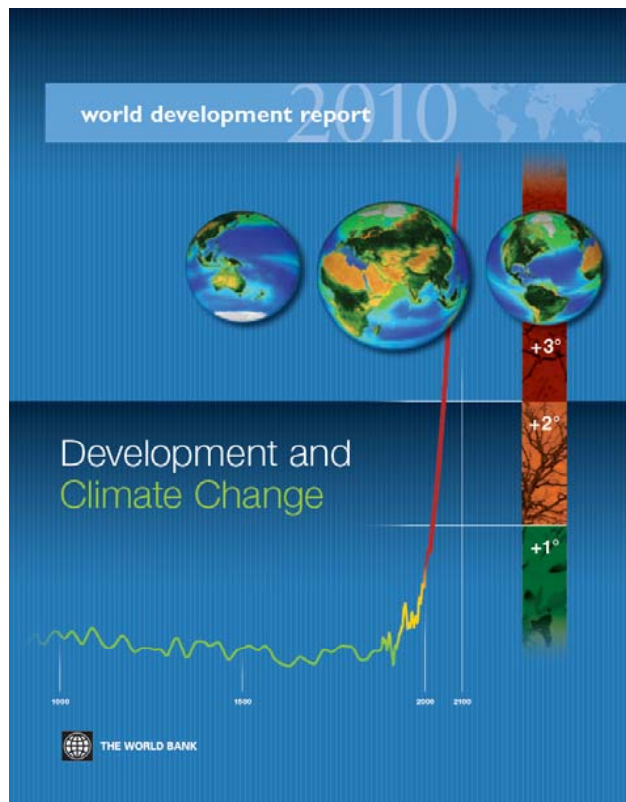


DEVELOPMENT AND CLIMATE CHANGE

EPRI Global Climate Change Research Seminar:
Issues in Climate Policy



Rosina Bierbaum

Co-director, WDR 2010

*Dean, School of Natural Resources and
Environment, University of Michigan*

May 18, 2010



CLIMATE CHANGE IS A THREAT TO DEVELOPMENT
BUT A CLIMATE-SMART WORLD IS POSSIBLE IF WE...



Act now



Act
together

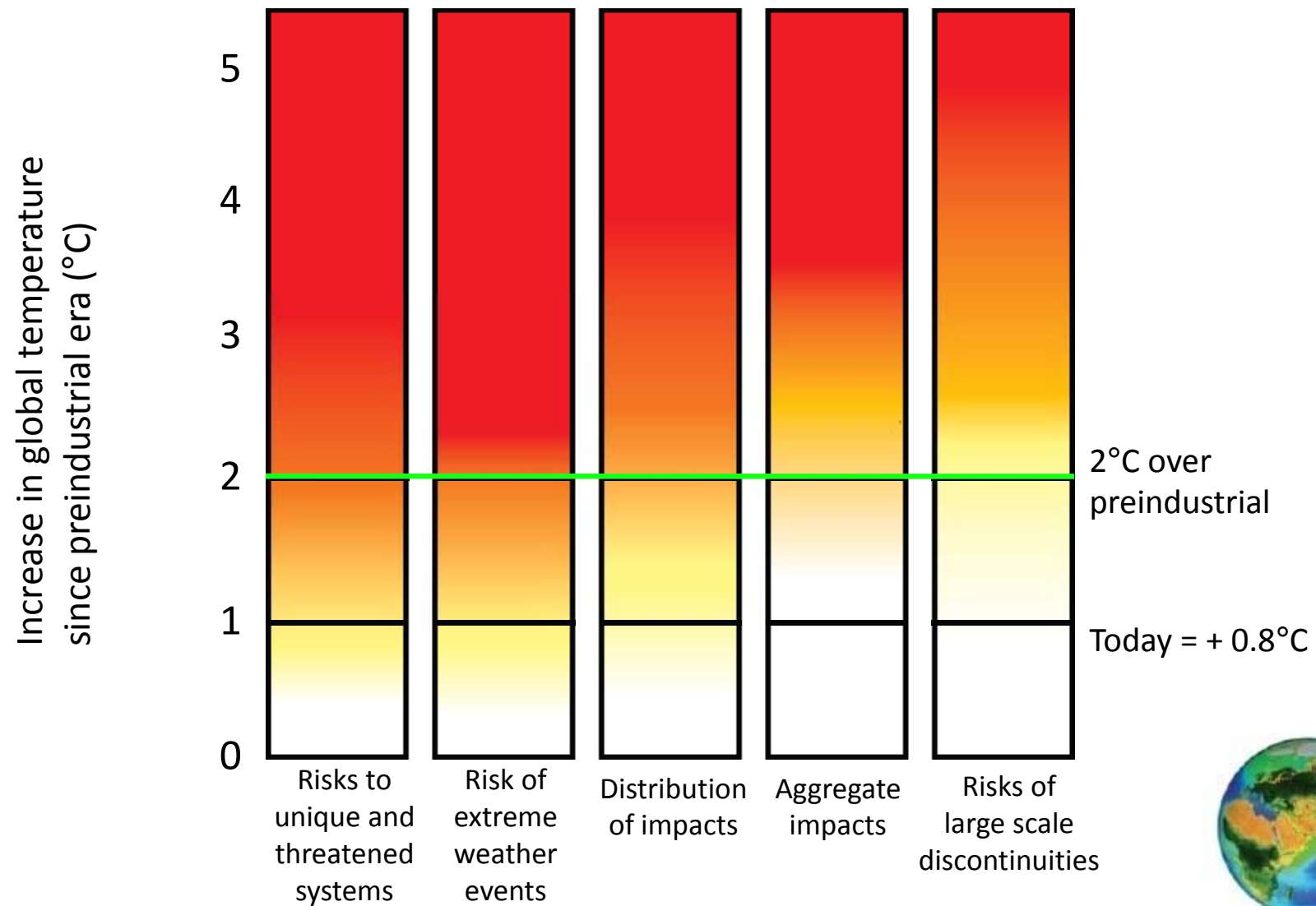


Act
differently

New finance, instruments and
pressures are helping build momentum

SCIENTIFIC CONSENSUS: SERIOUS AND IMMEDIATE

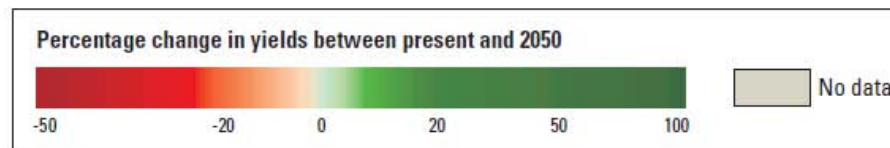
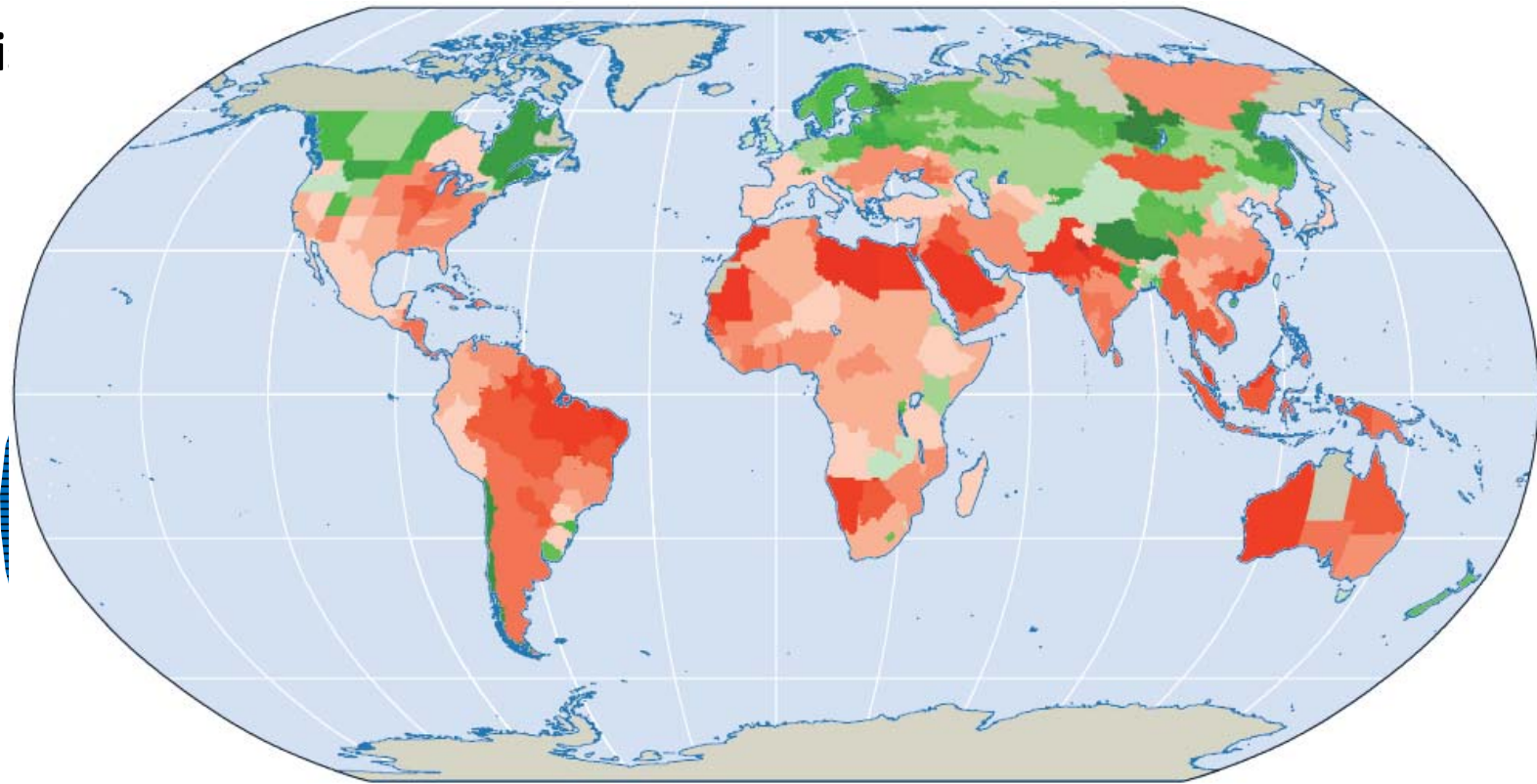
2007 assessment



Source: Smith and others, 2009

DEVELOPMENT CONSENSUS: THE POOR WILL SUFFER MOST

Hi



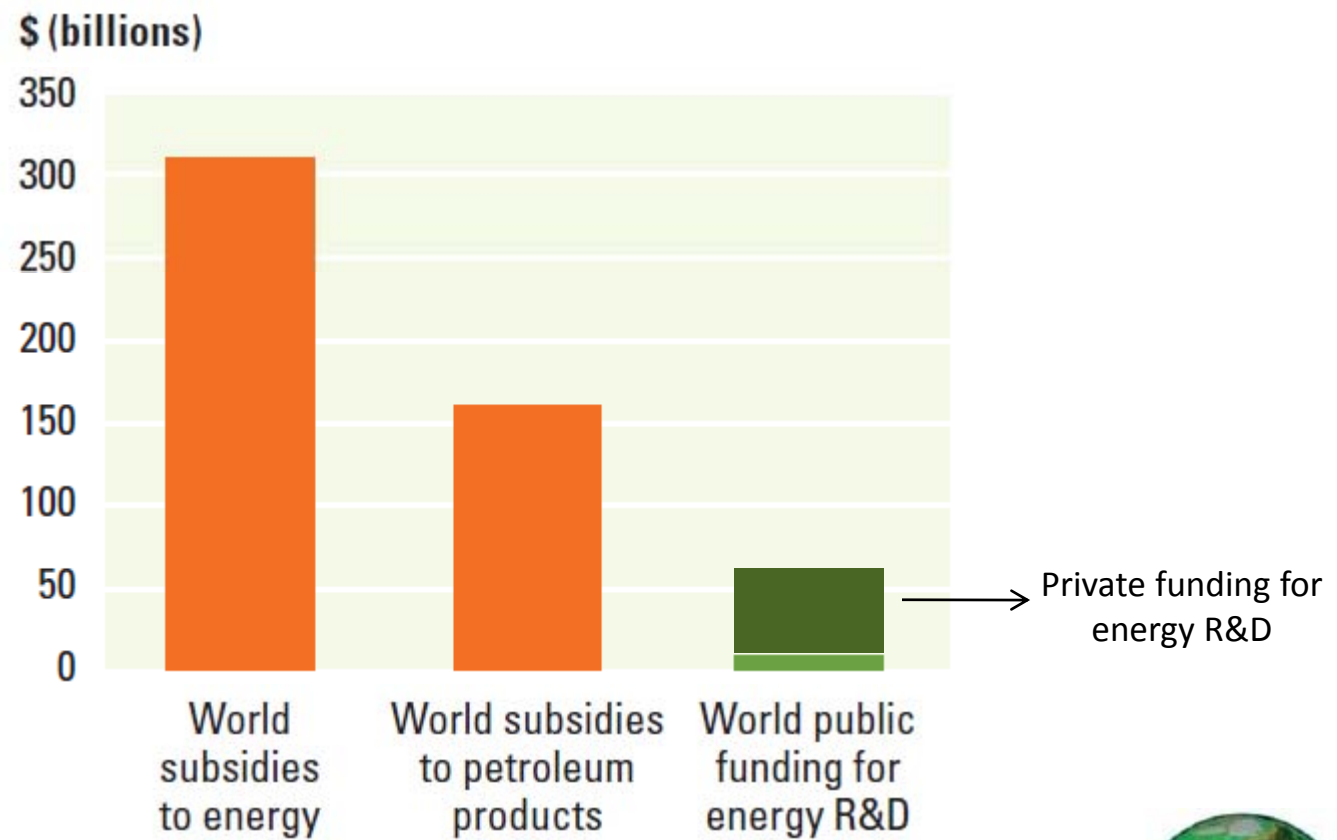
High income
countries
1.1 billion people

Developing
countries
5.6 billion people



A CLIMATE-SMART WORLD IS POSSIBLE...

Annual public subsidies



BUT TO MEET THE CHALLENGE, WE MUST

- ACT NOW
- ACT TOGETHER
- ACT DIFFERENTLY



ACT NOW:

TODAY'S ACTIONS DETERMINE TOMORROW'S OPTIONS

Inertia in the
built environment
costs



Inertia in
institutions and
individuals' behavior
political momentum



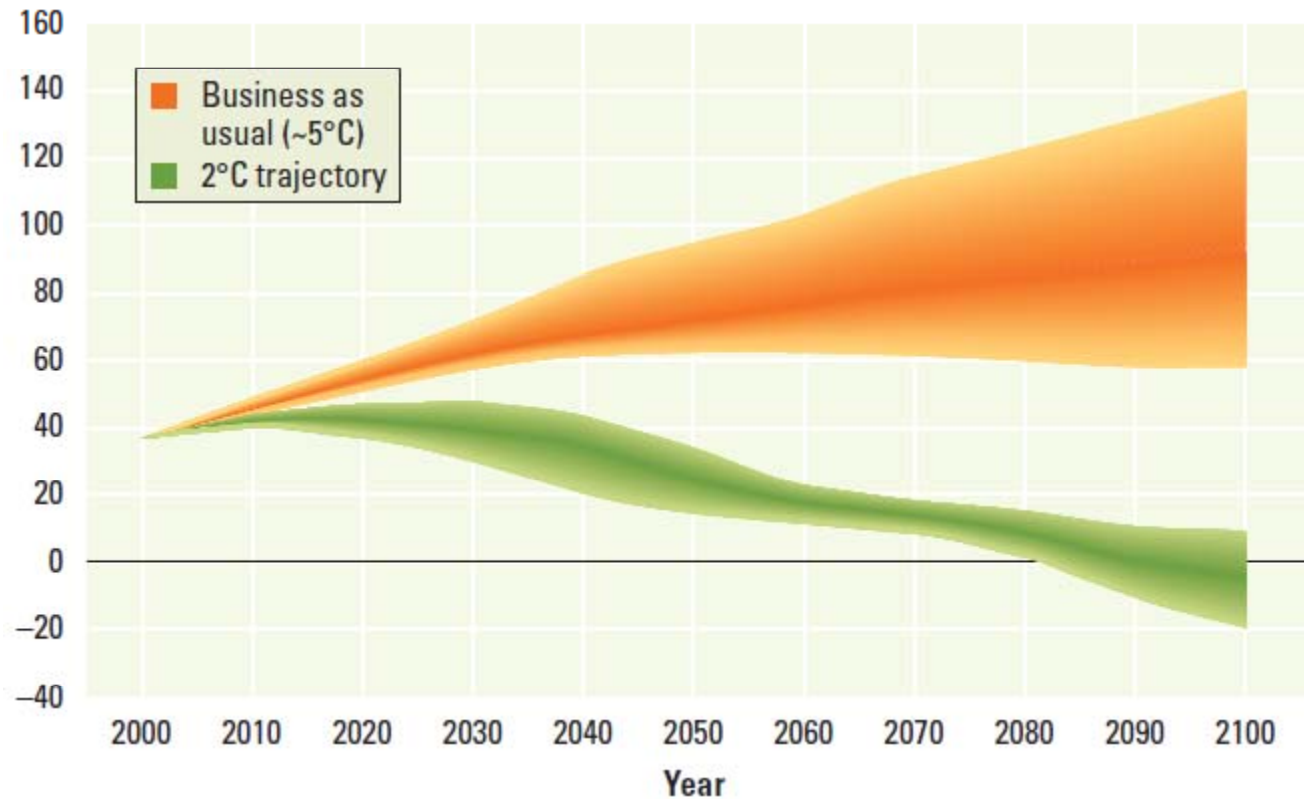
Inertia in the climate
system
feasibility



ACT NOW:

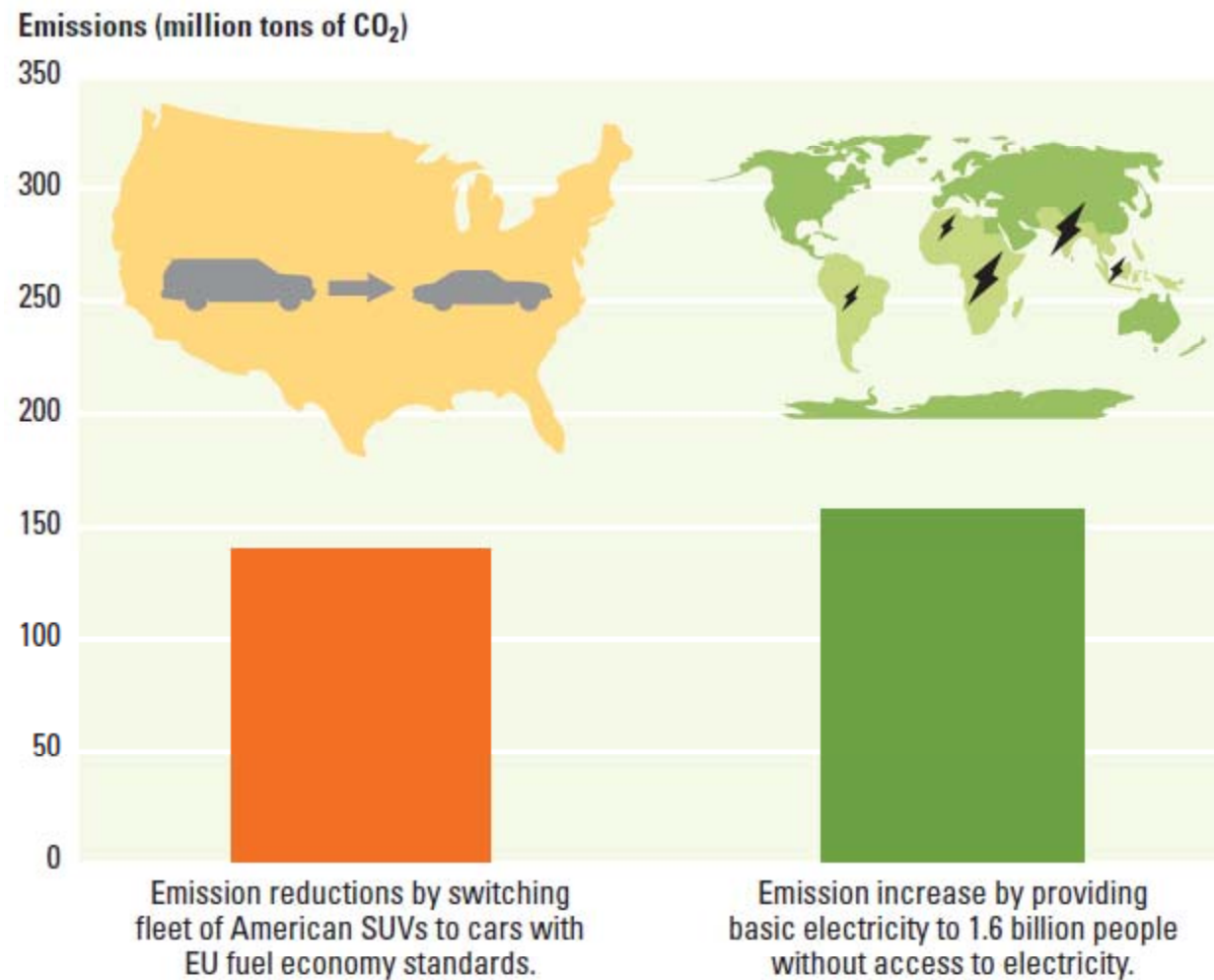
OR WE ARE HEADED TO MUCH MORE THAN 2°C

Projected annual total global emissions (billion tons of CO₂ equivalent)



ACT TOGETHER:

HIGH-INCOME COUNTRIES NEED TO TAKE THE LEAD



Source: WDR team calculations based on BTS 2008.

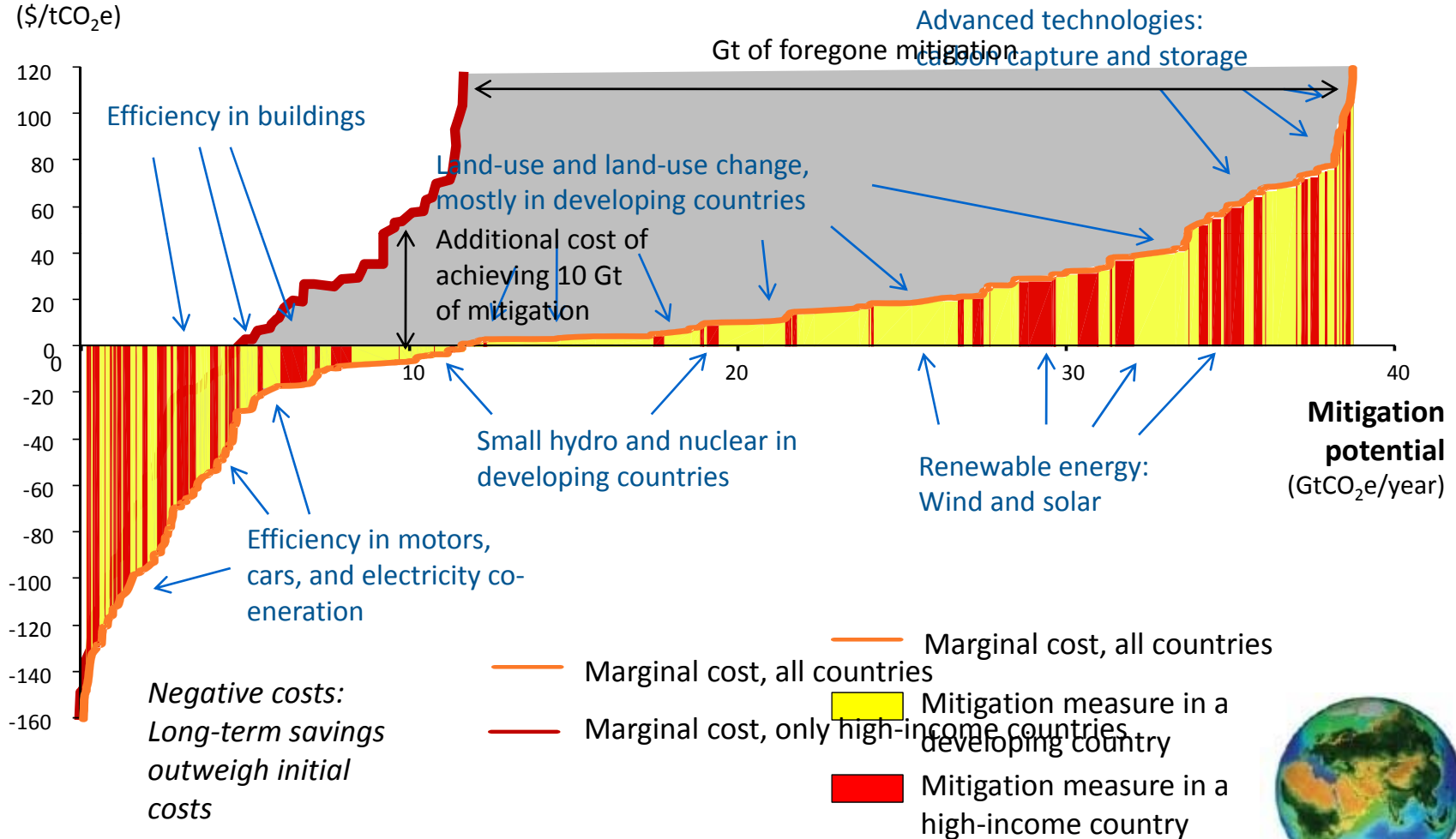


ACT TOGETHER:

BUT ALL HAVE A ROLE TO PLAY TO MANAGE COSTS

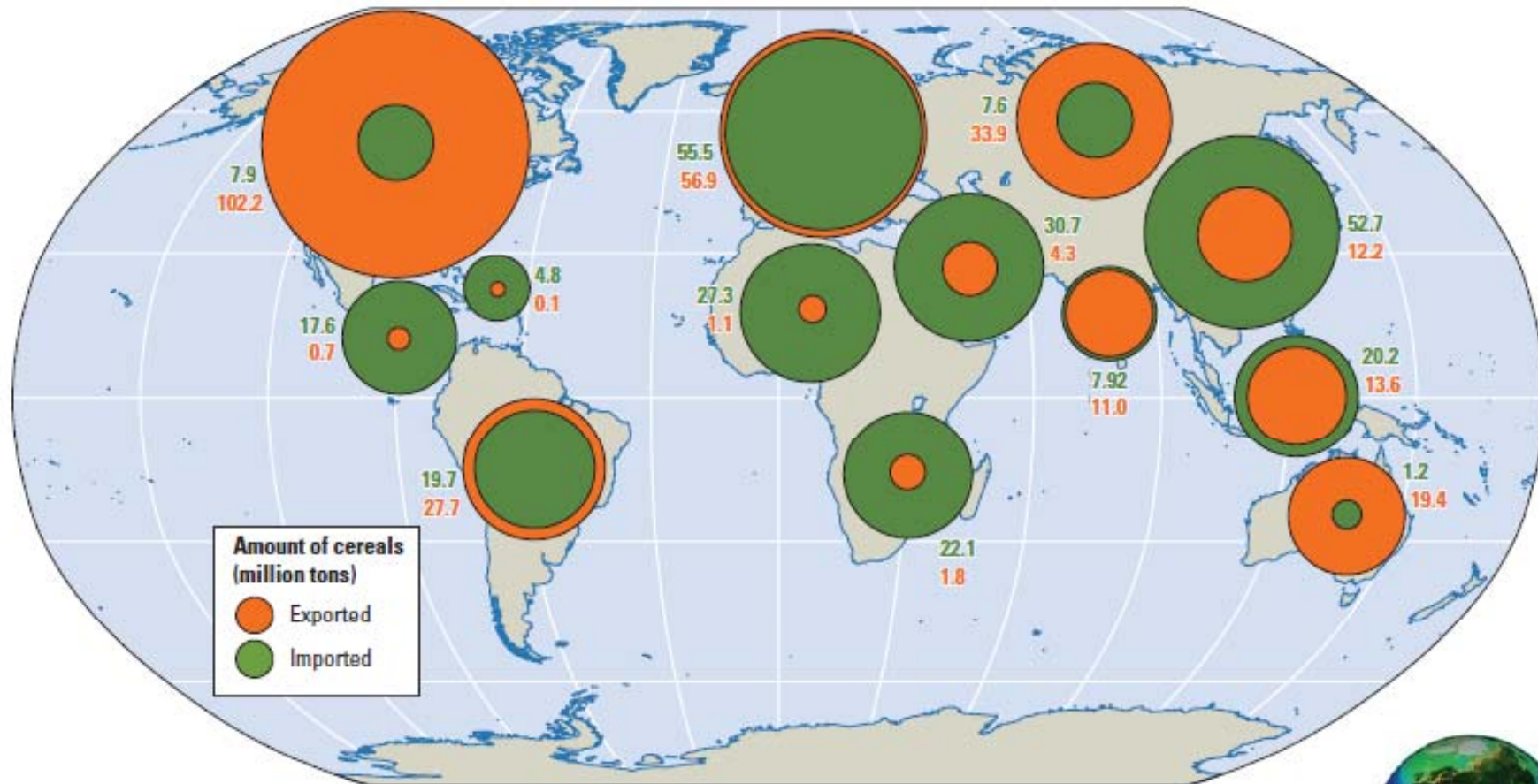
Marginal mitigation cost

(\$/tCO₂e)



ACT TOGETHER:
AND COOPERATION HELPS BUFFER SHOCKS

Global food trade depends on very few countries



Source: FAO 2009c.



ACT DIFFERENTLY:

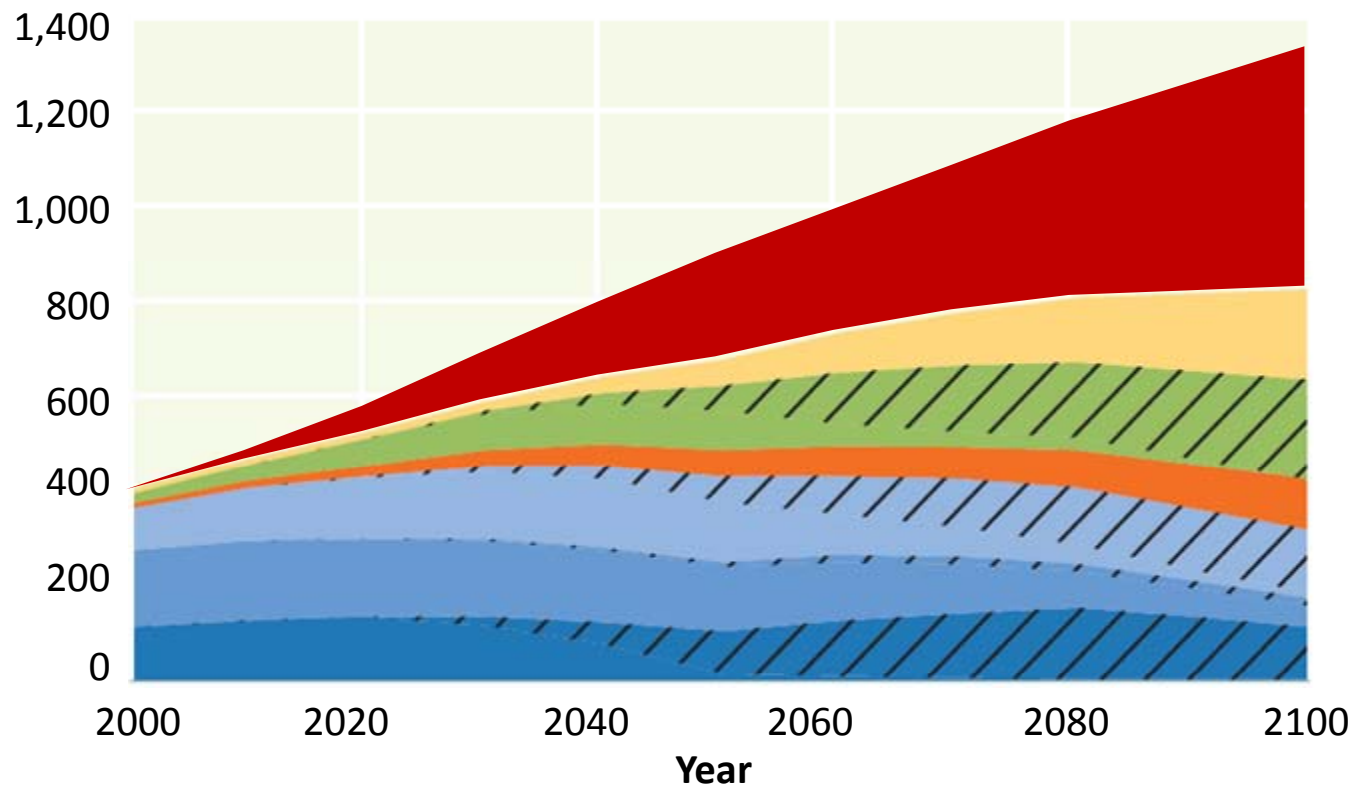
RAPID INNOVATION IN MITIGATION AND ADAPTATION

Sector	Mitigation	Adaptation	Examples
Transport	✓		Electric vehicles
Industry	✓		Energy efficiency
Energy supply	✓		Renewable energy
Waste management	✓		Recovering/reducing methane from waste
Building	✓	✓	Storm-resistant buildings, energy efficiency
Agriculture	✓	✓	Drought resistant crops
Forestry	✓	✓	Processing and use of forest products
Human health		✓	Health monitoring and surveillance systems
Coastal adaptation		✓	Geographical planning systems for coastal zones
Water		✓	Non-water based sanitation

ACT DIFFERENTLY:

RADICALLY TRANSFORM ENERGY SYSTEMS

Global primary energy mix (exajoules)



■ Energy efficiency
■ Nuclear ■ Biomass ■ Non-biomass renewables
■ Gas ■ Oil ■ Coal // with carbon capture and storage



ACT DIFFERENTLY:

RADICALLY TRANSFORM ENERGY SYSTEMS

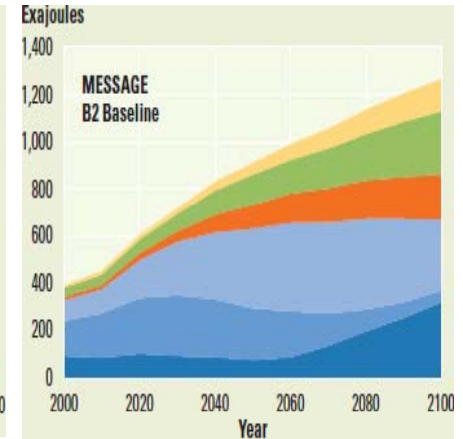
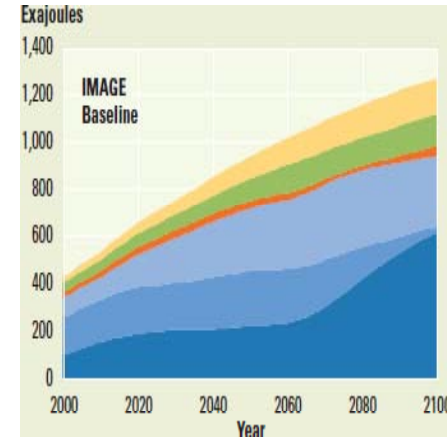
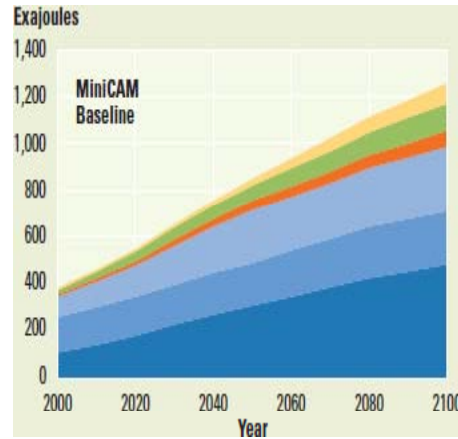
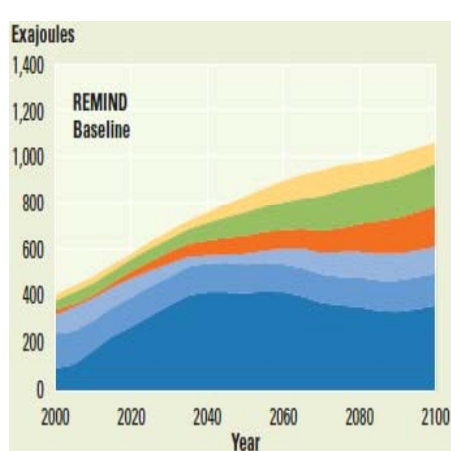
REMIND

Mini-CAM

IMAGE

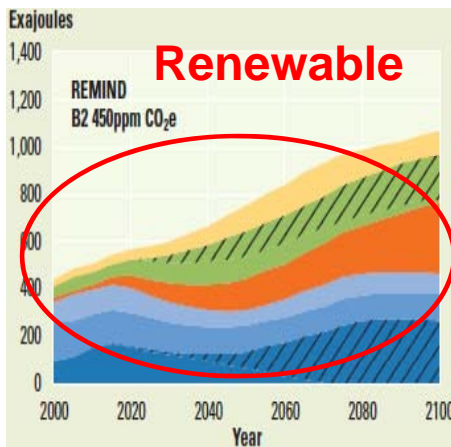
MESSAGE

baseline

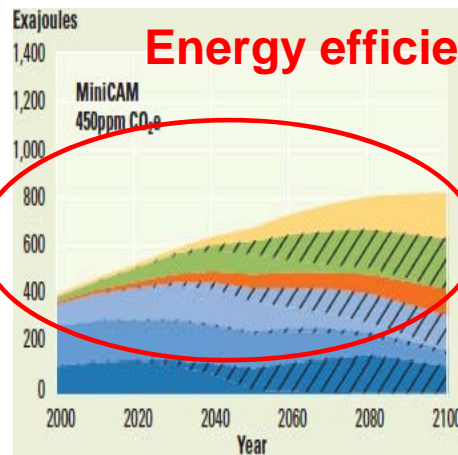


450 ppm-eq

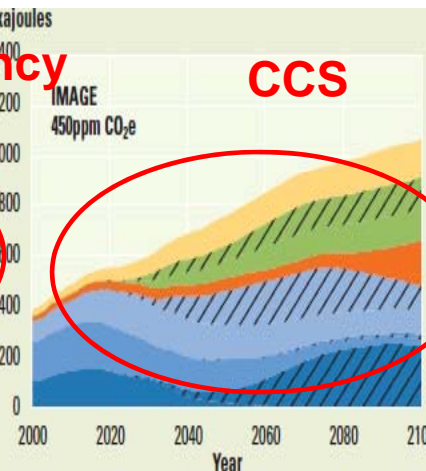
Renewable



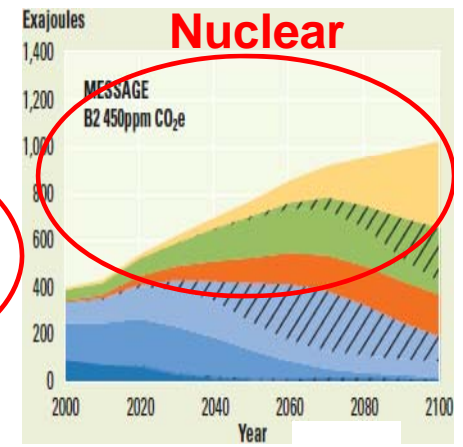
Energy efficiency



CCS



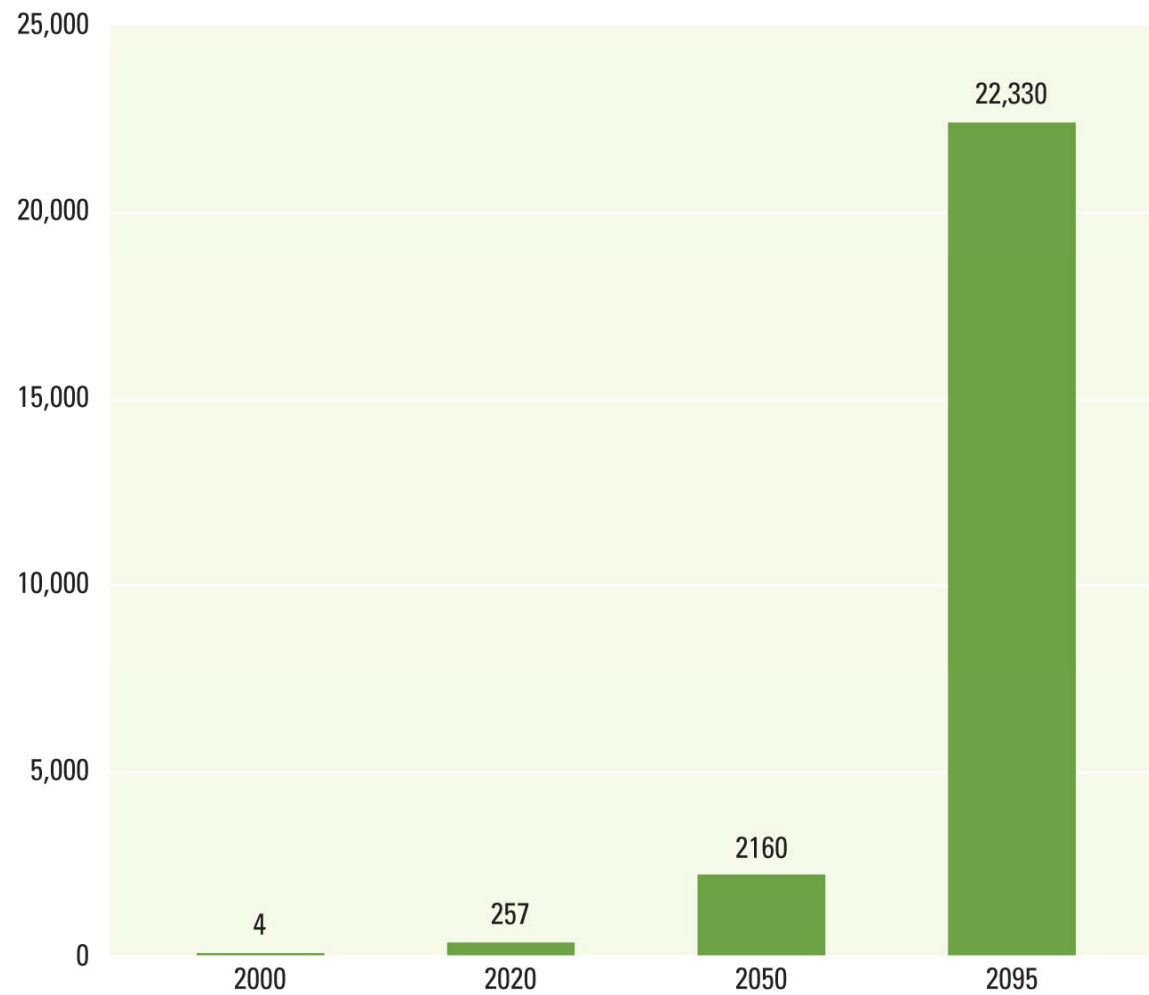
Nuclear



ACT DIFFERENTLY:

MASSIVELY SCALE UP CCS—A TECHNOLOGICAL CHALLENGE

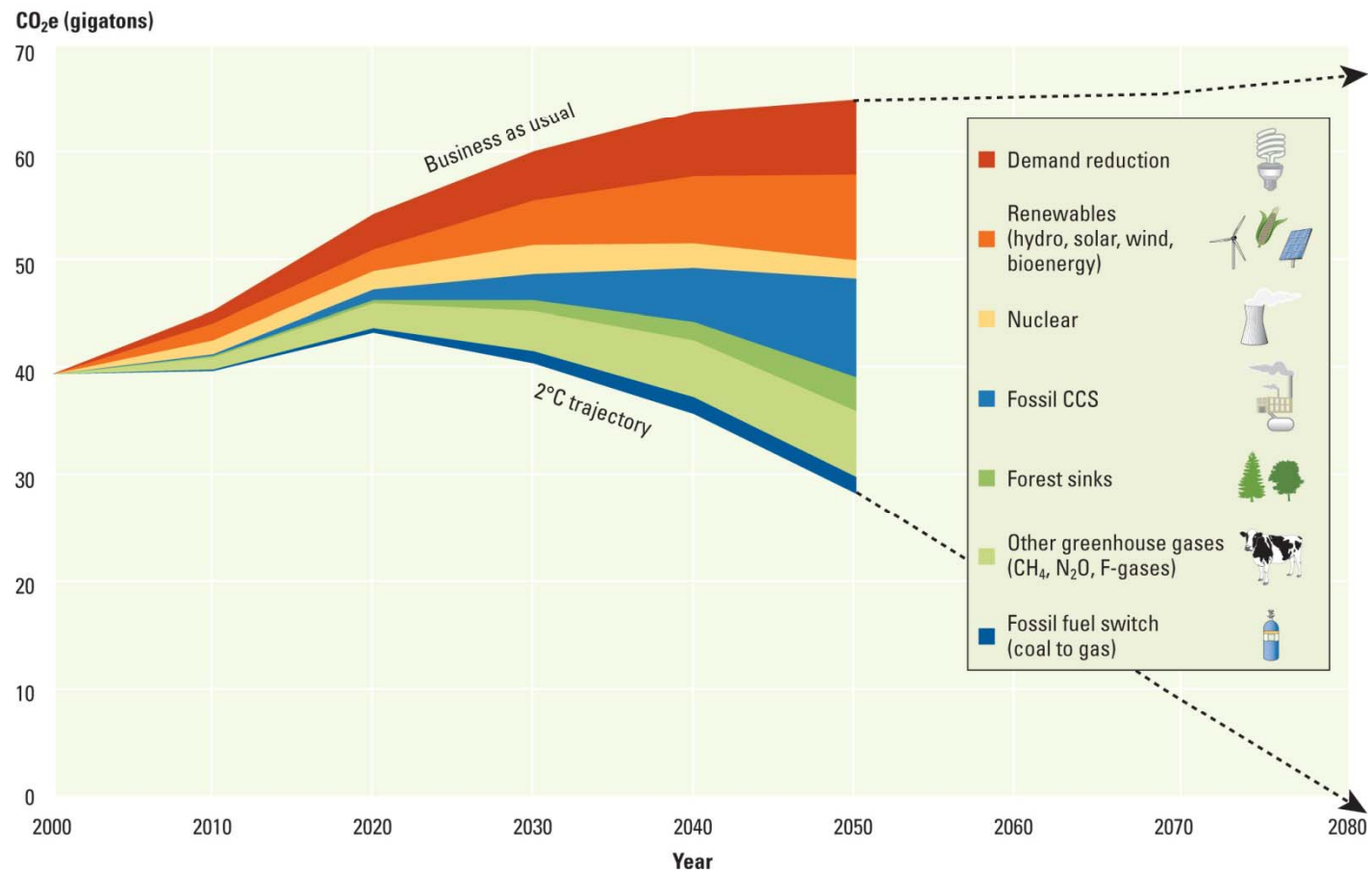
CO₂ removed/year (millions of tons)



box figure 5
Edmonds, 2009

ACT DIFFERENTLY:

RADICALLY TRANSFORM ENERGY SYSTEMS



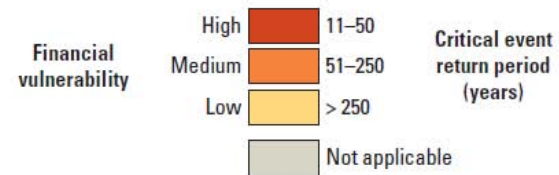
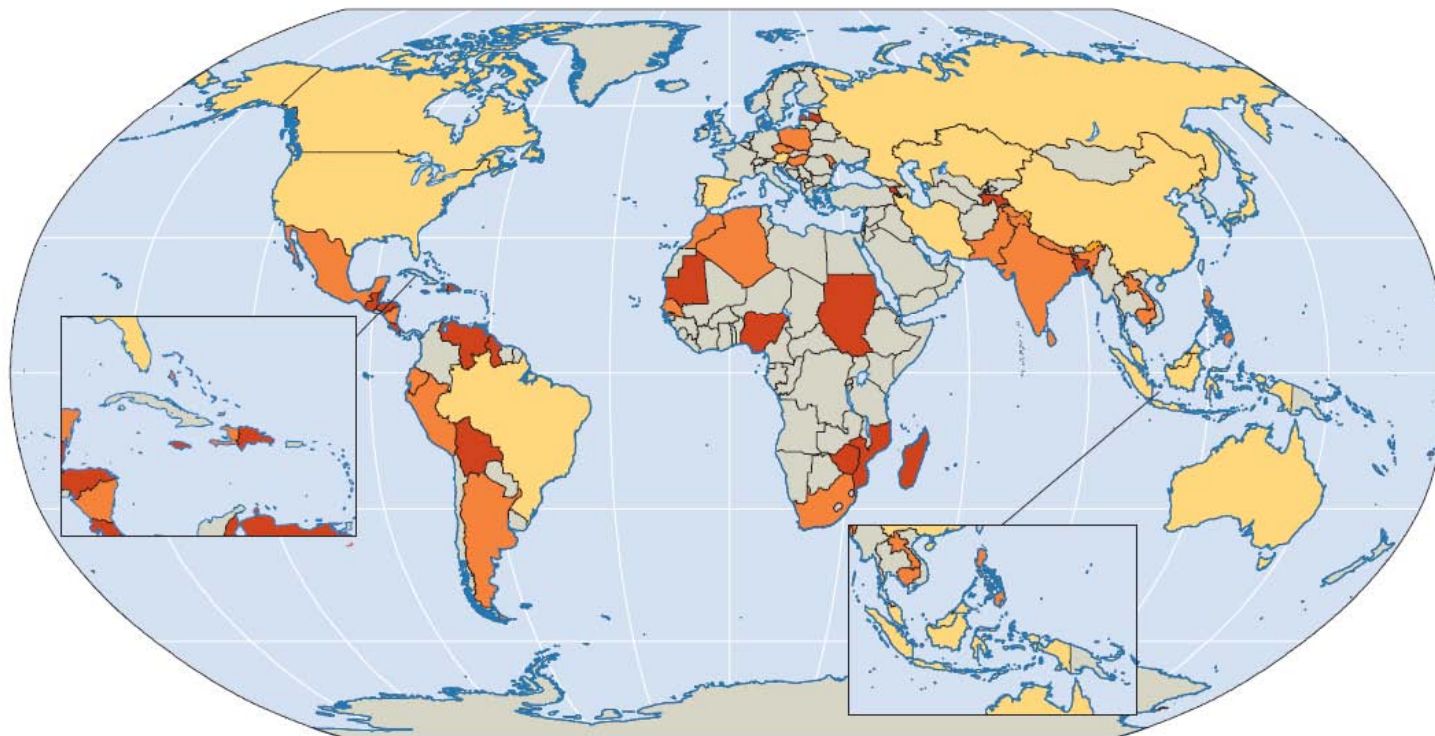
ACT DIFFERENTLY:

MAKE ROBUST RATHER THAN OPTIMAL DECISIONS



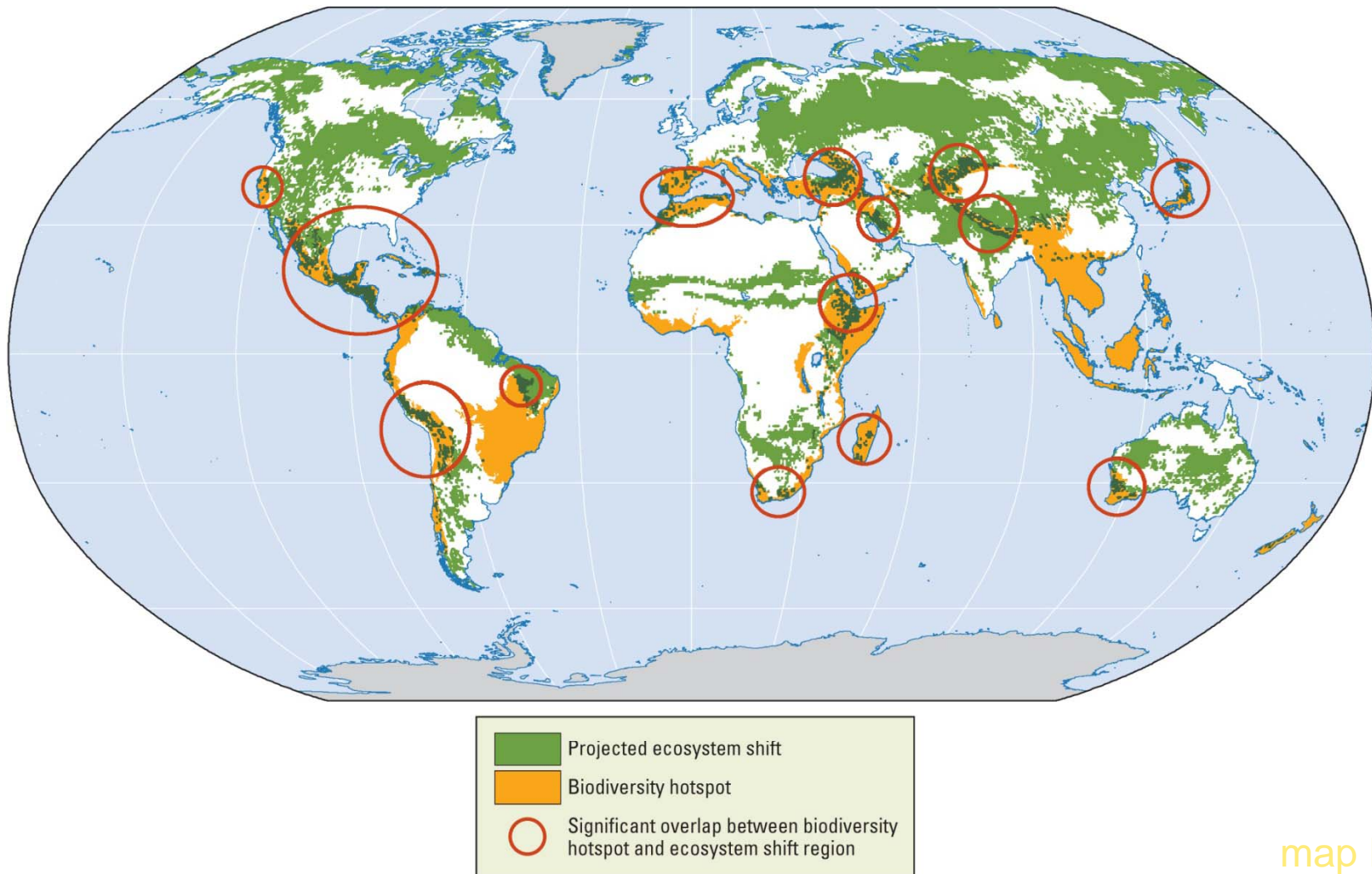
ACT DIFFERENTLY:

MANAGE CONTINGENCIES BETTER



ACT DIFFERENTLY:

MANAGE FOR MULTIPLE STRESSES



ACT DIFFERENTLY:

MAKE ROBUST RATHER THAN OPTIMAL DECISIONS

- Infrastructure to withstand new “extremes”
- Seed varieties that perform well in droughts/floods/heat
- Prioritize lands to preserve and manage multiple threats
- Increased need for social safety nets / insurance
- Emergency response plans, early-warning alert systems
- Information systems / best practices
- Weather and climate monitoring / regional assessments



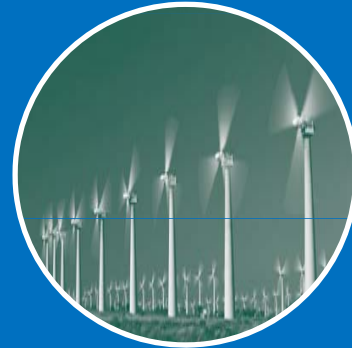
MAKING IT HAPPEN



Act now



Act
together



Act
differently

New finance, instruments and
pressures are helping build momentum

MAKING IT HAPPEN:

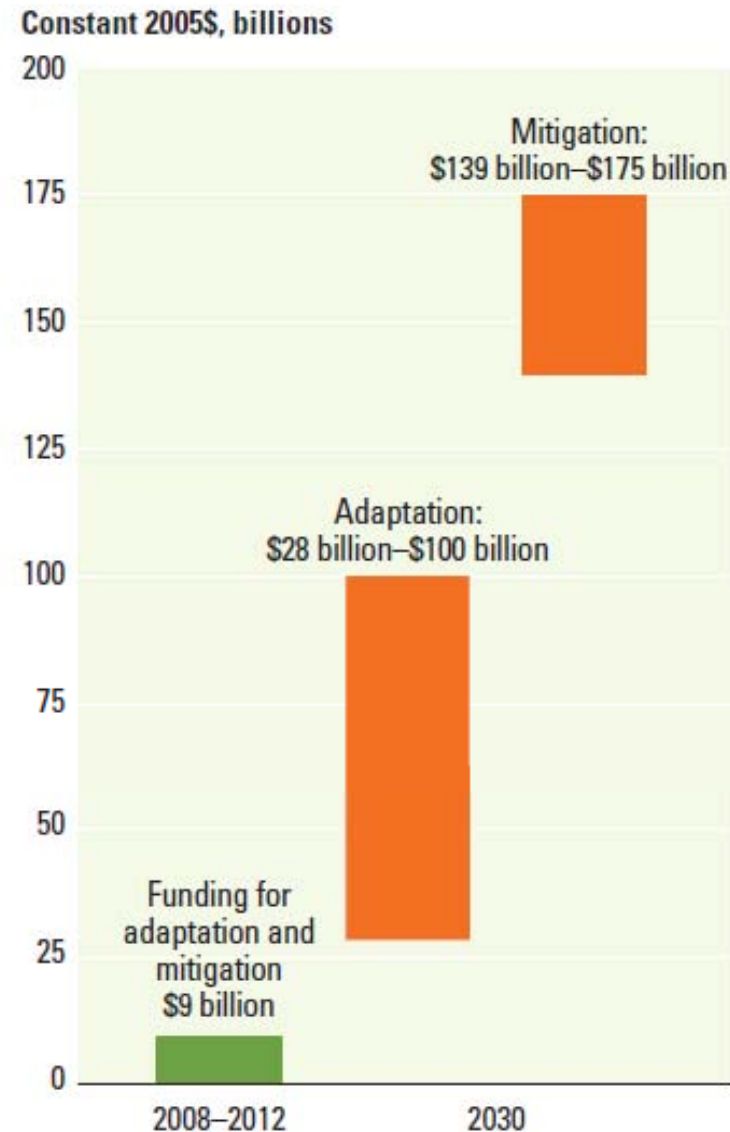
NEW RESOURCES



MAKING IT HAPPEN:

THE FINANCING CHALLENGE

- Critical to reconcile equity and efficiency
- Requires massive scaling up:
 - Costs: some \$200-275 Bn in 2030
 - Financing: up to \$550 bn in associated mitigation finance
- Can be done:
 - Costs = 0.4% of high-income country GDP to 2100
 - Financing = 3% of current global investments
 - But requires all options available



MAKING IT HAPPEN:

THE FINANCING CHALLENGE: IMMEDIATE NEEDS

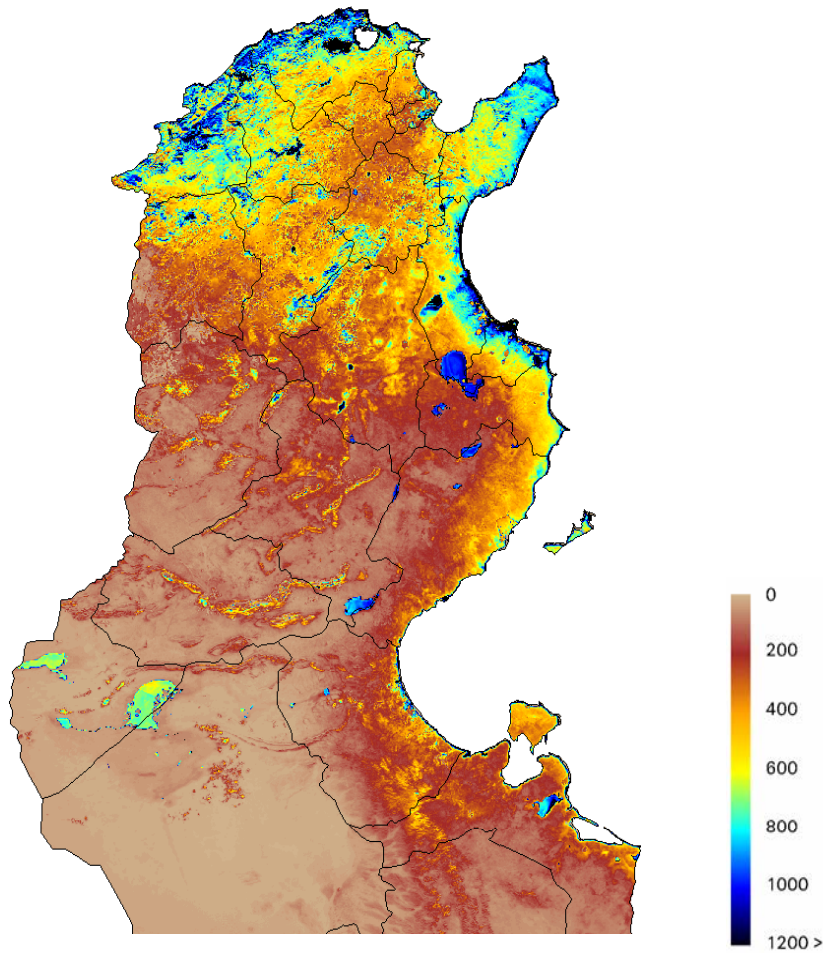
- Reform carbon markets:
 - Reform project-based CDM
 - REDD
 - Land emissions and soil carbon? Black Carbon?
- Leverage private finance:
 - Better information on climate trends and risks
 - Investment climate conducive to low carbon investments
 - Limited potential for public–private partnerships?
 - Risk finance (e.g., cat bonds, insurance)
- Allocation mechanism for adaptation finance



MAKING IT HAPPEN:

NEW INSTRUMENTS

- To support communities and decisionmakers
- Low-tech and high-tech



MAKING IT HAPPEN:

INCREASE THE PACE OF INVENTION

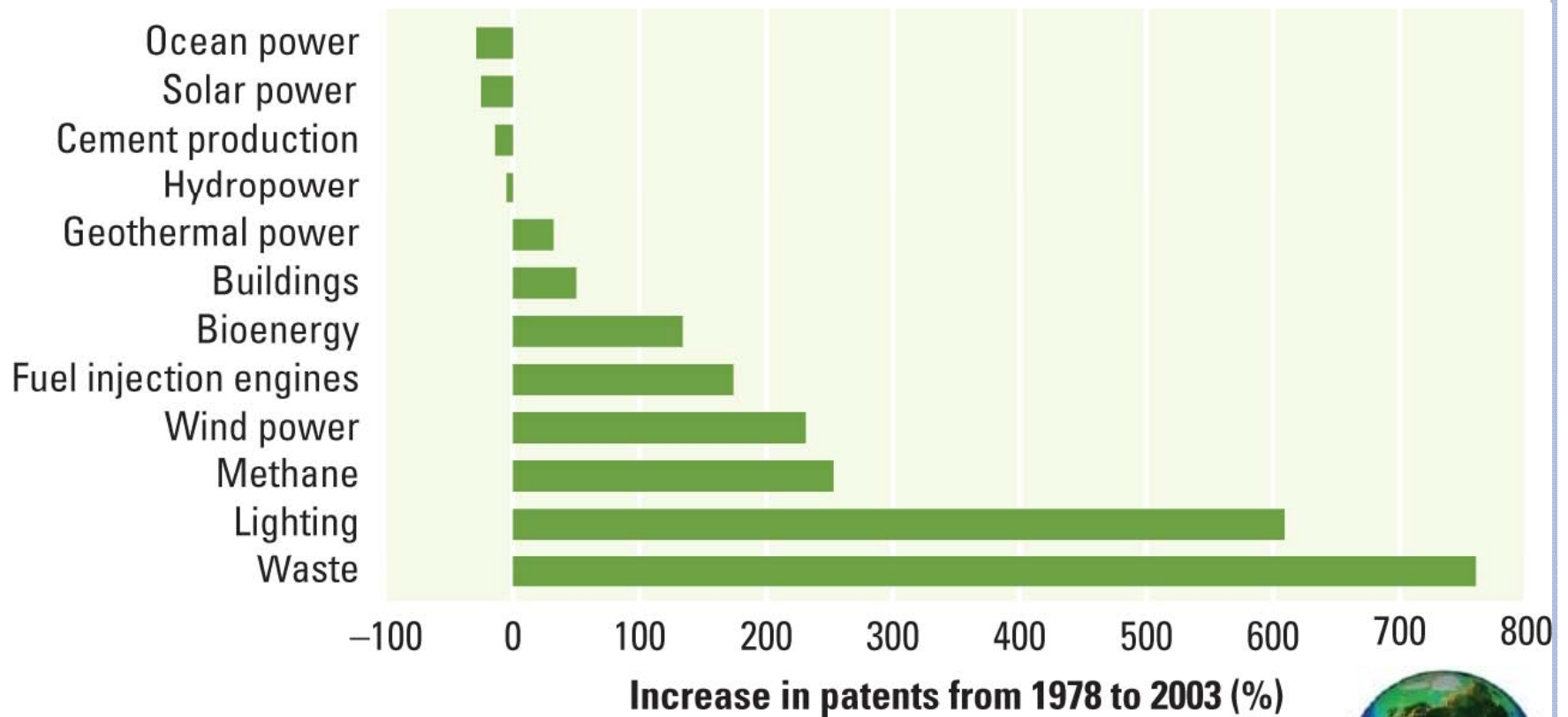
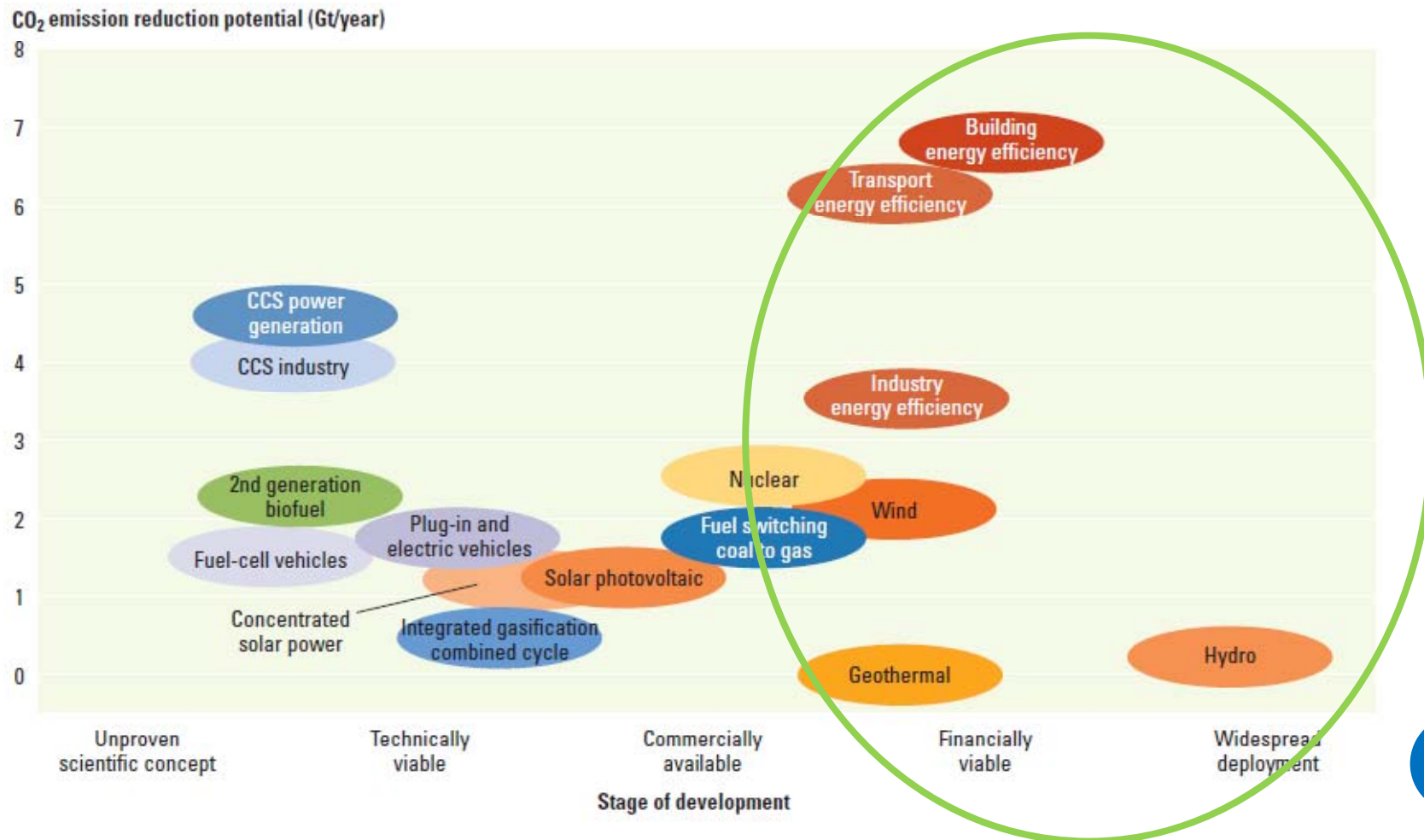


Figure 4

MAKING IT HAPPEN:

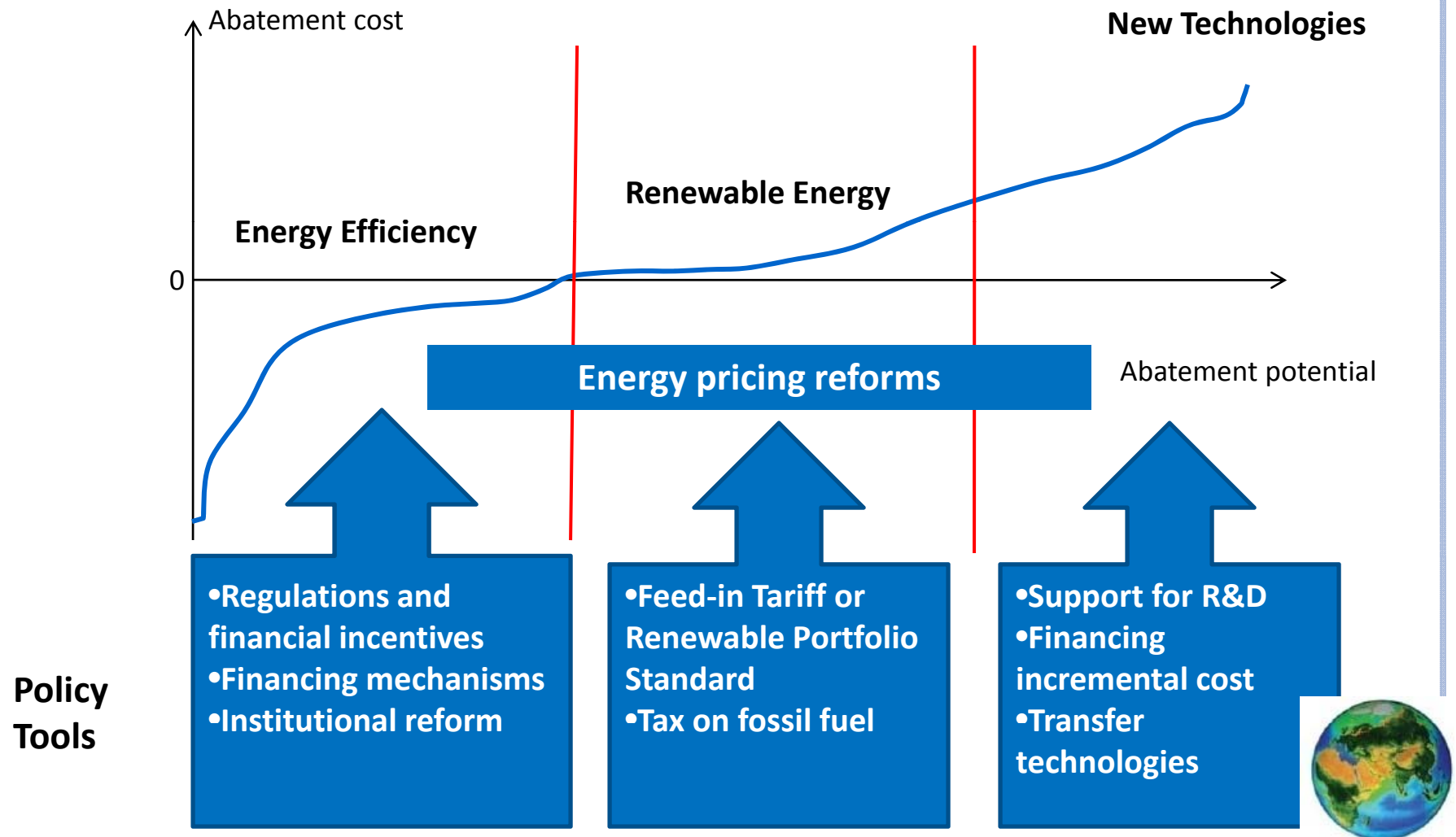
INCREASE THE PACE OF INNOVATION / PENETRATION

- Many climate change technologies are already financial viable



MAKING IT HAPPEN:

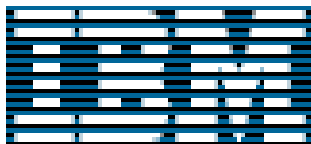
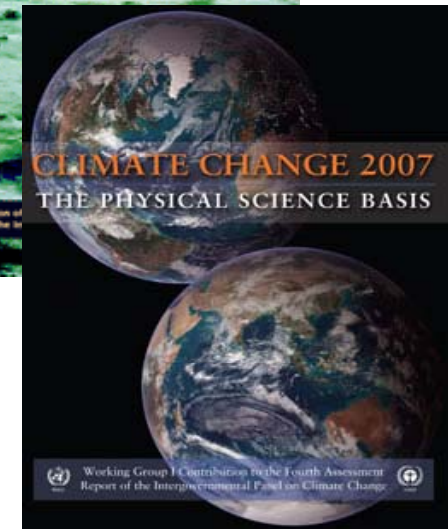
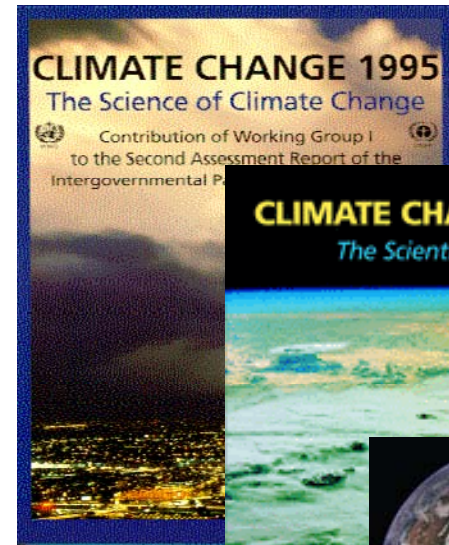
SUPPORTING POLICIES



MAKING IT HAPPEN:

NEW PRESSURES

- We've come a long way
 - Drumbeat of science
 - Politics are changing
 - Cities, states and countries are taking action
 - Individuals, business and organizations are responding
- More is needed to turn awareness into the needed actions
 - “Soft” policy tools – communication and education; social norms



**65% reduction
\$791 million saved**



17% reduction



**25% reduction
\$100 million saved**



**69% reduction
\$2 billion saved**

WDR 2010 SUGGESTS THAT A CLIMATE-SMART WORLD IS
POSSIBLE, IF WE...



Act now



Act
together



Act
differently

New finance, instruments and
pressures are helping build momentum

WDR 2010 SUGGESTS THAT A CLIMATE-SMART WORLD IS POSSIBLE, IF WE...



Break high carbon habit

Manage scarce resources

Reduce vulnerability



Act
together



Act
differently

New finance, instruments and
pressures are helping build momentum

WDR 2010 SUGGESTS THAT A CLIMATE-SMART WORLD IS POSSIBLE, IF WE...



Act now



New technologies

Anticipatory adaptation

**Manage costs & buffer
shocks**



Act
differently

New finance, instruments and
pressures are helping build momentum

WDR 2010 SUGGESTS THAT A CLIMATE-SMART WORLD IS POSSIBLE, IF WE...



Act now



Act
together



Climate-smart policies

Robust decision-making

Plan, prepare, protect

New finance, instruments and
pressures are helping build momentum

WDR 2010 SUGGESTS THAT A CLIMATE-SMART WORLD IS
POSSIBLE, IF WE...



Act now

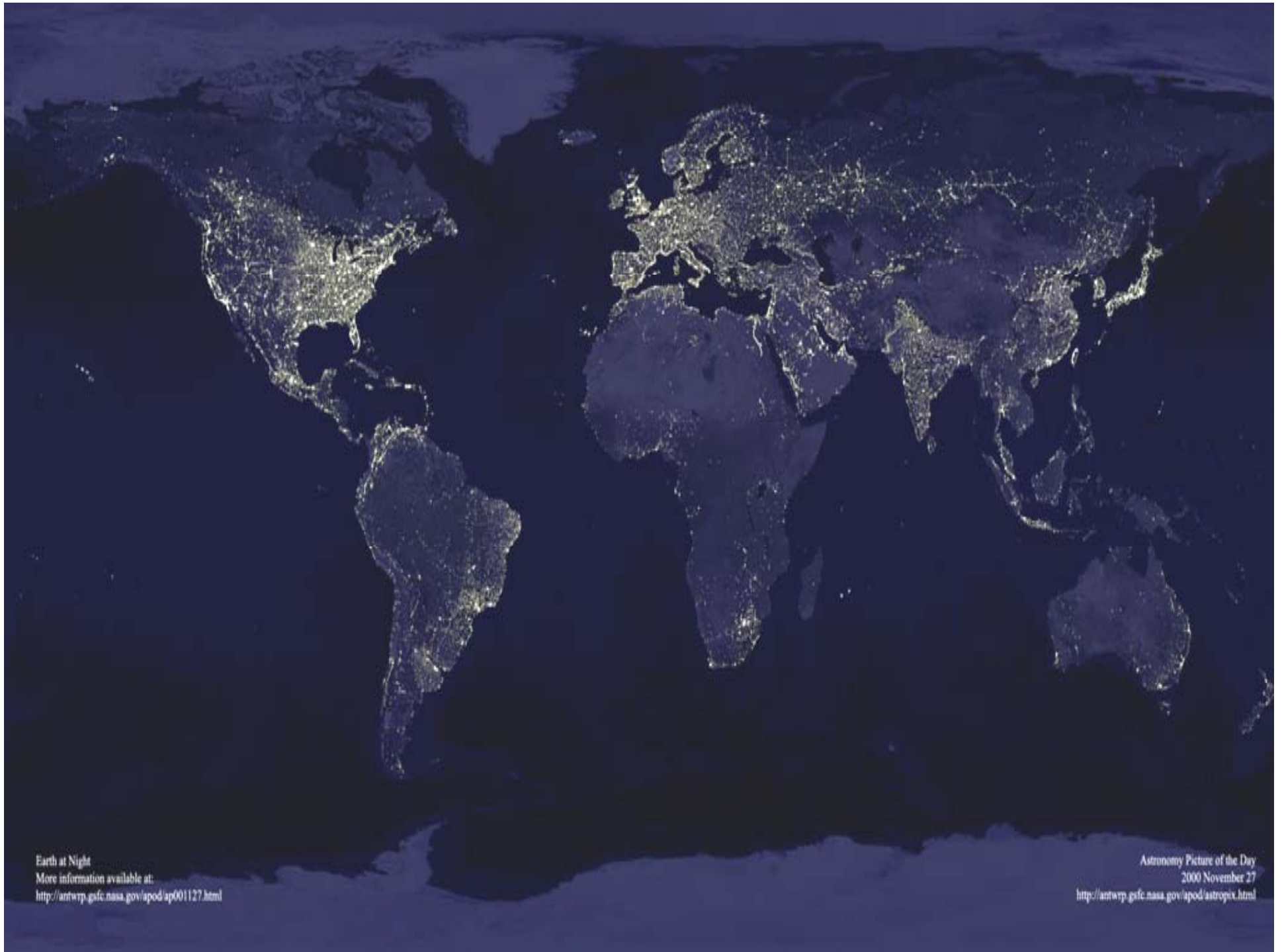


Act
together



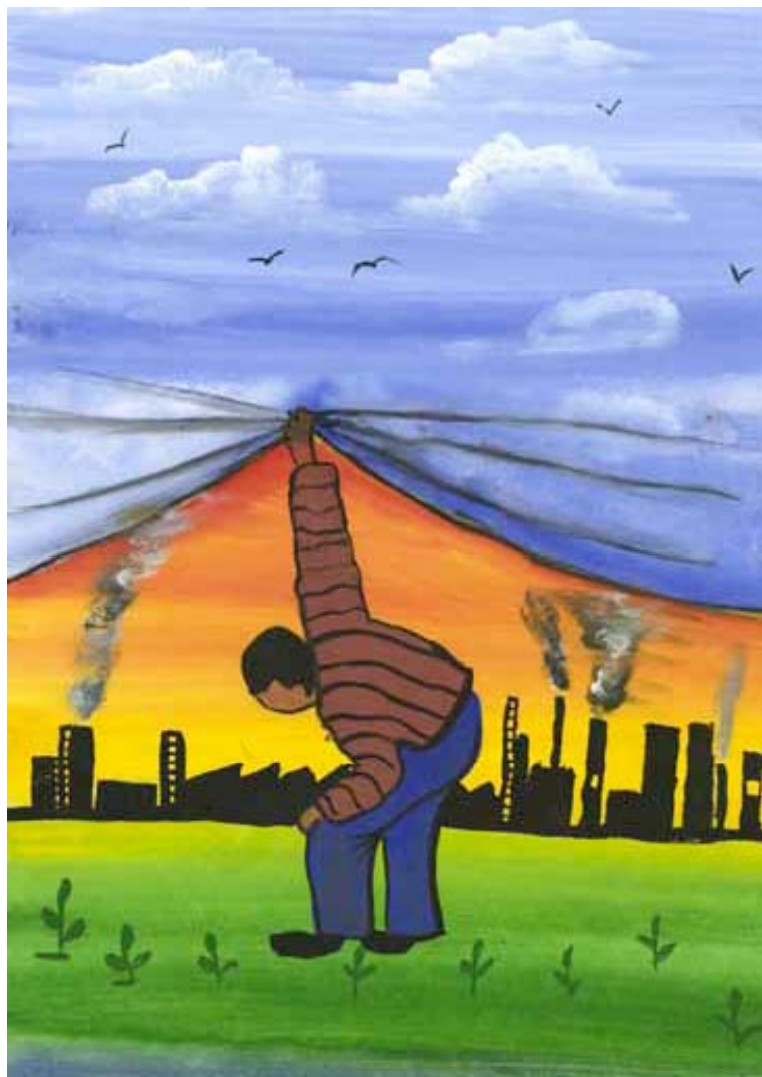
Act
differently

New finance, instruments and
pressures are helping build momentum



Earth at Night
More information available at:
<http://antwrp.gsfc.nasa.gov/apod/ap001127.html>

Astronomy Picture of the Day
2000 November 27
<http://antwrp.gsfc.nasa.gov/apod/astropix.html>



“It is our collective responsibility to find ‘unselfish’ solutions and fast before it’s too late to reverse the damage caused every day.”

Maria Kassabian, age 10, Nigeria

world development report

2010

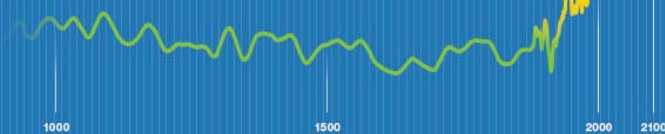


+3°

+2°

+1°

Development and Climate Change



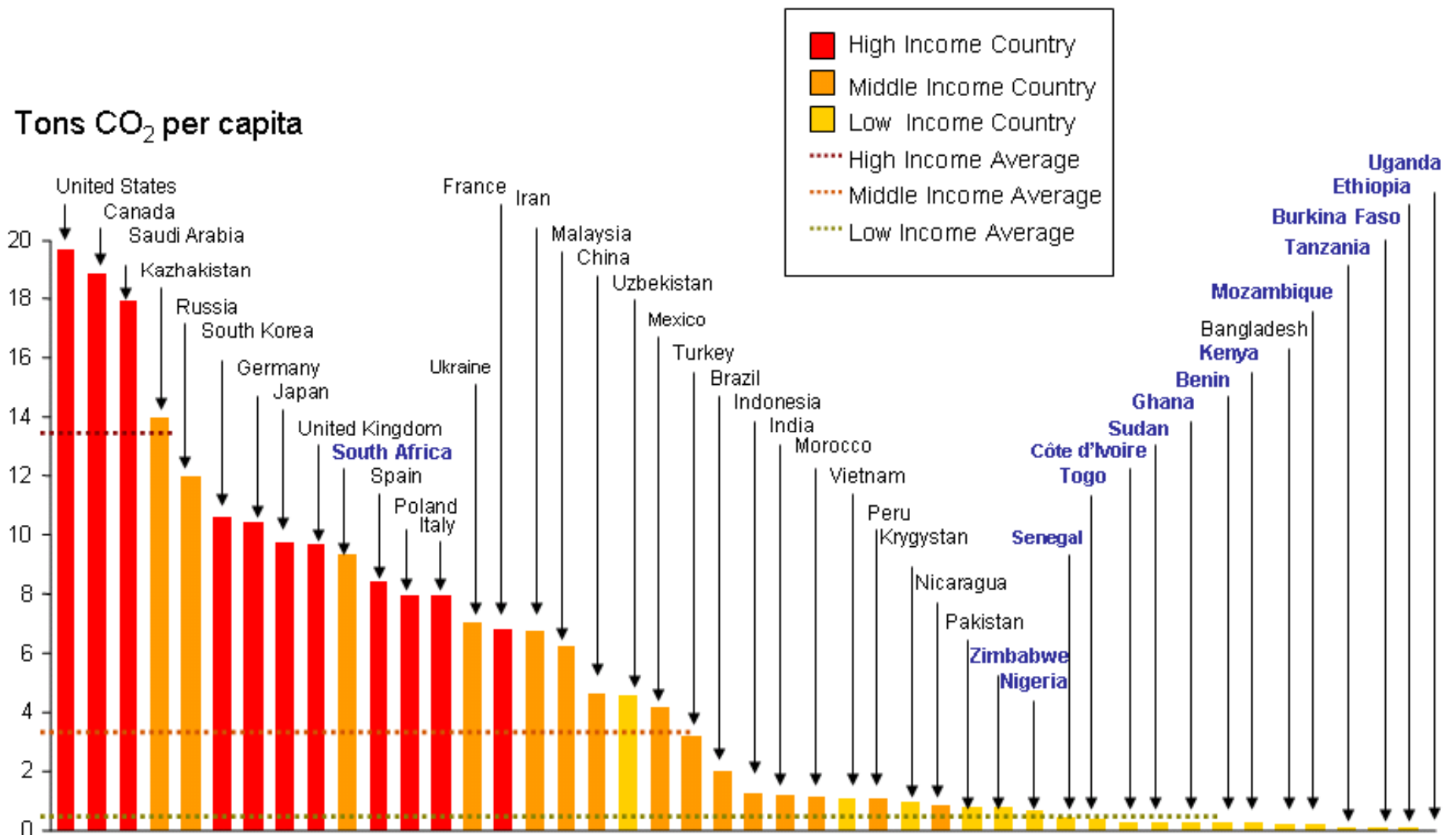
THE WORLD BANK

[http://blogs.worldbank.org/
climatechange/](http://blogs.worldbank.org/climatechange/)

<http://worldbank.org/WDR2010>



High-income countries need to significantly reduce emissions...



Making it happen:

The Technology challenge

