

ABSTRACT

Downtime on the Microgrid

A book manuscript

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October 2017.

Downtime on the Microgrid provides a cultural read on one of the most positive aspects of the times. As clean local energy becomes the very symbol of this century, it restores a very basic connection to surroundings. This invites new cultural expressions of a bedrock resource too long taken for granted. Thus despite the flood of white papers from the many technologists who would like to own a piece of this future, as yet there have been too few tales of cultural opportunity and challenge. No longer invisible, no longer to be left to the hardhats and analysts, electricity has become interesting again. Despite an industry otherwise too set on perpetuating its ways, the literature on smart, clean, local, and micro now needs many more cultural perspectives.

This work emphasizes the built environment, which remains the main context of electricity use. Looking past more usual smart city speculations and green building operations, this project instead explores a cultural sense of activation, even wonder, as if participation in local energy dispels what for too long has been a passive, often careless dependency. In particular this inquiry identifies “architecture’s grid edge” as a distinct new category of creative work and experience. More tangibly embodied media and components make electricity more knowable and culturally expressive once again, after half a century of invisible cultural standardization. Beyond so many apps for being green, this is also a rediscovery of architecture’s roles and rhythms. This rediscovery occurs not only amid a boom in an activated, sensate internet things, but also amid increasing threats to the aging infrastructures that power them.

Thus the narrative takes up trope of response and repose. Informed by historic, sociological, and technological perspectives, this project asks what it means to turn architecture on, but also off, and what it means to have well made places when, as seems ever more inevitable, a blackout lasts a bit too long. In a cultural of high availability and always-on connectivity, downtime is heresy. But what if disaster is just one form of downtime, and the word could also mean occasional off-grid independence, unconditioned natural operations, social practices of at least some intermittency, and a more versatile local resilience.

Many such prospects help explain the rise of the microgrid. Many prominent institutions now have plans and provisions for local electricity. Neither doomer nor technoutopian, there is a middle way toward a more sensible culture of staying powered. For a general reader who sees cultural choices ahead, and for the designer, advocate, or inhabitant who seeks some consequence or contribution, this book provides a timely look at the microgrid meme.

Downtime on the Microgrid, in 20 points, Malcolm McCullough, April 2017

1. **Electricity**, such a fundamental resource for so much else, has become more vulnerable and more volatile than most people have considered.
2. “**Cleantech**” (or whatever else you prefer to call it) has become one of the largest, most positive design agendas of the times, and thus means many different things to many different people.
3. The **built environment** is where most electricity gets used, yet is more than just a place to turn on the lights.
4. “**Responsive**” architecture, which also means many things, needs to rethink the role of activation, and that is the main focus of this inquiry.
5. This work often begins from **resilience**: smarter grids, sites, and buildings allow not only better emergency preparedness, but also more everyday flexibility, even new pursuits of comforts.
6. Flexibility often benefits from more local, more **loosely coupled** provisions, with many more players; energy networks become more like the internet.
7. Greater variability becomes more viable with **embedded intelligence**: better sensing, pattern recognition, and communications— together often called “smartgrid.”
8. Not all smartgrid is centralized from the top: local energy **microgrids** have become especially promising, and the design of place may have a role in them.
9. While the engineering and economics already seem remarkable in themselves, the **cultural opportunity** and challenge of microgrids has only begun.
10. **Values may change** about use and awareness of energy grids. For instance: limits of automation, benefits of downtime, greener over cheaper, reliability over efficiency.
11. Context is largely cultural; spatial patterns of **embodiment, habits, and identities** guide what becomes appropriate, even new normal.
12. Ambient, tangible, and thing-based forms of interactivity increase how context informs good design. Here, call this **response**.
13. Science/technology/society (**STS**) scholarship examines adaptive paths toward successful design, especially in historic perspective, and in that, electrification has often served as a foundational example.
14. In socio-technical change, enlightened players and **institutions** often lead the way with design proposals, often well before the market gets there
15. **Architecture** provides cultural context, especially through institutions, and does so with new technologies layering onto, rather than replacing, many earlier ones.
16. **Locality**, a valued cultural theme in many domains of life, now also becomes an aspect of energy.
17. “**Architecture’s grid edge**” consists of the material systems that make local electricity more tangible, knowable, and usable.
18. Persistence, passive operations, and place remain essential to architecture, no matter how much technological saturation. Here, call this **repose**.
19. More humane approaches to local energy microgrids suggest neither techno-utopia nor powered-down dystopia so much as a simple change of attitudes in **design for living**.
20. As new attitudes of **grid awareness** seem much more tied to the scale of place, this project seeks to restore a sense of wonder for architecture’s response and repose.