Analytical brief

SANTÉ MONDIALE 2030

CLIMATE ACTION AND HEALTH:

Same urgency, shared benefits

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The members of the group participate in their personal capacities and not on behalf of their respective organizations. This document is the product of collective work within the group. It does not engage, nor reflect, the individual opinion of any of its members.

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ACRONYMS

ADEME	French Environment and Energy Management Agency
AFOLU	Agriculture, Forestry, and Other Land Use
COPD	Chronic Obstructive Pulmonary Disease
COMEAP	Committee on the Medical Effects of Air Pollutants
CH_4	Methane
CO_2	Carbon dioxyde
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
NH_3	Ammonia
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxide
O_3	Ozone
WHO	World Health Organization
PM_{10}	Particulate matter with diameter less than 10 µm
$PM_{2.5}$	Particulate matter with diameter less than 2.5 µm

EXECUTIVE SUMMARY

Climate change already constitutes a threat to population health, and its impacts are expected to intensify over the coming decades. Climate action is therefore a public health emergency. Yet, ten years after the signing of the Paris Agreement on Climate Change, greenhouse gas (GHG) emissions have not decreased significantly, thereby exacerbating risks to global health.

However, mitigation policies implemented across different sectors, beyond their climate objectives, can generate benefits for population health. These indirect and concomitant positive effects are generally referred to as health co-benefits. By acting on transport, agriculture, industry, and the building sector, it is possible to improve public health while reducing greenhouse gas emissions. Measures integrated into these policies offer substantial health co-benefits, often local and already effective in the short term, sometimes within just a few hours. Available modelling suggests that, in the vast majority of cases, avoided health costs offset, or even exceed, the investments required to reduce emissions. Health co-benefits have been documented across several sectors:

ENERGY: **5 million deaths per year worldwide** among individuals over the age of 25 could be avoided through a phase-out of fossil fuels and the resulting improvement in air quality.

TRANSPORT: **active mobility** (walking, cycling) reduces mortality (–15% of avoided mortality among individuals aged 40–74 linked to levels of physical activity consistent with WHO recommendations), limits cardiovascular diseases, improves air quality, and promotes mental health.

FOOD: **diets lower in animal-based products and rich in plant-based foods** make it possible to reduce mortality (–27% of total mortality, and more with the adoption of a "planetary health" diet), chronic diseases, and GHG emissions.

HOUSING: **thermal renovation** reduces energy poverty and air pollution, both of which are associated with increased risks of mortality and respiratory diseases.

When designed with specific attention to the most vulnerable populations, policies generating co-benefits could **also help reduce social health inequalities** by decreasing environmental exposures disproportionately affecting these groups and by encouraging the adoption of protective behaviours.

Integrating health co-benefits into climate policies can serve as **a lever for engagement and thus improve public acceptance and participation**: health-related messages may be more effective in mobilising the public, opinion leaders, and decision-makers, including those less sensitive to climate issues. They offer a cross-cutting lever to accelerate the transition.

Thus, integrating "health" objectives into climate, sectoral, and territorial policies would make it possible to maximise health co-benefits, reduce social inequalities, and strengthen collective support for the transition.

FRAMING OF THE BRIEF

On health co-benefits

This brief focuses on the health co-benefits of climate change mitigation policies. Throughout the document, we deliberately use the term health co-benefits for two reasons. First, it is a term widely used in the international literature and one that is particularly emphasised in the Sixth and most recent Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). Second, in the field of health, this term makes it possible to distinguish between the mitigation of the consequences of climate change on human health – considered a benefit of climate action in the conventional sense – and the short-term modification of certain health determinants brought about by these same climate actions (co-benefits).

A focus on the highest GHG-emitting countries

This brief deliberately focuses on the specific context of high-income and middle-income countries, which are the largest emitters of GHGs, as these are the countries most directly concerned by international emission reduction targets.

INTRODUCTION

Current anthropogenic global warming has now exceeded 1.36°C relative to the pre-industrial era[1]. Climate change affects all regions of the world without exception[2]; its health impacts are already observable and are expected to intensify over the coming decades. The IPCC identifies numerous harmful effects of climate change on human health, including heatwave-related mortality, the spread of vector-borne diseases, and the deterioration of mental health[2]. As early as 2015, the Lancet Commission on Climate Change and Health warned: "The effects of climate change on a global population of 9 billion people threaten to undermine the progress made over the past fifty years in development and global health"[3].

In the face of limited adaptive capacity in many territories in terms both of resources and due to increasing climate risks, the rapid and structural reduction of greenhouse gas emissions appears as a public health imperative. Yet, the Paris Agreement objective of limiting warming to +1.5°C is now largely out of reach given current trends. The climate commitments set out in nationally determined contributions place the world on a warming trajectory of +2 to +3°C by the end of the century[4]. The IPCC report emphasises that it will become increasingly difficult, after 2030, to limit warming to below 2°C if current trends are not reversed. A study published in 2025 warns that there is now a very high probability that global warming will reach – and even exceed – 1.5°C, due to the failure to curb global CO_2 emissions, while the remaining carbon budgets – that is, the maximum amount of CO_2 that can still be emitted while meeting the objectives of the Paris Agreement – are rapidly shrinking[1].

In light of the health risks involved, the climate crisis must be understood as a public health issue. The latest IPCC report explicitly underscores this point: "Highlighting health co-benefits could strengthen the justification for ambitious mitigation actions"[4]. Indeed, this approach has strong potential to mobilise stakeholders and trigger action: reducing greenhouse gas emissions is not only essential to limit the future health impacts of climate change, but also makes it possible to generate tangible co-benefits in the short term. These benefits display several characteristics conducive to action: they materialise rapidly, can be very substantial in scale, directly affect major determinants of health, and are not contingent upon the achievement of global climate targets.

This brief aims to highlight the health co-benefits of selected climate change mitigation policies, in order to

inform public policy choices and guide them towards the implementation of the most priority action levers.

I. CLIMATE CHANGE & HEALTH:
MULTIPLE, INTERDEPENDENT, AND ALREADY VISIBLE CONSEQUENCES

Climate change has multiple effects on health. These impacts, which are already observable, translate into increased mortality, but also affect a wide range of diseases, including infectious, cardiovascular, respiratory, and renal diseases, as well as mental health disorders, to name only the most significant.

These effects may operate directly and/or indirectly, by acting on living environments, ecosystems, and the socio-economic determinants of health (Figure 1). It is thus possible to distinguish three categories of health impacts related to climate change[5]:

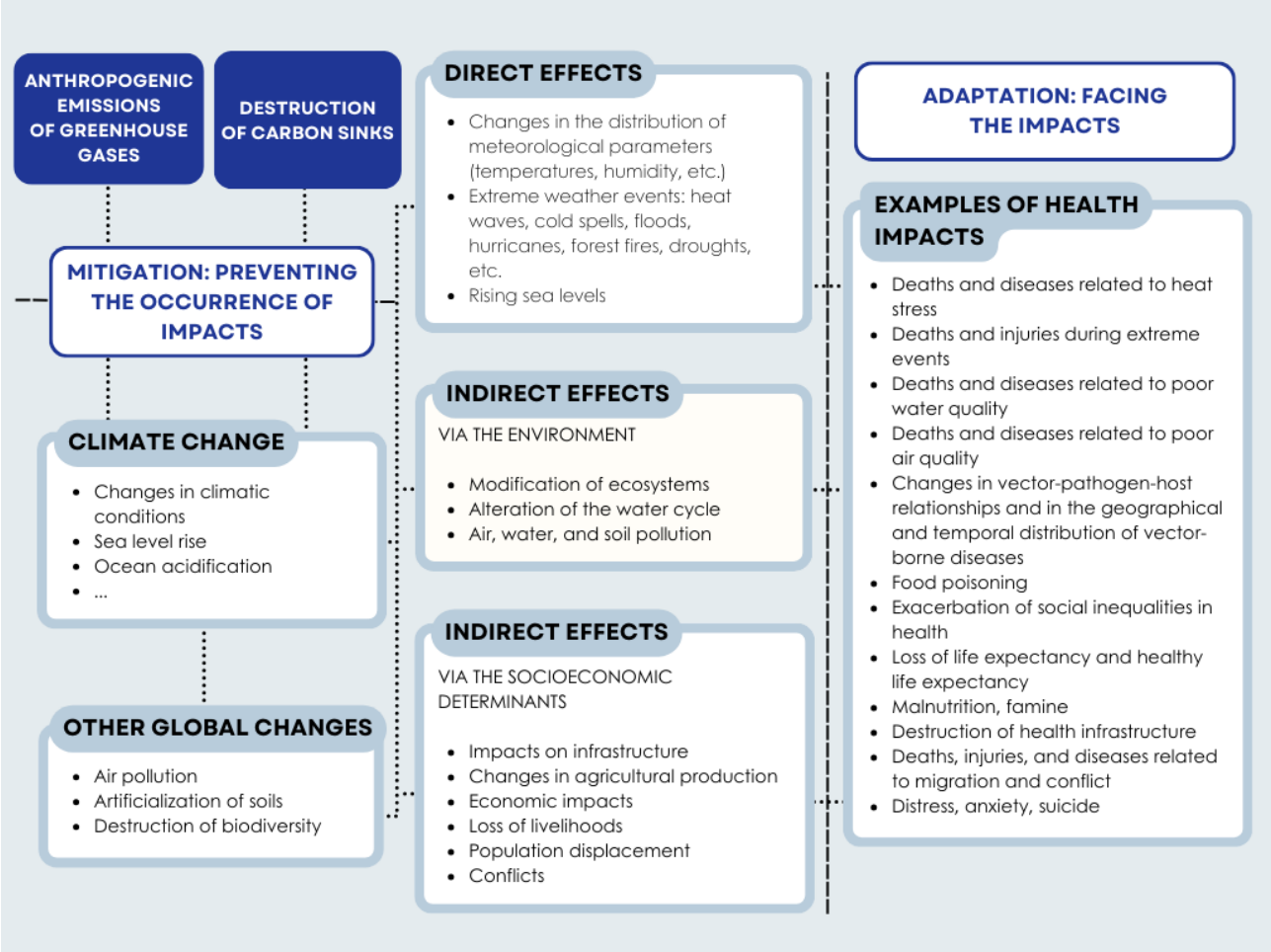
- **Direct effects**, linked to immediate exposure to extreme climatic hazards such as heatwaves, storms, floods, or wildfires.

- **Indirect environmental effects**, resulting from the progressive degradation of natural environments, including, for example, the deterioration of air quality, the scarcity and contamination of water resources, or the decline in the quality and availability of food resources.

- **Indirect socio-economic effects**, which stem from the consequences of climate change on living conditions and the social determinants of health: forced population displacement, economic instability, conflicts, infrastructure degradation, and the widening of social and territorial health inequalities.

The potential health impacts are far from negligible. For instance, nearly 7,000 deaths were attributed to heat in France in 2022[6]. At the European level, approximately 1,500 of the 2,300 heat-related deaths (i.e. 65%) were attributed to climate change during the June 2025 heatwave[7]. Beyond all-cause mortality, high temperatures are also associated with mental health effects: each one-degree increase raises the risk of mental health-related events by 2%[8] and increases suicide mortality[9]. An increase of approximately 5% in domestic violence has also been observed for each one-degree rise in temperatura[10]. Moreover, a recent study showed that nearly 60% of infectious diseases could see their burden exacerbated by climate change[11]. A second study indicates that global warming is likely to significantly lengthen transmission seasons and expand risk areas for malaria and dengue in certain regions, potentially newly exposing more than 4 billion people to these diseases by 2070[12].

Figure 1 – Main links between climate change and health (adapted from Santé publique France, 2021)[5]



It should nevertheless be emphasised that this categorisation of the direct and indirect effects of climate change remains artificial. Indeed, these effects are closely interdependent and mutually reinforcing. They may occur simultaneously and interact synergistically, thereby creating complex dynamics, often amplified by cascading effects, which make health consequences more difficult to anticipate and manage. For example, the accumulation of extreme events within the same territory can cause profound disruptions to the organisation of societies and ecosystems, as illustrated by Australia during the summer of 2019–2020[13,14]. **A prolonged drought reduced water reserves and caused agricultural losses, before record-breaking wildfires destroyed 24 million hectares and 3,100 homes, resulting in at least 33 direct deaths, 417 indirect deaths linked to deteriorating air quality, and major impacts on biodiversity.** A few months later, floods occurring after the drought and extreme wildfires greatly increased soil erosion and degraded water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quality well beyond levels expected in the absence of fires. These successive events led to multiple health effects, ranging from smoke-related respiratory diseases to psychological disorders.

The effects of climate change are all the more pronounced where social and territorial health inequalities already exist. **Populations that are socio-economically most vulnerable**, particularly due to poverty, precarious housing conditions, or limited access to healthcare, **are the first and most severely affected by the health impacts of climate change**[15,16].

Finally, the magnitude of these effects also depends on other ongoing environmental changes, such as land artificialisation, biodiversity loss, or widespread pollution, which weaken natural and social systems, creating a vicious circle between environmental degradation, social injustices, and the health crisis[17].

II. FACING THE LIMITS OF ADAPTATION:
THE URGENCY OF REDUCING EMISSIONS

In the face of accelerating climate change and its multiple impacts, two essential and complementary strategies exist: **adaptation** and **mitigation**.

Adaptation refers to the set of measures and adjustments implemented to limit the negative consequences of climate change and to harness its potential beneficial effects, although the latter remain marginal[2].


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Adaptation alone, while essential to protect against climate-related risks that are already unfolding, cannot constitute a sufficient response. Although it can help limit immediate or short-term impacts, it quickly reaches its limits, particularly under scenarios of uncontrolled warming. The effectiveness of current adaptation measures decreases as climate risks evolve [2,18]. Damage to terrestrial and marine ecosystems is occurring earlier and is more severe than anticipated, and some extreme climate events already exceed the resilience and adaptive capacity of many natural and human systems. **As a result, adaptive margins are progressively shrinking, exposing populations to increasing risks.**

This is why **mitigation**, namely the reduction of GHG emissions and the strengthening of their removal, notably through natural carbon sinks (forests, soils, oceans) is indispensable to limit the future magnitude of climate change and to preserve a manageable space for adaptation. Without rapid and large-scale reductions in GHG emissions, the effects of climate change will exceed the

adaptive capacity of natural and human systems, exposing populations to growing and increasingly difficult-to-manage health risks.

It is therefore essential to **consider mitigation and adaptation jointly**, as these two dimensions are closely interconnected: certain adaptation measures can strengthen or weaken mitigation efforts, and viceversa. For example, urban greening contributes both to reducing heat islands (adaptation) and to carbon sequestration (mitigation). Conversely, poorly managed reliance on air conditioning may exacerbate emissions while responding to adaptation needs in the face of heatwaves. **Adopting an integrated and coherent approach is thus indispensable**. Adaptation and mitigation must be articulated in ways that maximise synergies, avoid counterproductive effects, and ensure sustainable benefits, particularly with regard to health.

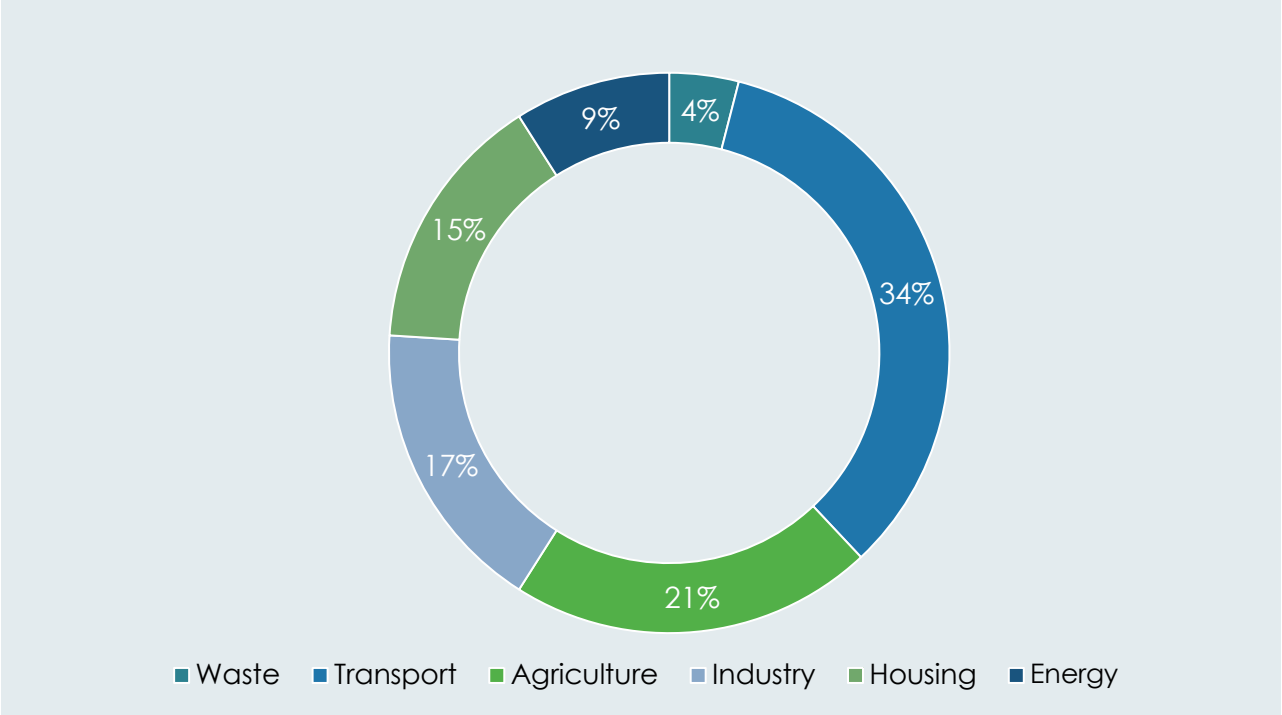
III. MAJOR HEALTH CO-BENEFITS ASSOCIATED WITH EMISSION REDUCTION POLICIES

1. MITIGATION POLICIES: A LEVER FOR PUBLIC HEALTH

Mitigation policies implemented across different sectors, beyond their climate objectives, can generate **health co-benefits** for populations. By acting on transport, agriculture, industry, and the building sector - which accounted for approximately 34%, 21%, 17%, and 15% of France's emissions in 2024, respectively (Figure 2)[19] – it is possible to improve public health while reducing GHG emissions. These transformations can lead to improvements in several health determinants, the magnitude of which will be detailed in the following section[20]:

- **Improved air quality**, through the gradual reduction in the use and combustion of fossil fuels;
- **Increased physical activity**, through the development of active mobility (walking, cycling) and public transport;
- **Healthier, more sustainable, and more accessible diets**, promoted by the transition towards less carbon-intensive food systems;
- **Improved thermal comfort**, notably through enhancements to the building stock and vegetated urban planning, which help reduce health risks associated with both heatwaves and cold periods.

Figure 2 – Share of emissions by sector in France in 2024 (adapted from the annual report of the "Haut Conseil pour le Climat", the French High Council on Climate, 2025)[19]



Source: Citepa (2025), format Secten

By acting on these different health determinants, the expected benefits of climate policies could be substantial. Such policies would make it possible to address numerous risk factors associated with the global burden of disease, the leading causes of mortality, and the deterioration of quality of life[21].

Thus, mitigation policies, by integrating a health co-benefits approach, **offer an opportunity to improve public health** while reducing future health risks linked to climate change.

2. THE MAGNITUDE OF HEALTH CO-BENEFITS BY SECTOR OF INTERVENTION

The health benefits expected from climate policies are increasingly well documented.

On the one hand, initiatives such as the Pathfinder Initiative have identified numerous concrete interventions already being implemented – for example, the promotion of active mobility, the reduction of air pollution, or sustainable diets –

which demonstrate that it is possible to simultaneously reduce GHG emissions and achieve health benefits amounting to several percentage points of avoided mortality at the scale of the global population[22].

To achieve the carbon neutrality set out in the Paris Agreement, however, it is necessary to combine all of these actions in a coherent manner. This is what prospective modelling seeks to assess, by estimating the health benefits associated with different global mitigation scenarios. A recent systematic review of the scientific literature by Moutet et al.[23], focusing on scenarios compatible with achieving carbon neutrality, shows that 98% of the scenarios analysed are associated with health co-benefits. In particular, the median estimates suggest a reduction of approximately 1.5% in all-cause mortality, with impacts reaching up to 19% for certain scenarios. Beyond health benefits, among the 13 studies that conducted a cost–benefit analysis, **85% estimate that the monetary value of health gains would exceed the costs of implementing climate policies**. Thus, the initial investment would be offset by the health benefits generated and the resulting reduction in healthcare expenditure.

Sectoral analysis of the main areas of action highlights the potentially substantial scale of the expected positive health effects, going beyond the sole reduction of GHG emissions.

a. Energy

Taking into account both energy production and supply across the various economic sectors, the **energy sector is the main contributor to global GHG emissions**, accounting for approximately two-thirds of total emissions[24]. Phasing out fossil fuels would not only make it possible to achieve carbon neutrality, but could also improve population health by significantly reducing ambient air pollution.

Indeed, the combustion of fossil fuels (coal, oil, gas) does not only produce carbon dioxide (CO_2): it also releases numerous ambient air pollutants that are harmful to health, such as particulate matter, nitrogen oxides, sulfur dioxide, or black carbon[25]. These pollutants are responsible for millions of premature deaths (Box 1) each year worldwide, due to their effects on cardiovascular, respiratory, and metabolic diseases[26,27]. Moreover, 99% of the global population is exposed to levels of PM2.5 (particulate matter with a diameter of less than 2.5 µm) exceeding the recommendations of the World Health Organization (WHO)[27]. A similar order of magnitude is also observed in France[16].

According to a study by Lelieveld et al.[26], exposure to ambient air pollution linked to fossil fuel combustion (for energy production, industry, land, maritime and air transport, residential energy use, agriculture, etc.) **is responsible for 5.13 million premature deaths per year worldwide among individuals over the age of 25**, representing 82% of the maximum number of air pollution-related deaths that could be avoided if all anthropogenic emissions were controlled. A study conducted by Hamilton et al.[28] estimates that achieving carbon neutrality in nine countries (Brazil, China, Germany, India, Indonesia, Nigeria, South Africa, the United Kingdom, and the United States) – through the implementation of the Paris Agreement within a "health in all climate policies" perspective – could make it possible to avoid 1.6 million air pollution-related deaths by 2040. **In France, the health benefits associated with carbon neutrality scenarios could make it possible to avoid 3% of all-cause mortality among individuals over the age of 30** as early as 2030 through reductions in PM2.5 concentrations, and 1% for NO_2[20].

DEFINITION OF PREMATURE DEATH, PREMATURE MORTALITY, AVOIDED DEATH AND AVOIDED MORTALITY

A **premature death** refers to an excess death that could be avoided or that could have been delayed if the cause had been eliminated (years of life lost). By extension, **premature mortality** refers to the excess number of annual deaths that could be avoided or that could have been delayed if the cause had been eliminated.

An **avoided death** refers to a death that would have occurred earlier if the cause had not been eliminated (years of life gained). By extension, **avoided mortality** refers to the number of annual deaths that would have occurred earlier if the cause had not been eliminated.

A study conducted in 857 European cities estimates that the contribution of the energy sector to mortality attributable to PM2.5 is 10%, and 15% for NO_2, among adults (≥ 20 years)[29].

b. Transport

The transport sector accounts for 15% of total global GHG emissions(4). Reducing emissions from this sector represents a lever for health co-benefits, for example through reducing the use of private cars and increasing the share of active transport, which would allow:

RECOMMENDATIONS ON PHYSICAL ACTIVITY [33]

The WHO recommends that adults engage in **at least 150 minutes of moderate-intensity physical activity or 75 minutes of vigorous-intensity physical activity per week**. For adolescents, it recommends **at least 60 minutes of physical activity per day.**

- **Promotion of active mobility** (walking, cycling, etc.)
- **Improvements in air quality**
- **Noise reduction**
- **Decrease in road traffic accidents** (in redesigned urban areas)

The co-benefits linked to improved air quality could be substantial. A study conducted in 857 European cities estimates that the contribution of transport to mortality attributable to PM2.5 is 13.5%, and nearly half for nitrogen dioxide (NO_2), among adults (≥ 20 years)[29].

The co-benefits associated with active mobility could also be significant. **According to the WHO, 31% of adults and 80% of adolescents do not meet physical activity recommendations** (Box 2)[30]. The use of active modes of transport could help increase physical activity levels: in France, for example, more than 60% of home-to-work trips shorter than 5 km are made by car, even though they could be cycled[31].

Based on WHO recommendations, sufficient physical activity could prevent a median share of 15% of premature mortality among individuals aged 40–74, corresponding to approximately 3.9 million deaths each year worldwide[32]. **The global cost associated with physical inactivity is estimated at around USD 27 billion per year**[30]. Walking, cycling, and public transport are effective means of integrating physical activity into daily life, particularly in urban settings. According to Hamilton et al., the health co-benefits of achieving carbon neutrality related to active mobility in the nine countries studied (see subsection on Energy) could make it possible to avoid 2 million deaths by 2040 among adults under the age of 85 (28). In France, two carbon neutrality scenarios prioritising sufficiency-based levers proposed by the French Agency for Ecological Transition (ADEME), and enabling

compliance with WHO recommendations, could avoid a high estimate of 11,700 deaths in 2030 and 25,000 deaths in 2050 among adults aged 20 to 89[20]. **The intangible health costs associated with these scenarios are estimated at EUR 19 billion avoided in 2030 and EUR 60 billion in 2050**[20].

Improving the quality and accessibility of public transport services also contributes to active mobility and the reduction of local pollutant emissions, while facilitating access to employment, healthcare, and social activities.

The co-benefits associated with noise reduction should also be highlighted. After ambient air pollution, noise is the second environmental factor causing the greatest health damage in Europe[34], and two-thirds of its social cost is linked to transport in France (including 54.8% for road noise, 7.6% for rail noise, and 4.1% for aircraft noise)[35].

It should also be noted that aviation and maritime transport remain significant sources of GHG emissions and local air and/or noise pollution (ports, airports)[35,36].

c. Food and agriculture

The agricultural sector (AFOLU – Agriculture, Forestry and Other Land Use) accounts for 22% of global GHG emissions[4].

Agriculture is also a **major source of ambient air pollution**, through emissions of methane (CH_4), nitrogen oxides (NOx), and ammonia (NH_3), notably from livestock production and nitrogen-based fertilisers[37]. Some of these pollutants contribute to the formation of fine particulate matter (PM2.5)[37]. A study conducted in 857 European cities estimates that the contribution of the agricultural sector to mortality attributable to PM2.5 is 18% among individuals aged 20 years and over[29]. Another study shows that a transition towards more plant-rich diets – flexitarian, vegetarian, and vegan – could significantly reduce air pollution, leading to an estimated reduction in premature mortality of between 108,000 and 236,000 deaths (3 to 6% of mortality attributable to PM2.5 and O_3) at the global level, including between 20,000 and 44,000 deaths (9 to 21% of mortality attributable to PM2.5 and O_3) in Europe[38].

Diet constitutes a major lever for health co-benefits, notably through the promotion of more plant-based diets and reduced consumption of animal products. Reducing meat consumption while increasing the intake of vegetables, fruits, legumes, nuts, and whole grains **would make it possible to reduce global agricultural sector emissions by more than half and to limit forest loss by 20% between 2030 and 2050**[22]. **These sustainable diets are also associated with improved health outcomes, including increased life expectancy and reduced risks of non-communicable diseases (cardiovascular diseases, type 2 diabetes, and certain cancers)**[39]. At the global level, estimates from the EAT-Lancet Commission indicate that adoption of a "planetary health diet" could prevent 15 million premature deaths per year among adults[40].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Según According to Hamilton et al., the health co-benefits of achieving carbon neutrality related to diet in the nine countries studied (see subsection on Energy) could make it possible to avoid more than 6 million deaths by 2040[28]. **In France, the carbon neutrality scenarios proposed by ADEME foresee a substantial decrease in the consumption of foods associated with an increased risk of all-cause mortality**, **such as red meat** (which, according to the WHO definition, includes beef, pork, and lamb) **and processed meat** (notably cured and processed meats), in favour of increased consumption of foods recognised for their beneficial effects on health, in particular vegetables and legumes[20]. Preliminary estimates suggest that by 2040, these dietary changes could make it possible to avoid approximately 30,000 annual deaths among individuals aged 18 and over in scenarios relying primarily on technological solutions, and up to 40,000 annual deaths in scenarios prioritising sufficiency-based levers, linked to a greater increase in the consumption of vegetables and legumes and a stronger reduction in foods associated with mortality risk[20].

Beyond the composition of diets, the quantity consumed is also a key factor. Overconsumption exacerbates non-communicable diseases (obesity, cardiovascular diseases, diabetes, cancers) while simultaneously reinforcing environmental impacts due to the excessive production demands it generates[37]. From a qualitative perspective, the consumption of ultra-processed foods high in sugars, fats, and salt and low in nutrients contributes to deteriorating health[37].

Reducing reliance on ultra-processed foods and curbing overconsumption would therefore not only help prevent disease, but also limit emissions linked to food production and waste. Food waste itself constitutes another avoidable source of emissions: nearly one-third of global food production is discarded, representing 8 to 10% of total GHG emissions[41].

d. Housing

The housing sector is also a major contributor to GHG emissions, largely due to domestic heating powered by fossil fuels[42]. Decarbonising residential energy and improving the energy performance of buildings are therefore key levers to achieve carbon neutrality, while simultaneously generating health co-benefits, notably through improved thermal comfort.


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Improving the thermal insulation of buildings helps reduce exposure to cold, which is associated with excess winter mortality and respiratory diseases[43]. Moreover, by lowering household energy bills, thermal renovations contribute to combating energy poverty. This has a direct positive effect on health, as low-income populations are particularly vulnerable to exposure to cold or degraded living environments. In France, it is estimated that energy renovation of housing could generate an average annual societal gain of EUR 7,500 per dwelling, including EUR 400 in reduced healthcare costs, EUR 1,400 in improved well-being, and EUR 5,700 in reduced mortality risk[44]. **Renovating all energy-inefficient dwellings by 2028 would thus make it possible to avoid nearly EUR 10 billion per year in health-related costs.**

However, thermal insulation should not be limited to protection against cold. It must also prevent excessive exposure to heat within dwellings – sometimes referred to as "thermal kettles" – which increases health risks associated with heatwaves, particularly among the most vulnerable populations (older adults, individuals experiencing socio-economic hardship, etc.). Interventions must therefore ensure that the risks of summer overheating are adequately addressed.

Finally, reducing the energy needs of housing and phasing out fossil fuels also helps improve outdoor air quality. A study conducted in 857 European cities estimates that the residential sector is the leading contributor to mortality attributable to PM2.5 among individuals aged 20 years and over, accounting for 22.7% of total PM2.5-related mortality[29].

e. Not all carbon neutrality scenarios are equal

Although all carbon neutrality scenarios generate health benefits, some strategies offer greater gains than others, depending on the sectors and the measures targeted[23]. For example, in the transport sector, decarbonization policies vary according to the levers chosen. A study by Moutet et al. (2024)[45] compared four scenarios leading France towards carbon neutrality by 2050. It showed that relying exclusively on the electrification of the vehicle fleet, although improving air quality, does not produce the same health benefits as the promotion of active transport (walking, cycling). The latter, by encouraging physical activity, could prevent up to 494,000 premature deaths between 2021 and 2050 among adults aged 20 to 89. In contrast, scenarios focused on electrification miss the health co-benefits linked to increased physical activity (an additional 52,000 deaths and a loss of 0.2 months of life expectancy). **It is therefore essential to integrate health considerations into decarbonization choices, on the same level as industrial or economic considerations.**


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3. HEALTH CO-BENEFITS: ARGUMENTS FOR ACCELERATING CLIMATE ACTION

a. Benefits independent of global cooperation

Climate policies provide a global and collective benefit: the reduction of GHG emissions benefits the entire planet, provided that other countries cooperate[20,23]. In the absence of coordinated international commitments, results may appear

uncertain or distant, thereby encouraging "free-rider" behavior, where some actors enjoy the benefits without contributing to the collective effort.

In contrast, **the health benefits of these policies are local, directly perceptible, and not contingent on the engagement of other actors** (i.e., regardless of the efforts of other countries). They are limited to the countries and regions that implement the policies. For example, the reduction in air pollution associated with increased active mobility directly benefits the local population exposed, independently of global climate policies.

Health co-benefits can thus strengthen the incentive to act at the local and national levels, including in contexts of uncertainty regarding the commitment of other international actors.

HEALTH AS A MEANS TO FOSTER CLIMATE COMMITMENT IN A DIFFERENT WAY

The approach based on health co-benefits also offers several advantages for promoting engagement with climate policies. It allows moving beyond a strictly GHG emission–reduction–focused approach, which is often perceived as abstract or distant. By delivering immediate, localized, and socially differentiated benefits, health arguments could strengthen the legitimacy, effectiveness, and equity of climate interventions. These characteristics make them a political, economic, and social lever whose value should be emphasized.

b. Short-term actions for short-term benefits

Los The health co-benefits of climate policies generally manifest in the short term[46], often within the first days or months following implementation. In contrast, climate benefits (through the stabilization or reduction of global temperatures) require several decades to materialize, especially given the relatively long atmospheric lifetime of certain greenhouse gases (e.g., one century for CO_2). **This more immediate timeline facilitates political ownership of climate measures, aligns with a temporal frame that is easier for policymakers to consider, and allows actions to be anchored in the present**. It also enables a faster evaluation of public policies, supporting their continuous improvement.

Various scientific studies illustrate the potential speed with which these benefits may occur:

- **Ambient air pollution**: health effects related to air quality are among the most immediate. A 2020 systematic literature review shows that exposure to

pollutants (PM10, PM2.5, NO_2, and ozone O_3) is associated with both all-cause and cause-specific mortality (cardiovascular, respiratory, and cerebrovascular) in the short term, within hours or days following exposure (47). According to COMEAP (Committee on the Medical Effects of Air Pollutants), 30% of the reduction in mortality risk associated with improved air quality (PM2.5) occurs in the first year[48]. Short-term effects are also suggested for hospitalizations or emergency visits for respiratory diseases (0 to 6 days depending on the studies and health events examined)[49,50], as well as adverse pregnancy outcomes following exposure to pollution during pregnancy[51].

- **Physical activity**: the promotion of active mobility also produces rapid health effects. Physical activity generated through active transport appears to confer almost immediate benefits on mood, cognition, sleep quality, anxiety, and cognitive function, sometimes on the very same day of the activity.[52-54] Effects on mental health, particularly the reduction of depression and stress, emerge within a few weeks[55], whereas cardiovascular benefits would be observable after approximately 10 years[56].

- **Diet**: multiple lines of evidence from clinical trials, natural experiments, and policy interventions suggest that improvements in diet, whether individual or collective, can produce significant health effects within a few months to a few years[57, 58]. For example, in Poland, coronary heart disease mortality rates fell by 25% over five years starting in 1991[58]. This rapid decline was partly attributed to the removal of subsidies for meat and animal fats, as well as improved access to vegetable oils and affordable fruits – changes likely to have altered dietary habits at the national level. These dietary shifts align with planetary health diets.


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Thus, climate policies can produce not only long-term global effects but also tangible short-term health benefits.

c. A lever for individual and collective engagement

Several studies suggest that messages emphasizing health elicit greater support for climate policies. Indeed, such policies can encounter a degree of ambivalence in public opinion. While the population generally expresses support for global climate objectives (e.g., national GHG emissions reduction), this support tends to weaken when measures involve personal costs or restrictions on certain individual behaviors[59].

In this context, **emphasizing health co-benefits could serve as a lever to strengthen collective adherence**. These benefits, being more tangible and directly related to individuals' quality of life, are generally better understood and valued than climate arguments, which are often perceived as distant (present bias), abstract, or uncertain and therefore less of a priority[59,60]. Several studies indicate that this type of framing often increases support for climate policies, including among people who are less sensitive to climate issues[61].

Moreover, health co-benefits are often perceived as more immediate and localized, which enhances their effectiveness in mobilization: messages focused on short-term positive effects may generate greater adherence than those emphasizing more distant horizons (2050)[61]. This approach also has the advantage of being ideologically cross-cutting: purely climate-based arguments tend to polarize according to political affiliation, whereas health-focused arguments may prove more consensual and effective across all groups, including more conservative populations[60-62].

d. A lever to reduce social health inequalities

Socially vulnerable populations are often those most exposed to environmental risks: energy poverty, proximity to pollution sources, substandard housing, etc. For example, in Europe, in many regions, social inequalities coincide with high levels of exposure to environmental factors potentially harmful to health[63], though this is not universal. In mainland France, the most disadvantaged urban areas are significantly more likely to be overexposed to heat, ambient air pollution, and lack of green spaces[16].

These exposure inequalities are compounded by differential vulnerability: at equal exposure levels, health impacts are often more severe for disadvantaged populations due to increased susceptibility (health status, comorbidities, etc.) and more limited coping capacities[64]. These converging mechanisms contribute to the accumulation of economic, environmental, and health vulnerabilities.

In this context, well-designed climate policies that account for these issues can also help reduce social health inequalities. For example, improving the thermal performance of social housing is an example of a climate action with strong potential to reduce social health inequalities by simultaneously lowering GHG emissions, energy poverty, heat stress, and associated health impacts[65].

Thus, an integrated approach that aligns climate policies with public health and social equity objectives could also address issues of social justice.

4. CASE STUDIES

This subsection illustrates, through several examples, how **certain actions already implemented in different countries have simultaneously reduced greenhouse gas emissions and generated health co-benefits for the affected populations.**

HEALTHIER HOUSING FOR VULNERABLE HOUSEHOLDS – VICTORIA, AUSTRALIA[66]

The *Victorian Healthy Homes Program* illustrates the strong potential of interventions on residential buildings to generate health–climate co-benefits. Conducted in the state of Victoria, Australia, between 2018 and 2021, this program assessed the impact of improving the energy efficiency and thermal comfort of housing on the health of low-income households. Through a randomized controlled trial, 276 households received minor works free of charge (insulation, draught-proofing, efficient heating appliances, averaging AUD 2,809) aimed at improving thermal comfort.


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The results show a **significant increase in indoor temperature during the winter period (+0.33°C on average), as well as a reduction in time spent exposed to cold (−43 minutes/day below 18°C**).

These improvements were accompanied by a notable reduction in gas consumption and a slight reduction in electricity use, reflecting a dual benefit: lower energy bills and reduced greenhouse gas emissions (approximately 0.2 t CO_2-e avoided per renovation).

From a health perspective, households receiving the intervention reported reduced shortness of breath and improved quality of life, particularly regarding mental health and access to social care, with fewer disruptions to daily activities. No differences were observed for asthma or symptoms of chronic obstructive pulmonary disease (COPD). The study highlights the substantial economic benefits related to health: for every Australian dollar saved on energy costs, more than ten dollars are saved on healthcare expenditures. The program becomes cost-effective after three years.

This study underscores the potential of minor energy renovations as an effective lever for both climate change mitigation and public health improvement, especially in contexts where housing is old or poorly insulated.

1 EURO INVESTED IN AIR QUALITY GENERATES TEN EUROS IN SAVINGS – ÎLE-DE-FRANCE, FRANCE[67]

Between 2010 and 2019, the number of premature deaths attributable to PM2.5 exposure is estimated to have fallen from 10,350 to 6,220, representing **a reduction of nearly 40%.** The economic benefits associated with this improvement in air quality are estimated at €61 billion over the period.

By comparison, investments dedicated to air pollution control amounted to just over €5 billion over ten years.

Thus, every euro invested in improving air quality generated an economic return at least ten times higher.

ACTIVE MOBILITY, IMPROVED AIR QUALITY, AND EMISSION REDUCTIONS – BUENOS AIRES, ARGENTINA[66]

Since 2009, Buenos Aires has developed an extensive network of bicycle lanes, covering more than 286 km, as part of a program promoting active mobility and reducing GHG and ambient air pollutant emissions. This network also includes 270 bike-sharing stations, accessible free of charge 24/7 throughout the year, alongside policies supporting bicycle purchases. Secure parking spaces have also been deployed.

The results are significant: since 2013, the number of bicycle trips has increased by 131%, and in 2020 these trips accounted for 10% of urban travel. It is estimated that this program avoided the emission of 12,155 t CO_2 in that same year. The impact on road safety is also notable: cyclist-related mortality fell by 80% between 2015 and 2020.

Finally, the program also contributed to greater mobility equity: the new infrastructure encouraged more women to cycle, with their trips tripling on certain routes.

This case illustrates the environmental, health, and social co-benefits of a sustainable mobility policy designed at the metropolitan scale.

IMPROVED COOKSTOVES AND AIR QUALITY – CASAMANCE, SENEGAL, THE GAMBIA AND GUINEA-BISSAU[66]

Between 2012 and 2014, nearly 5,300 rural households in the Casamance sub-region – Senegal, The Gambia, Guinea-Bissau – benefited from the installation of improved biomass cookstoves, replacing traditional stoves that emitted ambient air pollutants. This initiative aimed to assess the co-benefits of a cleaner cooking solution for both health and climate.

The results show a significant environmental impact: **each household studied reduced CO_2-e emissions by 2.7–2.9 tons per year**, with firewood consumption halved on average (-52%). This transition was accompanied by a 40-60% reduction in indoor air pollutants (average 24-hour PM2.5 concentration).

From a health perspective, these improvements **prevented 31 cases of acute lower respiratory infections among children under five**, three cases of chronic obstructive pulmonary disease (COPD) in adults over 30, and 0.16 deaths per 1,000 inhabitants.

The intervention also yielded gender-equity co-benefits: weekly time spent collecting firewood decreased by 72% and daily cooking time by 35%, tasks primarily performed by women.

This case illustrates the value of accessible and context-appropriate solutions to simultaneously improve indoor air quality, energy efficiency, and gender equity in rural contexts where access to clean and health-optimized cooking technology is limited.

CONCLUSION

The choices made in public policy to achieve carbon neutrality, whether concerning mobility, diet, housing, or energy, could have a major impact on population health. **The reduction of GHG emissions is accompanied by significant, documented health co-benefits, both in the short and long term. Moreover, the initial investments required to implement these policies are offset by the savings generated through health gains.**

This brief highlights the importance of designing climate strategies not only as levers for GHG emission reduction but also as genuine opportunities to improve public health. **Such an approach entails systematically integrating health into the development of sectoral policies**, leveraging the "Health in All Policies" framework, and promoting coordinated and coherent action across sectors.

In this regard, **climate policies must protect vulnerable populations** today while limiting the exacerbation of future risks, representing a major opportunity to improve public health and reduce social health inequalities.

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