



Artist designers Alex Schweder and Ward Shelley's experimental ReActor house, in New York State, spins when the wind blows and tilts from side to side according to the shifting weight of its inhabitants

A PIVOTAL MOMENT

Shapeshifting kinetic homes are becoming a reality for forward-thinking homeowners, as architects develop dynamic living spaces that harness the energy of sun - and provide innovative responses to some of the challenges posed by climate change. **Dominic Bradbury** reports

Imagine, if you will, homes that revolve and turn according to the movement of the sun, the changing climate or to frame a striking vista - "a machine for living" with kinetic elements that encourage a fresh and more thoughtful relationship with the environment around us. It's a concept some will know, having experienced dining in a rotating restaurant atop a towering city edifice - but architectural endeavour advances at pace and pioneering kinetic homes are now being built that not only enable constantly changing

vistas, but also address solutions to problems such as climate change.

One of the pioneers of the moving house is German architect Rolf Disch, creator of the Heliotrope that also serves as his own family home. Situated on the green edges of Freiberg in Baden-Württemberg, the glazed side of Disch's house tracks the sun during the day, drawing in its heat, while solar panels on the roof move independently to make the most of the available energy. It is described as a "plus energy" building in that it generates more heat and power than it needs. But the movement of the house -

turning at 2.5 degrees every 10 minutes, amounting to 180 degrees from sunrise to sunset - also offers a subtly shifting perspective on the landscape. "It's wonderful to have a view over the vineyards and the Black Forest in the east while having breakfast, and to later watch the sun set over the Rhine Valley," says Disch. "The rooms are flooded with light and the surfaces are always warm, but we have no energy bills to pay and even sell solar electricity to the grid."

Rolf Disch, who has built two further Heliotropes, is a solar energy expert and environmental activist, whose work echoes the ideas established by early visionaries,



From left: the Ballet Mécanique apartment block in Zürich has panels that unfold to become balconies or sun louvers; when they are closed the building looks more like an art installation. The D*Haus, scheduled to be built in Devon, is described as “the world’s first prefabricated

dynamic house” and will rotate according to weather, season, views or preference. The proposed Dynamic Tower designed by David Fisher has floor levels that rotate independently of one another so that the building is constantly changing shape and looking out to different vistas



such as Italian modernist architect Angelo Invernizzi, to harness the power of the sun. In 1935, Invernizzi designed Villa Girasole, or the Sunflower House, that could literally follow the sun’s path, and this idea resurfaced in the 1960s, when American architect Richard Foster built his Round House (pictured overleaf) in rural Connecticut. Circular homes were in demand during the midcentury period, but Foster’s Round House set itself apart by revolving around a central staircase, like a rotating mushroom. Added to this was the influence of the Japanese metabolist architects of the ’60s, who related buildings to organic systems that could adapt, grow and change according to the climate or their surroundings, as well as necessity.

Italian architect Roberto Rossi was influenced by Villa Girasole when building Casa Rotante, a modernist home near Rimini, Italy. Perched high upon a hillside, the main body of the house sits atop a central pillar above the ground and can turn a full 360 degrees in both directions. “As well as the ability to change the view, the rotation allows for the optimal positioning of the solar panels on the roof,” says Rossi. “This was my first project as an architect and it is certainly futuristic. Rotating buildings may have a limited impact in traditional housing, but they do represent a training ground where we can gain experience in designing homes suited to more extreme environments, and that could be on earth or even in future space exploration.”

Here in the UK, practices such as BACA Architects are rising to this challenge, and in response to the threat of flood risk on a site beside the River Thames, it has built Amphibious House, which rises on its dock-like foundations when flooding occurs. It is now using the same kinetic principles for other projects in the UK, US and the Maldives, and views kinetic architecture as a common-sense solution to building in flood-risk regions.

British architects David Ben Grunberg and Daniel Woolfson are of a similar mind. They have secured planning permission for their first D*Haus (pictured left centre) in Devon – which they describe as “the world’s first prefabricated dynamic house”, featuring a rotating upper level that moves around a central core according to the views, the weather, the seasons and preference. “We expect to see taller moving buildings alongside extreme types of new homes that will move on both land and water,” says Ben Grunberg. “With climate change, architecture will need to adapt.”

Kinetic architecture offers more immediate benefits for homeowners too – enhancing both the comfort and enjoyment of the home. In India, architects Matharoo

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Associates created the intriguingly named House with Balls for the owner of an aquarium shop, where a series of top-hinged shutters arranged around the central hallway are counter-weighted with concrete spheres suspended on each side of the building. These float in mid-air on one side and descend into a fish tank on the other when the shutters are opened. More ambitious still is the Moving Landscape House (pictured top left and right) owned by a real-estate developer, where one perimeter wall is made up of marble pivoting doors that glide open at the touch of a button to introduce light and air into the interior, while connecting the home to the gardens alongside it. “We believe that besides all the functional concerns, buildings must satisfy the inner urge to create delight and unfold as one moves through them, revealing their secrets and meanings,” says architect Gurjit Matharoo.

This idea of “engagement” is important on a number of levels. Kinetics encourage a closer relationship with both the setting and the home itself, which in some cases

demands a response comparable to taking part in a performance. This is a central ethos in the Ballet Mécanique (pictured on previous page) – a dynamic building in Zürich. Here, architect Manuel Herz has created a structure with five apartments close to Le Corbusier’s Heidi Weber Museum. The façade is punctuated by colourful panels and plates that unfold at the touch of a button to become balconies and sun louvers within a balletic process of transfiguration made possible by hydraulics. “When the building is closed it looks almost like a turtle or a mysterious installation, but when opened it has a completely different appearance,” says Herz. “I was not trying to do a ‘high-tech’ building controlled via sensors, but rather a ‘ghost in the machine’, as I believe we should directly control our environment rather than have a computer decide for us.”

High-rise moving buildings are also on the way. Architect David Fisher has been working on designs for a Dynamic Tower (pictured on previous page) for a number of years and hopes construction will start on

the first one next year, with a site agreed but as yet undisclosed (although early indications suggest Dubai or elsewhere in the Middle East). Fisher’s skyscrapers feature floor levels that move independently of one another, so that the building is constantly changing shape and looking out to different vistas. Each floor, according to Fisher’s practice Dynamic Architecture, can be prefabricated in an Italian shipyard and then fitted to a static core on-site, serving as homes but also as hotels. “Buildings in motion bring ‘democracy’ to architecture by allowing each person, at any given time, to shape their personal space as desired.”

The experiential aspects of kinetic design have caught the imagination of those in the world of art – perhaps the most extreme testing ground for how moving architecture might impact our lives. Artist designers Alex Schweder and Ward Shelley took the concept of a performance building to a new level with their project ReActor (pictured on opening page). Schweder + Shelley created a light, rectangular house that rotates and tilts upon a single column. The entire home spins in the wind, but also moves from side to side according to the shifting position and weight of its residents, as the artists have demonstrated during residencies at OMI International Arts Center’s Architecture Field near Ghent in New York State, where the ReActor resides.

From top: the India-based Moving Landscape House has pivoting stone doors that glide open to admit light and air. Richard Foster’s Round House in Connecticut caused a stir in the 1960s as it revolved around a central staircase, like a rotating mushroom

“The tilting makes us aware of where the other person is at all times and requires us to do corresponding activities to keep the house level,” says Schweder. “We think of it as an artwork that uses

architecture as its medium. English and French garden design in the 18th century abounds with follies and ReActor situates itself in this history, but also addresses the 21st-century artistic concern for immersive experiences.” And for those drawn to the idea, the pair have just adapted the ReActor to produce a prefabricated modular kit that can be bought for assembly. Represented by agent Edward Cella in Los Angeles, the kits are expected to retail for around \$750,000. Folly or not, it brings the notion of kinetic experiences one step closer to home. ♦

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BACA Architects, baca.uk.com. **The D*Haus Company**, thedhaus.com. **Dynamic Architecture**, dynamicarchitecture.net. **Edward Cella**, edwardcella.com. **Manuel Herz Architects**, manuelherz.com. **Matharoo Associates**, matharooassociates.com. **OMI International Arts Center**, aageastend.com/contents/omi-international-arts-center. **Roberto Rossi**, robertorossiarchitetto@gmail.com. **Rolf Disch**, rolfdisch.de. **Schweder + Shelley**, schwedersshelley.com.

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