



HEALTH & WELLBEING IN THE BUILT ENVIRONMENT

GLOBAL WELLNESS SUMMIT

ANN MARIE AGUILAR
VICTORIA LOCKHART

OCTOBER 2016

ARUP

POLLUTION

- **challenges**
- **solutions**



Indoor air pollution
is ranked as
one of the **world's**
greatest public
health risks.

(Wolverton, 1997)

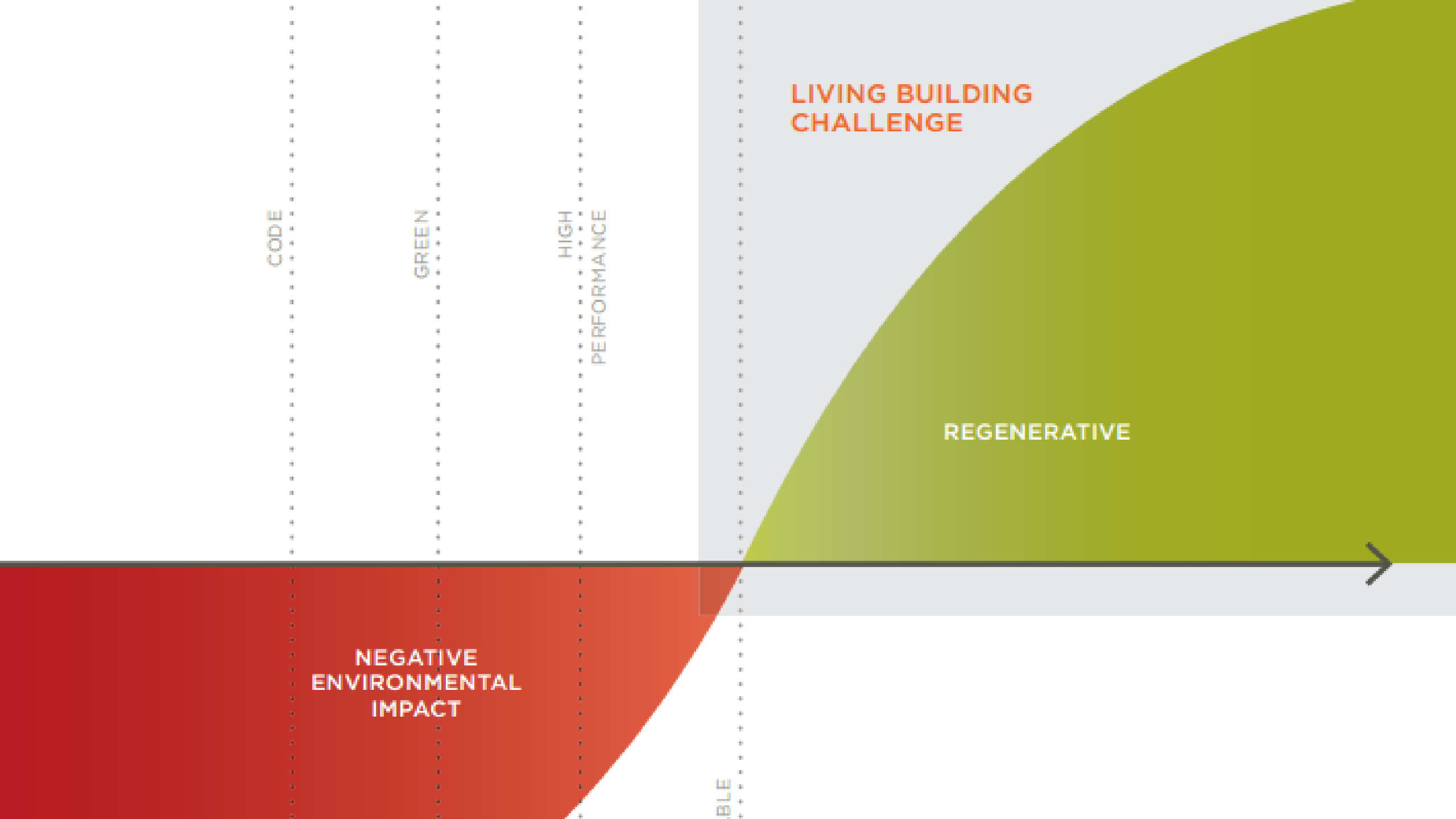
A woman with dark hair is shown in profile, looking out of a large window. The window looks out onto a city street at dusk or dawn, with blurred lights from buildings and cars. The scene is dimly lit, with the primary light source being the ambient light from the window.

It has been estimated that globally **14 times as many deaths occur from poor indoor air quality** compared with **outdoor** air pollution.

(Brennan and Withgott, 2005)

**BEING
INDOORS IS
MORE
DANGEROUS
THAN
OUTDOORS**





CODE

GREEN

HIGH
PERFORMANCE

LIVING BUILDING
CHALLENGE

REGENERATIVE

NEGATIVE
ENVIRONMENTAL
IMPACT

ENVIRONMENTAL
IMPACT



**DOING LESS
BAD IS NOT
GOOD ENOUGH**



investor & brand value:

long-term value

Health and Wellbeing increasingly recognised as a relevant factor for investors.

March 2016 saw the announcement that the GRESB global benchmark for real-estate portfolios will develop a health & wellbeing module for future surveys.

Source: <https://www.gresb.com/gresb-launches-health-well-being-module-for-the-real-estate-industry>



G R E S B

Search 🔍 | Login ▼

GRESB Launches Health & Well-being Module for the Real Estate Industry

14 Mar, 2016

Health and well-being rapidly emerging as important area of opportunity for the industry

March 14, 2016 (Amsterdam) - GRESB, the global standard for ESG assessment of real estate portfolios and infrastructure assets, today announced the launch of the GRESB Health & Well-being Module. This new module is an optional supplement to the GRESB Real Estate Assessment, which is an annual survey on behalf of a large group of institutional investors that captures information regarding the ESG performance of property companies, fund managers and developers.

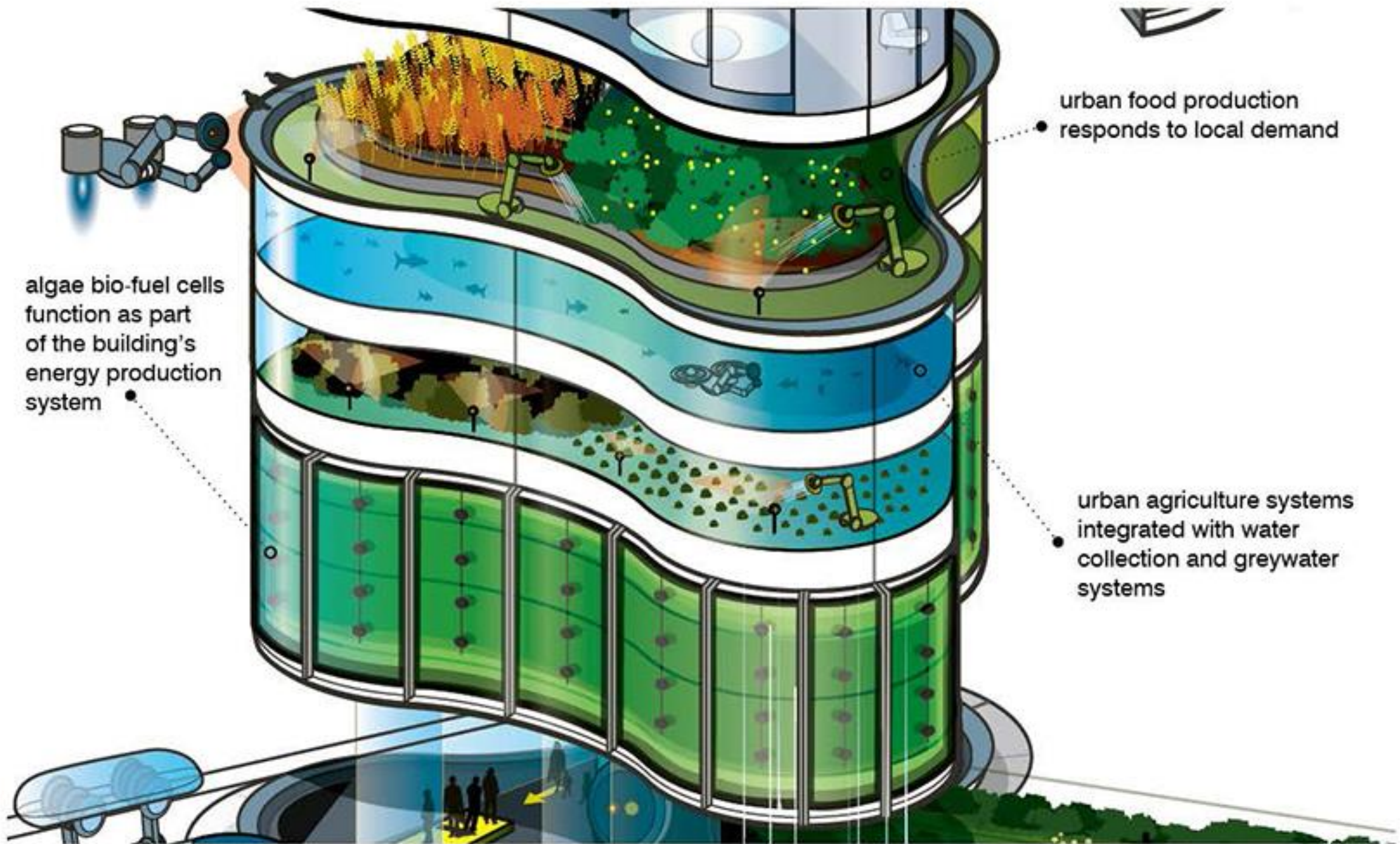
The new module evaluates and benchmarks actions by property companies and funds to promote the health and well-being of employees and their strategy to create value through products and services that promote health and well-being for their tenants and customers.

“The design, construction and operation of our built environment has a profound impact on individuals and populations,” said Chris Pyke, COO, GRESB. “GRESB’s vision is to ultimately create better places for people and communities – places that reduce environmental impacts, improve social practices and set high standards for corporate governance – in profitable ways that make good business sense and reward innovation. This new Health & Well-being Module adds an additional component to the annual GRESB Real Estate Assessment and sends a signal that human health and well-being plays a critical role in assessing the value of real estate portfolios and other assets.”

Real estate development can serve to create superior places – places that enhance productivity, support physical activity, promote social interaction, provide access to vital services and contribute to happiness. As interest in health and well-being in the built environment grows, the industry has

**BUILDINGS
WILL NEED TO
DO MORE GOOD**





urban food production
responds to local demand

algae bio-fuel cells
function as part of
the building's
energy production
system

urban agriculture systems
integrated with water
collection and greywater
systems

SOLUTIONS



THE METAPHOR OF THE FLOWER

ROOTED IN PLACE AND YET:

Harvests all energy + water

Is adapted to climate and site

Operates pollution free

Is comprised of integrated systems

Is beautiful



BEAUTY & INSPIRATION

A Living Building tells a story.

INDOOR QUALITY

Maximize health,
minimize impact.



MATERIALS

Safe, healthy and
responsible for all species.



WATER

A Living Building is
water independent.



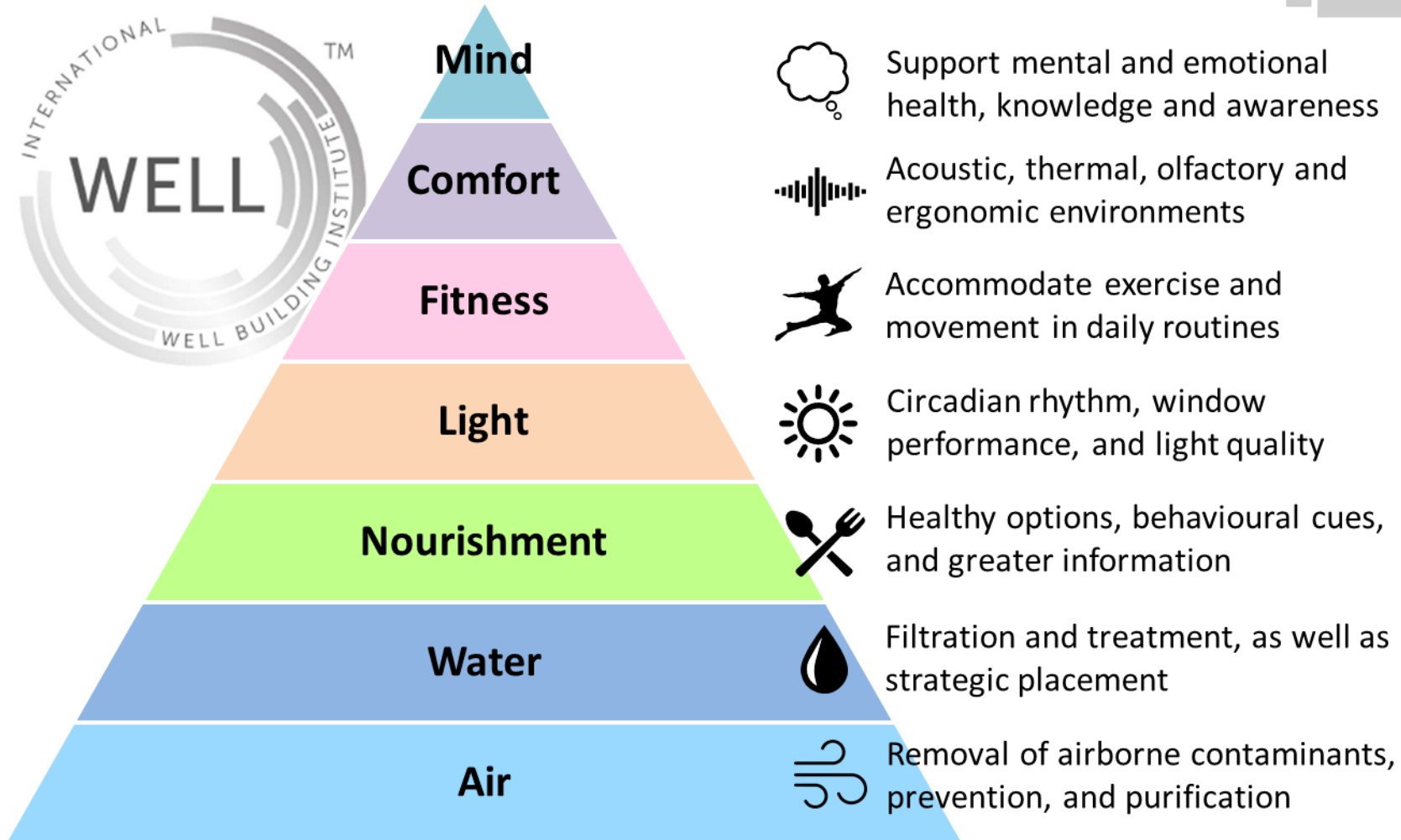
ENERGY

A living building relies solely on
current solar income.



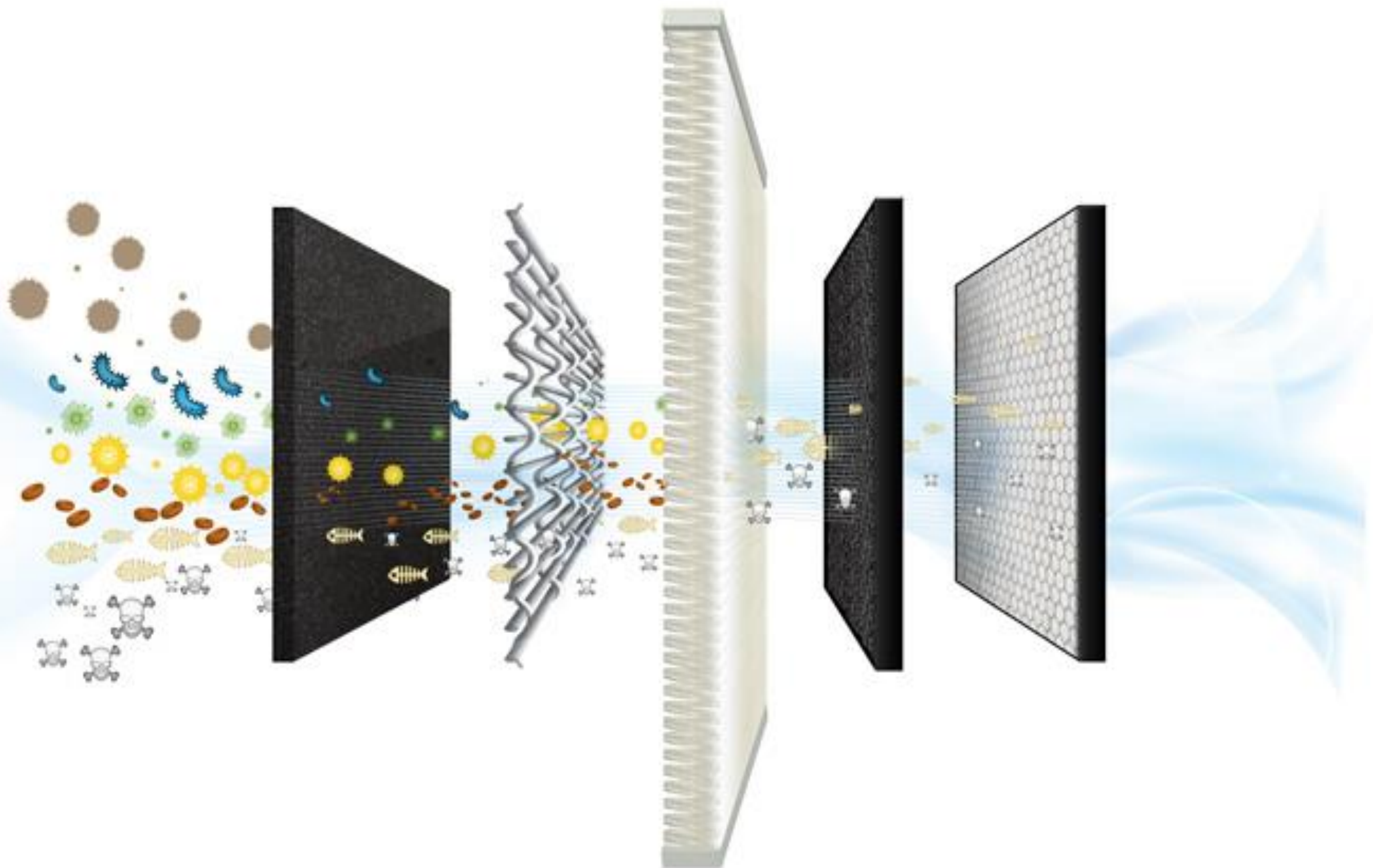
SITE

Humanity has co-opted
enough land; it is time
to draw boundaries and
declare it enough.





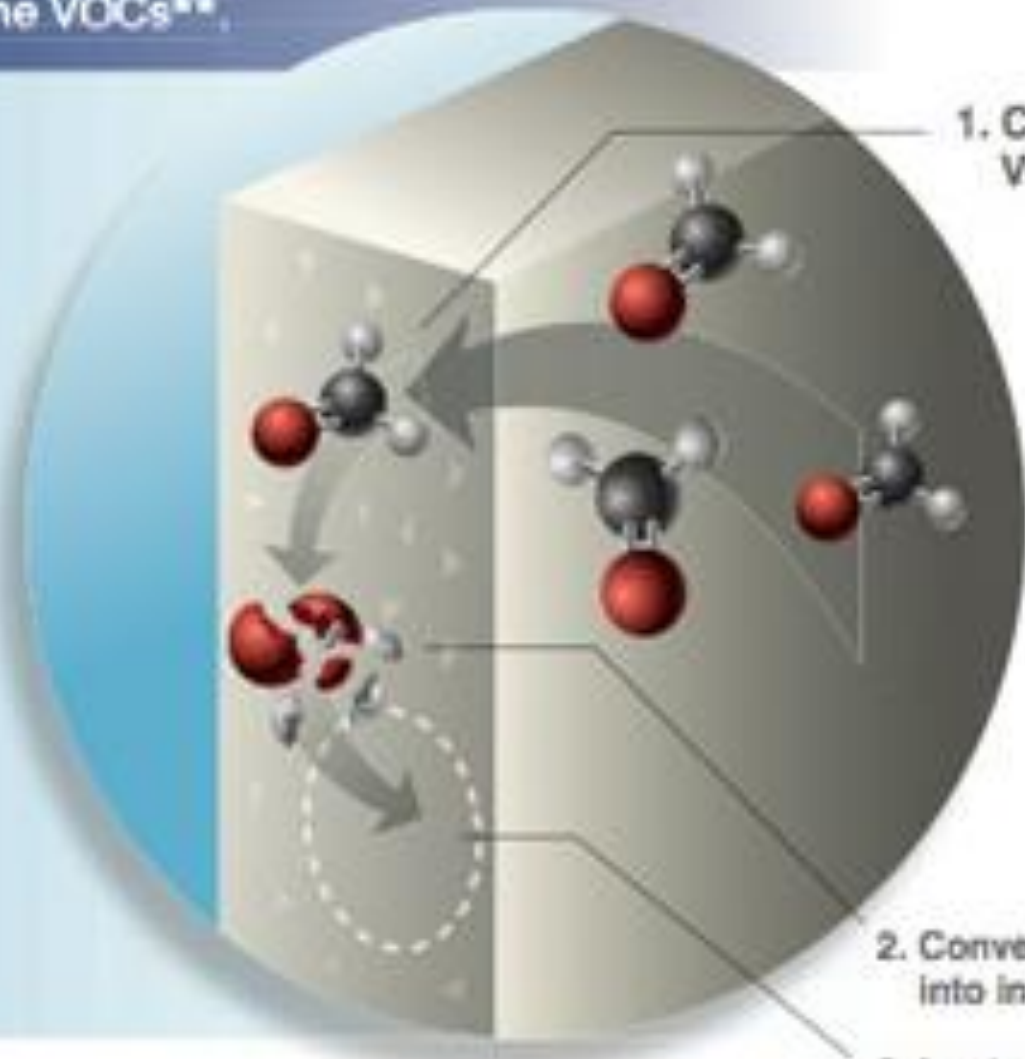
dust
bacteria
fungus
pollen
mold
odor
VOCs



AirRenew™ Gypsum Board permanently absorbs the VOCs.**



VOCs** come into contact with the board by typical airflow



1. Captures VOCs**

2. Converts VOCs** into inert compounds

3. Inert compounds remain within gypsum board



Toxic Red List

The Omega Center for Sustainable Living

does not contain any of the following

Living Building Challenge™ Red List materials or chemicals.

Cadmium • Chlorinated Polyethylene and Chlorosulfonated Polyethylene

Chlorofluorocarbons (CFCs) • Chloroprene (Neoprene) • Formaldehyde (added)

Halogenated Flame Retardants • Hydrochlorofluorocarbons (HCFCs)

Lead • Mercury • Petrochemical Fertilizers and Pesticides

Phthalates • Polyvinyl Chloride (PVC)

Declare.



**Commercial Broadloom Carpet on
Weldlok®**

Mohawk Group

Final Assembly: Chatsworth, GA, USA

Life Expectancy: 15 Years

End of Life Options: Take Back Program

Ingredients:

Nylon 6 (Dalton, GA) Nylon 6.6 (Camden, SC)





Bamboo Palm
Removes formaldehyde,
Acts as a natural humidifer.



Sansevieria
It absorbs nitrogen oxides
and formaldehyde.



Areca Palm
One of the best air purifying
plants for general air cleanliness.



Spathiphyllum
Remove mold spores,
formaldehyde, and trichloroethylene.



Spider Plant
Removes carbon monoxide
and other toxins or impurities.
one of three plants NASA deems best at
removing formaldehyde from the air.



Golden Pothos
Most effective indoor
Purifiers. Removes
Formaldehyde , xylene,
toluene., benzene,
Carbon monoxide and more





© foobot

CONSTANT MONITORING OF AIR

RESET 重生™
CERTIFIED

HAWORTH



31 minutes ago

TEMPERATURE & HUMIDITY 22 C, 45 %RH

8 VOC (mg/m3) **GOOD** 0.41

RESET | 重生™
REGENERATIVE ECOLOGICAL, SOCIAL & ECONOMIC TARGETS
具有再生作用的生态、社会和经济目标

PROJECT CERTIFICATION FOR
HEALTH & WELLNESS

Indoor Air Quality Criteria



PILOT PROJECT

On-going measurement & testing of indoor air quality, ensuring clean & breathable air

RESET 重生™
CERTIFIED

Shanghai Outdoor

25 **GOOD**
OUTDOOR PM2.5 an hour ago

Glumac

2 **GOOD**

| | | | | |
|--------------|------|-----|------|------|
| INDOOR PM2.5 | 0.37 | 681 | 26 C | 36 % |
| | TVOC | CO2 | TEMP | RH |

RESET Participant 22 minutes ago

Tishman Speyer - The Springs CBD

6 **GOOD**

| | | | | |
|--------------|------|-----|------|------|
| INDOOR PM2.5 | 0.14 | 415 | 23 C | 47 % |
| | TVOC | CO2 | TEMP | RH |

RESET Participant an hour ago

Haworth

6 **GOOD**

FUTURE

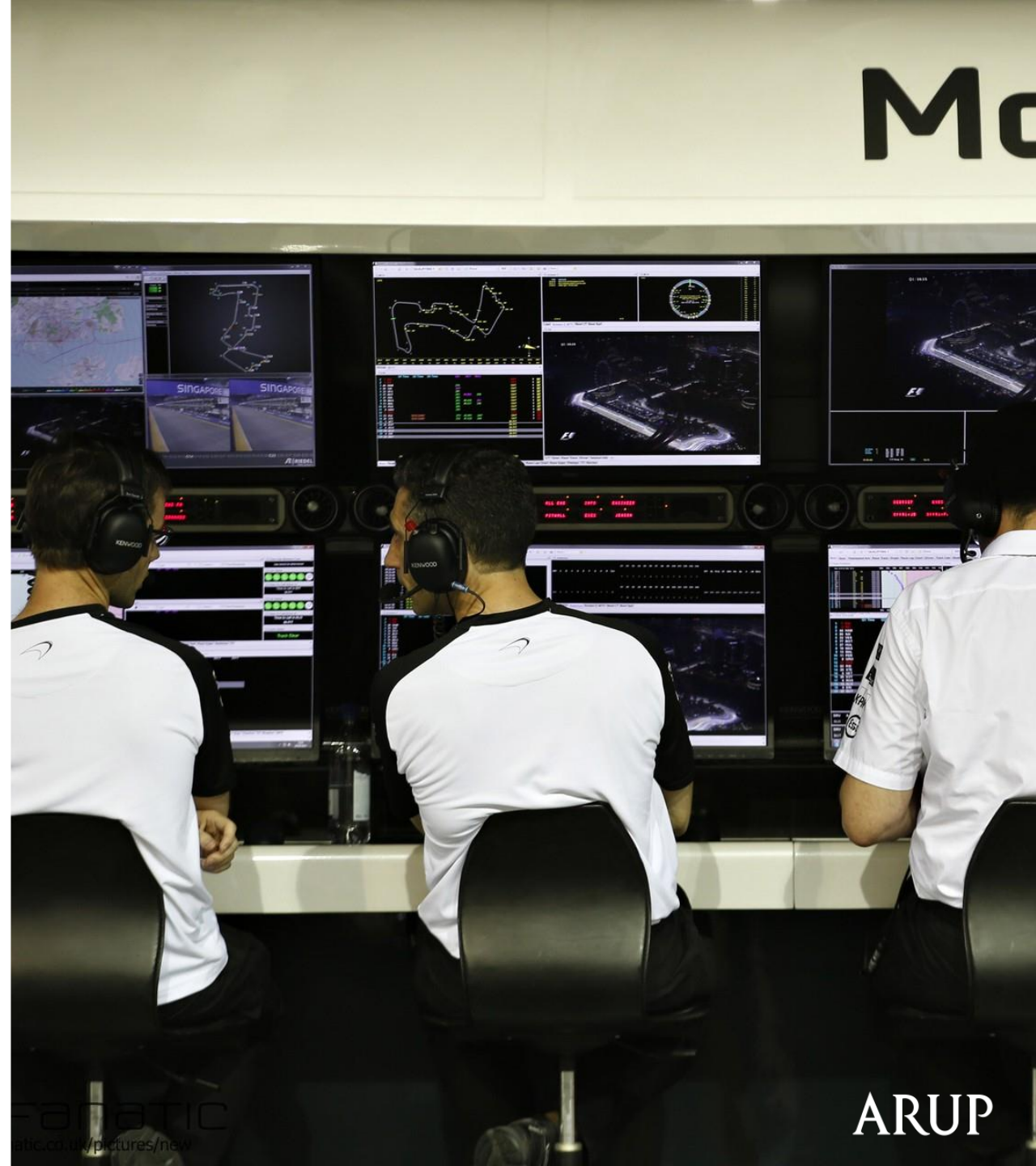


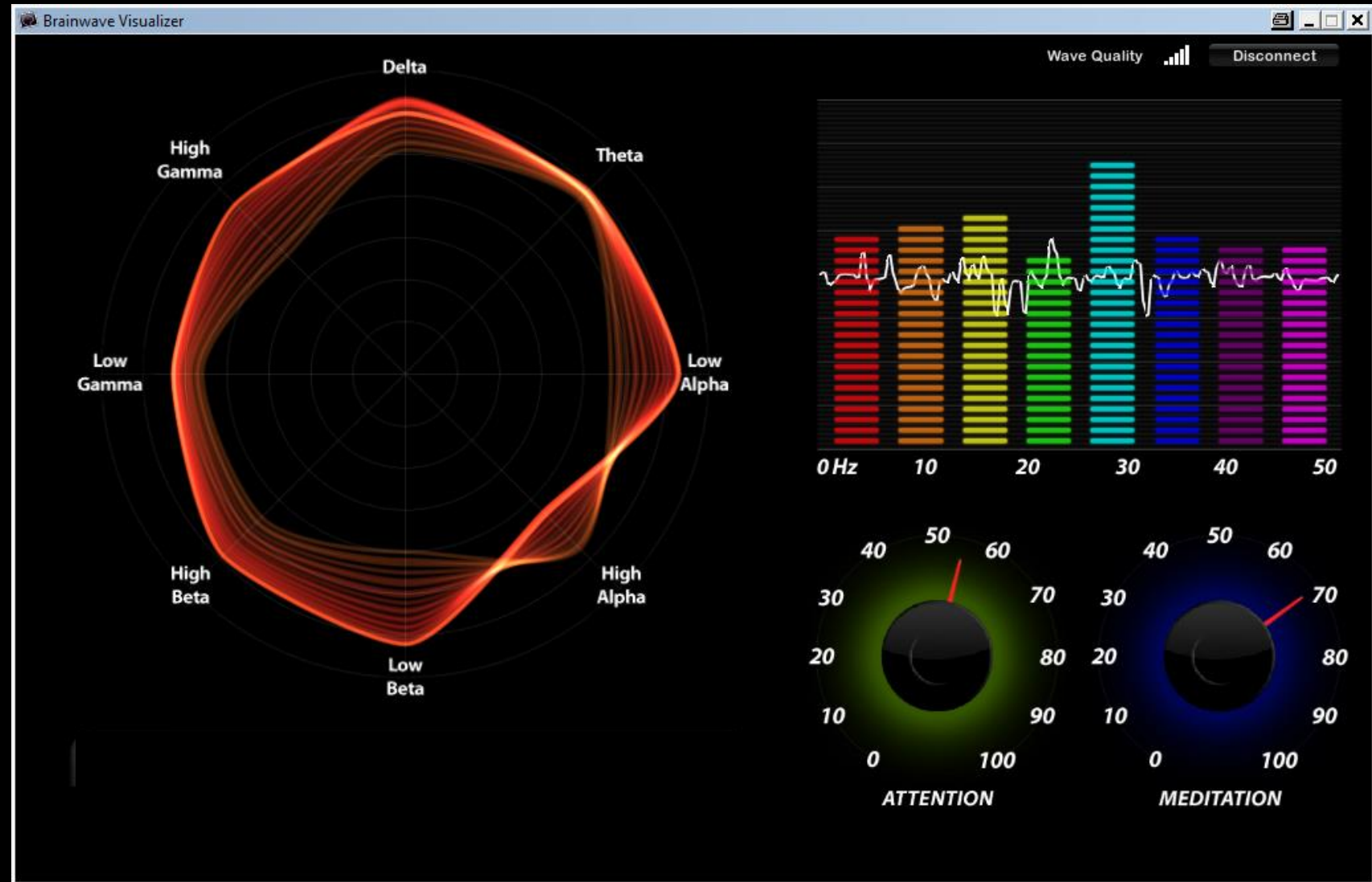
AmplifySoundLab



ARUP SoundLab









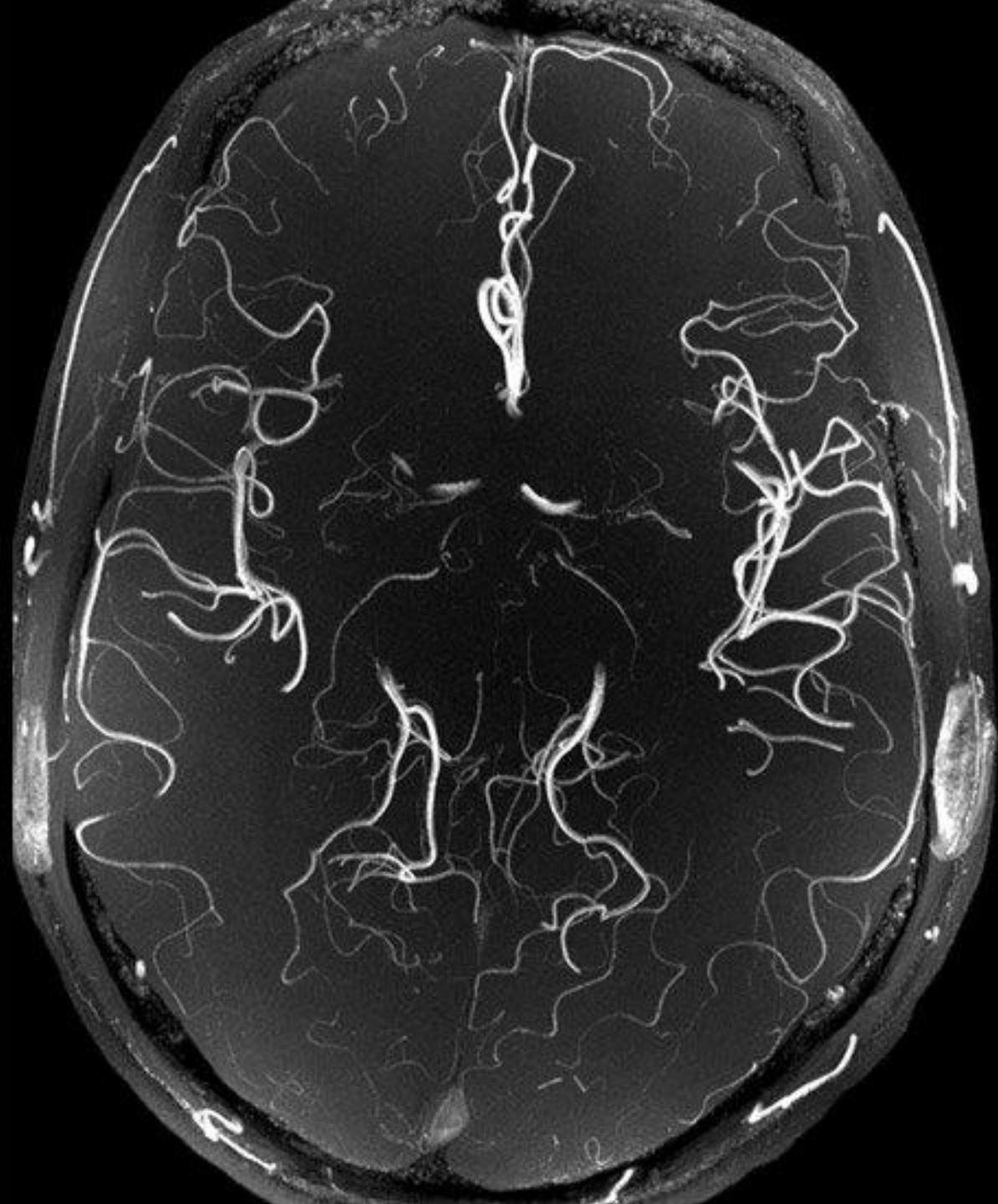
VR + wearables

rapid prototyping

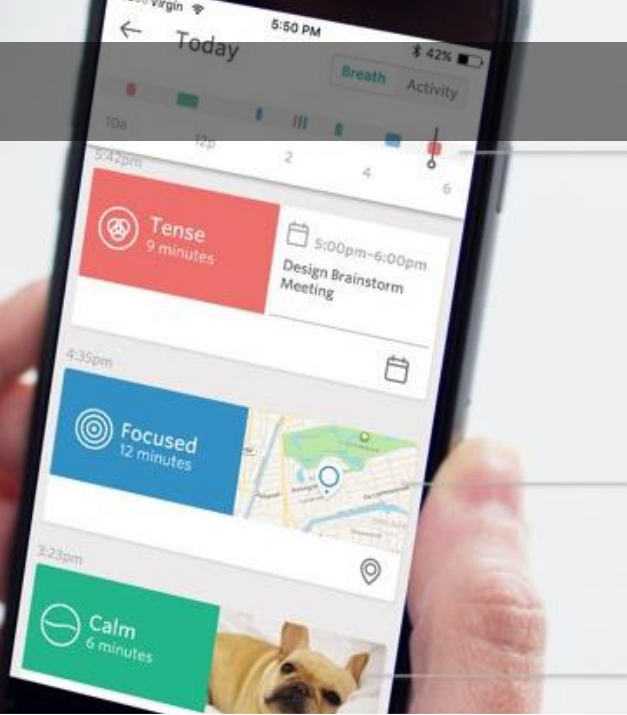
de-risking design

co-design

[>PLAY VIDEO]



EVOLVING HEALTH INSIGHTS



SPIRE - MINDFULNESS



THERMOS - HYDRATION



SUNSPRITE - LIGHT

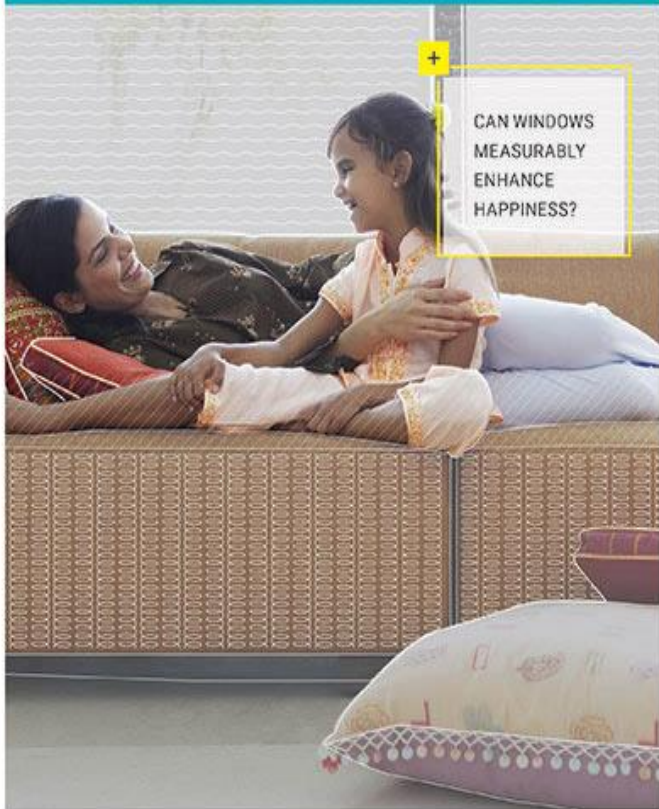


HEALBE GOBE - NUTRITION

ARUP

+

THE SCIENCE BEHIND A HEALTHIER INDOOR WORLD.



+

CAN WINDOWS
MEASURABLY
ENHANCE
HAPPINESS?



air



water



nourishment



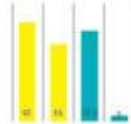
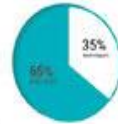
light

The Well Living Lab
is setting out to change
how people live, work
and play indoors.



+

CAN A CERTAIN TYPE
OF LIGHT ACTUALLY
SHARPEN EYESIGHT?



The first lab exclusively
committed to researching the
real-world impact of the indoor
environment on human health.



Indoor health
begins here.



We spend over
90%
of our time indoors

We're driving innovation from the inside out.



fitness



comfort

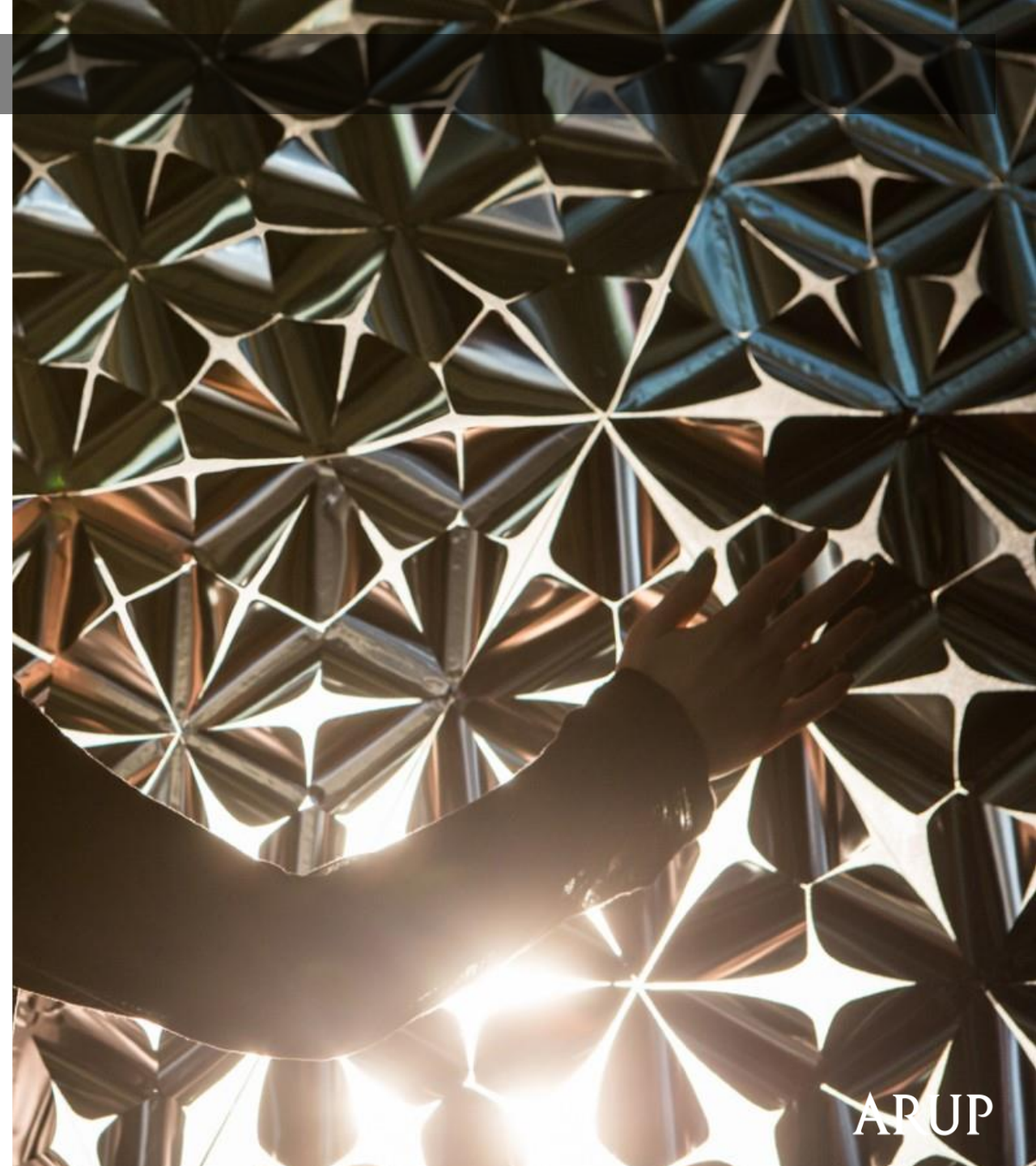


mind

ARUP

DIGITAL BUILDINGS

RESPONSIVE, CONSCIOUS ARCHITECTURE



APUP

A TAILORED EXPERIENCE



THE EDGE, NL: OVG / DELOITTE

ARUP

PERSONALISED RELAXATION



REAL-TIME ASSET HEALTH



Ask Arup.



THANK YOU