

Strong Sustainability by Design

EXECUTIVE SUMMARY



Strong Sustainability by Design - Version 1 (Draft)

Request for Input

Public comments are invited on the first version of ***Strong Sustainability by Design: Prioritizing ecosystem and human flourishing with technology-based solutions*** that identifies specific issues and pragmatic recommendations regarding sustainability and climate change to achieve “Planet Positivity” by 2030.

This draft compendium has been created by committees of the Planet Positive 2030 Initiative¹ that is supported by IEEE Standards Association (IEEE SA). The Planet Positive 2030 Initiative community is composed of several hundred participants from six continents, who are thought leaders from academia, industry, civil society, policy and government in the related technical and humanistic disciplines. At least one hundred fifty members of this community have contributed directly and have worked to identify and find consensus on timely issues.

The document’s purpose is to identify specific issues and candidate recommendations regarding sustainability and climate change challenges to achieve “Planet Positivity” by 2030, defined as the process of [transforming society and infrastructure by 2030 to](#):

- Reduce GreenHouse Gas (GHG) emissions to 50% of 2005 emissions by 2030²
- Significantly increase regeneration and resilience of earth’s ecosystems³
- Be well on the path to achieving net zero GHG emissions by 2050 and negative GHG emissions beyond 2050
- Continue to widely deploy technology as well as design and implement new technological solutions in support of achieving technological solutions designed and deployed to achieve “Planet Positivity”

In identifying specific issues and pragmatic recommendations, the document:

- Provides a scenario-based challenge (how to achieve “Planet Positivity by 2030”) as a tool to inspire readers to provide contextual technical and general feedback as part of this RFI.
- Advances a public discussion about how to build from a “Net Zero” mentality to a “Net or Planet Positive” (“do more good”) societal mandate for all technology and policy.
- Continues to build a diverse and inclusive community for the Planet Positive 2030 Initiative, prioritizing the voices of indigenous and marginalized members whose insights are acutely needed to help ensure technology and other solutions are valuable for all. Of keen interest is how we can encourage more in-depth participatory design in our processes.
- Inspires the creation of technical solutions that can be developed into technical standards (IEEE Standards Association, for example ICT and power & energy related standards, IEEE P7800™ series) and associated certification programs.
- Facilitates the emergence of policies and regulations; regulations that would potentially be interoperative between different jurisdictions (countries).

¹ Planet Positive 2030 is part of [The Sustainable Infrastructures and Community Development Industry Connections program](#)

² As described in the [United Nations Climate Change Conference \(COP 21\) Paris Agreement of 2015](#).

³ According to the [High Ambition Coalition for Nature and People](#), “In order to address both the biodiversity crisis and the climate crisis, there is growing scientific research that half of the planet must be kept in a natural state....experts agree that a scientifically credible and necessary interim goal is to achieve a minimum of 30% protection by 2030.” Protection for land and water of “30 x 30 by 2030” was recommended during COP15 United Nations [Convention on Biological Diversity](#).

By inviting comments for *Strong Sustainability by Design*, the Planet Positive 2030 community provides the opportunity to bring together multiple voices from the related scientific and engineering communities with the general public to identify and find broad consensus on technology to address pressing environmental and social issues and proposed recommendations regarding development, implementations and deployment of these technologies.

Details on how to submit public comments are available in the [Submission Guidelines](#).

Comments in response to this request for input will be considered by the Planet Positive 2030 Initiative committees for potential inclusion in the first public edition of *Strong Sustainability by Design* (“*Strong Sustainability by Design*, First Edition”) anticipated to be made available to the general public during the fourth quarter of 2023.

- For further information, learn more at the [Planet Positive 2030 Initiative website](#).
- For our Frequently Asked Questions (beyond RFI submission), [please click here](#).
- Get in touch at: PlanetPositive2030@ieee.org to get connected to a committee or any other reason.
- Please, [subscribe to our newsletter here](#).

If you’re a journalist and would like to know more about the Planet Positive 2030 Initiative, please contact: Standards-pr@ieee.org

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Disclaimers

Strong Sustainability by Design is not a code of conduct or a professional code of ethics. Engineers and technologists have well-established codes,

and we wish to respectfully recognize the formative precedents surrounding issues of sustainability and the professional values these codes represent. These codes provide the broad framework for the more focused domain addressed in this document, and it is our hope that the inclusive, consensus-building process around its design will contribute unique value to technologists and society as a whole.

This document is also not a position, or policy statement, or formal report of IEEE or any other organization with which is affiliated. It is intended to be a working reference tool created in an inclusive process by those in the relevant scientific and engineering communities prioritizing sustainability considerations in their work.

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A Note Regarding Recommendations in This Document

Strong Sustainability by Design is being created via multiple versions that are being iterated over the course of two to three years. Planet Positive 2030 is following a specific concurrence-building process where members contributing content are proposing “candidate” recommendations so as not to imply these are final recommendations at this time. This is also why the word, “Draft” is so prominently displayed.

Our Membership

Planet Positive 2030, an initiative supported by the IEEE Standards Association as part of the Industry Connections Program, [Sustainable Infrastructures and Community Development program](#) (SICDP) currently has more than 400 experts involved in our work, and we are eager for new voices and perspectives to join our work.

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Strong Sustainability by Design: Prioritizing ecosystem and human flourishing with technology-based solutions

Introduction

Imagine the future we⁴ can build together.

This is the vision driving the work of **Planet Positive 2030**, an initiative created and supported by the IEEE Standards Association⁵ that brings together a global, diverse, open community of experts to help chart a path for all people to achieve a flourishing future for 2030 and beyond.

The first step to imagine this future is to recognize the planet Earth and all its ecosystems form a part of all of us⁶. The air we breathe, the water we drink, and the food earth provides comprise who we are. We cannot continue to treat planet Earth as a “resource” from which to be extracted - planet Earth is finite with finite resources. We should, instead, prioritize the health of our planetary biosphere and recognize that we humans are a part of the system, not above it or outside it.

In 1987, the United Nations Brundtland Commission defined “sustainability” as “meeting the needs of the present without compromising the ability of future generations to meet their own needs”.⁷ This implies “sustainability” is the long-term resilience of people and the planetary biosphere in unison. Achieving sustainability for millennia to come requires a shift from the zeitgeist of competition defining the Anthropocene⁸ era to a culture of care for the land and one another, a ‘culture of sustainability’, the ultimate goal/vision we can imagine, share, and achieve together.

A key intersection for sustainability involves technology and the context of how and when it is applied and/or used. Quoting *Herbert Simon (1916–2001), Nobel prize laureate 1978, A. M. Turing award 1975*:

“We must look ahead at today’s radical changes in technology, not just as forecasters but as actors charged with designing and bringing about a sustainable and acceptable world. New knowledge gives us power for change: for good or ill, for knowledge is neutral. The problems we face go well beyond technology: problems of living in harmony with nature, and most important, living in harmony with

⁴ ‘We’ refers to ‘all of us people’ - our responsibility for ‘Now’ and ‘Future Generations’ of humanity and the earth’s biosphere

⁵ Planet Positive 2030 is part of [the Sustainable Infrastructures and Community Development Industry Connections program](#) of [IEEE SA](#).

⁶ “Us” refers to all people on Earth.

⁷ See the definition of “sustainable development” on page 41 of [Our Common Future: Report of the World Commission on Environment and Development from the UN General Assembly, Development and International Economic Co-operation: Environment, A/42/427 \(annex\)](#), originally published 4 Aug. 1987.

⁸ From [Anthropocene](#) by Andrew Goudie: “Paul Crutzen and colleagues introduced the term ‘Anthropocene’ (e.g., Crutzen 2002; Steffen, et al. 2007) as a name for a new epoch in Earth’s history—an epoch when human activities have ‘become so profound and pervasive that they rival, or exceed, the great forces of Nature in influencing the functioning of the Earth System.’”

each other. Information technology, so closely tied to the properties of the human mind, can give us, if we ask the right questions, the special insights we need to advance these goals.”⁹

The Planet Positive 2030 process builds on IEEE experience considering the potential positive and negative impacts of the applications of technologies on people¹⁰. It leverages previous work and vision created by IEEE taking an in-depth look at Artificial Intelligence, its applications and potential impacts as detailed in *Ethically Aligned Design: A Vision for Prioritizing Human Well-being with Autonomous and Intelligent Systems*:¹¹

“Ultimately, our goal should be **eudaimonia**, a practice elucidated by Aristotle that defines human well-being, both at the individual and collective level, as the highest virtue for a society. Translated roughly as ‘flourishing,’ the benefits of eudaimonia begin with conscious contemplation, where ethical considerations help us define how we wish to live.”¹²

Human well-being has many facets: health, education, social networks among others. Fundamentally, it is dependent on planet Earth, its climate, and the health of the earth’s ecosystems. It requires that nature be honored, that we as individuals and organizations recognize and respect planetary boundaries, the role of and limits to natural capital. This leads to the concept of **Strong Sustainability**.

Most notably, “Strong Sustainability” builds on the concept of “Sustainability” and stipulates that substitutability of natural capital and ecosystem services (by manufactured capital) be severely restricted to ensure availability of these resources for future generations, for human existence and well-being. The “consumption of natural capital is usually irreversible” (for example, loss of biodiversity).¹³ Strong Sustainability provides boundary conditions for technological design and implementation based on the reality that earth’s ecosystems will function and evolve as they will despite any human economic or cultural imperatives.

Put simply: We need Nature. Nature doesn’t need us.

It is this recognition of our need to account for and honor earth that the title of our compendium is **Strong Sustainability by Design: Prioritizing ecosystem and human flourishing with technology-based solutions**. Eudaimonia must embody conscious contemplation, ‘healing’, and conservation of our natural world with a healthy atmosphere and ecosystems for all the living organisms it contains.

⁹ Salvatore T. March and Fred Niederman, “The Future of the Information Systems Discipline: A Response to Walsham,” *Journal of Information Technology* 27, no. 2 (2012), <https://doi.org/10.1057/jit.2012.10>. Includes quote by Herbert A. Simon (2000).

¹⁰ “Technology and Society,” IEEE Society on Social Implications of Technology (SSIT), <https://technologyandsociety.org>.

¹¹ The IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems, *Ethically Aligned Design: A Vision for Prioritizing Human Well-being with Autonomous and Intelligent Systems*, 1sted. (IEEE, 2019).

¹² In *Ethically Aligned Design: A Vision for Prioritizing Human Well-being with Autonomous and Intelligent Systems*, the first three principles are:

1. **Human Rights** – Artificial Intelligence Systems (AIS) shall be created and operated to respect, promote, and protect internationally recognized human rights.
2. **Well-being** – Artificial Intelligence Systems (AIS) creators shall adopt increased human well-being as a primary success criterion for development.
3. **Data Agency** – Artificial Intelligence Systems (AIS) creators shall empower individuals with the ability to access and securely share their data, to maintain people’s capacity to have control over their identity.

¹³ Jérôme Pelenc, Jérôme Ballet, and Tom Dedeurwaerdere, “[Weak Sustainability versus Strong Sustainability](#),” brief for GSDR 2015.

The name of the Planet Positive 2030 Initiative tells the story of how we¹⁴ are approaching and doing our work:

- **Planet:** Our focus. The earth we must heal, protect, and sustain for humans and nature to flourish for seven generations¹⁵ and beyond.
- **Positive:** Our purpose. The design to give back more to the planet with technology than is removed and not to harm the biosphere/planet¹⁶.
- **2030:** Our urgency. The timeframe guiding our work inspiring responsible, bold, systems thinking to inspire accountable contextualized solutions, standards, policy, and pragmatic change.

Each chapter of *Strong Sustainability by Design* begins with a “Planet Positive vision of 2030” written as if the expert committee members authoring the content are in that future positive reality where our two “impossible goals”¹⁷ have been achieved. Discussions of “Issues” and “Recommendations” provide a pathway to get from today’s reality to the visions of 2030 as will be complemented by the feedback received as part of this process.

Many experts have collaborated, cooperated, and shared their insights to prepare this living document. Now we call on you, on all interested people, to provide advice, input, and suggestions.

You are invited.

Imagine the future we can build together.

Your participation and insights will help build this future.

To achieve Planet Positivity for 2030 and beyond.

¹⁴ We—the many contributors and participants of the Planet Positive 2030 Initiative.

¹⁵ For more information about the Seventh Generation Principle, [see the 30 May 2020 blog post of the Indigenous Corporate Training, Inc., entitled “What is the Seventh Generation Principle?”](#) When involving Indigenous communities, it is recommended to consider and prioritize the rights of Indigenous peoples, including the principle of free, prior, and informed consent. For more details, see: UN Human Rights, Office of the High Commissioner, “*Free, Prior and Informed Consent of Indigenous Peoples*,” from Sept. 2013.

¹⁶ Versus a “climate neutral” mindset.

¹⁷ Goal One: Transform society and infrastructure to achieve Planet Positive 2030 means reducing GreenHouse Gas (GHG) emissions to 50% of 2005 emissions by 2030 and significantly increasing regeneration and resilience of Earth’s ecosystems (as noted in the UN Convention on Biological Diversity’s [First Draft of the Post-2020 Global Biodiversity Framework from 5 July 2021](#), created as part of [COP 15 UN Biodiversity Conference](#)). Goal Two: Identify the current technological solutions that need to be deployed widely as well as technology gaps for which we need to design, innovate, and deploy new technological solutions to reach Planet Positive 2030.

With Deep Gratitude

The members of the Planet Positive 2030 community wish to express their deep gratitude to Brian Friedrich who played a pivotal role on our Metrics Committee and in the Initiative. It is with deep sadness we mourn his passing during the development of *Strong Sustainability by Design*. We celebrate his warmth, humor, enthusiasm for and seminal insights contained in this work.

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The Foundation

The need for a flourishing planet, human rights, and values

The foundation for the guiding principles of Planet Positive 2030 is the need for a flourishing planet to sustain all life. The guiding principles are built upon the United Nations (UN) Universal Declaration of Human Rights,¹⁸ Declaration on the Rights of Indigenous Peoples,¹⁹ Declaration on the Rights of Disabled Persons,²⁰ Declaration on the Right to Development,²¹ Rio Declaration on Environment and Development,²² Resolution on the human right to a clean, healthy and sustainable environment,²³ and Convention on the Rights of the Child; regional human rights declarations; and the IEEE Code of Ethics.²⁴

Human dignity and the human values of peace, freedom, social progress and equal rights form the values basis underlying *Strong Sustainability by Design*. Enshrined within the UN's Charter and its Universal Declaration of Human Rights for nearly three-quarters of a century, these broad values have guided the UN's efforts to fairly represent the world's diverse nations and cultures.

Alignment with UN values embraces a powerful declaration for universal human values that guide human societies. Having those values form the basis for *Strong Sustainability by Design's* guiding principles provides a powerful, cultures-wide foundation for guiding the efforts of humans as caretakers and caretaker advocates of a flourishing planet.

Essential to the success of the guiding principles are accountability, transparency, freedom of expression, and protection of whistleblowers. The goal is a flourishing planet—all nations, all peoples, all that supports life.

The goal of a long-term, flourishing planet Earth can be attained if the current warming trend of the earth's atmosphere is first halted and then reversed. Reduction of GHG emissions is a paramount goal. While shifting from fossil fuel-based economies to largely greenhouse gas emissions-free economies is the foremost agenda to address the looming climate crisis, it is also important to observe a balance for all stakeholders

¹⁸ UN General Assembly, Resolution 217 (III), Universal Declaration of Human Rights, A/RES/217 (III) (10 Dec. 1948), <https://www.un.org/en/about-us/universal-declaration-of-human-rights>.

¹⁹ UN General Assembly, Resolution 61/295, *Declaration on the Rights of Indigenous Peoples*, A/RES/61/295 (13 Sept. 2007), <https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP>.

²⁰ UN General Assembly, Resolution 3447, *Declaration on the Rights of Disabled Persons*, A/RES/3447 (9 Dec. 1975) <https://www.un.org/disabilities/documents/convention/convoptprot-e.pdf>.

²¹ UN General Assembly, *Declaration on the Right to Development*, A/RES/41/128 (4 Dec. 1986). https://www.ohchr.org/sites/default/files/Documents/Issues/Development/RTD_booklet_en.pdf.

²² UN General Assembly, Report of the United Nations Conference on Environment and Development (3-14 June 1992), Annex I: Rio Declaration on Environment and Development, A/CONF.151/26 (vol. I) (12 Aug. 1992), [A/CONF.151/26/Vol.I: Rio Declaration on Environment and Development \(un.org\)](https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP).

²³ "UN General Assembly Declares Access to Clean and Healthy Environment a Universal Human Right," UN News, United Nations, 28 July 2022, accessed 5 Sept. 2022, <https://news.un.org/en/story/2022/07/1123482>.

²⁴ "IEEE Code of Ethics," adopted by the IEEE Board of Directors, 2020, accessed Feb. 2023, <https://www.ieee.org/content/dam/ieee-org/ieee/web/org/about/corporate/ieee-code-of-ethics.pdf>.

between the urgency of today's energy and societal needs, the urgency of tomorrow's looming climate catastrophe and achieving a long-term, flourishing planet Earth.

Embracing complexity throughout the pursuit of this goal is vital. The increasing recognition of interdependencies between society and the environment means that the transition to a sustainable future is a complex or “wicked problem.”²⁵ This means the process of transitioning to a planet-positive society will not be easy or straightforward. Competing goals and problem sets, different cultural or governance approaches, and moving or unmeasurable targets mean that the journey will not be linear and will not be without political—or other forms of—disagreements or conflict. Indeed, addressing and responding to the realities of climate change may be the most important and complex problem humanity has ever faced. Failure to do so will have lasting harmful impacts and consequences for all stakeholders, including present and future humanity and the planetary biospheres. Honoring, recognizing, and including the large diversity in stakeholder cultures and in local, regional and global conditions and needs requires flexibility and a diversity of approaches to creating a planet positive society.

The very succinct definition of planetary sustainability by an unknown participant from Africa at the United Nations (UN) meeting in Johannesburg (Rio + 10), “Enough for All—Forever” can serve as a key guidepost. Individual, institutional, business, industry, government, organizational, academic and societal stakeholders share the responsibility to “take care” of the planet Earth and its biospheres, our home.

²⁵ Horst W. J. Rittel and Melvin M. Webber, “[Dilemmas in a General Theory of Planning](#),” *Policy Sci* 4 (1973):,155–169.

Guiding Principles and issues identified by the Planet Positive 2030 Committees

The **guiding principles** of *Strong Sustainability by Design* are intended to provide a framework for the document's strategies and recommendations capturing both the desire for planetary sustainability and the complexity that is inherent in fulfilling this desire. They embody the overall "impossible" goals of Planet Positive 2030.²⁶

Ten guiding principles

1. **Responsible and ethical leadership from individuals, organizations, and communities.** The responsibilities of individuals, of organizations, and of communities should be broadened to include an increased role in addressing the challenges of climate change, sustainability, and socioeconomic and environmental stewardship. New knowledge brings responsibility and demands action. Leadership requires collaboration and cooperation with **all** stakeholders impacted by decisions. Implementation of technology and policy development must always consider environmental flourishing and human wellbeing in accordance with specifics established by guidelines such as the United Nations Sustainable Development Goals.²⁷
2. **Justice, diversity, equity, and inclusion.** Championing justice, diversity, equity, and inclusion should be a part of climate change strategies recognizing that climate change impacts are often felt most by those with the least resources. It is the responsibility of those with the most resources to support those who lack resources in an equitable manner. Addressing climate change should reduce conflict, violence, and inequity.
3. **Energy systems transformation.** The transition from a fossil fuel-based energy system to a system that is based on clean and sustainable sources of energy must ensure that energy accessibility, affordability, sustainability, and reliability are maintained through all phases of the transition. This transition should also *ensure access for all to affordable, reliable, sustainable, and modern energy*.²⁸ A successful energy transition will enable GHG emission reductions not only in the energy/power sectors but in all sectors using energy, thereby supporting the decarbonization and electrification of these sectors.
4. **Mitigation and adaptation.** In responding to the challenge of climate change, and to prevent a climate catastrophe, society needs to both mitigate (i.e., reduce) GHG emissions and adapt to the impacts of a changing climate. Both goals require urgent action. The goals of mitigation and adaptation may come into conflict, and society will have to balance these conflicts.

²⁶ The Two "Impossible" Goals of the Planet Positive 2030 Initiative:

Transform society and infrastructure to achieve Planet Positivity.

Identify the technological solutions we need to design, innovate and deploy to reach Planet Positive 2030.

²⁷ "The 17 Goals," Department of Economic and Social Affairs, Sustainable Development, United Nations, accessed Feb. 2023, <https://sdgs.un.org/goals>.

²⁸ "Goal 7: Ensure Access to Affordable, Reliable, Sustainable and Modern Energy for All," Department of Economic and Social Affairs, Sustainable Development, United Nations, accessed 9 Nov. 2022, <https://sdgs.un.org/goals/goal7>.

5. ***The regenerative imperative and a circular economy.*** Thinking and action must broaden beyond current economic, business, societal, and resource utilization models to achieve sustainability and for people and the planet to flourish for many generations to come. Future economic, societal, and business models should take resource constraints into account and emphasize new public imperatives such as circularity, ecological regeneration, zero waste, and human flourishing and well-being.
6. ***Balance between today's needs and the needs of the future.*** In the course of transitioning societies and the global economy toward a sustainable future, today's short-term needs must balance with the long-term, global aspirations for a flourishing planet. This balanced approach should address all needs, including access to food and clean water, health care, and other essential goods necessary for a healthy standard of living.
7. ***Alignment of global goals with local goals and actions.*** The transition to a more sustainable future will be driven by local actions that should also produce positive global benefits. Local actions and global goals should support each other.
8. ***Culture of sustainability.*** Strategies and actions should move society toward building a culture of sustainability and 'doing good' that is based on respect for all living beings and for the Earth. Sustainability efforts must move beyond minimizing harm to restoring and regenerating human and environmental systems.
9. ***Responsible use of technology and technology labeling.*** The design, development, use, and disposal of technology should be a dynamic ongoing process for evolving an appropriate, timely response to both *negative impacts*—the unforeseen consequences of technology on people and planet—and *positive impacts*—the opportunities to relieve suffering, increase flourishing and equity, and better steward the planet.
10. ***Knowledge-based decisions, transparency, and accountability.*** Informed decisions are based on metrics, sound data, relevant information, context, experience, and perspective; these factors all contribute to knowledge and accountability. Knowledge-based decisions are thus made on the basis of good evidence and sound reasoning; this, in turn, can make hard decisions more defensible and accountable. Application of appropriate metrics and reevaluation of decisions at appropriate time intervals enable accountability and corrective actions.

The following text extracts identified issues from the various chapters of the compendium. For a detailed description of backgrounds to issues and recommendations, please, visit the individual chapters.

Metrics / Indicators

List of Issues:

- **Issue:** Metrics development should honor Nature
- **Issue:** Sustainability oriented metrics and indicators need to measure what matters
- **Issue:** Sustainability oriented Metrics need to be accurate, reliable, and practical
- **Issue:** Need for interconnectedness and trade-offs
- **Issue:** Global ecological and environmental interdependence
- **Issue:** Lack of socioeconomic transformation toward sustainability
- **Issue:** Technology not aiding our socioeconomic evolution towards a regenerative and sustainable path
- **Issue:** Technology to provide toolkits enabling paradigm shifts
- **Issue:** Metrics must provide evidence of compliance with standards, laws, and regulations
- **Issue:** The need for consistent, mandatory, and enforced standards

Economics and Regulation

List of Issues:

- **Issue:** Conundrum between economic growth and exacerbation of climate crisis
- **Issue:** Growth as the sole indicator of progress
- **Issue:** Need for transparency and stricter laws
- **Issue:** Adverse mental health fallouts not given enough attention
- **Issue:** Ensuring rural economies thrive
- **Issue:** The problem of landfills
- **Issue:** Lack of openness
- **Issue:** The Challenge of Greenwashing
- **Issue:** Placing onus on the consumer
- **Issue:** Negative impacts of tourism

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Global Methodologies

List of Issues:

- **Issue:** Lack of care
- **Issue:** Need for transdisciplinary collaboration
- **Issue:** Technical barriers to achieving Regenerative Sustainability
- **Issue:** Human barriers to achieving Regenerative Sustainability by 2030
- **Issue:** Lack of linking and mapping

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Forests and Trees

List of Issues:

- **Issue:** Deforestation and forest degradation are key drivers of the climate crisis
- **Issue:** There is no assignment of value for the existence of nature.
- **Issue:** The sudden death of forests from infectious diseases is a major concern in the management and conservation of forests worldwide.
- **Issue:** Global reforestation potential has a large and cost-effective mitigation potential *when done right*
- **Issue:** Monitoring, verification, and reporting of nature-based solutions is capital- and labor-intensive
- **Issue:** Nature-based carbon offsets currently lack trust and integrity standards, harming the world's climate
- **Issue:** Individual tree accounting is almost nonexistent, making various techniques such as selective logging and selection cutting difficult to execute, monitor, and verify.
- **Issue:** Despite the social media-driven push for corporate engagement on tree planting, numerous organizations have advocated that the process of tree and forestry protection is much more effective than that of virgin tree planting.

Rivers and Lakes

List of Issues:

- **Issue:** Water access rights are overly human centric as humans control access to many clean water sources through legal arrangements impacting numerous species, not just humans.
- **Issue:** Humans treat water as an endless resource that causes unnecessary waste, especially in regions where water is scarce or is under threat of becoming so.
- **Issue:** Community overexpansion can overtax water resources. Where the scaling effect, while seemingly efficient from a financial sense, may have the unexpected result of overtaxing available water resources.
- **Issue:** City infrastructure detracts from healthy river and lake ecosystems.
- **Issue:** Excess fertilizer, pesticide, and animal waste pollute water sources and increase the chances for toxic harmful algal blooms (HABs).
- **Issue:** Water flow diversions disrupt critical ecosystems.
- **Issue:** Growing water-intensive crops in arid zones accelerates water scarcity.
- **Issue:** Physical trash/plastics pollute freshwater ecosystems and plays a significant role in ecosystem degradation and destruction.
- **Issue:** Chemical and hazardous waste adversely affects river and lake ecosystems.
- **Issue:** Raw human sewage pollution causes degradation of river and lake ecosystems.
- **Issue:** Invasive species threaten freshwater ecosystems.

Towns and Cities

List of Issues:

- **Issue:** Need to harness positive innovation ecosystems
- **Issue:** Need to leverage clean energy solutions
- **Issue:** Need to transform legacy fossil-fuel urban transportation and infrastructure
- **Issue:** No guarantee of fresh air and clean water
- **Issue:** Need to ensure access to food, improve distribution, and decrease waste
- **Issue:** Need to foster sustainable and regenerative communities
- **Issue:** Energy challenges with artificial intelligence and machine learning data systems
- **Issue:** Lack of urban spaces for work–life balance and a well-being economy

DRAFT

The Ocean and Coasts

List of Issues:

- **Issue:** Imminent threat of sea-level rise to coastal communities
- **Issue:** Warming and acidification of the ocean
- **Issue:** Impacts of unsustainable ocean-based food production
- **Issue:** Destruction of important biodiverse and climate-resilient habitats
- **Issue:** Urgency of coral reef bleaching and die-offs
- **Issue:** Offshore extraction and processing of fossil fuels
- **Issue:** Influx of excess nutrients into the ocean environment
- **Issue:** Unsustainable marine transportation industry operations
- **Issue:** Path to decarbonization for new and existing ships is unclear
- **Issue:** Increased noise from ships is destroying underwater habitats
- **Issue:** Waste emissions from ships in the ocean are difficult to trace
- **Issue:** Ubiquitous presence of micro- and macro-plastics in the ocean
- **Issue:** Ubiquitous presence of micro- and macro-plastics in the ocean
- **Issue:** Management and sharing of global ocean data

Farmlands and Grasslands, Mountains and Peatlands

List of Issues:

- Issue: Extraction: Taking without replenishment
- Issue: Extraction: Pollution and biodiversity losses undermine human survival
- Issue: Extraction - Food waste and food loss contribute to human consumption overshooting beyond planetary boundaries
- Issue: How to achieve transition via Investment in land sustainability
- Issue: Upstream over downstream mitigation
- Issue: Need for integration to Use ancestral wisdom to sustain land with a diversity of global and local voices

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Human Wisdom and Culture

List of Issues:

- Issue: Lack of an expanded mindset of the impact of humans on the evolution of earth
- Issue: Need a new narrative to understand the perspective of our common regenerative and sustainability story
- Issue: Need for a wisdom-centric philosophy
- Issue: Counter position of traditional to technological thinking
- Issue: Failure to consider “I am because we are” Ubuntu philosophy
- Issue: Global North dominance in policy and technology
- Issue: Deliberate resource extraction and growth prevalence exists in global policy and technology design
- Issue: Lack of creativity arts and culture in representing planetary themes
- Issue: Failure to expand knowledge with respect and appreciation for other cultures and their wisdom
- Issue: Productivity over purpose should not be the focus
- Issue: Failure to promote a commons approach for a shared resources and asset-based approach
- Issue: Ignoring existing caretakers of the planet who use expert ecosystem regeneration, restoration, and maintenance efforts that include intergenerational stewardship thinking and design in all things
- Issue: Need to create a stage for new leaders to position vulnerable and marginalized communities as leaders in developing sustainable solutions
- Issue: Ignoring past sustainable technologies, design(architectural, building, agriculture, etc.), and systems is not sustainable
- Issue: Lack of transparent tracking of human rights with ethically based trackable measurability and accountability

Sustainability Commons

List of Issues:

- **Issue:** Thinking in silos. Currently, sustainability knowledge and information is spread over a large number of stakeholders, each of them thinking and acting in their own ecosystems and disciplines.
- **Issue:** Long-term viability. Lots of commons-aligned projects, especially with a heavy focus on knowledge commons, tend to have a model of grant- or subsidy-funded operations
- **Issue:** Free flow of knowledge and expertise. In the sustainability commons, where different points of view and diverse solutions to common problems are encouraged, ensuring the integrity of content and platforms becomes crucial to prevent greenwashing, marketing, or other dubious activities.
- **Issue:** Common language. Potential contributors to the sustainability commons will come from a variety of disciplines and geographies, each with its own language and terminology
- **Issue:** Shareable and verifiable data and models. Currently, various sustainability models have been built for specific domains and specific countries at different levels of granularity.
- **Issue:** Governance. As a public good, the sustainability commons needs to adopt a governance model that respects voices from a variety of contributors and supporters—in terms of both the strategic direction of the overall commons and the curation and related decisions

The Arts

List of Issues:

- **Issue:** How to use art to make people feel the urgency of climate change—Emotions push people into action
- **Issue:** How to increase opportunities to engage with art—Enforce society’s relational capital in the fight for climate change
- **Issue:** How to use art to tackle the complexity of environmental change—Art is essential for all powerful contexts
- **Issue:** Need to sensitize business leaders to act through art interventions
- **Issue:** How can artists and scientists join forces toward environmental sustainability—The power of STE(a)M
- **Issue:** Artificial intelligence needs art to confront the multifaceted challenges posed by AI Systems’ emergence
- **Issue:** Need to use art and digital technologies to express the effects of climate change
- **Issue:** Need to provoke action through art—Define “climate art” as a new language of aesthetics to create new ideas for articulating climate concerns
- **Issue:** Waste and waste management as a space for innovation
- **Issue:** The need to invent new sustainable materials through artistic practices
- **Issue:** Increase the dialogue between artists, policymakers, and the public to use art as a platform for environmental activism
- **Issue:** How to connect arts to the SDGs
- **Issue:** Choosing an approach – the Bauhaus design and policy approach to reach sustainability
- **Issue:** How to create empathy toward the environment through artistic listening exercises
- **Issue:** How to reconnect with nature – tapping into inner knowing and guidance
- **Issue:** How can the work of Indigenous artists be used to educate and inform wider audiences about the impact of climate change to create possible solutions stemming from Indigenous wisdom?
- **Issue:** Can we craft effective narratives about climate change using Polyphonic storytelling and poetry as methodologies

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standards.ieee.org

Phone: +1 732 981 0060

445 Hoes Lane, Piscataway, NJ 08854 USA

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