

# Six areas where action must focus to rescue this planet

November 12 2021, by Phoebe Barnard, William Moomaw

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For some time, the Earth's natural resources have been depleted faster than they can be replaced. The Intergovernmental Panel on Climate Change has set a 2030 [deadline](#) to reduce heat-trapping emissions by

half to avoid climate change that is both irreversible and destructive.

With colleagues, we coauthored a [climate emergency warning paper](#) in 2019. It has now been co-signed by 14,594 scientists from 158 countries. We also produced [an extension](#) in 2020 and a [grim update](#) in 2021. Our warnings are supported by thousands of research studies, many referenced in the [Intergovernmental Panel on Climate Change](#) papers.

In our new [paper](#), we move beyond warnings and call for concrete actions. These must happen in six areas, at six levels—from household to community, city, state, nation and global—and on three timescales.

In the next three decades, the world must dramatically decrease [greenhouse gases](#) in the atmosphere to return to a more stable climate. To do this, we identify priority actions for [energy](#), pollutants, nature, food, population and economy.

This takes place on three timescales—by 2026, 2030, and 2050. By 2050, [carbon](#) dioxide emissions must not exceed removals. After that, we must lower atmospheric concentrations by taking enough carbon out of the atmosphere.

Our paper, [summarized here](#), is intended to guide society, decision makers, planners, managers and financial investors with a framework for action. Yet humanity's biggest challenges are not technical, but social, economic, political and behavioral.

### **Energy: Less, cleaner, more with less**

It is essential to reduce demand for energy by increasing energy productivity. That means getting more energy services—heating, cooling, lighting, transport, electricity and mechanical work—out of less primary energy. Fossil fuels are the largest sources of heat-trapping

carbon dioxide and methane, and must be replaced. Our paper recommends the following:

- Follow much more ambitious road-maps for energy transformation to halve [carbon dioxide emissions](#) by 2030.
- Create [economic incentives](#) to provide [energy services](#) with less primary energy.
- Replace primary energy from coal, oil, natural gas and wood with solar, wind, geothermal, tidal and hydro energy, wherever ecologically appropriate.
- Account for all emissions and black carbon (soot) from burning bioenergy.
- Levy high carbon prices on air travel, inefficient vehicles, appliances, buildings and carbon intensive goods.

### **Pollutants: Reduce and remove**

Methane, nitrous oxide, hydrofluorocarbons, black carbon and other atmospheric pollutants add directly to global heating. Our warming world is melting permafrost, releasing heat-trapping methane. Policies must:

- Rapidly reduce methane emissions from agriculture, industry, and oil and gas production.
- Develop effective atmospheric methane removal practices.
- Require large methane producers to pay for atmospheric removal.
- Reduce methane, nitrogen oxides, carbon monoxide and non-methane hydrocarbons that produce heat-trapping pollutants.
- Reduce emissions of hydrofluorocarbons from refrigerants, solvents and other sources.
- Reduce [nitrous oxide](#) emissions from fertilizers, fossil fuel combustion and industrial processes.

## Natural climate solutions

Biodiverse natural ecosystems, including forests, wetlands, grasslands, peatlands and oceans, are essential for our planet to function. This includes carbon management. They remove and store 56% of annual [carbon emissions](#), preventing additional warming.

Society needs to:

- Protect carbon dense ecosystems to cover 30% of the Earth's surface by 2030 and remove all emitted carbon dioxide by 2050.
- Halt destruction of these essential systems.
- Restore degraded ecosystems.
- Greatly reduce land conversions by 2026 and halt them by 2030.

## Food system reform

Agricultural production is failing to sustain Earth's nearly 8 billion people without unacceptable damage to climate, land and water. The global food system generates [more than 25%](#) of greenhouse gas emissions and [consumes 70%](#) of freshwater. Expanding inefficient agriculture causes deforestation and nutrient runoff. It creates coastal low oxygen dead zones. To avoid widespread famines this century, leaders and farmers must:

- Shift production to foods that use land and water more efficiently.
- Use farming methods that regenerate the environment and store carbon in soils.
- Support farmers in these transitions, especially small farmers.

## Population stability

Population growth undermines efforts to protect nature and people.  
Leaders and civil society should:

- Embed population actions in economic, social and political agendas.
- Invest more in family well-being through health, education and economic policies.
- Support poorer families to advance economically and educationally.
- Protect everyone's right to life purposes other than parenting.
- Increase aid for family planning.

## **Economic reform**

Economies must operate within [planetary boundaries](#). Leaders need to:

- Correct market failures through appropriate taxes, subsidies and regulations.
- Create economic frameworks for profitable activities that protect and restore nature.
- Introduce reforms to sustain farm and forest lands, oceans, rivers and wetlands.
- Introduce land rights and urban planning models that encourage efficient land use.
- Develop economic policies that halt loss of wild lands.
- Introduce policies to reduce climate altering emissions and restore socially efficient local production.

We must accelerate these transformations, while maintaining social, economic and political stability. Effective and timely actions are still possible on many, but not all fronts. Avoiding each tenth of a degree increase in global temperature improves the lives of billions of people, thousands of species and ecosystems.

Humanity can choose cooperation, wisdom, innovation, and ethics—or not. People can learn from past mistakes and create better societies. Leaders' main challenge in the next decade may be to hold the rudder steady as society transforms on an almost impossible timescale. Our actions, or inaction, will determine whether we meet the challenges of the coming decades, and persist as civilized societies.

Our paper is open [here](#) for signature by anyone with a degree in natural, political, social, health, educational, behavioral or other science.

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