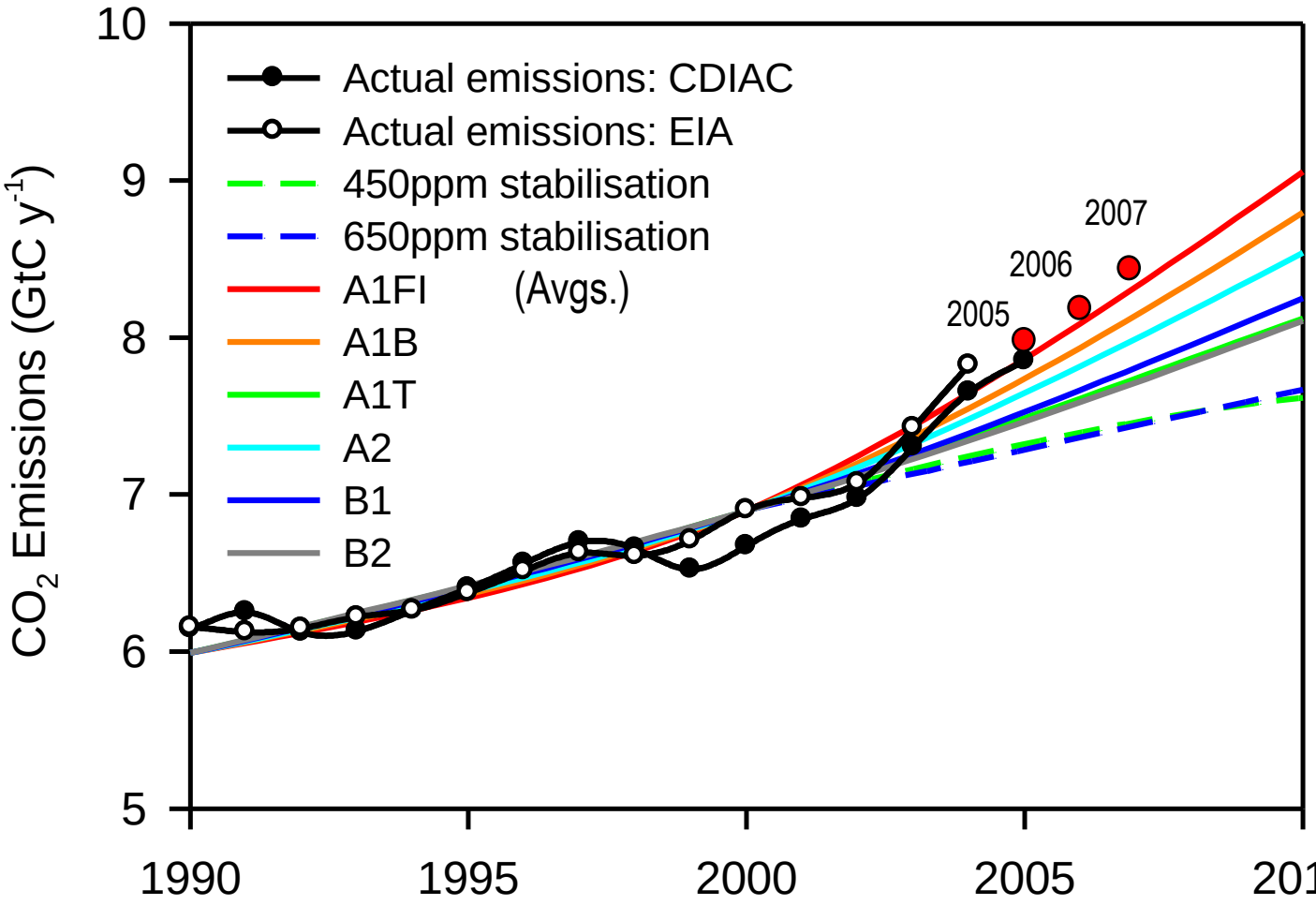


SRES (2000) aver. growth rates in % y^{-1} for 2000-2010:

A1B: 2.42
A1FI: 2.71
A1T: 1.63
A2: 2.13
B1: 1.79
B2: 1.61

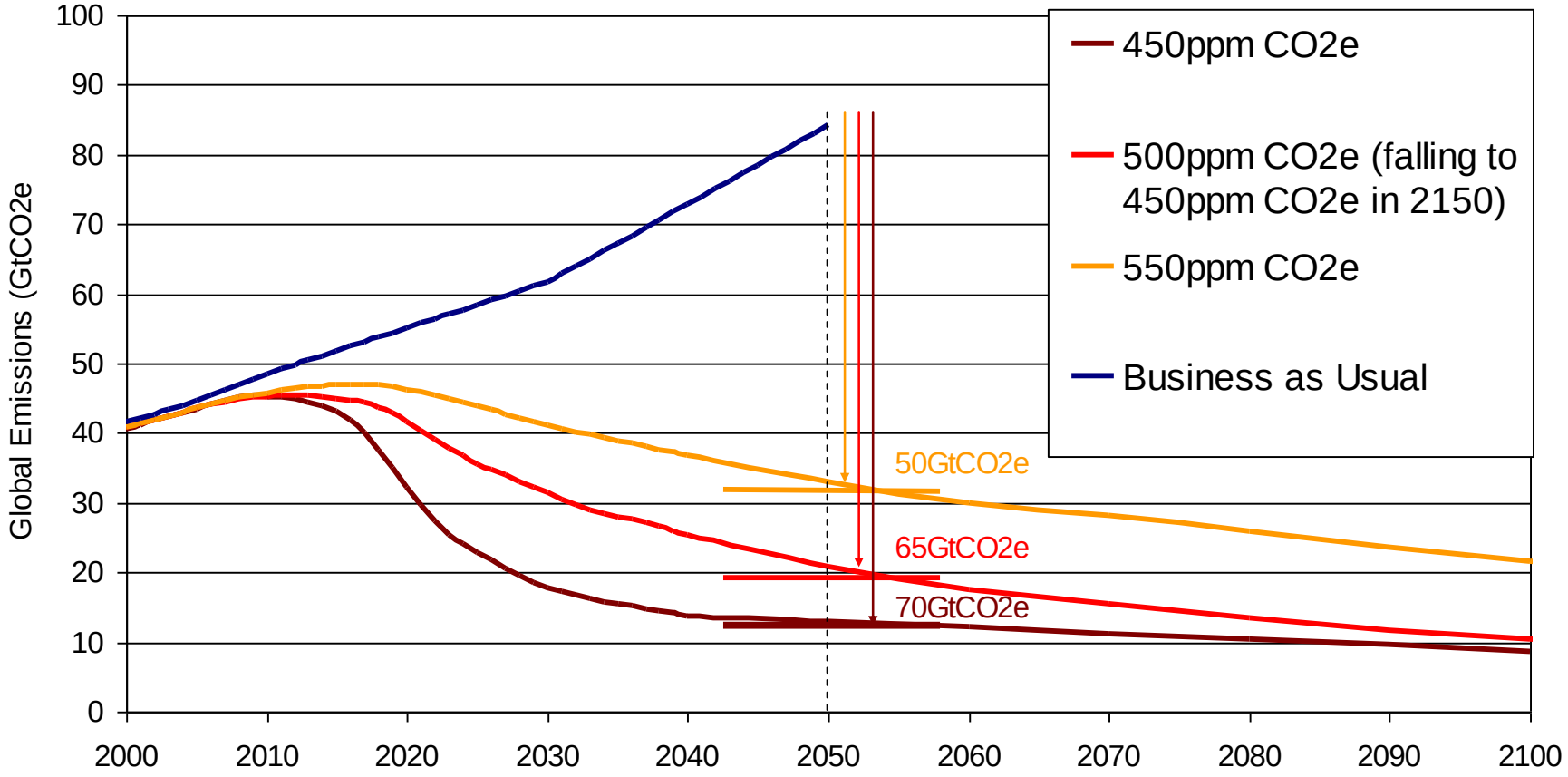
Observed 2000-2007 3.5%

Raupach et al 2007, PNAS; Global Carbon Project (2008)

Top Emitters

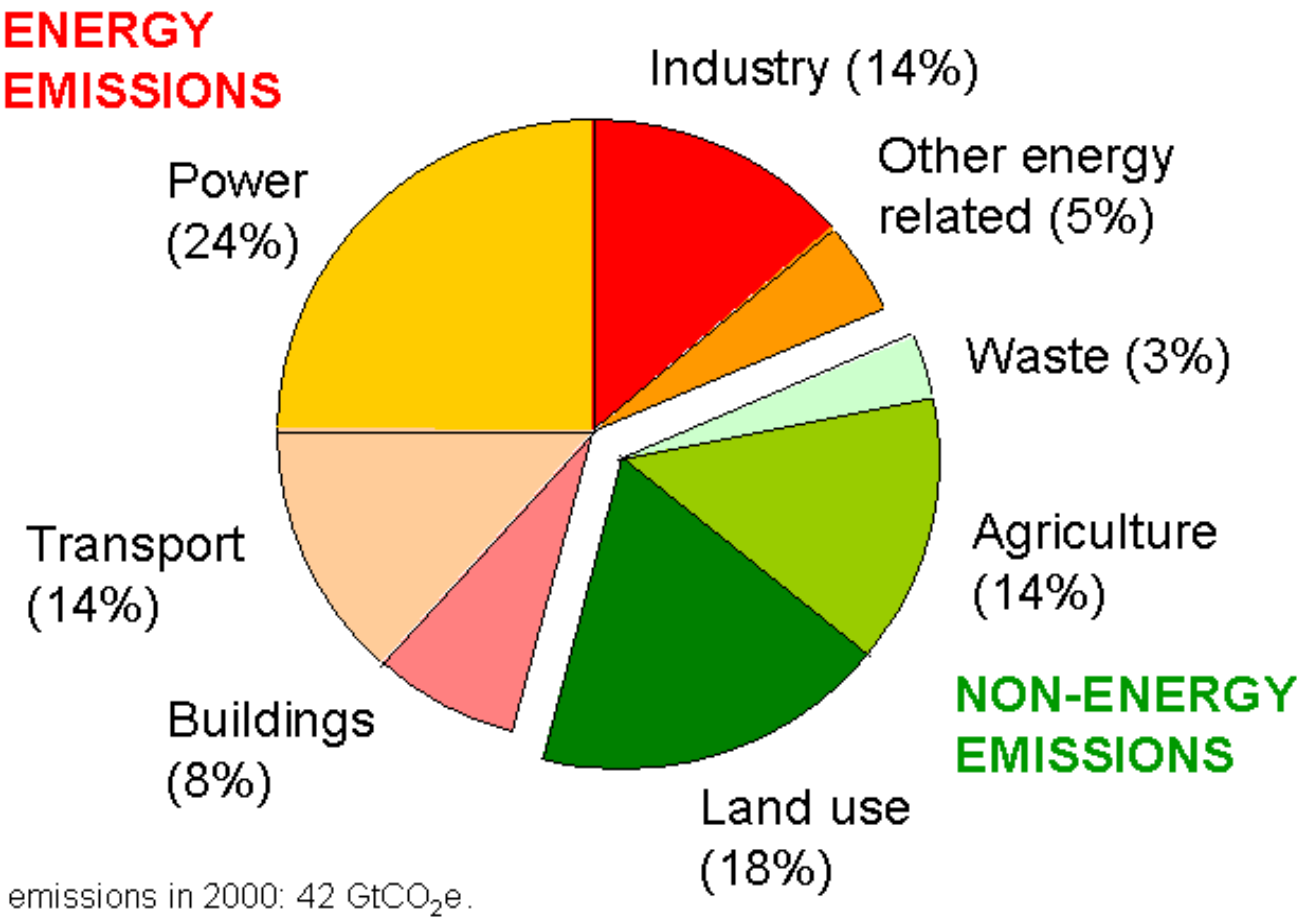
1. China
2. USA
4. Russia
3. India

Delaying mitigation is dangerous and costly

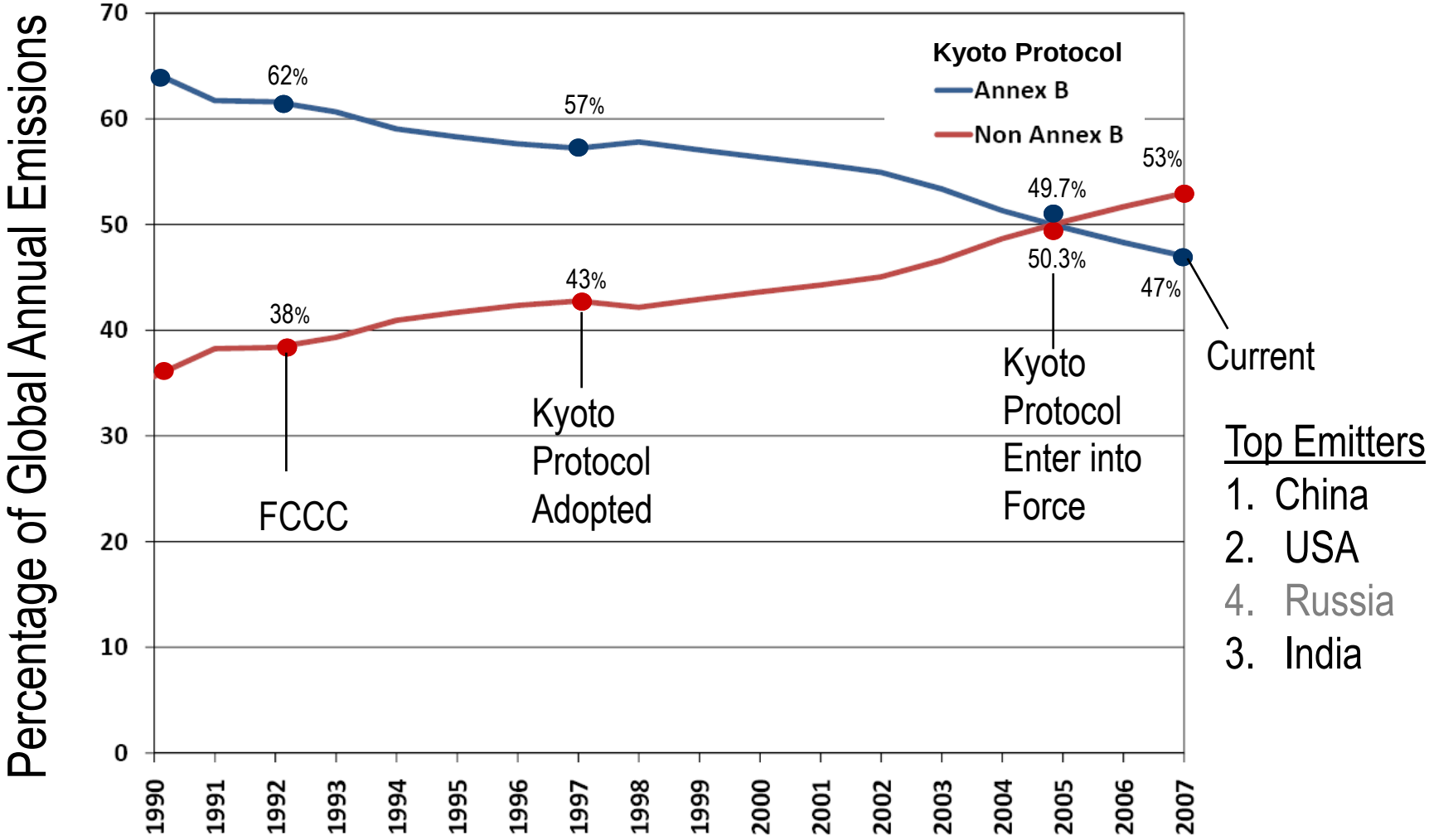


Source: Stern Review

Reducing emissions requires action across many sectors



Total emissions in 2000: 42 $GtCO_2e$.

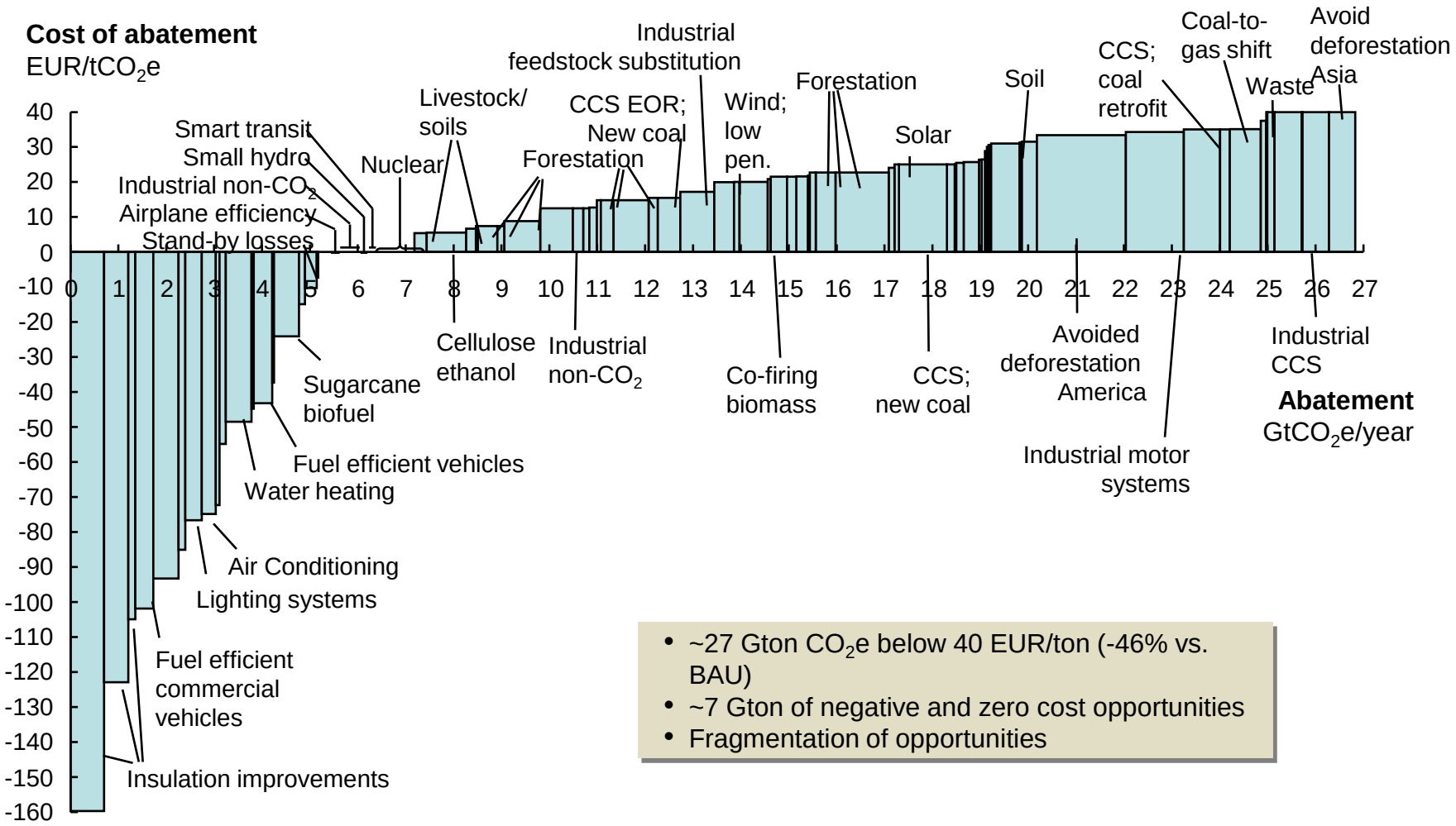


J. Gregg and G. Marland, 2008, personal communication

The cost of mitigation: developing versus developed world

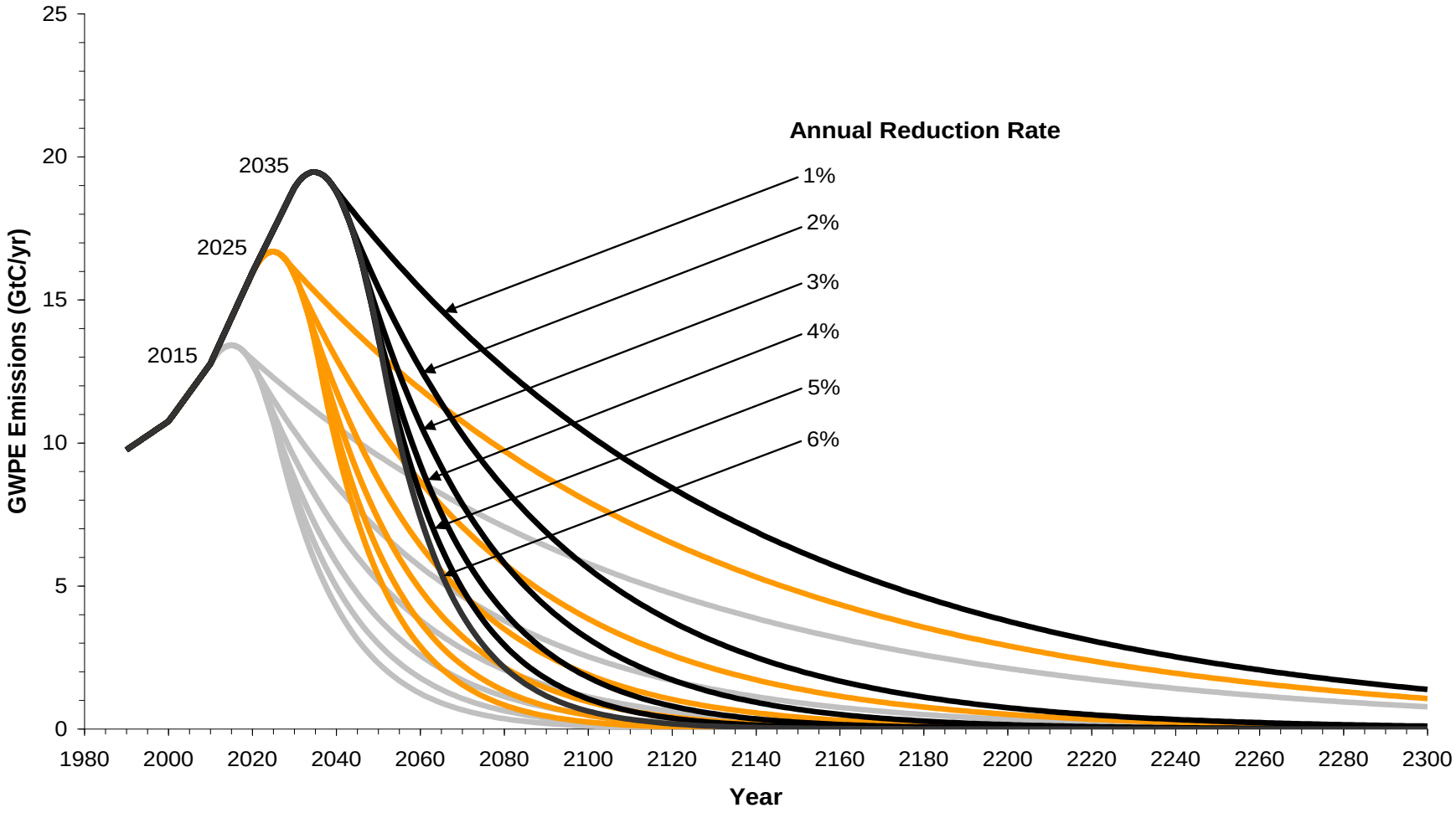
Many options: policy matters and prices crucial

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



C AN WE DELAY ACTION? Scenarios for emissions peaking at 3 different dates

Source: Parry et al., 2008

Recently, both UK and Brazil made paradigm-breaking decisions on climate change

UK announced a target of 80% emissions cut by 2050 and ism making that into Law

Brazil announced a National Climate Change Plan which, among many things, sets a target of cutting progressively tropical deforestation by 80% by 2020

Workshop on Physics and Chemistry of Climate Change and Entrepreneurship

São Paulo, 26-27 February 2009

Programa FAPESP de Pesquisa sobre Mudanças Climáticas Globais

The Institute of Physics

The Royal Society for Chemistry

Support provided by:

British Embassy

UK-Brazil Partnership in

Science and Innovation

FAPESP Research Program on Global Climate Change

- Carefully thought-out research plan (2 years)
- Long term research Program: 10 years warranted
- First Call for Proposals launched: US$ 8 million
- Two-pronged Call for Proposals:
  - US$ 6.5 million on scientific basis, impacts, and mitigation themes
  - US$ 1.5 million to develop the Brazilian Global Climate System Model (4 years)
- Contribution to the development of a full-fledged Earth System Model

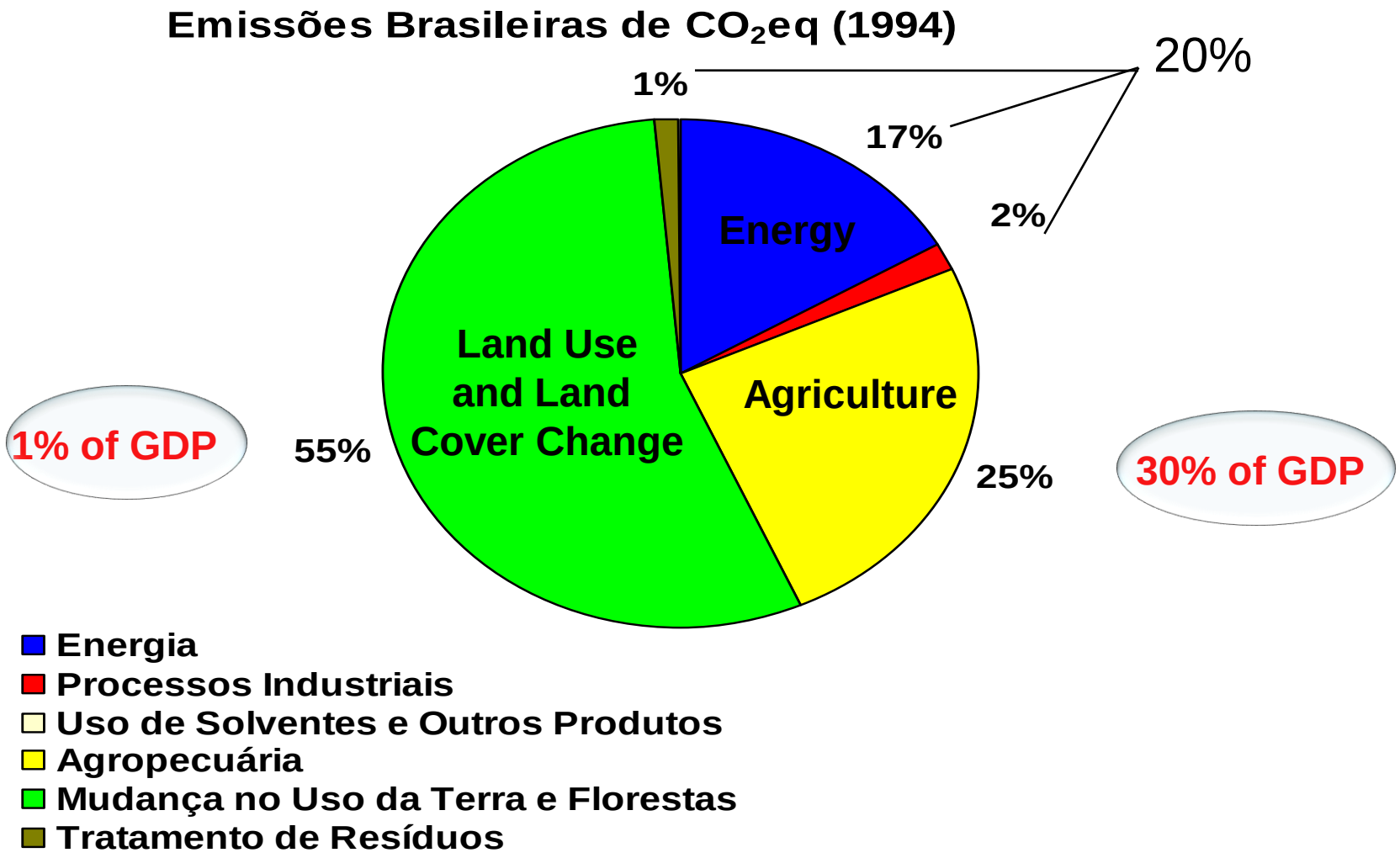
New Rede CLIMA-FAPESP Supercomputer for Climate Change Research

Sustained Throughput	15 to 20 TFlop/s
Main Memory	20 TBytes
Primary Storage	400 TBytes
Aquisition	2008/2009
Installations	Second half of 2009
Total cost	US$ 22.5 M

FNDCT - US$ 15 M
FAPESP - US$ 7.5M

It will make it possible to run global climate model decadal to centennial simulations at high spatial resolution!

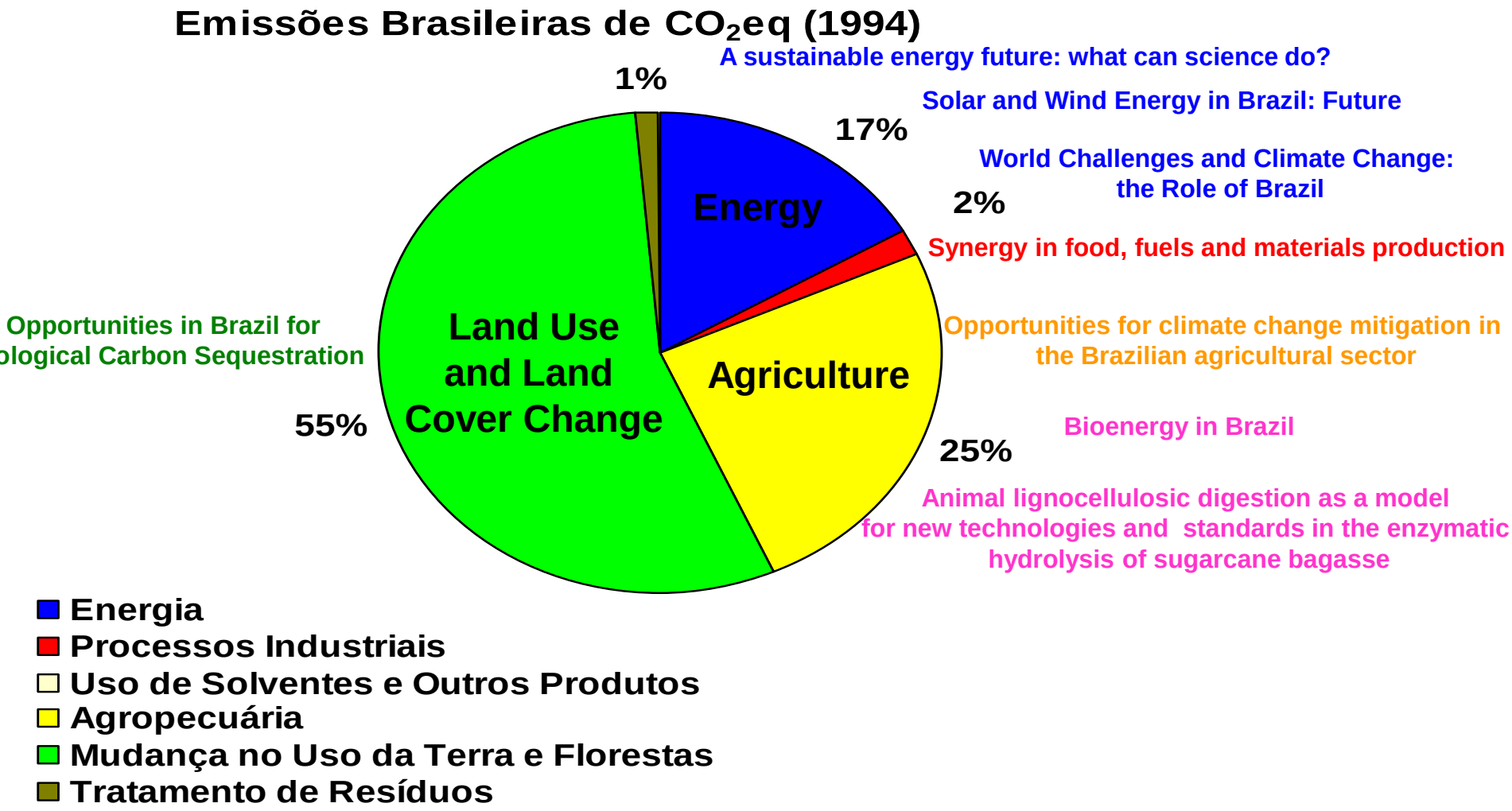
Inventory of Brazilian Emissions by Sector (CO_2-eq)



Considering GWP of CH_4 = 21

Source: adapted by MMA from MCT's Inventory of Emissions

Inventory of Brazilian Emissions by Sector (CO_2-eq)



A sustainable energy future: what can science do?

Solar and Wind Energy in Brazil: Future

World Challenges and Climate Change: the Role of Brazil

Synergy in food, fuels and materials production

Opportunities for climate change mitigation in the Brazilian agricultural sector

Bioenergy in Brazil

Animal lignocellulosic digestion as a model for new technologies and standards in the enzymatic hydrolysis of sugarcane bagasse

Opportunities in Brazil for ological Carbon Sequestration

Considering GWP of CH_4 = 21

Source: adapted by MMA from MCT's Inventory of Emissions

Chemistry, Engineering and Climate Change

Economics and Technology Transfer

Technology Transfer - Translating Research into Economic Benefit

Commercial Opportunities for Sustainable Technology to Mitigate Climate Change

Agriculture

Climate Change Impacts and Opportunities in Agriculture

Solar

Solar Photovoltaics – The challenges and potential for research into a sustainable future

Enhancing Solar Disinfection of Water for Application in Developing Regions

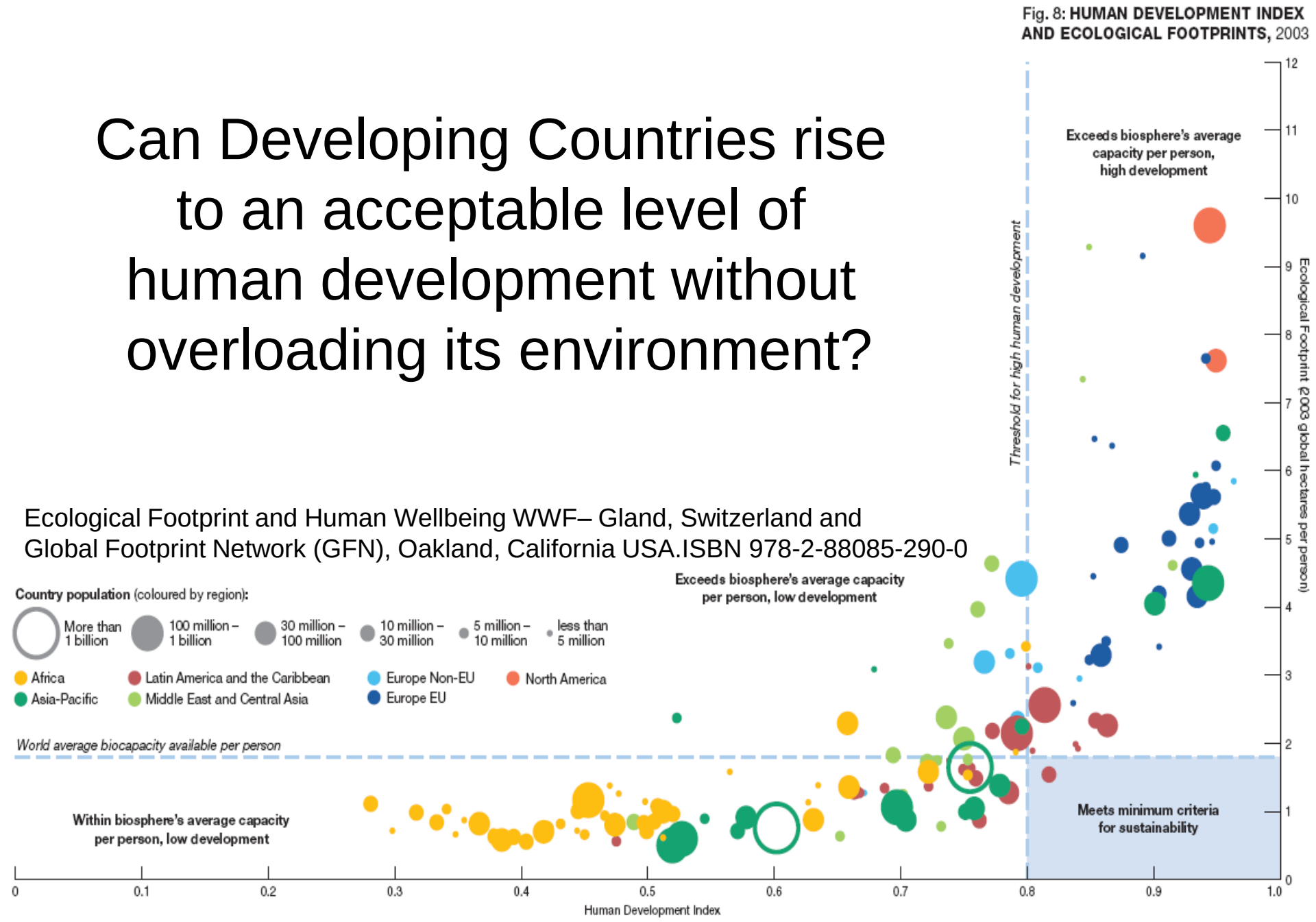
Biofuels and Bioenergy

Can We Make Lignocellulosic Biofuels Sustainable?

Climate Change and Bioengineering

Can Developing Countries rise to an acceptable level of human development without overloading its environment?

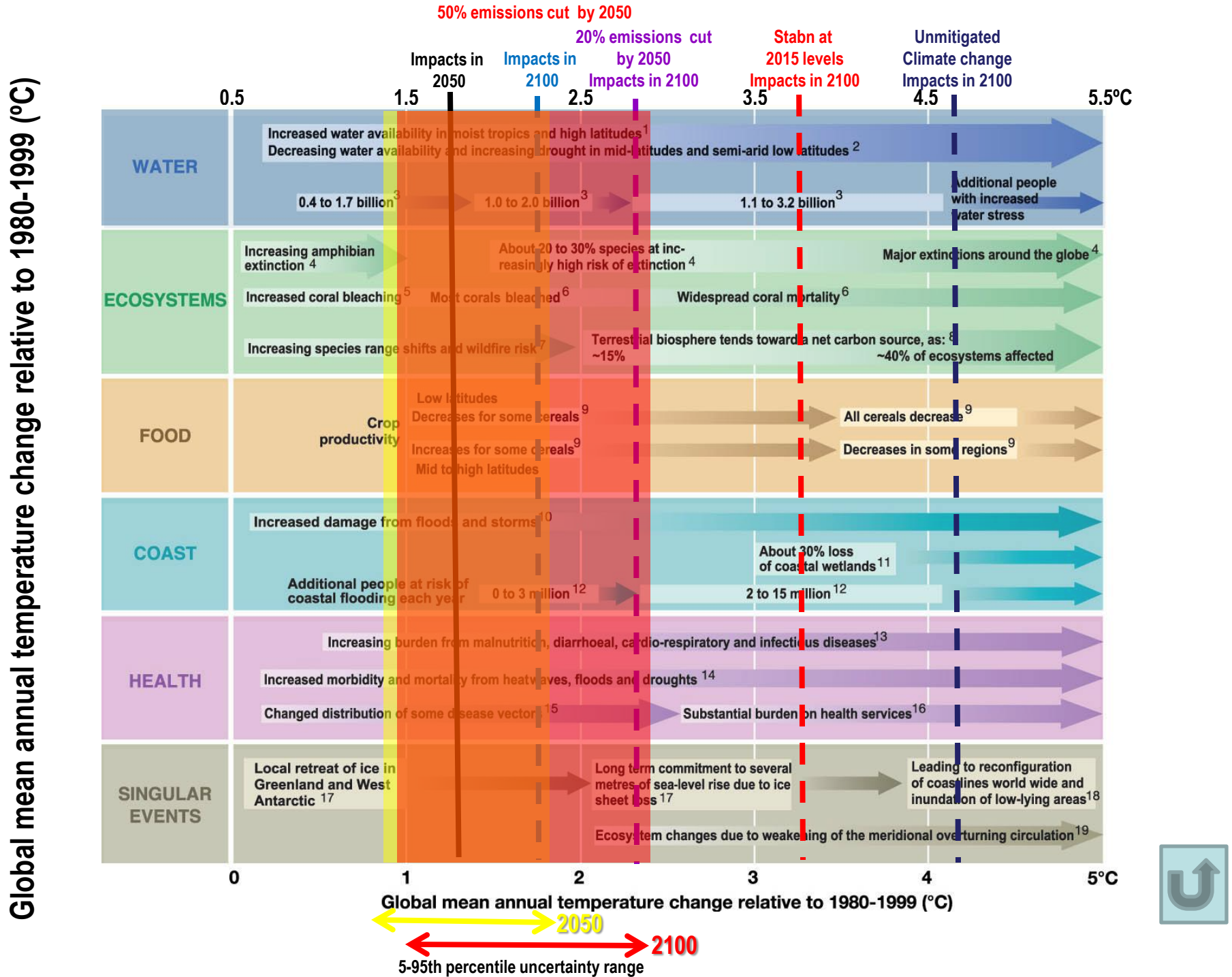
Ecological Footprint and Human Wellbeing WWF– Gland, Switzerland and Global Footprint Network (GFN), Oakland, California USA.ISBN 978-2-88085-290-0



Workshop on Physics and Chemistry of Climate Change and Entrepreneurship

Main Goal

Review recent progress on fundamental and applied Physics and Chemistry in the UK and Brazil that can be brought to bear for the mitigation of climate change and, at the same time, promote a ‘green technology’ entrepreneurship


50% emissions cut by 2050
20% emissions cut by 2050
Stabn at 2015 levels
Unmitigated Climate change
Impacts in 2050
Impacts in 2100
Impacts in 2100
Impacts in 2100
0.5
1.5
2.5
3.5
4.5
5.5ºC
WATER
Increased water availability in moist tropics and high latitudes 1
Decreasing water availability and increasing drought in mid-latitudes and semi-arid low latitudes 2
0.4 to 1.7 billion 3
1.0 to 2.0 billion 3
1.1 to 3.2 billion 3
Additional people with increased water stress
ECOSYSTEMS
Increasing amphibian extinction 4
About 20 to 30% species at increasingly high risk of extinction 4
Major extinctions around the globe 4
Increased coral bleaching 5
Most corals bleached 6
Widespread coral mortality 6
Increasing species range shifts and wildfire risk 7
Terrestrial biosphere tends toward a net carbon source, as: 8
~15%
~40% of ecosystems affected
FOOD
Crop productivity
Low latitudes
Decreases for some cereals 9
Increases for some cereals 9
Mid to high latitudes
All cereals decrease 9
Decreases in some regions 9
COAST
Increased damage from floods and storms 10
About 30% loss of coastal wetlands 11
Additional people at risk of coastal flooding each year
0 to 3 million 12
2 to 15 million 12
HEALTH
Increasing burden from malnutrition, diarrhoeal, cardio-respiratory and infectious diseases 13
Increased morbidity and mortality from heatwaves, floods and droughts 14
Changed distribution of some disease vectors 15
Substantial burden on health services 16
SINGULAR EVENTS
Local retreat of ice in Greenland and West Antarctic 17
Long term commitment to several metres of sea-level rise due to ice sheet loss 17
Leading to reconfiguration of coastlines world wide and inundation of low-lying areas 18
Ecosystem changes due to weakening of the meridional overturning circulation 19
0
1
2
3
4
5ºC
Global mean annual temperature change relative to 1980-1999 (ºC)
2050
2100
5-95th percentile uncertainty range
Global mean annual temperature change relative to 1980-1999 (°C)