

Beyond Carbon

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New draft: abstract

The global internet is comprised of vast interconnected networks spanning nearly every surface of planet and sky that, together with user devices, consumes energy and emits greenhouse gases. The true scale and proposed mitigations of the carbon footprint of the internet are the subject of important research. The internet also requires the depletion of other natural resources beyond carbon, namely land, water, electromagnetic spectrum and minerals. Electronic waste contributes in particularly acute ways to environmental pollution. This document surveys the impacts of the internet on the environment and includes, but goes beyond, energy use and carbon footprint to look at the consumption of natural resources and environmental waste.

Considerations beyond carbon

Land: Finite space / limit of use for other humans, Animals and other ecosystems, too [Vesna] Disruption of the sea bed

Water: For cooling, For mineral extraction, Limits use for other humans but animals and other ecosystems, too [Vesna]

Electromagnetic spectrum: Finite resource allocated to large companies and developed countries despite ITU pledge to allocate otherwise.

Minerals: Extractive of finite resources which minerals, Use of water, Effects of scarring and degrading earth crust, Destroying habitats, Poisonous at the time of extraction, Limited use for other things.

Waste: In the air -- pollution from fossil fuels, burning e-waste On earth -- sanitation, landfills, polluting soil, limiting use of space, ecosystem disruption In the sea -- undersea cables, mineral extraction byproducts, e-waste shipping, pollution In space -- debris, crowding the sky, limit of use

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Impacts of the Internet on the Environment, Beyond Carbon

Abstract

The global internet is comprised of vast interconnected networks spanning nearly every surface of planet and sky that, together with user devices, consumes energy and emits greenhouse gases. The true scale and proposed mitigations of the carbon footprint of the internet are the subject of important research. The internet also requires the depletion of other natural resources beyond carbon, namely land, water, electromagnetic spectrum and minerals. Electronic waste contributes in particularly acute ways to environmental pollution. This document surveys the impacts of the internet on the environment and includes, but goes beyond, energy use and carbon footprint to look at the consumption of natural resources and environmental waste.

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3. Guiding Principles

As the practice of digital sustainability is still in development, we suggest the following principles to guide IETF's approach to the topic. These principles are designed to be more enduring concepts that can inform solutions even as the technical specifics of those solutions evolve with the field.

- Open and fair: Claims about environmental impacts must be publicly verifiable, such as linking to publicly available evidence and allowing third party auditing. Publicly verifiable evidence contributes to higher confidence in the measurements and facilitates independent monitoring and assessment as well as ensures fairer participation and competition.
- Timely: Where possible, move towards real-time information about impacts over an annual cadence or slower cadence. More timely data enables more responsiveness and a higher resolution of understanding.
- Within planetary boundaries: Treat the carrying capacity of the planet, as determined by the best available science, as a constraint to work within. There is a safe operating capacity of the planet, that when breached represents a critical risk to people and ecosystems we are part of, causing avoidable harm.
- Demand and supply can both be levers: Reducing demand for resources is also a valid and important approach in addition to providing supply more efficiently.

4. Conclusions

Particular takeaways to mitigate effects: reduce extraction, efficiency in architecture to reduce cooling, more equitable resource distribution, data localisation impacts, backwards compatibility and protocol maintenance as antidotes to "Green IP".

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Authors' Address

Where this work is happening

<https://github.com/mallory/draft-beyond-carbon>