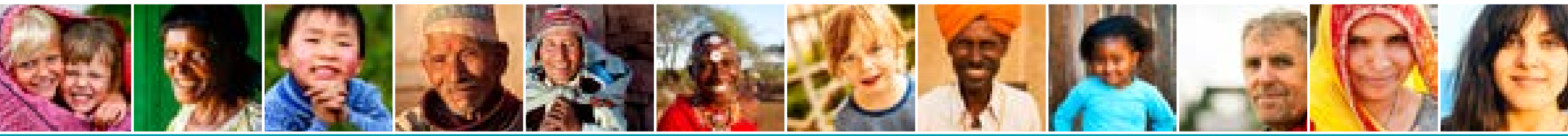
CLIMATE AND HEALTH COUNTRY PROFILE – 2015

FRANCE

World Health Organization

United Nations Framework Convention on Climate Change



OVERVIEW

The Republic of France[a] is a high-income country and the sixth-largest economy in terms of GDP [World Bank, GDP ranking, 2016]. France is largely seen as an environmental global leader: cutting greenhouse gas emissions across sectors in recent years, implementing initiatives in energy, transport and agricultural industries (amongst others) and contributing significant funds in the global fight against climate change.

Mainland France (not including Overseas Territories) has a mainly temperate climate, with mountainous alpine regions and a Mediterranean climate on the south coast. However, the heat waves in the summers of 2003 and 2006 are a stark illustration of the morbidity and mortality that can result from high temperatures, particularly in vulnerable populations; and climate change is likely to increase the intensity and frequency of such events. A 2009 report by The French National Observatory on the Effects of Global Warming (ONERC) indicated that between 2050 and 2100 climate change could lead to: extreme weather events, increased heat stress, losses in the agricultural sector, a decline in water resources in zones already under pressure, sea-level rise and an extension of areas affected by soil degradation.[b] Changing weather patterns could also impact the emergence, distribution and prevalence of vector-borne diseases in France such as Chikungunya, Dengue, Yellow fever and leishmaniose.

Regional differences in potential climate change impacts exist and therefore require specific planning and adaptation strategies. The French national climate change adaptation plan, adopted in 2011, outlines common operational measures with a focus on public safety and health, prevention of risk inequalities, limiting costs and preserving national heritage.[b]

In 1971, France became one of the first countries to create an environment ministry. As part of the EU's INDC submission, France commits to a minimum 40% domestic reduction in greenhouse gas emissions by 2030, compared to 1990 [EU INDC, 2015].

SUMMARY OF KEY FINDINGS

- In France, under a high emissions scenario, mean annual temperature is projected to rise by about 4.9°C on average from 1990 to 2100. If global emissions decrease rapidly, the temperature rise is limited to about 1.4°C (page 2).
- In France, under a high emissions scenario, and without large investments in adaptation, an annual average of about 435,100 people are projected to be affected by flooding due to sea level rise each year between 2070 and 2100. If global emissions decrease rapidly and there is a major scale up in protection the annual affected population could be limited to about 900 people (page 3).
- In France, under a high emissions scenario heat-related deaths in the elderly (65+ years) are projected to increase to about 61 deaths per 100,000 by 2080 compared to the estimated baseline of about 4 deaths per 100,000 annually between 1961 and 1990. A rapid reduction in global emissions could limit heat-related deaths in the elderly to about 11 deaths per 100,000 in 2080 (page 4).

OPPORTUNITIES FOR ACTION

France has an approved national health adaptation strategy and is currently implementing projects on health adaptation to climate change. France has a national strategy for climate change mitigation which includes considerations of the health implications of mitigation actions. Additionally, France has conducted a valuation of the health co-benefits of climate change mitigation policies. Country reported data (see section 6) indicate that there are further opportunities for action in the following areas:

1) Adaptation

- Conduct a national assessment of climate change impacts, vulnerability and adaptation for health.
- Estimate the costs to implement health resilience to climate change and include these costs in planned allocations.

DEMOGRAPHIC ESTIMATES	
Population (2013)[c]	63.84 million
Population growth rate (2013)[c]	0.4%
Population living in urban areas (2013)[d]	79.1%
Population under five (2013)[c]	6.2%
Population aged 65 or over (2013)[c]	18.2%
ECONOMIC AND DEVELOPMENT INDICATORS	
GDP per capita (current US$, 2013)[e]	40,925 USD
Total expenditure on health as % of GDP (2013)[f]	11.7%
Percentage share of income for lowest 20% of population (2010)[e]	NA
HDI (2013, +/- 0.01 change from 2005 is indicated with arrow)[g]	0.884 ▲
HEALTH ESTIMATES	
Life expectancy at birth (2013)[h]	82 years
Under-5 mortality per 1000 live births (2013)[i]	4

a All data and descriptions included in this country profile refer to Mainland France and do not include Overseas Territories.
b The French National Observatory on the Effects of Global Warming (ONERC), 2009. As cited in The sixth national communication of France to the United Nations Framework Convention on Climate Change, 2013.
c World Population Prospects: The 2015 Revision, UNDESA (2015)
d World Urbanization Prospects: The 2014 Revision, UNDESA (2014)
e World Development Indicators, World Bank (2015)
f Global Health Expenditure Database, WHO (2014)
g United Nations Development Programme, Human Development Reports (2014)
h Global Health Observatory, WHO (2014)
i Levels & Trends in Child Mortality Report 2015, UN Inter-agency Group for Child Mortality Estimation (2015)

1 CURRENT AND FUTURE CLIMATE HAZARDS

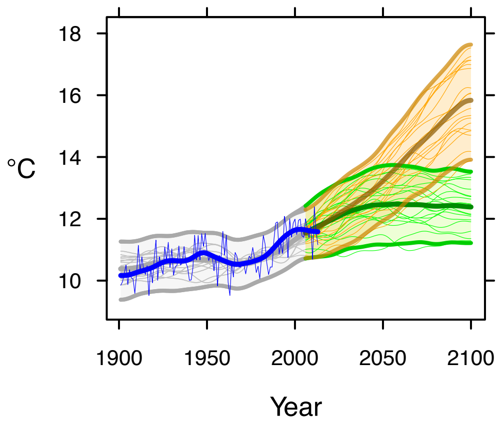
Due to climate change, many climate hazards and extreme weather events, such as heat waves, heavy rainfall and droughts, could become more frequent and more intense in many parts of the world.

Outlined here are country–specific projections up to the year 2100 for climate hazards under a 'business as usual' high emissions scenario compared to projections under a 'two-degree' scenario with rapidly decreasing global emissions. Most hazards caused by climate change will persist for many centuries.

COUNTRY-SPECIFIC CLIMATE HAZARD PROJECTIONS

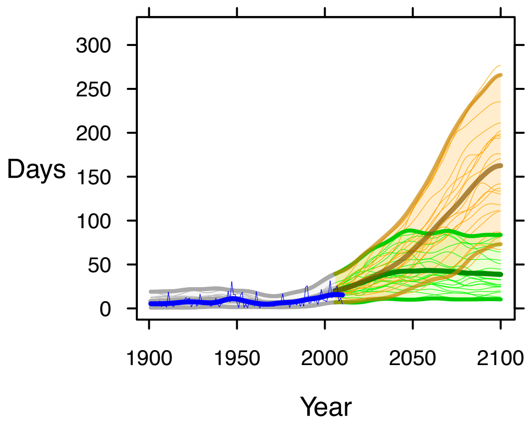
The model projections below present climate hazards under a high emissions scenario, Representative Concentration Pathway 8.5 [RCP8.5] (in orange) and a low emissions scenario, [RCP2.6] (in green).[a] The text boxes describe the projected changes averaged across about 20 models (thick line). The figures also show each model individually as well as the 90% model range (shaded) as a measure of uncertainty and, where available, the annual and smoothed observed record (in blue).[b,c]

MEAN ANNUAL TEMPERATURE



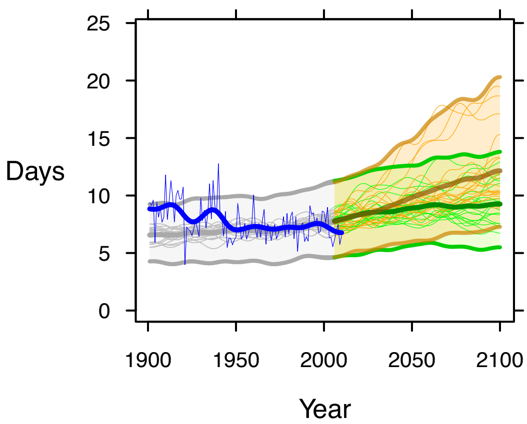
Under a high emissions scenario, mean annual temperature is projected to rise by about 4.9°C on average from 1990 to 2100. If emissions decrease rapidly, the temperature rise is limited to about 1.4°C.

DAYS OF WARM SPELL ('HEAT WAVES')



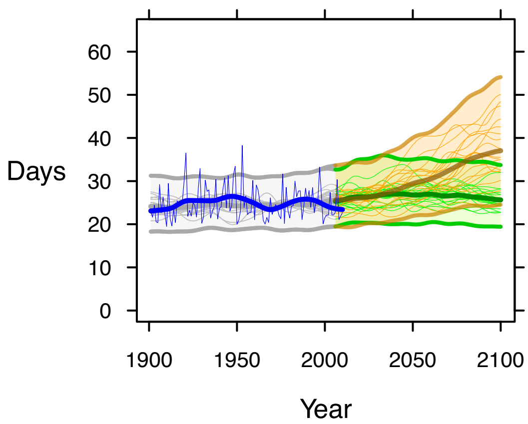
Under a high emissions scenario, the number of days of warm spell[d] is projected to increase from about 10 days in 1990 to about 160 days on average in 2100. If emissions decrease rapidly, the days of warm spell are limited to about 40 on average.

DAYS WITH EXTREME RAINFALL ('FLOOD RISK')



Under a high emissions scenario, the number of days with very heavy precipitation (20 mm or more) could increase by about 5 days on average from 1990 to 2100, increasing the risk of floods. Some models indicate increases outside the range of historical variability, implying even greater risk. If emissions decrease rapidly, the risk is much reduced.

CONSECUTIVE DRY DAYS ('DROUGHT')



Under a high emissions scenario, the longest dry spell is indicated to increase by about 12 days on average, from about 25 days in 1990, with continuing large year-to-year variability. If emissions decrease rapidly, there is little if any increase.

a Model projections are from CMIP5 for RCP8.5 (high emissions) and RCP2.6 (low emissions). Model anomalies are added to the historical mean and smoothed.
b Observed historical record of mean temperature is from CRU-TSv.3.22; observed historical records of extremes are from HadEX2.
c Analysis by the Climatic Research Unit and Tyndall Centre for Climate Change Research, University of East Anglia, 2015.
d A 'warm spell' day is a day when maximum temperature, together with that of at least the 6 consecutive previous days, exceeds the 90th percentile threshold for that time of the year.

2 CURRENT AND FUTURE HEALTH RISKS DUE TO CLIMATE CHANGE

Human health is profoundly affected by weather and climate. Climate change threatens to exacerbate today's health problems – deaths from extreme weather events, cardiovascular and respiratory diseases, infectious diseases and malnutrition – whilst undermining water and food supplies, infrastructure, health systems and social protection systems.

ANNUAL EXPOSURE TO FLOODING DUE TO SEA LEVEL RISE, FRANCE (2070–2100)

Severity of climate change scenario

	Without Adaptation	With Adaptation
RCP2.6	71,700	900
RCP8.5	435,100	1,200

* Medium ice melting scenario   ** Values rounded to nearest '00

Under a high emissions scenario, and without large investments in adaptation, an annual average of 435,100 people are projected to be affected by flooding due to sea level rise between 2070 and 2100. If global emissions decrease rapidly and there is a major scale up in protection (i.e. continued construction/raising of dikes) the annual affected population could be limited to about 900 people. Adaptation alone will not offer sufficient protection, as sea level rise is a long-term process, with high emissions scenarios bringing increasing impacts well beyond the end of the century.

Source: Human dynamics of climate change, technical report, Met Office, HM Government, UK, 2014.

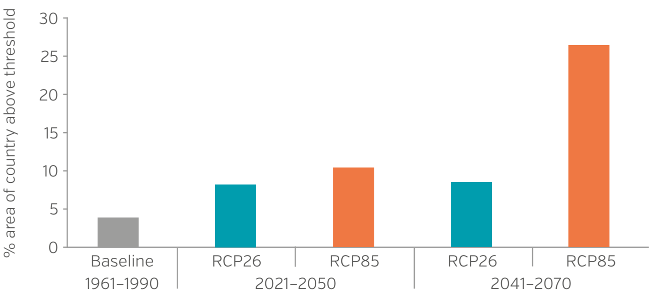
KEY IMPLICATIONS FOR HEALTH

France also faces inland river flood risk. It is projected, that by 2030, an additional 74,300 people may be at risk of river floods annually as a result of climate change and 34,500 due to socio economic change above the estimated 62,900 annually affected population in 2010.[a]

In addition to deaths from drowning, flooding causes extensive indirect health effects, including impacts on food production, water provision, ecosystem disruption, infectious disease outbreak and vector distribution. Longer term effects of flooding may include post-traumatic stress, mental health issues, and population displacement.

INFECTIOUS AND VECTOR-BORNE DISEASES

Dengue fever transmission in France
% area of the country with 3 months or greater above threshold for dengue transmission



Under a high emissions scenario, about 26% percent of the geographic area of France is projected to exceed the threshold deemed suitable for dengue transmission for at least three months of the year. This is compared to the baseline of less than 5% percent of the country annually between 1961 and 1990. If emissions decline rapidly this increase could be limited to about 9% of the geographic area of the country. [Source: Rocklöv, J., Quam, M. et al., 2015.[d]]

Other vector-borne diseases that may be affected by climate change in France include Chikungunya, Yellow fever and leishmaniose.

KEY IMPLICATIONS FOR HEALTH

Some of the worlds most virulent infections are also highly sensitive to climate: temperature , precipitation and humidity have a strong influence on the life-cycles of the vectors and the infectious agents they carry and influence the transmission of water and food-borne diseases.[b]

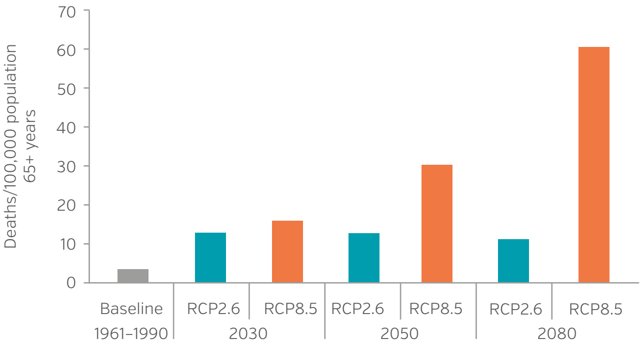
Vector-borne diseases that may be affected by climate change in France include Chikungunya, Dengue, Yellow fever and leishmaniose.

Socioeconomic development and health interventions are driving down burdens of several infectious diseases, and these projections assume that this will continue. However, climate conditions are projected to become significantly more favourable for transmission, slowing progress in reducing burdens, and increasing the populations at risk if control measures are not maintained or strengthened.[c]

a World Resources Institute, http://www.wri.org. Aqueduct Global Flood Analyzer. Assumes continued current socioeconomic trends (SSP2) and a 100-year flood protection.
b Atlas of Health and Climate, World Health Organization and World Meteorological Organization, 2012.
c Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. Geneva: World Health Organization, 2014.
d Country-level analysis, completed in 2015, was based on health models outlined in the Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. Geneva: World Health Organization, 2014. The mean of impact estimates for three global climate models are presented. Models assume continued socioeconomic trends (SSP2 or comparable).

HEAT-RELATED MORTALITY

Heat-related mortality in population 65 years or over, France (deaths / 100,000 population 65+ yrs)



Under a high emissions scenario heat-related deaths in the elderly (65+ years) are projected to increase to about 61 deaths per 100,000 by 2080 compared to the estimated baseline of about 4 deaths per 100,000 annually between 1961 and 1990. A rapid reduction in global emissions could limit heat-related deaths in the elderly to about 11 deaths per 100,000 in 2080.

Source: Honda et al., 2015.[a]

KEY IMPLICATIONS FOR HEALTH

Climate change is expected to increase mean annual temperature and the intensity and frequency of heat waves resulting in a greater number of people at risk of heat-related medical conditions.

The elderly, children, the chronically ill, the socially isolated and at-risk occupational groups are particularly vulnerable to heat-related conditions.

In Mainland France, heat waves have already been associated with a large excess mortality including: over 15,000 deaths in 2003, over 1,600 deaths in 2006, and over 3,000 deaths in 2015. [Source: Country reported data]

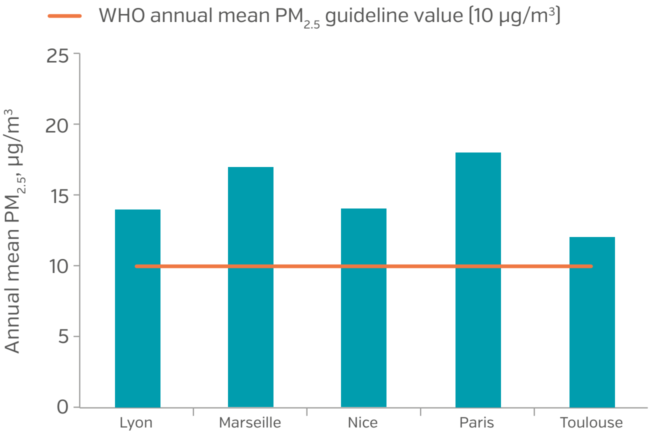
a Country-level analysis, completed in 2015, was based on health models outlined in the Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. Geneva: World Health Organization, 2014. The mean of impact estimates for three global climate models are presented. Models assume continued socioeconomic trends (SSP2 or comparable).

3 CURRENT EXPOSURES AND HEALTH RISKS DUE TO AIR POLLUTION

Many of the drivers of climate change, such as inefficient and polluting forms of energy and transport systems, also contribute to air pollution. Air pollution is now one of the largest global health risks, causing approximately seven million deaths every year. There is an important opportunity to promote policies that both protect the climate at a global level, and also have large and immediate health benefits at a local level.

OUTDOOR AIR POLLUTION EXPOSURE

Outdoor air pollution in cities in France annual mean $PM_{2.5}$ (μg/m³) 2014*



In 2014, some of the most populated cities for which there was air pollution data available had annual mean $PM_{2.5}$ levels that were above the WHO guideline value of 10 μg/m³. Source: Ambient Air Pollution Database, WHO, May 2016.

KEY IMPLICATIONS FOR HEALTH

Outdoor air pollution can have direct and sometimes severe consequences for health.

Fine particles which penetrate deep into the respiratory tract subsequently increase mortality from respiratory infections, lung cancer and cardiovascular disease.

OUTDOOR AIR POLLUTION AND SHORT LIVED CLIMATE POLLUTANTS

Short-lived climate pollutants (SLCPs) such as black carbon, methane and tropospheric ozone are released through inefficient use and burning of biomass and fossil fuels for transport, housing, power production, industry, waste disposal (municipal and agricultural) and forest fires. SLCPs are responsible for a substantial fraction of global warming as well as air-pollution related deaths and diseases. Since short lived climate pollutants persist in the atmosphere for weeks or months while CO_2 emissions persist for years, significant reductions of SLCP emissions could reap immediate health benefits and health cost savings,[a] and generate very rapid climate benefits – helping to reduce near-term climate change by as much as 0.5°C before 2050.[a]

In France, it is projected that a reduction in SLCPs* could prevent about 2,100 premature deaths per year from outdoor air pollution, from 2030 onwards (Source: Shindell, D., Science, 2012).

* Through implementation of 14 reduction measures: 7 targeting methane emissions and the rest, emissions from incomplete combustion. See source for further detail.

a United Nations Environment Programme. Reducing Climate-related Air Pollution and Improving Health: Countries can act now and reap immediate benefits. http://www.unep.org/ccac/Media/PressReleases/ReducingClimate-relatedAirPollution/tabid/131802/language/en-US/Default.aspx

4 CO-BENEFITS TO HEALTH FROM CLIMATE CHANGE MITIGATION: A GLOBAL PERSPECTIVE

Health co-benefits are local, national and international measures with the potential to simultaneously yield large, immediate public health benefits and reduce the upward trajectory of greenhouse gas emissions. Lower carbon strategies can also be cost-effective investments for individuals and societies.

Presented here are examples, from a global perspective, of opportunities for health co-benefits that could be realised by action in important greenhouse gas emitting sectors.[a]

Transport

Transport injuries lead to 1.2 million deaths every year, and land use and transport planning contribute to the 2–3 million deaths from physical inactivity. The transport sector is also responsible for some 14% (7.0 $GtCO_2e$) of global carbon emissions. The IPCC has noted significant opportunities to reduce energy demand in the sector, potentially resulting in a 15%–40% reduction in CO_2 emissions, and bringing substantial opportunities for health: A modal shift towards walking and cycling could see reductions in illnesses related to physical inactivity and reduced outdoor air pollution and noise exposure; increased use of public transport is likely to result in reduced GHG emissions; compact urban planning fosters walkable residential neighborhoods, improves accessibility to jobs, schools and services and can encourage physical activity and improve health equity by making urban services more accessible to the elderly and poor.

Electricity Generation

Current patterns of electricity generation in many parts of the world, particularly the reliance on coal combustion in highly polluting power plants, contribute heavily to poor local air quality, causing cancer, cardiovascular and respiratory disease. Outdoor air pollution is responsible for 3.7 million premature deaths annually. High-income countries still have work to do in transitioning to cleaner and healthier energy sources.

The health benefits of transitioning from fuels such as coal to lower carbon sources, including ultimately to renewable energy, are clear: Reduced rates of cardiovascular and respiratory disease such as stroke, lung cancer, coronary artery disease, and COPD; cost-savings for health systems; improved economic productivity from a healthier and more productive workforce.

Food and Agriculture

Agricultural emissions account for some 5.0–5.8 $GtCO_2eq$ annually, with food and nutrition constituting an important determinant of health. Many high-income countries are feeling the burden of poor diet and obesity-related diseases, with some 1.9 billion adults overweight globally.

A wide range of interventions designed to reduce emissions from agriculture and land-use will also yield positive benefits for public health. For example, policy and behavioural interventions to encourage a reduction in red meat consumption and a shift towards local and seasonal fruit and vegetables, which tend to have lower carbon emissions associated with their production, will improve diets and result in reductions in cardiovascular disease and colorectal cancer.

Healthcare Systems

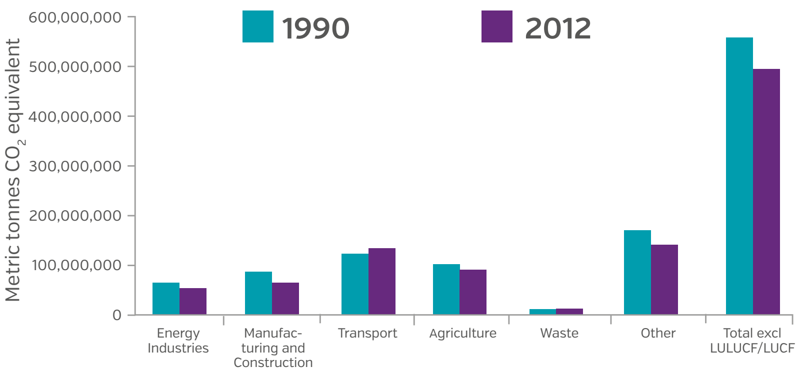
Health care activities are an important source of greenhouse gas emissions. In the US and in EU countries, for example, health care activities account for between 3–8% of greenhouse gas (CO_2-eq) emissions. Major sources include procurement and inefficient energy consumption. Modern, on-site, low-carbon energy solutions (e.g. solar, wind, or hybrid solutions) and the development of combined heat and power generation capacity in larger facilities offer significant potential to lower the health sector's carbon footprint, particularly when coupled with building and equipment energy efficiency measures. Where electricity access is limited and heavily reliant upon diesel generators, or in the case of emergencies when local energy grids are damaged or not operational, such solutions can also improve the quality and reliability of energy services. In this way, low carbon energy for health care could not only mitigate climate change, it could enhance access to essential health services and ensure resilience.

a For a complete list of references used in the health co-benefits text please see the Climate and Health Country Profile Reference Document, http://www.who.int/globalchange/en/

5 EMISSIONS AND COMMITMENTS

Global carbon emissions increased by 80% from 1970 to 2010, and continue to rise.[a,b] Collective action is necessary, but the need and opportunity to reduce greenhouse gas emissions varies between countries. Information on the contribution of different sectors, such as energy, manufacturing, transport and agriculture, can help decision-makers to identify the largest opportunities to work across sectors to protect health, and address climate change.

FRANCE ANNUAL GREENHOUSE GAS EMISSIONS
(metric tonnes CO_2 equivalent)



Source: UNFCCC Greenhouse Gas Data Inventory, UNFCCC (2015).

A 2°C upper limit of temperature increase relative to pre-industrial levels has been internationally agreed in order to prevent severe and potentially catastrophic impacts from climate change. Reductions are necessary across countries and sectors. In order to stay below the 2°C upper limit it is estimated that global annual CO_2-energy emissions, currently at 5.2 tons per capita, need to be reduced to 1.6 tons per capita.[c]

The most recent greenhouse gas emissions data for France is from the year 2012. At that time, carbon emissions were highest in the transport, agriculture and 'other'* sectors. Through intersectoral collaboration, the health community can help to identify the best policy options not only for continued reduction in greenhouse gas emissions, but also to provide the largest direct benefits to health.

* See source for description of 'other' emission category.

NATIONAL RESPONSE[d]

1992	FRANCE SIGNS THE UNFCCC
2000	NATIONAL PROGRAMME FOR TACKLING CLIMATE CHANGE 2000/2010
2003	FRANCE RATIFIES THE KYOTO PROTOCOL
2004/2006	NATIONAL CLIMATE PLAN
2007	VEHICLE CO2 BONUS AND PENALTY SYSTEM
2009	GRENELLE I (2009) TO STATE THE PRINCIPLES OF THE GRENELLE PROCESS, WHICH ADDRESSES ISSUES OF CLIMATE CHANGE AND ENVIRONMENTAL POLICY IN FRANCE

a Boden, T.A., G. Marland, and R.J. Andres (2010). Global, Regional, and National Fossil-Fuel CO_2 Emissions. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A. doi 10.3334/CDIAC/00001_V2010.
b IPCC (2014) Blanco G., R. Gerlagh, S. Suh, J. Barrett, H.C. de Coninck, C.F. Diaz Morejon, R. Mathur, N. Nakicenovic, A. Ofosu Ahenkora, J. Pan, H. Pathak, J. Rice, R. Richels, S.J. Smith, D.I. Stern, F.L. Toth, and P. Zhou, 2014: Drivers, Trends and Mitigation. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom
c Pathways to deep decarbonization, Sustainable development Solutions Network, 2014 report.
d Columbia Law School, 'Climate Change Laws Of The World'. N.p., 2015.

6 NATIONAL POLICY RESPONSE

The following table outlines the status of development or implementation of climate resilient measures, plans or strategies for health adaptation and mitigation of climate change (reported by countries).[a]

GOVERNANCE AND POLICY	
Country has identified a national focal point for climate change in the Ministry of Health	✓
Country has a national health adaptation strategy approved by relevant government body	✓
The National Communication submitted to UNFCCC includes health implications of climate change mitigation policies	✓
HEALTH ADAPTATION IMPLEMENTATION	
Country is currently implementing projects or programmes on health adaptation to climate change	✓
Country has implemented actions to build institutional and technical capacities to work on climate change and health	✓
Country has conducted a national assessment of climate change impacts, vulnerability and adaptation for health	✗
Country has climate information included in Integrated Disease Surveillance and Response (IDSR) system, including development of early warning and response systems for climate-sensitive health risks	✓
Country has implemented activities to increase climate resilience of health infrastructure	✓
FINANCING AND COSTING MECHANISMS	
Estimated costs to implement health resilience to climate change included in planned allocations from domestic funds in the last financial biennium	✗
Estimated costs to implement health resilience to climate change included in planned allocations from international funds in the last financial biennium	PARTLY
HEALTH BENEFITS FROM CLIMATE CHANGE MITIGATION	
The national strategy for climate change mitigation includes consideration of the health implications (health risks or co-benefits) of climate change mitigation actions	✓
Country has conducted valuation of co-benefits of health implications of climate mitigation policies	✓

a Supporting monitoring efforts on health adaptation and mitigation of climate change: a systematic approach for tracking progress at the global level. WHO survey, 2015.

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