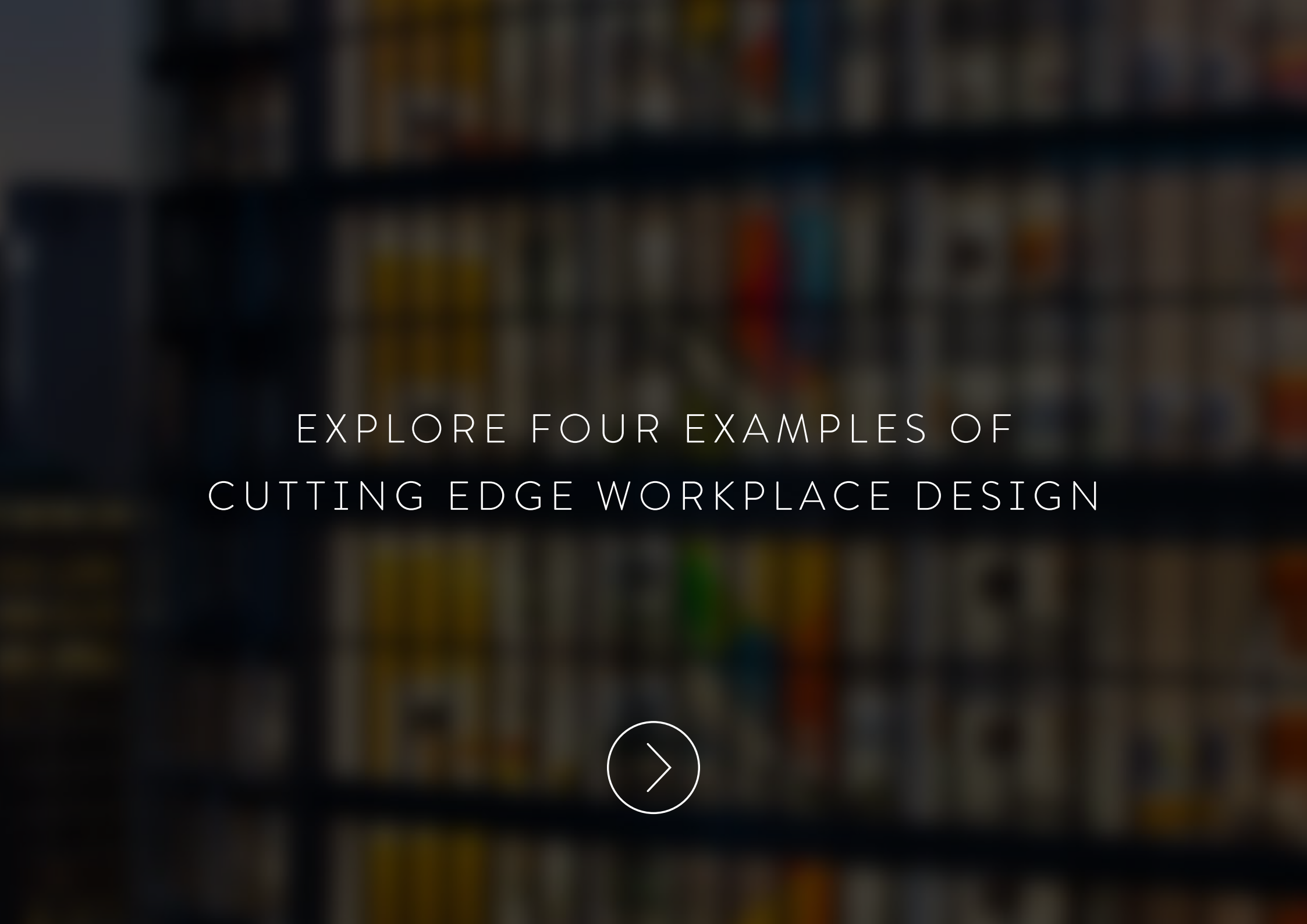
BUROHAPPOLD
ENGINEERING

PEOPLE FOCUSED
PERFORMANCE DRIVEN


EXPLORE FOUR EXAMPLES OF
CUTTING EDGE WORKPLACE DESIGN

CONTENTS

INTRODUCING THE WORLD'S GREENEST OFFICE TOWER

THE TOWER AT PNC PLAZA | PITTSBURGH, PA, USA

THE TOWER AT PNC PLAZA

LOCATION: Pittsburgh, PA, USA CLIENT: PNC Financial Services Group ARCHITECT: Gensler

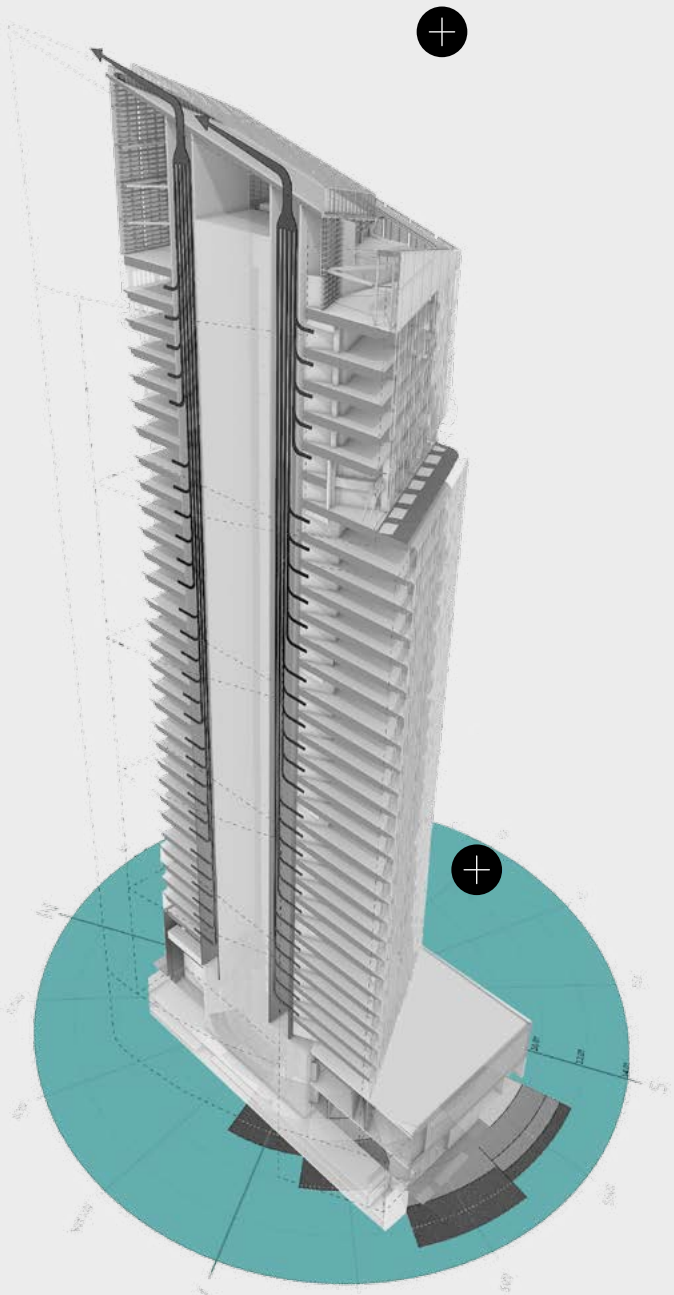
IMAGE: Gensler

THE TOWER AT PNC PLAZA | PITTSBURGH, PA, USA

THE PNC TOWER

IMAGE: Gensler

THE TOWER AT PNC PLAZA | PITTSBURGH, PA, USA



THE TOWER AT PNC PLAZA | PITTSBURGH, PA, USA

Passive design, powerful results

The PNC Tower establishes two important milestones that will influence future commercial development across America – it is the only building in the country to have a fully automated double-skin facade, and one of the first high-rise structures to incorporate a solar chimney.

The double-skin facade ensures 92% of the interior spaces are illuminated by daylight year round, and works in tandem with the solar chimney to enable the building to rely solely on natural ventilation for almost half the year. As well as creating an exceptional environment for occupants, these features dramatically reduce the tower's operating costs, and by doing so champion the economic and social value of passive design to the commercial sector.

ACTIVE SUPPORT SYSTEMS

The PNC Tower is able to operate passively for much of the year, but during both the height of summer and the depths of winter, active systems are required to maintain a comfortable environment for occupants.

We integrated active chilled beams within the floor space to provide additional cooling to interiors on hot summer days. During the winter months, a dual-wheel energy recovery system uses the warm exhaust air leaving the building to heat cold air as it enters, while radiant panels in the facade provide highly efficient heating and mitigate unwanted heat loss to the outside.

SPRING
Passive Mode

SUMMER
Passive Mode

WINTER
Active Mode

THE TOWER AT PNC PLAZA | PITTSBURGH, PA, USA

IMAGE: Connie Zhou

PNC IN NUMBERS

From solar orientation to facade glazing, water fittings to light fixtures, every component of The PNC Tower has been specifically designed to improve its sustainability. This quick fact sheet shows the day-to-day difference this bespoke approach delivers, to people and the planet.

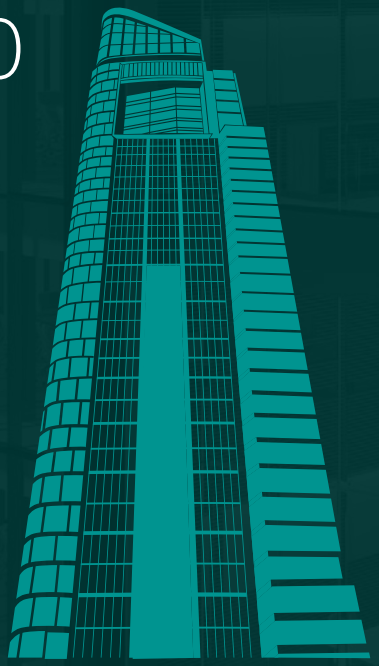
Vital statistics

800,00
square feet

2000
employees

495
ft in height to top

33
floors



77%
percent reduction in city water consumption compared to a typical new office tower

92%
portion of total floor area that is naturally lit (at an expanded illuminance level of 150 lux)

Energy

We made a series of significant design improvements to the Tower that will enable it to use 50% less energy per year than a typical new office complex. This annual energy saving translates to:

x235
trips around the world in a Toyota Prius or 130,000 gallons of gasoline

42%
proportion of the year the building will naturally ventilate

8
awards and industry accreditations received for the tower

THE PNC BEACON

THE TOWER AT PNC PLAZA | PITTSBURGH, PA, USA

IMAGE: Connell Lou

THE TOWER AT PNC PLAZA | PITTSBURGH, PA, USA

ENGINUITY™ PROCESS

Our Enginuity solution for PNC Tower focussed on innovative technologies
Click to see the range of BuroHappold specialisms that collaborated to make the vision viable.

IMAGE: Connie Zhou

THE TOWER AT PNC PLAZA | PITTSBURGH, PA, USA

ENGINUITY™ PROCESS

THE TOWER AT PNC PLAZA | PITTSBURGH, PA, USA

INNOVATIVE WAYS TO BEAT THE HEAT

SHIMOGA PROCESSING | SHIMOGA, INDIA

SHIMOGA PROCESSING

LOCATION:Shimoga, India CLIENT:Xchanging PLC ARCHITECT: Chadwick International

A BUILDING THAT BREATHES

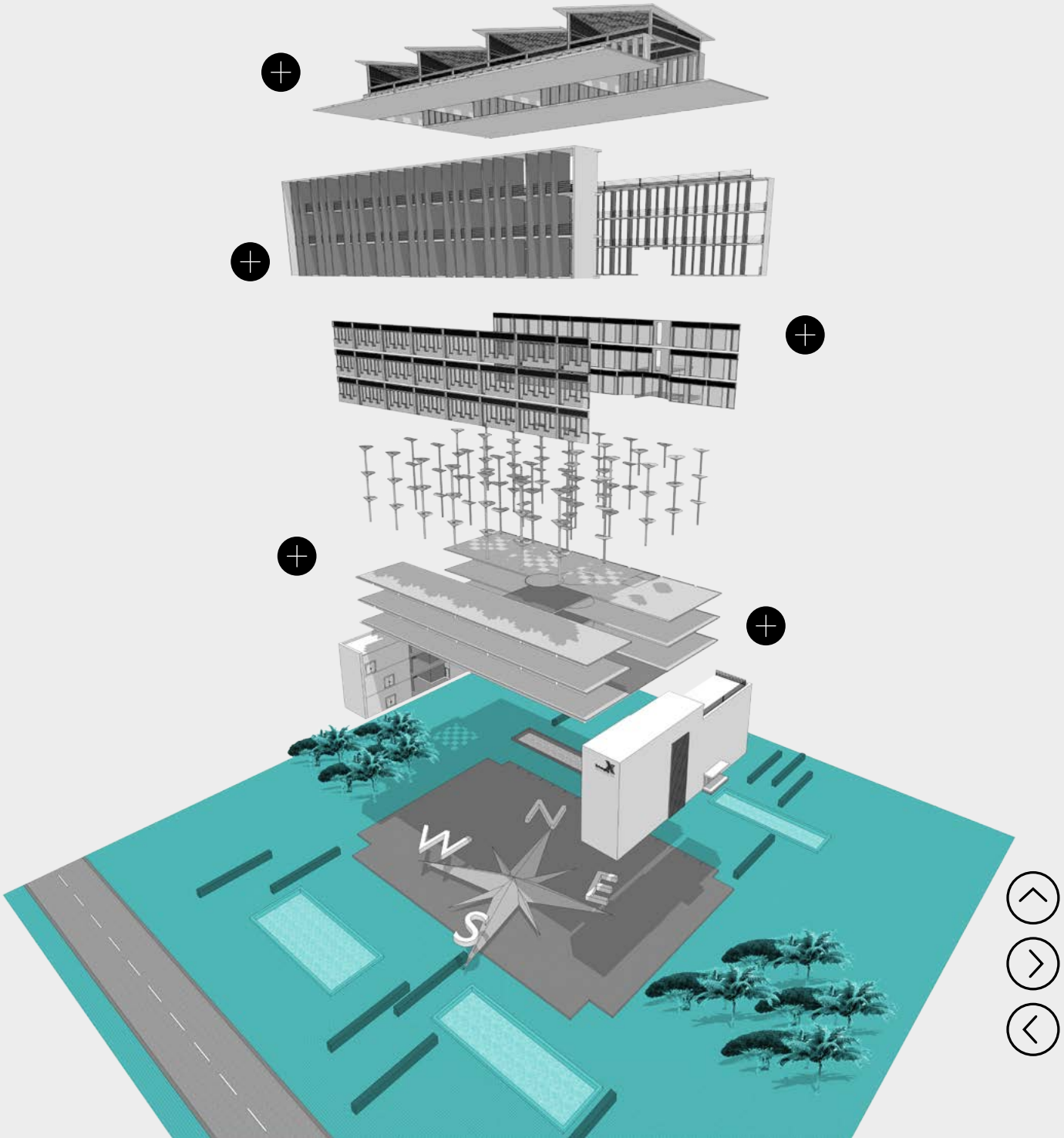
Home to several renowned higher education institutions, Shimoga is an academic hotspot that has no trouble attracting undergraduate students. With the economic hubs of Bangalore and Delhi offering more exciting career prospects, however, the city has struggled to retain its graduate talent. Our client, Xchanging Plc, aimed to change this by creating a contemporary office complex that provides an inspiring and dynamic work environment.

Cool solutions

With energy consumption a primary aim for our client, the BuroHappold team analysed the climate of Shimoga and then worked alongside the architect to devise integrated, low energy solutions that made use of the area's natural resources. Our engineers used bespoke computational analysis and parametric modelling tools to assess large numbers of potential design options and develop strategies that would not only create excellent interior conditions, but also support modern interactive working practices.

Tangible results

By replacing traditional mechanical air conditioning with passive ventilation strategies, we provided Shimoga Processing Centre with a cost effective and resilient system that proves low energy design can be achieved even in extreme climatic conditions.



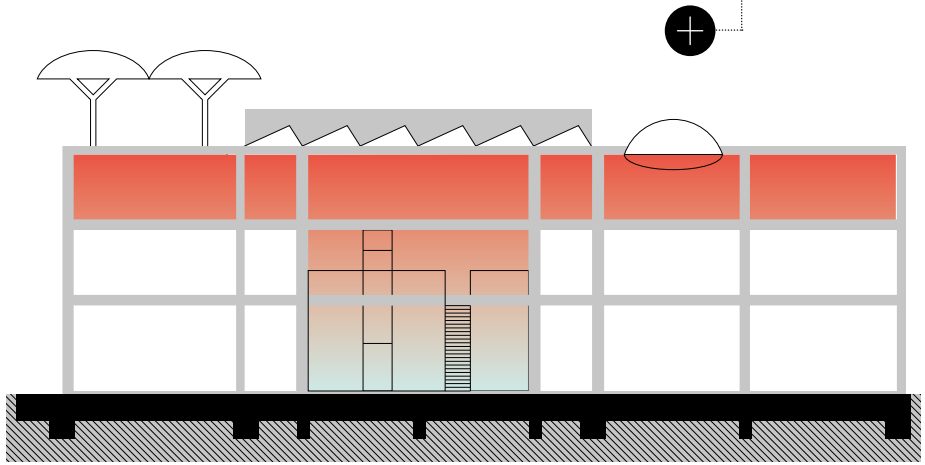
SHIMOGA PROCESSING | SHIMOGA, INDIA

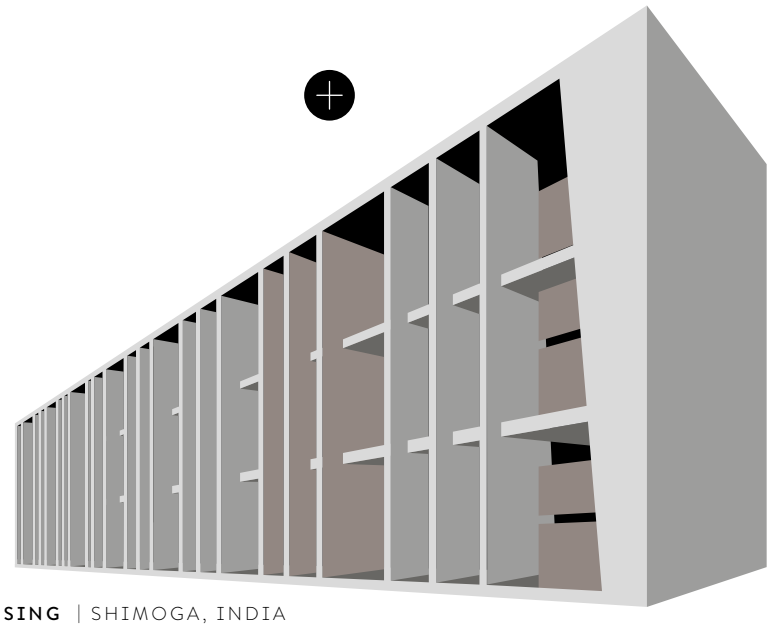
SHIMOGA PROCESSING | SHIMOGA, INDIA

Atrium roof

The atrium roof acts as a giant wind catcher, and the atrium itself as lungs for the two wings of the building.
As with all other glazed elements, the atrium skylight is only exposed to diffused light to reduce solar gain without compromising daylight harvesting.
By incorporating a further opening in the atrium skylight, we were able to cross ventilate all interior spaces.

Issues relating to roof lights when positioned flush to the office roof surface





SHIMOGA PROCESSING | SHIMOGA, INDIA

Brise soleil

As well as giving the centre a striking visual identity, these elements deflect direct sunlight to limit the unwanted effects of solar glare and heat gain. They also help channel the prevailing wind through the building.

ENGINUITY™ PROCESS

Our Enginuity solution for Shimoga focussed on passive design strategies.
Click to see the range of BuroHappold specialisms that collaborated to make the vision viable.

SHIMOGA PROCESSING | SHIMOGA, INDIA

ENGINUITY™ PROCESS

SHIMOGA PROCESSING | SHIMOGA, INDIA

A SUSTAINABLE INVESTMENT FOR UBS

5 BROADGATE | LONDON, UK

5 BROADGATE

LOCATION:London, UK CLIENT:British Land ARCHITECT: Make

IMAGE: Make Architects

5 BROADGATE | LONDON, UK

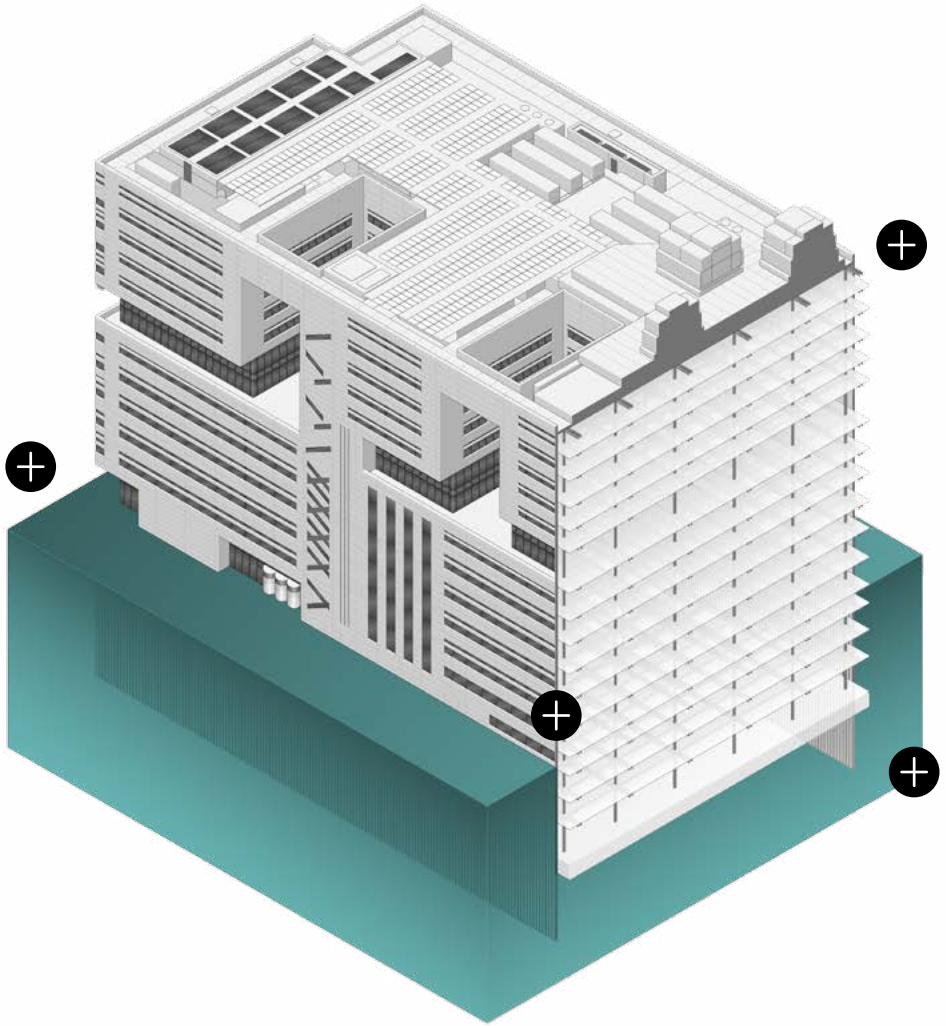

DISTINCTIVE AND DRAMATIC

TRACKING THE CARBON FOOTPRINT

5 BROADGATE | LONDON, UK

TACKLING THE KEY CARBON HOT SPOTS

Our detailed assessment of the projected carbon footprint of 5 Broadgate throughout its lifecycle enabled us to identify four core structural modifications that would significantly reduce the embodied carbon of the building as a whole.



ENGINUITY™ PROCESS

Our Enginuity solution for 5 Broadgate focussed on sustainable structural design
Click to see the range of BuroHappold specialisms that collaborated to make the vision viable.

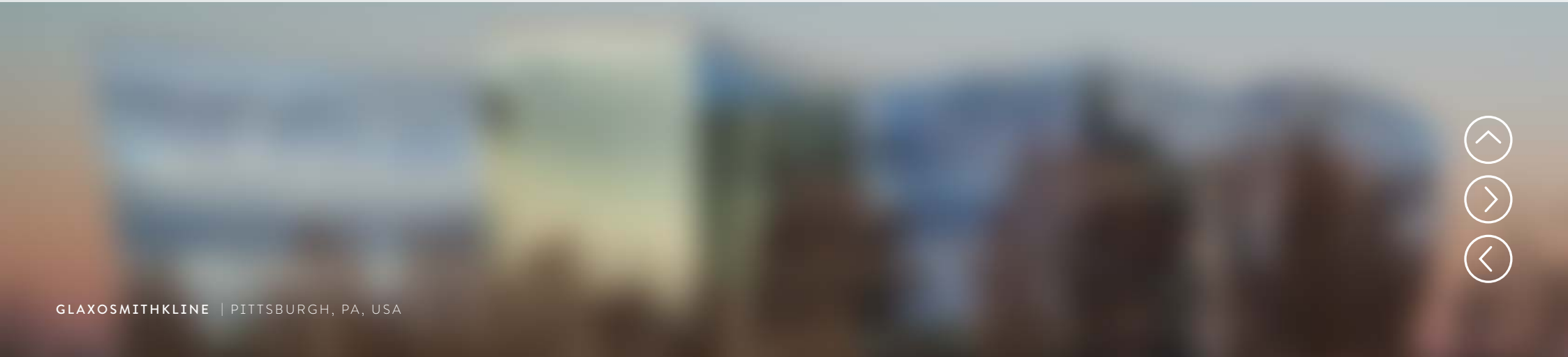
ENGINUITY™ PROCESS

View

5 BROADGATE | LONDON, UK

ENGINUITY™ PROCESS

HEALTHY HEADQUARTERS FOR A PHARMACEUTICAL GIANT



GLAXOSMITHKLINE | PITTSBURGH, PA, USA

GLAXOSMITHKLINE AT 5 CRESCENT DRIVE

LOCATION: Philadelphia, PA, USA CLIENT: Liberty Property Trust ARCHITECT: Kendall/Heaton Associates and Robert A.M. Stern Architects

IMAGE: Francis Dzikowski

GLAXOSMITHKLINE | PITTSBURGH, PA, USA

A WINNING WORKPLACE

IMAGE: Francis Cauffman

GLAXOSMITHKLINE | PITTSBURGH, PA, USA

IMAGE: Francis Cauffman

GLAXOSMITHKLINE | PITTSBURGH, PA, USA

IMAGE: Kendall HAeton

GLAXOSMITHKLINE | PITTSBURGH, PA, USA

SUSTAINABLE DESIGN

IMAGE: Francis Cauffman

GLAXOSMITHKLINE | PITTSBURGH, PA, USA

ENGINUITY™ PROCESS

Our Enginuity solution for GSK focused on health, wellbeing and productivity
Click to see the range of BuroHappold specialisms that collaborated to make the vision viable.

GLAXOSMITHKLINE | PITTSBURGH, PA, USA

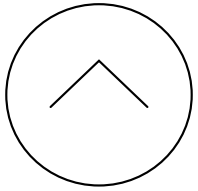
ENGINUITY™ PROCESS

OUR WORKPLACE PROJECTS WORLDWIDE

CLICK TO REVIEW LINKED PROJECT INFORMATION

BUROHAPPOLD
ENGINEERING

WE MAKE THE VISION VIABLE



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