ESCENARIOS CLIMÁTICOS GIPUZKOA

INFORMACIÓN CLIMÁTICA TERRITORIAL

Naturklima

INFORMACIÓN CLIMÁTICA TERRITORIAL

Además de las observaciones y proyecciones globales, es necesario un diagnóstico certero a escala del territorio que tenga en cuenta las particularidades del mismo.

Gipuzkoa no escapa del cambio climático, con un aumento de la temperatura media, tanto máximas como mínimas desde finales de los años 80 o fenómenos de lluvias torrenciales. Esto permitirá identificar los principales riesgos, vulnerabilidades e impactos, y así adoptar la planificación y medidas de adaptación especificas para nuestro territorio.

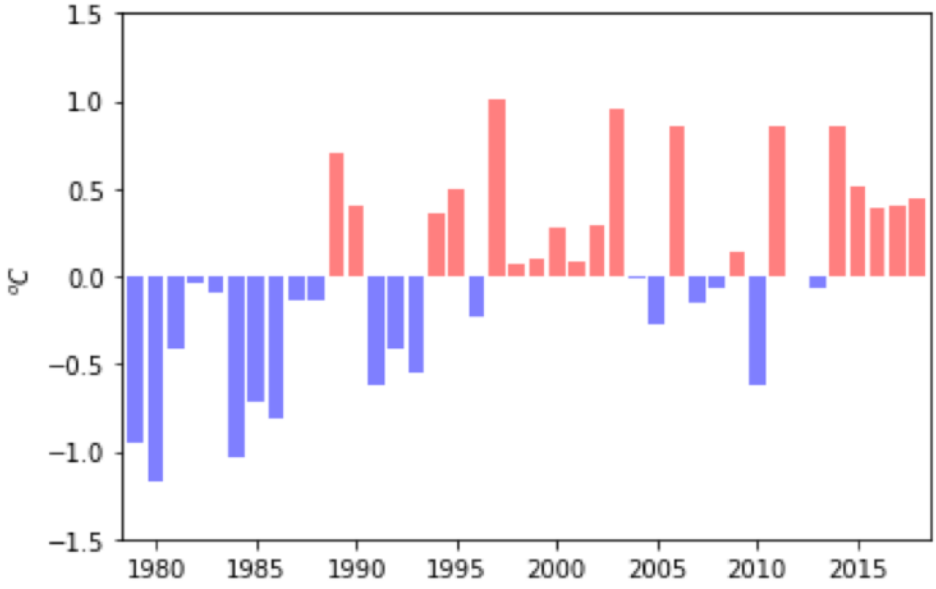
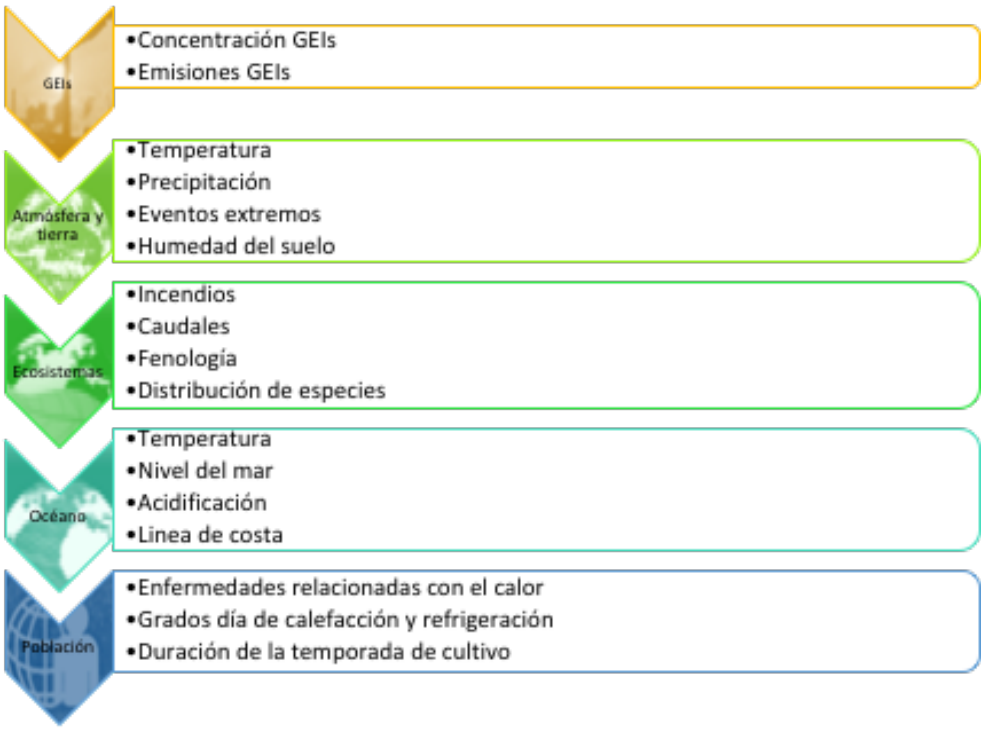


Figura 1. Evolución de la temperatura media anual en Gipuzkoa respecto a la temperatura media de 1981-2010 a partir de datos de ERA5.

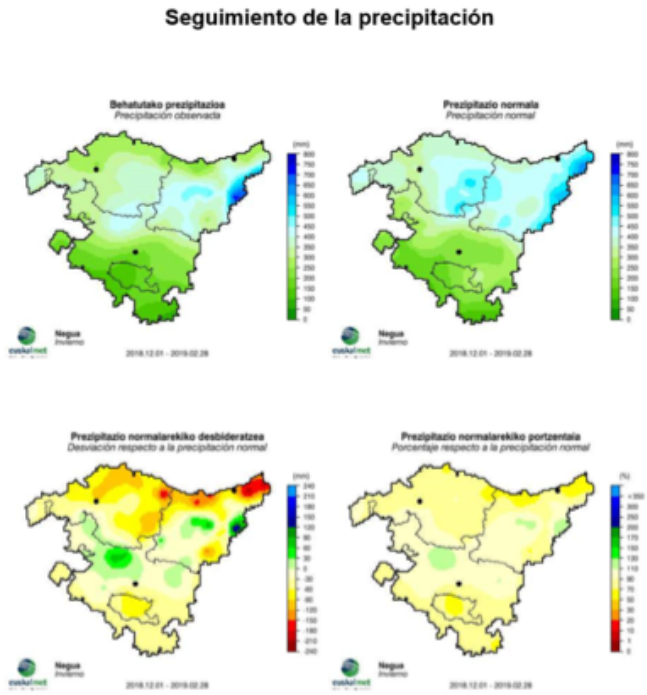
PRINCIPALES VARIABLES CLIMÁTICAS

El Observatorio de Cambio Climático desarrollará y mantendrá una red de indicadores climáticos que permitirán obtener datos para llevar a cabo la vigilancia del sistema climático, como la pronta identificación de los principales impactos consecuencia del cambio climático.

Este sistema de indicadores medirá principalmente las "Variables Climáticas Esenciales (ECV)" definidas actualmente por el Sistema Mundial de Observación del Clima (SMOC/GCOS). Éstas son variables físicas, químicas o biológicas, o un conjunto de variables relacionadas, que permiten caracterizar el sistema climático. Su elección se basa en estos criterios: relevancia, viabilidad y relación coste-eficacia.



Mapas estacionales

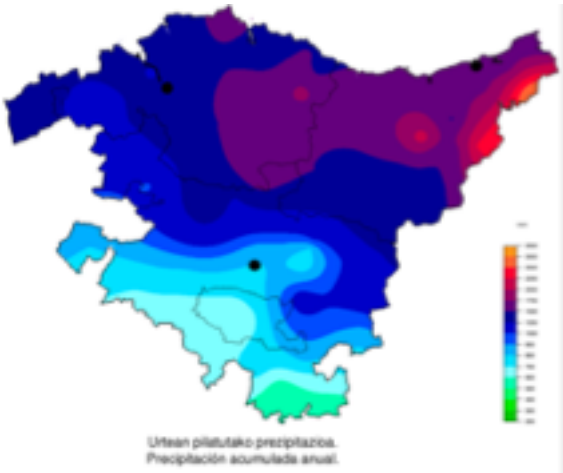


Las dos variables principales que se muestran en los mapas estacionales de Euskalmet son Tª y precipitación. En el caso de la Tª no se incluye mapa sino tabla de datos. Aemet muestra sólo tabla de valores.

Los informes anuales de Euskalmet si incluyen mapas de Tª media anual o precipitación acumulada.

Figura 2: mapas estacionales de precipitación en Euskadi, invierno 2018-19. Fuente: Euskalmet

Aunque el mapas de predicciones supone más hablar de meteorología que de climatología, es interesante por las dos variables principales que se manejan (*aunque hay más)* Tª y precipitación para avisar de posibles olas de calor, olas de frío, inundaciones… El servicio de AEMET es a 3 meses vista, el de Euskalmet es predicción diaria o semanal.



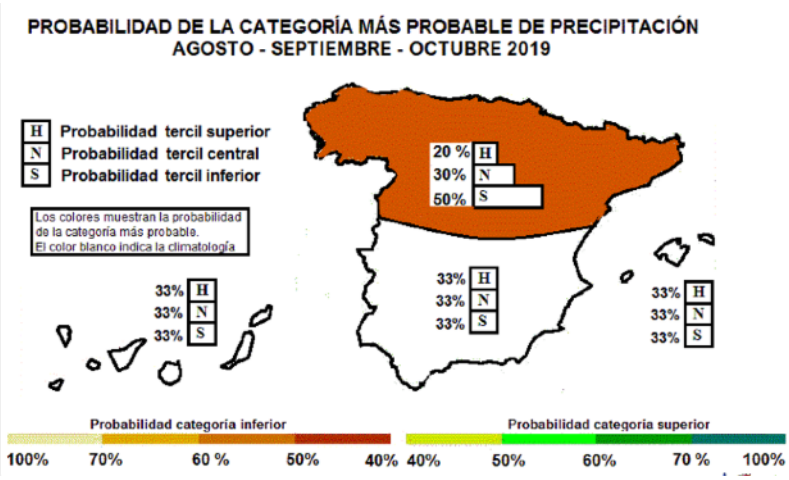


Figura 3 y 4: mapas de precipitación anual acumulada 2018. Fuente: Euskalmet

ESCENARIOS CLIMÁTICOS PARA GIPUZKOA

El conocimiento detallado de las condiciones climáticas actuales y de las prospectivas climáticas regionalizados constituyen la referencia en los procesos de evaluación de la vulnerabilidad e impactos, así como de las medidas de adaptación al cambio climático en la planificación sectorial.

La regionalización espacial reduce la escala para adaptar las proyecciones de los modelos climáticos globales utilizados en los informes del IPCC a las características regionales o locales influenciadas por la orografía, el contraste tierra-mar o el uso del suelo en el territorio.

Actualmente en Europa la iniciativa Euro-CORDEX es la encargada de realizar las proyecciones regionales de cambio climático para el siglo XXI. Bajo la iniciativa Klimatek 2016 del Gobierno Vasco se han realizado además proyecciones climáticas de alta resolución espacial (1 km x 1 km) para los escenarios RCP4.5 y RCP8.5 a partir de las simulaciones realizadas en el proyecto Euro-CORDEX.

La temperatura media muestra una clara tendencia positiva para todo el periodo de estudio, con un incremento máximo de unos 3,5ºC, respecto al periodo medio 1971-2000, a finales de siglo. El incremento es bastante homogéneo en todo el territorio, con un incremento ligeramente mayor al oeste.

El cambio proyectado para la precipitación total en días húmedos es menos clarificadora. El escenario RCP8.5 refleja para el último periodo una clara disminución de la precipitación, especialmente en la región oeste, alrededor de 10 mm/día. Esta región experimentará una disminución de la precipitación para todos los periodos y escenarios. Sin embargo, para el primer periodo ambos escenarios proyectan un incremento de la precipitación en una gran área del territorio, en torno a 3 mm/ día.

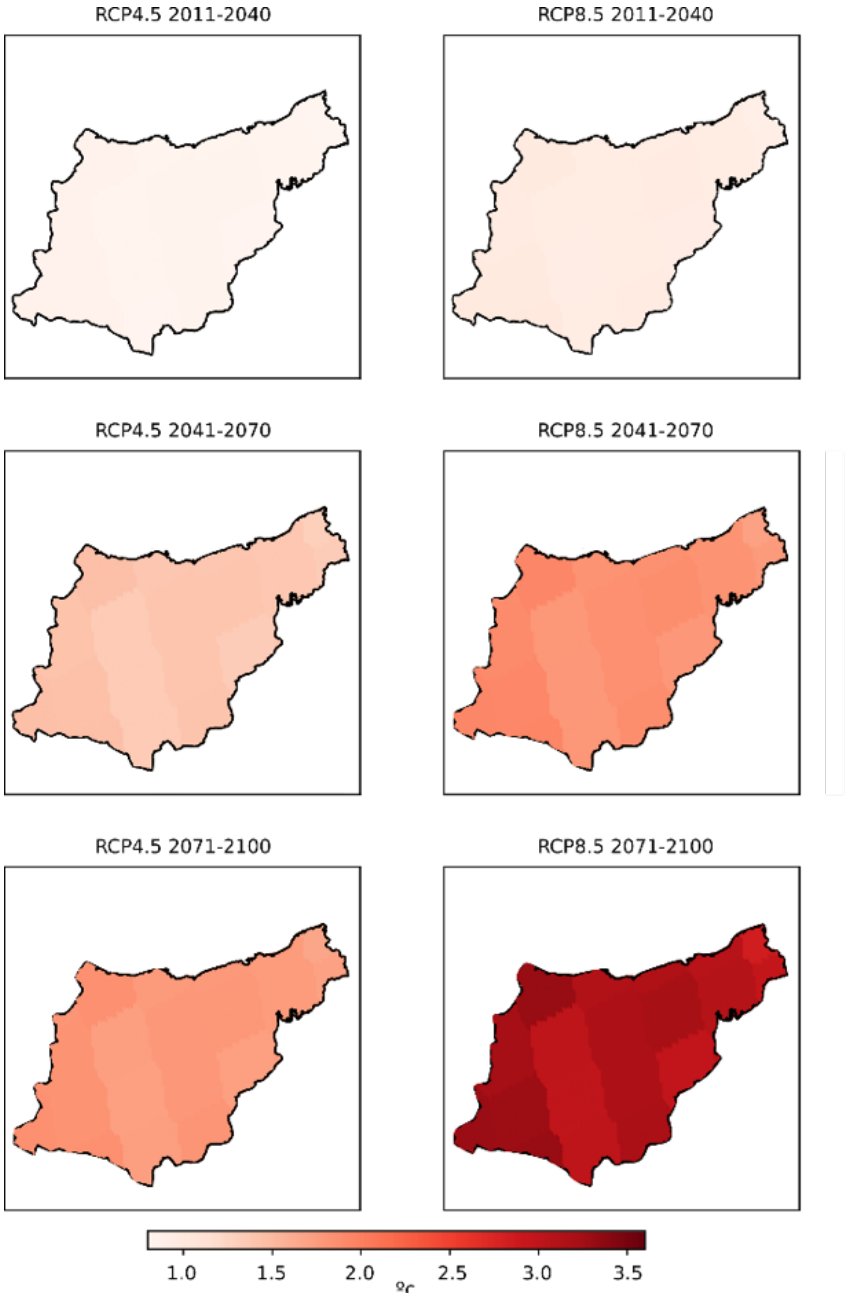


Figura. Temperatura media: anomalías (periodo base 1971-2000) proyectadas por los RCMs de Euro-CORDEX bajo los escenarios RCP4.5 (izquierda) y RCP8.5 (derecha) para los tres periodos futuros: 2011-2040, 2041-2070 y 2071-2100. Elaboración propia a partir de los escenarios de alta resolución de la CAPV (Klimatek, 2016).

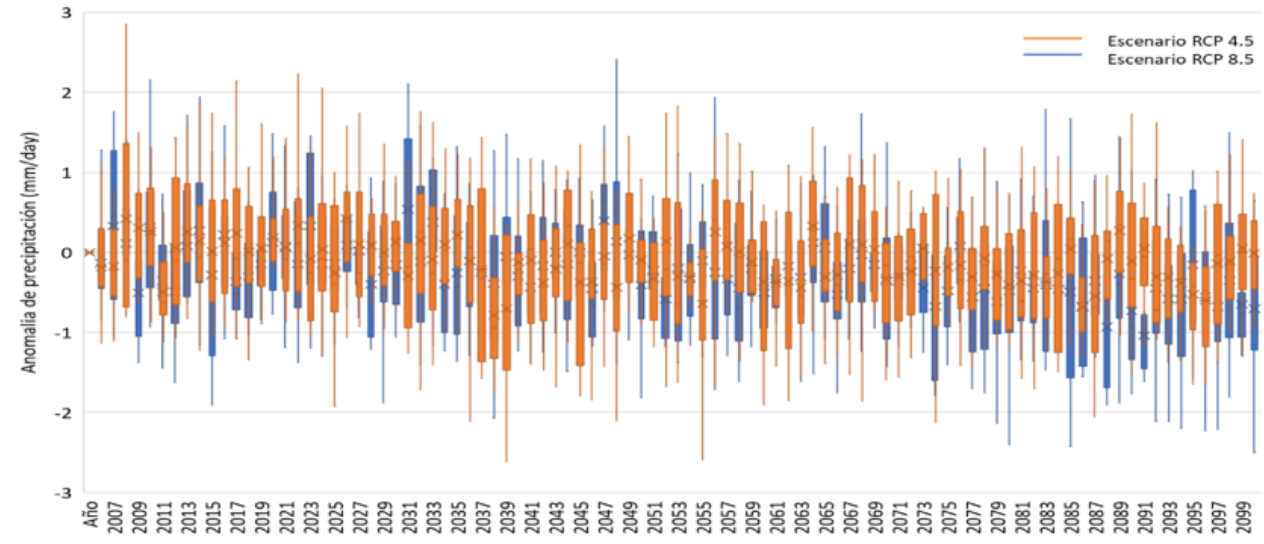


Figura. Proyección de la evolución de la anomalía de precipitación para Gipuzkoa a partir de los datos en el visor de escenarios de cambio climático (AdapteCCa). Fuente: Mº Transición Ecológica

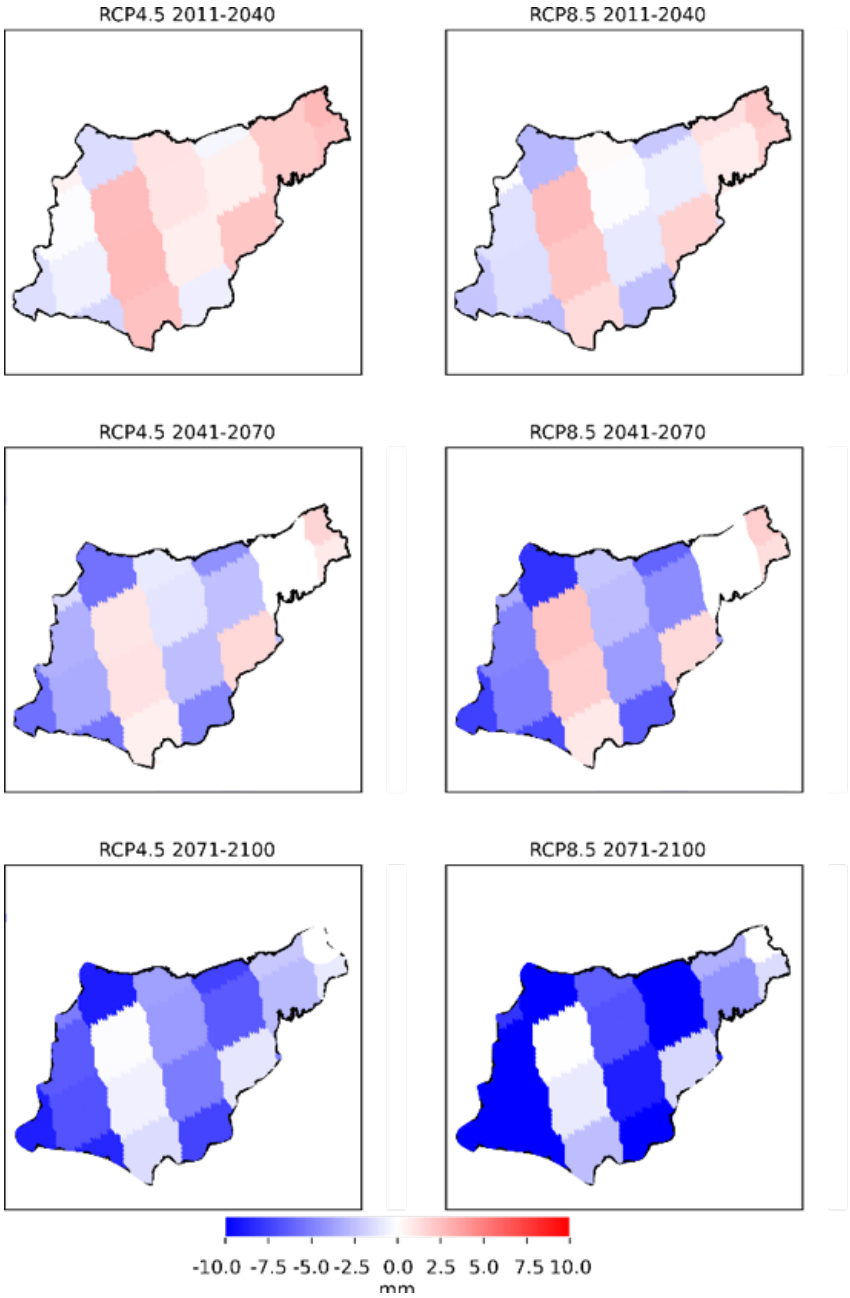


Figura. Precipitación total en días húmedos: anomalías (periodo base 1971-2000) proyectadas por los RCMs de Euro-CORDEX bajo los escenarios RCP4.5 (izquierda) y RCP8.5 (derecha) para los tres periodos futuros: 2011-2040, 2041-2070 y 2071-2100. Elaboración propia a partir de los escenarios de alta resolución de la CAPV (Klimatek, 2016).

SECTORES OBJETO DE ANÁLISIS

La evaluación de los impactos del cambio climático en los diferentes sectores y sistemas parte de la información relativa de los escenarios y proyecciones climáticos, teniendo en cuenta las consecuencias (positivas o negativas) directas y los impactos transversales y acumulados en estos sectores.

Muchos sectores y sistemas ecológicos, económicos y sociales en Gipuzkoa son vulnerables en mayor o menor medida al cambio climático y la evaluación de esta vulnerabilidad y la propuesta de posibles medidas de adaptación es uno de los objetivos de Naturklima. Los principales sectores en los que se centraran los análisis de riesgo, vulnerabilidad y adaptación al cambio climático son:

Recursos hídricos	Transporte
Biodiversidad y recursos terrestres y marino	Salud
Bosques	Urbanismo
Sector primario: agricultura, ganadería y pesca	Energía
Zonas costeras: litoral/acantilados/ playas, ecosistemas costeros	Industria
Edafología	Turismo

Tourism on the Move in a Changing Climate

Rising temperatures, higher sea levels and degraded habitats will have serious impacts on almost every sub-sector of the tourism industry. But options exist to help the industry adapt to climate change.

IMPACTS Changes already affecting the tourism sector

RISKS Likely impacts in the future

ADAPTATION How the industry can respond

MITIGATION How tourism can act to reduce its emissions

Mountain and Snow Tourism

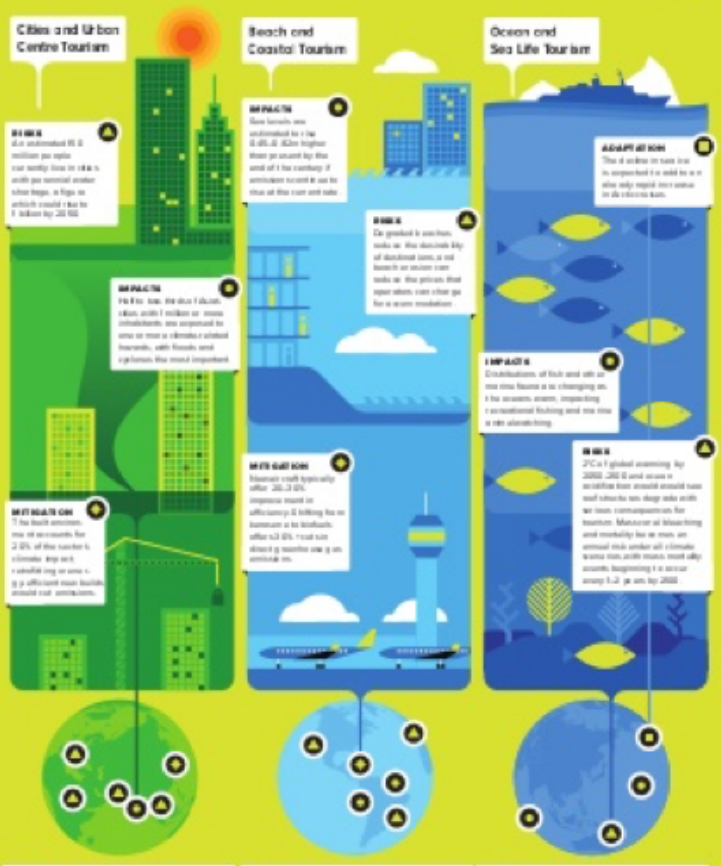
Winter sports, one of the most obvious risks from rising temperatures, with increasingly unreliable snowfalls and shorter seasons. But with all types of mountain tourism are also vulnerable, as infrastructure & people at risk from receding glaciers and thawing permafrost.

Forest and Lake Tourism

Outdoor recreation/tourism is affected by changes in forest abundance and water availability and distribution. Changes in rainfall and higher temperatures are a challenge and an opportunity. Warmer summers will lengthen the season for some activities, but may also increase the risk of wildfires.

Biodiversity and Agricultural Tourism

Changes in natural ecosystems, including species composition and distribution, are a challenge and an opportunity. Changes in rainfall and higher temperatures are a challenge and an opportunity. Changes in rainfall and higher temperatures are a challenge and an opportunity.



Cities and Urban Centre Tourism

City visits account for a large percentage of the global tourism industry. Across the world, city infrastructure is being tested to a range of climate impacts, including extreme heat events, water shortages and flooding. Coastal cities, most notably, are at risk from sea-level rise.

Beach and Coastal Tourism

Rising sea levels and more extreme events are threatening many beaches and coastal infrastructure enjoyed by the millions of tourists who visit each year. With less stable beaches and less reliable visitors, there is more difficult to protect and invest in, leaving them vulnerable.

Ocean and Sea Life Tourism

The combination of rising water temperatures, more frequent ocean acidification, caused by the same type of carbon dioxide, spells trouble for other reef ecosystems and the dive tourism they support. Warming sea temperatures also change the distributions of fish and marine mammals.

Building for a low-carbon future

Effective policies can lead to buildings and wider settlements that are climate resilient and use energy efficiently, so curbing the rise in greenhouse gas (GHG) emissions. There is potential for energy savings of 50–90% in existing and new buildings.

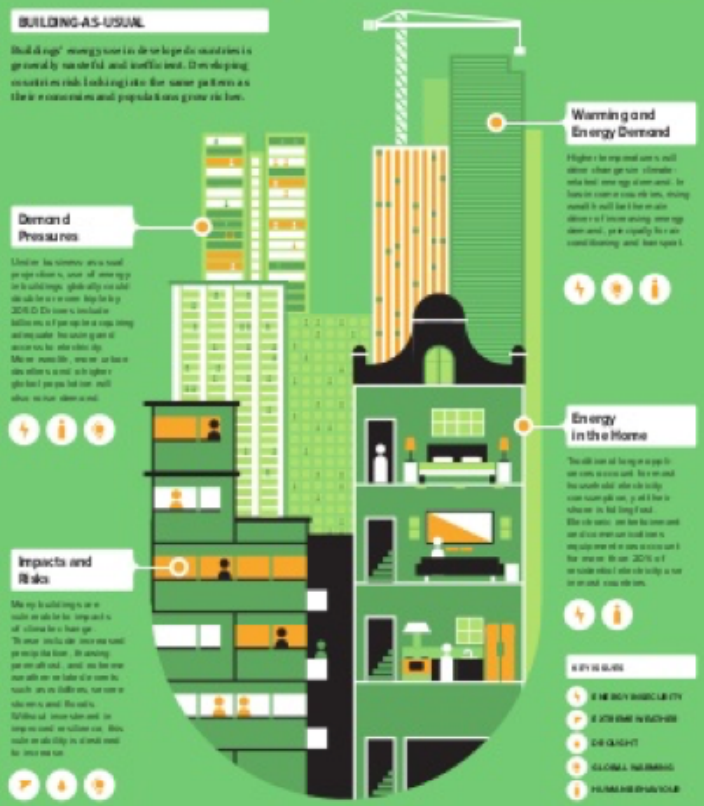
In 2010, buildings accounted for 32% of global final energy use.

In 2010, buildings accounted for 19% of all GHG emissions.

CO_2 emissions in the building sector could double or triple by 2050.

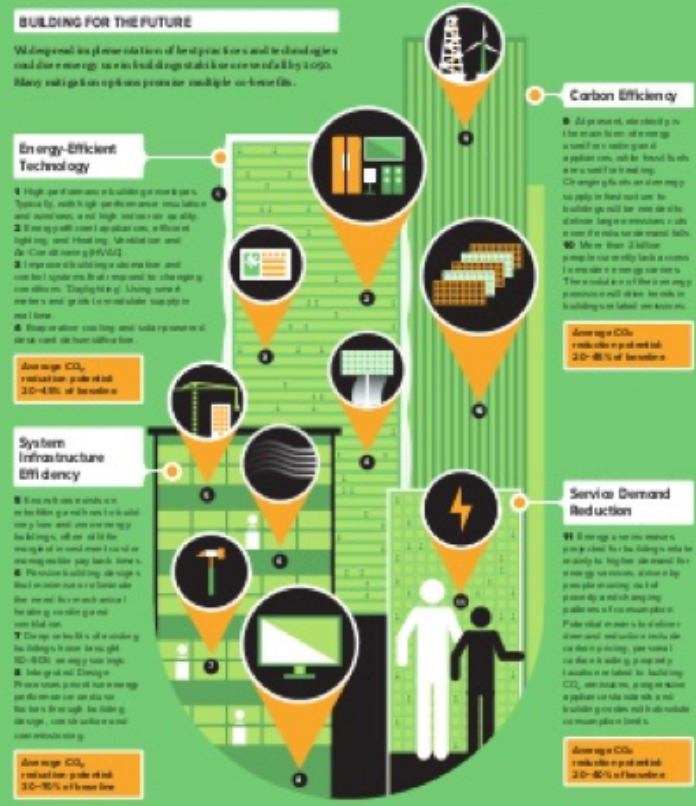
BUILDING-AS-USUAL

Buildings' energy use in developed countries is governed by wasteful and inefficient. Developing countries risk locking into the same patterns as their economies and populations grow rich here.



BUILDING FOR THE FUTURE

Widespread implementation of best practices and technologies could see energy use in buildings stabilise or even fall by 2050. Many mitigation options promise multiple co-benefits.



Cities on the front line of a changing climate

Urban centres account for more than half of the world's population, most of its economic activity and the majority of energy-related emissions. The role of cities in reducing emissions and protecting their inhabitants is therefore central to effective climate policies.

IMPACTS

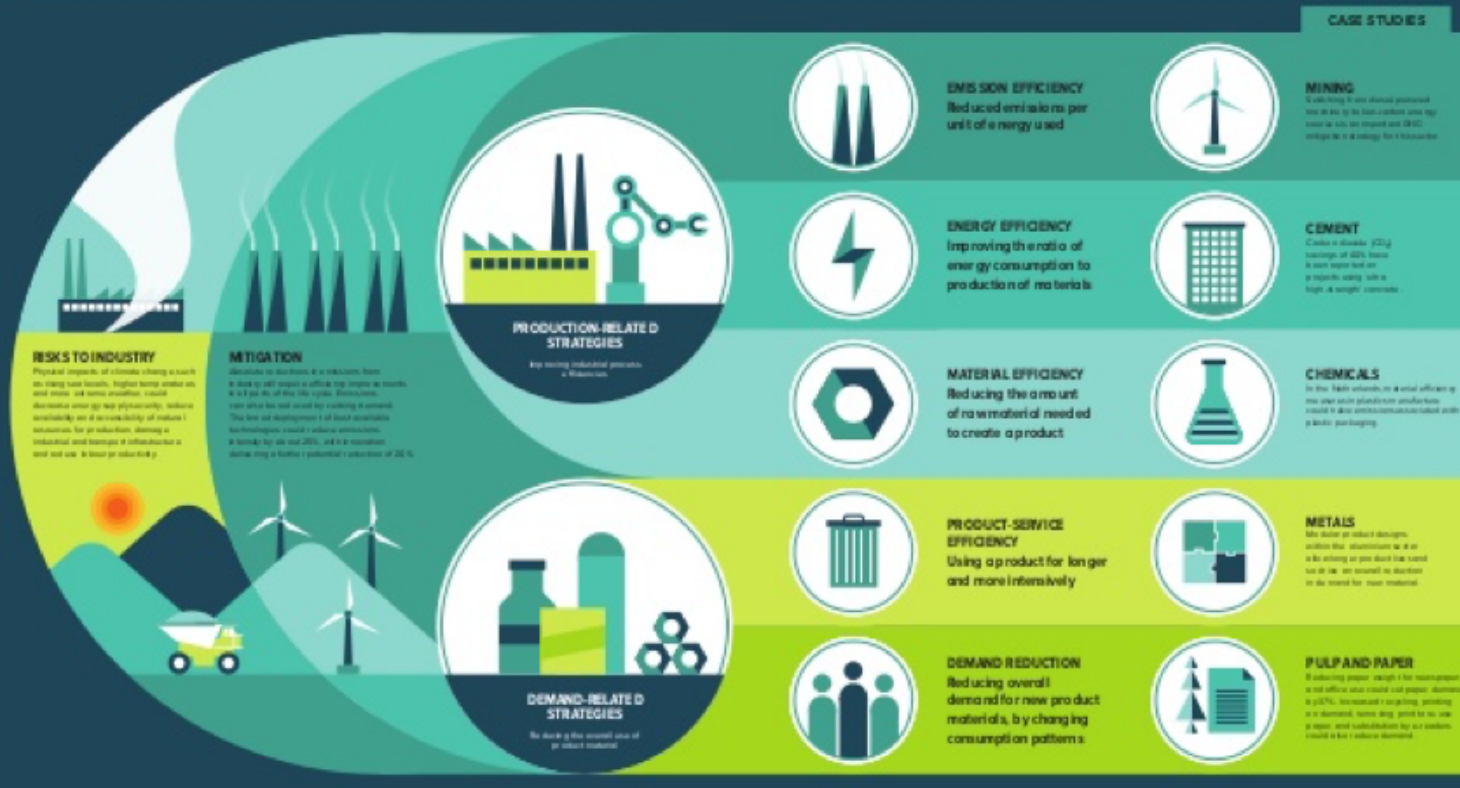
Climate change is expected to affect numerous aspects of urban life.

Adaptation is possible if complex, but cheaper in the long run than doing nothing. How cities adapt to the effects of climate change will vary enormously.

Mitigation efforts can have positive impacts for generations to come

Risks and Opportunities for Extractive and Primary Industries

Climate change is likely to affect many aspects of natural resource exploration and extraction, and the production of industrial commodities. Investments necessary for adaptation and mitigation measures are in many cases cost-effective.



Energy Sector Faces Major Challenges from Climate Change

Without strong mitigation policies, the global average temperature is likely to rise above the internationally agreed 2°C target. As a major source of carbon emissions, the energy sector will be affected by mitigation policies as well as by climate impacts in multiple ways.

→ Key findings from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) | Please visit riskconnect.com/ipcc | riskconnect.org

Global warming, changing regional weather patterns and extreme weather events will affect demand and impact energy production and transmission. Strong global policy action would also have major implications on investments.

Impacts and Adaptations

Power Stations

Thermal power plants will be affected not by the occasional efficiency penalty from ambient temperature rise as a result of rising ambient temperatures, but by reduced water flow resulting from increasing water temperatures, could lead to reduced power output and in extreme cases temporary shutdowns.

Pipelines

Rising permafrost temperatures in Arctic regions will affect oil and gas pipelines in coastal areas, affected by moving landmasses, and those in cold climates, by thawing permafrost. Many existing pipelines were laid at a time when cooling and refrigeration systems were considered adequate and construction standards and materials not upgraded and infrastructure has.

Power lines

Extreme weather events, especially strong winds, could damage power lines. Overhead lines can be more robust to implement and upgrade, despite adaptation measures, including more loading lines, damaged more frequent repairs.

Renewables

Changes in regional weather patterns threaten the impact this hydrological cycle that underpins hydropower plant operations. Hydropower plants may see some increased water availability in some regions, around different solar technologies, particularly in some of the northern and warmer of solar may could damage equipment.

Nuclear

Lack of water and extreme weather could also impact nuclear power plants by disrupting the functioning of cooling equipment and processes.

Emission Reduction Options

Carbon Capture & Storage

A deployment carbon capture and storage (CCS) after fossil fuel plants could reduce emissions. CO_2 storage capacity in large sink aquifers of this technology have been demonstrated. CCS units, burning bioenergy (BECCS) can draw CO_2 from them that be taken via CCS and BECCS remain, including cost.

Increasing Efficiency

Rising efficiency can be improved, by retrofitting existing plant control and applying efficient new ones, improving maintenance and operations and through technology improvement from faucet and extraction and conversion.

Switching Fuels

Switching to lower carbon fuels, (eg from coal to gas) can reduce emissions. Moving for example from an efficiency coal plant to state-of-the-art gas, can halve emissions. If fugitive methane releases is controlled, and can act as a 'bridging technology'.

Alternatives

Increasing use of renewables such as solar, wind and tidal fuels. Increasing use of nuclear power. High exposure is currently the largest single RE contributor, but solar, wind and tidal energy are expected to ramp more this long-term investment edge such.

Reducing Demand

Reducing consumer demand is a key mitigation strategy. This look for demand reduction does removed the tone of the mitigation challenge, looking for a energy sector. Practical limitations from 'rule sound effect' to be taken into consideration.

Policy Framework

In addition all countries will, which could be facilitated by political measures and/or sub-nations, are required in the energy supply system for to keep the global temperature increase below 2°C.

Largest GHG Contributor

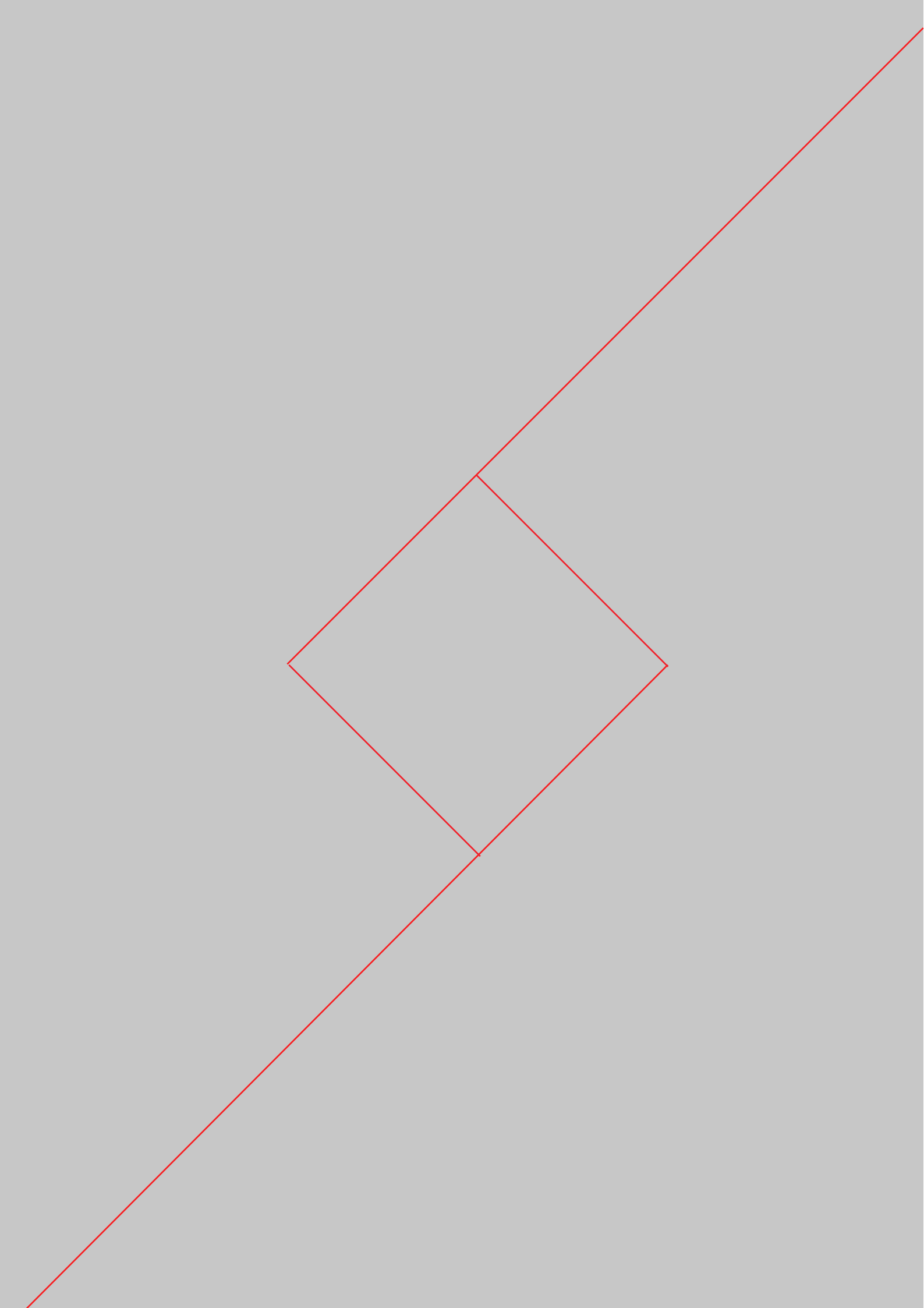
The energy sector is the largest source of global this one gas (GHG) emissions. Meeting this 2°C target implies ability making this cross emissions for the full energy system and is ongoing them to zero both at the end a this century, with a likely need for 'negative emissions technology such as BECCS.

Regulatory Frameworks

Consistent units, may facilitate an increased use of emissions reduction cap forms, by enabling an efficient focus and regulatory framework is.

Investment in Technology

Most technologies given to a need for efficiency improvements, power generation, transmission and distribution.

Carbon Pricing

Per gross removal and regulation, a tax, refuelling a still tax to, ensures a price of carbon that is an incentive and a cost of investment in low-carbon technologies.