

# A Green Economy and Relevance to Climate Change

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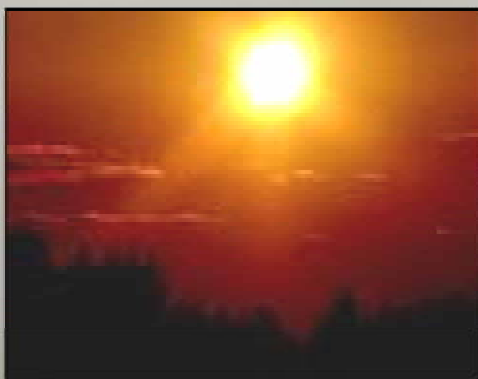
Director-General, The Energy and Resources Institute



Chairman, Intergovernmental Panel on Climate Change

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## Climate change is unequivocal



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# Warming Of The Climate System Is Now Unequivocal



## 125,000 years ago...

- The polar regions were significantly warmer than present for an extended period
- ... which led to reductions in polar ice volume and sea level rise of 4 to 6 .

Palaeoclimatic information supports the interpretation that the warmth of the last half century is unusual in at least the previous 1,300 years.

Source : IPCC

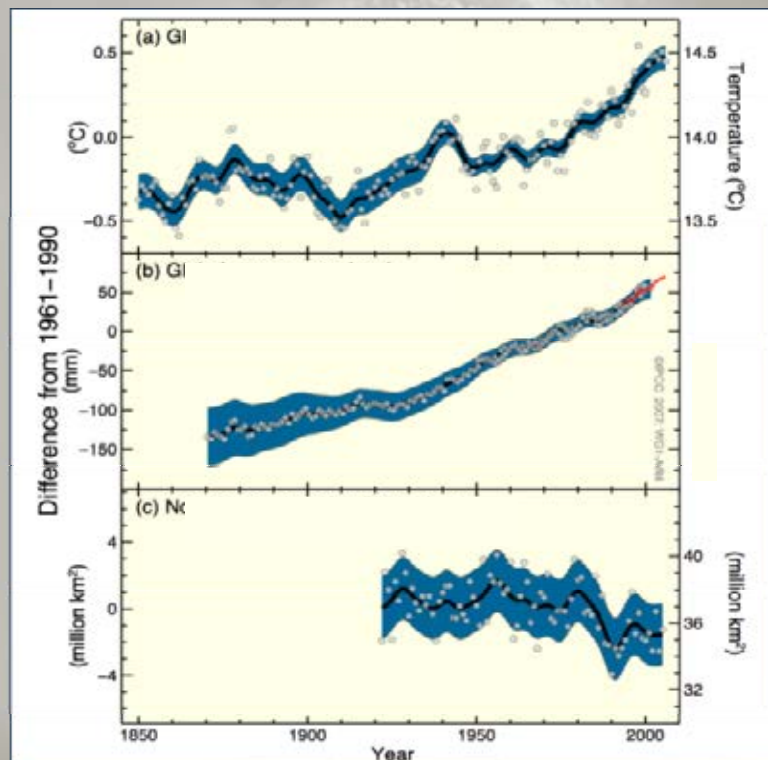
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## Observed Changes

Global average temperature

Global average sea level

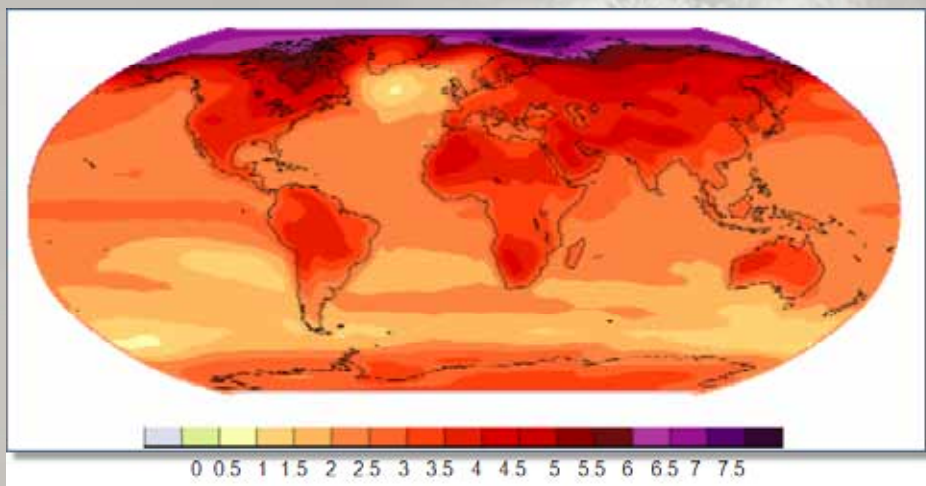
Northern hemisphere snow cover



Source : IPCC

# Increase In Global Average Temperatures

2090-2099 relative to 1980-1999



Continued emissions would lead to further warming of 1.1°C to 6.4°C over the 21st century (best estimates: 1.8°C - 4°C)

- Most of the observed increase since the mid-20th century is very likely due to the observed increase in anthropogenic GHGs.
- Discernible human influences now extend to other aspects of climate, including ocean warming, continental-average temperatures, temperature extremes and wind patterns.

Source : IPCC

## Understanding climate change

### Causes of change



- Global **GHG emissions** due to human activities have grown since pre-industrial times, with an increase of **70%** between 1970 and 2004
- **CO<sub>2</sub>** annual emissions grew by about **80%** between 1970 and 2004

Most of the observed increase in temperatures since the mid-20th century is very likely due to the increase in anthropogenic GHG concentrations

Source : IPCC



# Climate change and Urbanization



- Urbanization is **increasing very rapidly** with the fastest rates currently taking place in the **least developed** countries (UN Habitat 2011)
- Urban developments contribute to climate change as they are **major emitters of GHG** emissions and cause changes in land use.
- Climate change exacerbates **other stresses** on urban settlements

**These stresses can be serious enough that any significant additional stress could be the trigger for undesirable outcomes**

Source : IPCC

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# Projected Impacts On Water Resources



- Countries like Bangladesh, China and India are susceptible to **increasing salinity** of their groundwater and surface water resources, due to increases in sea level
- In India, gross per capita water availability will decline from 1820 m<sup>3</sup>/yr in 2001 to **1140 m<sup>3</sup>/yr in 2050**

**As a result of rapid melting of glaciers, glacial runoff and frequency of glacial lake outbursts causing mudflows and avalanches have increased.**

Source : IPCC

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# Vulnerability



- Africa is one of the most vulnerable continents because of the range of projected impacts, multiple stresses and low adaptive capacity.
- Substantial risks due to sea level rise are projected particularly for Asian megadeltas and for small island communities.

Regions in the weakest economic position are often the most vulnerable to climate change and frequently the most susceptible to climate-related damages, especially when they face multiple stresses

Source : IPCC

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## Vulnerability of coastal zones

- Under various scenarios, **coastal population** could grow from 1.2 billion (1990) to 1.8 to 5.2 billion by 2080s
- **60%** of the world's metropolises with a population of over 5 million are located within 100 km of the coast, including 12 with populations **greater than 10 million**.
- **Asian megadeltas** especially are key societal hotspots of coastal vulnerability
- Without adaptation, over **100 million people** will be flooded annually above a 40 cm sea level rise for all SRES scenarios
- **Asia dominates** the global exposure to flooding by storm surge with its large coastal population

Source : IPCC

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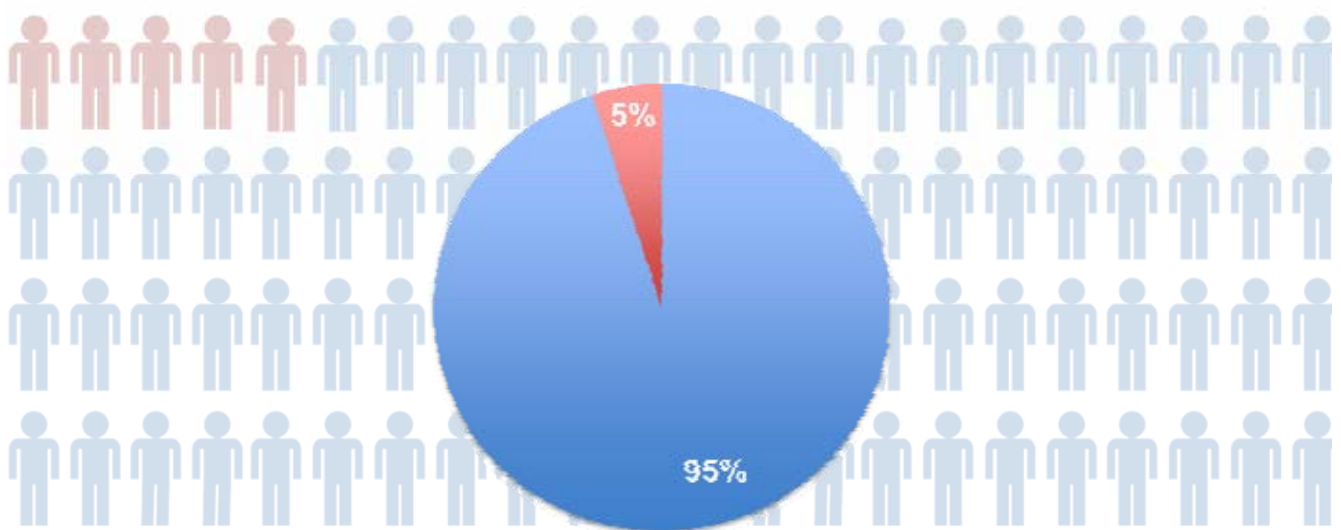
## Vulnerability of coastal deltas



- Extreme (> 1 million people potentially displaced by current sea-level trends by 2050)
- High (50 000 to 1 million)
- Medium (500 to 50 000)

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## Fatalities are higher in developing countries



From 1970-2008, over 95% of natural-disaster-related deaths occurred in developing countries



## Climate science at the heart of sustainable policy making

### Article 2 of the UNFCCC (1992)

*“The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, **stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.** Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.”*

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*“Neither adaptation nor mitigation alone can avoid all climate change impacts; however, they can complement each other and together can significantly reduce the risks of climate change”*

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*“There is substantial [...] potential for the mitigation of global GHG emissions over the coming decades that could [...] reduce emissions below current levels”*

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## Rio +20 critical issue: Disasters

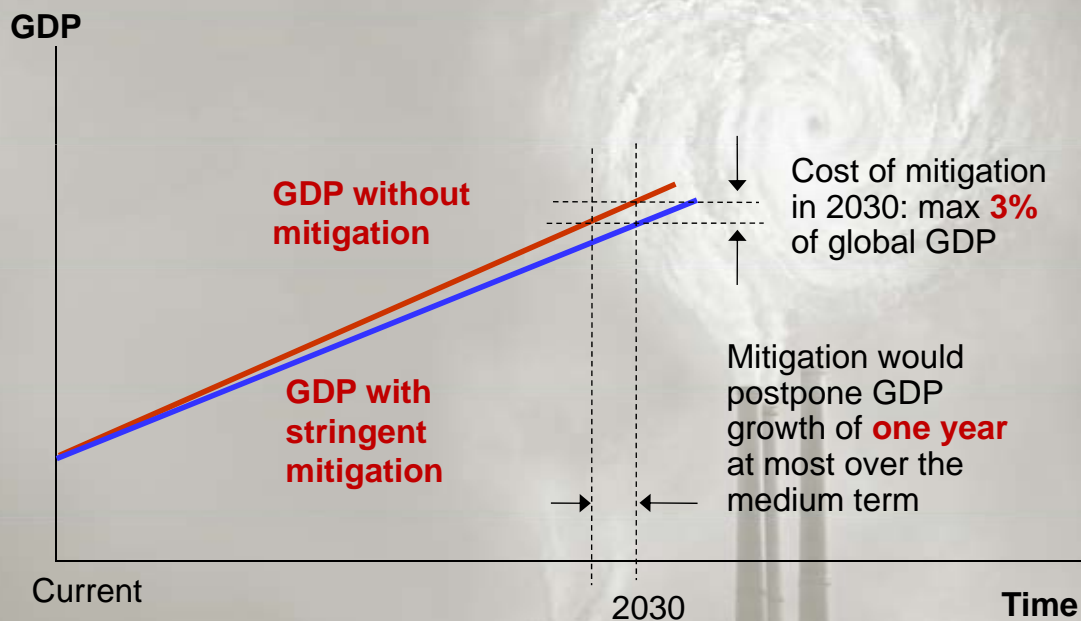


### The Future We Want

§188 “[...]We stress the importance of stronger inter-linkages among disaster risk reduction, recovery and long-term development planning, and call for more coordinated and comprehensive strategies that integrate disaster risk reduction and climate change adaptation considerations [...] in order to reduce risk, increase resilience [...]”



## Impacts of mitigation on GDP growth (for stabilization scenario of 445-535 ppm CO<sub>2</sub>-eq)



Source : IPCC

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## Key mitigation options and co-benefits at urban level

### Energy efficient buildings

- Increased building value, improved comfort, poverty alleviation

### Renewable energy production

- Job creation, improved air quality, energy security

### Construction density and green spaces

- Improved quality of life and air quality

### Public and non-motorized transport

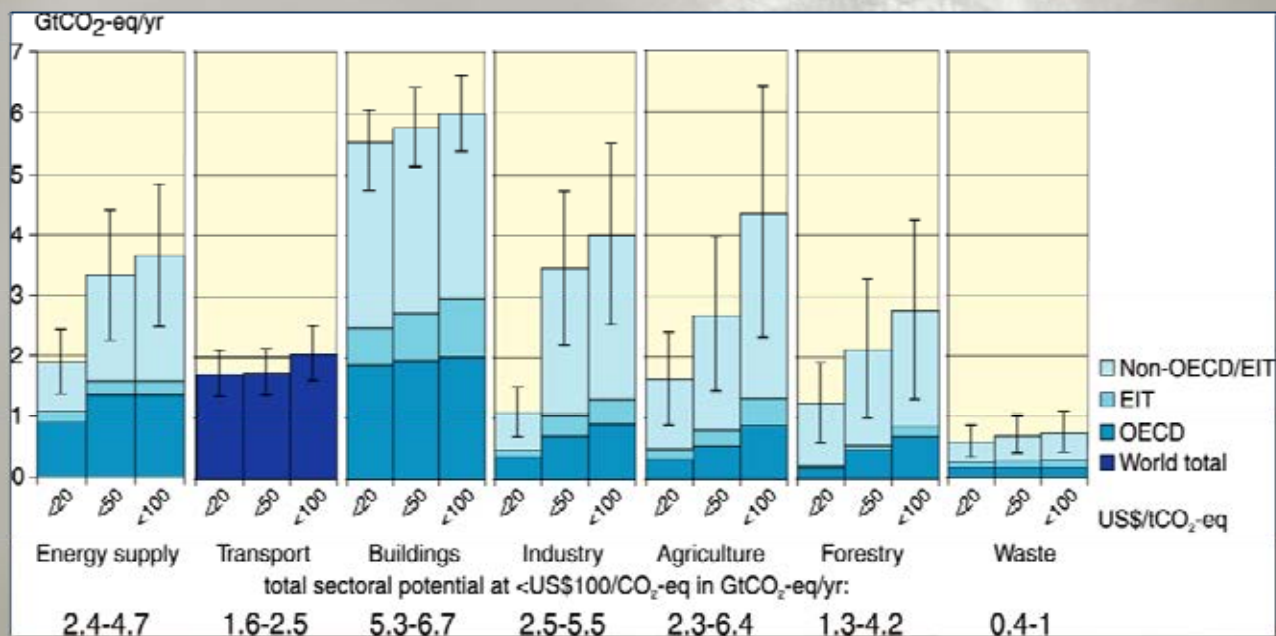
- Social equity, financial savings, improved public health, space gain

Source : IPCC

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# Opportunities – Mitigation targets

## Economic mitigation potential by sector in 2030



Source : IPCC

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## Rio +20 critical issue: Energy



### The SRREN finds that RE can contribute to sustainable development

- RE can accelerate access to energy, particularly for the 1.4 billion people without access to electricity and the additional 1.3 billion people using traditional biomass.

### Issues to consider

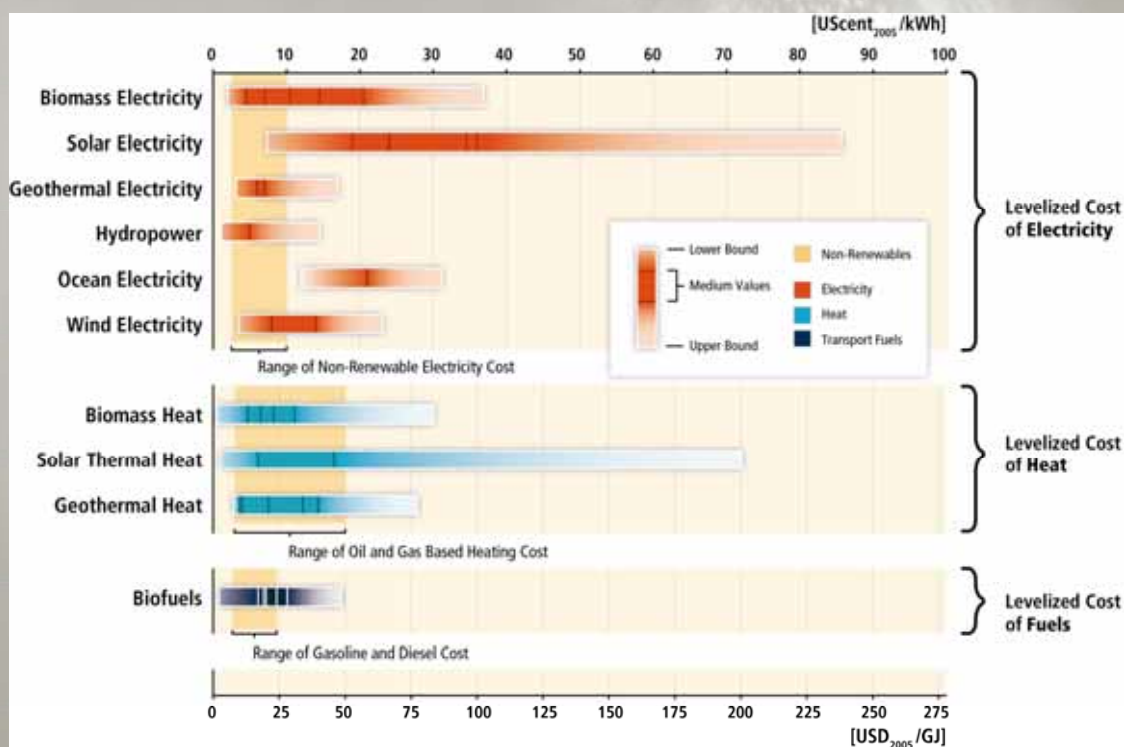
- vulnerability to supply disruptions and market volatility.
- Low risk of severe accidents
- Environmental and health benefits

The SRREN is a knowledge base for implementing policy decisions in the energy sector

Source : IPCC SRREN

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RE costs are still higher than existing energy prices but in various settings RE is already competitive.



Source : IPCC SRREN

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## Development And Mitigation



- **Health co-benefits** from reduced air pollution
- Increased **energy security**
- More **rural employment**
- Increased **agricultural production**
- **Reduced pressure** on natural ecosystems

Promising policies will capitalize on synergies between climate protection and development priorities to advance both simultaneously. Linking policies will produce multiple benefits such as reducing GHG mitigation costs.

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*"Mahatma Gandhi was once asked if he expected India to attain the same standard of living as Britain. He replied,  
It took Britain half the resources of the planet to achieve this prosperity. How many planets will a country like India require!"*

