JERRY YUDELSON | ULF MEYER

THE WORLD'S GREENEST BUILDINGS

PROMISE VERSUS PERFORMANCE IN SUSTAINABLE DESIGN

Foreword by Professor Alison G. Kwok

ROUTLEDGE

PIXEL, Melbourne, Australia

At only 10,764 sq ft (1,000 sq m), the Pixel building in Melbourne claims to be "the smallest building with the biggest expectations" and is by far the smallest building featured in this book.[2] However, it is a noteworthy project because it received a perfect Green Star score—100 points—with an extra 5 points awarded for innovation.[3] The Pixel project also received 105 points (LEED Platinum) (out of 110 possible), making it the highest-scoring building in the world under the LEED rating system. The project also is on track to achieve the highest rating, Outstanding, from BREEAM.[4]

The building's most dramatic feature is its colorful façade (Figure 9.5). The multicolored fixed louvers wrap around all four sides to create a "pixilated" sun shading system.

Pixel aims to produce all of its power needs on-site. Three 1.5-kW wind turbines, combined with 6.5 kW of rooftop PV panels, mounted on a tracking device to improve output by 40 percent, are projected to generate more electricity than the building requires.[5]

Another of Pixel's innovative features is vacuum-toilet technology. Similar to airplane toilets, the system reduces water consumption to a minimum and helps Pixel to maintain water self-sufficiency.

9.5 The multicolored fixed louvers on the Pixel building wrap around all four sides to create a "pixilated" sun shading system. Photo: Grocon.

If Melbourne maintains its ten-year average rainfall levels, Pixel is predicted to be net-zero, self-sustainable for water supply, using only harvested rainwater, except for drinking water.[6]

Another innovative feature is the anaerobic digester, which processes the building's sewage flows. Located on the ground level, the system extracts methane from the building's blackwater waste. Tanks in series hold toilet and kitchen waste, and the digester harvests methane gas, which replaces natural gas for heating water.[7]

Other high-performance features utilized in the Pixel building include:[8]

- 100-percent fresh-air distribution
- night purge cooling
- gas-fired absorption chiller
- "Pixelcrete," concrete with reclaimed and recycled aggregates
- daylighting and glare control
- living (green) roof
- rainwater, graywater, and blackwater harvesting and reuse.

"Our objectives were to provide an example of the sustainable office of the future and to set a benchmark that exceeds all current-day sustainable office developments," said Shane Esmore, with energy consultants Umow Lai.[9] The annual gross energy-use intensity is projected to be 31.7 kWh/sq m, with a net intensity (after renewable energy contribution) of 9.2 kWh/sq m.

As of April 2012, when Yudelson toured this project, it had only a handful of occupants, on the ground floor. The developer plans to place a team in the remaining floors in the building, to serve the project management needs of adjacent residential towers just beginning construction. Until the project is actually fully occupied and operating for a year, the projected energy and water performance will be difficult to verify. Nonetheless, the project is noteworthy for its "world's-best" achievements in design and the use of a full palette of green building measures in a commercial environment.

TABLE 9.2

Projected annual energy end-use summary

	Electricity (kWh)	Natural Gas (kWh)
Common area light and power	1,121	–
Lifts	567	–
Domestic hot water	–	0
Space heating	–	4,725
Space cooling	–	24,058
HVAC fans	3,833	–
HVAC pumps	423	–
Condenser fans	958	
Hydraulic pumps	237	
Miscellaneous loads, controls, etc.	150	
Total energy use	7,289	28,783
Energy use intensity	6.4 kWh/sq m	25.3 kWh/sq m (31.7 kWh/sq m, overall)
Fixed solar PV	3,509	
Tracking solar PV	6,853	
Wind turbines	15,282	
Total renewables	25,644	
Net energy use	(18,355)	28,783
Total energy use intensity	(16.1 kWh/sq m)	25.3 kWh/sq m
Net energy use intensity		9.2 kWh/sq m

At a glance
Name: Pixel
Location: Carlton, Victoria, Australia
Size: 12,230 sq ft (1,136 sq m)
Distinction: 6-Star Green Star Office "Design," LEED Platinum, and BREEAM Outstanding (expected)
Program: Corporate office

Project team
Owner: Developer, Builder: Grocon
Architect: Studio505
Building Services Engineer: ESD
Energy Engineer: Umow Lai & Associates
Structural Engineer: Van Der Meer Consulting