

# Planet B: Lifestyle Medicine for Healing Planet Earth

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## Abstract

The Planetary Health Check Report of 2025 identified 7 planetary boundary transgressions in the life-support systems of the planet. These transgressions occur as the result of human-engineered systems operating in conflict with the life-support systems of Planet Earth.

Systems engineering is a discipline for analyzing why systems behave the way they do and synthesizing systems that behave the way they should. **Planet B** is a systems engineering framework for orienting human-engineered systems to be in alignment with the life-support systems so that planetary health is obtained by design while the world meets a slightly modified version of the UN Sustainable Development Goals (SDG) by 2030. In this paper, we show that **Planet B** is analogous to the discipline of Lifestyle Medicine for healing the human body, but applied on a planetary scale.

## 1. Introduction

The Planetary Health Check Report of 2025 [1] revealed a sobering diagnosis that 7 out of 9 planetary boundaries have been transgressed. These boundaries represent the life-support systems of Earth including biodiversity, freshwater, carbon and nutrient cycles. The transgression of 7 boundaries signals a civilization operating out of sync with nature. These violations are not isolated accidents, but symptoms of human-engineered systems functioning in fundamental opposition to the natural world.

Just as lifestyle-related diseases in the human body mainly stem from misaligned habits [2], industrial systems have induced planetary pathology through unsustainable consumption, exploitation, and disconnection from ecological realities [3]. Modern engineering education is founded on the false assumption of an infinite source of raw materials and an infinite sink for toxic waste in the form of Planet Earth. To reverse this course, we must think like systems engineers. Systems engineering is not only about understanding how complex systems behave, but also about redesigning them to behave in ways that achieve desired outcomes.

**Planet B** is a systems engineering framework for healing Planet Earth [4], inspired by the analogy of Lifestyle Medicine [5], which focuses on root causes and sustainable behavioral changes to heal the human body. In that same vein, **Planet B** prescribes a transformative lifestyle shift at the civilizational level, rooted in the understanding that the health of the planet and the health of all its inhabitants are inseparably linked. Rather than managing planetary symptoms with techno-fixes, **Planet B** targets the root causes such as the cultural narratives,

economic incentives, and governance structures that currently prioritize profit and power over life and balance.

By redesigning human systems to be in harmony with Earth's ecological thresholds, **Planet B** provides a blueprint to reorient our trajectory. It shows how a modified set of the UN Sustainable Development Goals (SDGs) [6] can be achieved by 2030, not through incremental adjustments, but through a radical rethinking of progress, prosperity, and purpose. The **Planet B** framework includes transitioning to a fully plant-based economy, rewilding half the planet, eliminating extractive energy models, and re-centering indigenous and ecological wisdom in global policymaking.

## 2. Addressing the 7 Planetary Boundary Transgressions

Through the adoption of a plant-based economy, **Planet B** causes the relinquishing of about 40% of the ice-free land area of the planet for rewilding purposes [7]. This directly addresses each of the 7 Planetary Boundary Transgressions (PBT) with tailored systems-level solutions:

**(PBT 1) Biospheric Integrity:** A key measure of humanity's global impact is the rate at which wildlife is dying out on this planet, both in terms of species extinction rates and in the reduction in the total populations of wild animals. Currently, humans impact biospheric integrity through habitat loss, habitat fragmentation, introduction of invasive species, chemical pollution, depletion of freshwater sources and climate change.

Species extinction rates are currently estimated to be 1,000 to 10,000 times the background rate [8] and wild animal populations are declining exponentially [9] making biospheric integrity the worst of the planetary boundary transgressions. By releasing 40% of the ice-free land area of the planet as well as the entire ocean back to nature, **Planet B** addresses biospheric integrity mainly through habitat restoration.

**(PBT 2) Novel entities or Chemical pollution:** Humans have introduced several hundred thousand novel chemicals into the environment, mainly over the past century [10]. We produce over 2 billion tons of these synthetic chemicals every year and in addition, the waste products from our industrial processes total to about 220 billion tons of toxic chemicals being added into the environment every year.

This is a vast chemical experiment that is threatening the well-being of all life on earth. These chemicals are accumulating in the environment and working their way up the food chain in higher and higher concentrations, year after year. While trees and plants are very good filters and store the chemical pollution in their trunks and stalks, animal livers require seven years to clean out half the toxins in our bodies. The problem gets compounded when we animals consume a fresh load of chemical pollution at every meal.

Next to habitat loss, chemical pollution is causing more destruction of wildlife than any other factor. In addition to biospheric integrity, this planetary boundary transgression is considered to be at high risk of destabilizing the life-support systems of the planet [1].

In the **Planet B** solution, the restoration of native ecosystems on 40% of the ice-free land area of the planet will cause the uptake of chemical pollution in regenerating trees, thereby diminishing the novel entities in circulation in the environment. In addition, **Planet B** calls for urgently reconsidering and diminishing the use and discharge of novel entities in industrial processes.

**(PBT 3) Biogeochemical flows:** Humans have been impacting the nitrogen and phosphorous cycles of the planet through the over production and over use of synthetic fertilizers. Fertilizer runoff leads to dead zones in rivers and in the ocean as the over fertilized river and ocean beds lead to excess plant growth depleting the oxygen in the water and suffocating aquatic life [11].

At present, it is estimated that our nitrogen and phosphorous use is at least double the tolerable limits and this is also leading to the loss of biospheric integrity. In the **Planet B** solution, the production of industrial crops is decreased by at least 25% immediately, leading to a reduction in the planetary boundary transgression of biogeochemical flows.

**(PBT 4) Climate change:** Although it receives the most attention in the mainstream media, climate change is only the 4<sup>th</sup> worst planetary boundary transgression among the 7 listed in the Planetary Health Check Report of 2025. Climate change is caused by an imbalance in the incoming solar energy and the outgoing thermal energy of the planet due to human additions of greenhouse gases and cooling gases in the atmosphere as well as surface albedo changes. The primary greenhouse gases that humans emit are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O), while the primary cooling gases are sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>) and organic carbon. In the absence of any other greenhouse gases, it is estimated that CO<sub>2</sub> concentrations in the atmosphere must be below 350 parts per million (ppm) for climate change to be in the green zone. At present the CO<sub>2</sub> concentration in the atmosphere is at 426 ppm, transgressing this limit.

The Effective Radiative Forcing (ERF), expressed in Watts per square meter (W/m<sup>2</sup>), is the energy imbalance caused by the greenhouse gases and cooling gases that humans have added to the atmosphere since 1750. It is currently estimated to be 3 W/m<sup>2</sup> [12]. In terms of ERF, the planetary boundary on climate change is transgressed at 1 W/m<sup>2</sup> and therefore, it is important for engineers and policymakers to design mitigation strategies around reductions of ERF rather than just focusing on CO<sub>2</sub> emissions reductions alone. Since fossil fuel burning is the primary source of cooling gases such as SO<sub>2</sub> [13], effective mitigation on climate change requires the immediate cessation of animal agriculture as envisioned in the **Planet B** solution, accompanied by a more nuanced reduction of fossil fuel use.

**(PBT 5) Land system change:** This planetary boundary is impacted by the transformation of native ecosystems into grazing land, timber land, crop land or built land. At present, only 9% of the ice-free land area of the planet is covered by native ecosystems [14] making land system change a major factor in the loss of biospheric integrity. In the **Planet B** solution, the restoration of native ecosystems on 40% of the ice-free land area of the planet addresses this planetary boundary transgression.

**(PBT 6) Fresh water change:** Changes in fresh water cycles and the lack of availability of fresh water impact the well being of life. Humans have been modifying fresh water cycles through damming rivers and the destruction of forests. In the **Planet B** solution, the restoration of native ecosystems on 40% of the ice-free land area of the planet would repair the fresh water cycles of the planet.

**(PBT 7) Ocean acidification:** As CO<sub>2</sub> levels in the atmosphere increase, more of that CO<sub>2</sub> dissolves in the ocean to become H<sub>2</sub>CO<sub>3</sub> or carbonic acid, thereby increasing the acidity of the ocean. As the water becomes more acidic, sea animals that grow shells find it more difficult to survive. As of 2025, ocean acidification has just crossed the margin of the safe operating space [1], and the trend is worsening as the CO<sub>2</sub> levels in the atmosphere increase year on year. In the **Planet B** solution, as CO<sub>2</sub> gets sequestered in restored ecosystems, we can expect the CO<sub>2</sub> level in the atmosphere to start decreasing causing a reversal of this planetary boundary transgression.

The remaining planetary boundaries on atmospheric aerosol loading and stratospheric ozone layer are still in the green zone and the **Planet B** solution is not expected to adversely impact these boundaries.

### 3. Conclusions

In essence, **Planet B** is not an escape plan to another world but a pathway to restore this one. It is Lifestyle Medicine scaled up to the biosphere, a holistic, systemic approach to planetary healing that emphasizes prevention, regeneration, and compassionate coexistence. As the window for successfully restoring climate and ecological stability narrows, **Planet B** offers both a diagnosis and a cure rooted in the engineering of better choices. It invites humanity to finally live in the right relationship with Planet Earth, and in doing so, to heal ourselves.

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