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Energy Systems That Protect Climate and Health

The climate crisis is an acute and protracted health emergency with far-reaching effects on both human health and the environments that sustain our health. The climate crisis and significant health risks are interlinked, having many of the same drivers and solutions.

Burning fossil fuels in the production of energy is the leading cause of climate change and one of the world's greatest health risks. Providing carbon-free energy to everyone who needs it will dramatically improve human health, climate and the economy.

This paper puts forward policies that can help tackle the climate crisis while also improving human health, allowing national governments to address two important challenges at the same time. Efforts to limit global heating to 1.5°C must go hand in hand with achieving fundamental health benefits.

Recommendations

1. Improve human health and reduce premature deaths by phasing out fossil fuels and delivering sustainable energy for all.
2. End fossil fuel subsidies and ensure the price of fossil fuels reflects the true cost of their health and environmental impacts.
3. Eliminate deadly household air pollution by supporting clean cooking.
4. Ensure an equitable and just energy transition.

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How are climate, energy and health connected?

Fossil fuels are the main source of greenhouse gases globally, therefore driving major climate-related health impacts.

- **Global heating and changing weather are driving a range of health impacts across the world,** including malnutrition, vector-borne diseases (like malaria, Zika, and tick-borne encephalitis) and other infections (including cholera during floods and droughts), diarrhoea, heat stress, direct trauma, and mental illness[1].
- **The energy system** – encompassing electricity, transport, industry, and heating – **is the single largest source of greenhouse gas emissions,** responsible for nearly three-quarters of global emissions[2]. Around 80% of global energy is currently sourced from fossil fuels (oil, fossil gas, and coal).
- **All types of fossil fuel are highly climate damaging, but coal is the most urgent threat.** Burning coal produces more carbon dioxide (CO_2) per unit of energy than burning any other fossil fuel, and coal-fired power generation is the single largest emitter, accounting for 30% of all energy-related CO_2 emissions[3].
- In addition to CO_2, **fossil fuel combustion is the major source of other climate- and health-damaging air pollutants;** these include sulphur dioxide (SO_2), nitrogen oxides (NO_x), ozone, volatile organic compounds (VOCs), and fine particulate matter (PM_{10} and $PM_{2.5}$)[4].
- In many parts of the world **extraction of fossil fuels entails a legacy of land degradation and water pollution,** and in some cases human rights abuses[5]. For example, in the Niger Delta oil extraction and combustion have polluted the air, soil, and water, damaging productive farmland, fisheries, drinking water supplies, and directly harming the health of local[6], with direct impact on the health of local populations.

Pollution from fossil fuels is a significant cause of ill health and death

- **Fossil fuel combustion is by far the largest source of health-damaging air pollution,** particularly from coal and oil power plants, industry, and motor vehicles[7]. The World Health Organization (WHO) recognises air pollution as the cause of around a quarter of adult deaths from stroke and heart disease, almost a third from lung cancer, and over two-fifths from chronic obstructive pulmonary disease[8].
- With **nine out of ten people in the world breathing polluted air[9],** a recent study estimates that fossil fuel air pollution is responsible for one in five deaths worldwide[10]. Over 90% of fatalities linked to air pollution occur in low- and middle-income countries (LMIC).
- **The WHO estimates that around 7 million people die annually from both.** In 2016, ambient air pollution was responsible for 4.2 million deaths, with a further 3.8 million deaths caused by household air pollution (from cooking and home heating using wood, agricultural waste, coal, or charcoal[11]). Recent studies of very fine particulate matter PM2.5 estimate these figures could be much higher[12].
- **The economic benefits of preventing air pollution are immense.** One study estimates the global economic cost (externalities) of ill health and premature death due to air pollution in 2018 at US$2.9 trillion, equivalent to US$8 billion a day and 3.3% of global GDP[13]. China alone incurs an annual cost of US$900 billion, while cost estimates for the United States range from US$600 billion to up to US$1 trillion[14]. Initiatives to reduce pollution and clean air are simply cost-effective; the Clean Air Act, enacted in the USA in 1963, has cost around US$65 billion but led to savings of US$2 trillion[15].

Health and energy poverty

- **Globally, there are still 759 million people without access to electricity. In addition, 2.6 billion people have no access to clean fuels or technology for clean cooking.** Lack of modern clean energy access traps people in poverty.
- **Energy access is also critical to health care.** Providing electricity is highly important in health care facilities, including for refrigeration for vital vaccines and medicines. Uninterrupted energy access is critical for care delivery, leading to better health outcomes when health facilities are well connected to grids or off-grid energy sources.
- Conventional, centralised energy systems are not always accessible in remote areas or during extreme climate events. The International Energy Agency estimates that **decentralised solutions are the most affordable way to provide power to more than half of the population by 2030[16].** Off-grid power sources, such as solar power and renewable mini-grids, can increase access and provide emergency backup power.

A warming world demands more energy

- **As the world warms, refrigerated air conditioning is projected to become a major source of growing electricity demand[17],** vital for living in highly heat-stressed parts of the world[18]. Unless sustainable energy sources are used, this increase in demand will add to global emissions.
- **Fluorinated gases (widely known as F-gases) are widely use used in cooling technologies, but they can have a global warming effect up to 10,000 times greater than that of CO_2**[19] and if left unchecked could cause an additional 0.5°C of warming by 2100[20].
- **Energy for cooling already accounts for 7% of global greenhouse gas emissions, and demand for cooling is increasing rapidly.** Access to cooling and refrigerant is not a luxury – vulnerable populations depend on it for preserving nutritious food, keeping vaccines at a safe temperature, increasing workplace productivity, and preventing heat-related ill health and deaths.

Actions for delivering energy systems that protect climate and health

To deliver healthy and sustainable energy systems for all people and a thriving planet, national governments are recommended to take the following actions:

1) Improve human health and reduce premature deaths by phasing out fossil fuels and delivering sustainable energy for all.

To safeguard human health and the environment economy, national governments must phase out the use of all fossil fuels and provide access to clean, renewable energy for all.

We have the existing technology and resources to enable clean energy access for all. By making the right policy choices today, we can ensure that everyone has access to clean, renewable energy that will benefit health, climate and the economy.

Energy poverty is a trap with economic and social implications. It is essential that emissions reductions targets should be paired with efforts to ensure universal energy access by 2030, therefore ensuring clean and renewable energy is accessible to all[21]; helping to deliver the UN Sustainable Development Goals SDG3, SDG7, and SDG13 as globally agreed targets for health, energy, and climate change for 2030 in tandem.

Increased energy efficiency and reduced energy wastage are key factors to reducing global carbon emissions and can be embedded in built environments, transport systems, and industry. Thermally insulated buildings can be designed—or retrofitted—for better passive heating or cooling. Urban gardens or green roofs can also limit heat build-up in dense urban areas, thus reducing energy use.

Policy recommendations to phase out fossil fuels:

- End all new exploration and production of coal, oil, and gas in line with advice from the International Energy Agency to meet net zero targets from 2021. No no new oil and gas fields (including fracking) should be approved for development, and no new coal mines or mine extensions[22].
- Adopt strategies for delivering Nationally Determined Contributions (NDCs) consistent with the Paris Climate Agreement goal of limiting warming to 1.5°C, with milestones based on science-based targets.
- Join the 'Powering Past Coal Alliance' and remove all coal from the domestic energy mix as soon as possible and by 2030 at the latest.
- Support LMICs in leapfrogging from coal directly to renewable energy, avoiding long-term dependence on natural gas.
- Make reducing air pollution a national health priority, setting, monitoring, and delivering national targets for air quality in line with WHO standards.

Policy recommendations to phase in renewable and sustainable energy access:

- Rapidly scale up renewable energy projects such as solar, wind and geothermal power, including both on-grid and decentralised systems that increase energy access for remote communities.
- Enhance cooperation on energy efficiency across sectors, organisations, ministries, and countries and support research and development and innovation for energy efficient products, services, and business models.
- Use urban design and planning to create climate-resilient buildings and spaces that reduce energy consumption and promote healthy living. Urban design can be used to reduce the energy demand for both heating and cooling, including through building codes, stringent minimum energy performance standards, and market incentives for appliances.
- Develop National Cooling Action Plans to deliver efficient and sustainable cooling, incorporate clean and efficient cooling in NDCs, and bring essential life-preserving services like vaccines and safe food to all people.
- Reject false solutions such as industrial scale biofuels which require significant land resources, thus competing with forestry and food production. Avoid plans which rely on untested potential future technologies while continuing to emit today.

2) End fossil fuel subsidies and ensure the price of fossil fuels reflects the true cost of their health and environmental impacts.

End subsidies and other incentives that support the production and consumption of fossil fuels. Reorient subsidies and incentives in favour of clean, renewable energy sources.

In 2017, fossil fuels were subsidised to the tune of US$5.2 trillion, representing over 6% of global GDP[23]. Recent analysis estimates that during the Covid-19 pandemic (between January 2020 and March 2021), G7 countries committed US$189billion to support oil, coal, and gas. In comparison, the same countries – the UK, US, Canada, Italy, France, Germany, and Japan – invested US$147billionn on clean forms of energy[24].

Other financial incentives like tax breaks and government funding distort the true cost of fossil fuel production compared to alternatives, and do not reflect the resulting health and environmental costs.

Non-financial structural barriers also favour vested interests which benefit from the current energy system, for example, petroleum groups lobbying against air quality regulations or business interest groups opposing climate targets[25]. National governments must act to counter undue influence and ensure that both financial and non-financial policies are fully aligned to support clean energy systems that nurture human health.

Ending subsidies, alongside other financial and non-financial incentives for fossil fuels, can substantially reduce global emissions, deliver vast health benefits, and produce net economic savings. Research suggests that eliminating these subsidies alone could lower global carbon emissions by 21%, reduce air pollution deaths directly attributable to burning fossil fuels by 55%, and allow a rise in social welfare spending of 2.2% of global GDP[26].

Policy recommendations:

- Strictly limit the influence of vested fossil fuel interests in all national and international governance and policymaking on climate change and energy; the WHO Framework Convention on Tobacco Control is a relevant guide for good practice[27].
- Remove all forms of subsidy and tax incentives for fossil fuel production and all consumption subsidies, placing safeguards to support a fair and just transition to sustainable alternative fuels and to avoid energy poverty.
- End all public financing and public investment in fossil fuel projects, at home and overseas.
- Ensure effective carbon pricing for fossil fuels that reflects true environmental and health costs.

3) Eliminate deadly household air pollution by supporting clean cooking.

Remove household air pollution by prioritising clean cooking and heating.

Nearly half the global population – 3.6 billion people – are exposed to household air pollution, causing millions of deaths annually. Household pollution arises largely from the use of wood, biomass, animal waste, charcoal, kerosene, and coal for household cooking and heating. Across the world, primarily in low-income countries, around 3 billion people lack access to clean cooking facilities[28].

Residential solid fuel burning accounts for up to 58% of global black carbon emissions and a gigaton of carbon dioxide per year – approximately 2% of global climate emissions.

Both women and children are disproportionately exposed to household air pollution and cookstove smoke. This is linked to health impacts such as acute pneumonia in children, lung cancer, cardiovascular disease, and adverse birth outcomes for pregnant women.

Clean cooking includes improved very low emission cookstoves, cleaner fuelled stoves (such as biogas), solar cookers, and electric stoves. Fast-tracking the transition to clean cooking and heating fuels and technologies has clear health, climate, gender equity, and economic benefits, with particular advantages for rural and marginalised communities, women, and children.

For many vulnerable women, particularly in urban areas of LMICs, liquified petroleum gas or natural gas (LPG or LNG) are far healthier cooking fuels than the solid fuel currently in use, almost eliminating toxic emissions from the home. For this reason, LNG/LPG cookstoves will remain an important part of clean, healthy cooking programmes in the coming years. However, as countries transition away from fossil fuels, much more investment is urgently required to deliver healthier, affordable sustainable cooking solutions.

Policy recommendations:

- Design and implement data-driven national plans for clean cooking with the full engagement of impacted women and marginalised communities, to ensure access to affordable, reliable, sustainable and modern energy for all.
- Increase and coordinate political commitments to accelerate access to clean cooking and prioritise greater public finance to scale markets for innovative clean cooking solutions.
- Scale up public and private investments to deliver clean cooking solutions in every household by 2030.

4) Ensure an equitable and just energy transition.

Ensure that the transition to sustainable energy systems is done in a fair and just way.

The climate crisis is a global crisis, but not every country is equally responsible, equally affected or equally resourced to respond. Low-income countries are least responsible for climate change yet face its most severe impacts. Over 90% of the ill health and deaths linked to air pollution occur in LMICs. This disproportional impact means that LMICs will experience greater health gains or 'co-benefits' from climate action.

High-income countries must take the lion's share of responsibility for the mitigation of climate change given their historic role as the predominant users and beneficiaries of fossil fuel use. As such, high-income countries must support low-income countries in implementing clean, renewable energy systems[29].

Efforts to reduce and eliminate fossil fuel production and consumption should not jeopardise access to energy for the poorest and most marginalised communities. A just transition will be needed to ensure the current fossil fuel sector workforce is supported to retrain and be provided with jobs in other sectors. No community should be left behind in the transition to sustainable and healthy energy systems.

Policy recommendations:

- Establish climate finance and technology transfer from historically high-emitting countries to foster renewable energy transition in the LMICs.
- Support workers and communities dependent on income and employment from fossil fuel in the transition to sustainable energy, including by providing retraining and support in finding new jobs in renewable energy and the zero-carbon economy.
- Prioritise increasing the community ownership of decentralised clean energy systems, thus maximising shared benefits of the energy transition.

References

[1] Lancet Countdown, lancetcountdown.org/

[2] Climate Watch, 2020, Historical GHG emissions. climatewatchdata.org/ghg-emissions?breakBy=sector&chartType=percentage&end_year=2017&start_year=1990

[3] Rice, 2019, Coal is the main offender for global warming, and yet the world is using it more than ever, USA Today, eu.usatoday.com/story/news/nation/2019/03/26/climate-change-coal-still-king-global-carbon-emissions-soar/3276401002/

[4] Air Pollution, The key air pollutants. air-quality.org.uk/04.php

[5] Oil Change International, Human rights. priceofoil.org/thepriceofoil/human-rights/

[6] The Bayelsa State Oil and Environmental Commission, 2019, Interim Report. https://www.bayelsacommission.org/wp-content/uploads/2019/11/BSOEC-Public-Interim-Report-ONLINE-VERSION-29.10.19.pdf

[7] Lelieveld et al, 2019, Effects of fossil fuel and total anthropogenic emission removal on public health and climate. Proceedings of the National Academy of Sciences. pubmed.ncbi.nlm.nih.gov/30910976/

[8] World Health Organization (WHO), 2018, 9 out of 10 people worldwide breathe polluted air, but more countries are taking action. who.int/news/item/02-05-2018-9-out-of-10-people-worldwide-breathe-polluted-air-but-more-countries-are-taking-action

[9] WHO, 2018, 9 out of 10 people worldwide breathe polluted air, but more countries are taking action. who.int/news/item/02-05-2018-9-out-of-10-people-worldwide-breathe-polluted-air-but-more-countries-are-taking-action

[10] Vorha et al, 2021, Global mortality from outdoor fine particle pollution generated by fossil fuel combustion, Environmental Research. sciencedirect.com/science/article/abs/pii/S0013935121000487

[11] WHO, 2016, Ambient air pollution: A global assessment of exposure and burden of disease. who.int/publications/i/item/9789241511353

[12] Burnett et al, 2018, Global estimates of mortality associated with long-term exposure to outdoor fine particulate matter, PNAS. pnas.org/content/115/38/9592

[13] Farrow et al 2020, Toxic air: The price of fossil fuels. Seoul: Greenpeace Southeast Asia. storage.googleapis.com/planet4-southeastasia-stateless/2020/02/21b480fa-toxic-air-report-110220.pdf

[14] Farrow et al, 2020, Toxic air: The price of fossil fuels. Seoul: Greenpeace Southeast Asia. storage.googleapis.com/planet4-southeastasia-stateless/2020/02/21b480fa-toxic-air-report-110220.pdf

[15] Kirk, March 2020, Burning fossil fuels heats the climate. It also harms public health. Yale Climate Connections. yaleclimatemediaforum.org/2020/03/burning-fossil-fuels-heats-the-climate-it-also-harms-public-health/

[16] International Energy Agency (IEA), 2020, SDG7: data and projections. iea.org/reports/sdg7-data-and-projections/access-to-electricity

[17] International Energy Agency (IEA), May 2018, The future of cooling: opportunities for energy-efficient air conditioning, Technology report. iea.org/reports/the-future-of-cooling

[18] Berwyn, 2021, Extreme heat risks may be widely underestimated and sometimes left out of major climate reports, Inside Climate News. insideclimatenews.org/news/16052021/extreme-heat-risks-climate-change/

[19] Kigali Cooling Efficiency Program, 2019, Guidance on incorporating efficient, clean cooling into the Enhancement of nationally determined contributions. k-cep.org/wp-content/uploads/2019/07/Guidance-on-Incorporating-Efficient-Clean-Cooling-into-the-Enhancement-of-Nationally-Determined-Contributions.pdf

[20] United Nations Industrial Development Organization (UNIDO), 2016, The Montreal Protocol evolves to fight climate change. unido.org/our-focus-safeguarding-environment-implementation-multilateral-environmental-agreements-montreal-protocol/montreal-protocol-evolves-fight-climate-change

[21] IEA, 2021, Net Zero by 2050: A roadmap for the global energy sector. iea.blob.core.windows.net/assets/0716bb9a-6138-4918-8023-cb24caa47794/NetZeroby2050-ARoadmapfortheGlobalEnergySector.pdf

[22] IEA, 2021, Net Zero by 2050 A roadmap for the global energy sector iea.blob.core.windows.net/assets/0716bb9a-6138-4918-8023-cb24caa47794/NetZeroby2050-ARoadmapfortheGlobalEnergySector.pdf

[23] International Monetary Fund (IMF), 2019, Global fossil fuel subsidies remain large: an update based on country-level estimates. https://www.imf.org/en/Publications/WP/Issues/2019/05/02/Global-Fossil-Fuel-Subsidies-Remain-Large-An-Update-Based-on-Country-Level-Estimates-46509

[24] *The Guardian*, 2021, G7 nations committing billions more to fossil fuel than green energy theguardian.com/world/2021/jun/02/g7-nations-committing-billions-more-to-fossil-fuel-than-green-energy

[25] Keating, 2020, Powering progress or enabling inertia? The role of corporate climate advocacy in 2020, BusinessGreen. businessgreen.com/feature/4020172/powering-progress-enabling-inertia-role-corporate-climate-advocacy-2020

[26] IMF, 2019, Global fossil fuel subsidies remain large: an update based on country-level estimates. imf.org/en/Publications/WP/Issues/2019/05/02/Global-Fossil-Fuel-Subsidies-Remain-Large-An-Update-Based-on-Country-Level-Estimates-46509

[27] See article 5.3 of World Health Organisation, WHO framework convention on tobacco control, who.int/fctc/guidelines/adopted/article_5_3/en/

[28] WHO, 2018, 9 out of 10 people worldwide breathe polluted air, but more countries are taking action. who.int/news/item/02-05-2018-9-out-of-10-people-worldwide-breathe-polluted-air-but-more-countries-are-taking-action

[29] CSO Equity Review, 2018, After Paris: Inequality, Fair Shares and the Climate Emergency. civilsocietyreview.org/report2018/

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