Ascending Array
Miracle for Africa Foundation Central Library, Lilongwe, Malawi

Main author
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Project data
Project group: Architecture, building and civil engineering
Client: Miracle for Africa Foundation
Project background: Private commission
Planned start: March 2018

Summary and appraisal of the project by the jury
The new central library for the campus of the Miracle for Africa Foundation in Lilongwe provides spaces for books, archives, reading rooms, classrooms, offices, and an open forum. The architectural aim is to maximize the use of natural light, while powering the building with solar energy. An ascending array of roof elements, each with a gentle curve, like wind moving across a field – gives orientation to all interior spaces. Small glass-encased rooms containing humidity-sensitive materials and activities are situated within a larger, passively cooled open plan. A locally-crafted bamboo screen enclosure acts as a permeable dust-filtrating facade and allows natural cross ventilation to cool the building both during the day and at night.

The jury commended the sophisticated, undulating design that synthesizes effective shading, natural ventilation, solar energy, and greywater recycling into one seductive and highly resolved form. It was further noted that ambitious architecture is so unusual in the region that – as a distinctive landmark with a noble program – the project could provide an aspirational environment. Despite the exceptional design, a clear depiction of the siting of the building – as, for example, a site plan – was unfortunately lacking, making it impossible to assess the library’s relation to its context. Nonetheless, the jury applauded the project’s overall design posture, taking sustainability beyond what it conventionally appears to be.

Statements on the sustainability of the project by the author
Sustainably designed and programmed for human comfort
The building’s program is sensitively arranged with glass boxes rooms controlling smaller environments within a larger open plan, passively conserving energy and maintaining thermal comfort in the space. A permeable dust filtering facade for the building allows natural cross ventilation throughout the building during the day and an exposed thermal mass to naturally cool off at night. During the dominant rainy season peak temperatures are above 35°C while nights are below 22°C. Naturally ventilated office boxes made of glass and open reading rooms located near the periphery and under mezzanine clerestories are lit by the high-quality daylight. Humidity controlled archive boxes, also made of glass are strategically located at the center under the mezzanine for maximum UV and storage ensure no drop of water goes to waste, but is instead utilized for landscape irrigation and cleaning.

Building as an ecological engine for the campus and Malawi!
The characteristically curved roof is covered with flexible solar PV sheets, a pioneering solution to Malawi’s crippling energy crisis. The roof produces 627 MWh/a of electricity, 34% more than its calculated consumption of 142 MWh/a. All excess energy is distributed to the rest of the campus. Thermal mat caps behind the PV harvest solar energy for free water-based night heating, while also boosting the efficiency of the PV panels. The ratio of the facade’s perforation was calculated to utilize the dominant East South East winds and maximize cross ventilation throughout all reading and office spaces. Roof-formed mezzanine clerestories allow diffuse daylight from the South, ensuring high quality reading and office spaces with a spatial daylight autonomy between 70-99%.

High performance, low impact
There are two main construction materials used for the library: local wood & bamboo are used to create a seductive and highly resolved form. It was further noted that ambitious architecture is so unusual in the region that – as a distinctive landmark with a noble program – the project could provide an aspirational environment. Despite the exceptional design, a clear depiction of the siting of the building – as, for example, a site plan – was unfortunately lacking, making it impossible to assess the library’s relation to its context. Nonetheless, the jury applauded the project’s overall design posture, taking sustainability beyond what it conventionally appears to be.

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