Commentary

For alt.chi paper
Low Power Web: Legacy Design and the Path to Sustainable Net Futures

Jason T. Jacques
University of Cambridge
Cambridge, UK
jtj21@cam.ac.uk

This work offers a notable perspective on the growing significance of the Internet as a user of global energy and a potential contributor to climate change.

The authors start by highlighting the simple, practical action of choosing to use a sustainable energy source for infrastructure. However, the work continues by framing energy use in the broader concept of overconsumption. In this regard, the authors consider environmental impact measured by kW h per GB of data transfer. While this does provide a broad overview of energy consumption, this will likely vary based on a multitude of factors.

It would be interesting for readers to be able to conceptualise how differing technological choices might affect usage. For example, newer processors might be more efficient or offer reduced-power idle states compared with older technology. Equally, when provisioning servers, spinning-disk storage is typically cheaper, but what are the energy implications compared to choosing solid state devices?

The work offers a concrete project, which spotlights their approach, in the form of the Raspberry Pi webserver. The authors approach the sustainability of its energy consumption from multiple angles including using both solar and wind. To provide more stable power, marine storage batteries, and gravity batteries are explored. Finally, an ambitious, if somewhat impractical, hybrid approach is described using a micro hydro storage/generation plant. These techniques offer a thought provoking take on our approaches to a highly distributed sustainable web.

On a smaller scale, I hope readers can think about these more ambitious ideas and translate and transfer them to their own experiments with sustainable web-technologies. Easily replicated alternatives might include more commonly available lithium-ion battery packs and solar chargers, which are sometimes packaged as a single unit, to power low-consumption devices.

Away from hardware, the authors highlight the challenges and opportunities afforded by software and the content itself in improving the efficiency of web-technologies. Using the example of the ACM website, the work considers options for reducing data transfer from oversized and superfluous images, excessive eternal scripts, and unnecessary video. By choosing to limit the dependence on these resources the authors look to reduce data transfer and dependence on multiple data-hosting servers.

Their own constrained approach, of hand coding web pages without external resources and a 200 KB "page budget", heralds a very different vison of the modern web without the rich multi-media experiences we have become so accustomed to. Here, parallels with *negative utilitarianism* might offer an important perspective on removing what is unnecessary but equally preserving what is of value. The authors touch on the important and potentially problematic issue of who determines the value of the content.

Finally, I would invite both the authors and readers to consider the effectiveness of any changes. While grass-roots approaches may offer individual savings, consolidation of effective distribution networks, and efficiently packaged resources, coupled with efficient caching, may offer larger overall benefits at the global scale. Understanding the total, overall impact is crucial to developing a truly sustainable net future.