



Höweler + Yoon Architecture, LLP,
Hover, New Orleans, Louisiana, USA,
2007, view from below. LED lighting
embedded in the canopy fabric is
powered by a solar-charged battery.
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Architectures of Eco-Literacy

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Access to, and production of, energy is widely uneven and unsustainable across the world. While in developing countries large portions of the population live without electricity and depend on expensive and toxic alternative fuels for lighting and cooking, in developed countries, the by-products of electricity generation are pushed to peripheries to cause major unseen environmental damage. Designing strategies for alternative energy must be a layered approach dealing not only with infrastructure and economies, but also cultural expectations and behaviours. Höweler + Yoon Architecture, a multidisciplinary practice that operates between architecture, art and landscape, presents here a series of installations that respond to the fragility of urban ecosystems. Their practice instigates discussion of energy and sustainable ecology by highlighting the ubiquitous resources of wind and sun, relating them to their social contexts. While new energy technologies proliferate, Höweler + Yoon Architecture uses beauty and play to encourage the changing of our energy behaviours. Here the vision of a thriving society reverberates with intelligent alternatives to energy consumption and production by utilising technology as a tool for education and resilience.

In the period following Hurricane Katrina, the reconstruction of New Orleans and its neighbourhoods proceeded at a painfully slow pace. There was a sense that the city might never recover completely to its pre-Katrina days. In October 2007, we were invited to participate in the Des Cours festival, which sought to animate hidden sites within the city with temporary installations designed by architects. Our proposal *Hover* was installed in the courtyard of a traditional house in the French Quarter. Recognising that the residents of New Orleans were still reeling from the experience of the hurricane, and wanting to activate the city, we proposed an illuminated canopy that would run on solar power. The fabric canopy would create a festive atmosphere during the day and early evening, but would also be entirely off-grid. The city's power grid and infrastructures in general proved to be highly vulnerable during the storm, and an off-grid solution demonstrated a kind of energy self-reliance that could inspire new attitudes towards resilience as vital city systems came back on line.

Hover, comprised of a series of yellow fabric canopies, shaped by a rigid aluminium frame to create a pentagonal tile. The tiling system allows the canopy to occupy any number of courtyard shapes and still pack into a complete surface. The cone-shaped surfaces of the canopy are specifically biased towards the solar orientation for New Orleans in October, thereby creating a solar collecting surface for a flexible photovoltaic panel (PV). The panel is connected to a custom microcontroller and a small rechargeable battery. When the PV is exposed to the sun the microcontroller switches to charging mode. When

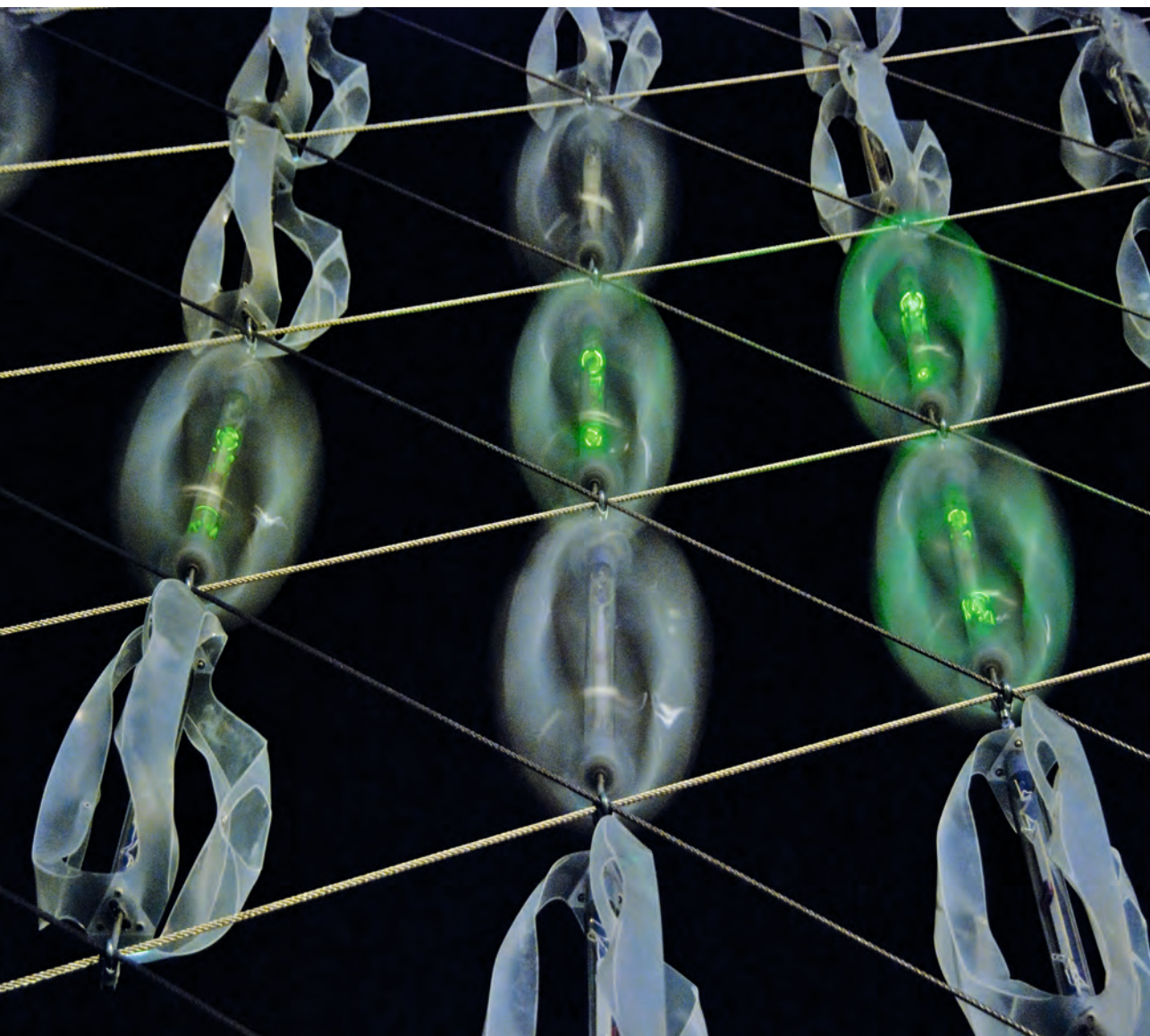
the PV is not charging the microcontroller acts as a switch to power an LED rope light that is sewn into the fabric. The effect was of a bright luminous cellular structure, under which outdoor events and impromptu jazz performances were held.

During the time that *Hover* was installed, the structure called attention to the sun as an abundant and reliable energy source, and that translated into a luminous structure representing greater implications. Explicit connection was made between smarter energy-conscious infrastructures and smarter building, rather than fetishise lone technologies grafted onto the status quo of architecture and urban living. It produced and consumed solar energy on the spot. It also made a point about energy independence and being able to function without reliance on a fragile infrastructure. But most importantly, the project was bright and festive, making a statement about the vibrancy of the city, and refusing to allow the storm to dampen the festive character for which the city is known.

Hurricane Katrina – and more recently Hurricane Sandy – served as a wake up call for environmental action, with many calls for more improved coastal management practices and energy infrastructures. At a greater scale the hurricanes have pointed to a larger cultural consciousness about extreme weather, global warming, the impact of human inhabitation on our eco-systems and the general instability of urban landscape contrary to existing faith in the impregnable modern city. For many, this has intensified an interest in sustainable and green design. Since 2005, there has been an explosion in interest in ecological architecture, environmentally friendly products and green design practices. Rightly or wrongly, the storm and its aftermath created visible evidence of the fragility of urban infrastructure and the necessity of environmental design.

It is impossible to speak of architectural discourse today without mentioning questions of energy, the environment, the larger ecology of discourses in which it is embedded. While contemporary architectural culture may find itself in the post-postmodern period, which is characterised by a proliferation of positions, without clear sides or stakes, it is clear that there is one dominant contemporary issue in architecture: ecological design. Ecological, sustainable, green ... call it what you will, it is the central issue both within the academy and without. Yet the term ecological means different things in different contexts, and the proliferation of uses and abuses has created a kind of meaning smog. For us, ecology means the relation of elements or organisms to their larger context, where actions have consequences throughout a system or environment.

This renewed focus on ecological design has created a cultural condition complete with manifestos, regulations, manuals, products and markets. There are green design gurus and practitioners. There are accreditations, awards and certifications. There are green design standards and improvement standards. And, as with any movement, there is a coordinated market for green building products. Much of the discussion about green design centres on energy use, energy conservation. Energy efficiency and energy optimisation are key terms for an ecological design practice. This ecology of meanings and metrics prompted the 2009 issue of *Harvard Design Magazine* to ask if sustainability and pleasure were irreconcilable. Does being sustainable, using less energy, necessitate doing less or having fewer choices? Does ecological design rely on austerity?



Höweler + Yoon Architecture, LLP, *Windscreen*, Cambridge, Massachusetts, USA, 2012. Shifting gusts of wind spun 220 individual micro wind turbines to light up LEDs across the screen.
© Höweler + Yoon Architecture, LLP.

Höweler + Yoon Architecture, LLP, *Windscreen*, Cambridge, Massachusetts, USA, 2012. The installation harnessed wind power beneath MIT's Green Building to create a dynamic pattern of light across an array of micro wind turbines. © Höweler + Yoon Architecture, LLP.



Eco-Literacy

Our own experience with post-Katrina New Orleans was instructive: the city was desperate to rebuild itself, and to learn from the past. Reconstruction took multiple forms. Some designs sought sustainability through LEED certifications and recycled materials. Our *Hover* project did not intend to save energy, or supply energy to the grid. It did not propose a utility for the energy that it produced. *Hover* sought to make energy visible. It sought to locate the site of energy production in the city centre, making energy not an abstract, remote and invisible process, but rather a tangible condition in the centre of the city. By making energy manifest itself in the form of a luminous canopy, it sought not to do any pro-active environmental good, but rather it sought to create an environmental awareness – an Eco-literacy. It creates the capacity for individuals to visualise energy, to understand the sources, methods of capture, products and by-products of energy. And in so doing, concretely alter their energy behaviours in other aspects of their lives.

The technology that has the greatest impact on energy consumption in architecture is not the argon-filled insulated glass units, or the geothermal heat pumps, but rather the human agency of the person who left the lights on, AC running and the windows open. A high performance window left open by a careless user is a high-tech, but useless, solution.

The Eco-literacy movement seeks to educate users about the way in which their actions affect the larger environment; those human actions – not technology – have the highest impact on energy use. The simple mechanism of visualising the effects of human action on energy has the greatest chance of affecting future behaviour. Making the connection between behavioural patterns and energy consumption requires a feedback loop. The energy efficiency displays of the first hybrid cars were revolutionary in that they allowed the driver to get immediate feedback on the relationship between their driving and energy consumption. Drivers presented with real-time feedback adjusted their driving patterns to drive more efficiently. This was dubbed the 'Prius Effect': an effective feedback loop of energy consumption as a consequence of actions in real time, capable of drastically altering user behaviour simply by showing the user the measurable effects of their actions.

Architecture can be understood as part of an information system, a low-definition broadcast medium capable of delivering information to users through its tectonic encoding. The Gothic cathedral, through its dematerialisation of the wall into an attenuated stone screen, was able to communicate a message through its implicit and explicit use of material, light, colour and ornament. More recent understandings of architecture as a semiotic system were popularised by postmodern and post-structuralist readings of architecture that made explicit use of signage, ornament and motifs to create a 'legible' architecture. Our claim for architecture of Eco-literacy builds on these theories of architectural communication to argue for architecture that is expressive of its own patterns of energy consumption and production, and is constructive of a broader energy consciousness. Architecture of Eco-literacy provides feedback to its users, informs their overall understanding of energy systems and their impact on the environment so that their energy behaviour can be productively altered.

Eco-Bling

Amidst calls for verifiable metrics for sustainable design and quantifiable evidences of green credentials, the rhetoric of sustainability compels us to use less energy, optimise systems and increase the functional performance of buildings. Its mantra replaces 'Less is More' with 'Less or Else'. Austerity and restraint are the implicit mechanisms of sustainable practices. Yet the goals of sustainable design are to convince as much as they are to reduce. The communication of energy practices is essential to the project of sustainability. As we have seen, the feedback loop of behavioural patterns and energy use is one of the most effective tools for improving energy efficiency. In fact, changing energy behaviour is more important than any energy technology. Sustainable design is not equivalent to austerity design. Sustainable design can mean doing more, or better, rather than simply less.

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