2035

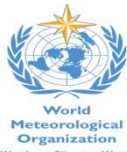




Calculation of Emissions from the Tourism Sector

- **‘Global Tourism Emissions Model’ for 2005**
 - » UNWTO Department of Statistics and Economic Measurement of Tourism prepared a specific database for the project
 - » Three sub-sectors: transport, accommodation, activities
 - » Includes international and domestic tourism

- **‘Business as Usual’ Scenario for 2035**
 - » Arrivals and LOS trend projections: ‘*Tourism Vision 2020*’, nation and industry forecasts
 - » Energy efficiency trend projections: Boeing (2006), EU MuSTT Study (2004)



Global Tourism Emissions in 2005: CO₂ Only *

<u>Sub-Sectors</u>	CO ₂ (Mt)	
Air transport *	522	40%
Car transport	418	32%
Other transport	39	3%
Accommodation	274	21%
Activities	52	4%
TOTAL	1,307	
Total World (IPCC 2007)	26,400	
Tourism Contribution	5.0%	



Transportation
of Tourists = 75%
of Sector Emissions

* - does not include non-CO₂ emissions and impact on climate

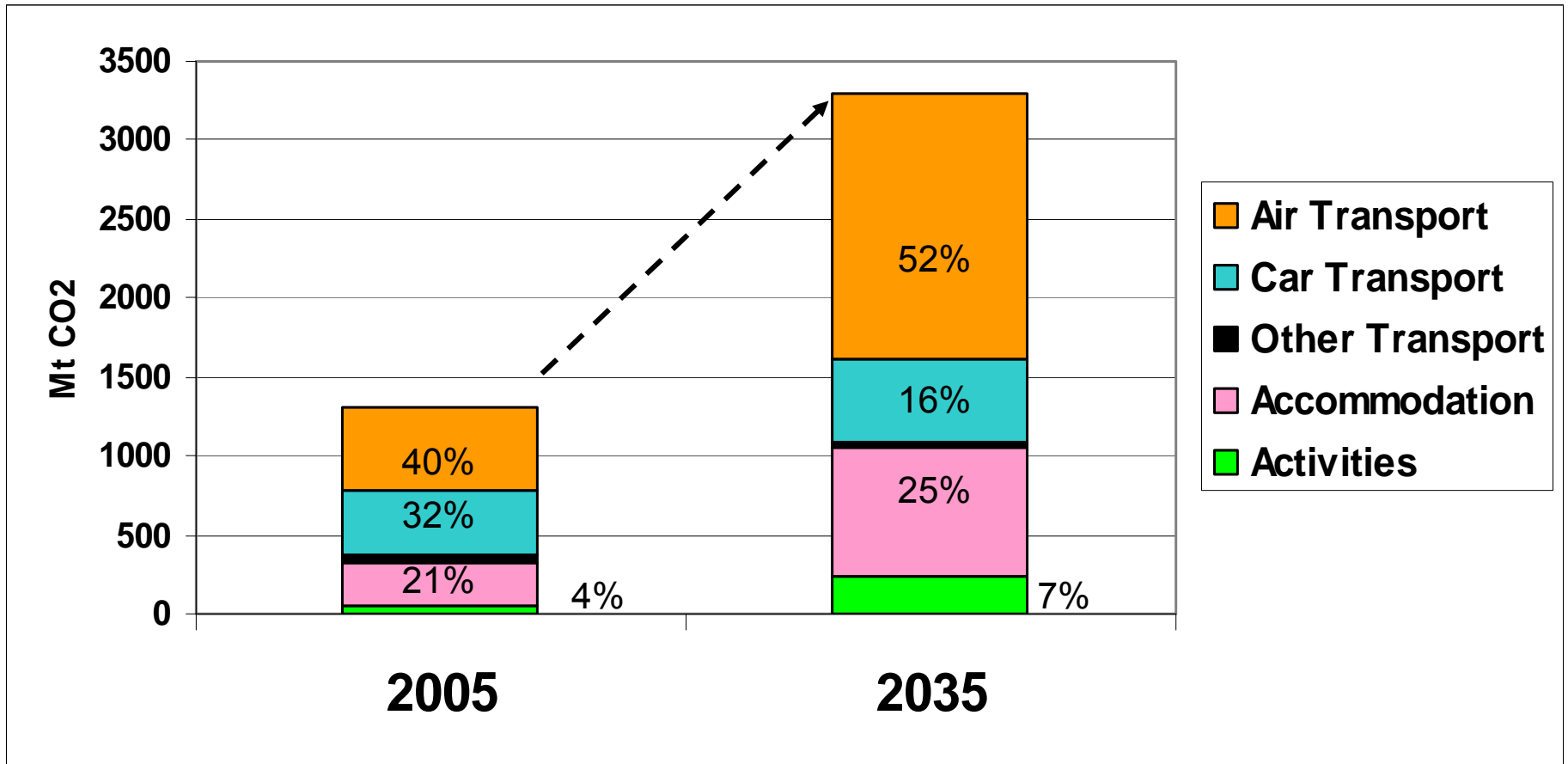


If Tourism was a Country

Rank	Country	Percentage of total emissions (2005)
1	 United States	22.2 %
2	 China	18.4 %
-	 <i>European Union</i>	11.4 %
3	 Russia	5.6 %
-	Global Tourism Sector	5.0%
4	 India	4.9 %
5	 Japan	4.6 %
6	 Germany	3.0 %
7	 Canada	2.3 %
8	 United Kingdom	2.2 %
9	 South Korea	1.7 %
10	 Italy	1.7 %



'Business as Usual' Projection of Future CO₂ Emissions from Tourism

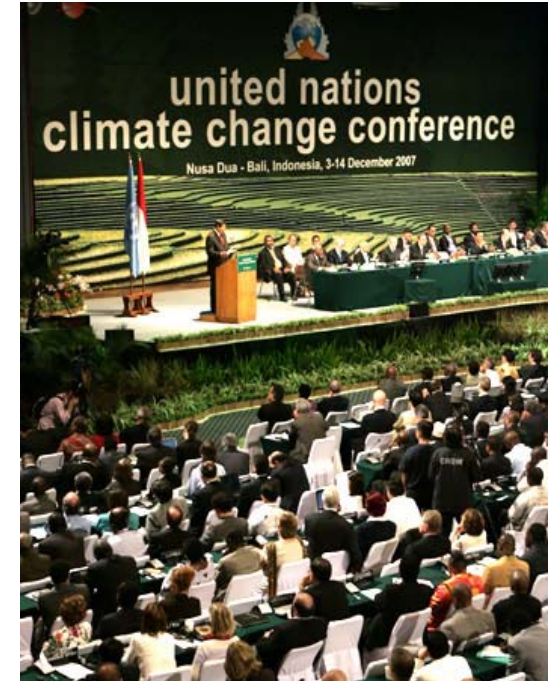




Post-Kyoto Mitigation Targets

(all wrt 1990 levels)

- **IPCC** -80% by 2050 for industrial nations
- **European Union**
 - 20% emission reductions by 2020
 - discussing reductions of 60-80% by 2050
- **US and Canada**
 - 24 States commitment to mandatory emission cap
 - 6 States Considering mandatory emissions cap
 - 793 Cities signed 'Climate Agreement'
 - 10 States and Provinces have reduction targets of 75 to 80% by 2050
 - British Columbia implemented first Carbon Tax





Mitigation Policies & Measures



The CarbonNeutral Company
protecting our climate



EV Rental Cars



The Nation's Only Environmental Rental Car Company

KEEP WINTER COOL
FIGHT GLOBAL WARMING WINTER'S SHORT ENOUGH ALREADY





Tourism Mitigation Scenarios for 2035

■ **High Tech-Efficiency Scenario:** (changes versus BAS)

- » reduction in aviation energy consumption per pkm of 50% (vs 32% in BAS)
- » additional 2%/year reduction in car emissions per pkm
- » additional 2%/year reduction in other transport emissions per pkm
- » additional 2%/year reduction in accommodation emissions per guest-night
- » additional 2%/year reduction in activities emissions per trip

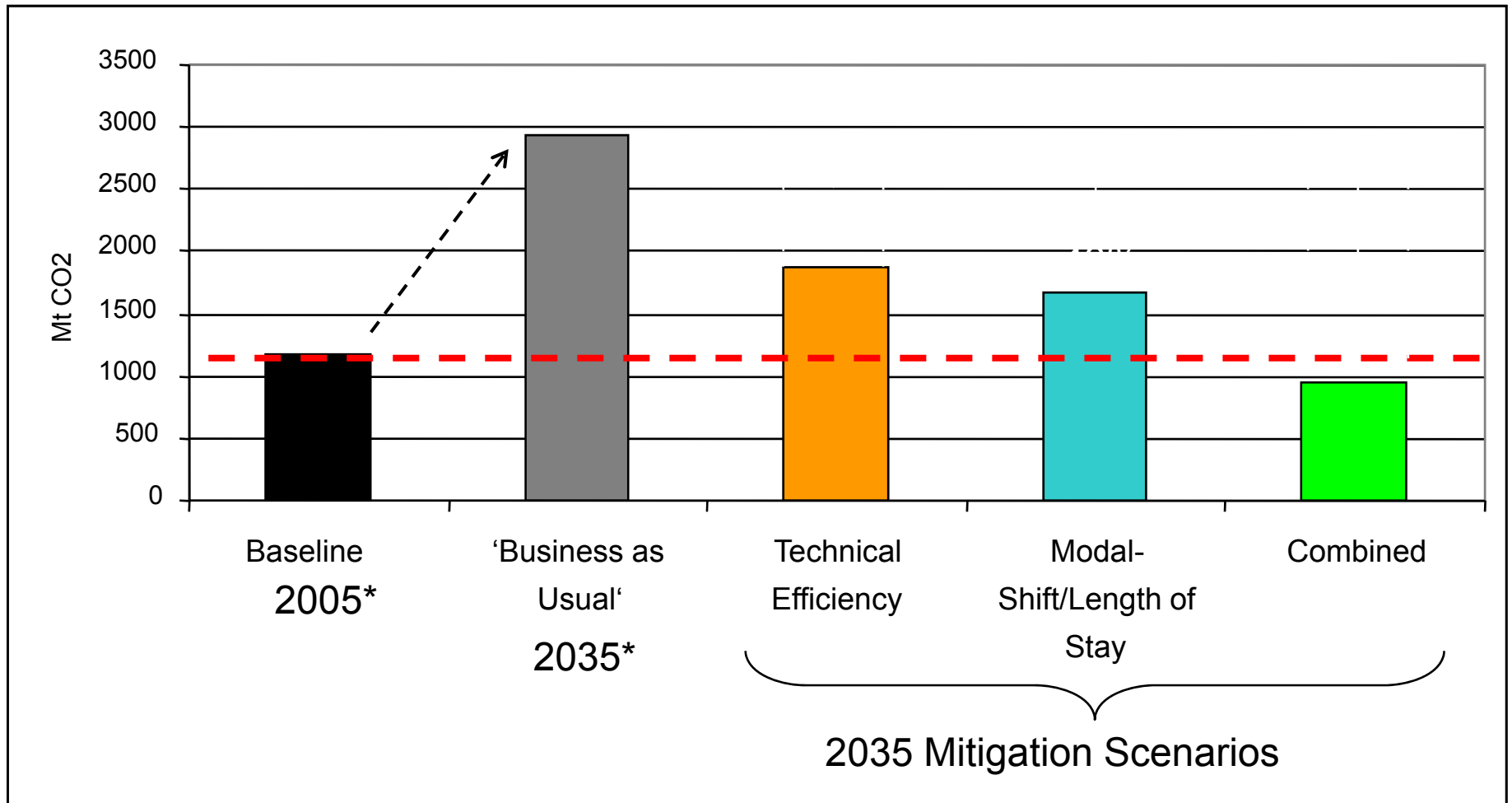
■ **Modal Shift-Longer Stay Scenario:** (changes versus BAS)

- » no further growth in aviation number of trips and pkm [i]
- » growth in rail/coach of 2.4% to 5% per year to keep total number of trips growth constant with BAS
- » 0.5%/year increase in average LOS vs 0.5% reduction/year in BAS
- »

[i] The number of pkm is kept constant, using average trip distance as found in BAS, thus also keeping the number of trips by air transport constant. However, it is possible to reach the same emissions reduction with some growth in the number of trips by air when the average distance is reduced (i.e. less long haul and more medium haul).



Future CO₂ Emissions from Global Tourism: Scenarios of Mitigation Potential in 2035





Tourism and Climate Change Mitigation: *The Credibility Challenge*

- Climate change is a serious issue for tourism
- Carbon reduction targets and progress must be real and measurable
- Industry communication must have credible message
 - not just a PR exercise
 - backed up with meaningful action



‘The tourism sector must be part of the climate change solution. If we are not, we will be villainized and rejected as an industry.’



The Future is Now

- The scientific evidence is clear - climate change must be considered the greatest challenge to sustainable development and tourism in the 21st century.
- Tourism can play a significant role in addressing climate change. It must show leadership as an agent of change for both adaptation and mitigation – the time for action is now.



The Davos Declaration



- Endorsed by 450 delegates (from 80 countries) in Davos



The Conference agreed that:

- climate is a key resource for tourism and the sector is highly sensitive to the impacts of climate change and global warming, many elements of which are already being felt. It is estimated to contribute some 5% of global CO2 emissions.
- tourism - business and leisure - will continue to be a vital component of the global economy, an important contributor to the Millennium Development Goals and an integral, positive element in our society.
- given tourism's importance in the global challenges of climate change and poverty reduction, there is a need to urgently adopt a range of policies which encourages truly sustainable tourism that reflects a "quadruple bottom line" of environmental, social, economic and climate responsiveness.
- the tourism sector must rapidly respond to climate change, within the evolving UN framework and progressively reduce its Greenhouse Gas (GHG) contribution if it is to grow in a sustainable manner; This will require action to:
 - mitigate its GHG emissions, derived especially from transport and accommodation activities;
 - adapt tourism businesses and destinations to changing climate conditions;
 - apply existing and new **technology** to improve energy efficiency;
 - secure financial resources to help poor regions and countries.



The Conference

- sets out a range of specific actions to be taken by all stakeholders in the sector to immediately begin to establish and implement a long range carbon-neutral roadmap;
- invites governments and international organizations; the tourism industry; consumers; research and communications networks to implement these recommendations, with concrete commitments and action plans, and to use the UNWTO on-line Climate Change and Tourism Information Exchange Service as a platform, for committed stakeholders to register their pledges and activities toward adaptation and mitigation on an on-going basis;
- stresses the need that UNWTO, in collaboration with UNEP and WMO, continue to lead this process, and to consider convening a Third Conference on Climate Change and Tourism, at an appropriate time in the future, to review progress, to maintain response levels and to identify further needs and actions;
- urges action by the entire tourism sector to face climate change as one of the greatest challenges to sustainable development, and to the Millennium Development Goals in the 21st Century.



The Davos Declaration

Strongly endorsed by Ministers' Summit on Tourism
and Climate Change at World Travel Market
(London, UK – Nov 2008)

Adopted by the UNWTO General Assembly
(Cartagena, Columbia – Dec 2008)



2008



- World Tourism Day 2008 will focus on Tourism's response to the challenges of climate change. It will be a year long campaign aiming to:
 - Advance – Tourism in the UN global response to the challenges of climate change and poverty alleviation
 - Promote – the Davos Declaration Process for the Tourism Sector
 - Encourage – tourism stakeholders to adapt, to mitigate and use new technology and secure financing for the poorest countries.