SUBJECT TO CHANGE SUBJECT TO CHANGE SUBJECT TO CHANGE

The 2019 Sustainability Action Plan Annual Report

bnim

ABOUT BNIM

BNIM is an innovative leader in designing high performance environments. BNIM's instrumental development of the USGBC, LEED, and the Living Building concept, combined with projects, methods, and research, shaped the direction of the green building movement. Through this involvement, the firm has redefined design excellence to elevate human experience together with aesthetics and building performance. In practice, this multifaceted approach to design excellence has yielded national acclaim, including the AIA National Architecture Firm Award, and consistent design recognition nationally and internationally. BNIM is Building Positive, a notion that describes how our practice leverages its collective capacity for design thinking to solve issues at every scale in a way that is focused on building the positive attributes of community, the built environment, and natural environment. Through an integrated process of collaborative discovery, BNIM creates transformative, living designs that lead to vital and healthy organizations and communities.

SUBJECT TO CHANGE

The 2019
Sustainability
Action Plan
Annual Report

bnim

34 GIGATO

source: Architecture 2030, U.S. Energy Information Administration, Annual Energy Outlook

That is the magic number. This represents the total global carbon dioxide emissions humanity can emit over the next 30 years if we are to keep our planet from warming to the point of irreversible cascade failure. Buildings and infrastructure are currently responsible for half of global emissions, so architects have a vital role to play in the months and years ahead. Now is the moment our innovation, ingenuity, and resourcefulness are needed most in the world.

BNIM reduces carbon dioxide emissions in the operation of our practice and our portfolio of projects to net zero by 2030...but that's not going to be nearly enough!

BNIM designs to phase out on-site fossil fuels across our portfolio by 2025.

BNIM designs for net-zero energy and off-grid readiness on every project. Everywhere.

BNIM commits to measure, report, and publicly share our environmental performance progress across our portfolio and studio operations.

BNIM commits to supporting office and staff C02 emissions reductions through a new suite of employee benefits and practice policies by the end of 2020.

02

BNIM commits to embodied carbon across all projects 100% by 2040, and by 2050.

reducing the
dioxide emissions
by 65% by 2030,
d 20% net positive

Sustainability Action Plan

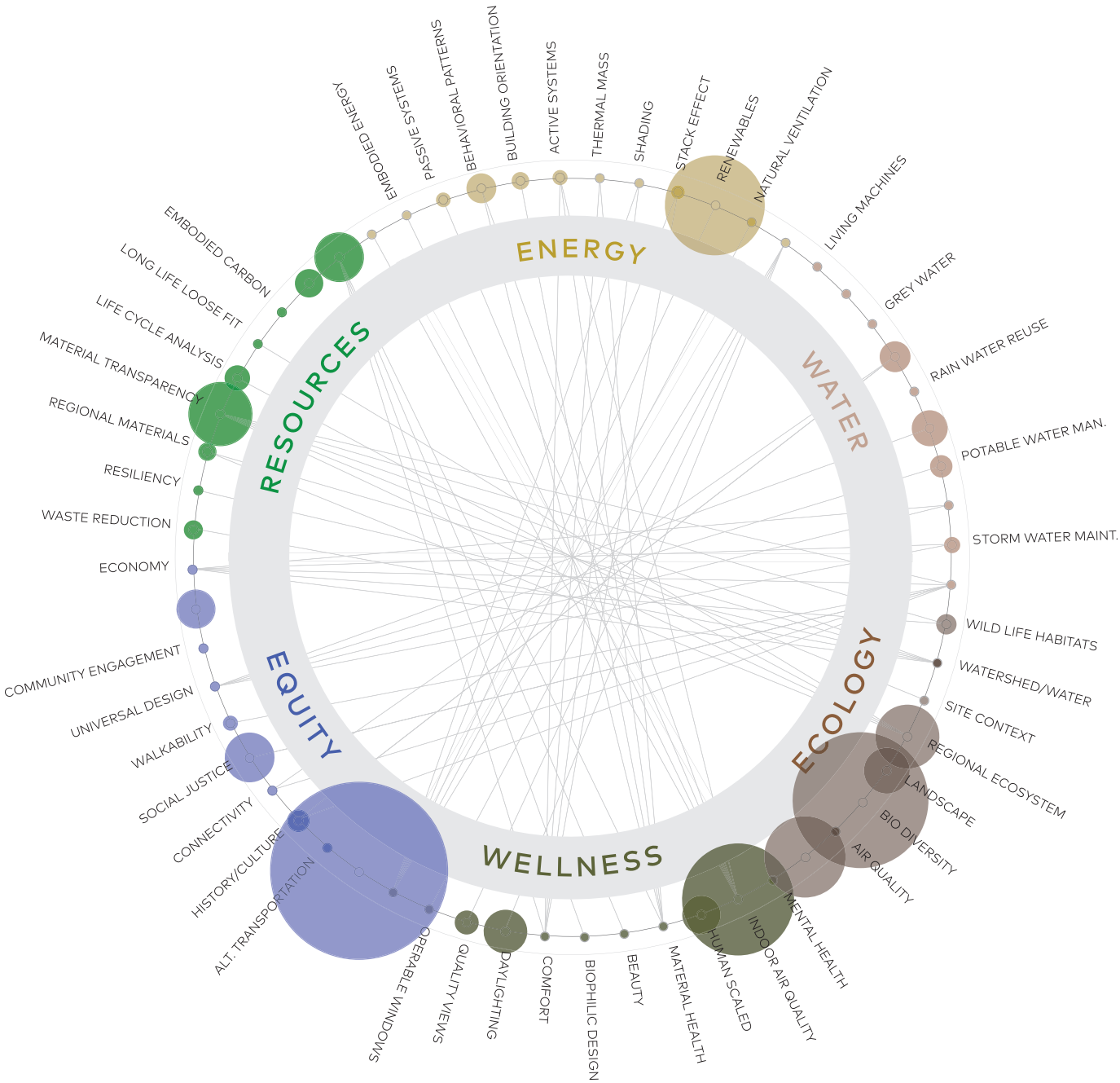
2019 Annual Report

Across BNIM, we redoubled our commitment to sustainable design by developing an aspirational Sustainability Action Plan in 2019. Our Action Plan requires that all projects, big and small, start off by setting clear performance goals with the project team and client, and then report metrics through the life of the project across six categories: **Energy, Water, Ecology, Wellness, Equity & Resources**. BNIM's sustainability team dedicated the last year training staff, building a new suite of tools and strategies, and working with project teams to establish project metrics and baseline office-wide goals in our united quest to shape a regenerative future.

This is our "Year Zero" of a decade-long period of intense focus on transforming the way we design, build, and measure our projects. While not every project can afford to be net zero energy on day one, or have time and fee to support detailed modeling and analysis, what is clear is that establishing a goal makes a difference. Asking the question that might not have been asked can divert the course of a project into a new direction.

BNIM will be releasing our first Annual Sustainability Report ***Subject to Change*** over the next few weeks. Through this report, we will share project highlights, call out exemplary solutions and strategies across the firm's work, and identify areas for improvement and focus in 2020. This is the springboard, intended to be both an internal tool for learning and improvement, as well as an external resource to share our progress and lessons learned with our industry peers.

Below is the summary of our Year Zero firm-wide metrics, representing a snapshot in time of current projects in every phase of design. All reported projects began design in 2019 after the launch of our Sustainability Action Plan, so had the opportunity to develop performance goals based on the same information.


ENERGY
WATER
ECOLOGY
WELLNESS
EQUITY
RESOURCES
EMBODIED ENERGY
PASSIVE SYSTEMS
BEHAVIORAL PATTERNS
BUILDING ORIENTATION
ACTIVE SYSTEMS
THERMAL MASS
SHADING
STACK EFFECT
RENEWABLES
NATURAL VENTILATION
LIVING MACHINES
GREY WATER
RAIN WATER REUSE
POTABLE WATER MAN.
STORM WATER MAINT.
WILD LIFE HABITATS
WATERSHED/WATER
SITE CONTEXT
REGIONAL ECOSYSTEM
LANDSCAPE
BIO DIVERSITY
AIR QUALITY
MENTAL HEALTH
INDOOR AIR QUALITY
HUMAN SCALED
MATERIAL HEALTH
BEAUTY
BIOPHILIC DESIGN
COMFORT
DAYLIGHTING
QUALITY VIEWS
OPERABLE WINDOWS
ALT. TRANSPORTATION
HISTORY/CULTURE
CONNECTIVITY
SOCIAL JUSTICE
WALKABILITY
UNIVERSAL DESIGN
COMMUNITY ENGAGEMENT
ECONOMY
WASTE REDUCTION
RESILIENCY
REGIONAL MATERIALS
MATERIAL TRANSPARENCY
LIFE CYCLE ANALYSIS
LONG LIFE LOOSE FIT
EMBODIED CARBON

Category 1

Energy

We design to the AIA 2030 Commitment. To address this trajectory, we seek to decrease the total energy use and carbon footprint of the project.

IF YOU COULD ONLY DO A FEW THINGS

1. Benchmark (EUI, LPD,)
2. Establish design targets (pEUI, LPD, window wall ratio, carbon reduction target)
3. Optimize building envelope for climate
4. Passive strategies
5. Energy Modeling
6. Track Results
7. Operational Carbon Calculations
8. Behavioral patterns
9. Building Commissioning

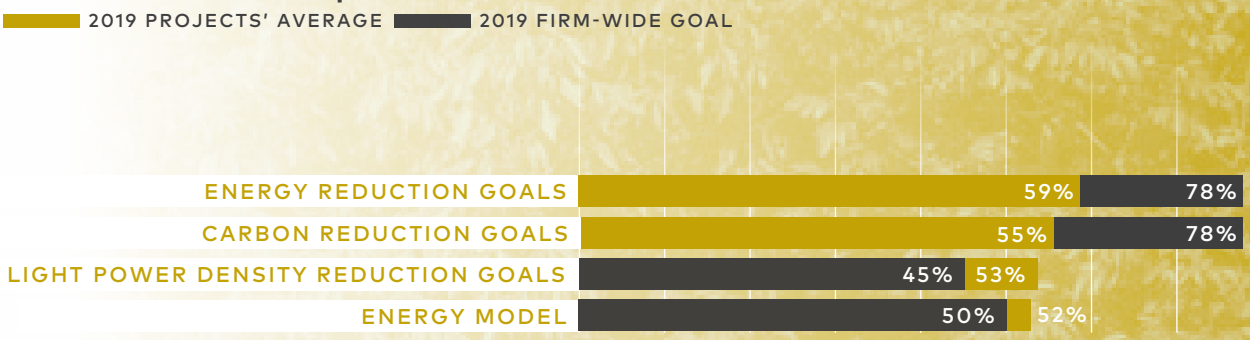
RESOURCES

AIA COTE Top Ten Toolkit - Measure 6: Design for Energy
AIA COTE Top Ten Toolkit - Measure 1: Design for Integration
Living Building Challenge - Energy Petal Handbook - Design Performance Modeling Guidelines
AIAU + 2030 Series
Climate Consultant
Architecture 2030 Zero Tool
ASHRAE Advanced Energy Design Guides
AIA Architect's Guide to Integrating Energy Modeling
Sefaira Best Practices
PV Watts Calculator

QUESTIONS FOR ENGAGEMENT

- In what ways does the local climate inform the design challenges + opportunities?
- What are the energy challenges associated with the building type, intensity of use, or hours of operation? How can the design respond to these challenges?
- In what ways can the design reduce energy loads for heating, cooling, lighting, and water heating?
- What is the energy efficient design intent, including passive design strategies and active systems/ technologies? In what ways are these strategies evident in the design and not just applied systems?
- What are the opportunities for on-site renewable and alternative energy systems?
- Is it possible to not use combustion for energy generation?
- What steps should be taken to ensure that the building performs the way that it is designed?

2019 Firm-Wide Report



ENERGY + CARBON REDUCTION GOALS

Meet 2030Challenge, Baseline is 2004 CBECS

POOR

GOOD

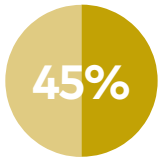
BETTER

HIGH PERFORMING

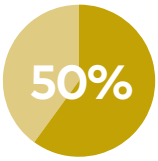
LIGHT POWER DENSITY REDUCTION GOALS

Baseline is IECC 2015

POOR



GOOD



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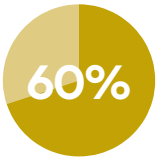

HIGH PERFORMING

ENERGY MODEL

Level of energy modeling used during project design process

NO MODEL

DESIGN PERFORMANCE MODELING

FULL ENERGY MODEL

Category 2

Water

We design to conserve potable water and manage storm water in a responsible way..

IF YOU COULD ONLY DO A FEW THINGS

1. Benchmark indoor water use and compare to anticipated use
2. Establish design targets
3. Use low-flow fixtures
4. Reduce or eliminate outdoor water use (Irrigation Reduction/Elimination)
5. Manage stormwater runoff with the goals of increasing on-site infiltration and improving water quality down stream
6. Capture and reuse rainwater onsite
7. Track Result

RESOURCES

AIA COTE Top Ten Toolkit - Measure 5: Design for Economy
AIA COTE Top Ten Toolkit - Measure 4: Design for Water,
AIA COTE Top Ten Toolkit - Measure 1: Design for Integration
AIA COTE Super Spreadsheet Water Calculator
Living Building Challenge - Water Petal Handbook
Water Sense
LEED v4 Water Use Calculator
Building Green: Net-Zero Water and More: Moving Beyond "Low Flow"
Water Reuse Practice Guide
EPA Water Efficient Mechanical Systems Guide
Greenvalues Stormwater Calculator

QUESTIONS FOR ENGAGEMENT

- In what ways can the project use water wisely and handle rainfall responsible?
- How do various water streams flow through the building and site, including major water conservation and stormwater management strategies?
- How does the project relate to the regional watershed?
- In what ways is the project innovative in the way that is uses and treats water?
- Could the project recapture or re-use water including the use of rainwater, graywater and wastewater?
- Is it possible to reduce reliance on municipal water sources?
- In what ways does water reveal itself on the project and contribute to the design narrative?
- How does the mechanical system selection impact project water use? Can condensate be used for greywater on the project?

2019 Firm-Wide Report

2019 PROJECTS' AVERAGE 2019 FIRM-WIDE GOAL

POTABLE WATER REDUCTION

% reduction from baseline

POOR GOOD BETTER HIGH PERFORMING

STORMWATER MANAGED ON SITE

percent managed for 2 year, 24 hour storm event

POOR GOOD BETTER HIGH PERFORMING

Category 3

Ecology

We design to protect and benefit site ecology in the presence of human development. We consider the macro and micro scale of the site and consider not only the anthropocentric world but also the rest of biodiversity.

IF YOU COULD ONLY DO A FEW THINGS

- Design a project that responds to its site and ecological context.
- Design landscaping that is comprised of 100% native plantings, especially species that attract pollinators. Avoid all decorative turf grass.
- Preserve mature trees on site.
- Create a night time habitat by eliminating artificial light and sounds while no humans are present.
- "Vision Zero" for bird strikes: design to eliminate all building-related bird deaths.

RESOURCES

AIA COTE Top Ten Toolkit - Measure 3: Design for Ecology
Living Building Challenge - Place Petal Handbook
The Sustainable SITES Initiative
Ecology and the Architectural Imagination
Landscape Architectural Foundation, Performance Series
Seven Principles of Xeriscaping
Guidelines for Good Exterior Lighting Plans
International Dark-Sky Association
The Bird-Friendly Building Design

QUESTIONS FOR ENGAGEMENT

- What is the regional ecosystem (climate, soils, plant and animal systems) in which the project is sited?
- How does the development of the site respond to its ecological context, including the watershed, and air and water quality at different scales from local to regional level?
- How might the project protect and benefit these natural ecosystems and habitat?
- How much rainfall is expected to fall on this site, and how much can I store in a tanks and in the soil/landscape?
- What is the health of the existing soil? Is it possible to improve these soils and increase storm water holding capacity and plant health?
- What are the native, migratory, and endangered animals and insects to this area?
- How does the context inform the exterior lighting approach? Can the lighting color temp, timed controls, and fixture cutoffs be adjusted to accomodate a dark sky approach?
- How does the building mitigate bird-strikes?
- In what ways does the project contribute to biodiversity and the preservation or restoration of habitats and ecosystem services?
- How does the design encourage local food networks?

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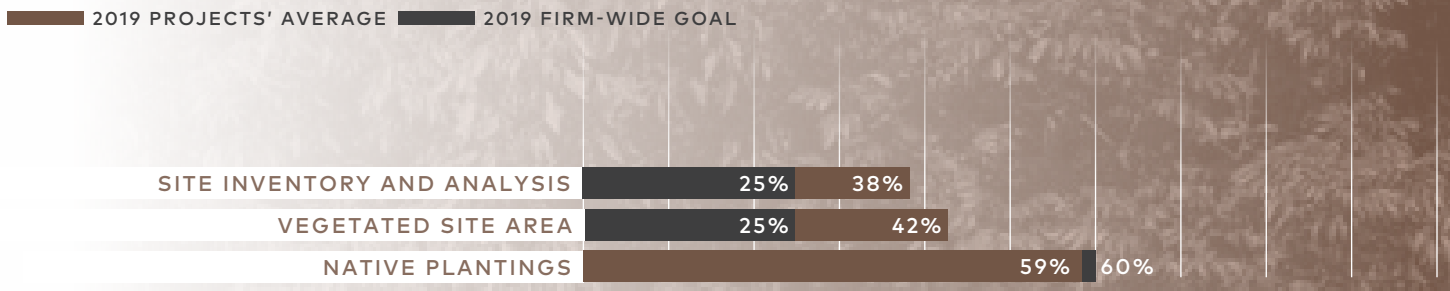

SITE INVENTORY AND ANALYSIS

Investigation of site and ecological context to inform design

POOR BEST

VEGETATED SITE AREA

Percent of vegetated site area post development

POOR GOOD BETTER HIGH PERFORMING

NATIVE PLANTINGS

Percent of native plantings in total vegetated area

POOR GOOD BETTER HIGH PERFORMING

Category 4

Wellness

A project is only sustainable if people enjoy being in it. We design projects to promote beauty, comfort, health and wellness.

IF YOU COULD ONLY DO A FEW THINGS

- Consider operable windows
- Give all occupants individual control over their immediate environment
- Allow occupants to experience natural, biophilic elements through a variety of senses
- Pre & Post Occupancy Evaluations
- Request and track building products used on the project that can provide material transparency documentation and give priority to manufacturers who provide this documentation
- Air quality testing (post occupancy) CO2 constant and VOC annual
- Consider programming exterior spaces

QUESTIONS FOR ENGAGEMENT

- In what ways does the project optimize daylight, indoor air quality, connections to the outdoors and thermal, visual, and acoustical comfort for occupants and others inside and outside the building?
- How does the design promote the health of the occupants?
- What passive and active systems could be used that would promote thermal comfort?
- In what ways can the design reduce indoor pollutants?
- Could you eliminate the use of Red List Materials from the project, such as vinyl?

RESOURCES

AIA COTE Top Ten Toolkit - Measure 7: Design for Wellness
Living Building Challenge - Health & Happiness Petal Handbook
Living Building Challenge - Materials Petal Handbook
WELL Building Standard
Perkins + Will Precautionary List
Daylight Pattern Guide
Biophilic Design Exploration Guidebook
Economics of Biophilia
CBE Thermal Comfort Tool
Glazing and Winter Comfort Tool (Payette developed)
Indoor Air Quality: EPA
Environmental Product Declarations (EPD)
Health Product Declarations (HPD)
Mindful Materials
Health Data - Institute for Health Metrics and Evaluation

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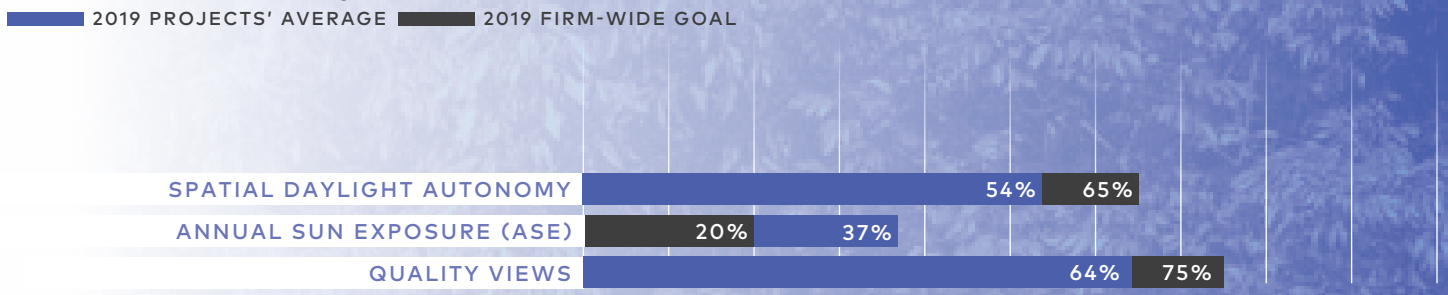


SPATIAL DAYLIGHT AUTONOMY

Percent of occupied floor area that receives a min. of 300 lux for at least 50% of occupied hours

GOOD

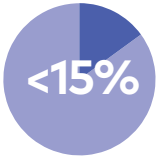
BETTER

HIGH PERFORMING

ANNUAL SUN EXPOSURE (ASE)

Percentage of floor area that receives at least 1000 lux for at least 250 occupied hours per year (glare factor)

GOOD

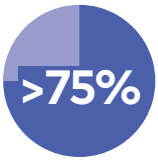


BETTER

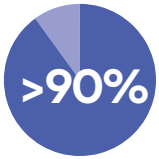
HIGH PERFORMING

QUALITY VIEWS

Percent of occupied areas with a direct line of sight to nature



GOOD



BETTER

HIGH PERFORMING

Category 5

Equity

We design to enhance human, social, economic and environmental wellness in our communities. Listening, inclusion and collaboration are fundamental to promoting equity in the built environment.

IF YOU COULD ONLY DO A FEW THINGS

- Establish an inclusive design approach (open to multiple perspectives, include all design disciplines)
- Engage community in design process
- Develop inclusive design strategies for people with a range of capabilities (Ex. blind, deaf, sensory sensitive, and other groups)
- Provide a Mothers' / Wellness Room for 1% (1 per 100) of the FT Female Population
- Design human scaled, humane places and provide universal access to nature & place
- Provide amenities for pedestrians, bicyclists and transit users; advocate for expanded public transit and reduce parking on site

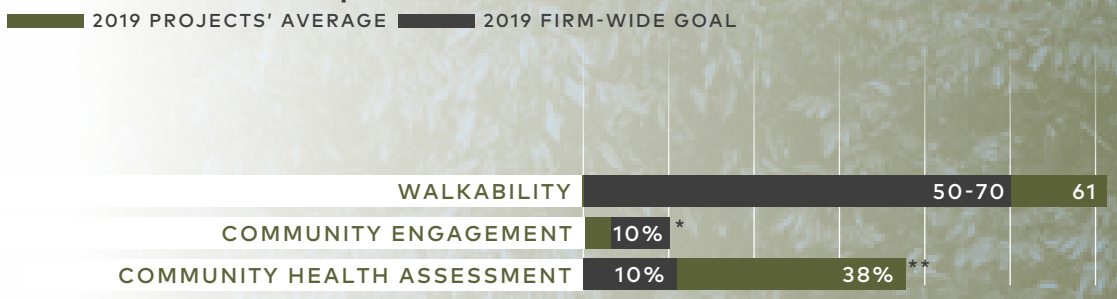
RESOURCES

AIA COTE Top Ten Toolkit - Measure 2 - Design for Community
Living Building Challenge - Equity Petal
Inclusive Design Research Center; Designing with People - Range of Capability Overview
Center for Excellence in Universal Design - Design Guide; Creating DeafSpace; Designing for the Blind
Walkability Assessment Tool
EDR Community Engagement Toolkit
Community Commons Community Indicator Report Tool
CDC Community Assessment Tools
Streetwyze - People Powered Place Making

QUESTIONS FOR ENGAGEMENT

- In what ways do community members, inside and outside the building benefit from the project?
- How will the project ensure inclusive access to people with varying levels of capabilities?
- How will the project support sensory friendly experiences?
- How will the design process ensure an inclusive design process both internally and externally?
- How will a community engagement strategy enhance project outcomes? What don't we understand about the community our project serves?
- Who are the project stakeholders? Which groups may be under-represented or missing from the decision making?
- What metrics will best demonstrate healthy community outcomes? How will we measure?
- How will the project create or strengthen walkable human scaled place?
- What are the existing relationships of interdependence and suffering for the project population and place?
- What systems can be reinforced and strengthened through design intervention, what liabilities can be reduced?

2019 Firm-Wide Report



* % engaging at level 6 or higher ** % of projects with health assessments

WALKABILITY

Calculate Walk Score

POOR GOOD BETTER HIGH PERFORMING

COMMUNITY ENGAGEMENT

Level of engagement utilizing Arnstein's Ladder of Citizen Participation

Manipulation, Therapy
POOR

Informing, Consultation
GOOD

Partnership, Delegation
BETTER

Citizen Control
HIGH PERFORMING

COMMUNITY HEALTH ASSESSMENT

Indicator report which gathers data to understand how the social determinants of health (poverty, housing, access to education, food security) are shaping equity in a neighborhood or community

POOR HIGH PERFORMING

Category 6

Resources

We seek to design environments that positively shape the lives of people by analyzing the embodied energy, regional climate hazards, life cycle material costs and source streams of our projects.

IF YOU COULD ONLY DO A FEW THINGS

- Design adaptive environments for a changing and regional climate
- Re-use an existing building; right size the program
- Reduce or replace cement in concrete mix
- Design for long life and loose fit; select materials that consider building design lifespan
- Track raw materials and prioritize responsible sourcing
- Minimize the construction and demolition waste stream from your project

QUESTIONS FOR ENGAGEMENT

- What is the criteria by which you ar selecting materials? Considerations might include optimizing health, durability, maintenance and energy use reducing the impacts of extraction, manufacturing, and transportation?
- What regional resources are available and prevelant?
- What efforts might be made to reduce the amount of material waste and environmental impact of materials over their lifetime?
- How might you reduce construction waste and promote recycling during occupancy?
- How can the project be designed to promote long-term flexibility, adaptability, and resilience?

RESOURCES

AIA COTE Top Ten Toolkit - Measure 5: Design for Economy
AIA COTE Top Ten Toolkit - Measure 8: Design for Resources
AIA COTE Top Ten Toolkit - Measure 9: Design for Change
Living Building Challenge - Materials Petal Handbook
AIA Guide to Life Cycle Assessment in Practice
Tally - Life Cycle Assessment Tool
AIA Materials Transparency and Risks for Architects
Origin - Materials Search Engine
DECLARE - Material Transparency
Resilience - RELi, US Resiliency Council, PEER
True Zero Waste
Design for Disassembly (DfD)

2019 Firm-Wide Report

2019 PROJECTS' AVERAGE 2019 FIRM-WIDE GOAL

* % reduction of all new construction ** % of all projects completing LCA *** % of projects setting RELi goal of 2 or higher

EMBODIED CARBON

Calculate the amount of lbs. of carbon dioxide per square foot, utilize COTE spreadsheet for rating

POOR

GOOD

BETTER

HIGH PERFORMING

LIFE CYCLE ASSESSMENT

Meet requirements of LEED v4.1 credit MRc1 (historic, abandoned, blighted re-use or LCA)

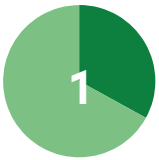
POOR

HIGH PERFORMING

PASSIVE SURVIVABILITY

Design to achieve passive functionality to COTE standards 1, 2, or 3

POOR



GOOD

BETTER

HIGH PERFORMING

Earth Day Case Study

Charity Hospital Redevelopment

LOCATION	1532 Tulane Avenue New Orleans LA 70112
TOTAL BUILDING AREA	952,798 GSF
SITE AREA	183,463 SF

In 1938, the art-deco style Charity Hospital was constructed to expand the public healthcare resources available to the City of New Orleans. Charity was a teaching hospital that stood as a beacon of hope for many in the community. Following Hurricane Katrina, the one-million square foot building was shuttered and still stands vacant today, leaving an emptiness in what was once a bustling area of the City.

The adaptive reuse of the former Charity Hospital will include a common thread of lifelong learning that dates to its beginnings. The building's history as a sacred space within the community will be honored by providing a welcoming space for all. Tulane University will serve as the anchor tenant, in addition to a high school, early childhood learning center, multi-family housing, retail, and multiple scales of public gathering space, both interior and exterior to the structure.

Currently in the design development phase, the project team has been utilizing BNIM's Action Plan Framework to set high level goals on multiple aspects of the building. While it is still undetermined if the project will seek certification, this process helped the team to identify challenging goals to achieve and focus on early in the process. These goals include but are not limited to setting rough order of magnitude quantities for embodied carbon budgets, predicted energy use, and water use by utilizing the COTE top 10 super spreadsheet. Each of these data points are actively being sharpened and right sized as the design continues to be refined.

Embodied Carbon

40% Reduction / 24,843,841 lbs CO_2

GREENHOUSE GAS EMISSIONS AVOIDED BY

4,450 tons of waste recycled instead of landfilled

636 garbage trucks of waste recycled instead of landfilled

556,691 trash bags of waste recycled instead of landfilled

2.8 windturbines running for a year

497,031 incandescent lamps switched to LEDs

CARBON SEQUESTERED BY

216,336 tree seedlings grown for 10 years

17,086 acres of US forests in one year

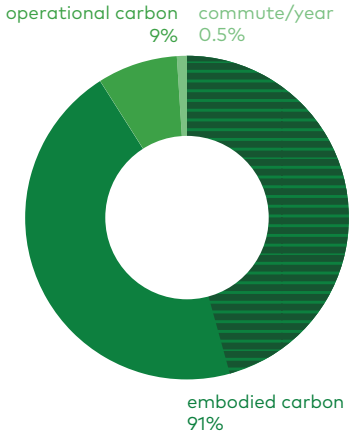
88.5 acres of US forests preserved from conversion to cropland in one year

		poor	good	better	high-performing	BASELINE	TARGET	STRATEGIES
ENERGY	ENERGY REDUCTION			80%		135 EUI (kbtu/SF)	27 EUI (kbtu/SF)	Tie into existing District Energy Plant, chilled water and steam
	CARBON REDUCTION			70%		32 Carbon (lb/SF/yr)	9.6 Carbon (lb/SF/yr)	
	LPD REDUCTION				60%	1 LPD (W/SF)	0.4 LPD (W/SF)	
	ENERGY MODEL				YES			
WATER	POTABLE WATER REDUCTION			50%		26 WUI (Gallons/SF)	13 WUI (Gallons/SF)	• Primary programs and services to be constructed above Base Flood Elevation • Utilization of permeable paver system
	STORMWATER MANAGED ON-SITE			50%				
ECOLOGY	SITE ANALYSIS	NO						• Use of native plantings • Minimizing area of turf grass
	VEGETATED SITE AREA			47%		1183,463 SF	86,226 SF	
	NATIVE PLANTING			90%		86,229 SF	64,670 SF	
WELLNESS	SPATIAL DAYLIGHT AUTONOMY		53%					• Daylight analysis • Occupancy sensors in concert with daylight sensors with step dimming • Exterior green space, fitness center, and roof top pools/basketball court provided for building tenants in urban environment
	ANNUAL SUNLIGHT EXPOSURE				10%			
	QUALITY VIEWS		75%					
EQUITY	WALKABILITY				92			• Community outreach partner - "Hawthorne Agency" • Community meetings and coordination with community groups • Identification of Disadvantaged Business Enterprises for design and construction employment
	COMMUNITY ENGAGEMENT		4					
	COMMUNITY HEALTH ASSESSMENT				YES			
CARBON	EMBODIED CARBON REDUCTION			40%		91	36.4	• Identify "hot spots" and evaluate products for lowest GWP • Reduce cement content in new concrete • Evaluate spray fireproofing GWP • Evaluate new structure options • Set embodied carbon budget for TI projects
	LIFE CYCLE ASSESSMENT				YES	TALLY		
	PASSIVE SURVIVABILITY			2		2 = Island building capabiliities and acts as community shelter		

Estimated Cumulative Carbon
1 Year

101,470,120 LBS CO_2
-43,757,052 LBS CO_2 (existing to be reused)

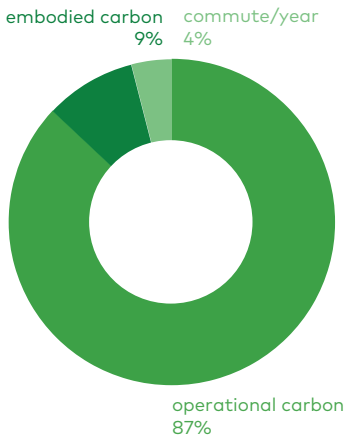
57,713,068 LBS CO_2



Estimated Cumulative Carbon
100 years - Building Life

1,055,830,120 LBS CO_2
-43,757,052 LBS CO_2 (existing to be reused)

1,012,073,068 LBS CO_2



Being an adaptive reuse project, embodied carbon has been at the forefront of many conversations with the project team and client regarding design. The team is currently working on an evaluation using Tally to determine the breakdown of the embodied carbon and the "hot spots" to better understand how we can achieve our target of 40% reduction in the embodied carbon of new construction materials. One specific study was regarding the new cementitious fireproofing that will need to be applied to the existing structure. The team analyzed four different strategies in addition to three different material types, ultimately finding the lowest contributing solution.

Given the project history and location, storm water capture has also been a priority to drive several high-performance project goals. The new building program and primary services will be located above flood elevation to increase the building's resilience in the event of a flood. In addition, the design team has targeted to capture 50% + of the rain fall in a 24 hour-2 year event. The captured water will provide irrigation for the vegetation on site.

Regarding energy use, the project will be tying into an adjacent district energy plant. The existing utility will be providing chilled water and steam for the building. This will reduce the amount of equipment needed on site in addition to improving the efficiency of the energy plant itself. The current plant has excess capacity within its production, so by looping in the new Charity program there is strong potential to increase the efficiency of both the Charity building and the energy plant.

bnim is building positive

2460 PERSHING RD
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