



City of Dallas

Green Building Code Update Options

**Environment & Sustainability
Committee
February 7, 2022**

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Informational briefing on efforts to answer the question:

“How can we update our City project specifications to be consistent with the CECAP net zero goals moving forward?”

Paris Smart City 2050, copyright [Vincent Callebaut Architectures](#)

Overview

- Related CECAP Targets/Goals
- Existing “Green” Policies
- Net Zero Energy 101
- Opportunities Moving Forward
- Next Steps
- Questions



GREENHOUSE GAS EMISSIONS



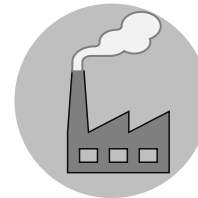
64%

Buildings + Energy



34%

Transportation



3%

Industrial processes



1%

Solid waste + wastewater treatment



CECAP: Target Overview



NET ZERO ENERGY NEW CONSTRUCTION

ENERGY USE IN EXISTING RESIDENTIAL BUILDINGS



SOLAR POWER GENERATED

RENEWABLE ELECTRICITY PLANS



PUBLICLY AVAILABLE EV CHARGING

ELECTRIC FLEETS

SINGLE OCCUPANT VEHICLE TRAVEL MODE SHIFT



ORGANIC WASTE

PAPER WASTE

LANDFILL DIVERSION



WATER CONSUMPTION

WATER FOR INDIRECT REUSE

IMPAIRED WATERBODIES LISTED IN WATERSHED

GHG EMISSIONS FROM TREATMENT FACILITIES



CANOPY COVER CITYWIDE

URBAN HEAT ISLAND INDEX

PARK OR TRAIL ACCESS



HEALTHY, AFFORDABLE FOOD ACCESS

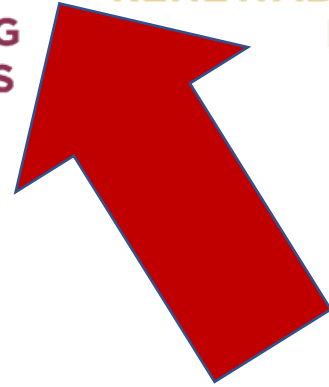
ACRES OF URBAN GARDENS

RESTAURANTS, FARM STANDS, OR MARKETS SOURCING FROM LOCAL PRODUCERS



GROUND LEVEL OZONE

AIR POLLUTANTS





GOAL 1: DALLAS' ***BUILDINGS*** ARE ENERGY EFFICIENT AND CLIMATE RESILIENT.

16

Objectives

- Increase energy efficiency of **existing buildings** or facilities.
- Ensure that **new buildings** are constructed sustainably and are carbon neutral.
- Increase **climate resilience** for new and existing buildings through structural and operational improvements.

Targets

Net zero energy new construction

- 100% starting in 2030

Energy use in existing residential buildings

- 10% of existing buildings reduce energy use 10% by 2030
- 10% of existing buildings reduce energy use 25% by 2030



Key Planned Action: Zero Net Energy Code for Buildings



- *B12: “Update Building Code to include zero net energy code for all new buildings and substantial renovations by 2030”*
- Goal builds on original Dallas Green Building Code goal from 2008 for Net Zero by 2030....
- Dallas Green Building ordinance builds on work from the Dallas Green Building Program that was begun in 2003.



Vickery Park Branch Library – 43+ KW Solar



Existing “Green” Policies

- Environmental Policy (2005)



Green Building Policy (2003, 2008, 2012, 2016)

- Cool Roof Policy (2012)
- Complete Streets (2016)
- Update to Tree & Landscape Ordinance (Article X), (2018)
- Green Energy Policy (2019)
- Updates to City Paving/ Drainage Criteria (2019).....
- CECAP (2020)
- Sustainable Procurement (2021)



Existing “Green” Building Policy



- Adopted 2008; updated in 2012, 2015
- Chapter 52 Admin procedures for Construction Codes
- Chapter 53, Dallas Building Codes
- Chapter 57 Dallas One- and Two- Family Dwelling Codes (Water Conservation)
- Chapter 61 of the Dallas City Code
- Adopted in 2008; updated in 2012 and 2016
- Generally based on International Green Construction Code of the International Code Council (2012/ 2015)



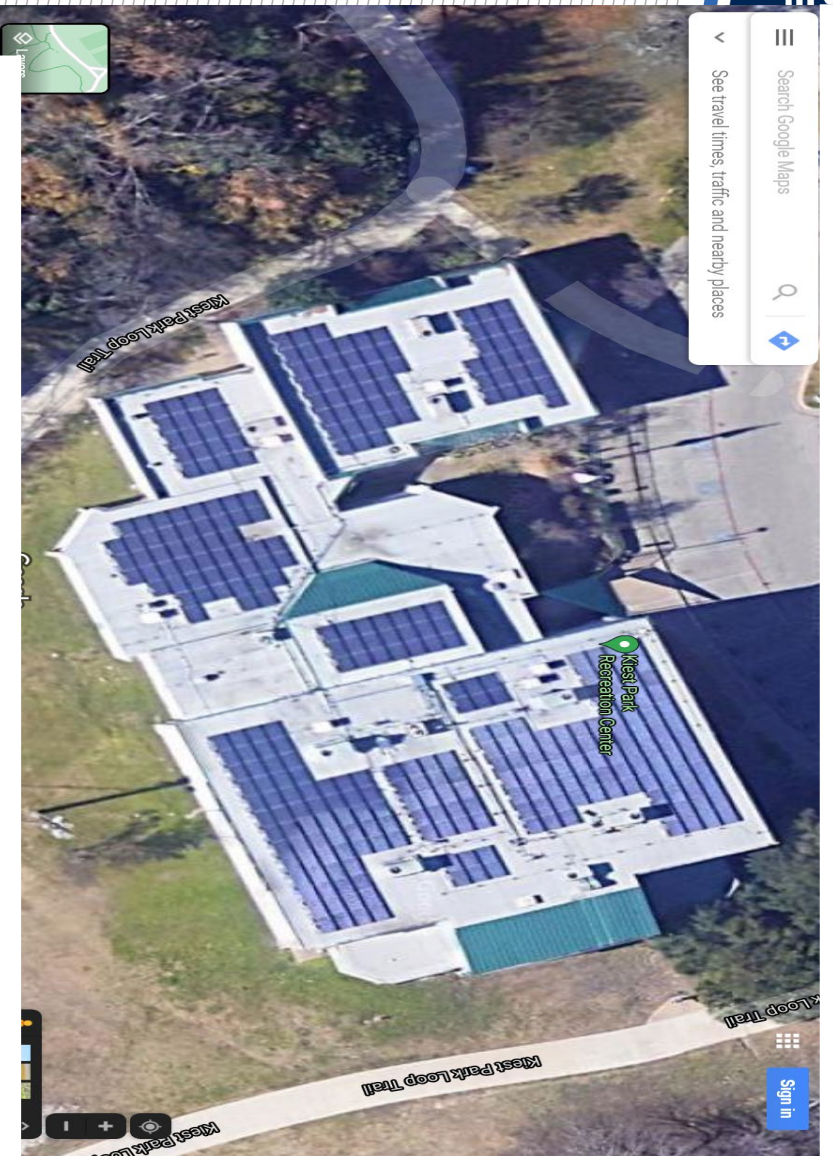
Existing “Green” Building Policy in a Nutshell

- “Certifiable” under LEED Programs, Green-Built Texas or an equivalent Green Building standard
- Energy efficiency per ASHRAE 189.1-2011/ 2014
- LEED silver or higher certification: expedited review
- Water Conservation measures of Green-built Texas, LEED NC, LEED CS, LEED CI
- Minimum requirements of ICC 700 (2015)
- Indoor Air Quality Testing
- Cool Roof for Commercial <50,000 sf (white, cool, or vegetated)



Existing “Green” Building Policy (Cont’d)

- Minimum 50 percent post-consumer recyclable materials
- Energy Star Benchmarking per EPA
- Greenfields requirements
(Buffers to protect open space)



Kiest Recreation Center



Existing “Green” Roofing Policy

- Cool Roof required for buildings > 10,000 square feet
- Reflective Coating (minimum)
- Location for Photovoltaics
- Potential for storage (“Blue Roof”)
- Green Roofs
 - Local roofer has developed 4-inch vegetative roof section for Texas exposure (less weight + heat resistance)

US Federal Reserve Bank Dallas' Trinity River Audubon Center; Perot Museum of Natural History, SWA Architects

Antoine Predock

Dallas Morning News



Recent City Examples:



Singing Hills Recreation Center



Vickery Park Branch Library

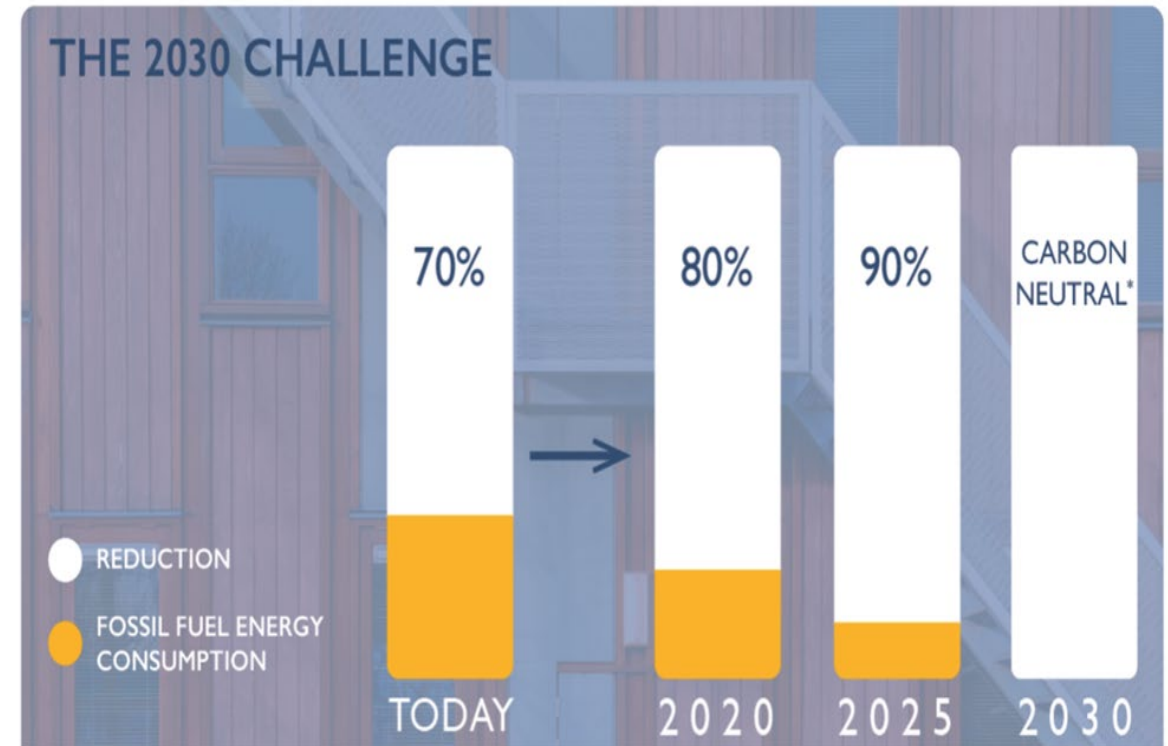


AIA Architecture 2030 Challenge



The American Institute of Architects created the [2030 Commitment Program](#) in 2006, basically challenging architects to holistically respond to the climate crisis. Over 400 A/E/P firms have adopted this Commitment.

- **Establishing an Energy Use Intensity (EUI) baseline and target.**
- **Applying low/no cost passive design strategies** to maximize energy efficiency
- **Integrating energy efficient technologies and systems.**
- **Incorporating on-site and/or off-site renewable energy** to meet the remaining energy demands.
- **Performing iterative energy modeling** throughout the design to assess progress towards meeting the EUI target.



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Net Zero Energy 101



- Working Definitions
- Suggested Application(s)
- Sustainable Procurement



Working Definitions



- **Net Zero Building**: “an energy-efficient building where the annual delivered energy is less than or equal to the on-site renewable energy exported.”
- Net Zero energy buildings typically combine energy efficiency and renewable energy to result in net zero energy consumption over the course of a year.”
 - U.S. Department of Energy



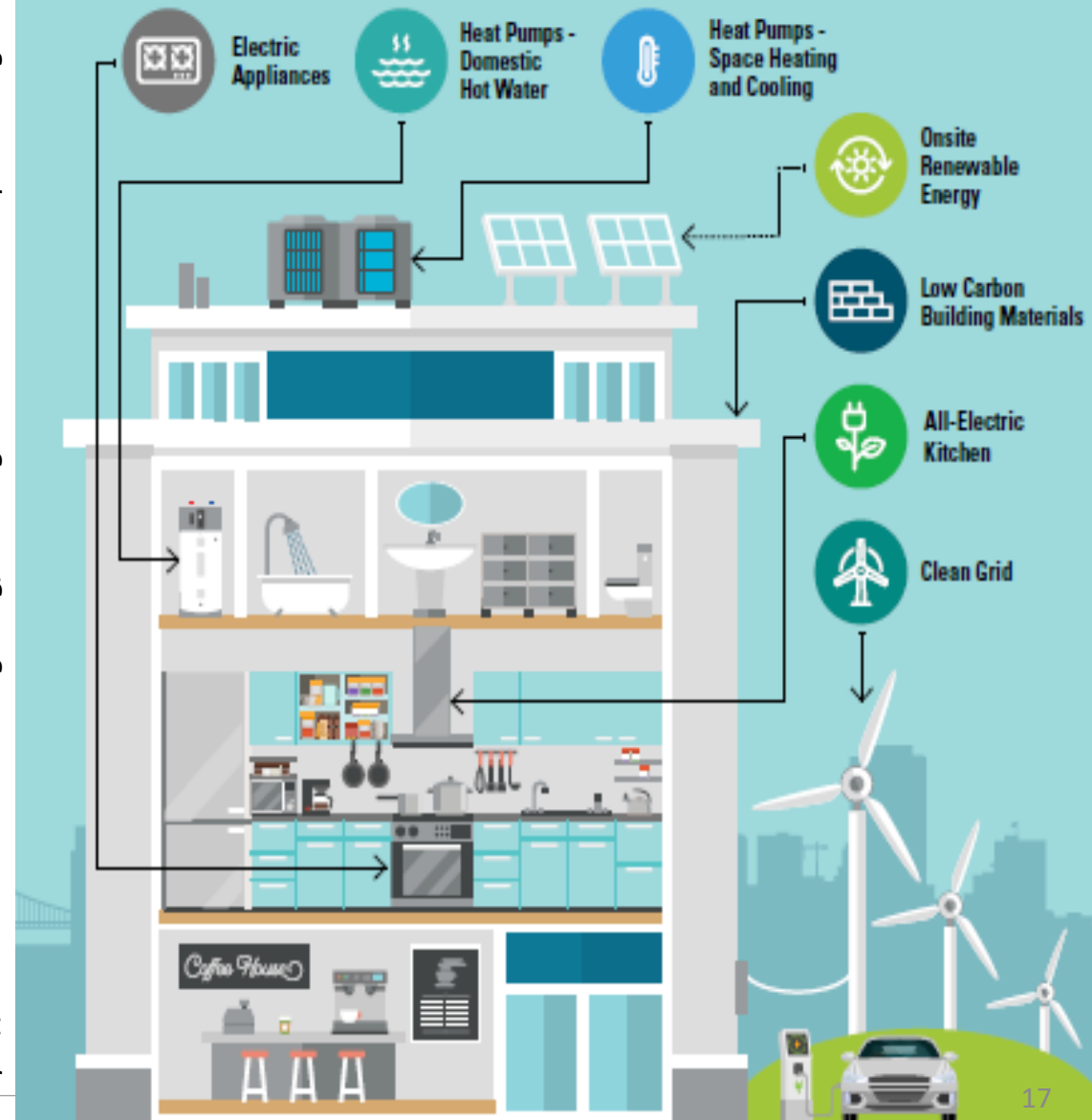
Working Definitions

- **Zero-Net Carbon:** “A ZNC building is defined as: a **highly energy efficient building that produces on-site**, or procures, enough carbon-free renewable energy to meet building operations energy consumption annually..”
- “Zero carbon buildings typically assess embodied carbon in building materials in addition to carbon associated with energy consumption over the course of a year.”
 - U.S. Department of Energy



<https://www.collaborativedesign.org/building-decarbonization-practice-guide>

COMMON ELEMENTS OF LOW CARBON CONSTRUCTION



Understanding Carbon



Building Opportunities Moving Forward:



- LEED Net Zero (2020)
- International Green Building Construction Code (2021)
- Building Industry Design Challenges:
 - AIA Architecture 2030 Challenge (2006)
 - Structural Engineers 2040 Challenge (2020)
 - Mechanical-Electrical-Plumbing 2040 Challenge (2021)
- Institute of Living Building Initiatives (2020)
- WELL Building / Fitwel (2020) focused on indoor health
- Building Decarbonization Code(NBI/ US DOE – National Renewable Energy Laboratory) (2021)



Next Steps:

- Research other Cities' strategies through cohorts
- Reach out to internal/ external building/design professionals
- Compile, contrast & compare
- Develop recommendations for use in 2022 Bond Program and other City Projects
- Present to Environmental Commission, then the Environment & Sustainability Committee
- Explore future efforts to be brought forward through the City Planning Commission processes



AIA Dallas
COMMITTEE ON THE ENVIRONMENT





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APPENDICES



Sustainable Procurement Policy



- Resolution # 21-0908 adopted by Dallas City Council in May 26, 2021
- Is a “*comprehensive Sustainable Procurement Policy to guide procurement decisions to positively impact the City's social, economic, and environmental health*”
- Implemented through a Sustainable Procurement Working Group of affected departments
- Sustainable Procurement Working Group is charged with maintaining environmentally preferred products lists, identifying sustainability labels and standards to use in writing specifications, analyzing citywide purchases for efficiency and waste reduction opportunities, and making other recommendations related to the social, economic, and environmental aspects of contracting; these recommendations shall be included in the City's Administrative Directive 4-05, as appropriate.



Financial Considerations

- Increased building costs?
- Return on Investment
- Macro-economic analyses related to global action
- Moody's Bond Underwriting Agency Requirements





NATIONAL INSTITUTE OF BUILDING SCIENCE (NIBS)

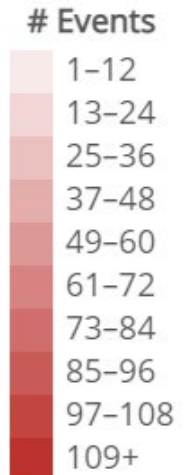
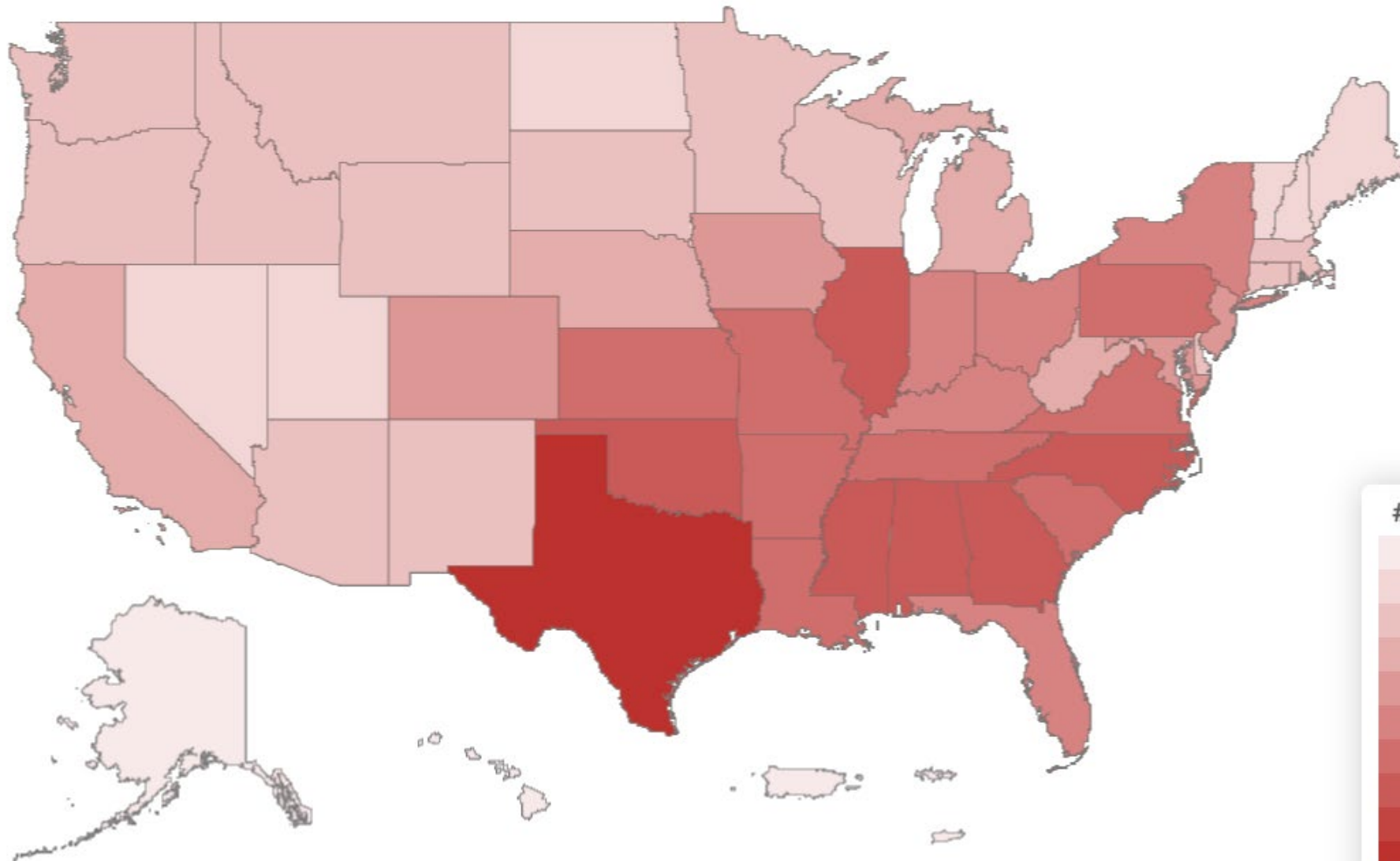
- Multi-year effort funded by FEMA, HUD, EDA, ICC, AIA, NFPA, Insurance Institute for Business & Home Safety (IBHS), and others
- The project team found a **national benefit of \$11 for every \$1** invested in Code updates.
- FEMA, HUD and U.S. Economic Development Administration (EDA) found hazard mitigation funding **can save the nation \$6 in future disaster costs, for every \$1 spent.**



https://cdn.ymaws.com/www.nibs.org/resource/resmgr/docs/NIBS_MitigationSaves2018-Sum.pdf



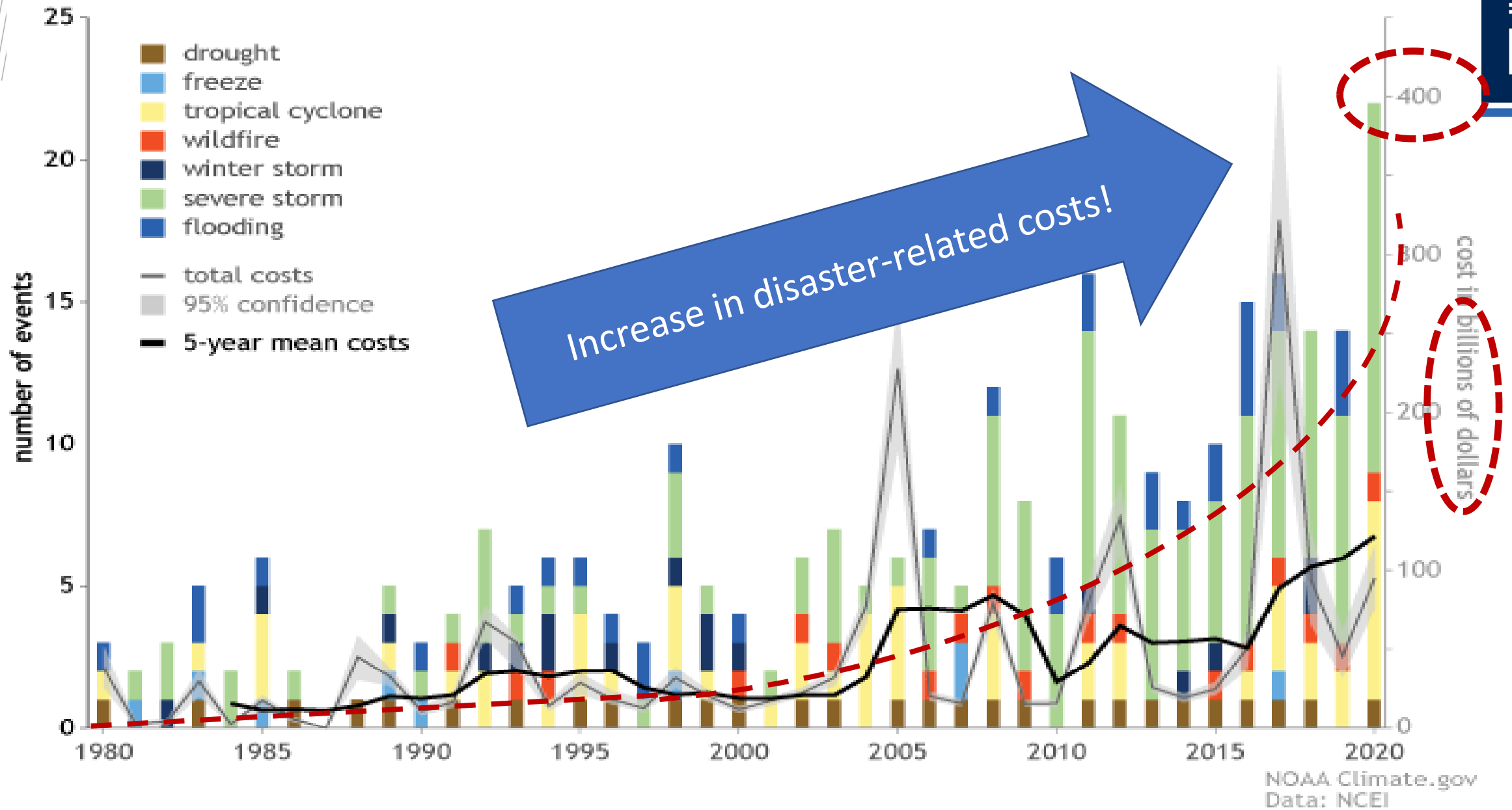
1980-2020 Billion-Dollar Weather and Climate Disasters (CPI-Adjusted)



United States

28	Drought:	33	Flooding:	9	Severe Storm:	128
52	Tropical Cyclone:	18	Wildfire:	17	Winter Storm:	285

Billion-dollar disasters and costs (1980-2020)







LEED Net Zero Programs

- **LEED Zero Carbon** recognizes net zero carbon emissions from energy consumption through carbon emissions avoided or offset over a period of 12 months.
- **LEED Zero Energy** recognizes a source energy use balance of zero over a period of 12 months.
- **LEED Zero Water** recognizes a potable water use balance of zero over a period of 12 months.
- **LEED Zero Waste** recognizes buildings that achieve Green Business Certification Institute's [TRUE certification](#) at the Platinum level.



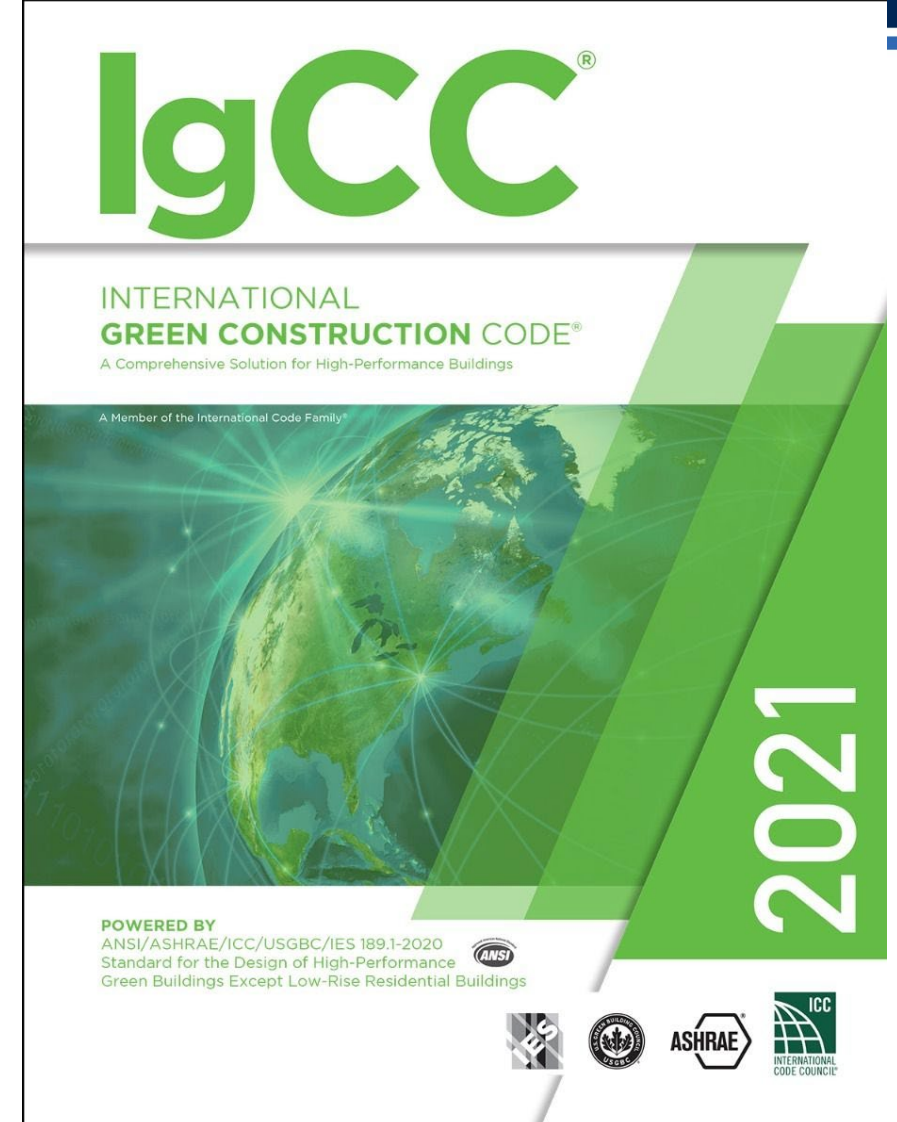
Bank of America Plaza, Dallas



International Green Building Construction Code / (IgCC)(2021)



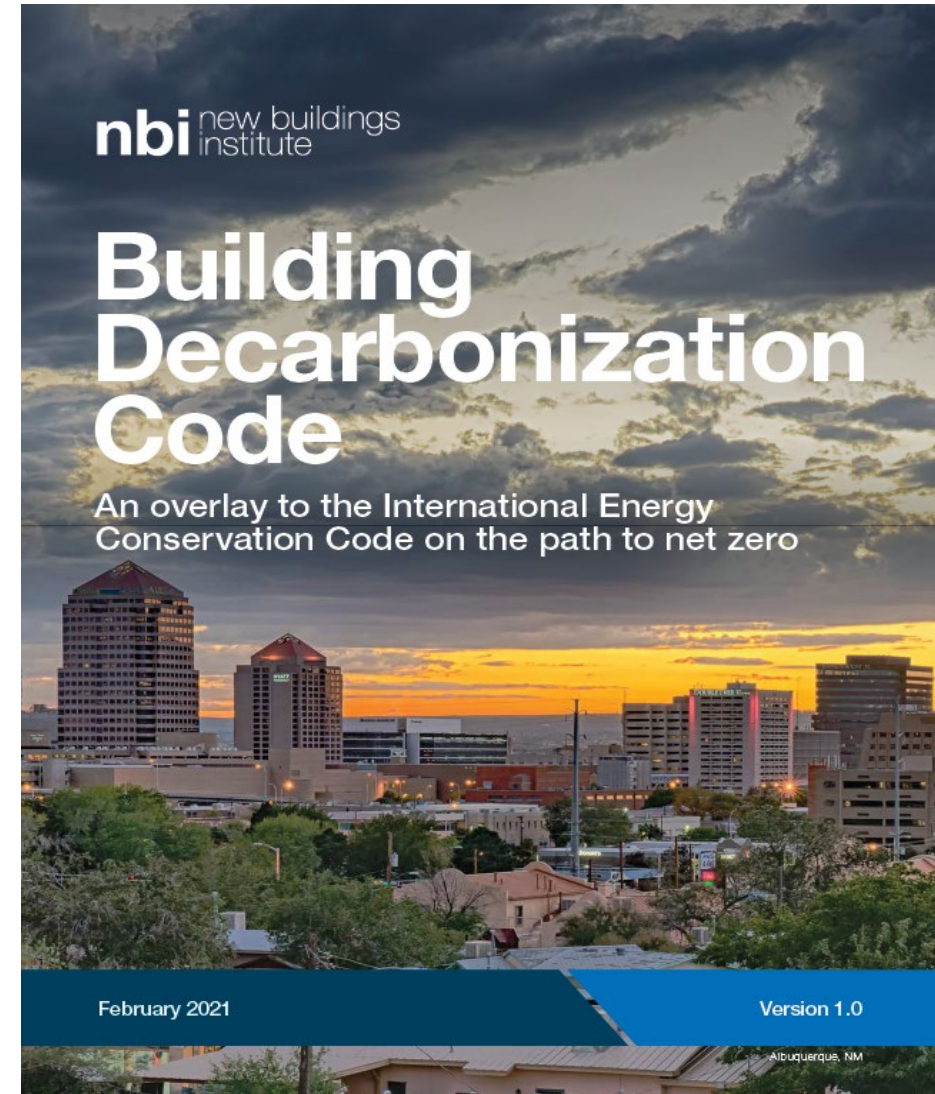
- Released by the International Code Council, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), the U.S. Green Building Council (USGBC) and the Illuminating Engineering Society (IES)
- Provides communities with model code language to assist in achieving sustainability in building stock
- Includes ANSI/ASHRAE/USGBC/IES 189.1-2020 Standard the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings
- Correlates with the International Energy Conservation Code, ASHRAE Standard 90.1 and other referenced standards.
- Streamlines code development and adoption saving the time and money needed to develop their own codes and creating uniformity among adopting jurisdictions.



Building Decarbonization Guide (NBI/ RMI)



- Provides sample language to use as a Code Overlay to meet cities' goals for Net-Zero Emissions
- Based on International Code Council's 2021 International Energy Conservation Code
- Provides sample code amendments for commercial and residential buildings under all-electric and mixed-fuel energy
- Primary emphasis on solar energy, battery storage, electrical vehicles and demand-response systems



Institute of Living Building Initiatives: Living Building Challenge 4.0



SUMMARY MATRIX

The Living Building Challenge is composed of 20 Imperatives grouped into seven petals. Some Imperatives are not required for all Typologies.

			TYPOLOGY			
PETAL	IMPERATIVE		New Building	Existing Building	Interior	Landscape + Infrastructure
PLACE		1 Ecology of Place				
		2 Urban Agriculture				
		3 Habitat Exchange				
		4 Human Scaled Living				
WATER		5 Responsible Water Use 				
		6 Net Positive Water 				
ENERGY		7 Energy + Carbon Reduction				
		8 Net Positive Energy				
HEALTH + HAPPINESS		9 Healthy Interior Environment				
		10 Healthy Interior Performance				
		11 Access to Nature				
MATERIALS		12 Responsible Materials				
		13 Red List				
		14 Responsible Sourcing				
		15 Living Economy Sourcing				
		16 Net Positive Waste				
EQUITY		17 Universal Access				
		18 Inclusion				
BEAUTY		19 Beauty + Biophilia				
		20 Education + Inspiration				



CORE IMPERATIVE



SCALE JUMPING ALLOWED



HANDPRINTING IMPERATIVE



IMPERATIVE REQUIRED FOR TYPOLOGY



REQUIREMENT DEPENDENT ON SCOPE



NOT REQUIRED FOR TYPOLOGY



International WELL Building Standard



- People-first approach to buildings, organizations and communities.
- [WELL Building Standard](#) (WELL): a roadmap for creating/ certifying spaces that advance human health and well-being.
- Aligned with UN Sustainable Development Goals (SDGs)
- “Sets pathways for accomplishing health-first factors that help us to do our best work and be our best selves by supporting our physical and mental health across 10 core concepts”



Fitwell Standards



The Fitwel Scorecards include 55+ evidence-based design and operational strategies that enhance buildings by addressing a broad range of health behaviors and risks:

- Impacts Surrounding Community Health
- Reduces Morbidity and Absentee-ism
- Supports Social Equity for Vulnerable Population
- Instills Feelings of Well-Being
- Enhances Access to Healthy Foods
- Promotes Occupant Safety
- Increases Physical Activity





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