DESIGNING FOR A BETTER WORLD

ANNUAL SUSTAINABILITY REPORT

CRTKL

APRIL
2023

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Boxyard RTP
NORTH CAROLINA, USA

FOREWORD

In March of this year, the Intergovernmental Panel on Climate Change (IPCC) released its sixth and final assessment report on the global climate crisis and its conclusion was stark: Rapid transformational action to effectively reduce greenhouse gas (GHG) emissions must start immediately at every level in every country around the world, or the destructive human-caused climate change that has accelerated at an unprecedented level over the past 50 years will not be able to be reversed. The IPCC's latest warning echoes the clarion call issued at the United Nations COP27 Climate Change conference in Egypt - as well as from a flood of academic and NGO foundations around the world - for immediate science-based climate action to reduce GHG emissions everywhere.

There is no question that the world today is being deeply affected by many issues: Climate change, biodiversity loss, social and economic inequity and – continuing still – a global pandemic.

As designers of the built environment, we cannot adequately fulfill our design and sustainability commitment without addressing these issues head on. At the same time, we must understand that these challenges are interconnected and that we cannot simply address any one in isolation from the rest.

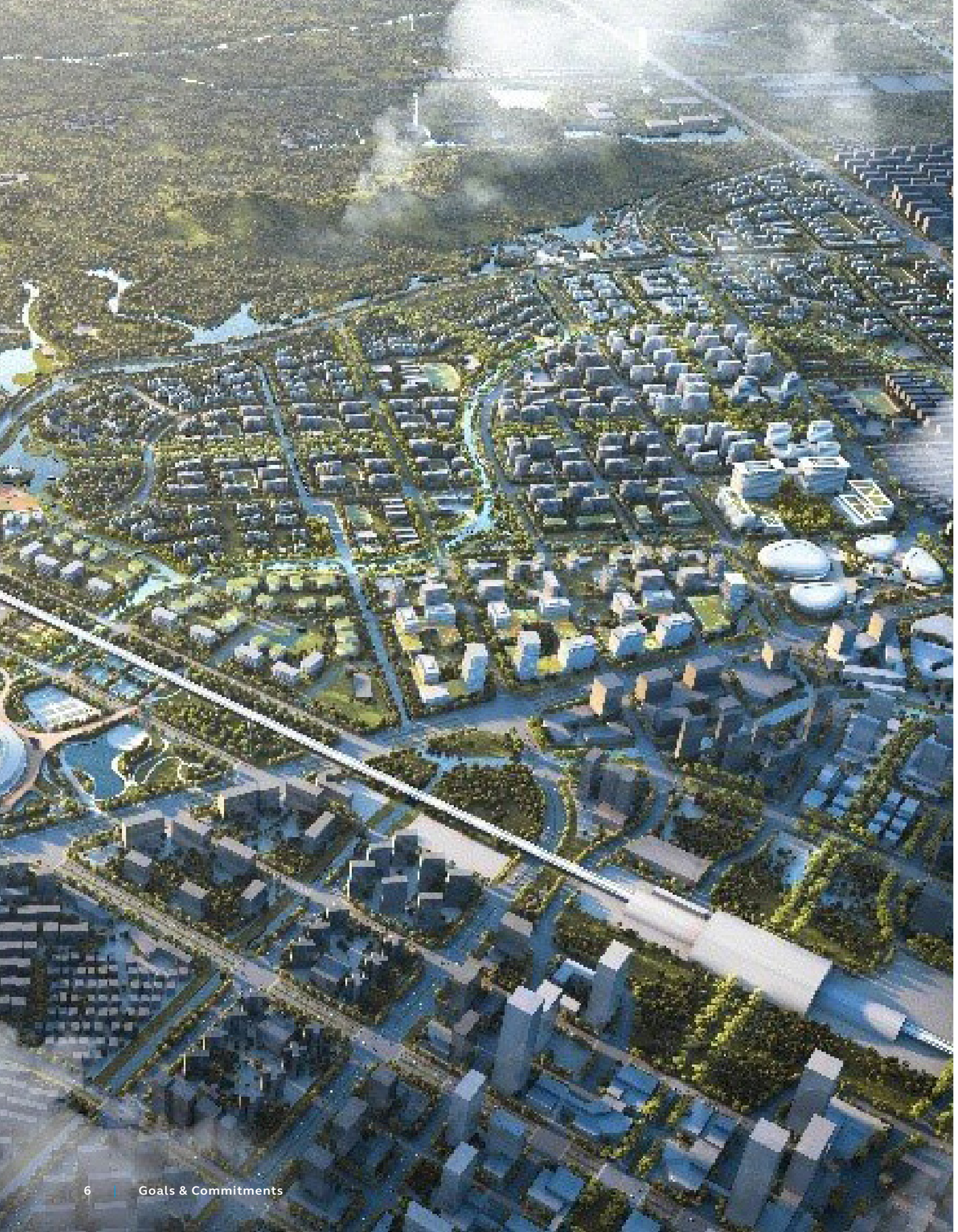
Likewise, within a sustainable design context, the complex problems we face today cannot be solved by any one discipline. Within this edition of CRTKL's annual report are highlighted a number of excellent examples where cross-disciplinary teams made up of key personnel from our Research, Design Technology, Urban Planning and Design, Computational Design, and Experience Design groups, came together to collaborate on designing climate-positive, equitable and inspiring design solutions to last well into the future.

Each one of these projects is a tangible illustration of our progress towards achieving our vision of producing design solutions that embody a positive perspective on improving quality of life for people and which serve to reduce the global carbon footprint and contribute to a healthy and sustainable future for our planet.

This is very much in line with the IPCC's view that "The solution (to reducing GHG emissions) lies in climate resilient development. This involves integrating measures to adapt to climate change with actions to reduce or avoid greenhouse gas emissions in ways that provide wider benefits."

A prime example of the work we have been doing to address this exact need is **Castellana 66**, an office building in Madrid, Spain in which we dramatically reduced its operational carbon footprint by designing a high-performance exterior facade that saves more than 100 metric tons of CO2e per year while keeping 9,000 metric tons of CO2e embodied in the structure in the building and out of the atmosphere. Another good example is the intensive work we put into developing a Climate Action Plan that would

Ring of Life
HONG KONG, CHINA



preserve the valuable collections of the **John F. Kennedy Presidential Library** in Boston, Massachusetts.

To accelerate our ability to deliver these types of high performing sustainable design projects, we are increasing staff literacy in all areas of sustainability that are relevant to the built environment and we are leveraging and developing an array of digital sustainable design simulation tools across the firm.

We are also collaborating with a highly diverse range of academic research and community-level organizations to add to a deeper and more complete understanding of exactly where and how a sustainable design approach can factor into shaping a better world for everyone.

At the same time, CRTKL is an active participant in such community-level sustainability initiatives as our own **Research and Innovation MicroGrant program**, which fosters creativity and sustainability-focused research by providing financial support to small, focused ideas and projects, and our **Sustainability Design Slam** competition for employees.

As you read through the pages of this report, I encourage you to continuously imagine where the world of built space is headed and how the built environments we own, design and build will unavoidably be impacted by the natural forces of the sun, the wind, water, and the earth. If we start thinking now about how these built spaces must fit into the natural environment, it will become easier and more intuitive for us to work together to integrate built and natural environments into a cohesive and sustainable whole.

The manifestation of this view is that buildings will be able to actively and efficiently promote biodiversity by integrating ecological components within their design, such as living roofs that provide stormwater management, shrink urban heat islands and improve air quality, all the while providing essential amenities for people to live, work and thrive.

In essence, buildings of the future will be regenerative and will improve the surrounding natural environment. Buildings will be part of a greater ecosystem, providing water, energy, and nutrients to both the human and natural habitats. They will be water neutral, energy positive, and carbon positive.

It's a future well worth striving for.

Pablo La Roche, PhD
Sustainable Design Leader, CRTKL

LEFT: Ring of Life
HONG KONG, CHINA

DEFINING OUR VISION

Our Purpose

We commit to designing a climate-positive, equitable, inspiring future. **People, Planet, Positive Design.**

Each of these keywords is a commitment to our future. People and the planet have had our attention for some time, and we've made great strides. Now, we are leveraging our past innovations and achievements and building exponentially to build on our successes.

Aligning our Progress

We align our progress and measure our goals according to industry standard platforms. Our project aspirations are aligned with AIA 2030 and with the United Nations Sustainable Development Goals, as will be discussed in more detail in Chapter 1 of this report. Our operational carbon footprint is tracked following the Greenhouse Gas Protocol accounting and reporting standard. Our parent company Arcadis discloses carbon emissions, including CRTKL's emissions, to CDP, an international non-profit that helps companies, cities, and states around the world measure and disclose their environmental impacts.

People

We will use our design capacity to foster stronger communities, inspiring human experiences, wellbeing, social responsibility and equity, and human happiness.

Planet

We commit to a more sustainable future. We are climate-neutral in our operations and commit to designing climate-positive projects for operation by 2030 and climate-positive, including materials by 2040.

Positive Design

We embrace our purpose with a positive perspective, driving forward-thinking outcomes through research-empowered, data-driven, advanced digital design.

RIGHT:
Central Park at City Walk
DUBAI, UAE

01

GOALS & COMMITMENTS

DESIGN PRACTICE

Our firm's impact is truly global with over 2,000 projects under design at any given moment. To improve the performance of our projects and stay below our planetary carbon budget, CRTKL has adopted two important goals for all its projects: all projects will be climate positive for operation by 2030, and all projects will be climate positive including embodied in materials by 2040.

Climate Positive for Operation by

2030

Climate Positive Including Materials by

2040

PLANET

Our Design Performance Targets

Sustainability addresses environmental, social, and economic issues. Our projects are inspired by ecology and designed for people to live full, healthy lives with a minimal environmental footprint. They should be able to support all life on this planet and contribute to safe and affordable access to varied human needs. Resources should be used efficiently while providing for immediate needs as well as long-term benefits. Our projects address sustainability in these different areas, placing special emphasis on carbon and reducing GHG emissions to reduce our impact on climate change.

Scientists warn that we have less than ten years left to avoid the worst consequences of climate change. Understanding how we handled the COVID-19 crisis offers an opportunity to tackle climate change head-on. The pandemic shows us that, even with all the mistakes we have made, we have the technology, scientific understanding, financial means and human resourcefulness needed to tackle climate change. Our goal as designers of the built environment should be to contribute towards the Paris Agreement by “limiting warming to well below 2˚C, and pursue efforts to limit it to 1.5˚C.”

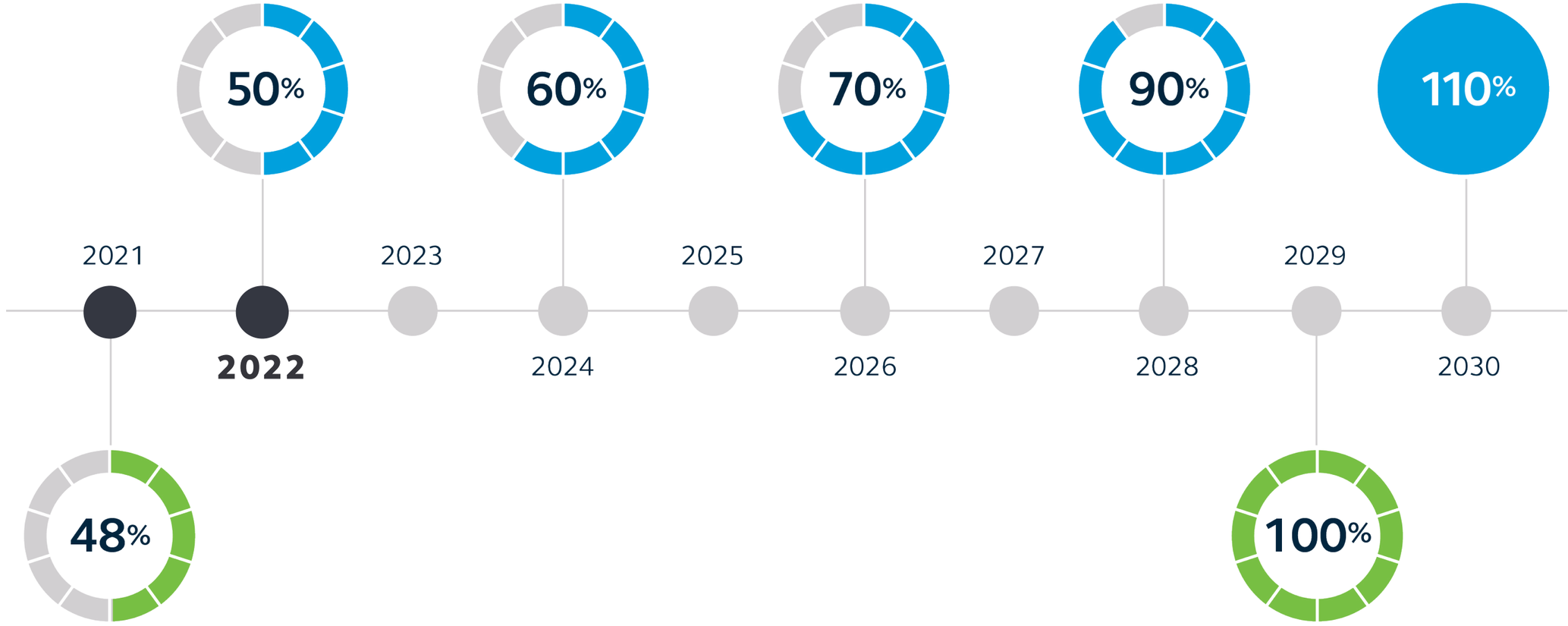
The "Special Report: Global Warming of 1.5˚C" by the Intergovernmental Panel on Climate Change (IPCC) indicates how much higher the risks of a 2˚C world are than a 1˚C world. According to the report climate models project robust differences in regional climate characteristics between present-day and global warming of 1.5°C and between 1.5°C and 2°C. These differences include increases in: mean temperature in most land and ocean regions (high confidence), hot extremes in most inhabited regions (high confidence), heavy precipitation in several regions (medium confidence) and the probability of drought and precipitation deficits in some regions (medium confidence).

Our goal is to apply our design skills to help flatten the emissions curve by achieving a substantial reduction in carbon emissions in line with the global 1.5 °C temperature rise target, as agreed by all signatories to the Paris Agreement. As we design buildings with a lower carbon footprint we will reduce our emissions which will give us time to protect our coastlines and cities from super storms and adapt our agricultural practices to evolving climates drought and floods.

LEFT:
Torre Europa
MADRID, SPAIN

GOAL SETTING

The Energy Use Intensity (EUI) of our reported projects to the AIA 2030 commitment in 2020 was 46% better than the baseline. We set the internal goals below to achieve climate positive performance in our projects by 2030. In 2022 we more than doubled the number and square footage of whole building projects reported to the AIA 2030 commitment. Our project performance was 49% better than baseline, improving upon our 2021 performance and almost achieving our 2022 goal.



PLANET

PROJECT PERFORMANCE TRACKING

Our Sustainability team and our Data and Dev Ops teams collaborated to develop our 2030 Climate App and are launching our Project Dashboard. These tools are used by our teams to track and report the energy performance of our projects, benchmark against other CRTKL projects, and learn from the work of our colleagues.

Country

All

CO2 SAVINGS TONS/YR

TBD

CO2_SAVINGS

368

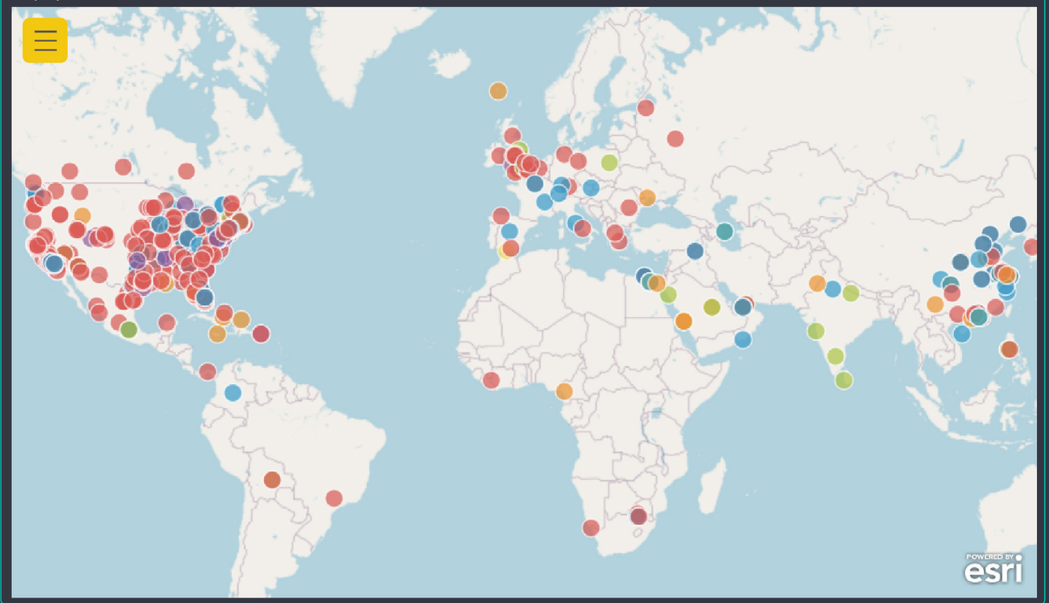
Projects

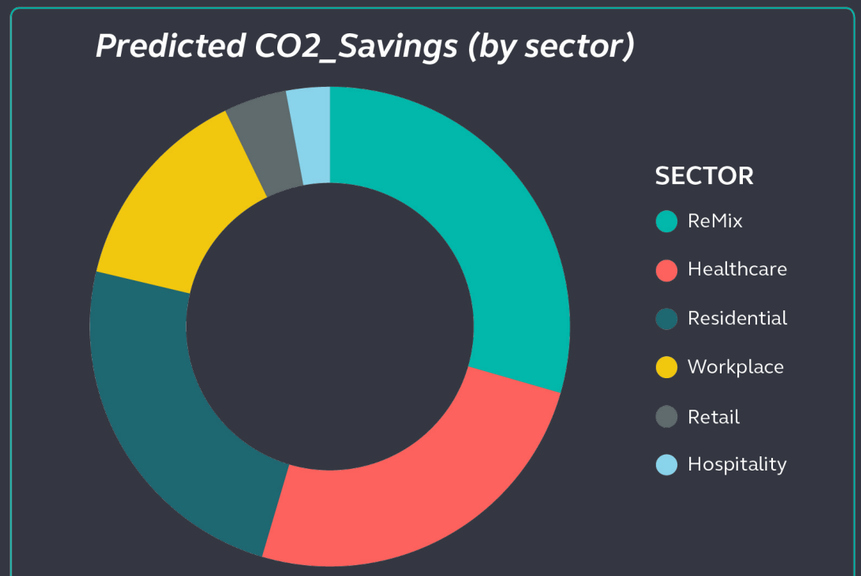
Country (groups)

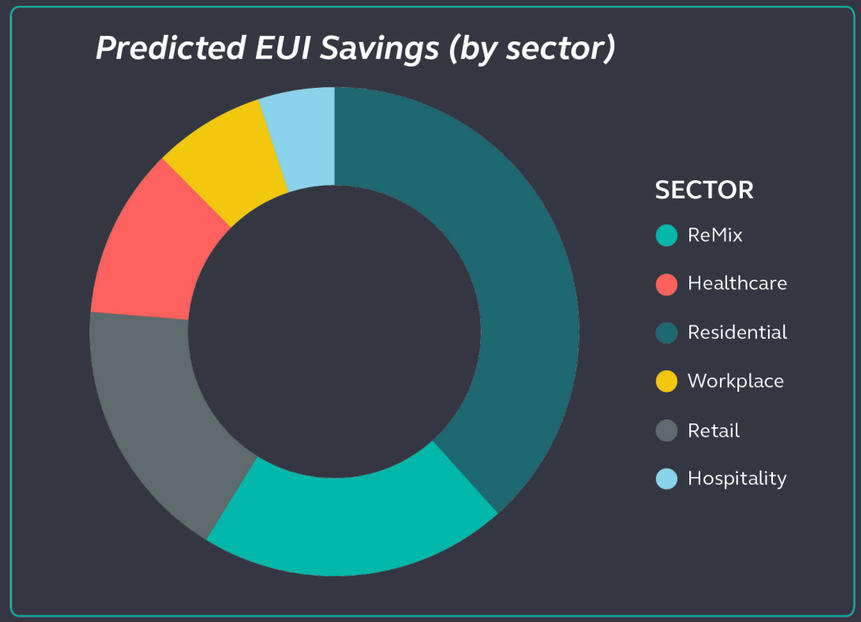
Other

US

City by SECTOR







EMBODIED CARBON

Zero Embodied Carbon

Making building materials and products creates greenhouse gas emissions. Activities such as mining, driving trucks, running factories and combining chemicals result in emissions to the air, earth and water. While efficiencies are being developed, they are often in these industrial activities that allow materials to be produced faster and travel farther. This availability and convenience only exacerbate the problem of material waste and associated greenhouse gas emissions, where durable products are considered ‘disposable’.

Embodied carbon is the sum of all greenhouse gas emissions attributed to the materials throughout their life cycle (extracting from the ground, manufacturing, construction, maintenance and end of life/disposal).

Embodied Carbon: Circularity and Reuse LCA

The embodied carbon emissions of building products and construction represent a significant portion of global emissions: concrete, iron and steel alone produce ~9% of annual global GHG emissions; embodied carbon emissions from the building sector produce 11% of annual global GHG emissions.

Embodied carbon will be responsible for almost half of total new construction emissions between now and 2050 (architecture 2030). We run life-cycle analyses on selected projects to track embodied carbon of all materials, and have committed to tracking embodied carbon on every project by 2040.

We recognize that to truly get to zero, projects must also close the material loop through deconstruction and reuse. We will continue to engage in dialogue, research and collaborations to develop tools and examples that help teams at CRTKL and across the industry implement more building material reuse.

As a firm, our goal is that all our projects will be climate positive including embodied carbon by 2040.

PLANET

OPERATIONS

Climate Neutral

We will continue operating as a climate neutral firm by tracking our carbon footprint, reducing our emissions and offsetting the remainder of our emissions. We are committed to implementing creative solutions to continue reducing and mitigating our emissions.

Climate Neutral Since

2020

PEOPLE

Commitment to Culture

As an organization, we recognize that how we work drives what we make: from who makes up our organization, how employees navigate it and feel valued, to how we show up in our communities. These all affect how individuals and teams work with each other and the ideas that make their way into our projects.

As CRTKL continues our transformation journey, we commit to enhancing employee engagement and agency in shaping the future of the organization. We encourage both formalized and casual channels for these connections:

- Continuing to evaluate our performance and progress using the Just Label framework.
- Multiple training tracks to develop project management, leadership, and digital skills tailored to employees in interactive cohorts.
- Expanding supply chain commitments from our own suppliers and encouraging more diverse and equitable purchasing across the organization.

Growing our internal employee groups, from Women in Leadership (WIL), Cultural Champions, and Fellows to support DEL, sustainability, design excellence, and research efforts.

POSITIVE

Research Empowered & Advanced Digital

Our research uncovers new insights by investigating the trends and data behind our shared global challenges. From the climate crisis to a shift, towards urbanization, the places in which we live, work and play must meet a new set of imperatives. We believe that an insights-driven, human-centric approach elevates design to solve complex challenges in an increasingly interconnected world.

This year we deepen our collaboration across CRTKL's Sustainability, Research, and Design Technology teams, further weaving together the intersections between sustainability, research and digital technologies to reinforce our positive impacts on people and planet:

- Developing digital work flows that optimize design processes for deeper analysis and amplify sustainable strategies in the design work and solutions we produce.
- Focusing research and digital evolution labs that further unify CRTKL's People, Planet, Positive Design vision.
- Rolling out the Design Scorecard for all teams to evaluate holistic project performance at incremental milestones in the life span of projects.
- Sharing knowledge among teams and external partnerships to broaden our learning and advance industry awareness.

WE FRAME AROUND UNITED NATIONS GLOBAL GOALS

In our practice we are also framing our work and our operations around the United Nations Sustainable Development Goals (SDGs) — also known as the Global Goals. These were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. The 17 SDGs are integrated — that is, they recognize that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability.

MOST APPLICABLE TO OUR DESIGN WORK

Good Health and Wellbeing:

We are committed to designing healthy places to work and live that provide good indoor environmental quality, and connection to nature, and that promote activity.

Affordable and Clean Energy:

We must reduce the energy consumption of our projects while also utilizing clean, renewable energy.

Industry, Innovation and Infrastructure:

Advanced digital technology and research groups develop programs to spark innovation across CRTKL, deepen and broaden our understanding of the impact of design decisions, and apply innovations in practice and projects. Investing in innovation helps shape the trajectory of the AEC industry.

Reduced Inequalities:

Social and economic equity are essential components of a sustainable future and the fight against climate change. We must evaluate the social impact of our project work.

Sustainable Cities and Communities:

No project exists in a vacuum—we must evaluate the impact of our work on surrounding communities.

Responsible Consumption and Production:

Buildings are estimated to consume 50% of global materials and contribute to approximately half of global solid waste. We pledge to support reuse and circularity by working with existing conditions, and making responsible material choices to mitigate environmental and social impacts of CRTKL design projects.

Climate Action:

Buildings and their construction account for 36% of global energy use and 39% of energy-related CO2 emissions annually, according the the UN Environment Programme. As a large global firm, we have a responsibility to be part of the solution to climate change and to work towards net zero energy and net zero carbon for our projects and operations.

Life on Land:

Our projects, in their site selection, design strategies, and material choices have direct effects on quality of life on land. CRTKL supports prioritizing existing buildings, densifying communities, and helping restore natural habitats through landscape design and planning.

Partnerships for the Goals:

Internal and external collaborations allow us to go further than any individual employee or single organization. Each project provides an opportunity to bring a cross-disciplinary team together around advancing people, planet, positive design.

MOST APPLICABLE TO OUR OPERATIONS

Good Health and Wellbeing:

We are committed to continually evaluating and improving the benefits available to all employees for holistic health and wellbeing. Programs include support for physical, emotional, and mental health through medical benefits and ongoing education, flexible schedule options, paid time off and leave, and more to meet employee needs by region and life events.

Quality Education:

Personal growth and professional development allow individual employees to always keep learning and share knowledge with each other to progress together. We facilitate this education through annual stipends, access to thousands of free on-demand courses, and high quality employee-led learning series throughout the year on various topic areas.

Gender Equality:

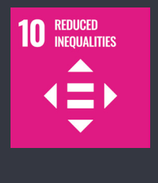
We believe that transparency improves accountability, and report on our progress to advance gender equity across the firm, in leadership, and in compensation. CRTKL encourages internal programs and affinity groups to cultivate encouraging environments for underrepresented employees to open up and thrive.

Decent Work and Economic Growth:

CRTKL prioritizes full time employment with access to comprehensive benefits and roadmaps for employees to develop their careers at CRTKL. Talent reviews provide feedback loops and touchpoints for employees to chart goals and progress. We support providing living wages at all levels.

Industry, Innovation and Infrastructure:

Advanced digital technology and research groups develop programs to spark innovation across CRTKL to shape our future work and industry. Rather than specialized units, these teams primarily create opportunities for all employees to become experts, uncovering new knowledge and developing critical tools and solutions.



Reduced Inequalities:

We review demographic data to better understand our overall diversity and progress, as well as identify unexplained pay gaps by gender or ethnicity at each level so that they can be corrected. Through mentorship programs and community volunteering, our employees participate in expanding access to opportunity into the industry for underrepresented communities.

Partnerships for the Goals:

Internal and external collaborations allow us to go further than any individual employee or single organization. We support organizations that help advance positive social, environmental, or economic change, and forge new partnerships with industry peers and academic institutions to uncover opportunities together.

02

HOW WE WORK OPERATIONS

PLANET

Reduction of Carbon Emissions

In 2020, we set a goal to be climate neutral for our own business operations by the end of 2021 in order to contribute to the Paris Agreement's goal of keeping climate change below. We met this goal one year early and our operations have been climate neutral since 2020.

We define Climate Neutrality as "the state where human activities result in no net effect on the climate system" per the CDP's Science-Based Targets initiative, which requires both net-zero emissions and an avoidance of bio-geophysical changes that negatively impact climate. We have achieved this through a combination of mitigation strategies to reduce our emissions and nature-based neutralization measures that offset our emissions, restore forested land, and preserve habitat. We also follow the CDP's mitigation hierarchy – we prioritize mitigation over neutralization and pledge to continue to reduce our carbon consumption prior to offsets by at least 10% each year, using our 2019 emissions as a baseline.

We believe in the importance of transparency when it comes to our carbon calculations, and follow GHG Protocol to track our emissions. GHG Protocol was developed by the World Resources Institute and the World Business Council for Sustainable Development, and is the world's most widely used greenhouse gas accounting standard. We include both the mandatory Scope 1 and Scope 2 emissions (direct emissions and electricity) in our operational carbon footprint as well as several categories of Scope 3 emissions that are voluntary to report - business travel, commuting, and paper consumption. Our 2022 emissions prior to neutralization measures were 1,452 metric tons CO_2e, a 2% reduction from our 2021 footprint.

Business travel was the largest contributor to our carbon footprint, accounting for 60% of our emissions. Our US offices were the biggest contributor to our global carbon footprint at 66%, followed by our China offices at 16%.

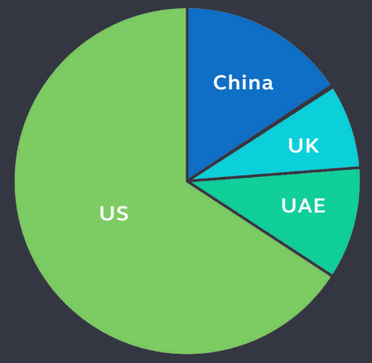
Climate Neutral Since

2020

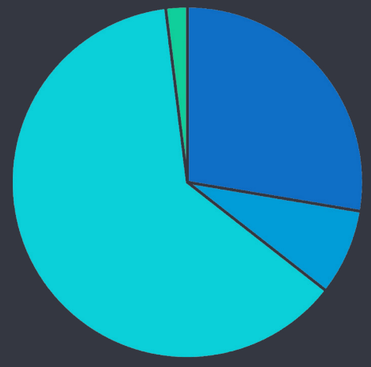
We achieved this goal through several strategies:

- Adoption of Digital 1st communications to reduce printing and paper consumption
- Hybrid work-from-anywhere model to reduce employee commuting
- Right-size office space for hybrid work-from-anywhere model
- We are continually looking to implement new strategies to reduce our carbon footprint.

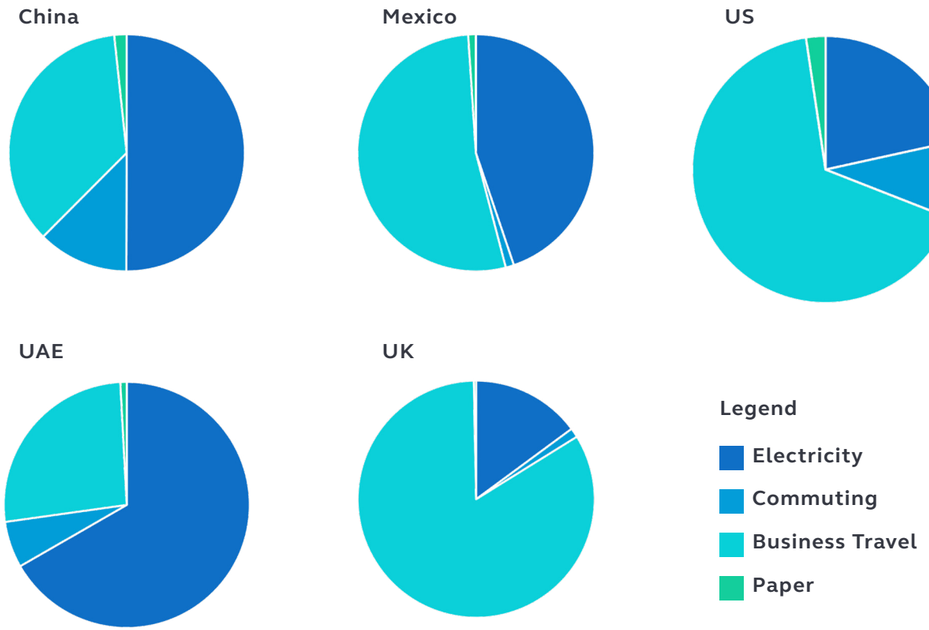
Carbon Footprint Total By Region



Carbon Footprint Total Firmwide



Carbon Footprint by Region



2022 Carbon Footprint Breakdown

As business travel increased and our employees returned to the office as part of a hybrid work environment, our business travel and commuting footprints increased as compared to 2021 - business travel by 15% and commuting by 20%. 2 primary factors kept the business travel increase down - a travel policy requiring Principal approval for all trips, and revised, lower EPA miles to CO2e conversion factors for US air travel. For our commuting footprint, post-pandemic in 2022 we no longer used desk check-in software to precisely track the number of people in-office each day, and did not have revised commuting survey results in time for this report. Therefore, we have used a conservative estimate based on commuting methods per 2021 commuting surveys and average number of days per week in each office - 50% of employees in office 3 days a week for most offices.

Our overall footprint decreased by 2%; the travel and commuting increases were mitigated by a 21% decrease in electricity footprint and a 66% decrease in our paper footprint.

Business Travel
877,519 kg CO2e
▲15% increase
from 2021

Electricity
420,214 kg CO2e
▼ 21% decrease
from 2021

Employee Commuting
127,000 kg CO2e
▲20% increase
from 2021

Paper
27, 805 kg CO2e
▼ 66% decrease
from 2021

Direct Emissions
0 kg CO2e
no change
from 2021

Total

Equal To
323 cars
driven for a year

It Would Take
1,732 acres of forest
to sequester that much
carbon for a year

TRAINING & DEVELOPMENT

Catalyzed by the virtual working environment of the pandemic, CRTKL's specialized teams have organized high quality employee-led educational programming to share and deepen our collective knowledge. These are offered live, and then accessible on demand for CRTKL employees globally to watch at their convenience.

These expanded series complement the fundamental trainings that all employees complete for business critical competencies, leadership development, technical and craft-related training, as well as the vast array of self-paced learning opportunities. On average, each CRTKL employee completes between 15-25 hours of training throughout the year to excel in their role, with access to thousands more hours of education few engagement highlights from our custom CRTKL-crafted programs are shared on the following pages.

Additionally, CRTKL supports employees' attendance at industry conferences to share their own findings and learn from others in the field. More information on our teams' recent speaking engagements can be found in Chapter 5.

Education and Training

Education and training are essential and necessary to fulfill our People, Planet, Positive Design vision. In 2021, we launched the Performance Driven Design Learning Series. Continuing into 2022, we offered seven 1-hour classes throughout the year on topics including circular design, designing with daylight and GHG emissions. Each class was offered virtually and open to everyone in the firm, and a recorded version was available for viewing after the live session. We also introduced an in-depth building simulation training program in partnership with Sefaira, piloted in our London and Dubai offices, to be rolled out to all offices globally in 2022. Over 200 participants in Sefaira training sessions to build more in depth knowledge across teams.

7 Sessions

650+ Attendees

Women in Leadership (WiL)

WiL wants to create a space for incredible women* to come together, build community, create connections, celebrate accomplishments, and gain and learn new valuable skills to thrive both personally and professionally. Events and workshops help create a network of support across offices, teams and levels. They provide opportunities for learning, empowerment, and growth, and promote gender diversity and inclusion across the firm.

11
Workshops + Events

70+
Average Attendees

400
Members Across All Offices

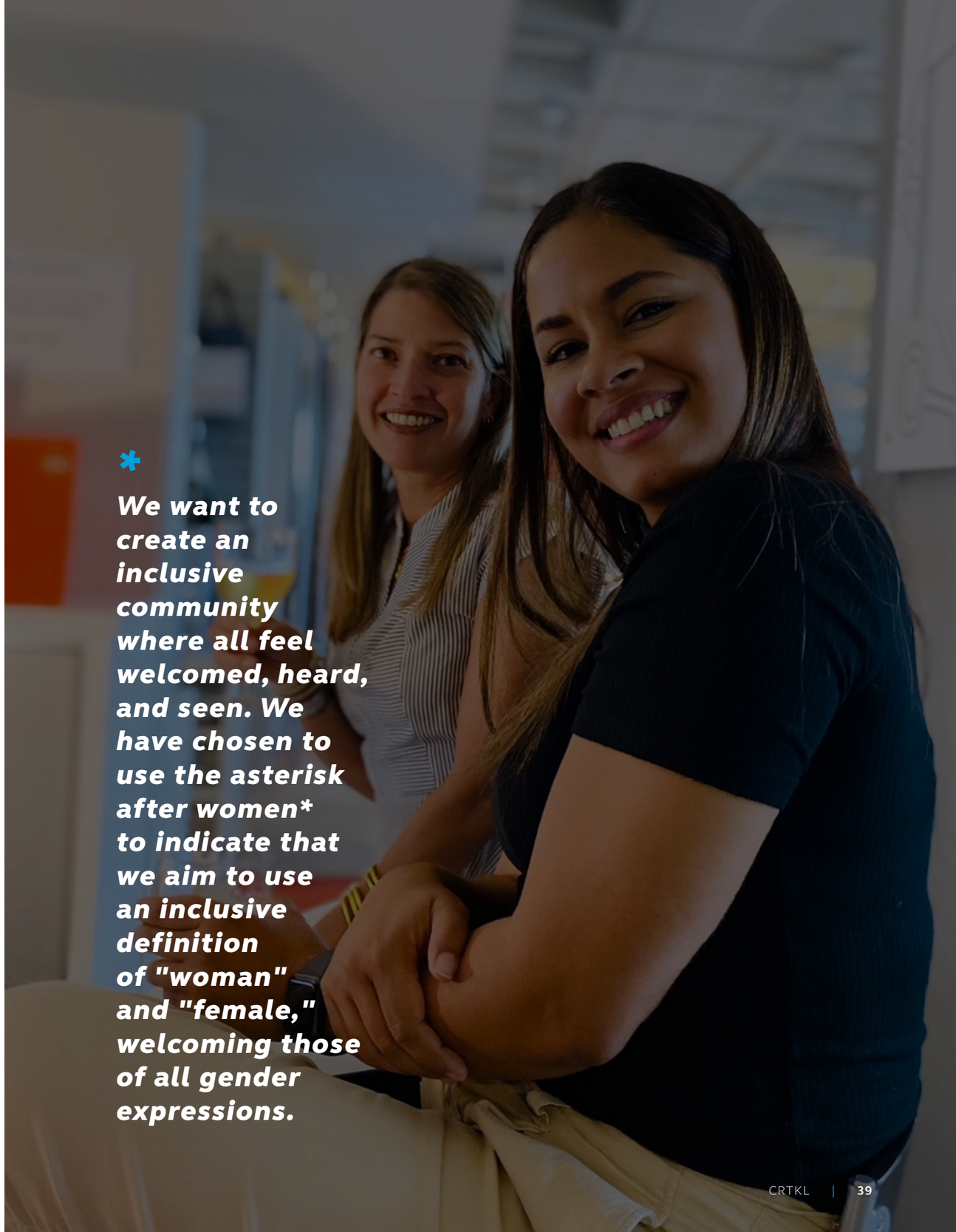
Research50

The Research50 webinar series are hosted by the CRTKL research team to help employees become familiar with the basics of research methods, skills and how to use them in the context of teams' larger project goals. These cover wide array of go-to resources to best practices for common research methods, as well as a platform for sharing case studies. They cover the basics to get employees familiar and comfortable with research tools and approaches.

9
Webinars Hosted

100
Avg. Monthly Attendees

243
Total CEU Credits Given



CRTKL Homeschool

CRTKL is into our third year hosting this series by the Digital Technology Group. Both attendance and engagement have been consistent, as we average about 70 attendees per event. We love to be able to continue to share knowledge, insights, and digital upskilling opportunities with fellow CRTKL employees.

12
Sessions Last Year

795
Total Attendees

66
Avg. Attendees Per Event

CRTKL Revit University & Onboarding

Revit University is our internal training program intended to improve our Revit practices and overall BIM literacy. This training is administered when a new-hire begins at CRTKL (Onboarding) and once a year for existing employees.

101
Total Attendees

CRTKL Computational Design - Sustainability Design Slam

Following on previous years' Digital Evolution Labs, the Sustainability Design Slam was a week-long, virtual event during which participants were challenged to design a vibrant and sustainable mixed-use master plan with a focus on understanding the sustainability metrics of the scheme including sunlight, noise, view distance and operational energy.

48
Registrants

14
Submissions

HOLISTIC FRAMEWORKS

JUST Label

CRTKL received the JUST Label for our US region in early 2021, and are currently in the process of gathering documentation to update it for our biennial review. As one of the largest firms with the Just Label, CRTKL's process to proactively evaluate the firm's policies and practice sets in motion ILFI's ambitious vision with real tools for organizational and systemic change.

While these efforts are always a work in progress, we are please to report that in our preliminary data for our updated label in 2023 we've seen an increase in our employee diversity metrics, both gender and ethnic.

The JUST Label brings social equity priorities to the forefront. Internalizing them as part HR, financial and procurement practices enhances our pathways to measure success as an organization. The JUST Label connects the dots across the many ongoing efforts to measure what matters. We look forward to sharing our progress through an updated 2023 Just Label soon.

Ecovadis

Ecovadis is a digital platform that provides sustainability assessments to evaluate companies' material sustainability impacts based on documented evidence.
In late 2021, CRTKL submitted to the Ecovadis assessment for the first time. It helped us take a broad view of ESG issues across the organization, and challenged us to improve our tracking and documentation of policies, actions, and results that keep the organization accountable to a well rounded vision of sustainability.

Our resubmission in 2022 resulted in improvement across all four impact categories (environment, labor & human rights, ethics, and sustainable procurement). We have now been awarded a bronze medal in recognition of sustainability achievement.

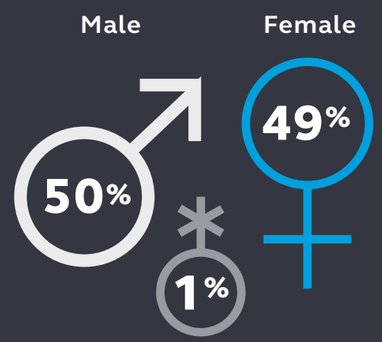
Evaluating Diversity

As a firm, we recognize the inherent value in a diverse workforce and an inclusive work environment – more holistic and equitable decision-making, higher performance and more innovation, and greater employee connection and engagement. We value the differences among people and the contribution these differences bring to our business. We recognize that certain groups are underrepresented in our workforce and our industry, and that raising awareness helps us take action and evaluate progress.

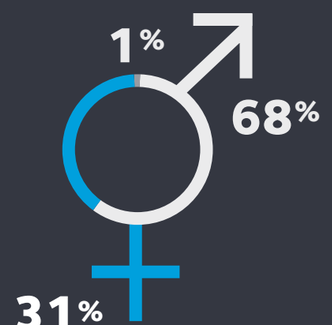
CRTKL advances our commitment to a just workplace and world through:

1. Transparency in our operations, policies, and procedures
2. Developing equity through our benefits and programs
3. Partnering with diverse businesses and organizations that reflect our communities

Gender



Leadership by Gender



Leadership by Race

- 58% White
- 30% Asian
- 8% Hispanic or Latino
- 2% Two or More Races
- 2% Black or African American

Race Firmwide

- 46% White
- 36% Asian
- 11% Hispanic or Latino
- 4% Black or African American
- 2% Two or More Races
- <1% Native Hawaiian or Other

Race by Region

NORTH AMERICA	
Asia	18.5%
Black or African American	3%
Hispanic or Latino	11%
Native Hawaiian or Other	<1%
Two or more races	2%
White	38%

EMEA	
Asia	2.5%
Black or African American	1%
Two or more races	<1%
White	8%

APAC	
Asia	15%

POSITIVE

Innovation Ecosystem and Research

CRTKL builds upon decades of innovative ideas by formalizing and building a platform for investigation. Our research and digital evolution programs and activities are not siloed. Rather, they are an ecosystem of ideas, hunches and thoughtful investigations. We foster research and forward-thinking design solutions that are directly applied to our work.

Our Research Team is hard at work delivering innovative design solutions, while strategically building a formal engine for research and innovation. This requires the partnership of business strategy, collaborative opportunities and rigorous investigations. We invite clients and collaborators to help us explore future solutions to topics we are currently focused on through a variety of programs.

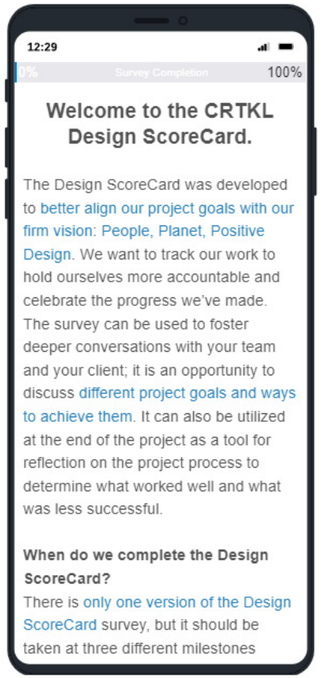
- Microgrants Program
- Impact Studies
- Digital Evolution Lab

Design Scorecard

A Collaborative Effort Between Sustainable Design, XD, Design, Research Teams

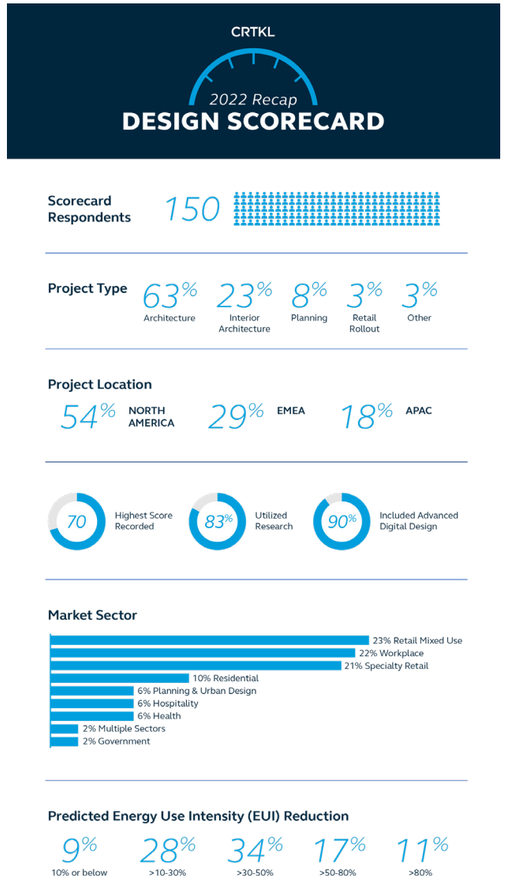
Launched in September 2022, the Design Scorecard was developed to better align our project goals with our firm vision: People, Planet, Positive Design. We want to track our work to hold ourselves more accountable and celebrate the progress we've made.

The purpose of the program is to evaluate ourselves and bring more awareness to how our firm goals align with project work. As of December 2022, we have received over 150+ responses.



150+ Responses

70 Highest Score



03

WHAT WE MAKE PROJECTS

Torre Europa
MADRID, SPAIN

SUSTAINABLE DESIGN

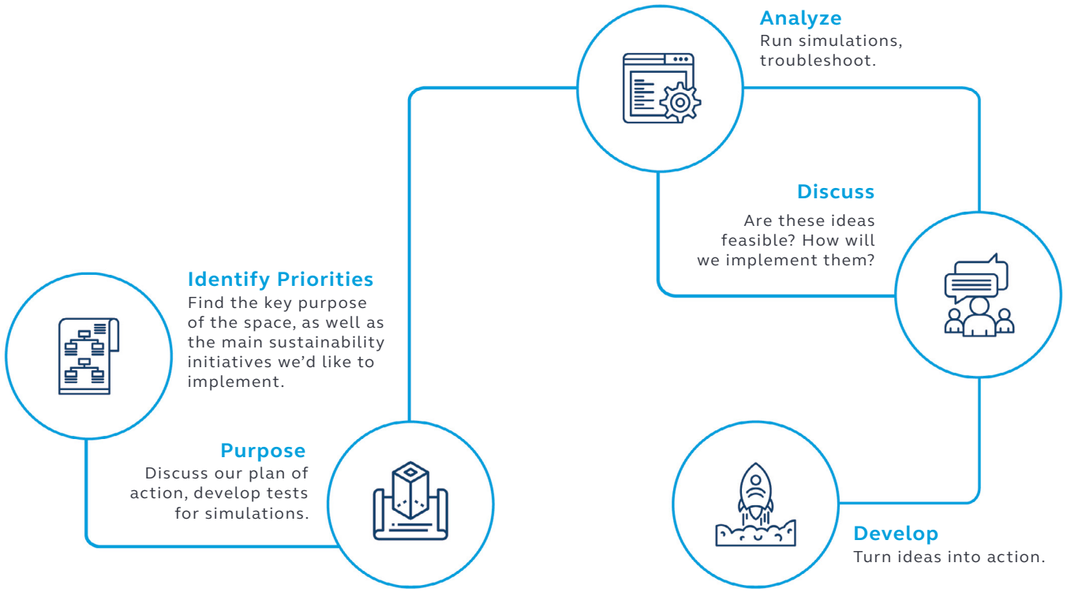
At the core of every CRTKL project lies a commitment to preserving and ensuring the needs of future generations. In our work, we focus on design excellence, informed by environmental performance, providing a positive impact on the planet, and informed by climate justice. From interiors to urban spaces, we use advanced technologies to design resilient environments that provide health and comfort for their occupants. Our projects are informed by nature, modeled after living beings, and integrated with the environment, reducing consumption of non-renewable resources, and minimizing waste, while moving towards the creation of carbon positive and regenerative environments. As industry leaders in sustainable design, we also develop and share tools such as ClimateScout that benefit the design industry. As a global firm we are already Climate Neutral in our operations and are committed to social equity as demonstrated by being the largest firm to receive ILFI's JUST label.

CRTKL's Sustainable Design process combines analog and digital tools to design low-carbon buildings that are also more resilient and responsive to climate. It is a flexible process that can be tailored to any project goal. Bolstered by scientific principles, research and performance simulations, our process guides designers in an increasingly complex world -- improving the quality and value of any project.

In all our offices, we follow the same basic principles which we apply to different types of spaces and projects. In our projects, we consider the impact of energy, water, waste and materials. When necessary, we use computational design to aid in the generation of ideas and building performance simulation tools to test them. Among the building performance simulations that we use in our practice are energy modeling, life cycle assessment (LCA), daylight and glare analyses, air flow and thermal comfort.

Sustainability is integrated into our design process. Projects in our practice move very quickly, driven by the developer and market forces, making it challenging to implement sustainable design strategies in projects. The activities in the process can be organized as a set of strategies described in the figure on pages 52 and 53. The vertical columns indicate the phases: Pre-Design, Conceptual Design (CnD), Schematic Design (SD), Design Development (DD), Construction Documents (CD), Construction Administration (CA) and Operation and Maintenance (O&M).

The horizontal bands identify six areas that must be developed including operational energy and carbon, daylight and views, high performance envelope, micro-climate design, life cycle assessment, and climate proofing along with a seventh horizontal band for optional building certification. Rectangles in the intersection of these two describe strategies and processes that can be implemented in each area to improve building performance. These can take many forms and combine different analogue and digital tools. It is thus possible to delve deeper into each of these "boxes" or combinations of boxes and develop very detailed workflows that include tools and activities.



CRTKL Sustainable Design Process

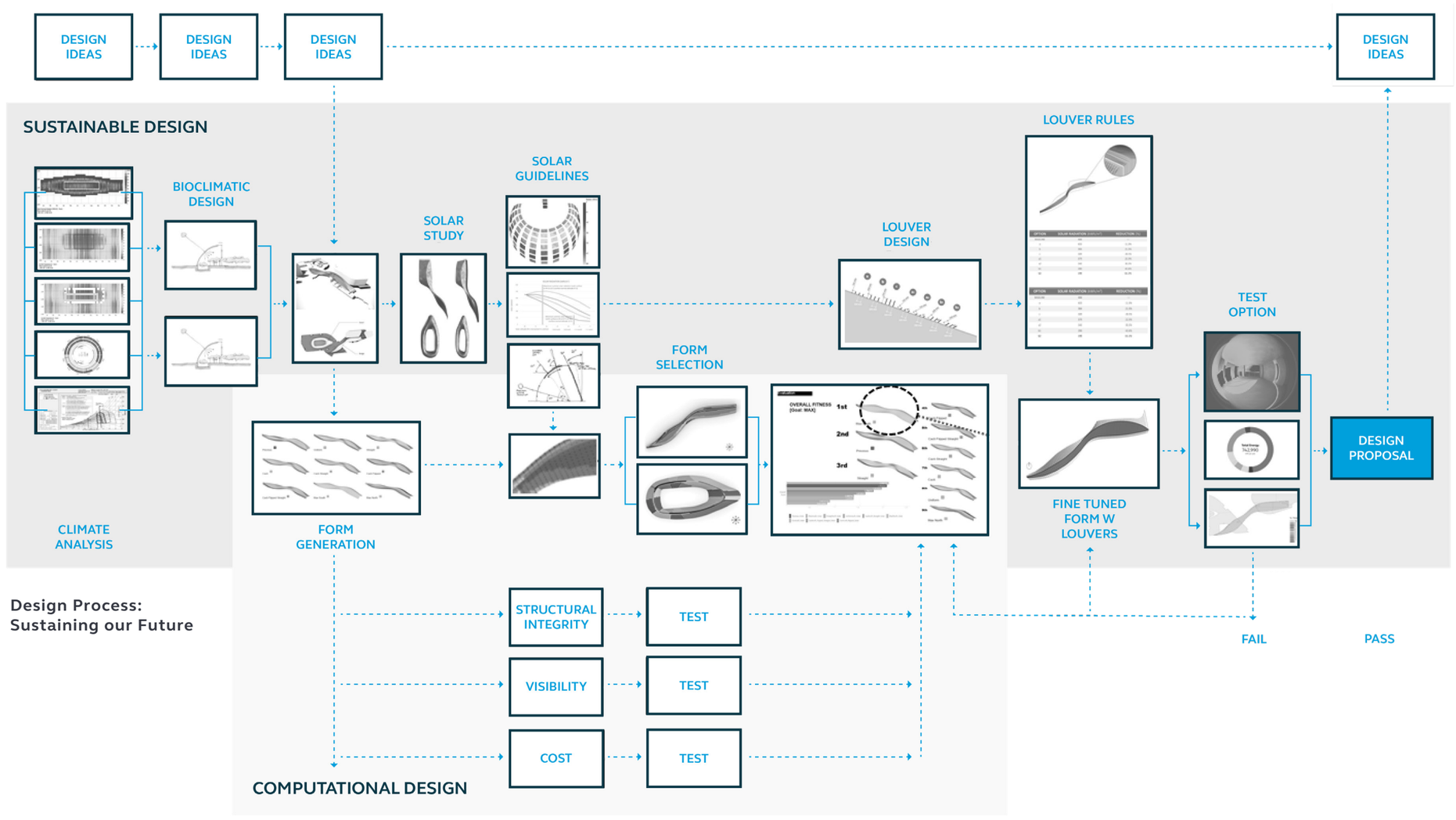
To achieve these goals, sustainable design at CallisonRTKL is integrated in the design process involving several steps: from identifying priorities, proposing ideas, analyzing, discussing and developing.

DESIGN PROCESS WITH STRATEGIES

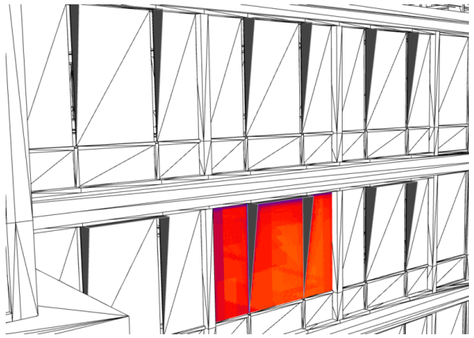
	PRE-DESIGN	CnD			SD		DD + CD		CA + O&M	
Operational Energy / Carbon	Benchmarking	Sustainability Concepts & Systems	Eco-Charrette/ Set EUI Goals	Passive and Active Strategies	Passive Heating & Cooling	Renewable Energy	Compliance Energy Model	Final Energy Model / LEED Energy Model	Verify Performance as Specified	Energy Audits
	Climate Study	Climate Study, Preliminary HVAC Design	Climate Responsive Guidelines	Shoe-box Simulations	Active Solar Systems	Preliminary Energy Study / HVAC	Renewable Energy / PV Production	HVAC	Post Occupancy Evaluation Set Up	Post Occupancy Evaluation
Daylight & Views	Climate Study	Goal Setting (sDA, ASE, sDG)	Facade Daylight Analysis		Preliminary Daylight Study	Test Daylight and Glare Goals	Integrated Envelope Design	Final Energy Model	Adjustments to Sustainability Requirements	Energy Audits
		Sun Path Analysis, Solar Studies	View Distance Method			Modify Window / Shading Design	Comprehensive Daylight Study	LEED Daylight & Views Analyses		Post Occupancy Evaluation
High Performance Envelope	Climate Study	Climate Analysis	Facade Solar Study	Shade Design / Parametric Design	Indoor Air Velocity	Facade Solar Study	Shading	Final Energy Model	Adjustments to Sustainability Requirements	Post Occupancy Evaluation
			Envelope Assembly	Generate / Research Design Guidelines	Envelope Assembly	Massing and Shading Study	CFD Studies	Integrated Envelope Design		
Microclimate Design	Climate Study	Outdoor Thermal Comfort	Outdoor Solar Study	Seasonal Wind at Site	Solar and CFD Studies	UTCI Calculations			Adjustments to Sustainability Requirements	Post Occupancy Evaluation
Life Cycle Assessment	Review Embodied Carbon Requirements	Define Baseline and Set Targets	Determine Green Certification Targets	Begin Tracking Embodied Carbon	Begin LCA, Structural, Envelope, Partitions	Total Carbon per Life Cycle Stage	Explore End of Life Options	Update WBLCA	Track Procurement of Materials for Embodied Carbon	
Climate Proofing	Understand Exposure		Assess Vulnerabilities and Risks	Investigate Options		Prioritize and Plan	Take Action			
Certification	Guidelines	Goals Targets Charrette	Integrated Design		Goal Assessment		Credit Documentation	Design Credit Submission	Credit Documentation	Design Credit Submission

PARAMETRIC DESIGN

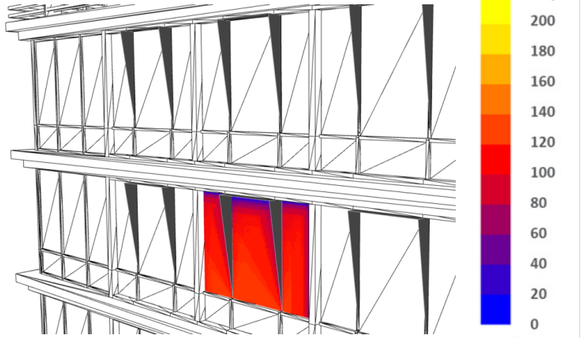
Parametric design is a form of computational design in which features such as building elements or urban components are shaped according to algorithmic processes, using parameters and rules to determine the relationship between design intent and design response instead of being designed directly. The diagram illustrates how the parametric design process, as part of computational design can be integrated in the design process with sustainability informing it as the project develops. Climate analysis informs bioclimatic strategies, while parametric design evaluates multiple options based on criteria such as structurall integrity, visbility and cost. Rules are developed by the sustainability team and used in parametric design. Options are tested for daylight, glare and energy using building simulation tools. The designers also evaluate ideas during the process and ultimately select the most appropriate option in conjunction with the client.



Design Process: Sustaining our Future

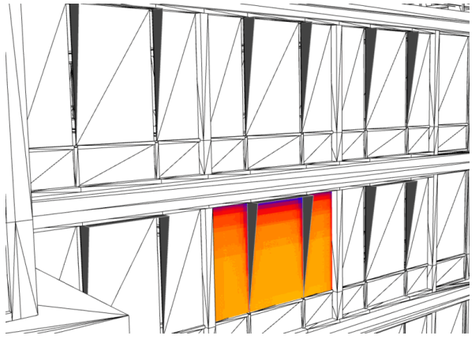


East Elevation, Winter
Medical office building in Texas

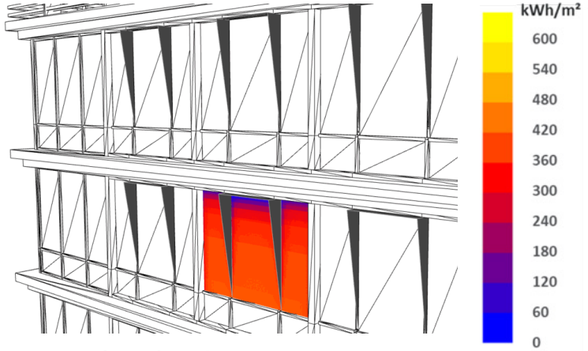


West Elevation, Winter
Medical office building in Texas

Several examples of parametric design are shown. The parametric shade design uses advanced computer algorithms to generate shading structures that vary in extrusion and angles tailored to specific solar conditions. By integrating solar study data, such as sun angles, orientation, and shading patterns, designers can create precise and efficient shading solutions in response to changing solar angles that maximize solar gain during the winter months and minimize it during the summer. This approach allows for maximizing natural daylighting, reduces glare, and optimizes building performance and energy efficiency while creating aesthetically appealing and functional shading elements. By using parametric modeling tools, designers can iterate and refine shading designs based on performance feedback, allowing for a more informed and iterative design process.

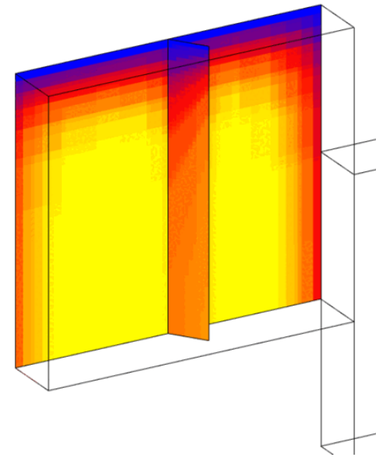


East Elevation, Summer
Medical office building in Texas

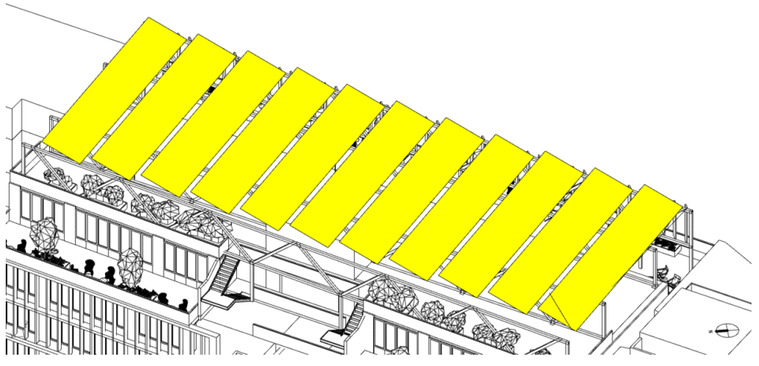


West Elevation, Summer
Medical office building in Texas

The parametric facade PV and roof PV design aim to optimize the placement of PV panels on building facades and roofs to maximize energy generation. The optimized facade PV option involves finding the optimal size and division of PV panels to achieve lower annual solar gain on glazing and higher solar radiation on each PV panel. This helps to minimize the impact of solar radiation on the building's interior while maximizing the energy generated by the PV panels. On the other hand, the roof PV option focuses on finding the optimal tilt angle, azimuth, and division of PV panels to achieve maximum energy generation. This helps to optimize the positioning of the panels to capture the most solar energy throughout the year, resulting in greater energy production. Such an approach ensures that the building's energy needs are met sustainably, while contributing to reducing its carbon footprint. Overall, parametric PV design has become an essential tool in creating energy-efficient buildings that effectively harness the power of solar energy for electricity generation.



Southeast Facade PV
Office Building in Malaga, Spain



Roof PV
Office Building in Malaga, Spain

PLANET

‘Planet’ focused projects highlight many of the strategies we employ to reduce environmental impact and move toward restorative and regenerative systems. Working with nature, these projects increase efficiency, harness renewable energy and preserve natural resources. Integrated strategies further improve occupant experience by prioritizing outdoor connections, increased mobility, healthy materials, and passive design strategies. Teams develop a focused, measurable, and meaningful understanding of the environmental impacts of their work through advanced simulation tools and processes throughout their projects.

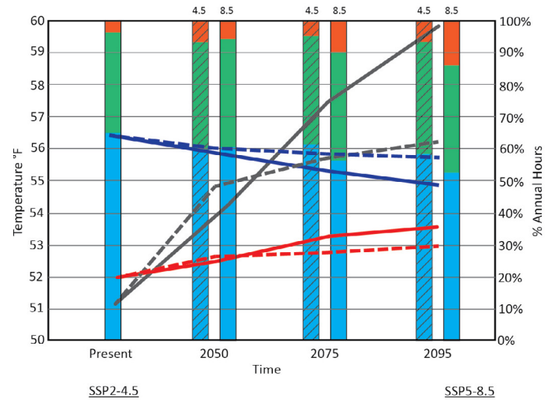
Adapting To A Changing Climate

JFK Presidential Library Climate Action Plan

Boston, Massachusetts

John F. Kennedy Presidential Library Climate Action Plan provides a comprehensive analysis of climatic conditions, potential hazards, associated vulnerabilities, and suggested mediation strategies.

The first step toward resilience is to explore hazards for the Kennedy Library. As climate change is the underlying catalyst in many of the projected hazards, it is extremely important to understand how Boston's future climate might shift in the coming decades. Projected climatic analyses for the remainder of the 21st century, are highly dependent upon global greenhouse gas (GHG) emission rates. The IPCC has presented several emission scenarios that are based on varying degrees of global GHG emission rates and span the remainder of the 21st century. CallisonRTKL utilized morphed weather files that are representative of certain IPCC emission scenarios to gain a detailed understanding of how the City of Boston's climate will transform in the near and distant future. A moderate emissions scenario, SSP2-4.5, and a business-as-usual emission scenario, SSP5-8.5, were used to generate climatic data charts that were used to envisage future environmental conditions. Climatic data was aggregated and analyzed for three time periods: 2050, 2075, and 2095. Temperature, humidity, solar radiation, cloud cover, wind, and thermal comfort were among the climatic factors taken into consideration. The data from these studies helped render a clearer understanding of the implication and magnitude that future climate conditions could contribute toward potential environmental hazards in the future.



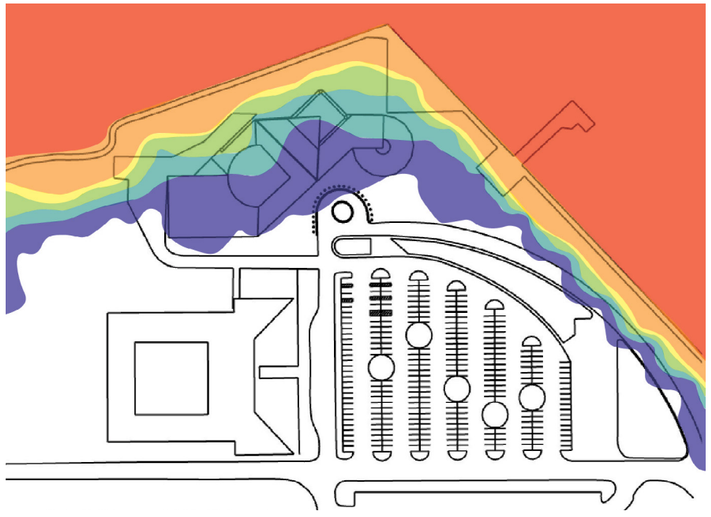
Time SSP2-4.5

- Annual Average Temp.
- Underheated Hours
- Overheated Hours
- UTCI (Cold Stress)
- UTCI (No Stress)
- UTCI (Heat Stress)

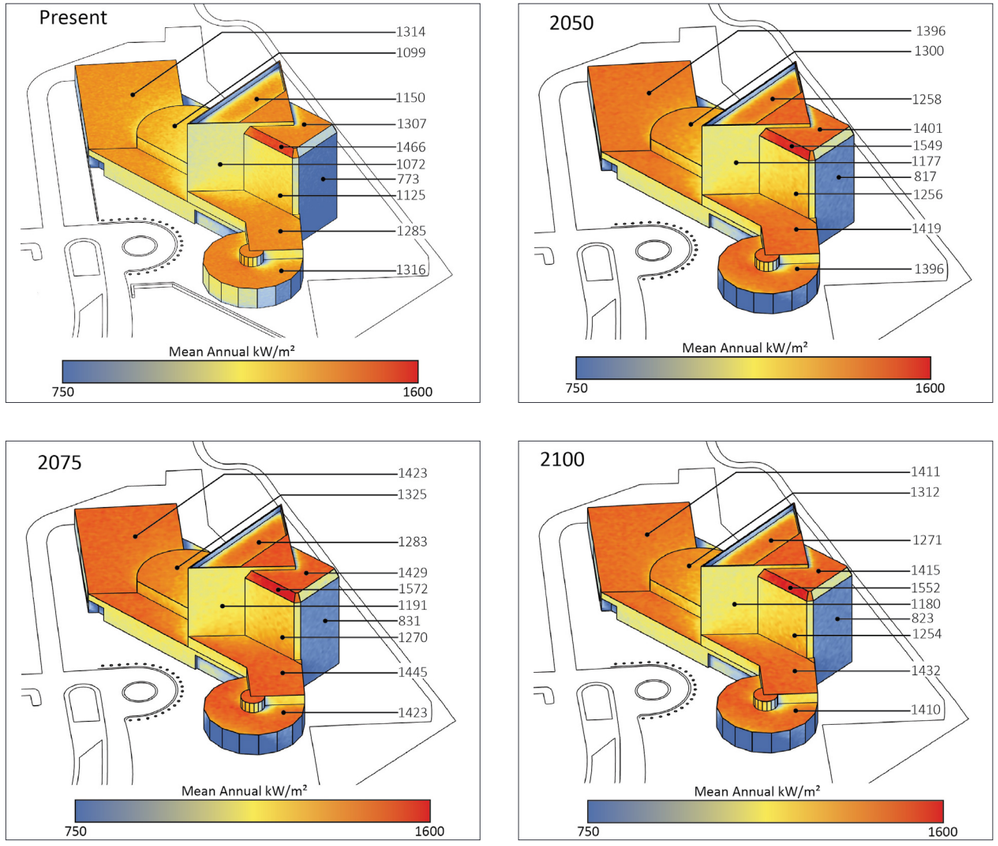
- Annual Average Temp.
- Underheated Hours
- Overheated Hours
- UTCI (Cold Stress)
- UTCI (No Stress)
- UTCI (Heat Stress)

Emission scenario climate projection analysis summary chart for Boston, Mass.

The data sets that resulted from the morphed weather files were used to accomplish the second step toward resilience where they were used to create charts and tables used to assess vulnerabilities and risk factors that the John F. Kennedy Presidential Library will confront in the coming century. These hazards include sea level rise, extreme heat events, as well as increased frequency and severity of storms. NARA's mission to preserve historical artifacts and serve as educational ambassadors to surrounding communities is threatened due to environmental hazards imposing serious risk to the physical integrity of the Kennedy Library. The vulnerabilities of the JFK Presidential Library are listed in relation to how each type of hazard could present issues for the site, the building envelope, mechanical systems, operations, and the surrounding communities on aspects regarding environmental justice. Due to its shore front setting, the Kennedy Library is exceedingly vulnerable to relative sea level rise and storm surge flooding events. The figure below shows a projected flood depth in the event of a 1% annual flood in the 2070s. The lowest levels of the John F. Kennedy Presidential Library would be completely inundated in up to two feet of water in this type of flooding event. Increased frequency and duration of heat waves could threaten greater portions of the surrounding Boston population who have little access to amenities for refuge to avoid heat related illness and mortality. Other considerations that could pose risk to the Kennedy Library are drought and wildfire caused air quality issues.



2070 1% Annual flood depths

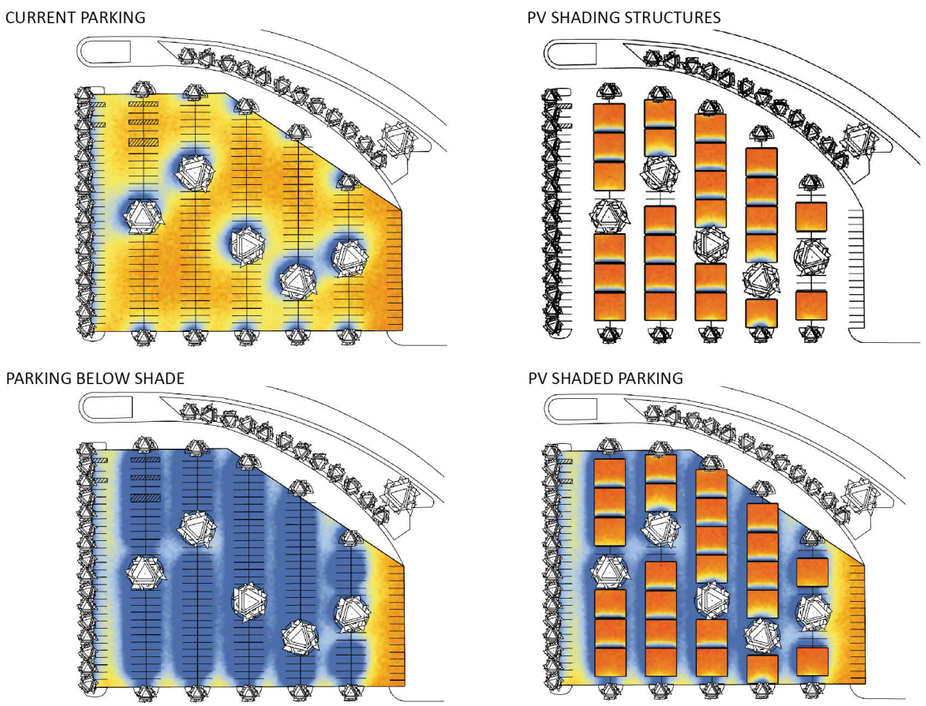


Distribution of solar radiation according to SSP5-8.5 at: present, 2050, 2075, 2100.

As climate change raises average temperatures over the coming century, it is pertinent to understand how this phenomenon will affect the building envelope of the John F. Kennedy Presidential Library. Increased concentrations of GHGs will influence levels of solar radiation that building envelope reflects and absorbs. The figure above was generated to express how the John F. Kennedy Presidential Library performs in solar radiation simulations associated with emission scenario SSP5-8.5. The numerical figures correspond with mean annual kilowatts per square meter, kW/m^2 - yr. Generally, the southeastern facades receive most of the direct sun light. The roofs of the building capture higher levels of radiative heat than all other surfaces. The study indicates that the building envelope will receive increasing levels of solar radiation until the 2070s and then levels will decrease slightly by 2095 due to increased levels of relative humidity that contribute to atmospheric absorption of solar radiation.

The proximity of the asphalt paved parking lot to the front entrance of the John F. Kennedy Presidential Library contributes to a sensible urban heat island effect for visitors and staff. Measures can be taken to shade and cool the parking area to lessen the sensible temperature increase. A mechanical solution to the parking lot heat island effect could be the implementation of photovoltaic solar panels in the form of shade structures. By generating on-site power this type of solution would help to offset current annual electric utility costs, contribute to the site's passive resilience, and shade the overheated parking lot.

The figure below presents a solar radiation map to visualize the effectiveness of this proposed solution. A second option that can be done in concert with the implementation of a shading solar panel array above the parking lot is the addition of more trees and natural vegetation to generate more shade and cooling. The parking lot could be redesigned to create a cooling microclimate around the building by maximizing utilization of landscaping and trees to naturally shade the site, reducing surface temperature at the outdoors occupied areas, mitigating high summer temperatures, and reducing extreme daily swings.



Photovoltaic array shading system proposal for Kennedy Library parking lot.

CONTEXT	STRATEGY	INCREASE RESILIENCE	ECONOMIC FEASABILITY	POSITIVE ENVIRONMENTAL IMPACT	ABILITY TO IMPLEMENT
SITE	HARBORWALK SEAWALL	YES	MAYBE	YES	YES
	PLANT TREES	YES	MAYBE	YES	MAYBE
	OUTDOOR COOLING STATION	YES	MAYBE	MAYBE	YES
	PARKING LOT PV SHADING SYSTEM	YES	MAYBE	YES	MAYBE
	PERMEABLE PAVEMENT IN PARKING LOT	YES	MAYBE	YES	MAYBE
	INCREASE ALBEDO OF PARKING LOT PAVING	MAYBE	MAYBE	MAYBE	MAYBE
	LIVING BREAKWATERS	YES	MAYBE	YES	NO
ENVELOPE	RESEAL ROOF LEAKS	YES	YES	NO	YES
	BUILDING INTEGRATED PV GLAZING SYSTEM	MAYBE	MAYBE	YES	YES
	SHADE CONTROLLED ROOF	YES	MAYBE	MAYBE	MAYBE
MECHANICAL	ENHANCE MECHANICAL SYSTEMS	YES	MAYBE	YES	MAYBE
	REINFORCED BACK-UP POWER SYSTEM	YES	MAYBE	MAYBE	MAYBE
OPERATIONS	HAZARD S.O.P.	YES	YES	MAYBE	YES
	HAZARD AWARENESS FOR COMMUNITY	YES	YES	YES	YES
	EASY SANITATION OF FINISHES AND FURNITURE	YES	YES	YES	YES
	PROMOTE LOW CO^2 EMISSIONS	YES	YES	YES	YES

YES
MAYBE
NO

Strategy selection matrix

The last step is to prioritize and plan which mitigation strategies are feasible for actionable deployment. The table above is intended to be used as an organization tool to consider various pros and cons of each of the climate resiliency strategies. Each strategy can be evaluated in terms of its ability to increase resilience, economic feasibility, positive environmental impact, and its ability to be implemented. A simple three tier rating system can be used to indicate whether a recommended strategy aligns with NARA's mission with respect to each of the four criteria listed in the table below. This can help streamline and simplify the mitigative strategy selection process and can even help illuminate complementary strategy combinations that could be more cost effective to implement together instead of individually.

A New Skin for a New Life

Castellana 66 | Madrid, Spain

Castellana 66 is an office project in Madrid, built in 1990 and that now, thirty years later, the building needed to be upgraded with the current building standards in terms of acoustics, energy efficiency and carbon emissions. Rather than demolish the building and design a new one, a careful design upgrade for the facade has been carried out to create a high-performance envelope.

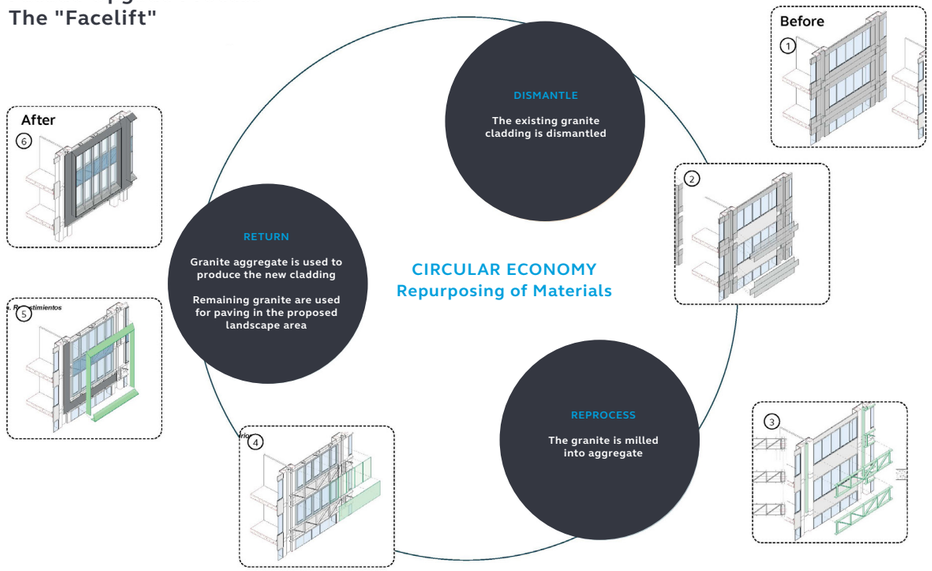
This facade generates energy through photovoltaics integrated in the façade with minimal additional embodied carbon and a significant reduction in operation emissions and improvement in daylight and overall wellness inside the office environment.

Bioclimatic criteria is used to increase energy efficiency, while the design also fully respects the urban parameters of uses, volume, heights, occupancy, buildability, etc. The existing building is integrated with the environment with appropriate construction systems, materials and finishes to achieve carbon neutrality. The existing façade openings have been maintained, grouping them in pairs every two floors.

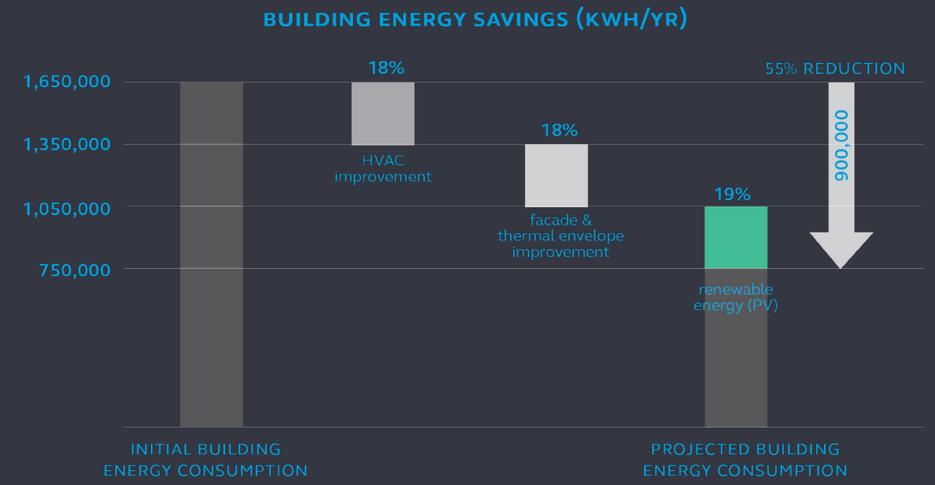
Light overhangs have been superimposed on the façade that frame the gaps grouped by 55cm eaves every two floors and a similar light lateral closure. The components of the photovoltaic system are part of the bioclimatic system exposed to the sun and includes glass slats for solar protection.

The exposed and massive façade is transformed into a simple urban composition of bioclimatic architecture.

Facade Upgade Process
The "Facelift"



Energy



Carbon

Using the same structure instead of demolishing saves 8,937 metric tons of carbon embodied in it.

Annualized for a 60-year lifetime, this is 148,953 kg CO2e per year avoided.

Improving the envelope and mechanical systems and adding renewable energy reduces energy use by 55%. This is a savings of 101,151 kg CO2e per year.

Annualized savings are 250,104 kg CO2e/yr. in total carbon, equivalent to 4,134 tree seedlings grown for 10 years every year.

Renovating for High Performance

Torre Europa | Madrid, Spain

Originally constructed in 1985 by architect Miguel de Oriol e Ybarra, located in the heart of Madrid's business district and across from Santiago Bernabéu Stadium—the 116-meter high Torre Europa was a striking landmark in need of key upgrades.

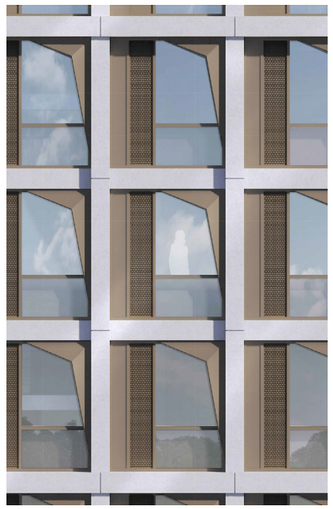
CallisonRTKL reoriented the entrance the lobby, providing transparency improving the connection between the lobby and the public space. A sophisticated glass cube with a reflective water feature serves as the building's new front door. A second entrance on the ground level enhances outdoor connectivity, improving linkage to a public plaza surrounded by dining and other amenities. A hanging canopy above the lobby wraps around the side of the building to connect the plaza to the main entrance. All internal lift lobbies and cross lobbies were upgraded accordingly, complemented by new finishes, stone floors, contemporary lighting and a consistent branding identity. CallisonRTKL also replaced the tower's exposed concrete façade with stainless steel, enhancing its modern appeal for a target market of international office tenants.

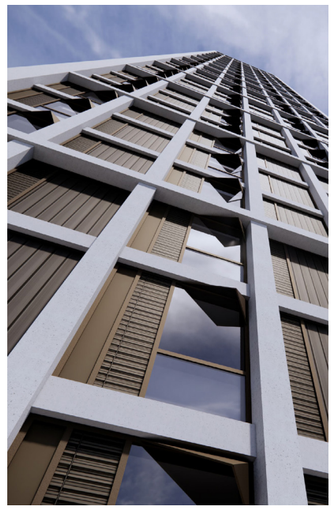
The goal for this project was to obtain a carbon neutral building for operations. Energy consumption was reduced by 30% and water consumption was reduced by 29%. A Connected Lighting System was introduced to the project which had the potential to reduce energy consumption by 80%. The remaining energy required to run the tower, was sourced from renewable sources. Biophilia was incorporated to outdoor areas to improve biodiversity and air quality. Torre Europa achieved LEED Platinum.

Parametric Design Informs the Envelope

Brindley Drive | Birmingham, UK

The Brindley Drive residential project in Birmingham is a prime example of the benefits of utilizing energy modeling and shading optimization in architecture design. Through extensive analysis of different design options, our team was able to minimize cooling loads during hot periods and maximize heating loads during colder months. We prove the benefits of shadings by comparing Energy Use Intensity (EUI) with various façade options. Our team developed an algorithm that integrated parametric façade with sun vectors, allowing us to generate the optimal extrusion and angles for shading. The use of automation and iteration through Grasshopper in Rhino allowed for data post-processing and the discovery of a sweet point where the shade blocks direct sunlight during the summer months while admitting solar gains during the winter. By cross-validating our optimal shade design option with the initial design, we were able to ensure that the building received adequate solar radiation during both cold and hot periods while providing unobstructed views to the outside year-round. The Brindley Drive project is a testament to the benefits of utilizing innovative technology and design techniques to create sustainable, energy-efficient architecture.





58%
Reduction In
Carbon Emissions

30%
Energy Demand
Reduction

c.90%
Material Selection
Target Recycled
Eol Scenario

15 & 46
Storey Apartment
Buildings

0.7
Maximum Overall
U-Values (W/M2k)

12%
Reduction In Solar Radiation
In Summer Via Hood & Fin
Integration

581
New Homes

c.15k sqft2
Internal Amenity
Space

Extending the Workplace Outside

Block 6 | North Carolina, USA

Block 6 is a 375,000 SF, 27-story office tower, including 10,000 sf of ground-level retail and an integrated parking deck. Project will attain a 35% reduction in outdoor water use and use renewable energy for 100% of the projects energy use for the next 3 years. Rafting streets that are walkable, green and accessible for those on bikes and other micromobility devices are also planned. Target is LEED Silver.

Tower 5 | North Carolina, USA

Strategically positioned 17 stories high in Raleigh, North Carolina with immediate access to both active urban and natural spaces, Tower 5 includes 322,000 SF of office space, thoughtfully amenitized common areas, integrated parking and dynamic ground level experiences. Connection points to the outdoors abound, creating new workplace opportunities for collaboration, working and gathering. The District will offer an unprecedented amount of open natural area (including outdoor working spaces), and bustling, walkable ground level with experiential retail and maker's spaces. Target is LEED Silver.

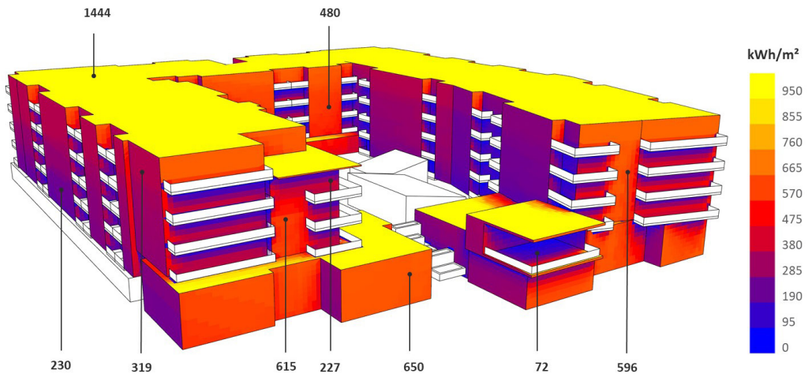
Connecting with the Ocean Breezes

Oceanside Transit Center | California, USA

The new Oceanside Transit Center is envisioned as a vibrant, walkable, attractive and engaging mixed-use destination for visitors and locals. Development of the site will extend and further activate Oceanside's downtown core and reinforce transit ridership by introducing approximately 831,480 sq ft of mixed income residential, retail, office, and hotel, while featuring a modern intermodal transit facility for travelers by bus and train and provide improved bicycle and pedestrian circulation. Subterranean and structured parking facilities accommodating approximately 1,800 spaces will serve the transit center and support the various land uses.

Public amenities will further enliven and enrich the project and serve the community, including streetscape enhancements and a Transit Plaza with capacity to support moderately-scaled community activities and events.

Multiple building performance simulations were performed to inform the design process and implement design strategies that reduce GHG emissions while also mitigate our impact on climate change. Solar studies helped to understand the impact of solar radiation on the building envelope and the performance of shading strategies. An energy model allowed to evaluate the effectiveness of architectural design strategies such as shade, natural ventilation, insulation, PVs and high-performance mechanical systems.

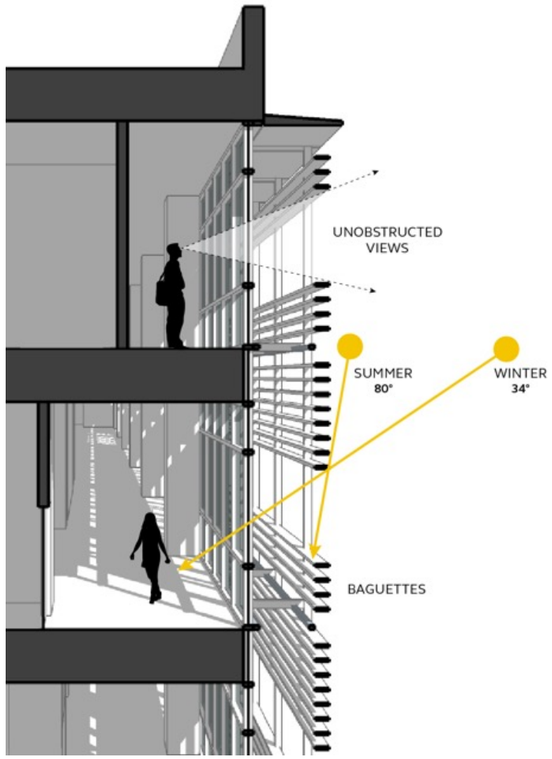


Daylight for Healing

University of Miami Doral Ambulatory Center | Florida, USA

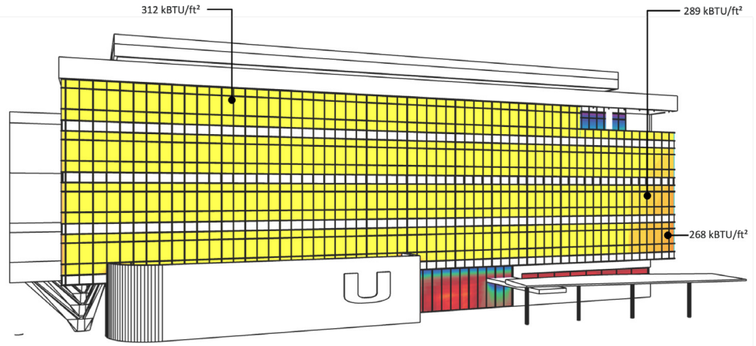
For the University of Miami Doral Ambulatory Center, we studied the effect of the envelope as a regulator of heat, glare, and daylight, to design a facade that blocks the sun and controls glare while providing good daylight.

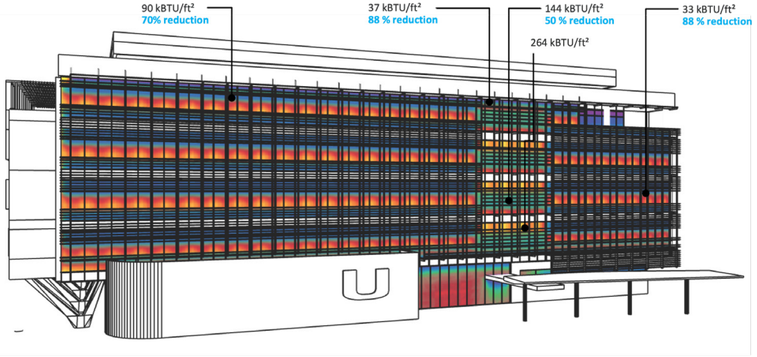
A section of the south façade shows the effectiveness of the baguettes (shading devices) at blocking direct sunlight during the summer months, while allowing sunlight to penetrate the building during the winter and providing unobstructed views to the outside year-round.



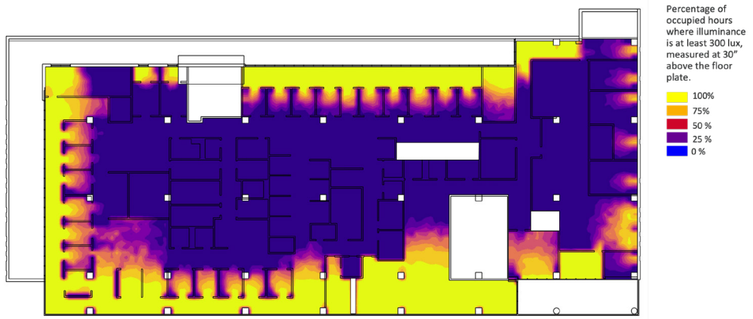
Annual solar studies test the effectiveness of the south façade over the course of the year. Less solar gains on the façade will improve thermal comfort, reduce cooling loads, and reduce GHG emissions.

The baguette shading scheme is designed to reduce solar gains entering through the glass, especially the higher altitude summer sun in the south façade. With the proposed shading scheme, 50-88% annual solar gain reduction is feasible which will lead to building cooling energy savings.





Solar Studies Before and After Shade

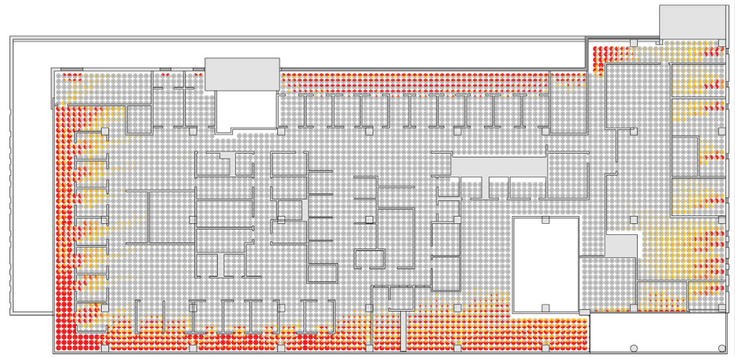


Spatial Daylight Autonomy Study

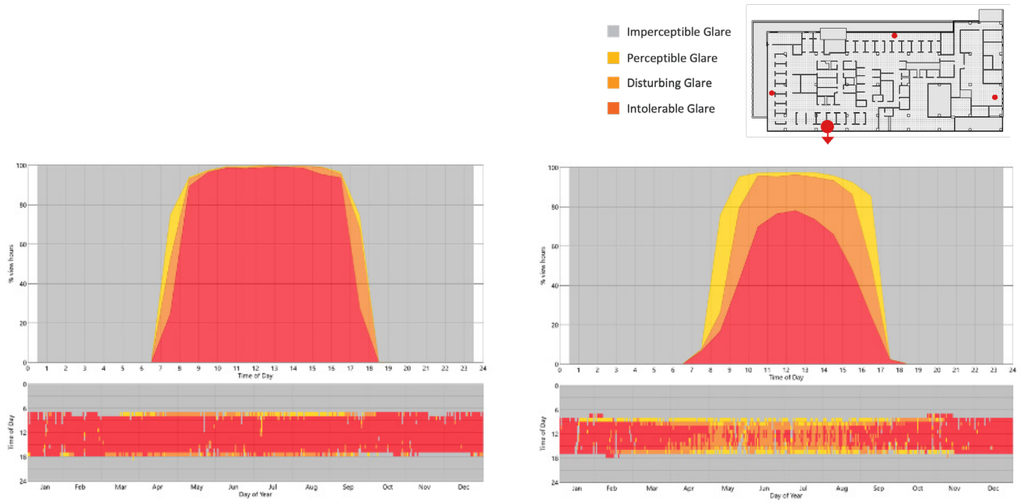
Daylight saves energy, but more importantly it increases visitor and occupant satisfaction. Daylight analyses provide an assessment of illuminance levels the building is likely to get from daylight on an annual basis. Our goal is to provide waiting areas with optimal daylight and minimum glare. A study of a typical floor, show that waiting areas near the windows are receiving an sDA of 100%.

Imperceptible Glare DGP ≤ 34%
Perceptible Glare 34% < DGP ≤ 38%
Disturbing Glare 38% < DGP ≤ 45%
Intolerable Glare DGP > 45%

Glare studies predict the likelihood that an observer at a given view position and orientation will experience discomfort glare. The image to the right shows areas of a typical floor in which the observer can experience discomfort glare for at least 5% of occupied hours.



Glare | Shade



Glare | South

The probability that an observer facing south will experience discomfort glare decreases when shading devices are incorporated to the south facade. The proposed shading elements help reduce disturbing and intolerable glare for this orientation, especially during the summer months when the sun is higher in the sky. During the winter months, operable blinds are recommended.

PEOPLE

Projects focused on people are all about how places are experienced once they are operational, or how we learn what needs to happen in a space or strategy. Our services help clients and their occupants navigate and manage change, plan moves or transitions, design experiences, and translate what we hear from people by engaging with communities both targeted and broad. The audience might be residents of a neighborhood, staff in a hospital or office, visitors to a retail store, and more. ‘People’ projects are all about building trust and enjoying the process.

Pentagon Row
ARLINGTON, VA

Educational Videos

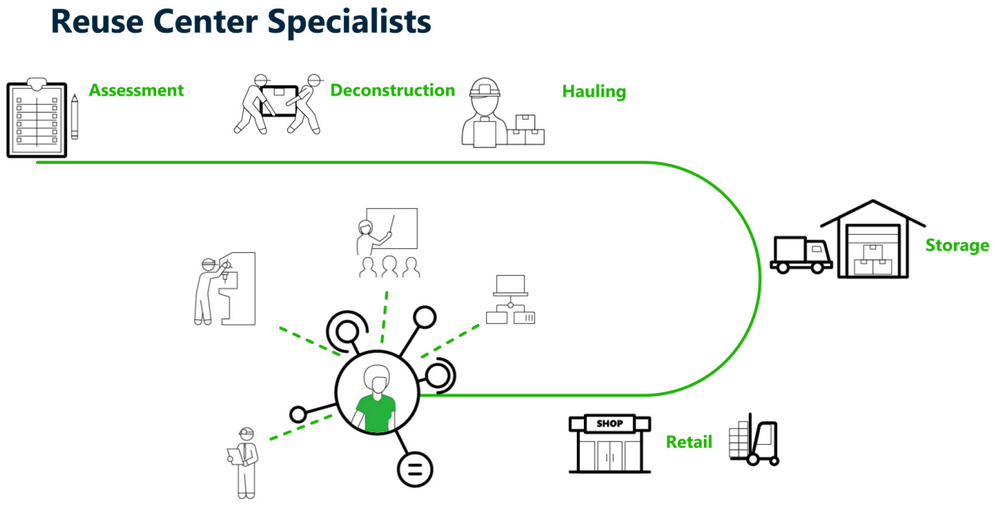
Construction Junction - Building Material Reuse

Recognition is growing about the concept of a circular economy as a critical path forward to expand access to existing resources and local jobs, protect natural habitats, mitigate greenhouse gas emissions and reduce waste in the construction industry. But how can teams take action?

Construction Junction is a nonprofit organization based in Pittsburgh, PA, whose mission is to promote conservation through the reuse of building materials. Construction Junction has been in operation since 1999, reclaiming, salvaging, deconstructing, repurposing, and upcycling items to keep them in use and out of the waste stream.

With a strong community presence, Construction Junction participates in hundreds of deconstruction projects and material pickups throughout the year, and receives thousands of material drop-offs. The challenge is that calls are often unpredictable or last minute. This limits the opportunities to truly maximize material salvage and reuse.

CRTKL collaborated with Construction Junction to envision a more streamlined approach, that would help clarify and standardize the process for project teams wanting to work with reuse centers like Construction Junction.



Click on image above to play video

This video that explores how owners, designers, and construction teams on commercial projects can engage with reuse centers and each other to support the transition to a circular economy in the built environment.

No discipline works alone over the course of a project. Together, we aim to make it easier for all teams to evaluate their projects for reuse and support circularity wherever they are. You can also find more information on the Construction Junction (cjreuse.org) website, with further resources through Build Reuse (buildreuse.org).

Change Management

National Institutes of Health

Rockville, Maryland, USA

The National Institutes of Health began planning for the consolidation and renovation of the Neuroscience Center in 2015. The design evolved during the COVID-19 pandemic as stakeholders started to see a shift in the way people were working and how they wanted to work in the future. As the change management lead, CRTKL assisted the project team in discussions with stakeholders about how to design the space to be more effective for hybrid work.

Construction began during the pandemic while everyone was working from home, which created an ideal construction site for a renovation-in-place that typically causes inconvenience and disruptions to tenants.

The phased moves into the new spaces aligned with the return to office plan of the National Institutes of Health, and there was a lot of excitement from staff to return to a new, dynamic workspace. Change management activities such as site tours, welcome celebrations, all hands meetings, and newsletters gave stakeholders an opportunity to celebrate and understand the recent changes to the workplace.

Community Engagement

City of Greenville Downtown Airport District

Greenville, South Carolina, USA

CRTKL's Planning, Landscape and Urban Design team is leading a community engagement effort in the City of Greenville, South Carolina. They are bringing people together to align the economic development and land use vision of the City of Greenville with the logistical requirements of the Greenville Downtown Airport. The project aims to help influence the Greenville Convention Center as a District Hub by layering in placemaking opportunities as well as leveraging the expansion of the Swamp Rabbit Trail into this study area by focusing on trail-oriented development.

Through a 9-month planning process layered with varied engagement touchpoints including a public design charrette (steering committee, stakeholder meetings, online survey, public workshop, public design charrette), the CRTKL team has been working toward community & stakeholder driven consensus for the land use strategy around the Greenville Downtown Airport and Convention Center. This includes insights on airport development innovation, trends, and best practices, detailed market analysis, and the prioritization of capital improvements for both transportation and infrastructure projects.

The effort include navigating a large, diverse steering committee, with public workshop and events that have drawn the participation of over 215 community members so far. The intent is to inform the community and stakeholders about the project, achieve a consensus vision, allow for valuable feedback and evaluation of concepts and recommendations, and promote "shared authorship" to shape and build support for the final plan.

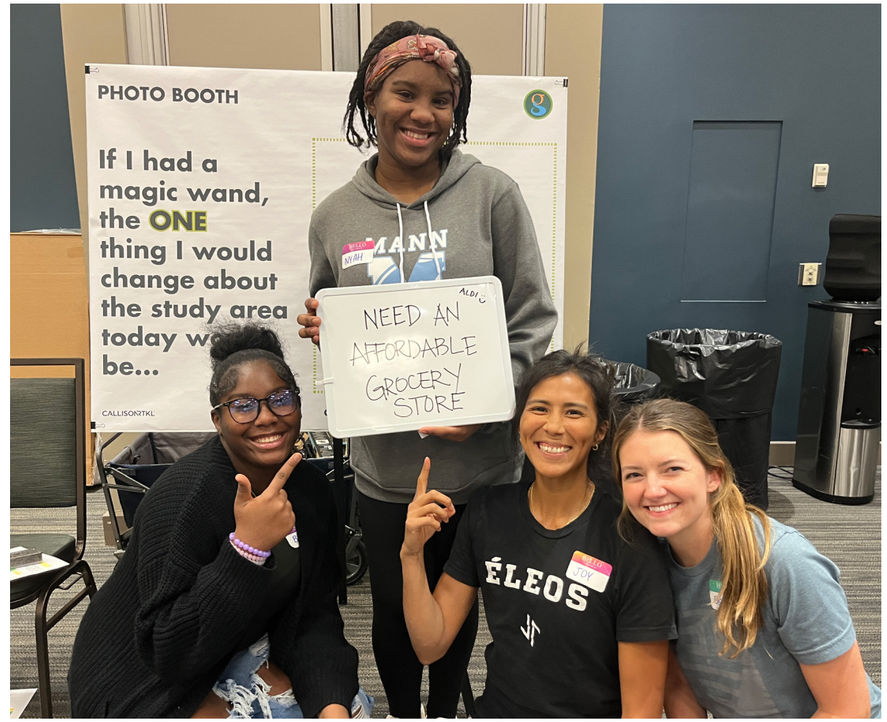
3 GOOD HEALTH AND WELL-BEING

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10 REDUCED INEQUALITIES

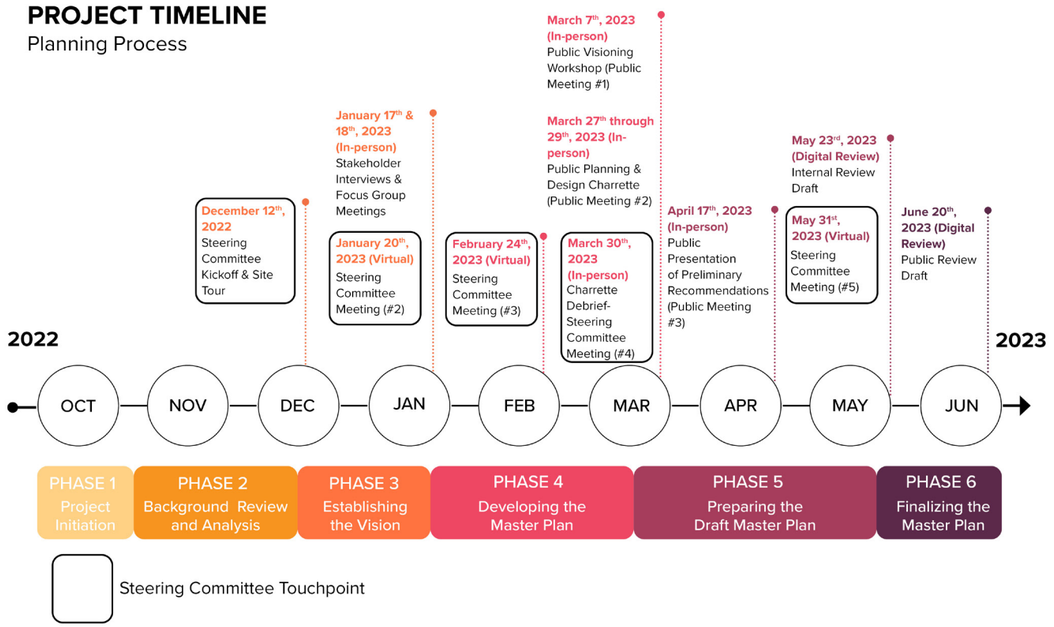
11 SUSTAINABLE CITIES AND COMMUNITIES

17 PARTNERSHIPS FOR THE GOALS



PROJECT TIMELINE

Planning Process



Enhancing the Patient Experience Through Nature

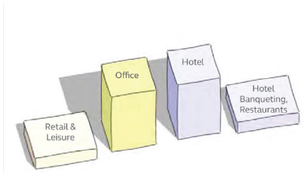
UHealth at SoLé Mia | North Miami, Florida, USA

World-class academic medical center SoLé Mia encompasses 363,000 square feet of space and will become UHealth's largest ambulatory site, providing top-notch medical care to patients. It will feature an adjoining parking garage and direct access from Biscayne Boulevard, as well as open green spaces, a reflection garden, and views of the Atlantic Ocean and Crystal Lagoons to enhance the patient experience. Target is LEED Silver.

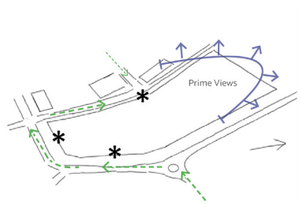
High Performance Hotel

D5 Cameroon, Douala

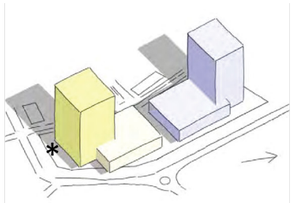
Located on the east of Douala, Cameroon, the project consists of a hotel provided by Kempinski with additional area managed by ALS for an office, commercial space, a casino and a nightclub. The project will install solar panels that will offset 3% of total energy use and reduce indoor water use through the use of efficient fixtures by 30%. Target is LEED Silver.



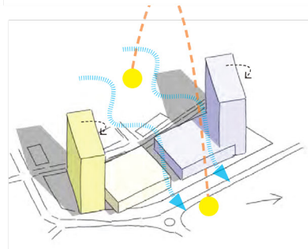
The Brief



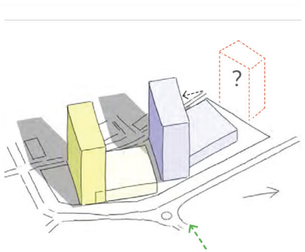
The Site



Site Organisation
Step 1



Building Orientation



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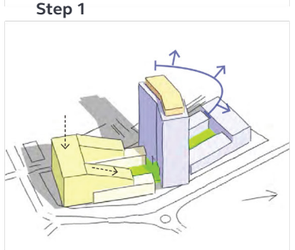
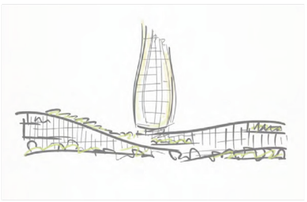


Refinements
of the Massing

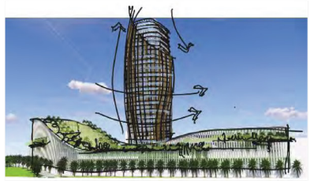
'The Flower' - lower rise office and hotel, leisure facilities frame the central hotel tower

The office and Hotel Leisure areas surround internal gardens with lobby at centre



The Hotel Tower as a distinctive, shaped building

The use of deep mullions to create a strong sense of verticality. Warm materials to distinguish the tower from the podium base



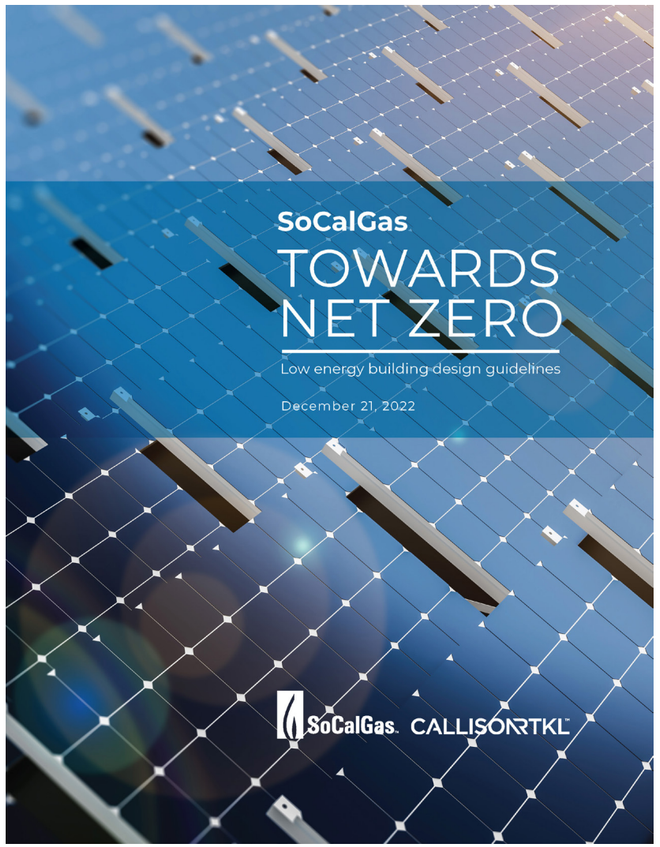
Peeling away the mullions to reveal upper level apartments with terraces enjoying a northern view

Setbacks in the podium express public areas within and soften the podium wrap

SoCalGas Net Zero Guidelines

California, USA

The report outlines a series of steps to aid in the renovation of existing buildings and the design of new facilities to achieve net zero goals within the coming decade. The goal for both existing and new buildings is to reduce their environmental impact while improving the wellness of occupants, with special emphasis on reducing GHG emissions.



Passive Strategy Potential

EFFECTIVE HOURS PER YEAR
- HIGHLY EFFECTIVE
- MODERATELY EFFECTIVE
- SEASONALLY EFFECTIVE

DAYLIGHTING ENERGY CONSERVATION POTENTIAL

ENERGY CONSERVATION
- HIGHLY EFFECTIVE
- RECOMMENDED WITH CONTROLS

Strategies

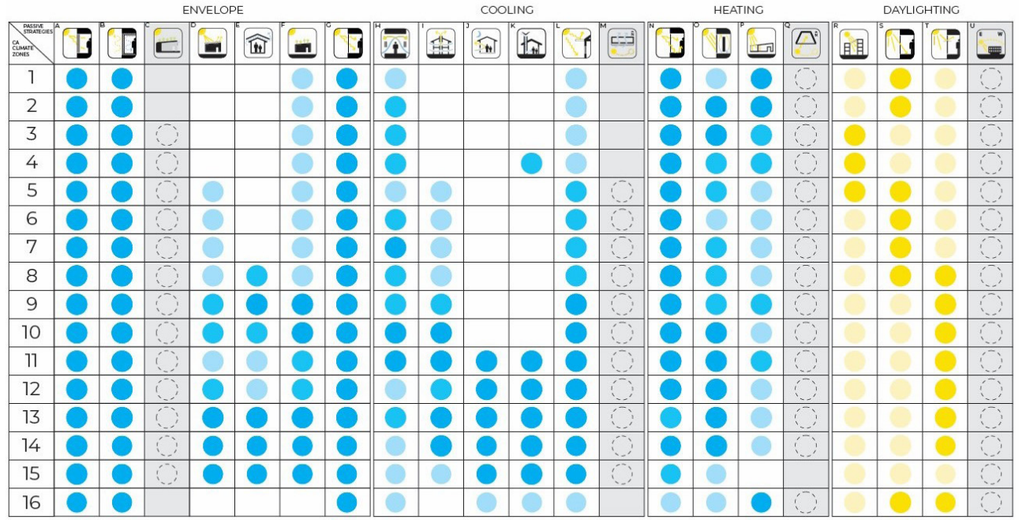
ENVELOPE
- A THERMAL INSULATION
- B TIGHT ENVELOPE
- C EARTH SHELTERING
- D COOL ROOF
- E DOUBLE ROOF
- F GREEN ROOF
- G HIGH PERFORMANCE GLAZING

COOLING
- H CROSS VENTILATION
- I STACK VENTILATION
- J NIGHT VENT COOLING
- K EVAPORATIVE COOLING
- L SOLAR SHADING
- M FORM FOR COOLING

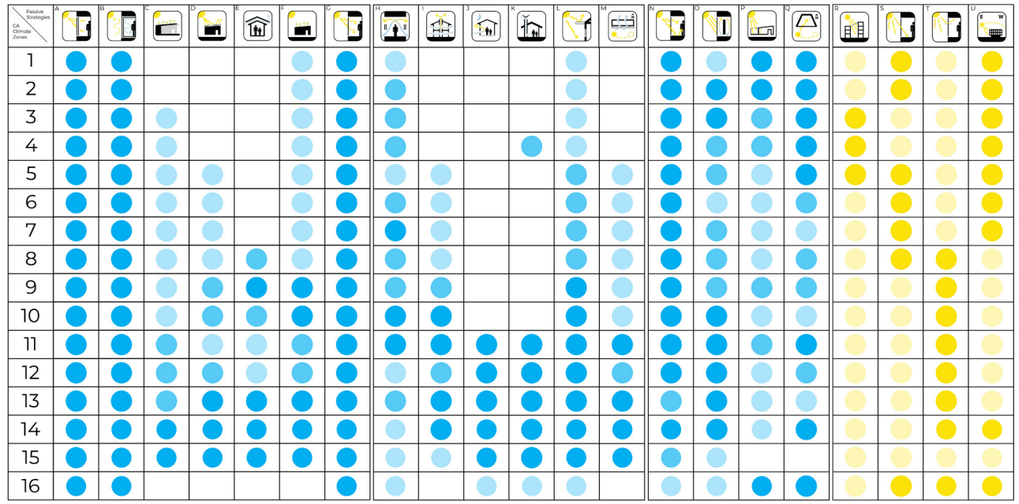
HEATING
- N DIRECT GAIN
- O INDIRECT GAIN
- P ISOLATED GAIN
- Q FORM FOR HEATING

DAYLIGHTING
- R TOP DAYLIGHTING
- S SIDE DAYLIGHTING
- T INTERMEDIATE LIGHTSHELVES
- U FORM FOR DAYLIGHTING

Passive/Net-Zero Strategies in CA Climate Zones - Existing Buildings



Passive/Net-Zero Strategies in CA Climate Zones - New Construction

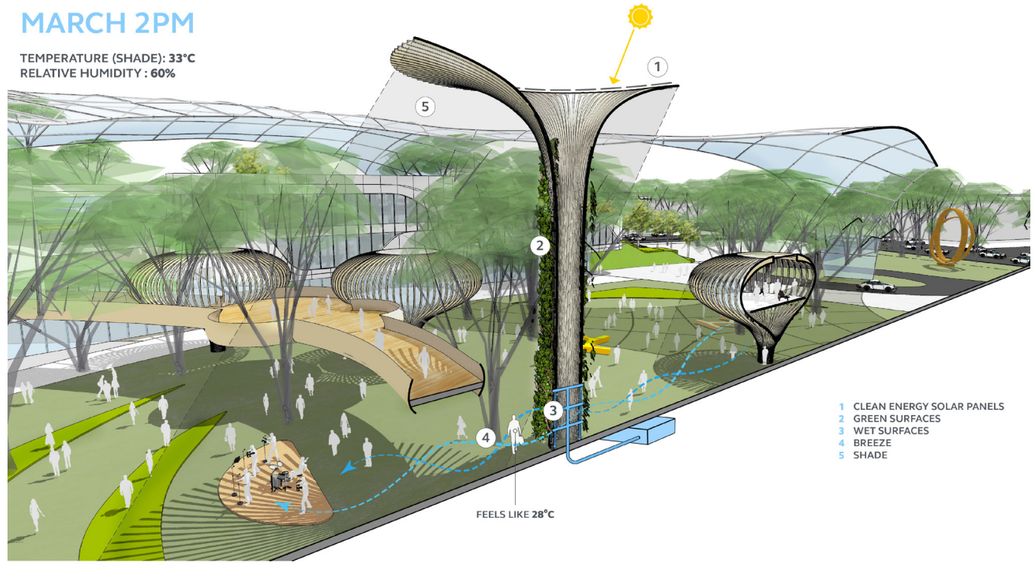


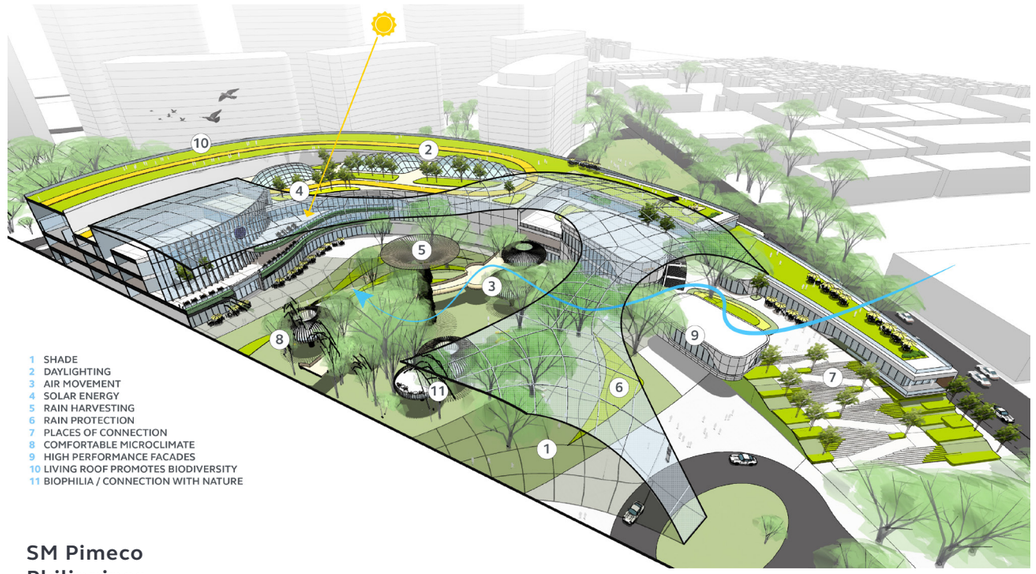
Experience Design (XD)

Multidisciplinary Collaboration

CRTKL's experience design team choreographs the design of the built and digital environment to deliver outstanding experiences for the people who use our spaces.

The XD and Sustainable Design teams work together to develop experiences that offer compelling, sustainable choices, helping people modify their behavior for good. A prime example is developing an efficient, incentivized transit system, motivating people make the choice to leave their cars at home. Another is developing a brand narrative and experience program for a sustainable development, delivering experiences that help make the place a successful destination. By designing for the real behaviors of people, we shift communities to more sustainable options while contributing to our client's bottom line.

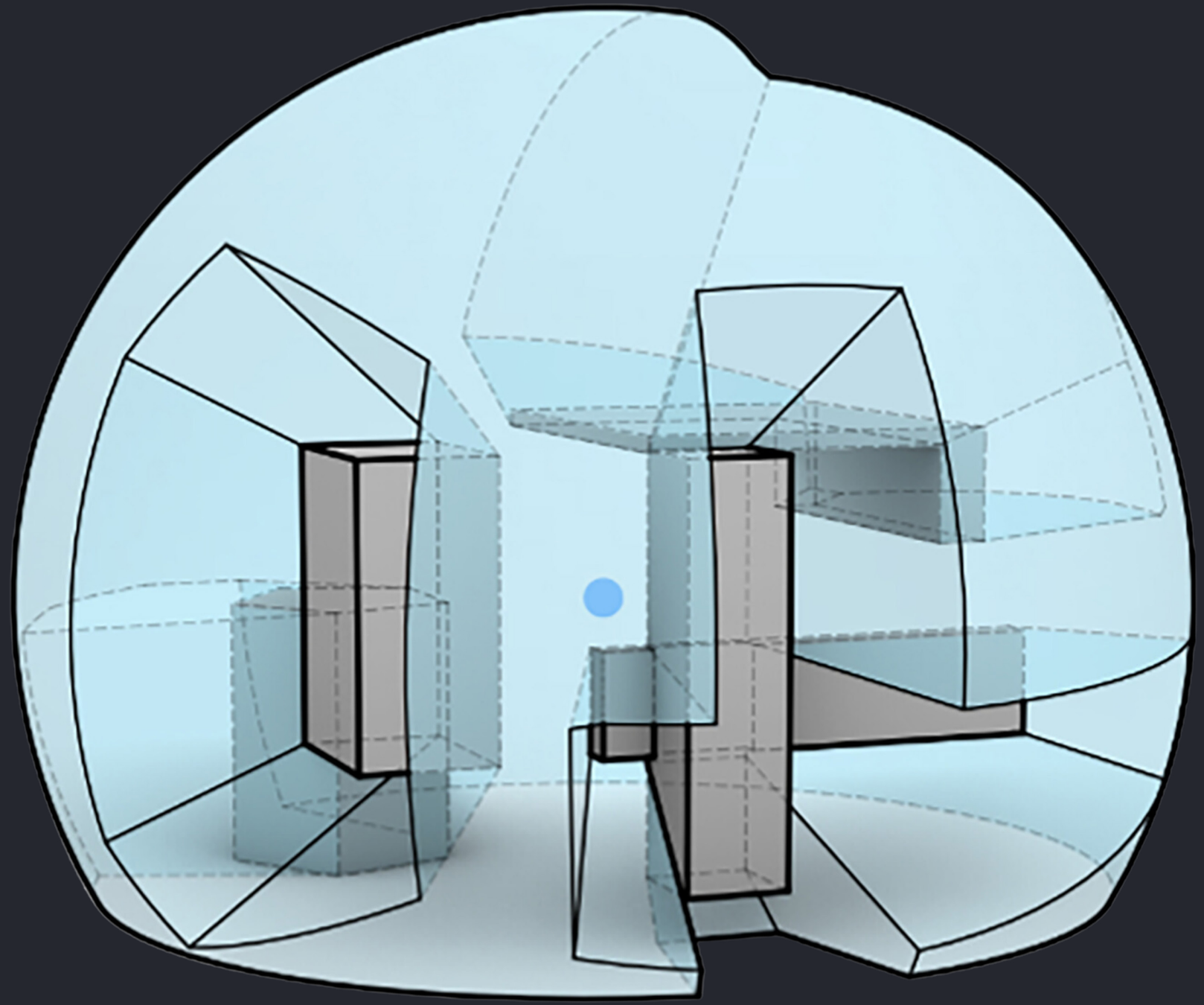




SM Pimeco
Philippines

POSITIVE

‘Positive’ projects are those that help us rethink how we work, through research to uncover new knowledge, or advanced digital tools to shift what we can create and measure. The positive is the exploratory. It allows us to continuously learn, and hone our delivery through research-empowered and advanced digital design.

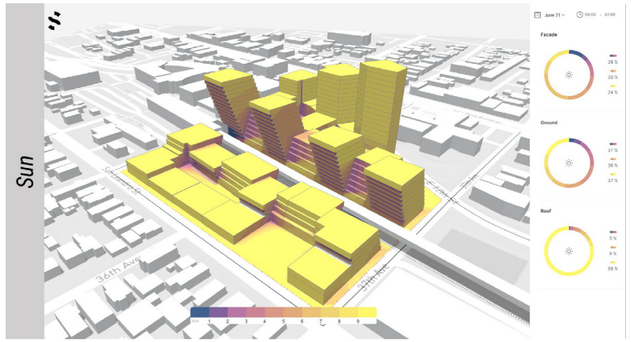


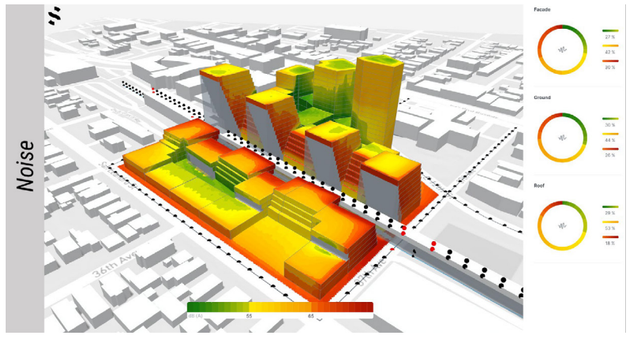
Advanced Digital Design

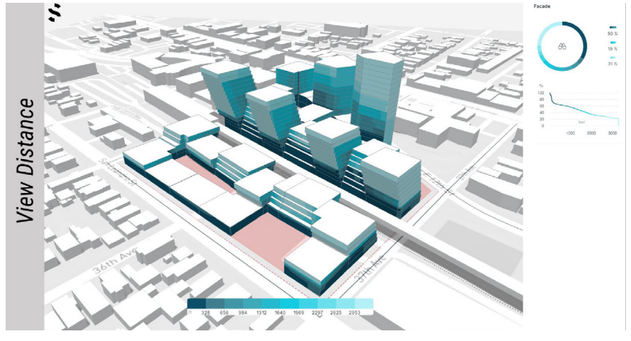
Sustainability Design Slam

Winning Submissions: Garrett Wiese, Juan Ortiz

Sustainable Spray (1st Place) | Garrett Wiese

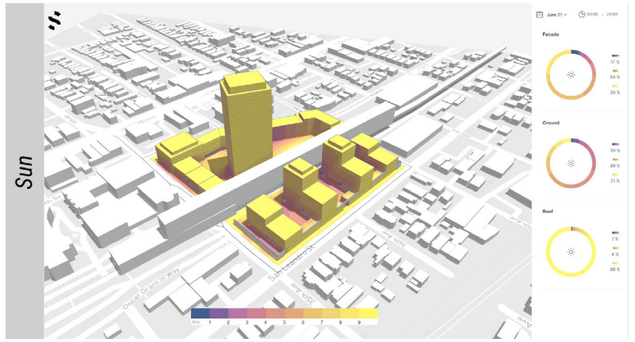


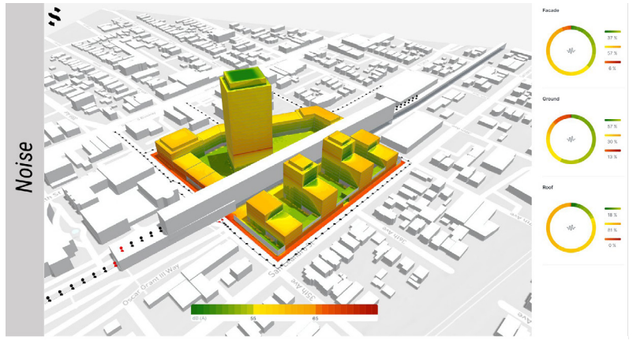


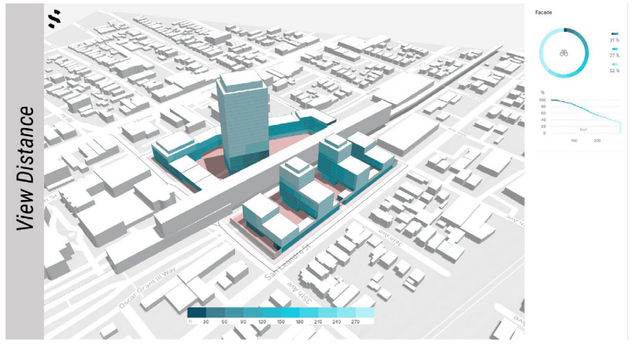


To help us achieve our company goals of being climate positive for operation by 2030 and climate positive for operation and embodied carbon (materials) by 2040, CRTKL's Computational Design team hosted its first Sustainability Design Slam. This event was a competition-based training that introduced employees to sustainable design concepts using Autodesk Spacemaker, an early-phase design and planning software with built-in sustainability analysis.

Bosco (2nd place) | Juan Ortiz







The Sustainability Design Slam was a week-long, virtual event during which participants were challenged to design a vibrant and sustainable mixed-use master plan with a focus on understanding the sustainability metrics of the scheme including sunlight, noise, view distance and operational energy.

The 1st and 2nd Place Awards were selected by a CRTKL panel of judges representing our Design, Digital, and Performance Driven Design teams via an anonymous review process. Here are winning submissions.

Want to learn more: Sustainability Design Slam

Advanced Digital Design

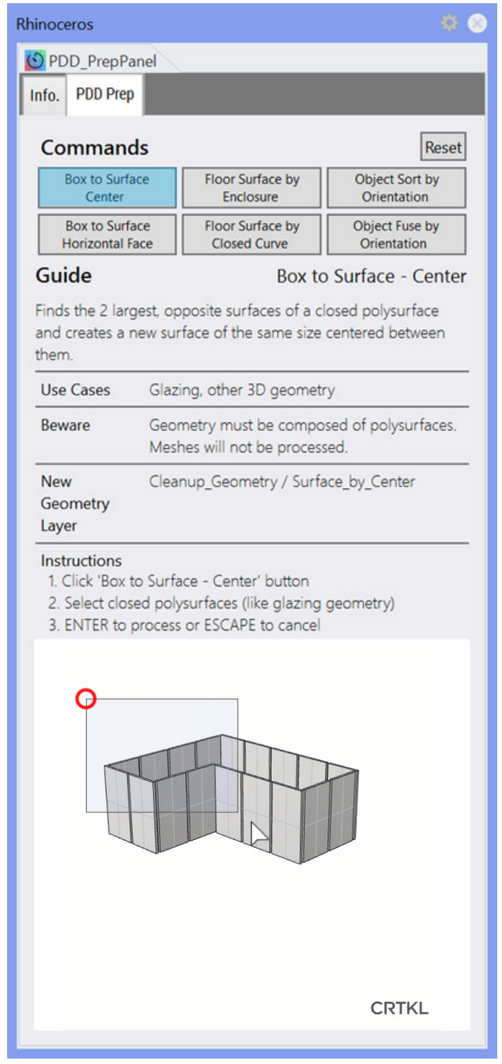
DTG Workflows - Daylight

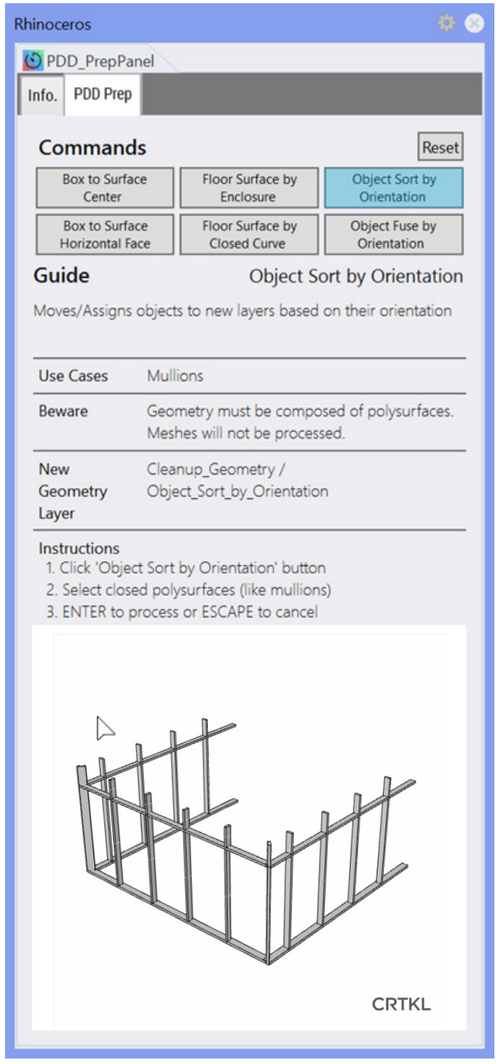
Team: Kashif Dafedar, Jen Gullett, Lauren Buffenbarger, Arianne Ponce, Maryam Hamidpour, Yarden Harari

Daylight is an important design component. Studies show that appropriate daylighting design improves occupants' health and well-being, as well as reduce energy consumption and costs. To achieve good daylighting, daylight levels must be estimated using simulation techniques during the design stages. This can inform teams on the optimal placement of elements such as windows, shadings, and interior partitions.

Different simulation tools could be used for daylight analysis, such as ClimateStudio, Honeybee, and Sefaira. The Sustainable Design Team often uses ClimateStudio, which is a Rhino Plugin. Design teams mostly use Revit. Daylight studies often require simplification and preparation of the geometry of complicated Revit models. In a standard practice, a lot of effort and time is dedicated to this process. The DTG workflow has helped optimize this procedure by improving the model export workflow in Revit. Typical steps of geometry simplification in Revit include Transfer Project Standards, Setup Scope Boxes, Create New Views, and Assign Settings in Properties Palette.

Moreover, the DTG team has created a new Rhino tool panel (PDD Prep) for model simplification once the model is exported from Revit to Rhino. The PDD Prep panel in Rhino comprises several commands, each designed for specific simplification needs. Examples of these commands include Box to Surface, Floor Surface by Closed Curve, and Object Sort by Orientation. For instance, Box to Surface command finds the two largest opposite surfaces of a closed polysurface and creates a new surface of the same size centered between them. A typical application of this command is for glazing elements which are often exported as polysurfaces, and need to be transformed to single surfaces for daylight analysis.





Advanced Digital Design

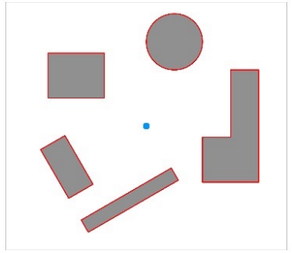
View Studies

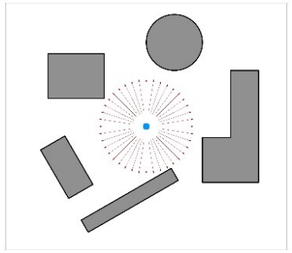
Team: Kashif Dafedar, Yarden Harari

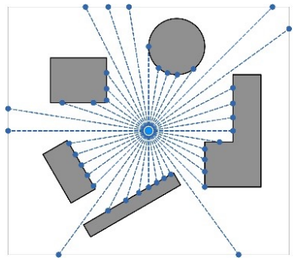
Views to the outdoors support circadian rhythms and are often an important source of occupants' connection to nature throughout their time inside. Understanding the availability and quality of views helps quantify the experience in a space, and better ground the ideas of biophilic design with evidence.

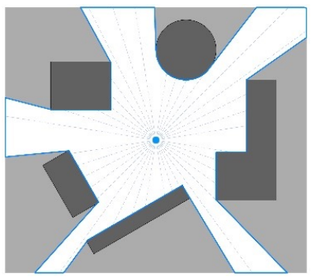
Views are inherently affected by how teams design a space and lay out the program, so the ability to understand and adjust the impact on views outside in real time would be powerful and beneficial to improving the occupant experience in all projects, not just for LEED.

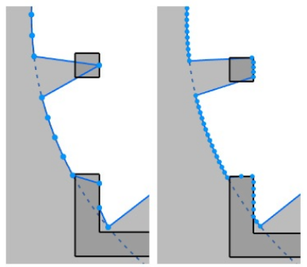
For larger architectural and urban scales, outward facing view analysis tools are being used extensively, and are becoming quite popular in helping identify optimum building orientations in varying contexts. Along with daylight, energy and thermal comfort, view analysis has now become an integral part of a typical environmental analysis package. With easy access to such tools most design teams have started included 'view analysis' as a part of their early design process.

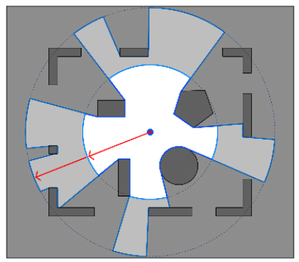


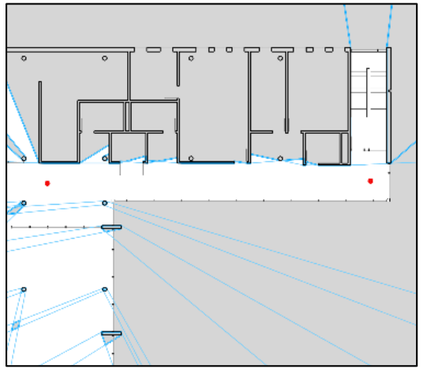


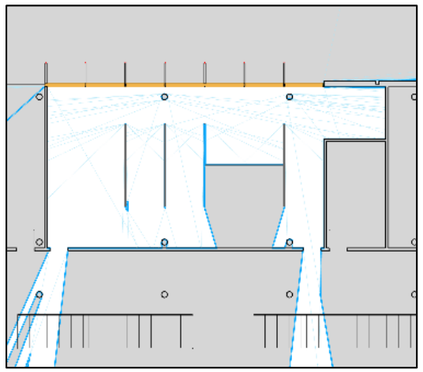


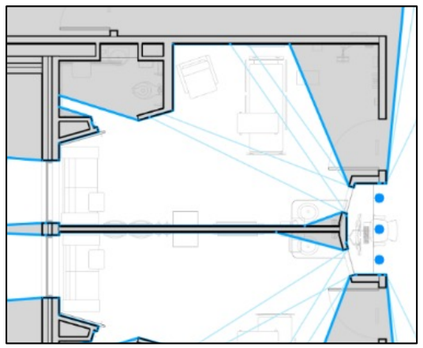












While conventional view analysis technique works wonderfully for the larger architectural forms; however, they don't provide the best outcomes when planning interior spaces. Currently, trying to diagram views from interior spaces manually is both imperfect and tedious. It also makes it harder for teams to make their design decisions with views in mind. The DTG team developed a useful script to help automate this process utilizing the concept of Isovist studies. Using Isovist techniques offers a better solution to help increase the use of view and visibility analysis tools for planning better interior spaces.

Most designers rely on intuition to plan for good views but may not be aware of Isovist type analysis techniques to help improve or validate design decisions. To ensure we continue to create the best design solutions for our clients and better habitable environments for the users, it will be essential to make such analysis tools readily available to our design teams. The objective of this exercise was to create a set of user-friendly tools to perform spatial analysis related to two dimensional (2D) Isovist zones.

Advanced Digital Design

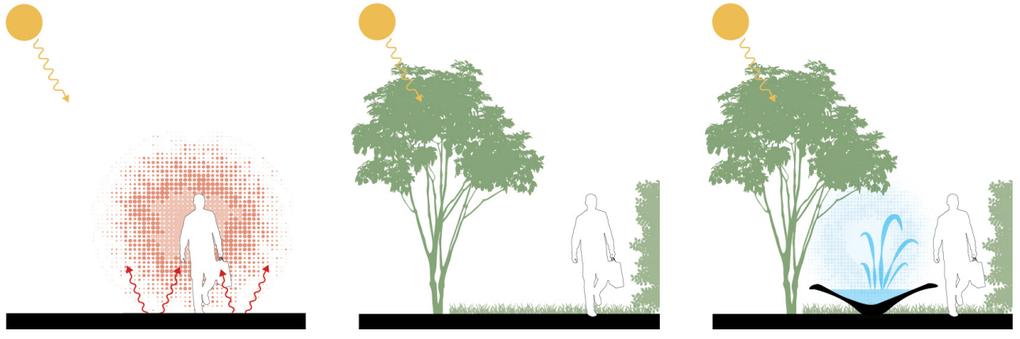
Outdoor Comfort Research Study | Hot and Dry Climate

Team: Pablo La Roche, Arianne Ponce, Kevin Yang

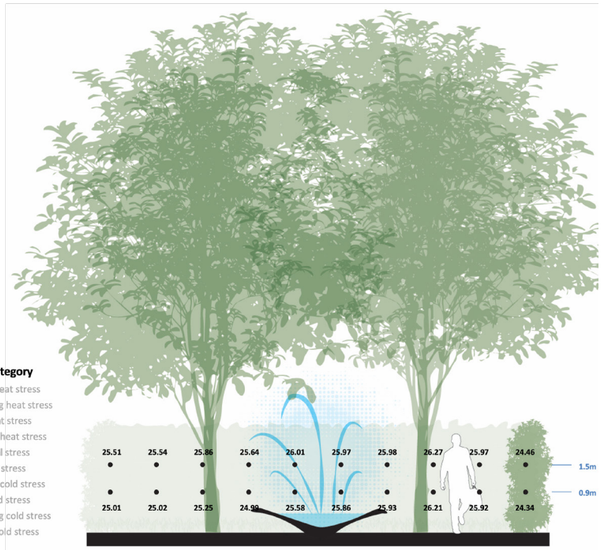
An outdoor comfort research study was performed using ENVI-met to assess the effectiveness of different passive strategies in a very hot and dry location. ENVI-met is a 3D microclimate simulation software used to simulate air temperature, humidity, wind, and radiation for any outdoor environment.

For the analysis, a typical day in the summer was developed using simple forcing inside ENVI-met and referring to average values from the weather file. During June, the maximum and minimum temperatures were 24 and 45°C and minimum and maximum relative humidity was 6 and 15% at 6 am and 2 pm. Wind direction was from the northeast at 1 m/s. The UTCI (Universal Thermal Climate Index) simulations were calculated at 12pm, where the temperature was 39.75 °C and the relative humidity was 8.25%.

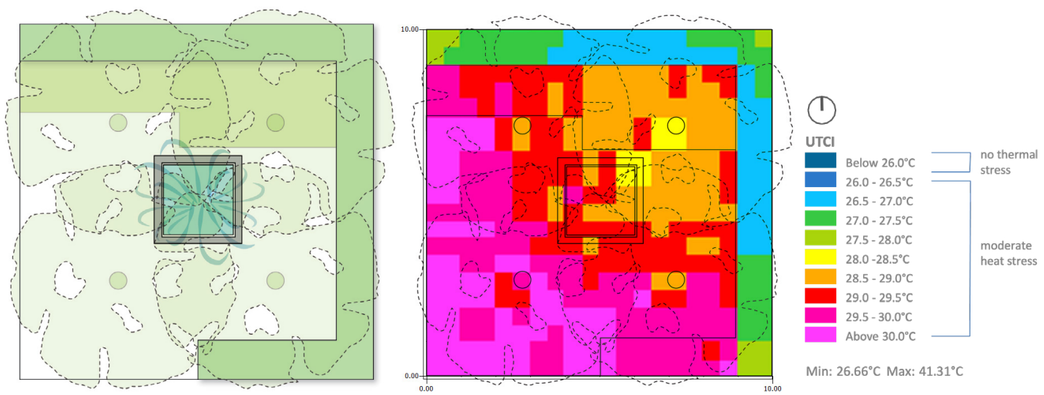
Outdoor strategies such as cool pavement, shade, vegetated surfaces, and water features were individually tested to calculate their efficiency. A person can experience extreme heat stress (UTCI=46.1) while standing on a dark unshaded pavement. When changing to a cooler pavement, and adding trees, grass, hedges and a misting fountain to the same analysis area, the person experiences no thermal stress (UTCI=25.5).



Due to the excessive heat stress over summer months in hot and dry climates, few visitors would find conditions tolerable during the hottest part of the year. Places of respite should be located throughout the site providing micro-cooled areas. The image on the left shows a proposal that includes cool pavement and grass at the ground level, a hedge to block hot winds, trees to provide shade and reduce solar gains, and a fountain to lower air temperature through evaporative cooling.



UTCI



Plan View

Academic Partnerships

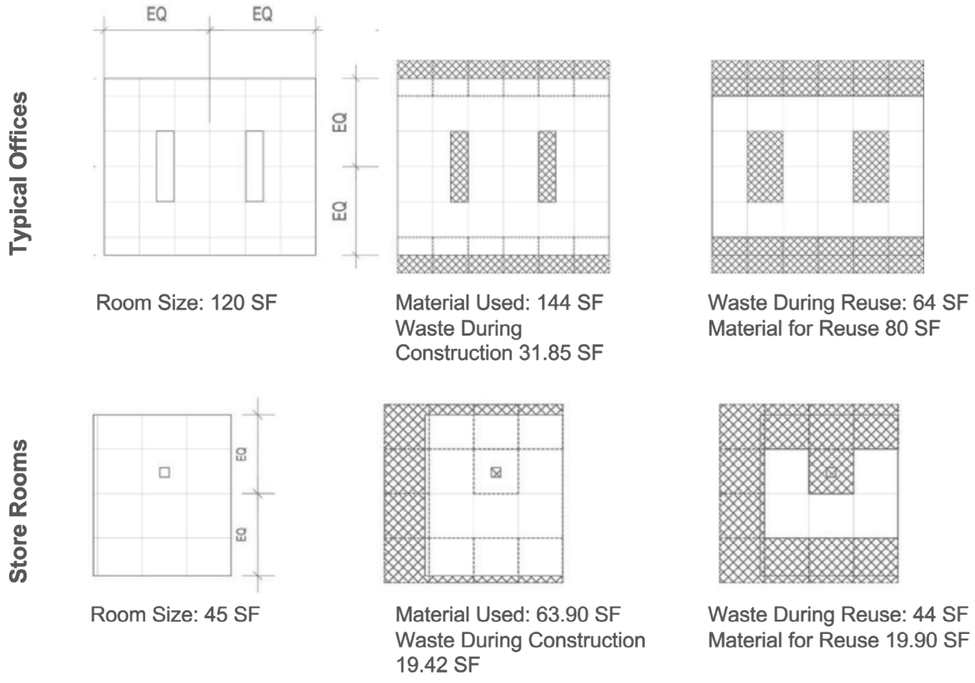
Carnegie Mellon University

Carnegie Mellon University: Joshua D. Lee, Ryan Vaz, Naishal Asutosh Gajjar, Shekhar Damaria. CRTKL: Yarden Harari, Helia Taheri

CRTKL has been partnering as advisors with Carnegie Mellon University (CMU) on a research study focused on advancing the circular economy in commercial design and construction.

The research project considers the concept of “Buildings as Material Banks,” and studies data from existing interiors projects to develop a data-driven approach for quantifying the potential benefits, challenges, and opportunities of building product reuse.

Design choices impact the quantity of material that can be reused.



How does this tool compare to other resources available on the market?

Tool	Current Performance	Future Performance	Cost of Reuse	Environmental Impact	Marketplace	Green Credits	Quantify Reuse Potential	Tax Credits	Strategy Recommendation
Rheaply Resource Exchange		✓		✓	✓		✓		
SmartWaste (BRE Group)	✓		✓	✓		✓			
WARM Tool (EPA)				✓					
Circularity Tool (Arup)									✓
Our Tool	✓	✓	✓	✓		✓	✓	✓	✓

✓ Tool Supports this functionality

Core Functionality of Tool

Our team of academic researchers and industry experts developed a tool that utilizes standardized economic values, performance testing criteria, and a variety of sustainability rating tools to evaluate the reuse potential of individual materials. This information allows architects, contractors, and owners, and reuse or salvage entities to evaluate the reuse potential while being cognizant of the number of years a material can remain in use.

Current reuse markets tend to be informal, focused on residential, and limited to one-off items that are either unique or feature elements. With limited reuse opportunities at scale, hundreds of millions of tons of material goes to waste in landfills each year. The research with CMU starts to leverage the commercial industry, looking first at retail and commercial interior fit-outs due to high turnover rates. In the future we plan to improve the tool’s robustness and usability, as well as evaluate other sectors to provide benchmarks that will further aid decision making across a wider range of project types.

We see the potential not only to better understand what’s inside existing spaces, but also how we might start to holistically evaluate what is viable for reuse at an ecosystem scale.

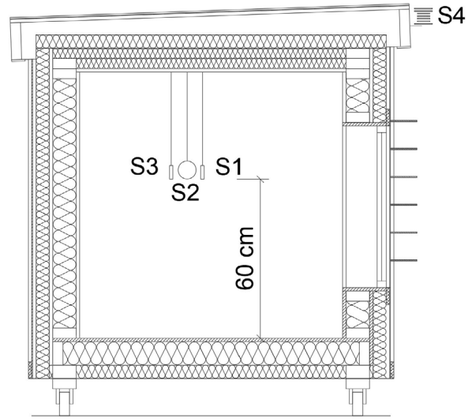
To learn more about the tool or participate in user testing, reach out to Professor Joshua D. Lee at Carnegie Mellon University (jdlee2@andrew.cmu.edu).

Academic Partnerships

Cal Poly Pomona

Gabriel de Bem (Federal University of Technology, Parana Brazil)
Pablo La Roche (Cal Poly Pomona and CRTKL)
Eduardo Krüger (Federal University of Technology, Parana Brazil)
Alexandre A. A. M. (Federal Institute of Education Science and Technology - Santa Catarina, Brazil)

Gabriel De Bem, a visiting scholar from the Federal University of Technology at Parana under the supervision of Pablo La Roche developed a responsive brise-soleil to control solar heat gains and indoor illuminance, using a set of movable parallel slats combined shading a south-facing window. A low-cost microprocessor equipped with sensors controls the responsive behavior that responds to thermal and luminous comfort. The comfort schedule is based on neutral and operative temperature parameters from the Adaptive Comfort Model, and indoor illuminance thresholds are based on the Useful Daylight illuminance (UDI) parameter. The test-cell study, conducted at the Lyle Center for Regenerative Studies of the California State Polytechnic University



Pomona, proves that a responsive brisesoleil without internal blinds and consisting only of external louvers can improve both the illuminance and thermal performance of a space and reduce energy demand for illumination and air conditioning. In addition, responsive shading systems with the flexibility are more efficient in locations with sudden weather changes compared to static shading systems.

S = Sensors

Research Microgrants

About the Program

CRTKL's Research and Innovation MicroGrant program has fostered creativity and research since 2020 by supporting small, focused ideas and projects. This year's cohort includes seven diverse research and innovation projects from a pool of 27, selected by an esteemed academic jury from fields in design, innovation, and architecture.

CRTKL is committed to delivering stronger, research-driven, future-focused design solutions—solutions that can quantifiably and positively impact the social, economic, and environmental value. These projects reinforce that commitment. Below are a few highlights from the 2022 program.

To learn more about these projects and other microgrants, check out the full Microgrant journal here.

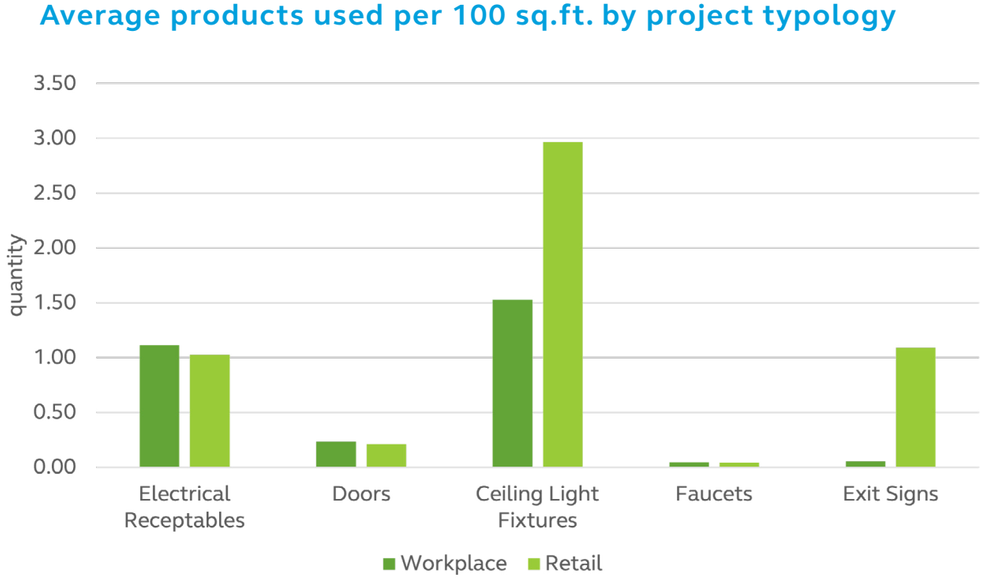
Research Microgrants

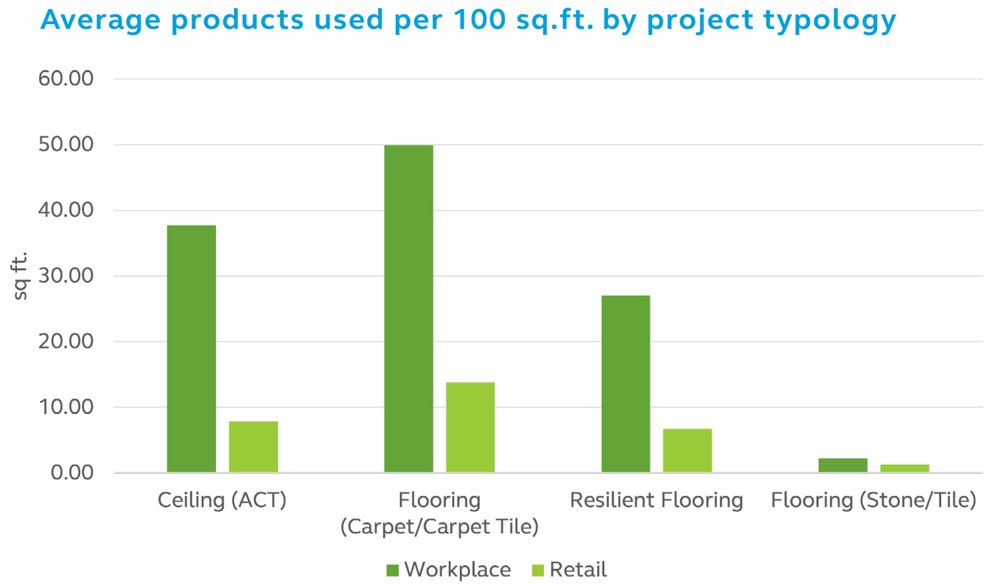
What Goes In Must Come Out: Applying the Circular Economy in Practice

Team: Yarden Harari, Crystal Cheung, Jodi Williams and Maryam Saidian

The use of materials has drastically increased globally, depleting natural habitats while concurrently growing landfills, risks, and pressure on frontline and fenceline communities. The building industry is one of the greatest users of resources and producers of waste. Despite the benefits of material innovations to decrease energy and carbon emissions, a systemic and cultural change of material use behaviors is vital to truly address these issues. In current practice, it is simpler and easier to dispose of existing materials in landfill and purchase new products, than to deconstruct and reuse the components in design and construction projects.

While we know that hundreds of millions of tons of material get sent to a landfill in the US each year (U.S. EPA, Office of Resource Conservation and Recovery 2018), materials used in interior environments are often more complex and specific than would be represented





in EPA data or reports (e.g., metals, wood, gypsum). It is not clear how light fixtures or electrical receptacles may be capture within metals, if at all, or how doors might be incorporated into the wood category. Prevailing research does not track products, such as how many light fixtures or doors, making it that much more challenging to indicate how much and what could be re-usable.

This paper explores how to enable architecture and design teams to work with reused products to proactively distribute existing materials. The research focused on two overarching needs; one, how to quantify usable products and two, identifying processes and workflows for reuse. One of the key objectives is to identify which current industry practices can be adapted to enable processes and behaviors that support a circular economy in the built environment.

Refer to the CRTKL Microgrant Research & Innovation Journal Volume 03

Research Microgrants

Unpacking Social Value: Developing the Social Scout

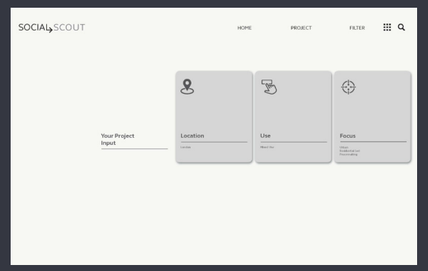
Team: Nathmya Saffarini, Frederica Buricco and Ekaterina Dziadkovskaia

Social value is an intrinsic aspect of good design. As architects and designers, we often embed it without specifically identifying it during our design process. However, to maximize it, we need to not only demonstrate its' value to clients, but also know how to implement it in the most effective way. Currently, the industry is struggling with both, therefore this study's objective is twofold. One, to identify a practical holistic way of measuring social value and secondly, to create a simplified go-to instrument for architects and designers to address and implement the social value in their projects.

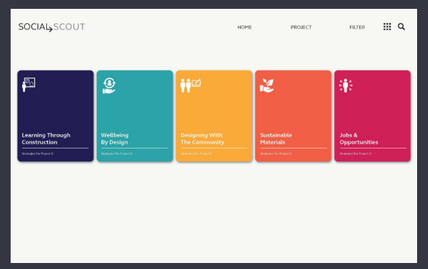
RIBA Toolkit : 5 Key Dimensions of Social Value, Source: Author

The built environment creates value for everyone who uses and interacts with it, not just its immediate users. This project aims to increase our understanding of the impact of design decisions and projects have on the wider community. Social value traditionally was not viewed as having a return on real estate investment however clients are now asking architects and designers to demonstrate the real value in designing inclusively, not just for the immediate user. There has been a rather poor perception that success, when it comes to people, is only measured through footfall or occupancy levels. This project explores the creation of a tool to allow architects and designers to better understand and, ultimately, quantify the impact of their work.

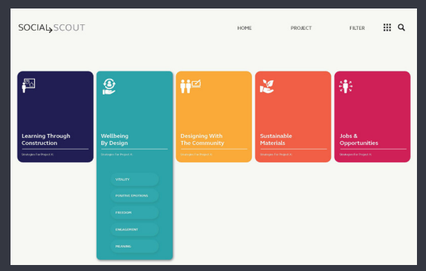
Refer to the CRTKL Microgrant Research & Innovation Journal Volume 03



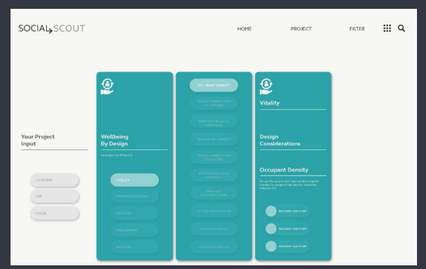
The application starts with a filtering section: the designer answers a set of questions to narrow down the SocialScout suggestions. It includes a location, use(s), and any specific focuses of the project such as event places or high-density developments. The project focus question input can be chosen from the pool of hashtags related to the case study library of the app.



The Dimensions Section That Shows All Five Dimensions Available In The Tool (Learning Through Construction, Sustainable Materials, Wellbeing By Design, Designing With The Community And Jobs & Opportunities) And Is Rated By Importance Based On The User's Input.



As the user clicks through the Dimensions section, a preview of Themes relevant to the project is revealed. The user then selects a specific theme (e.g., Vitality; Positive Emotions or Engagement under the Wellbeing theme) to learn more about.



Each theme contains Design Considerations to be potentially pursued on a project. Aspects such as Occupant Density, Visual Connection to the Outside, and Active Circulation could be included. Each Design Consideration will be then explained with a real-life case study from the industry. Once the designer navigates through a number of those considerations, implementing suggested strategies on their project may become easier and enable discussions on how the project can contribute to the social value.

Impact Study Highlights

Heat Island Effect | Dallas Impact Study

Team: Camila Simas, Kevin Yang, Joey-Michelle Hutchison

The Impact Study 2.0, a follow-up to the inaugural Impact Study, is underway, examining the economic, social, and environmental impacts of three urban design projects: State Thomas, Addison Circle, and Legacy Town Center. Conducted by CRTKL, the study aims to provide evidence-based design strategies for future urban development projects.

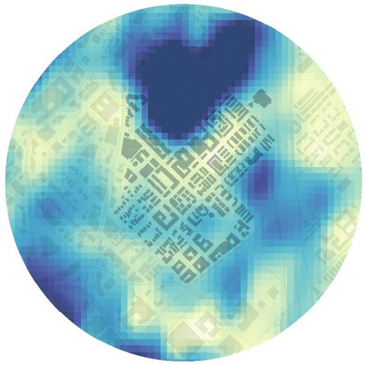
As part of the study land satellite data obtained from the US Geological Survey, specifically the thermal and vegetation bands, were processed through a series of calculations in ArcGIS. By quantifying the impact of thoughtful and future-proof planning, architecture, and urban design, the study aims to highlight the importance of sustainable development practices.

Through the Impact Study, CRTKL seeks to encourage the implementation of evidence-based design strategies that will lead to more sustainable and resilient cities. By continuing to assess completed projects, the study aims to improve the impact of urban development on economic, social, and environmental factors, ultimately benefiting communities and the planet.

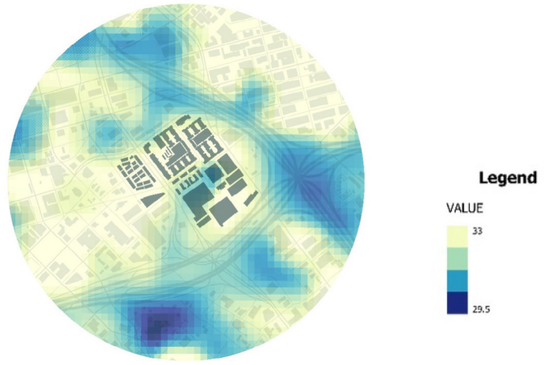
Heat Island Effect | State Thomas

CRTKL's two-decade project in the State Thomas TIF District showcases the benefits of sustainable urban design principles in promoting economic growth while improving the quality of life for residents. By implementing sustainable design strategies like green roof, tree planting and cool pavement, the area has cooler temperatures compared to other development areas.

Through a one-tailed hypothesis test, the team compared the Land Surface Temperature (LST) of the State Thomas area to a comparable development area, demonstrating that the urban design itself has a significant impact on LST. The results indicate that the State Thomas development is cooler than similar neighboring areas, highlighting the effectiveness of sustainable urban design in mitigating the urban heat island effect.

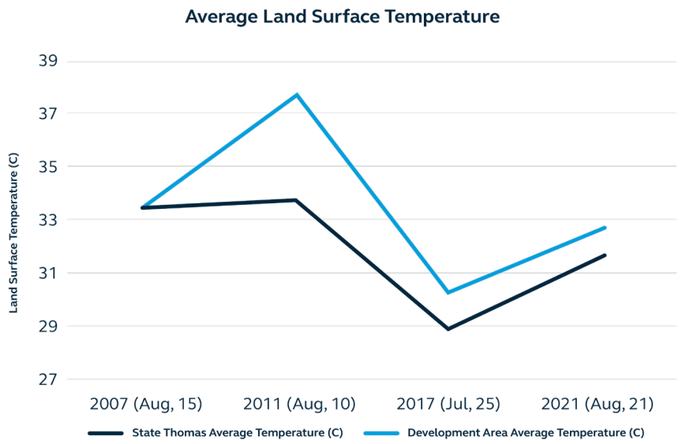


State Thomas Land Surface Temperature (LST) 2021



Comparable neighboring area Land Surface Temperature (LST) 2021

Furthermore, we compared the LST of State Thomas from 2007 to 2021, revealing that the firm's design strategies are more efficient at cooling the land surface temperature. This study underscores the importance of implementing sustainable design practices in urban development projects to improve environmental sustainability, while simultaneously promoting economic growth and improving the quality of life for residents.



As cities continue to grow and urbanization expands, it is essential to recognize the role of sustainable urban design in promoting a more resilient and sustainable future. The State-Thomas TIF District serves as a prime example of how strategic urban planning can create a cooler, greener, and more livable city.

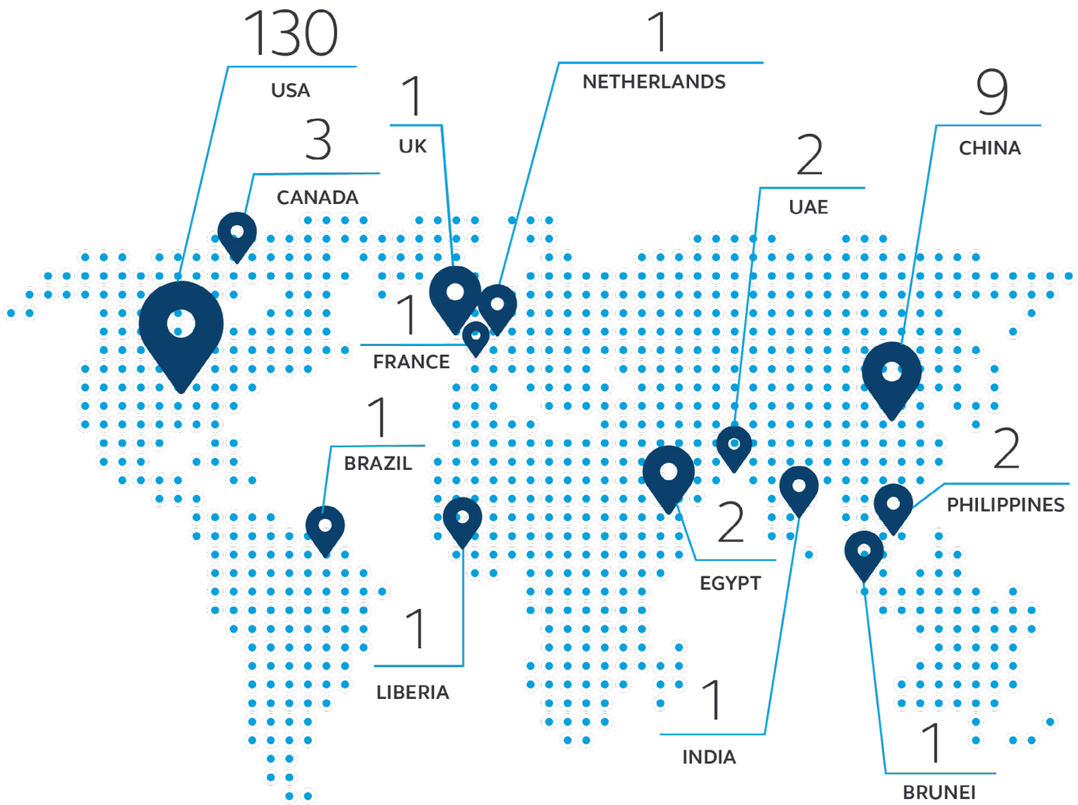
Learn More

GREEN CERTIFICATIONS

CRTKL offers sustainability certification services internationally utilizing virtually all existing certification systems. Sustainable building rating and certification systems utilize an integrated design process to generate projects that are environmentally responsible and resource efficient throughout a building's lifecycle: from schematics to design, construction, operation, maintenance, renovation and demolition.

Some systems are single attribute, meaning they focus solely on energy, recycling or water, while others are multi-attribute addressing carbon, toxicity and overall environmental performance. The approach, certification type and philosophy method may differ across these the systems, but a common attribute of projects certified within these frameworks is an intention to reduce the overall impact of the built environment on human health and the natural environment.

Sustainable building rating systems exist to address every project type from single commercial buildings to entire neighborhoods and are available for new construction -- which include focusing on decisions made in the planning and design process and decisions made through construction, as well as for existing buildings, which encompass operations and maintenance throughout the lifecycle of the building. Sustainable building rating and certification systems are proven marketing and educational tools for owners, designers and construction teams as they navigate the process of delivering high performance regenerative buildings while at the same time incentivizing clients, owners, designers and contractors to utilize sustainable design and construction practices.



Our Certifications

LEED is the most widely recognized building certification system used across the globe. Our LEED certified projects span five continents and range in size from small tenant improvement projects to large master plans.

As a firm, we seek to utilize sustainable building rating and certification systems as proven marketing and educational tools for owners, designers and construction teams as they navigate the process of delivering high performance regenerative buildings while at the same time incentivizing clients, owners, designers, and contractors to utilize sustainable design and construction practices.

CRTKL has expertise executing the most well known sustainable building rating systems such as LEED, BREEAM, WELL, Fitwel, BOMA 360, CALGreen,GRESB, Estidama, CASBEE, and BEAM, as well as emerging systems such as LOTUS, Green Ship, BERDE, Green Building Index and Green Mark. Remaining on the cutting edge of existing and new certification systems enables CRTKL to provide clients the most comprehensive range of options and insights for their projects anywhere in the world. CRTKL has certified more than 155 certified projects in 13 countries.

Sustainability Certification Facts

- Certified spaces garner higher rents than non-certified spaces
- Tax exemptions, permit expediting, and associated incentives are often available for high performance or certified buildings
- Many multinational and local companies now require sustainability certifications for each of their locations
- Many municipalities are now requiring sustainable building practices, meaning that certified projects are not only future-proofing environmentally by design, but also better prepared to prevent obsolescence as regulations grow more stringent
- Certified buildings generate transparency and enforce methodical documentation, providing a comprehensive and informative package for building owners and occupants upon completion

Custom Sustainability Programs

In addition to established existing sustainability certification systems CRTKL also offers Custom Sustainability Programs which are tailored to an organization's specific goals.

These programs include creation of custom rating systems that clients can use to track performance of their projects based on the metrics that matter most to them.

GAP Analysis/Implementation Plan/Feasibility Studies

Projects seeking guidance can also benefit from a host of preliminary investigative services designed to gauge the viability, time, and cost impact of all the aforementioned sustainability programs.

155 PROJECTS

13 COUNTRIES

37 CERTIFIED

63 GOLD

43 SILVER

12 PLATINUM

04

GIVING BACK & SHOWING UP

PRESENCE IN OUR COMMUNITIES

CRTKL employees volunteer with a wide array of organization types, and participate in a medley of community based activities, pro-bono design work, and ongoing participation in mentor programs across different offices to connect with our local communities. Employees' volunteer to have a positive impact, connect with community, and gain perspective on local civic and social issues.

CRTKL provides pathways for employees to participate in volunteer activities of their choosing and are growing our formalized platforms to enable participation:

- The Social Action Committee (SAC) is a firm-wide program centered on advancing social change through design. SAC members represent the firm and manage an allocated pool of corporate funds to fuel the design efforts. It serves as CRTKL's mechanism for doing pro-bono work, proactively focused on people, planet, positive design in our communities.
- CRTKL sponsors and participates in several ongoing and recurring mentorship programs, such as the ACE Mentor Program that operates in several cities and regions across the nation.
- CRTKL employees further organize group volunteering activities that are specific to an meaningful issues or office location. Many of these have grown into annual traditions that have spanned generations.

SAC Project Highlight

Mount Auburn Elementary

Team: Michael St. Clair, Eduardo Castañeda, David Cullers, Claudia Belzer, Rohan Saklecha, Eric Bell, Rubi Sanchez-Romo, and Lenora Devine.

Mount Auburn Elementary School is minutes from the CRTKL office in Dallas, Texas, and has recently completed an almost two-year construction upgrade. Unfortunately, not all their spaces received a renovation — including the staff lounges.

Angela Crum saw a request on social media for used furniture donations for the lounges made by one of the school administrators, and shared it with her team – knowing we had the resources and connections to give these teachers the upgrade they deserve. After a quick call with the school, it was clear that CRTKL could support the wellbeing of their staff through more than just furniture. We wanted to give both lounges the facelifts they missed out on and make it a surprise to the entire staff as they returned for the school year, teeing up the perfect way to celebrate the school's 101st Anniversary.

After just two weeks of planning, our team from the Dallas office started bright and early on a Saturday morning and completed most of our project in one day, finishing with the furniture installation the following Monday. We provided multifunctional spaces allowing food preparation, dining, planning, conversation, and – most importantly – respite.

We removed the existing tack boards and mirrors and patched and painted the walls with a few vibrant accent colors. We gave the rooms new furniture – donated from OFS, a manufacturer whose local representative lives minutes from the school, and delivered by Department of Wonder. Interface donated a large format, carpet-tile rug to anchor the lounge area. Faux floral arrangements and greenery peppered each space, bringing the outdoors in, and unique accessories were the cherry on top. CRTKL's Social Action Committee donated funds which allowed us to purchase new kitchen appliances, large-scale artwork to be featured on the accent walls, and stock the kitchen with snacks and coffee. We also had an in-house donation of framed photography from Eduardo "Eddie" Castañeda, one of our talented CRTKL designers, which gave the spaces a pop of much-needed color.

Project completion took just over one day, but its impact will last long into the future. We are thrilled to celebrate the school's 101st Anniversary Celebration and partner on future projects!

Seattle Design Festival 2022

Beat Roulette

Team: Rodrigo Tarriba, Eduardo Silva, Nomi Cooper, Diane Moore, Patrick Winston, Mark Hower, KJ Burkland, Espe Zivkovic, Steven Digiorgi, David Chamness, Todd Lawson

The Seattle Design Festival was founded in 2011 as a strategic initiative of AIA Seattle to promote public dialogue and community engagement about the role and impact of design in urban life. CRTKL collaborated with Absher Construction for the debut of Beat Roulette, a public art installation and interactive exhibit, composed fully of repurposed wood. In celebration of this year's theme, Connection, Beat Roulette highlights one of the most important ways in which we create connections — by enabling the immersive power of collaboration. In the Beat Roulette arena, your body movements double as instruments. Onlookers were invited to dance, have fun, and interact with others in the space to create new sounds and music.

Mimicking the shape of how sound waves and frequencies blend in harmony to produce the most exquisite music, participants in this installation work together to achieve sounds that are only possible through the unique input each of them is contributing. When participants enter this concave-shaped structure, they quickly realize that their body movements are triggering all sorts of sounds in their surroundings. When other participants join the experience, new beats emerge — which start colliding with the other sounds in the system, attempting to create music. Together, participants must realize that the results of the music depending on the level of synchronization between their body movements, they should work in tandem if their goal is to achieve harmony in the sounds being produced.

We believe in the value of enabling experiences that connect strangers through a shared purpose, giving people the opportunity to create something unique that is only possible through the combination of their choices, experiences, and their level of desire to connect with others.

CANstruction 2022

CRTKL raised $3,490

Donated: over 3,000 cans

Team: Zoe Calish, Nicholas Timpone, Jun Jung, Stephanie Gottlieb, Soyoung Park, Alejandra Arenas, Jenny Liang, Ashkan Radnia, Laurette Parrella, Chris Su, Shalin Bhatt, Alex Guzman, Terra Ponce, Keith Wlosek, Clayton Whitman, Nelson Medina, Ho Cheuk Choi

For this year's structure we were inspired by Richard Serra and his landscape-inspired designs. Our structure, CANscape, aimed to draw in the viewer and motivate them to think outside the box to find solutions to fight hunger. Our approach was to create a monumental sculpture that was built out of thin air and provoke feelings of wonder and exploration.

At the conclusion of the exhibit all of our leveling boards and our base were donated to students participating in another CANstruction event.

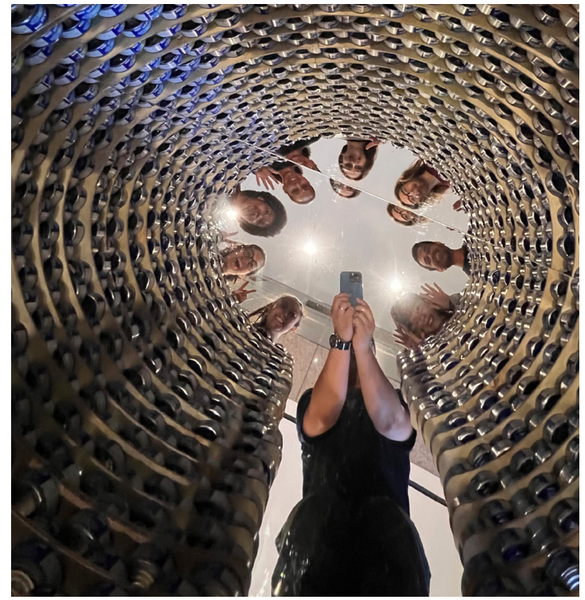
About Canstruction

Canstruction® New York is a 501(c)(3) Corporation. Canstruction, founded by the SDA, whose purpose is to advance management and administrative professionals in the A/E/C industry through education, networking, leadership, and resources. Canstruction hosts competitions and events worldwide, creating awe-inspiring, gigantic structures made entirely out of non-perishable food.

Teams of volunteers, which include design industry professionals, participate in Canstruction® events in over 100 cities each year. The can art sculptures are on exhibit to the public in each city where a competition is held. The public is invited to donate non-perishable food items during the exhibition. At the close of an exhibition, all food from the structures and public donations are donated to local food banks.

Canstruction® New York has donated over 2 million pounds of food to local food banks since 1993, and over 1.2 million pounds to City Harvest since 2006. Since 1992, Canstruction® has raised nearly 82 million pounds of food for hunger relief organizations around the world with its signature, trademarked CanArt.

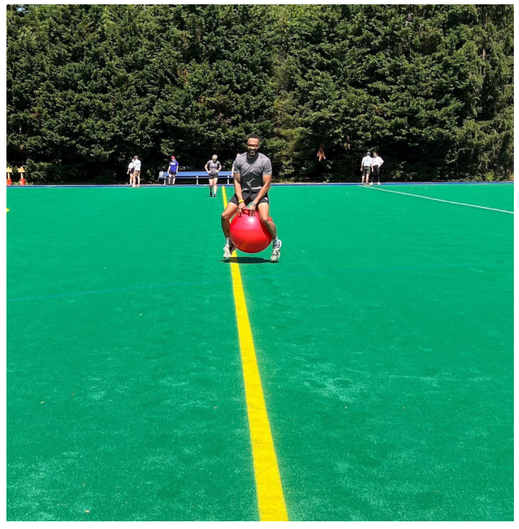
Learn more here



JDRF

About the program

The Juvenile Diabetes Research Foundation (JDRF) is the leading global organization harnessing the power of research, advocacy, and community engagement to advance life-changing breakthroughs for type 1 diabetes (T1D).



2022 JDRF Real Estate Games

June 2022 | Washington, DC
Team: Kate Gallagher, Beth Resetco, Shaun Quartier, Jaylon Floyd

Each year, the Washington DC real estate community competes in an Olympic-style sports competition to raise money for The Juvenile Diabetes Research Foundation (JDRF). CRTKL is a proud participant in this annual event and is dedicated to supporting funding efforts for type 1 diabetes (T1D) research. We were thrilled that the games were back together in-person this year.

The JDRF Real Estate Games is an annual fundraiser sponsored by the DC area commercial real estate community to benefit the Mid-Atlantic Chapter. The commercial real estate industry has joined together to fund life-changing type 1 diabetes (T1D) research for 33 years and now, more than ever, it is important to our community that the Real Estate Games continues as a symbol of the industry's collective strength and its commitment to ending T1D.

Visit realestategames.org for more information.

2022 JDRF Gingerbread Village

November - December 2022 | Seattle, Washington
Team: Douglas Dohan, Julie Lefeuvre, Tamryn Bendix, David Chamness, Mikayla Chor, Steven DeGiorgi, Mark Hower, Luna Huang, Katherine Hubenthal, Tomoko Lehtinen, Natasha Nesbitt, Nicole Orellana, Patrick Winston

Each year for the past 28 years, the Juvenile Diabetes Research Fund (JDRF) Pacific Northwest Chapter and Seattle Guild has held an annual fundraiser to create a Gingerbread Village. CRTKL has participated for over 25 years and we are keeping the tradition going!

In the most recent years, 5 Design Firm led teams starting in August and culminating at Thanksgiving would design and build large gingerbread displays (8 ft x 8 ft x 8ft) to a theme. These were then on display from November into the new year for public viewing and fundraising for JDRF.

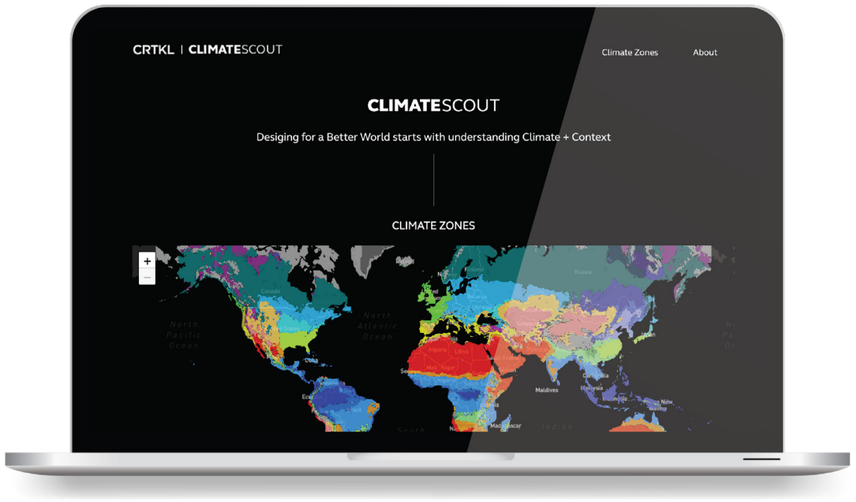
This year's theme was "Buzzing Back," and is a truly collaborative event between local design teams, JDRF Elves, and the Sheraton Grand Seattle's culinary team to develop the impressive displays.

In 2022, a total of $69,150 was raised to fund research for cures for type 1 diabetes!

05

THOUGHT LEADERSHIP & INDUSTRY PARTICIPATION

INDUSTRY CONTRIBUTIONS



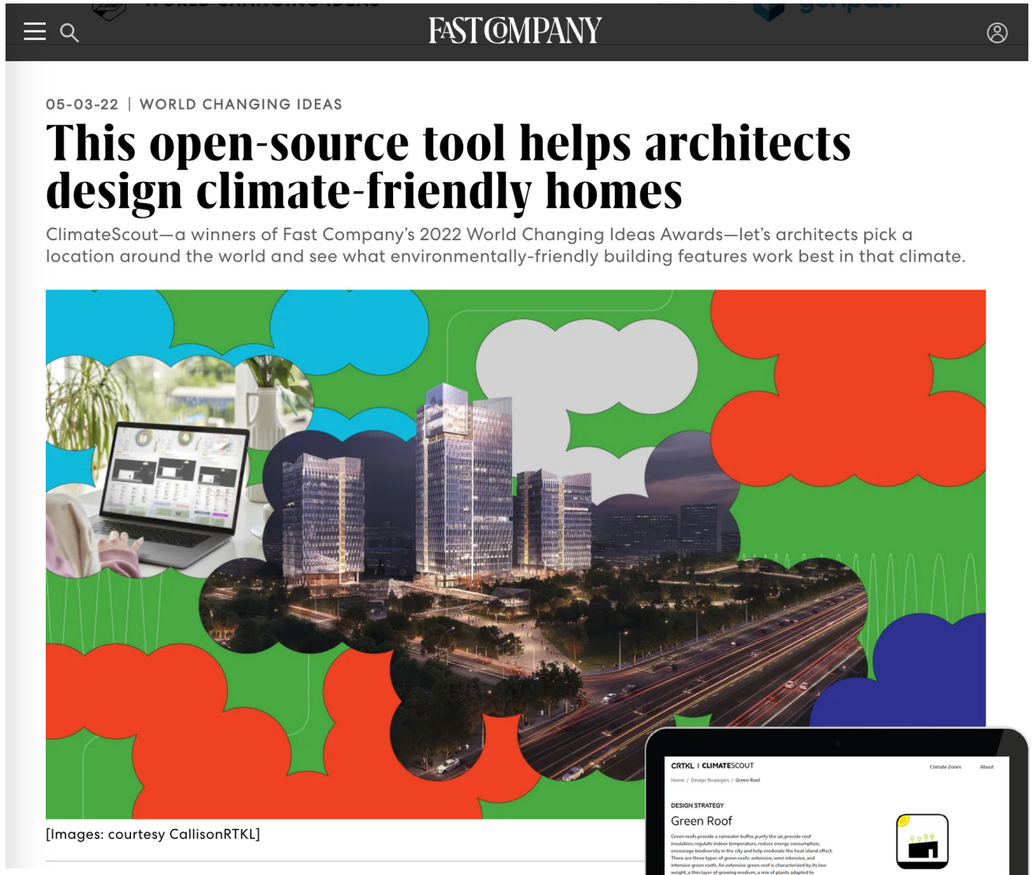
CLIMATESCOUT®

Designing for a Better World starts with understanding Climate + Context

CRTKL's vision for the future is designing a better place for all. Understanding climate and developing an appropriate architectural response is one of the first steps in our design process.

CLIMATESCOUT® helps its users design buildings that uniquely respond to a site by providing climate-specific design advice at the building scale. It pairs the Köppen-Geiger climate classification and building design strategies from Architecture 2030's Palette. It is accessible for free and used in practice and academia worldwide.

Try it out here



[Images: courtesy CallisonRTKL]

Award

CRTKL's CLIMATESCOUT®, was selected as a winner of Fast Company's 2022 World-Changing Ideas Awards.

Check it out here

CLIMATESCOUT®

How it Works

CLIMATE SCOUT® is a web-based climate analysis application that helps its users design buildings that uniquely respond to a site by providing climate-specific design advice at the building scale. After clicking on a world map to select a climate zone, the application takes the user to a page to build a section combining appropriate strategies for a selected climate. During the design, we pre-selected the strategies by comparing 27 building scale strategies from the 2030 palette with the 30 Köppen-Geiger climate subtypes to determine their applicability for each of them. As they are selected, they appear in real-time overlaid in diagrammatic form, providing an immediate visual connection between the climate and the architectural idea.

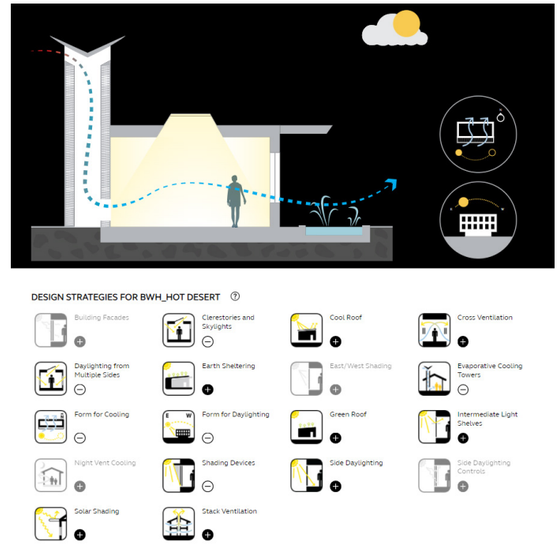
As designers in architecture, it is our responsibility to look after the future. **CLIMATE** SCOUT® is just one step in the right direction as CRTKL commits to designing a climate positive, equitable, inspiring future... embedding a mindset of sustainability into everything we do is the primary driver behind planet positive design and is a key component of CRTKL's cultural DNA and the design solutions that we deliver.

1

When accessing the site, **select the appropriate climate zone by clicking on the map or choosing from the list below.** In the Köppen-Geiger climate type, you can find climate data and descriptions for most cities. Selecting the climate prompts a new screen with a building section to overlay chosen design strategies.

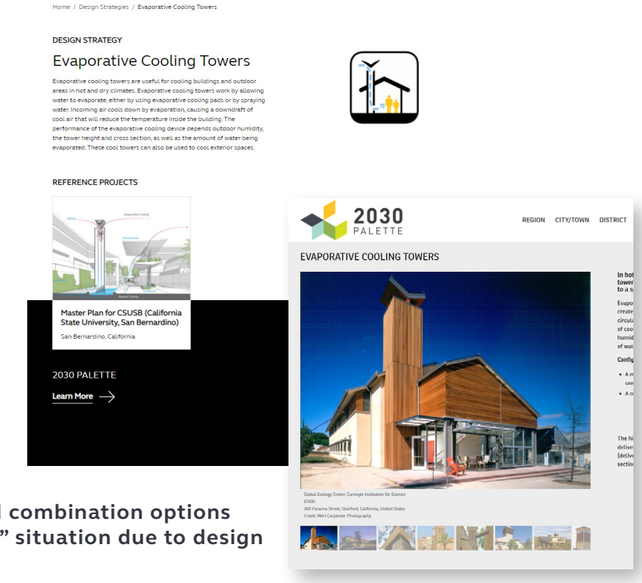
2

Using the icon's plus symbol populates the strategy in the diagram. You can select as many of the strategies in any combination until satisfied with the results. You will be able to export this image to a report of your initial site analysis.



3

You can also click directly on each strategy icon to learn more and see CRTKL project examples of its implementation.



4

This page also directly links to the same strategy in the 2030 palette, where more information resides on strategy implementation.

We have also evaluated and omitted combination options that would not work in "a real-world" situation due to design interference or other technicalities.

RECOGNITION + AWARDS

CRTKL wins world best multi-residential design of the year for Central Park at City Walk
Winner of the Best International Architecture Multiple Residence award | Dubai, UAE

Radius Named Finalist at 2022 Breaking Through Design Competition
CRTKL is honored to be chosen as a Finalist at Healthcare Design's 2022 Breaking Through design competition.

Learn More Here

CRTKL Wins Two Gold, One Merit Award at 8th Annual CREDAWADS
MixC World Shenzhen, Shenzhen
Gemdale Viseen Tower, and
Jin Jiang Mansion

Learn More Here

Gemdale Viseen Tower Wins CTBUH Award of Excellence for Best Tall Building 200-299 Meters

Learn More Here

The Ring of Life Wins Merit Award in Urban Design
2022 AIA Hong Kong Honors & Awards

Learn More Here

Merlata Bloom Milano
Nhood Italy Wins The Plan Real Estate Award 2022

Learn More Here

Lampwick Quay shortlisted for Apartment of the Year Award
A finalist in the Apartment Development of the Year category and part of the Manchester Life portfolio

Learn More Here

SPEAKING ENGAGEMENTS 2022

Speaking and Publishing, including Peer Reviewed Conferences 2022

Panelist in International Building Performance Simulation Association (IBPSA) Mixa Event | January 11, 2022
Speaker: Pablo La Roche
How Can Architects do Better

Retail Design Institute Seattle | January 27, 2022
Speakers: Yarden Harari, Joey-Michelle Hutchison
Circularity in Retail: Where Things Come From and Where They Go

I+S Hear Design | February 2023
Speaker: Pablo La Roche
Podcast Sustainability Part 2: Demystifying Design Tools & Third-Party Certifications.

ULI China Mainland | March 1, 2023
Speaker: Pablo La Roche
Presentation on Sustainable Building Design for ESG Leadership Training Program

ARCC-EAAE 2022 International Conference, Resilient City: Physical, Social, and Economic Perspectives, Hosted by Florida International University, Miami | March 2-5, 2022
Authors: Lewis O., La Roche P., Hutchison, JM., Ponce A.
Understanding Efficient Mitigation Strategies for Los Angeles' Heat Islands using OLS Regression Analysis (PUBLISHED)

Center for the Built Environment, CBE, UC Berkeley | April 2022
Speaker: Pablo La Roche
Speaker at Industry Advisory Board Meeting

University of Southern California | April 13, 2002
Speakers: Pablo La Roche, Olivia Lewis
The Economics of Sustainable Architecture: Adapting to Climate Change

Beyond the Walls | May 31, 2022
Speaker: Preeti Mogali
Podcast "Away With Greenwashing and Implementing Sustainability"

The Designerati | June 6, 2022
Speaker: Jan-Maurits Loecke
Podcast "On A Sustainability Mission To Educate The Design Industry"

Neocon 2022 | June 13, 2022
Speakers: Yarden Harari, Marcus Hopper (Gensler), Daniel Kietzer (Rheaply)
Activating a Connected Reuse Ecosystem

AIA Conference on Architecture 2022 | June 22, 2022
Speakers: Yarden Harari, Marcus Hopper (Gensler)
Designing For Zero Waste: Building A Material Reuse Ecosystem

2022 AIA/ACSA Intersections Research Conference | October 7, 2022
Speakers: Joshua Lee and Ryan Vaz (Carnegie Mellon University), Yarden Harari
A Toolkit for Circular Construction of Retail and Commercial Spaces

2022 Build Reuse Deconstruction + Reuse Conference | October 19, 2022
Speakers: Yarden Harari, Melissa Wenzel (Minnesota Pollution Control Agency)
Ready, Set, Map! A Tool for Listing Reuse Organizations

Advanced Building Skins Conference, Berne | Oct 20-22, 2022
Authors: La Roche, P. Ponce A.
Form follows daylight: daylight design at CRTKL (PUBLISHED)

Urban Land Institute Fall Meeting 2022, Dallas | Oct 24-27, 2022
Panelists: Renee Schoonbeek , Kevin Augustyn, Pablo La Roche
ESG by Design: A Conversation about Investing in ESG and Performance-Driven Design

36th PLEA Conference 2022 Sustainable Architecture And Urban Design Santiago de Chile | November 23 - 25, 2022
Authors: Rodriguez L, La Roche P.
Living Roofs for Cooling in Hot Dry Climates: Effects of Temperature and Swing (PUBLISHED)

36th PLEA Conference 2022 Sustainable Architecture And Urban Design Santiago de Chile | November 23 - 25, 2022
Authors: La Roche P. Ponce A. Hutchison Joey-Michelle
CLIMATESCOUT® a Design Tool for Low Carbon Architecture (PUBLISHED)

36th PLEA Conference 2022 Sustainable Architecture And Urban Design Santiago de Chile | November 23 - 25, 2022
Authors: de Bem, G., La Roche P., Kruger, E., de Abreu A.
Responsive Brise-soleil: Design Concept and Performance Analysis (PUBLISHED)

PUBLICATIONS + PRESS 2022

CRTKL SHFT Planet Edition
https://cdn.crtkl.com/wp-content/uploads/sites/1/2023/01/CRTKL_SHFT_Planet-new-final.pdf

ESG and the future of Hospitality Part 1
https://www.callisonrtkl.com/news/esg-and-the-future-of-hospitality-part-1/

ESG and the future of Hospitality Part 2
https://cdn.crtkl.com/wp-content/uploads/sites/1/2023/02/Part_2_ESG_and_the_Future_of_Hospitality_2.pdf

CLIMATESCOUT included in sustainable supplier index 2023, edited by GreenBuild
https://images.go.informaconnect01.com/Web/UBMSCG/%7B1ac5592d-6fa3-433d-9828-74a6ecd7350c%7D_GB_Sustainable_Supplier_Index_(003).pdf

GBD Magazine "Airport Design Strategies That Make for a Less Stressful Departure"
https://gbdmagazine.com/airport-design-strategies/

Saudi Projects "CRTKL Reveals Potential Impact of Universal Buildings on Future of Sustainable Cities"
https://saudi.tpg.media/crtkl-reveals-potential-impact-of-universal-buildings-on-future-of-sustainable-cities/

Designerati "Regenerative design promotes a better world – Pablo La Roche"
https://designerati.co.uk/2022/10/28/regenerative-design-promotes-a-better-world-pablo-la-roche/

CRTKL "Universal Building"
https://cdn.crtkl.com/wp-content/uploads/sites/1/2022/08/Exploring-Universal-Building.pdf

Facilitiesnet "Regenerative Buildings Represent the Future of Facilities"
https://www.facilitiesnet.com/green/article/Regenerative-Buildings-Represent-the-Future-of-Facilities--19629

The Greenest Building Is Flexible, Adaptable, and Universal
CRTKL is developing a template for a building that can serve many functions
https://www.treehugger.com/greenest-building-flexible-adaptable-universal-6455985

Zawya by Refinity "CRTKL reveals three key ways digital technology is reducing the impact of the built environment on the planet"
https://www.zawya.com/en/press-release/research-and-studies/crtkl-reveals-three-key-ways-digital-technology-is-reducing-the-impact-of-the-built-environment-on-the-planet-sjgjk387

National Aviation Day/Terminal 2:
https://www.linkedin.com/feed/update/urn:li:activity:6966416458268504066

Dezeen "Ten airports designed with sustainability in mind" Features Terminal 2 Guadalajara
https://www.dezeen.com/2022/07/08/airports-sustainable-architecture/

Fast Company "CLIMATESCOUT world changing ideas award"
https://www.fastcompany.com/world-changing-ideas/list

Architizer. "Transport Interiors: Will Architects Prioritize Passenger Experience in the Post-Pandemic World"
https://architizer.com/blog/inspiration/stories/post-pandemic-airport-architecture/

The Economics of Sustainable Architecture: Adapting to Climate Change Pablo La Roche, Olivia Lewis April 13 2022 University of Southern California
https://www.linkedin.com/feed/update/urn:li:activity:6918211010092789761/

Architizer "Guadalajara International Airport, Terminal 2"
https://architizer.com/projects/guadalajara-international-airport-terminal-2/

HEALTHCARE FACILITIES TODAY "Sustainable Materials Critical for Resilience Amid Climate Change
https://www.healthcarefacilitiestoday.com/posts/Sustainable-Materials-Critical-for-Resilience-Amid-Climate-Change--26952

Research Committee IBPSA Mixa Event with Pablo La Roche
https://www.linkedin.com/feed/update/urn:li:activity:6885314087404793856/

Archinect "From the Editors: What We're Thankful for in 2021"
https://archinect.com/features/article/150289108/from-the-editors-what-we-re-thankful-for-in-2021

AIA LA CRTKL's Pablo La Roche And Cliff Bollmann to Present Civic Citation Award Winner Guadalajara Airport Terminal Two at AIA Los Angeles' Inside Look: The Design Award Winners Event
https://www.callisonrtkl.com/news/crtkls-pablo-la-roche-and-cliff-bollmann-to-present-civic-citation-award-winner-guadalajara-airport-terminal-two-at-aia-los-angeles-inside-look-the-design-award-winners-event/?utm_campaign=pdd&utm_source=linkedin&utm_medium=social&utm_content=1635792946

Built Environment News "Material Technology At Crossroads"
https://benews.co.uk/insight/material-technology-at-crossroads/

OUR PARTNERSHIPS

Collaboration and dialogue with our peers is essential to advance the performance of the built environment. We all need to do our part in the generation and sharing of knowledge.

architecture 2030

CLF Carbon Leadership Forum

CAALA UNLOCKING SUSTAINABILITY

CBE CENTER FOR THE BUILT ENVIRONMENT

NOMA

INTERNATIONAL LIVING FUTURE INSTITUTE

AIA Committee on the Environment Top Ten Green Buildings Award

U.S. GREEN BUILDING COUNCIL LEED CERTIFIED USGBC

ACE MENTOR PROGRAM ARCHITECTURE • CONSTRUCTION • ENGINEERING

100 BLACK MEN OF AMERICA, INC.

BuildingGreen

ULI Urban Land Institute

AIA 1.5
Degree Event

CONTACT US

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Global Sustainability Fellows

The Global Sustainability Fellowship Program was designed to expand sustainable design knowledge and expertise as well as to create a network of sustainability enthusiasts across the firm. Fellows are passionate about sustainable design and want to make a positive impact in the built environment. They support firmwide initiatives, act as the sustainability leader for their office and are encouraged to interact with each other and help project teams have a better understanding on how to design for planet positive.

Roy Li
Beijing

Fotis Perizes
Chicago

Siji Lu
Dallas

Brian Hurh
DC

Lisa Ganna
Dubai

Jan-Maurits Loecke
London

Ruotian Cai
Los Angeles

Raul Jaramillo
Mexico

Sandra Camejo
Miami

Nikita Malviya
New York

Jennifer Gullet
Seattle

CRTKL

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