Downtime on the Microgrid

A short preamble to a larger project
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The design challenge of living with smarter, cleaner, more local energy systems now accelerates. After half a century of fairly little change, even America has begun to remake its power grids. Historians might mark the year 2015 as the tipping point in that. Yet despite all the engineering projects now breaking ground, the main work lies ahead. For if the power supply remains something for almost everyone to ignore, so long as it is on, there is not much revolution in that.

Design for better living involves not only industrial ecology, power materials, and electrical engineering, but also the disciplines that mediate everyday experience. Interaction design, which now alters experience enough to be considered a great artform of the century, figures ever more prominently in that. Yet so does architecture, which in its ancient origins was the first built technology of energy, and whose modern buildings consume more energy that just about any other objects of design. Architecture remains vital not only for engineering but also for cultural reasons. Anyone who doubts this needs only to price some local real estate. For despite ever more electronic links, the built world still grounds, shapes, and cues everyday life.

So how do the disciplines of architecture and interaction design react to the cleantech energy shift? How do they design for living an actual revolution? Does this mean ever more systems, apps and novel objects of design? Is the cultural color of green a bright strange one or just dark and self-abnegating. Can there be more to the design challenge than prompting so many small acts of conservation? How might more fundamental notions of comfort and convenience themselves now change?

This project takes a less-traveled path into these perhaps too-familiar questions. Instead of marveling at interactive technology futures or admonishing about emissions imperatives, this project takes a longer historic view and a wider cultural approach to the question of inhabiting technology, especially through comfort, convenience,
interactivity, and energy. For a debatable provocation, the project asks whether the built
environment might now become smart enough to be turned off sometimes. Thus in a
word, it unpacks off. Looking past the usual connotations of downtime, off-the-grid, or
dystopian power-down, this project seeks optimistic design insights into passive,
intermittent, bottom-up, standing by, pleasantly contrasting, tangibly engaging, sometimes
unconditioned living.

As a narrative thread on this bread path of inquiry, and for some linger perspective on
this particular provocation this project adopts a single, uniting theme of electricity itself.
Although the early history of electricity remains an oft-told tale, surely overexposed on
the likes of Tesla vs Edison, its lessons for today's design challenge of pervasive
information technology still deserves new investigations. That turns out to be an amazing
thread to spin. For of course electrification is not merely a story of technological
infrastructure, but also of humane living. Of all designed systems, none correlates better
than electricity does with overall measures of human development (HDI). Invisible yet
essential, uniform in its flow and yet infinitely diverse in its uses, electricity may well be
the quintessential modern technology, the one without which which most others
instantly halt. Electricity is barely a century old in most settings, and yet is taken for
granted and indeed has been designed to be so.

Besides any lessons about persistence, one key comparison between then and now
concerns invisible embedding. To put it in recent terms, unlike a “ubiquity” that treats
digital devices as foreground portals to one same faraway internet, “pervasiveness”
emphasizes immediately tangible objects and situations. Although this may sometimes
suggest an “internet of things,” it also involves things that process locally without ever
transmitting remotely over a net, like swiping a key fob to open a door. Locally
embedded systems quickly transformed architecture, a century ago. Elevators, safe and
consistent lighting, communications through larger buildings, and later air conditioning all
altered the configurations of everyday life. Although in the more recent half century
since, architects have generally assumed that electricity, if not all energy, has no further
implications for design, especially not for building form, the recent acceleration into
smarter, cleaner, greener grids may now renew such prospects. Now as the emerging
discipline of pervasive computing infuses the ancient (but also electrically modern)
design discipline of architecture, it is again time to rethink many values, not only of
technology but also of use, as happened in early electrification.

Electricity now passes into a new era itself; this is the heart of the cleantech revolution.
Although the latter is a word to use sparingly, if ever, it does seem to fit here. Given the
strategic, economic, and cultural magnitude of the energy industry, its recently accelerating changes do seem like a revolution, that has already altered cultural aspirations and details of everyday life, especially coming after a period of relative stasis. For a half century approximately from say 1960 to 2010 in America, the technologies, policies, and culture of electricity changed much less than before or since. What happened before especially in the half century of early urban electrification from say 1880 to 1930 was far more remarkable in how it altered life. What has been happening since, and is accelerating today, may again seem remarkable, especially for in its patterns of use.

For this emphasis on use, this project narrows the focus from all things green to the specific developments and design opportunities of microgrids. In the most usual sense of the word, a microgrid is a local, self-contained energy system with a varying relation to the more massive public utility grid. Its primary justification is in resilience: a microgrid can run as independent and disconnected island in event of downtime or crisis on the major utilities. Its main growth horizon is in renewables. By sometimes giving, taking, or storing power from the utilities, a distribution of microgrids does better than a centralized monolithic system at accommodating the variability of intermittent sources such as sun and wind. This is necessarily a case of pervasive computing. Advances in sensing, switching, and microtransactions among digital things make it go. Future horizons suggest energy materials that are themselves more micro. Indeed many engineers and advocates anticipate electricity futures where microgrids predominate, where less and less power gets transmitted great distance (with great losses) over high voltage lines. Culturally, and indeed with respect to a great many considerations by which technological determinism must inevitably, productively be tempered, a microgrid’s main transformation is toward more active local governance, participation, variability, conservation, and systems integration. Numerous and situated rather than centralized to one standard, microgrids introduce much greater diversity in the cultural expectations around these patterns of use. At least some of them may create conditions where interaction design questions always-on, right-now convenience, and where architecture runs unconditioned sometimes. To go downtime on the microgrid need not seem like some hippie, survivalist, or luddite rejection of technology. Instead it asserts that like most things in life, a little variety, rest, and engagement produces a better experience than a constantly consuming stream.

This is not a lament on technological dependence. Those don’t get very far. Here instead seek some inquiry into technological possibility, appropriateness, and expectations. Not everything happens simply because it now can. Technological determinism must always be
tempered with social, psychological, historic, and cultural considerations. To debate those is not to oppose technology writ large, nor to lament its ever increasing role. To raise anything beyond engineering and economic considerations does not make you into a Luddite. To turn some things off from time to time should not feel countercultural. (May the day never come when to unplug from the net becomes a criminal act.) To open the windows again, and to do so yourself rather than delegating the task to sensate robotics, may somehow stand for a larger cultural shift.

Yet who would dare question convenience? Advocates and stakeholders of an ever more clever, pervasive infosphere would quickly dismiss that as heresy, nostalgia, or nonsense. Economists, marketers, and business planners might advise that convenience outranks all other factors in life. There's no money taking your time, putting things aside, or just being glad to be alive. A sociologist might observe how the desire for convenience and the instantaneous rewards of the net make anything slower, less fungible, or more demanding just fall out of life. In the sense that always-on, right now diminishes previous cultural values, it is fair to speak of “disturbing convenience.”

With the longer perspective from the history of electrification, this project does suggest that notions of comfort and convenience do change. In the early rush to a new technology, not all that arises makes longterm sense. Electroshock therapies were more fashionable than electrical kitchen appliances at first, but then that changed. Office towers once left the lights on all night, but now they do not. Early smartphones got used for just about anything anytime, but now at least some notion of etiquette has developed. And much as anything human beings do has now been done while also texting, similarly in the mid 20th century, almost anything was done while in cars. Then at least some wisdom returned.

“Downtime on the microgrid” is about the wisdom of running unconditioned sometimes, whether in the inhabitation of buildings, the use of digital media, or their newly arising hybrids. Not just a reminder to stop and smell the roses, this is a wish for appropriate technology in the strange new world of inhabitably pervasive computing. That in turn involves some historic and intercultural perspective on notions of comfort and convenience. So without adding to the hype or laments, and without making it direct subject matter, this project may yet yield some insight on the human condition of technological dependence. Meanwhile there are more practical goals at hand. Amid all the advocacy for smarter greener living, here, in its applications to the built environment, might be some suggestions of ways further into that cultural change.