

# A DIY solar server and the challenges and provocations of attempting to decarbonise our lab's website

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ICTs' use of energy and material footprint are projected to continue to increase over the next decade [1]. At the same time, with the advent of the Internet of Things, digital technology is also projected to materially incorporate itself into previously non-digital objects. These projections are accompanied by growth in the carbon footprint of digital technologies and their infrastructures as well as the material intensity of most consumer goods [2]. The ideas of endless economic growth and limitlessness of technology are at the core of these projections and can even be found even in the most utopian visions of digital technology. The Solar Server is a DIY artefact that uses open-source hardware and software alongside a renewable energy circuit as a scaled down and limited computing environment. It is our attempt at decarbonizing our infrastructures in a setting where this is not currently being addressed institutionally. Our artefact was conceived as a challenge and rejection to utopian visions of the internet that take for granted its constant accessibility and ignore the expanding infrastructures required for this. The artefact itself extends beyond the physical server, as its presence, embodied work and visible materiality have provoked questions about ecological dimensions of the lab's other IT infrastructures and projects.

Following the guides by the Low-Tech Magazine's solar server [3,4], we built our solar server and site prototype using a CMS called Publii [5]. The process has revealed different organizational, technical, and social tensions that arise when limits and ecological dimensions are centred in web hosting. Nevertheless, due to the similarities between the Low-Tech Magazine's server and ours, it can be inferred that the server itself is not yet fully optimised to be less impactful than the grid [6]. Furthermore, other non-technical factors such as organisation of tasks related to the server maintenance have also proven difficult to address. Work on the server has unearthed various questions about commitment to the project of decarbonising and its implications of changes in lab routines due to a new system and workflow. For example, website version archiving and upload of files to the server become an extra responsibility for the lab manager. Furthermore, it has provoked questions as to how decarbonisation can happen at certain use-cases, remaining conscious of the material intensity of the hardware. The next steps are looking into computer recycling as a way to re-purpose old computers into servers, other possible uses outside of the lab, and generally thinking how we can abstract more information regarding the re-organisation of our infrastructures while being resource aware.

The artefact is currently a work in progress. The hardware is open and accessible for different people such as students and staff at the lab as an experimental environment. In its current state, it has elicited provocations regarding materials, the role of websites and the work required to maintain them, unused hardware, decarbonising by reorganising and changing processes, and the necessity of availability in our use-case. It's current testing phase can be accessed via the following link: <https://solar.itu.dk>

## REFERENCES

- [1] Charlotte Freitag, Mike Berners-Lee, Kelly Widdicks, Bran Knowles, Gordon Blair, Adrian Friday. 2021. The climate impact of ICT: A review of estimates, trends and regulations. arXiv preprint arXiv:2102.02622
- [2] Nižetić S, Šolić P, López-de-Ipiña González-de-Artaza D, Patrono L. 2020. Internet of Things (IoT): Opportunities, issues and challenges towards a smart and sustainable future. <https://doi.org/10.1016/j.jclepro.2020.122877>
- [3] Low Tech Magazine. 2022. About this website (solar version). Barcelona, Spain <https://solar.lowtechmagazine.com/about.html>
- [4] Homebrew Server Club. 2018. How to build a low-tech website: software and hardware. <https://solar.lowtechmagazine.com/2020/01/how-sustainable-is-a-solar-powered-website.html>
- [5] Publii. 2022. Publii documentation <https://getpublii.com/docs/>
- [6] Low Tech Magazine. 2020. How Sustainable is a Solar Powered Website?. Barcelona, Spain. <https://solar.lowtechmagazine.com/2020/01/how-sustainable-is-a-solar-powered-website.html>