INTERNATIONAL WELL BUILDING INSTITUTE™

Air Quality & Energy

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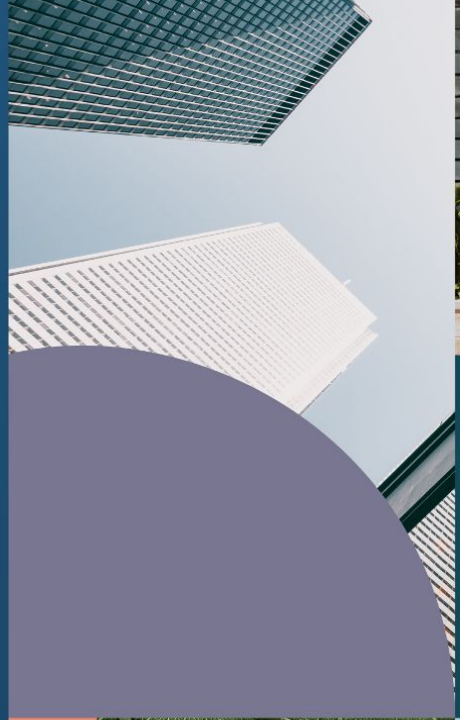
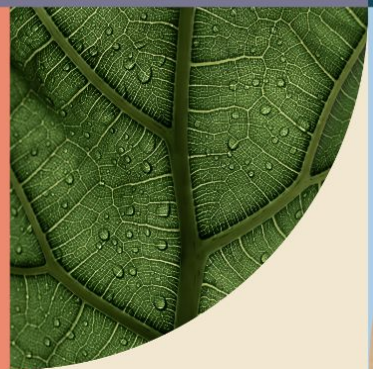
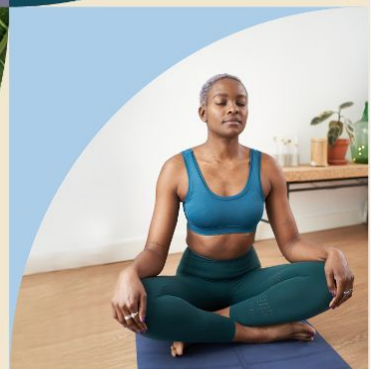
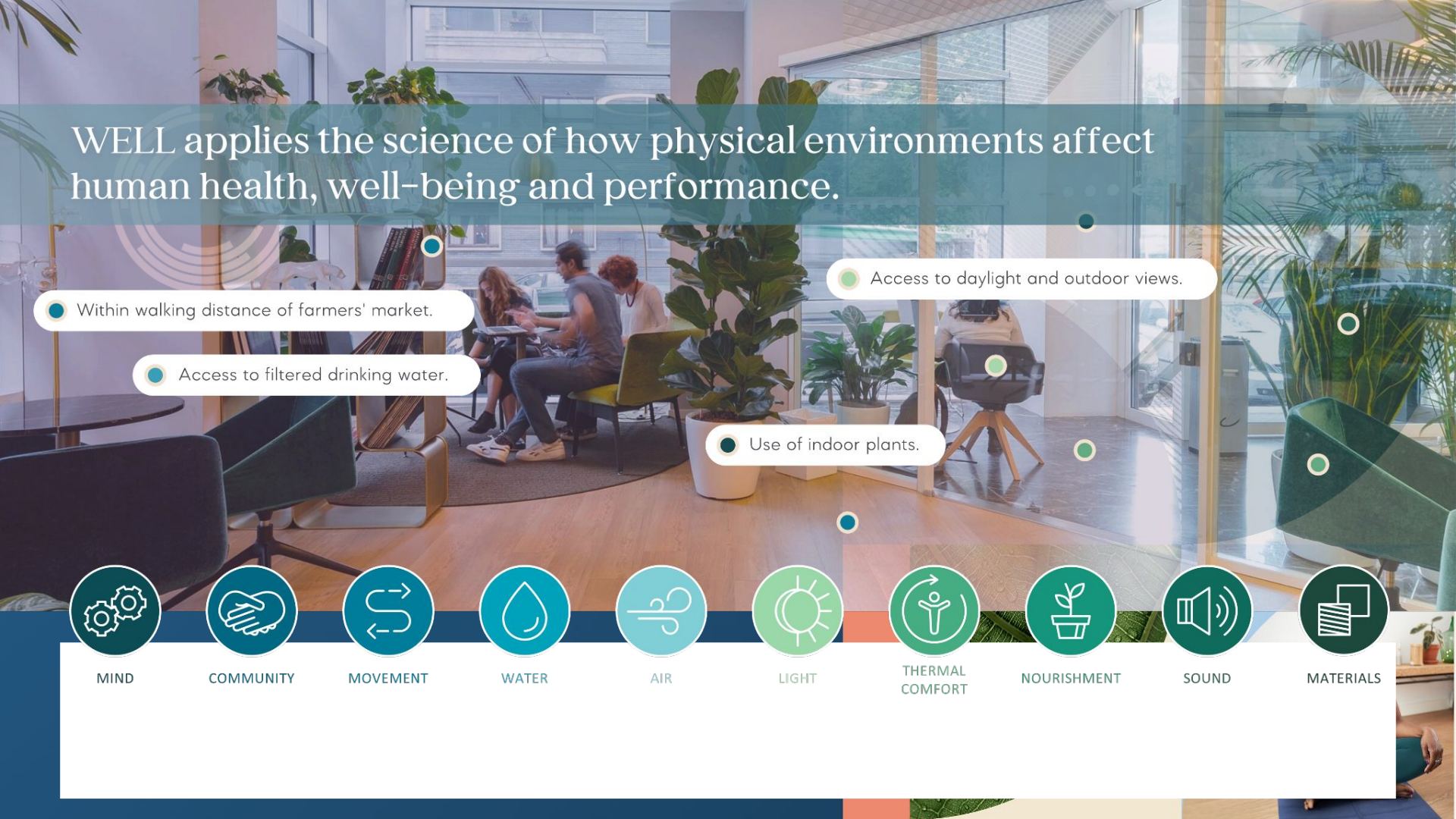







WELL applies the science of how physical environments affect human health, well-being and performance.
Within walking distance of farmers' market.
Access to filtered drinking water.
Access to daylight and outdoor views.
Use of indoor plants.
MIND
COMMUNITY
MOVEMENT
WATER
AIR
LIGHT
THERMAL COMFORT
NOURISHMENT
SOUND
MATERIALS

CATALYZING GLOBAL ADOPTION

WELL is the world's largest certification and ratings platform for healthy buildings

5.62B+
square feet

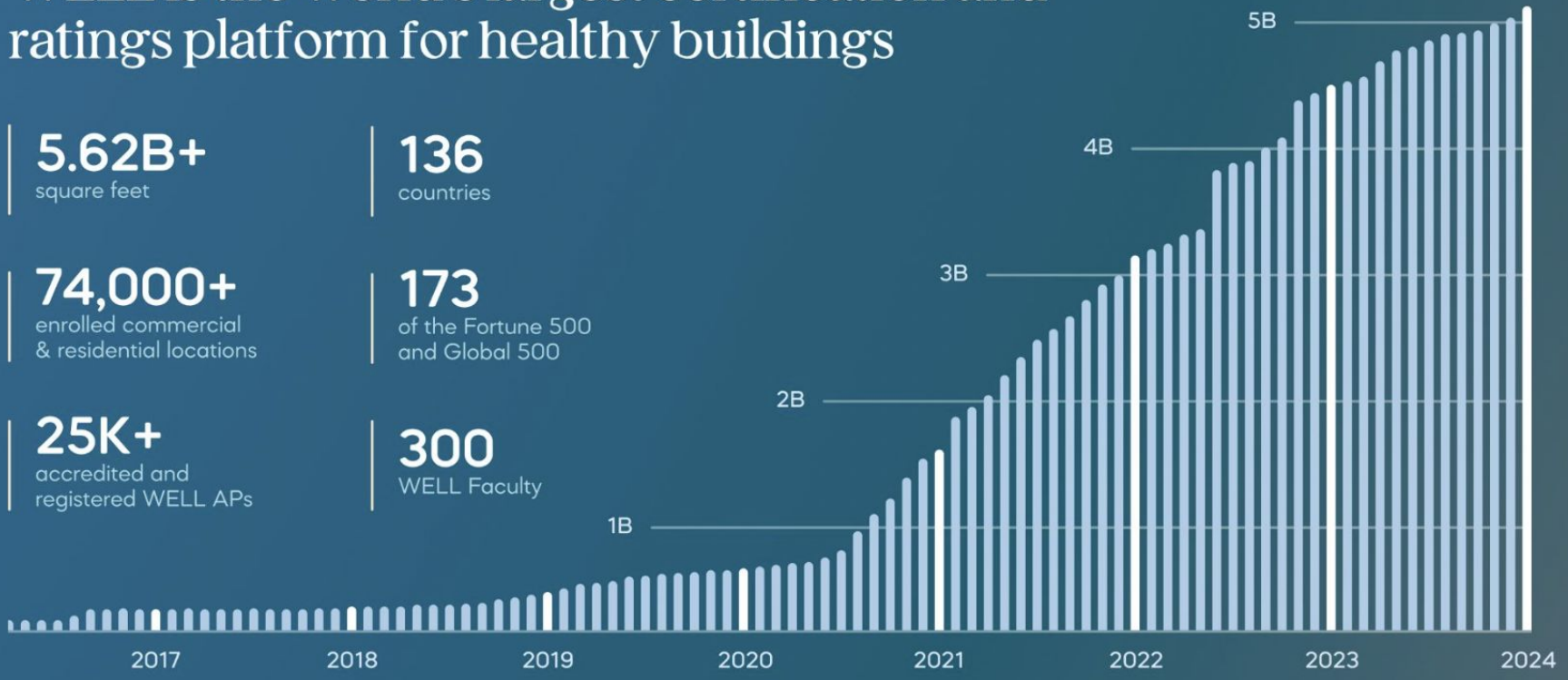
136
countries

74,000+
enrolled commercial & residential locations

173
of the Fortune 500 and Global 500

25K+
accredited and registered WELL APs

300
WELL Faculty



Data as of September 2024

AIR

- P A01 Air Quality
- P A02 Smoke-Free Environment
- P A03 Ventilation Design
- P A04 Construction Pollution Management
- 4 Pts A05 Enhanced Air Quality
- 3 Pts A06 Enhanced Ventilation Design
- 2 Pts A07 Operable Windows
- 2 Pts A08 Air Quality Monitoring and Awareness
- 2 Pts A09 Pollution Infiltration Management
- 1 Pt A10 Combustion Minimization
- 1 Pt A11 Source Separation
- 1 Pt A12 Air Filtration
- 1 Pt A13 Enhanced Supply Air
- 1 Pt A14 Microbe and Mold Control

WELL Strategies Energy Use

"According to the further quantitative analysis, individual WELL features would have an energy impact of between +9% (energy penalty) to -11% (energy saving). When combining all of the 'energy penalty features' and 'energy saving features', the result led to 53-78% more annual energy use and 20-28% energy saving, respectively depending on the climate."

Right-sizing Outdoor Air Filters

CONCEPTS / AIR / FEATURE A12 **OPTIMIZATION**

Air Filtration

1: Filtration levels

The following requirement is met:

a. Media filters are used in the ventilation system to filter outdoor air supplied to the space, in accordance with thresholds specified in the table below:[5,6]

Annual Average Outdoor $PM_{2.5}$ Threshold	Average Air Filtration Efficiency (particles 0.3-1 µm)
23 µg/m³ or less	≥ 35% (e.g., MERV 12 or M6)
24–39 µg/m³	≥ 75% (e.g., MERV 14, F8 or ePM1 75%)
40 µg/m³ or greater	≥ 95% (e.g., MERV 16, E10 or ePM1 95%)

Selecting Ventilation Air Filters to Reduce $PM_{2.5}$ Of Outdoor Origin

BY BRENT STEPHENS, PH.D., ASSOCIATE MEMBER ASHRAE; TERRY BRENNAN, MEMBER ASHRAE; LEW HARRIMAN, FELLOW ASHRAE

ASHRAE Standards 62.1 and 62.2 specify minimum ventilation rates, minimum requirements for HVAC particle filtration efficiency, and other measures intended to provide acceptable indoor air quality (IAQ) in commercial and residential buildings. Although the minimum requirements are designed to address both indoor and outdoor sources of airborne pollutants, highly polluted outdoor air presents a challenge to providing clean outdoor air to meet ventilation needs in many parts of the world.

Demand Controlled Ventilation

CONCEPTS / AIR / FEATURE A06 **OPTIMIZATION**

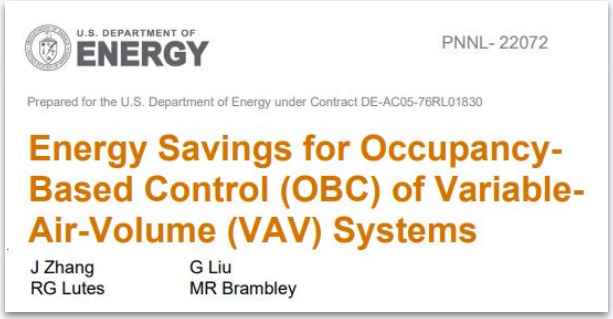
Enhanced Ventilation Design

Option 2: Demand control ventilation

For mechanically ventilated buildlings, the following requirements are met in at least 90% of regularly occupied spaces:

a. A demand-controlled ventilation (DCV) system regulates the outdoor air ventilation rate to keep CO_2 levels less than the thresholds specified in the table below, at the maximum intended occupancy:

Tier	Threshold		Threshold	Points
1	900 ppm	OR	500 ppm above outdoor levels	1
2	750 ppm	OR	350 ppm above outdoor levels	2


U.S. DEPARTMENT OF ENERGY

PNNL- 22072

Prepared for the U.S. Department of Energy under Contract DE-AC05-76RL01830

Energy Savings for Occupancy-Based Control (OBC) of Variable-Air-Volume (VAV) Systems

J Zhang, RG Lutes, G Liu, MR Brambley

"At a national scale, the construction-volume-weighted average energy savings are 17.8% for OBC using advanced occupancy sensors and 5.9% using common occupancy sensors."

Displacement Ventilation

CONCEPTS / AIR / FEATURE A06 **OPTIMIZATION**

Enhanced Ventilation Design

Option 1: Displacement ventilation system

The project uses a displacement ventilation system in at least 90% of regularly occupied spaces, with one of the following as a basis for design:

a. ASHRAE Guidelines RP-949.[9]

b. ASHRAE 62.1-2019, "Stratified Air Distribution Systems (Section 6.2.1.2.1).[10]

c. REHVA Guidebook No. 01 (Displacement Ventilation in non-industrial premises).[11]

ELSEVIER

Journal of Building Engineering

Volume 96, 1 November 2024, 110474

Displacement ventilation: A systematic review of the interactions with indoor environment and simplified modelling approaches

Giacomo Tognon, Angelo Zarrella

"Regarding cooling energy demand, displacement ventilation has more saving potential than mixing ventilation since a lower supply flow rate and higher supply temperature are required for the same IAQ and thermal comfort level in the occupied zone."

Ultraviolet Irradiation

CONCEPTS / AIR / FEATURE A14 OPTIMIZATION

Microbe and Mold Control

1: UV system design

The following requirements are met:

a. All central air handling units use ultraviolet lamps to irradiate the surfaces of the cooling coils and drain pans.[10]

b. All cooling coils and drain pans not associated with central air handling units (e.g., those used in fan coil units or supplementary air handling units) either:

1. Are irradiated by ultraviolet lamps.
2. May be opened for inspection for mold growth and cleaned, if necessary.

Science and Technology for the Built Environment ›
Volume 24, 2018 - Issue 6
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Original Articles

Field measurement and modeling of UVC cooling coil irradiation for heating, ventilating, and air conditioning energy use reduction (RP-1738)—Part 1: Field measurements

Joseph Firrantello, William Bahnfleth & Paul Kremer

Pages 588-599 | Received 03 Jan 2017, Accepted 19 Oct 2017, Published online: 11 Dec 2017
Cite this article https://doi.org/10.1080/23744731.2017.1402662 Check for updates

"In two field studies, UVGI coil irradiation reduced airside pressure drop and increased UA of cooling coils with degraded performance due to biofouling, though the magnitude of the improvement varies.

Results of this study support longstanding industry claims that UVGI cooling coil treatment can decrease pressure drop and increase heat-transfer coefficient."

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