

Healthy Buildings

**How Green Building Can Improve Employee
Comfort, Health, and Productivity**

- 1. WELL Building**
- 2. The Business Case for Healthy Buildings**
- 3. The Story of 222 Laporte**



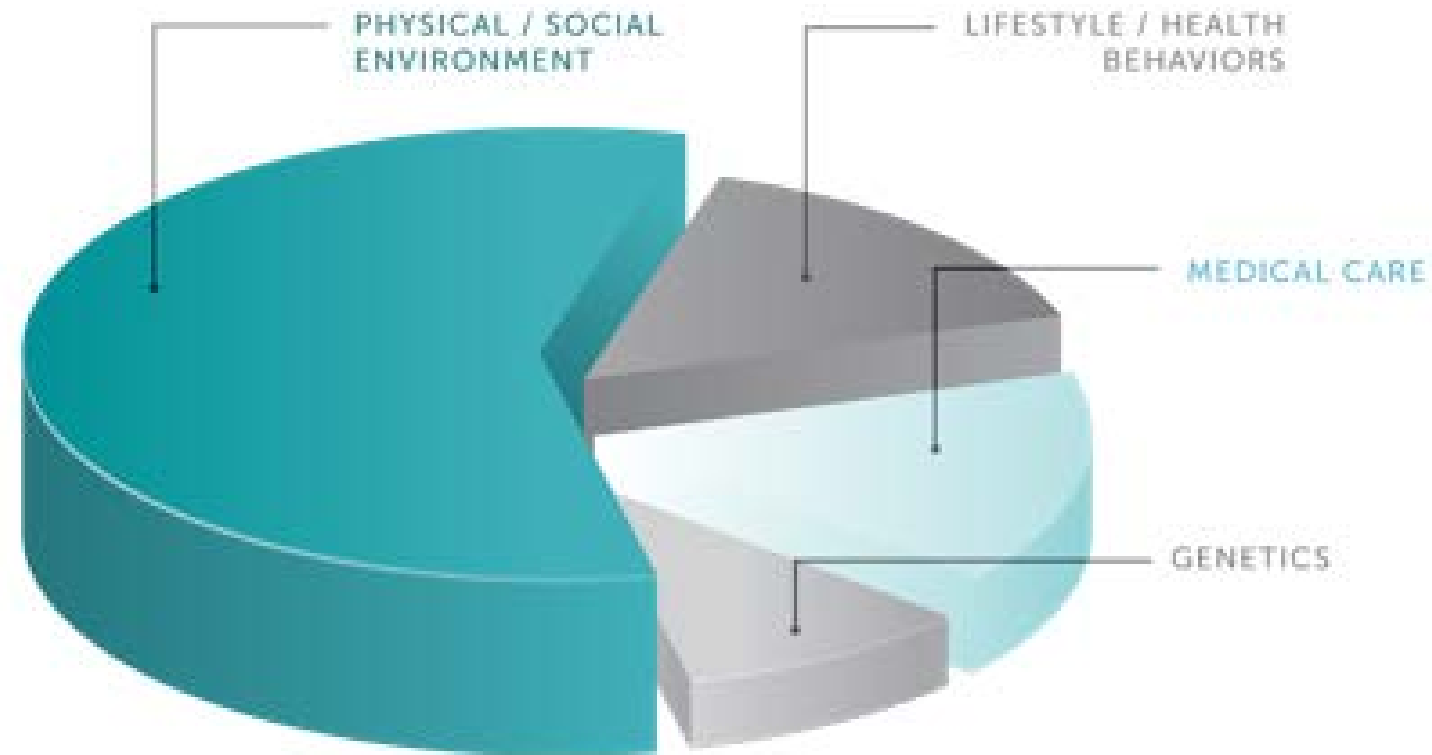
THE WELL BUILDING STANDARD





**WE SPEND ABOUT 90% OF
OUR TIME INDOORS.**

WHAT DETERMINES THE STATE OF HEALTH?



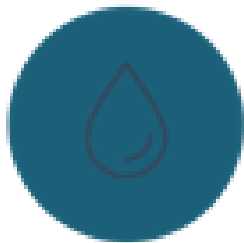
Source: Centers for Disease Control and Prevention, Frequently Asked Questions, 2014. Available online at: <http://www.cdc.gov/nchs/dsp/socialdeterminants/faq.html>

A COMPREHENSIVE APPROACH TO WELL-BEING

The WELL Building standard is made up of features that address seven concepts:



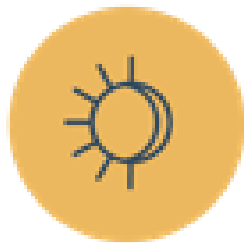
AIR



WATER



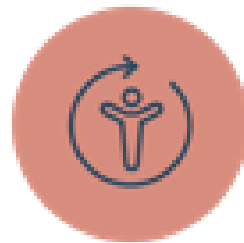
NOURISHMENT



LIGHT



FITNESS



COMFORT



MIND

“

WELLNESS: THE NEXT TRILLION DOLLAR INDUSTRY

MCKINSEY & COMPANY

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WELL AT WORK

50% of U.S. employers with 50 or more employees, or 3/4 of the workforce, offer wellness promotion initiatives.¹

49% of U.S.-based companies say health and productivity program are essential to their company strategy.²

*Within the next 3-5 years, we can expect 99% of employers to offer health improvement and wellness programs.³

1. Workplace Wellness Programs Study, 2013 Randi Corporation.

2. The Business Value of a Healthy Workplace: Saying@Work™ Survey Report, 2013/2014, Dream Wellness.

3. Aon Hewitt 2013 Healthy Case Survey Aon plc.





WELL AT WORK: Benefits

FOR EMPLOYEES AND CLIENTS:

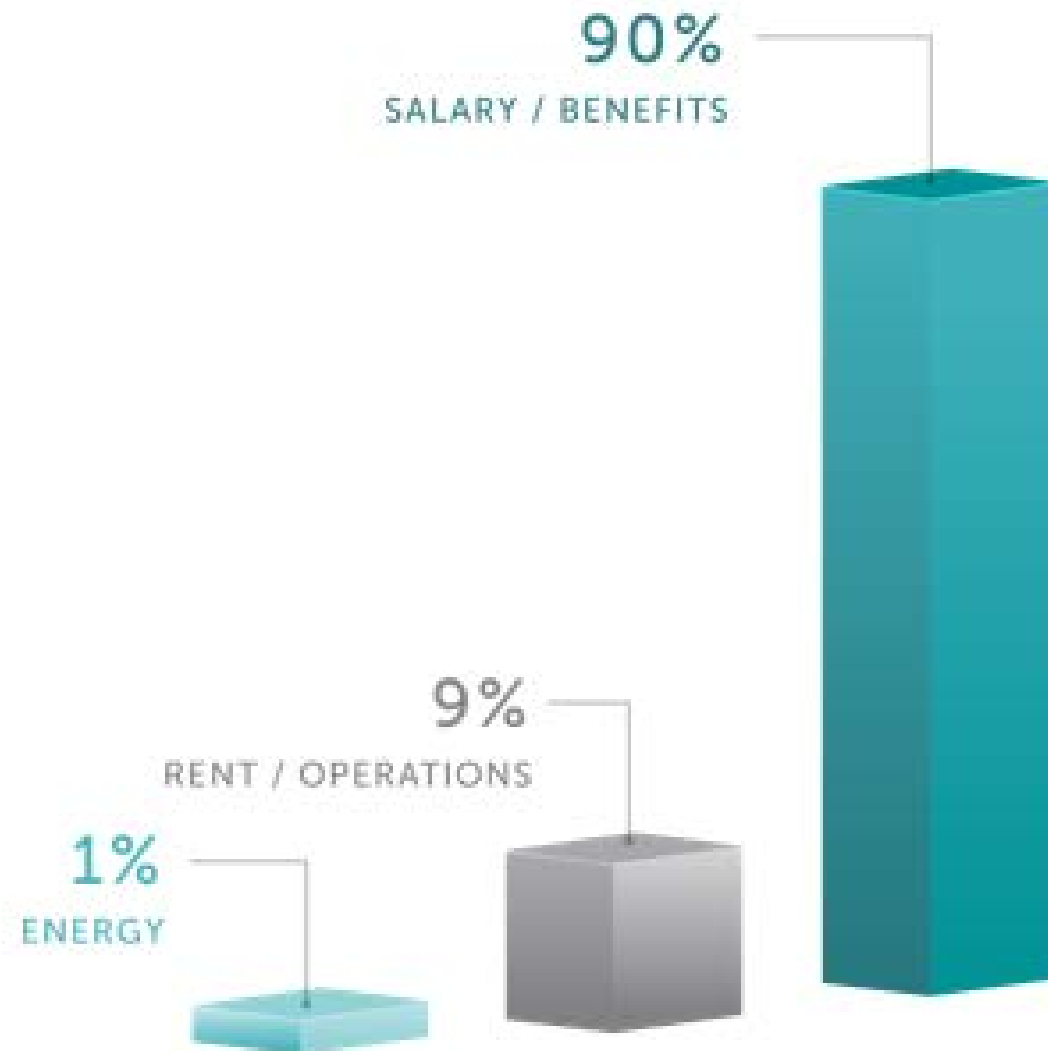
- Health-focused environment
- Increased productivity
- Improved satisfaction and happiness at work

FOR COMPANY:

- Attract and retain top talent, clients and investors
- Promote health to 100% of employees through WELL features
- Return on investment
- Lead the industry

INVEST IN PEOPLE FOR RETURN ON INVESTMENT

Source: Kroll Workplace Research "What's Good for People: Moving from Well-lives to Well-Being", Kate Lister 2004. Studies include those conducted by organizations including Harvard Business Review and World Economic Forum and the American Journal of Health Promotion. Image courtesy of World Green Building Counsel Report "Health, Wellbeing & Productivity in Offices".



OWNERS VIEW THESE AS THE TOP BENEFITS OF HEALTHY BUILDINGS:



Positive impact on
building value



Positive impact on
building leasing rate



Positive impact on
occupant satisfaction

Health Benefits

Type of Energy Related Work	Reduced Respiratory Risks	Reduced Other Health Risks	Reduced Emergency Dept. Visit or Hospitalization*	Improved Indoor Air Quality
Core Energy Efficiency (6 studies)	Asthma COPD Bronchitis <i>Nasal allergies</i>	Colds Headaches Hypertension Sinusitis Thermal Stress Overall Health Mental health	Asthma Other Respiratory	Moisture Condensation VOCs <i>Formaldehyde Radon</i>
Enhanced Energy Work (7 studies)	Asthma	Hypertension		Moisture/Mold Dust Allergens Particulates Acetaldehydes
Ventilation (9 studies)	Asthma	Lung cancer (predicted)		Moisture Formaldehyde Radon NO ₂ , CO ₂

Italics: decreased air quality

Other supplemental services can also produce improvements: (wood stove replacements, room HEPA air cleaners, gas to electric stove replacement)

The Impact of Well-Being on Costs and Organizational Performance

Greater well-being results in lower costs and increased productivity

+10%

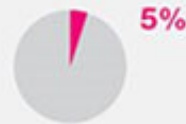
increase in well-being
was associated with



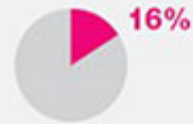
↑ increase in
job performance



↑ more "best work"
days per month



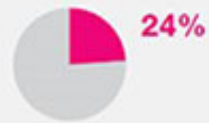
↓ fewer unscheduled
absences



↓ fewer ER
visits



↓ decrease in
hospital admissions



↓ lower
presenteeism

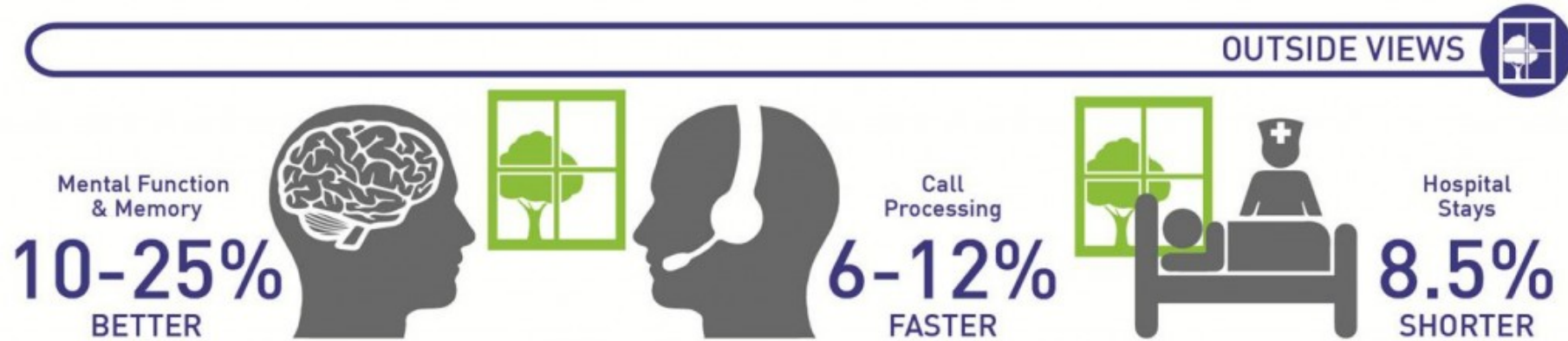


↓ lower
medical costs



↓ lower
prescription costs

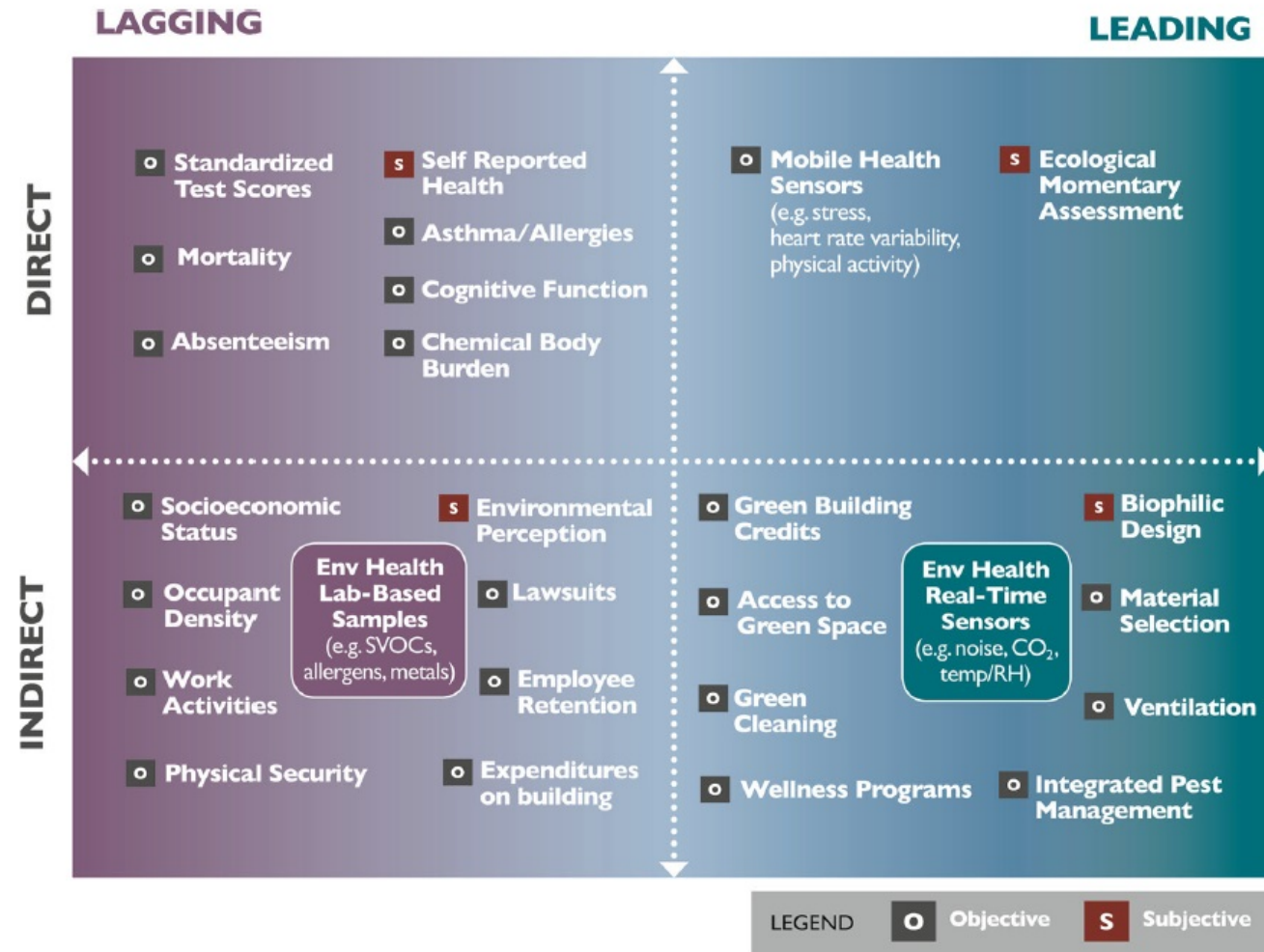
Health Benefits



Health Performance Indicators

HPIs: quantifiable measures of human health, productivity and well-being

- Direct or indirect
- Leading or lagging
- Objective or subjective





INSIGHTS From the New Fort Collins Utilities Office Building



COMFORT

Features:

- Year-round thermal comfort and indoor air quality
- 90% of occupant spaces with daylight and views
- Individualized, customizable workstations
- LED task lights, adjustable window shades, personal fans
- Collaboration and flex spaces



Change of Satisfaction: Building Features



Project Summary

222 Laporte Ave.
37,500 sq. feet
\$387/sq. foot
Integrated design & construction process

Completed 2016
Owner: City of Fort Collins
Architect: RNL Design, [au]workshop
Contractor: Adolfson + Peterson



EFFICIENCY

Targets & Performance:

- ✓ EUI: 32.9 kBtu/sf/yr & 30.8 actual
- ✓ LEED Platinum V4
- ✓ ENERGY STAR® score of 100
- ✓ Water use reduced indoor 45%/outdoor 65%

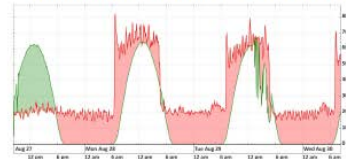
Features:

- Building shape & orientation optimizes daylighting
- High-performance envelope and windows
- Distributed heat pumps, energy recovery ventilation
- Daylighting & efficient LED lighting
- High-efficiency building transformers
- Detailed energy monitoring & continuous commissioning
- Low water use landscaping
- Low Impact Development rain gardens

Site Energy Breakdown (kBtu/sf/yr)



Building Demand and PV Production



CHARACTER

Art in Public Places – telling Utilities' story

Google "Butterfly Building" renovation

Repurposed bricks from creamery that once stood on the site



- Ventilation
- Low emissions materials
- Interior active circulation
- Daylight and window access
- Glare control



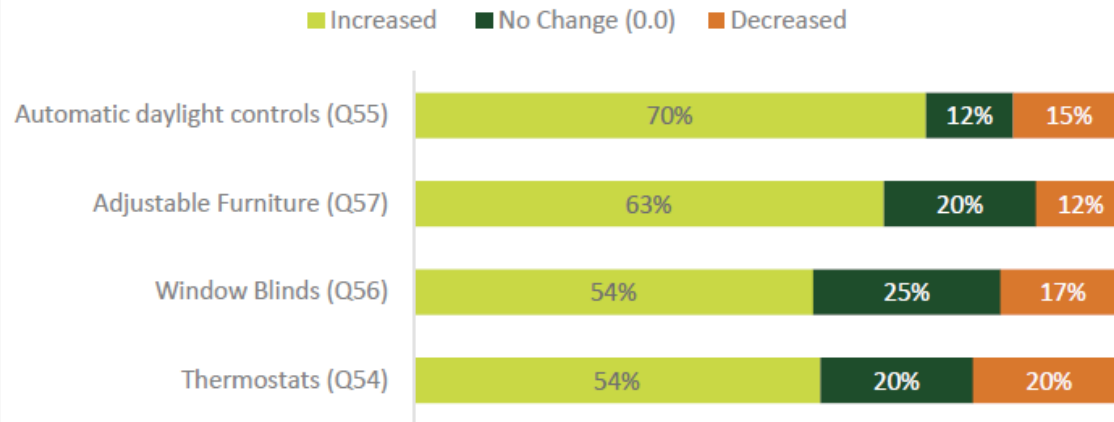
Goals of the survey:

- Determine impacts of green building and open office on employee productivity, comfort, health, and well-being
- Identify opportunities for improvement
- Develop estimates for financial benefits of green building
- Inform future City facility design and renovation

Survey steps

- Seven different buildings
- Pre-occupancy in September 2016
- Post-occupancy in March-April 2017
- Pre – 85 responses, 35 in control
- Post – 79 responses, 16 in control
- IBE completed analysis in July 2017

Change of Satisfaction: Building Features Summary Graph



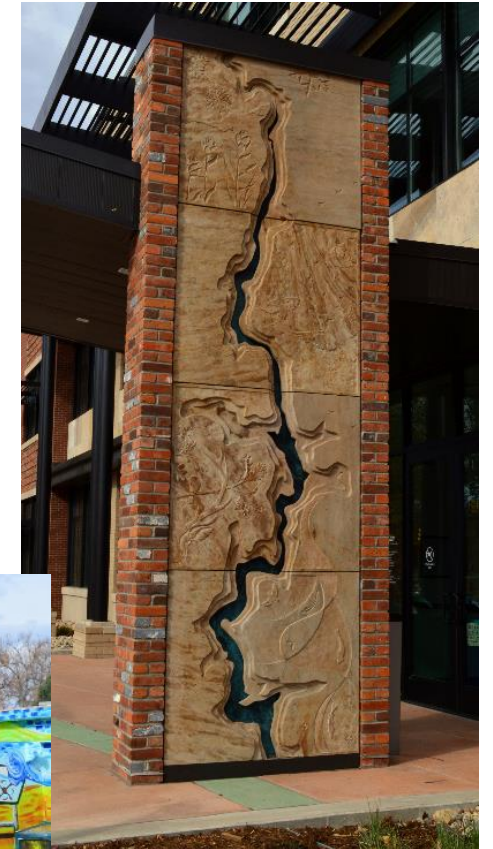
11. Do you have a view to the outdoors from your workspace?

	Pretest (Percent)	Posttest (Percent)
No, I cannot see outside	33.3	3.3
Yes, I can see a window but don't have a full view outside	11.7	28.3
Yes, I have a view of buildings	38.3	65.0
Yes, I have a view of nature	26.7	55.0

12. How much natural light do you receive in your workspace?

	Pretest (Percent)	Posttest (Percent)
No natural light	25.0	0.0
Minimal	36.7	10.0
Enough	26.7	63.3
Too much	8.3	26.7





Survey results

- Significant improvements in perception of air quality, lighting, thermal comfort, and general wellbeing.
- Declines in acoustic comfort and privacy

	7.1%	Lighting		0.333		2.4%
	1.8%	Ventilation		1		1.8%
	1.2%	Thermal		1		1.2%
	10.1%	Sub-Total				5.4%Sub-Total
		Less Acoustic				Less Acoustic
Total Personnel Cost	\$	9,158,688				
Total Salary	\$	6,938,400			Total benefits	\$ 372,197
Avg Salary	\$	58,800				
Avg Benefits	\$	18,816				
Occupants		118				
Square Footage		37,500				
Salary per Square Foot	\$	185.02				

- People like green, open offices are more debatable
- Questions about when to do second survey
- Many of the acoustic issues have been mitigated
- Open offices require more planning, not less
- Communication about design intent and goals is critical, before and after the move

Questions?

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