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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

Increase in global temperature since preindustrial era (°C)

- 0 1 2 3 4 5

- Risks to unique and threatened systems
- Risk of extreme weather events
- Distribution of impacts
- Aggregate impacts
- Risks of large scale discontinuities

2°C over preindustrial

Today = + 0.8°C

Source: Smith and others, 2009
DEVELOPMENT CONSENSUS: THE POOR WILL SUFFER MOST

High-income countries

1.1 billion people

Developing countries

5.6 billion people
A CLIMATE-SMART WORLD IS POSSIBLE...

Annual public subsidies

<table>
<thead>
<tr>
<th></th>
<th>$ (billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>World subsidies to energy</td>
<td>300</td>
</tr>
<tr>
<td>World subsidies to petroleum products</td>
<td>150</td>
</tr>
<tr>
<td>World public funding for energy R&amp;D</td>
<td>50</td>
</tr>
</tbody>
</table>

Private funding for energy R&D
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 climate system

feasibility

Inertia in the built environment

costs

Inertia in institutions and individuals’ behavior

political momentum
**Act now:**

**Or we are headed to much more than 2°C**

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

- Business as usual (~5°C)
- 2°C trajectory
ACT TOGETHER:

HIGH-INCOME COUNTRIES NEED TO TAKE THE LEAD

Emission reductions by switching fleet of American SUVs to cars with EU fuel economy standards.

Emission increase by providing basic electricity to 1.6 billion people without access to electricity.

Source: WDR team calculations based on BTS 2008.
ACT TOGETHER:

BUT ALL HAVE A ROLE TO PLAY TO MANAGE COSTS

**Marginal mitigation cost ($/tCO$_2$e)**

- Efficiency in buildings
- Efficiency in motors, cars, and electricity co-generation
- Land-use and land-use change, mostly in developing countries
- Additional cost of achieving 10 Gt of mitigation
- Small hydro and nuclear in developing countries
- Renewable energy: Wind and solar
- Advanced technologies: Carbon capture and storage

**Mitigation potential (GtCO$_2$e/year)**

- Negative costs: Long-term savings outweigh initial costs
- Marginal cost, all countries
- Marginal cost, only high-income countries
- Mitigation measure in a developing country
- Mitigation measure in a high-income country
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**

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

Renewable  Energy efficiency  CCS  Nuclear

450 ppm-eq

Legend:
- Nuclear
- Biomass
- Non-biomass renewables
- Gas
- Oil
- Coal
- with carbon capture and storage
ACT DIFFERENTLY:

MASSIVELY SCALE UP CCS — A TECHNOLOGICAL CHALLENGE

**Box Figure 7.5**

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**

![Bar chart showing the increase in patents from 1978 to 2003 for various technologies. The technologies listed include: Ocean power, Solar power, Cement production, Hydropower, Geothermal power, Buildings, Bioenergy, Fuel injection engines, Wind power, Methane, Lighting, Waste. The chart illustrates the percentage increase in patents for each technology.](image-url)
Many climate change technologies are already financially viable.
**MAKING IT HAPPEN:**

**SUPPORTING POLICIES**

- **Energy Efficiency**
- **Renewable Energy**
- **Energy pricing reforms**

**Policy Tools**

- Regulations and financial incentives
- Financing mechanisms
- Institutional reform
- Feed-in Tariff or Renewable Portfolio Standard
- Tax on fossil fuel
- Support for R&D
- Financing incremental cost
- Transfer technologies

**Abatement cost**

**New Technologies**

**Abatement potential**
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 $100 million saved
- 69% reduction $2 billion saved
- 25% reduction
- 69% reduction
- 25% reduction
- 69% reduction
- 25% reduction
- 69% reduction
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

New finance, instruments and pressures are helping build momentum

- Climate-smart policies
- Robust decision-making
- Plan, prepare, protect
WDR 2010 SUGGESTS THAT A CLIMATE-SMART WORLD IS POSSIBLE, IF WE...

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Act differently

New finance, instruments and pressures are helping build momentum
“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
High-income countries need to significantly reduce emissions...
Making it happen:
The Technology challenge

We are heading to 6°C:
Baseline emissions 62 Gt

We want to go to 2°C:
450 ppm (14 Gt emissions)

Existing technologies with aggressive domestic policies
- Demand-side energy efficiency (38%)
- Fuel Switch (7%)
- Nuclear (6%)
- Non-biomass Renewable (15%)
- Bioenergy (8%)
- Fossil CCS (19%)
- Electric and fuel cell vehicles (8%)

Advanced technologies and innovations with international climate policies and R&D