

GRADLE TO GRAVE

The **Health Toll** of Fossil Fuels
and the Imperative for a **Just Transition**

2nd Edition

GLOBAL
CLIMATE & HEALTH
ALLIANCE



Frontlines of Harm:

The Human Story of Fossil Fuels



Musawenkosi Dhlamini

EMpumelelweni, eMalahleni,
South Africa



Dylan Paul
Center for Environmental Rights

My name is Musawenkosi Dhlamini. I am 22 years old. In 2010 I was diagnosed with asthma. I grew up as a child who could not participate in sports, and other activities children partake in. My chest would close up and I wouldn't be able to do anything. The older I got I could tell what the cause of my asthma was. The place where I live is surrounded by mines. The asthma affected many things in my life. I was always being admitted to hospital, and had to carry my asthma pump everywhere I went. Living in Witbank is something else because even these mines surrounding us do not help us to get better medication at the clinics we go to. The only thing they do when your chest closes up is give you an asthma pump. They do not follow up. Living in a polluted area like this has affected me and put me in the condition I'm in right now.

**R. L. Srinivasan**

Fisherman, Kattukuppam,
Ennore (North Chennai),
India



*Global Climate and Health Alliance
(GCHA)*

Our waters are more than just a source of livelihood—they are the heart of our culture, the keeper of our traditions, and the essence of our identity. But relentless coal and oil refinery pollution and frequent oil spills have poisoned these waters, destroying the ecosystems we depend on and making fishing no longer viable. Stripped of our sustenance, many of us are forced to leave behind generations of tradition and take up menial jobs elsewhere just to survive. It doesn't just end our way of life—it erases our connection to the land and sea, our dignity, and the very fabric of our community. This is not just environmental harm—it is an attack on our identity and existence.

Executive Summary

When we think of fossil fuels, we often focus on the moment they are burned - when coal powers a plant, petrol fuels a car, or gas heats a home. However, the impact of fossil fuels starts far earlier than combustion, and extends long after it. From the moment oil, coal, and gas are extracted from the earth, through refining, transport, and distribution, to the eventual shutdown and cleanup of industrial sites, every stage of this process leaves a footprint on human health as well as the environment. Air and water pollution, habitat destruction, toxic waste, and long-term public health crises are woven into the value chain of fossil fuel production. This report maps the full lifecycle of fossil fuels, exposing the often-overlooked consequences that impact our ecosystems, economies, and communities long before and after a single drop of oil or lump of coal is burned.

Cradle to Grave: The Health Toll of Fossil Fuels and the Imperative for a Just Transition provides a comprehensive global overview of the health consequences associated with fossil fuel use at every stage of their lifecycle. It collates existing scientific evidence, and gathers personal testimonials and case studies, to explore the multidimensional interactions between fossil fuels and human health and social wellbeing, particularly for the world's most vulnerable people and communities.

Our approach to examining these health impacts follows the broad definition set out in the World Health Organization (WHO) Constitution: health as a state of complete physical, mental, and social well-being, not merely the absence of disease. Accordingly, this report pairs rigorous data on health outcomes with the lived experiences of communities and health professionals on the front lines, showing how social and environmental conditions shape people's capacity to live healthy lives.

Our collated research aims to equip policymakers, health professionals, advocates and labour movements with the necessary evidence to push for transformative action and a healthy, just transition (see Principles of Just and Health-Focused Transition, p.80).



Key Findings



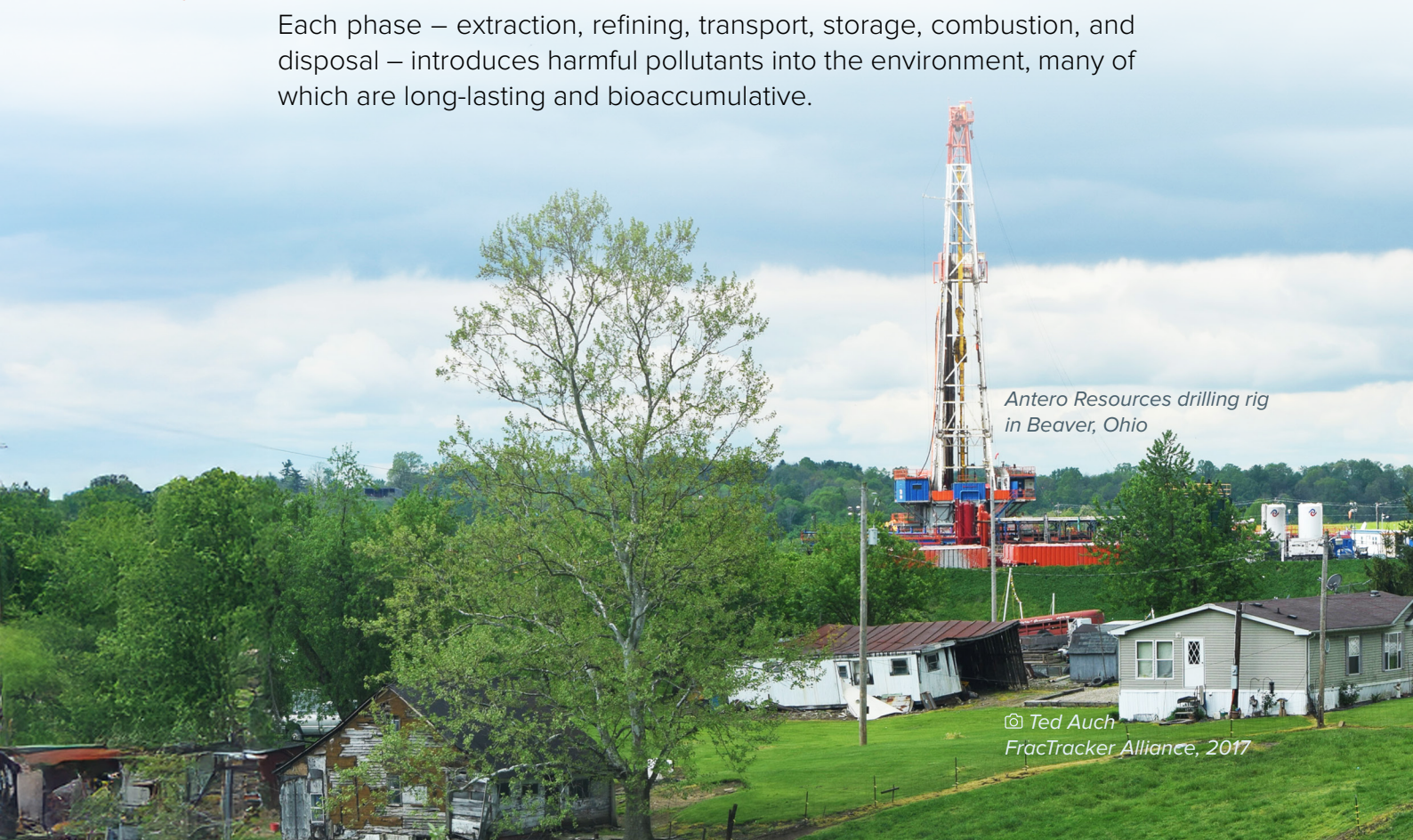
Fossil fuel-related pollution affects every stage of life, from fetal development to old age.

Exposure has been linked to increased risk of low birth weight, childhood cancer, asthma, neurological disorders, cardiovascular disease, and premature death. For instance, during the prenatal period, when vital organs are forming, exposure to pollutants from coal, oil, and gas extraction and combustion is linked to low birth weight, preterm birth, miscarriage, and a range of congenital abnormalities. Many of these health harms are permanent, impairing the child throughout their lifetime. Children are also particularly vulnerable due to their faster breathing rates, narrower airways, and developing organs. Fossil fuel pollutants are linked to a wide range of health harms across multiple body systems. They impair lung function and exacerbate asthma and other respiratory diseases; increase the risk of cardiovascular disease and hospitalizations; disrupt cognitive function and mental health through impacts on the brain and nervous system; elevate the risk of cancers such as leukemia; cause reproductive damage; and contribute to premature mortality. Older adults face unique vulnerabilities due to declining organ function, pre-existing chronic diseases, and cumulative exposure.



At every stage of their lifecycle, fossil fuels cause severe health harms.

Each phase – extraction, refining, transport, storage, combustion, and disposal – introduces harmful pollutants into the environment, many of which are long-lasting and bioaccumulative.



*Antero Resources drilling rig
in Beaver, Ohio*

*© Ted Auch
FracTracker Alliance, 2017*

Key health impacts include:



Extraction (e.g., fracking, coal mining, offshore drilling) releases benzene, heavy metals, radioactive materials, and particulates, driving up rates of respiratory disease, cardiovascular illness, cancers, adverse birth outcomes, and neurological disorders in surrounding populations.



Refining and processing have been shown to emit carcinogenic chemicals such as benzene, toluene, and Volatile Organic Compounds (VOCs), posing serious risks to workers and nearby residents, especially in densely clustered industrial zones.



Transport and storage involve risks of chemical leaks and spills, which contaminate air and water and trigger acute and chronic health effects, including respiratory and neurological damage.



Combustion, whether in power plants, vehicles, or homes, generates particulate matter 2.5 (PM2.5), nitrogen oxides, and other pollutants, significantly increasing risks of asthma, heart disease, stroke, cancer, dementia, and premature mortality.



Post-combustion waste (e.g., coal ash, gas flaring) continues to expose communities to heavy metals and toxins, contributing to long-term environmental degradation and chronic disease.



Legacy pollution from abandoned fossil fuel sites causes sustained harm decades later.

Fossil fuels are the largest source of greenhouse gas emissions, driving the climate crisis that fuels extreme weather, spreads disease, and causes lasting and devastating harm to human health.

It's crucial to note here that many health harms remain dangerously understudied—often unfolding over decades, by which time the damage is irreversible. Worse still, the cumulative toll of multiple projects in the same region is rarely accounted for, leaving entire communities exposed without adequate scrutiny or protection.

Coal plants in central India are associated with emissions that affect local air quality.

Amirtharaj Stephen



The health impacts of fossil fuels are persistent and systemic.

Fossil fuel harm doesn't end with exposure. The persistent nature of many pollutants, such as heavy metals, benzene, and particulate matter, means that they linger and build up in the environment and harms endure long after operations cease and can cause chronic health issues. Pollutants remain in soils, water systems, and food chains for decades or even centuries, causing continuous exposure and multiplying the health risks through the lifetime and for future generations. Exposure to heavy metals like mercury, lead, and arsenic has cumulative health impacts – damaging neurological development in children, causing cognitive impairment, kidney dysfunction, cardiovascular diseases, and multiple cancers long after fossil fuel activities have ceased.



Fossil fuel health harms are unevenly and unjustly distributed in communities and across nations.

Social determinants—conditions in which people are born, grow, live, work, and age, shaped by the distribution of power, resources, and opportunity—significantly influence exposure to fossil fuel pollutants and their impacts. Economic, political, racial, and geographical factors compound these risks. Marginalized groups, including Indigenous peoples, racial minorities, low income populations and migrant workers, disproportionately live near polluting infrastructure and face systemic barriers to healthcare, housing and a safe environment. These communities experience heightened rates of respiratory illness, cancer and cardiovascular disease, often in 'sacrifice zones' where a power imbalance between project proponents and the local community mean that people are forced to live in the midst of pollution.

Coal mines in Mozambique are located in close proximity to residential areas.

📷 *Justiça Ambiental, Mozambique*





Fossil fuels drive wider societal health impacts and exacerbate other pre-existing health disparities in communities and between nations.

Fossil fuel operations have profound societal consequences, often linked to rising inequality, disruptions to community well-being and human rights violations. Across the world, extraction projects have displaced Indigenous and marginalized communities, disrupting traditional livelihoods, and becoming linked to long-term mental and physical impacts. Fossil fuel operations can destabilise local economies and social structures, and have been linked to increased rates of substance abuse, violence, human trafficking, and mental health crises, particularly in communities surrounding extraction zones.



Climate policy and health policies have largely ignored these multidimensional health harms of fossil fuels.

While climate negotiations have focused on CO₂ and, more recently, methane emissions, they have overlooked the broader health consequences of fossil fuel dependence. Carbon capture technologies and emission offsets cannot mitigate the full range of health, social and ecological damages. Nor can they address the lasting legacies of toxic contamination or exposure. Furthermore, the fossil fuel industry's disproportionate political influence has eroded environmental and labour protections, weakened regulation, and permitted misinformation, compounding health impacts.



The cost of inaction is rising by the day.

In 2022, global fossil fuel subsidies reached an estimated US\$7 trillion, according to the International Monetary Fund (IMF), including explicit subsidies such as tax breaks and price caps (US\$1.3 trillion) and implicit subsidies of US\$5.7 trillion. The latter are due to the unpriced societal costs of fossil fuel use including air pollution, climate change, traffic congestion and other health and environmental damages. Phasing out fossil fuel subsidies and investing in clean, renewable energy could prevent millions of premature deaths, unlock over US\$4 trillion in public revenue currently lost to unpriced pollution and climate impacts, and deliver long-term economic and health benefits.



A rapid and just transition away from fossil fuels—and to clean, renewable energy—is imperative for health.

A just transition not only implies shifting toward renewable, clean and healthy energy sources but ensuring equitable access to these resources, particularly for historically marginalized and disproportionately impacted communities. It necessitates robust social policies, substantial investment in public healthcare, comprehensive environmental remediation, community involvement in decision-making, and fair economic opportunities for transitioning workers. Only through such integrated approaches can we address the root causes of climate injustice, improve overall community resilience, and secure long-term health benefits for all populations.

This report offers a cautionary framework as the world accelerates the extraction of critical minerals. We must apply the lessons of fossil fuel exploitation – prioritizing transparency, human rights, and environmental protection – to avoid repeating the same mistakes and prevent yet another cycle of harm disproportionately affecting the world’s poorest and most vulnerable.

Ultimately, shifting from fossil fuels toward health-focused, energy efficient and just renewable energy systems is economically advantageous, ethically necessary, and essential for global health and climate resilience. To address these issues, we make several key policy recommendations.

Women near coal mines in Mozambique carry biomass for household cooking and heating needs.



📷 *Justiça Ambiental, Mozambique*

Key Policy Recommendations



Halt New Fossil Fuel Exploration and Development

Ending new fossil fuel exploration and development is essential for meeting global climate targets, particularly the 1.5°C threshold set by the Paris Agreement. Despite mounting scientific evidence and economic concerns, including over stranded assets, new projects continue to receive approval.

Initiatives such as the Beyond Oil and Gas Alliance (BOGA), the Fossil Fuel Non-Proliferation Treaty, and the Powering Past Coal Alliance signal a growing international commitment to ending fossil fuel expansion. However, these efforts must be reinforced by legally binding commitments to phase out existing production and provide structural support for a just transition, including support for workers, communities, and countries dependent on fossil fuels. Precedents set by countries like Costa Rica, Colombia, France, and the Small Island Developing States illustrate political feasibility, yet persistent policy contradictions underscore the need for coordinated, comprehensive global action.



End Fossil Fuel Subsidies and Redirect Savings to Health

Despite all the science, fossil fuel subsidies continue to increase, reinforcing dependence on polluting energy sources and undermining health and climate goals. Phasing out subsidies and redirecting funds toward renewable energy, resilient infrastructure, and pollution mitigation would yield major public health gains and long-term savings. While some international commitments exist, stronger enforcement and accountability are needed to ensure funds support a healthier, more sustainable future.



Clean Up Existing Fossil Fuel Production

Immediate actions to mitigate harms from existing fossil fuel production, particularly methane emissions (e.g. the Global Methane Pledge (GMP)), are essential but must not replace the ultimate goal of fully phasing out fossil fuels. Reducing methane through ending flaring, plugging leaks, and stricter regulations can quickly decrease climate impacts and improve public health, though these interim measures should not justify prolonged fossil fuel extraction.

Beyond methane, fossil fuel production releases toxic chemicals harming frontline communities. Governments should enforce stringent emission standards, mandate real-time pollution monitoring, strictly limit flaring and hazardous waste disposal, enhance environmental enforcement and community-led oversight, require cumulative environmental and health impact assessments for new facilities, and support targeted pollution remediation programs. Remediation efforts and stricter regulation must be accompanied by transition planning and economic alternatives for workers and communities historically dependent on fossil fuel industries



Internalize the Health Costs of Fossil Fuels through the “Polluter Pays” Principle

The “Polluter Pays” principle asserts that those responsible for environmental harm should bear the associated costs. Currently, these costs - including respiratory diseases, cardiovascular conditions, and premature deaths - are externalized onto public health systems, allowing fossil fuel companies to profit without accountability.

Internalizing these costs creates clear financial and regulatory incentives to reduce toxic emissions and accelerate the transition to clean, renewable energy. Legal instruments, including the internationally recognized right to a clean, healthy, and sustainable environment, provide a foundation for enforcing such accountability. Strengthening this principle - through policy mechanisms such as reversing the burden of proof to require companies to demonstrate safety - can help ensure greater environmental and public health protection, while easing the economic strain on health systems.



Initiate Community-Led Health Research and Action for Fossil Fuel-Affected Areas

Prioritize community-partnered research to assess the health harms of fossil fuels and climate change on highly impacted communities, integrating both Western scientific methods and Traditional Knowledge. These studies should examine physical, mental, and cultural health impacts in a holistic manner. Crucially, the findings must lead to concrete policy changes, resource allocation, and remediation efforts that reflect the priorities identified by the communities themselves.



Regulate, Limit and Counter Fossil Fuel Industry Advertising and Disinformation

Banning fossil fuel advertising and sponsorship, alongside evidence-based counter-marketing, can reduce industry influence, challenge disinformation, and shift public norms, as seen in successful tobacco control campaigns. Policies implemented in France, Amsterdam, and Canada demonstrate that such measures help build cultural and political momentum toward clean energy transitions.

Fossil fuel companies and petrostates have long used their presence at climate and pollution conferences to undermine policy progress. As tobacco companies are excluded from health conferences on lung disease, fossil fuel entities should likewise be barred from COPs and other international forums focused on environmental and public health protection.



End Fossil Fuel Finance: Align Global Institutions with Climate Goals

Global financial institutions, including the World Bank and major investment banks, continue to fund fossil fuel projects, undermining climate goals and delaying the transition to renewable energy. Redirecting these funds to clean, renewable energy is essential, with the International Energy Association (IEA) calling for a tripling of renewable investments to US\$4.5 trillion annually by 2030. Additionally, continued funding risks creating stranded assets worth up to US\$1 trillion, making fossil fuel investments financially unsound.



Lead by example in the Health Sector

The health sector holds considerable influence as a trusted voice and major economic actor. By decarbonizing healthcare systems, divesting from fossil fuels, and adopting sustainable practices, it can play a critical role in accelerating the fossil fuel phase-out and leading by example. Health professionals can humanize the impacts of fossil fuels by sharing firsthand accounts from patients and communities. Through these actions, the sector can lead a transition toward a healthier, more equitable, and sustainable future and inspire a society-wide transformation.

A Call for Collective Action



Fossil fuel dependence is driving a triple crisis—devastating the environment, inflicting widespread harm on human health, and reducing the stability required for health systems to function. The extensive health impacts outlined in this report, from respiratory illnesses to long-term chronic diseases, provide an undeniable imperative for urgent, collective action. While scientific research highlights the scale of the crisis, lived experiences reveal a deeper toll, particularly on marginalized communities living near polluting infrastructure.

At the same time, the world stands at a turning point. The falling cost of renewable energy and battery storage has made clean electricity cheaper than fossil fuels in much of the world. The IEA now projects oil and gas demand will peak before 2030. When the hidden health costs of fossil fuels are considered, the case for transitioning becomes even more urgent. Yet, fossil fuel companies continue to delay this shift to protect their profits—at the expense of ecological, economic, and human wellbeing.

This moment demands bold leadership from governments, civil society, businesses, and the global health community to swiftly transition away from fossil fuels. By prioritizing public health, safety, health system stability, social justice, and environmental sustainability, this transition can not only mitigate harm but also create transformative change—protecting the most vulnerable and building a healthier, more equitable future for generations to come.



Dr. Marina Romanello

Executive Director,
Lancet Countdown



University College of London

The science is clear: our persistent dependence on fossil fuels is claiming lives and livelihoods today, and putting the world on track to a potentially catastrophic future of climate change. A prompt and just transition away from fossil fuels and towards renewable energy and energy efficiency is essential to ensure our world can continue to support healthy human lives. It can also help save over 2 million lives every year from improved air quality, enable a transition to more affordable and reliable energy, support the generation of healthier jobs, and enable a thriving and more equitable future for all. With this burden of evidence, there are no more excuses for further delays.

The **Global Climate and Health Alliance (GCHA)**

works at the forefront of a growing global movement of health professionals and health and development organisations dedicated to promoting a healthy, equitable, and sustainable future for all. We address the climate crisis through evidence-based advocacy, policy, movement building, research and strategic communications.

With 200+ organisational members, from every region and reaching over 125 countries, the Alliance co-chairs the WHO-Civil Society Working Group on Climate & Health and collaborates with organisations and agencies around the world to ensure that people's health is protected in the climate change era, in national, regional, and international decision-making. We are committed to tackling the climate crisis to preserve a healthy home for humanity.

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