







Observations – Atmosphere and surface



It is unlikely that any uncorrected urban heat-island (UHI) effects and land use change effects have raised the estimated centennial globally averaged Land-Surface Air Temperature trends by more than 10% of the reported trend.

This is an average value; in some regions with rapid development, UHI and land use change impacts on regional trends may be substantially larger.

But it is indisputable that UHI and LULC are real influences on raw temperature measurements.

Source : IPCC AR5



Extreme events during and by the end of the 21st century



Key future impacts and vulnerabilities



Vulnerabilities to climate change of industry, infrastructures, settlements and society:

- are greater in high-risk locations:
 > coastal and riverine areas
- areas whose economies are linked with climate sensitive resources:
 - agricultural and forest product industries
 - water demands and tourism
- these vulnerabilities tend to be localised but are often large and growing

Rapid urbanisation in most low and middle income nations, often in high-risk areas, is placing an increasing proportion of their economies and populations at risk.

Source : IPCC AR4

Key future impacts and vulnerabilities



Implications for sustainable development



Limits to resilience are faced when thresholds or tipping points associated with social and/or natural systems are exceeded, posing severe challenges for adaptation.

Source : IPCC SREX

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Adaptation and Mitigation







Source : IPCC AR4

"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"

- IPCC Fourth Assessment Report

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Integration of responses across scales



Integrated response to heatwaves could include:

 climate change considerations in the design and construction of new buildings and in the planning of new urban areas

National energy efficiency programmes and transport policies could include approaches for reducing:

- urban heat islands (UHI)
- emissions of ozone and other air pollutants

Measures to reduce the UHI effect:

- planting trees
- Roof gardens
- growth planned to reduce UHI

 \rightarrow increase the resilience of communities to heatwaves and reduce energy requirements.

Adaptation responses to health risks will often cut across scales; and interventions designed to increase the adaptive capacity of a community or region could also facilitate the achievement of GHG mitigation targets.

Source : IPCC AR4



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



Cost effective strategies for mitigation and adaptation: Resource efficiency in the built environment



At no/negligible incremental cost

Source : TERI

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"A technological society has two choices. First it can wait until catastrophic failures expose systemic deficiencies, distortion and self-deceptions... Secondly, a culture can provide social checks and balances to correct for systemic distortion prior to catastrophic failures."

- Mahatma Gandhi

