

BUILDINGENERGY BOSTON

Hotel Marcel: The Only Passive House Certified Hotel

Bruce Redman Becker, FAIA (Becker + Becker)

Curated by Mark Schow

**Northeast Sustainable Energy Association (NESEA)
March 28, 2023**

NESEA - Boston
March 28, 2023

Bruce Redman Becker, FAIA

Hotel Marcel Case Study



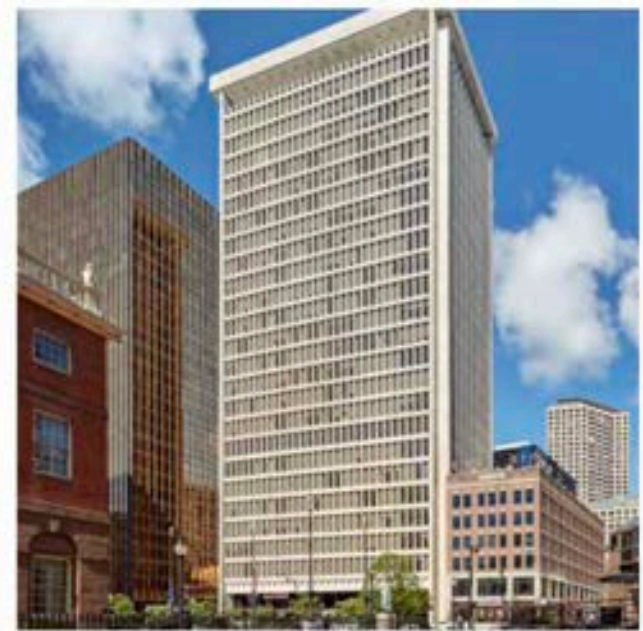
BECKER + BECKER



Hotel Marcel



Cary Institute of Ecosystem Studies



777 Main



360 State



The Octagon



The Wauregan



360 State Street

New Haven Connecticut

Project Type:

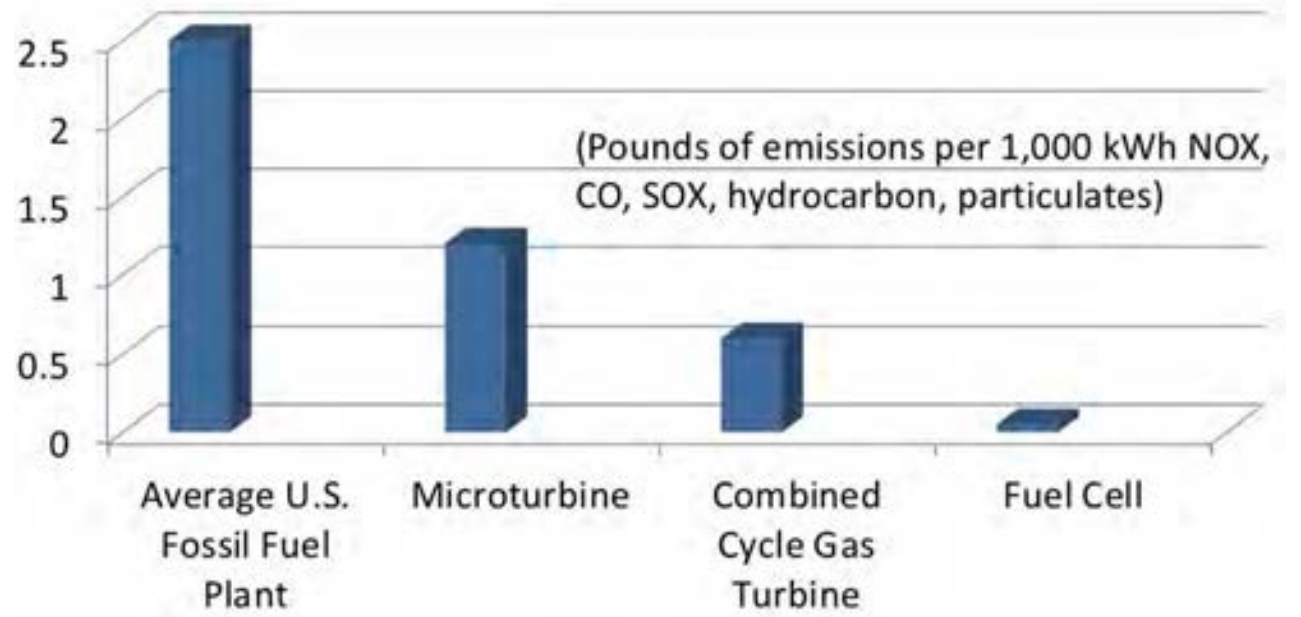
Mixed-use, Transit-oriented development

B+B Role:

Master Developer/Part Owner/Architect of Record

Status and Scale:

Completed 2011. 1.6 acres/680,000 SF
500 units plus grocery store





777 Main Street
Hartford Connecticut

Project Type:
Mixed-use
Transit-oriented development

B+B Role:
Developer/Owner/Architect of Record

Status:
Completed 2016

Size:
387,000 SF

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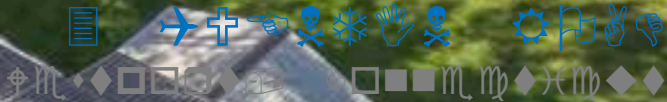
















STOP
ILMASTOTUHO

STOP
FOSSIL
BURNING

EKO energy

isovanhemmat
vaativat
ILMASTO-
TEKOJA

FÖR
BARNBARNENS
FRAMTID

CLIMATE
STRIKE



AMSTRONG
RUBBER



ARMSTRONG
RUBBER



1969
MARCEL BREUER
and ROBERT F GATJE
Architects





Marcel Breuer's most iconic structures include – Atlanta Central Library (Atlanta, Georgia); Church at St. John's Abbey (Collegeville, Minnesota); IBM Laboratory (La Gaude, France); and Whitney Museum of American Art (New York City, New York).

Breuer's students at Harvard include Philip Johnson, Edward Larrabee Barnes, Ben Thompson, Elliot Noyes, I.M. Pei, John Johansen, Ulrich Franzen, and Paul Rudolph





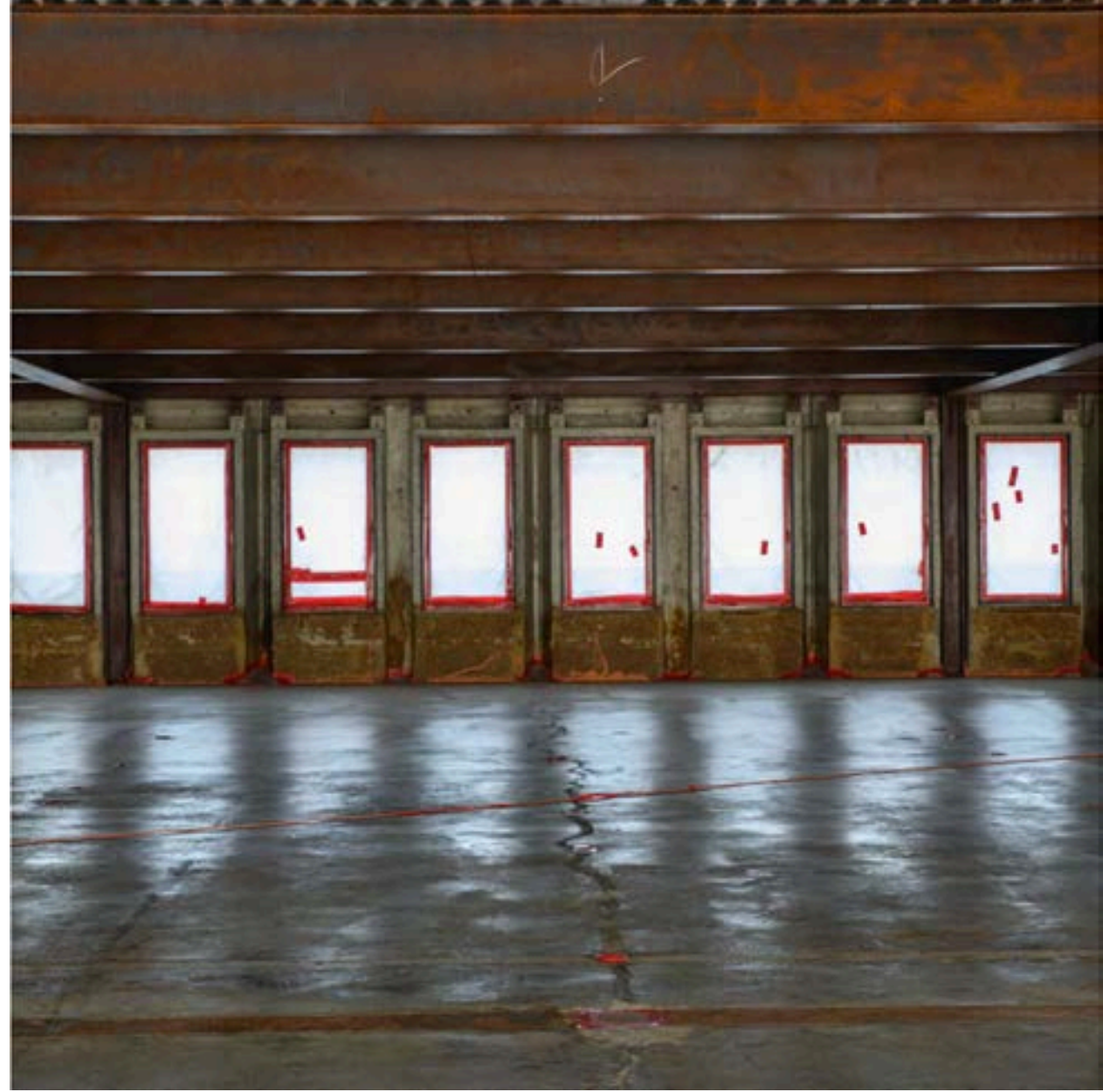


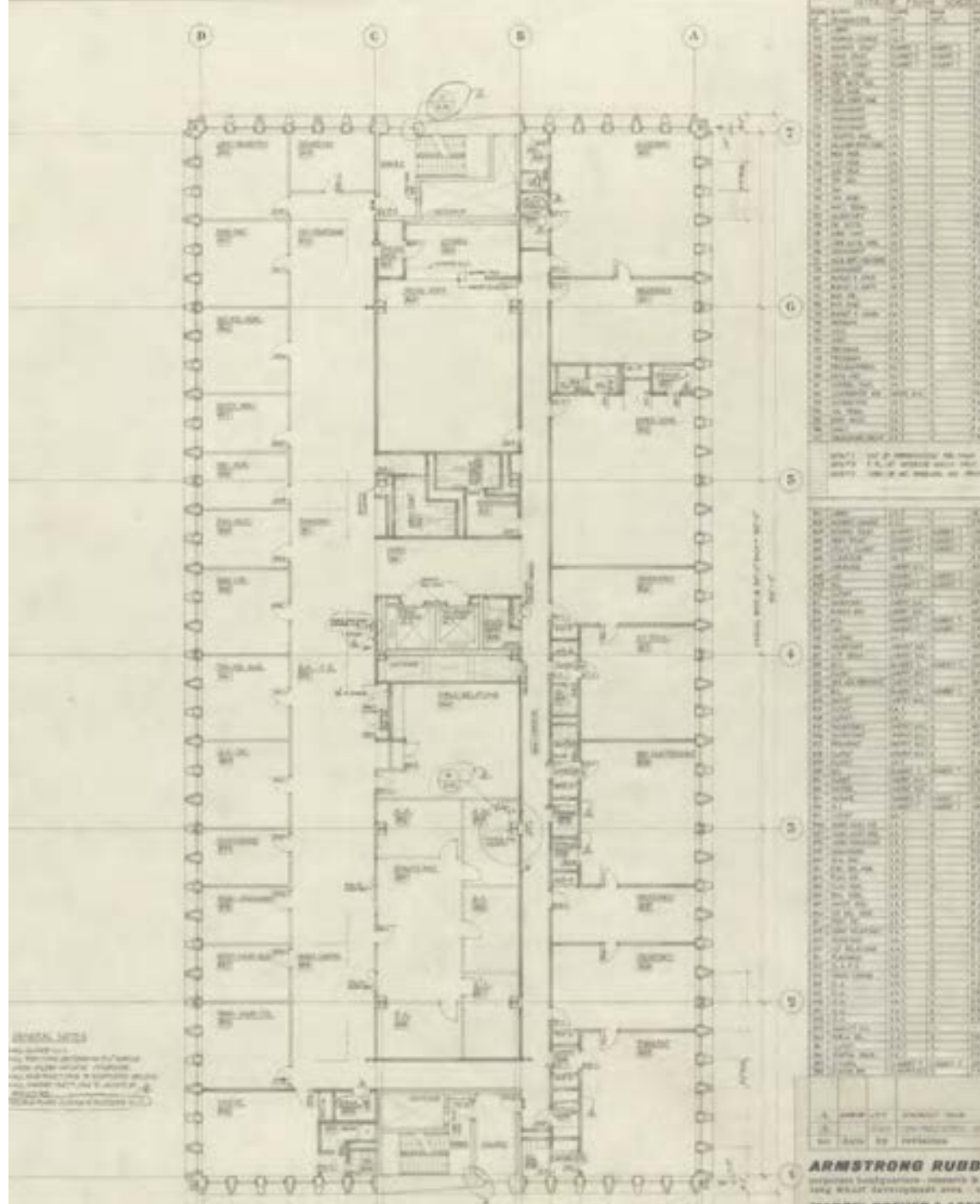
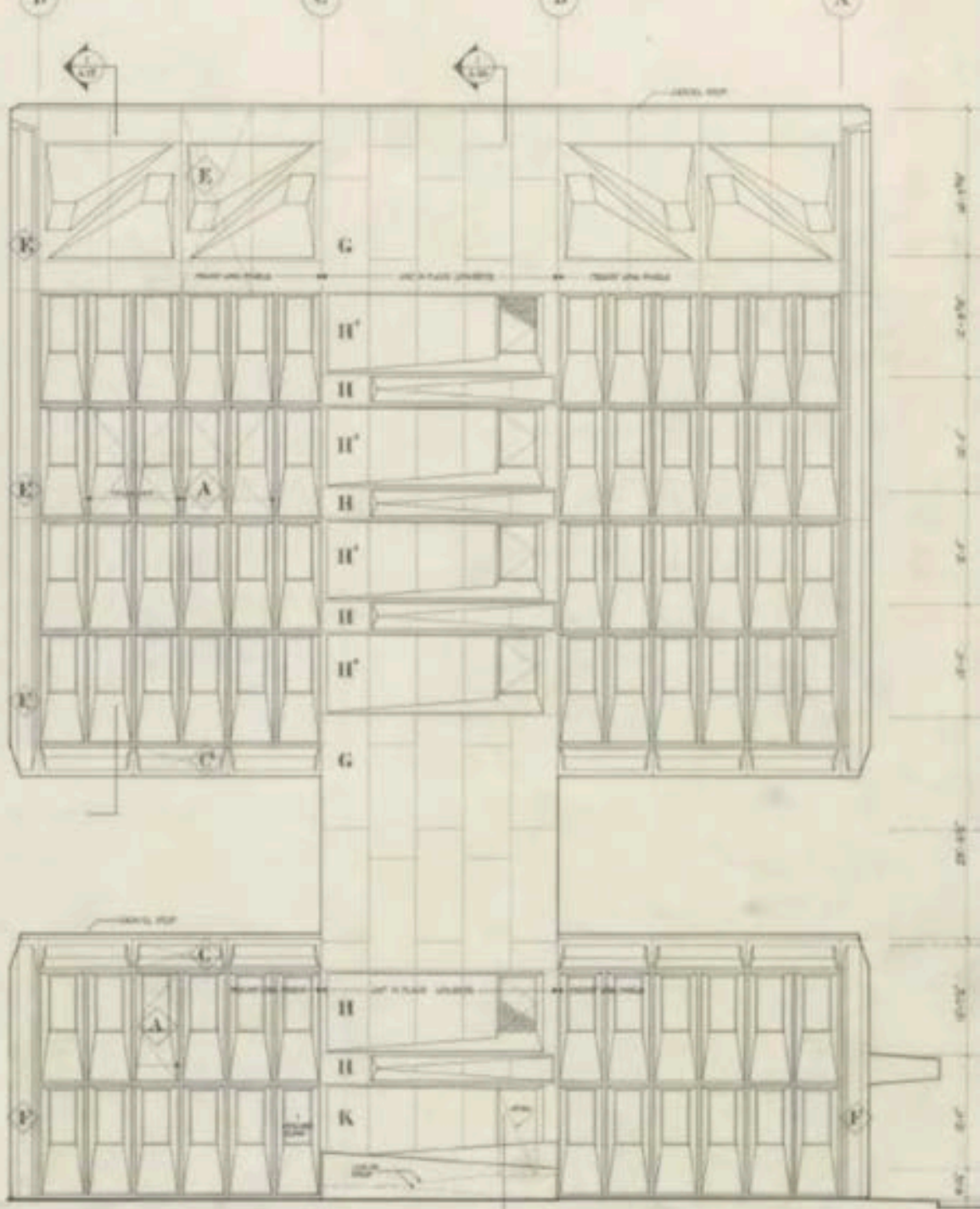
Hotel Marcel – Program for Reinvention

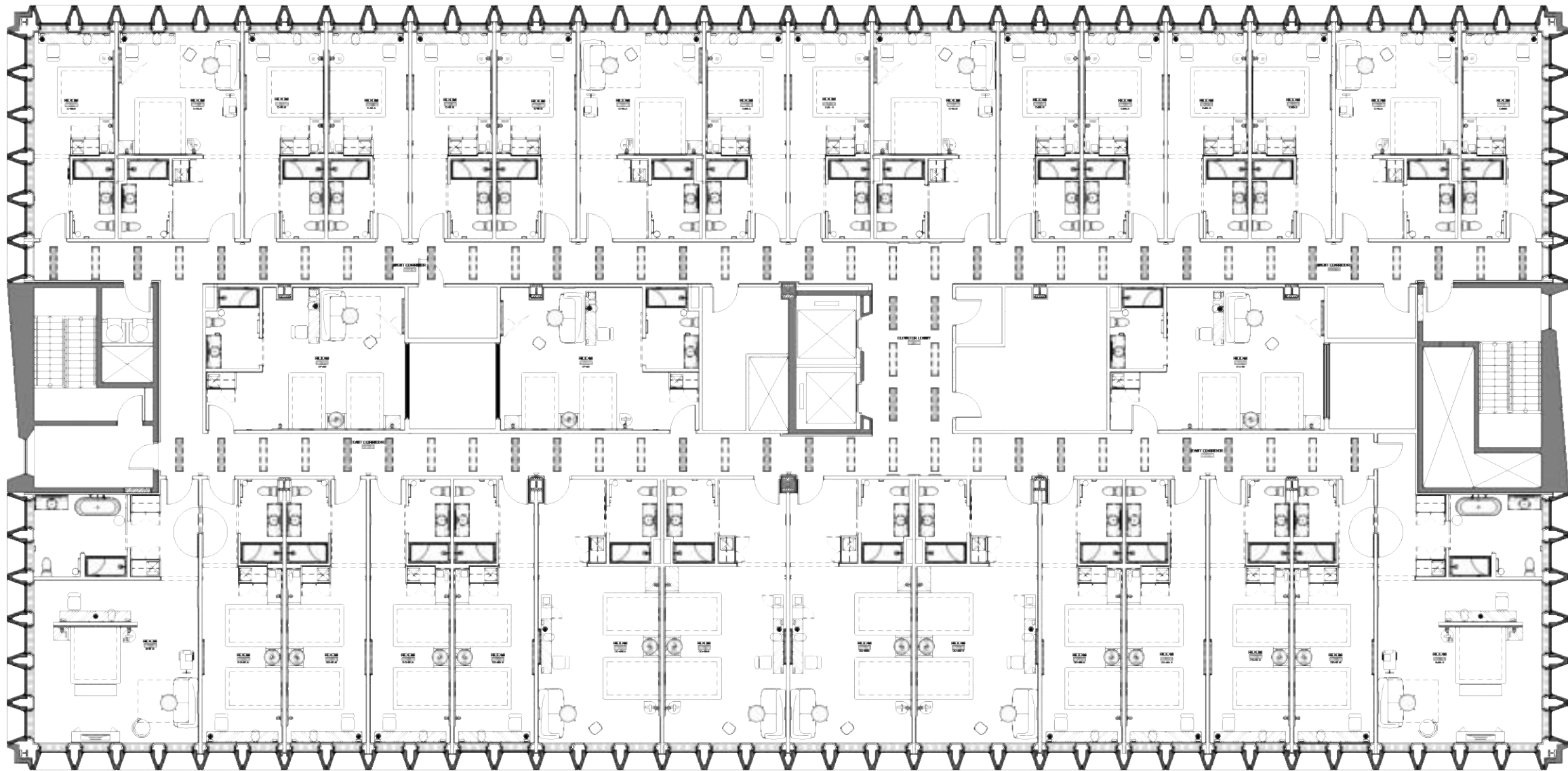
- 165 room Boutique Hotel, including restaurant, 7,000 sf of meeting space
- Listed on National Register of Historic Places
- Certified historic rehabilitation (approved by National Park Service and SHPO)
- Meet standards required for inclusion in Tapestry Collection by Hilton

Sustainability Program

- LEED Platinum Certification (one of only about a dozen such hotels in United States)
- Passive House Certification (believed to be first such hotel in United States)
- No use of fossil fuels (including 100% of HVAC, hot water, kitchen and laundry)
- All electric building (no natural gas connection)
- Net zero energy (believed to be first such hotel in United States)
- Use of Power over Ethernet (POE) for all Lighting and Shades
- Creation of Micro-grid for resilience with 1 megawatt hour of battery storage

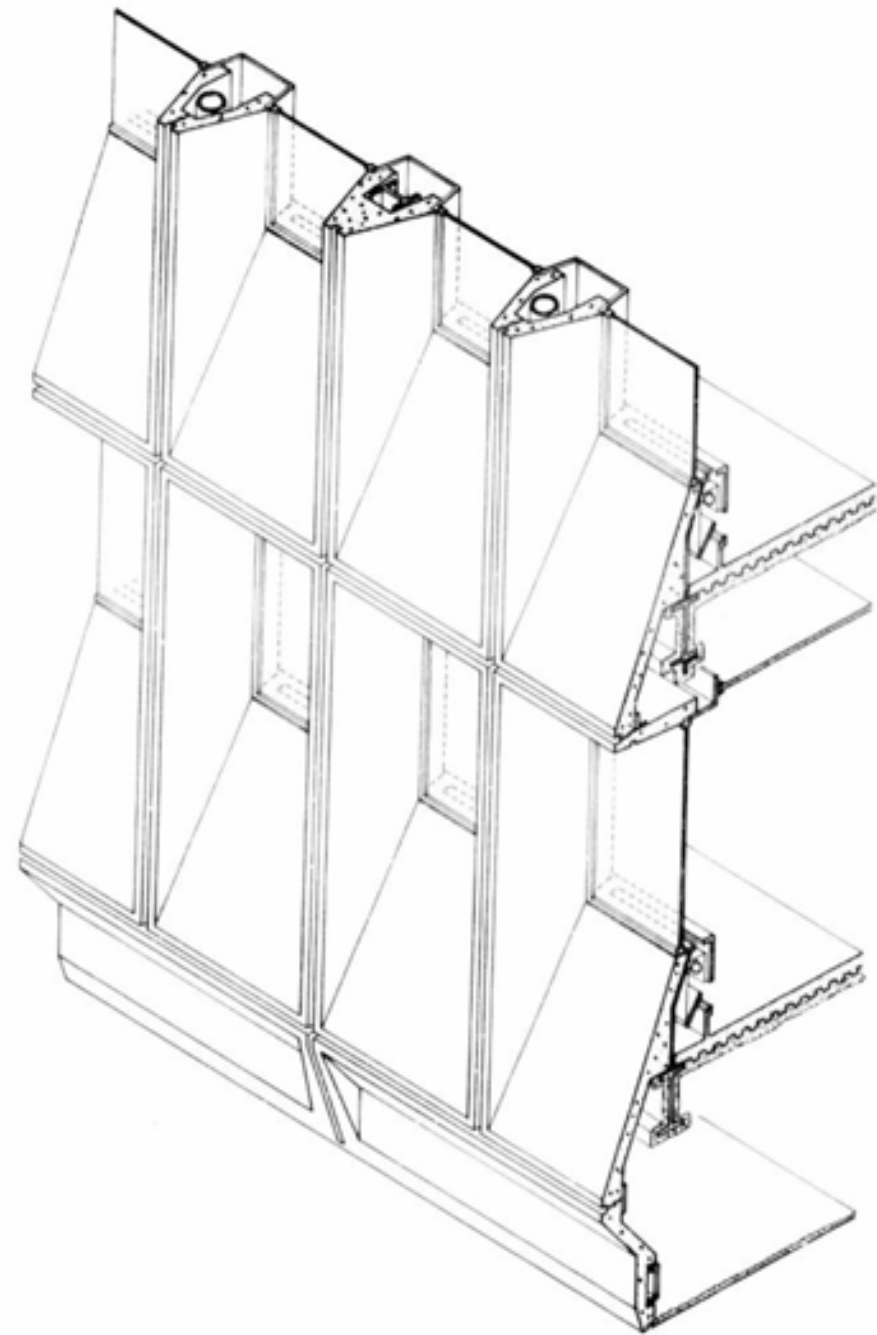






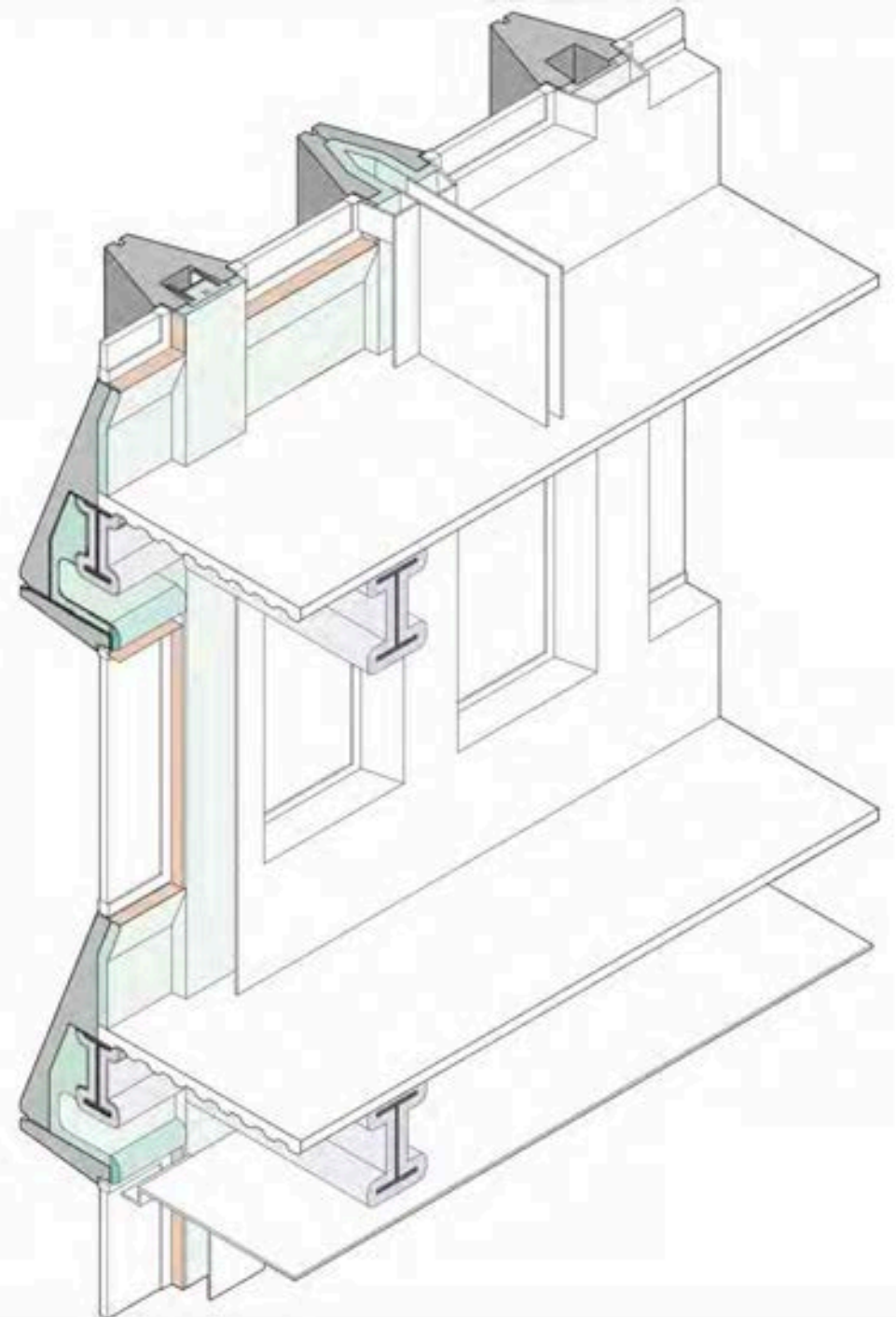


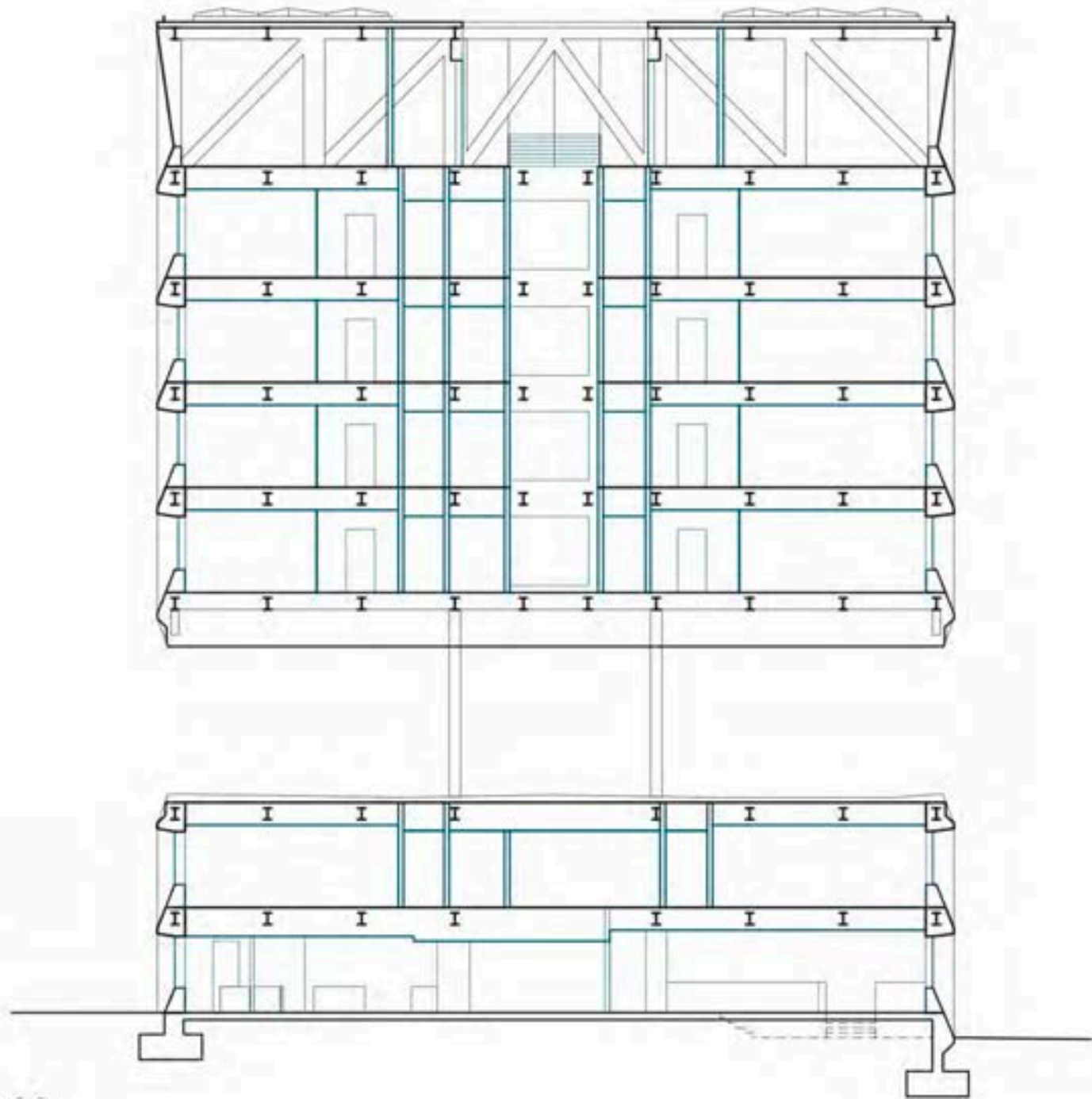


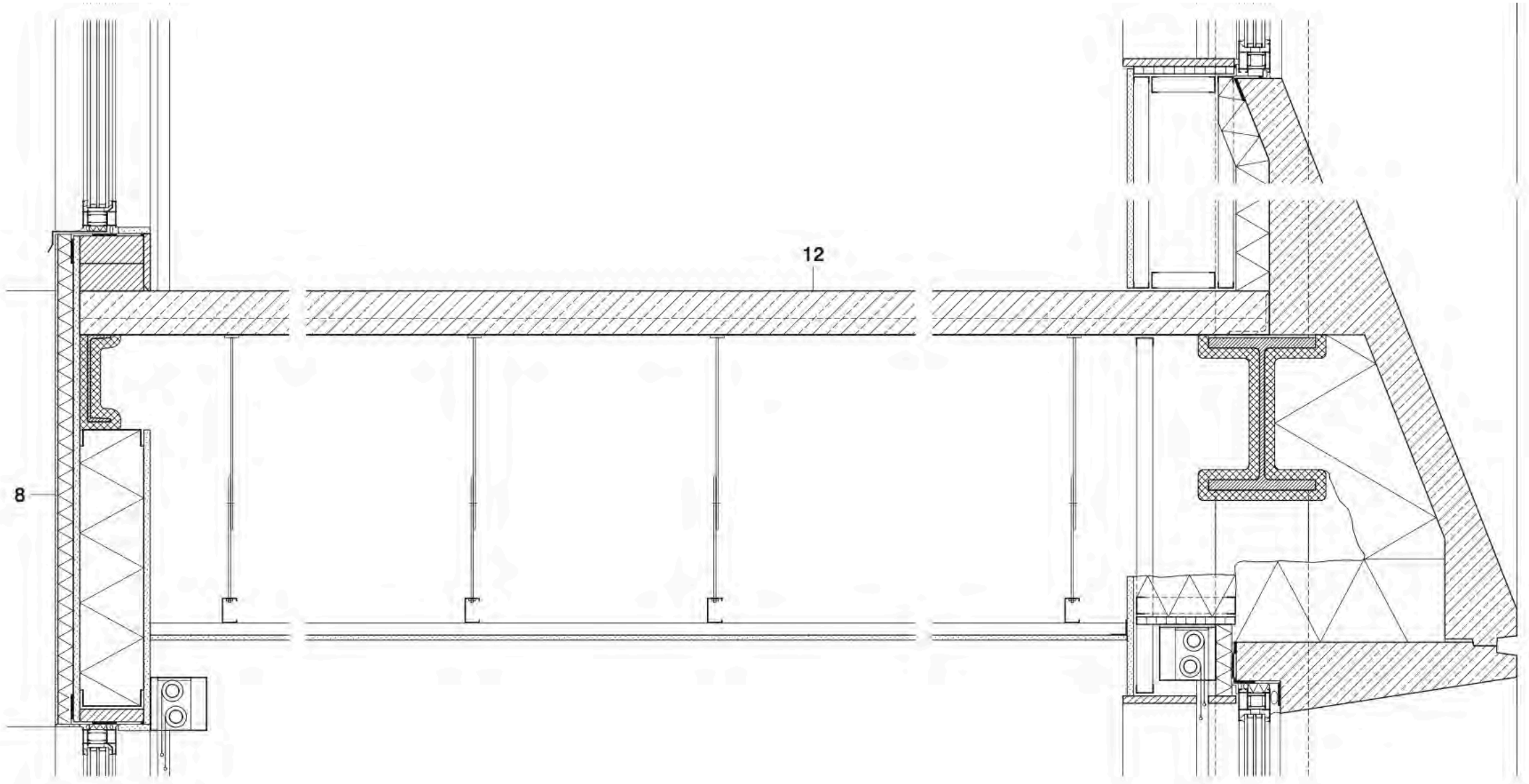


Probable Energy Use and Utility Cost:

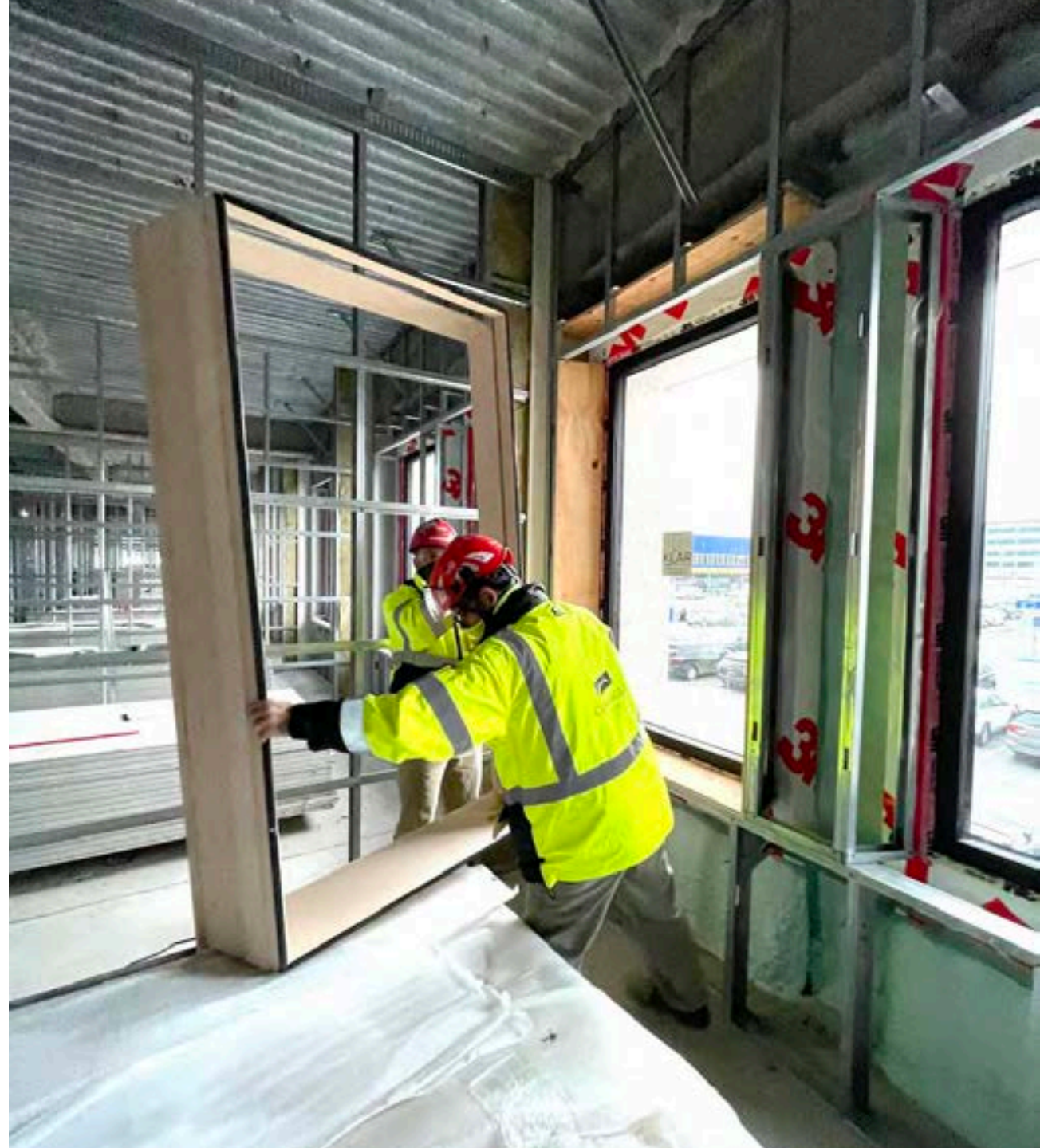
	1. Proposed Model	
	Electricity (kWh)	Natural Gas Therm
Heating	73,467	-
Cooling	89,157	-
Interior Lighting	119,293	-
Exterior Lights	19,636	-
Interior Equipment	356,251	-
Exterior Equipment	-	-
Fans	94,023	-
Pumps	0	-
Heat Rejection	-	-
Humidification	-	-
Heat Recovery	-	-
Water Systems	49,195	-
Refrigeration	-	-
Generators	-	-
Total End Uses	801,023	-
Utility Cost	\$ 87,024	\$ -
Total		\$ 87,024





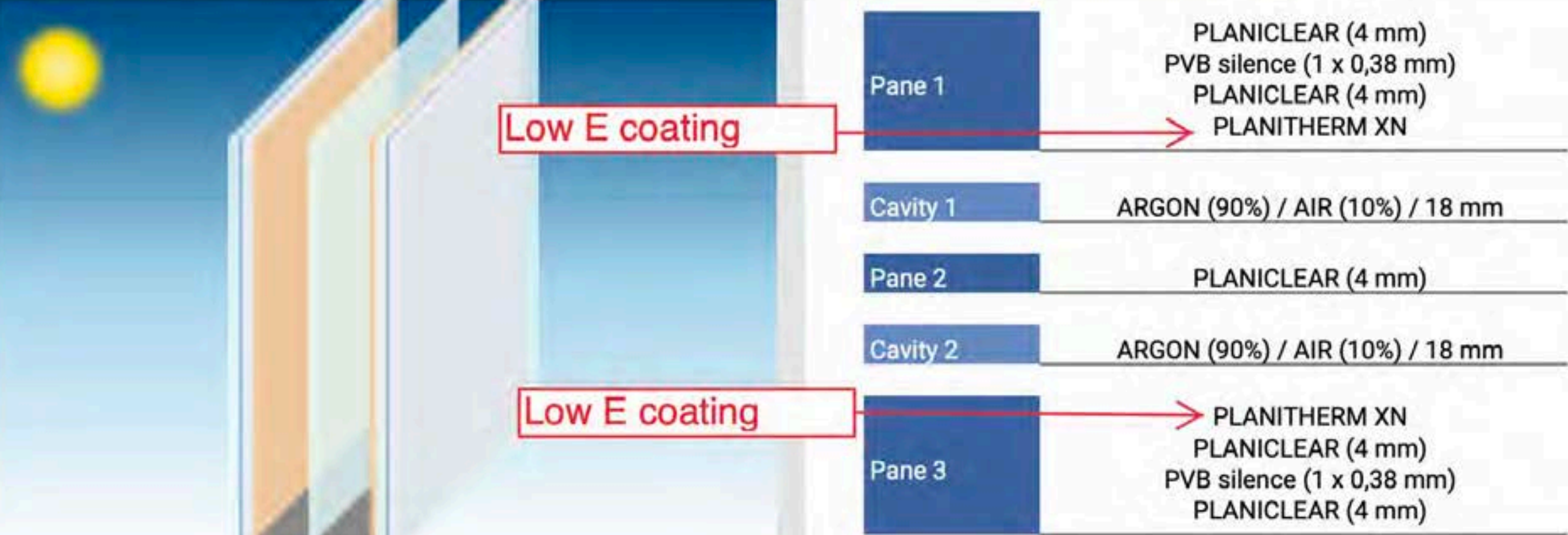














	LUMINOUS FACTORS	CIE (15-2004)
	Light transmission (TL %)	72,0 %
	Outdoor reflection (RLe %)	14,0 %
	Indoor (RLi %)	14,0 %
	SOLAR FACTORS	NFRC
	SHGC	0,4451
	RHG	326,82 W/m ²
	Shading Coefficient (SC)	0,5116
	COLOR RENDERING	CIE (15-2004)
	Transmission (Ra)	95,3
	Reflection (Ra)	93,3

	ENERGY FACTORS	NFRC
	Transmission (Te)	40,4 %
	Reflection (Ree)	28,2 %
	Indoor (Rei)	28,2 %
	Absorption (AE1)	21,8 %
	Absorption (AE2)	3,5 %
	Absorption (AE3)	6,1 %
	THERMAL TRANSMISSION	NFRC100
	Ug - Winter	0,724 W/m ² .K
	Ug - Summer	0,578 W/m ² .K
	0° related to vertical position	

	ACOUSTICS	EN12758
	Acoustic simulated values	Rw(C;Ctr) = 47(-2;-7) dB

























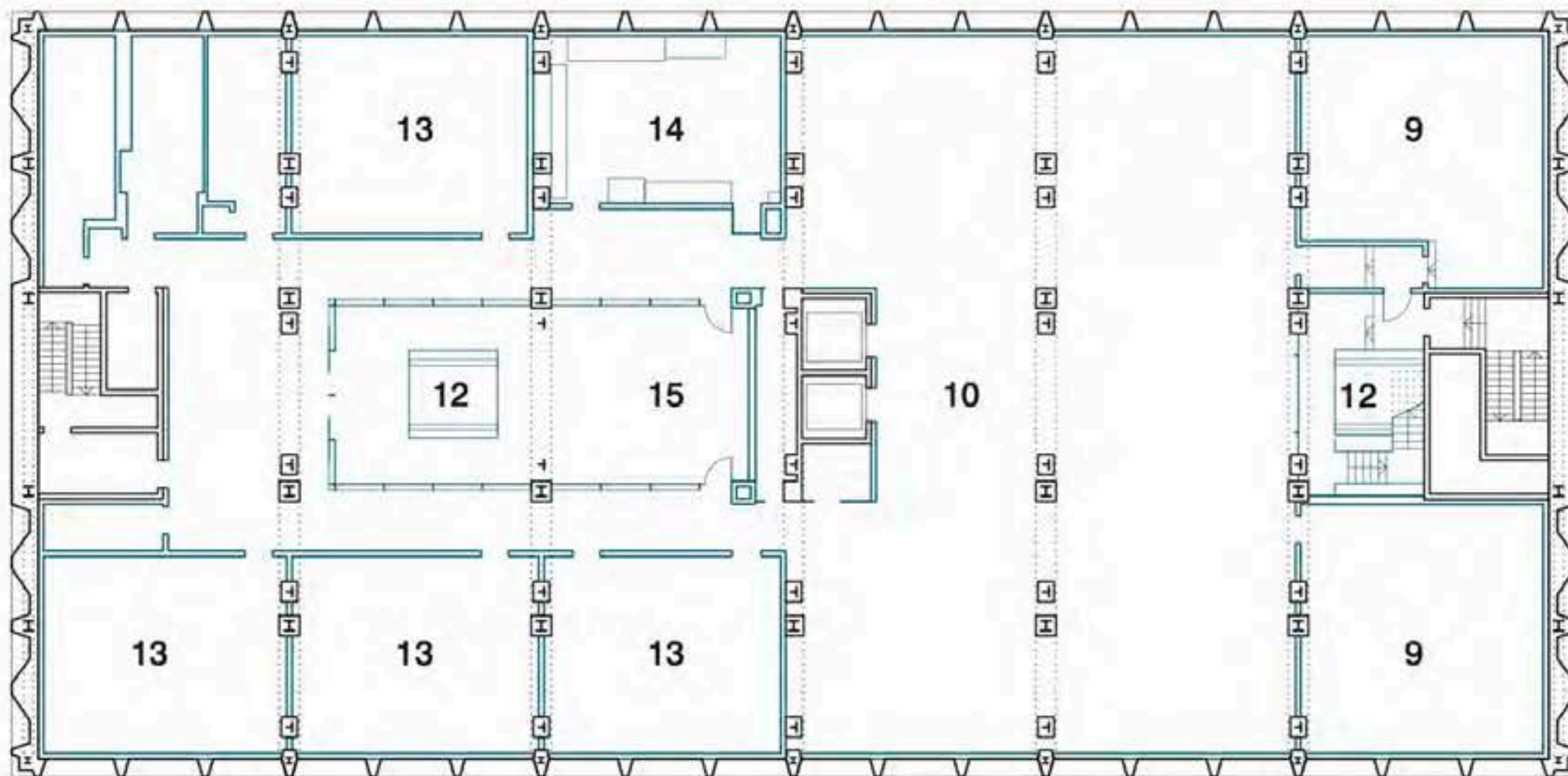






















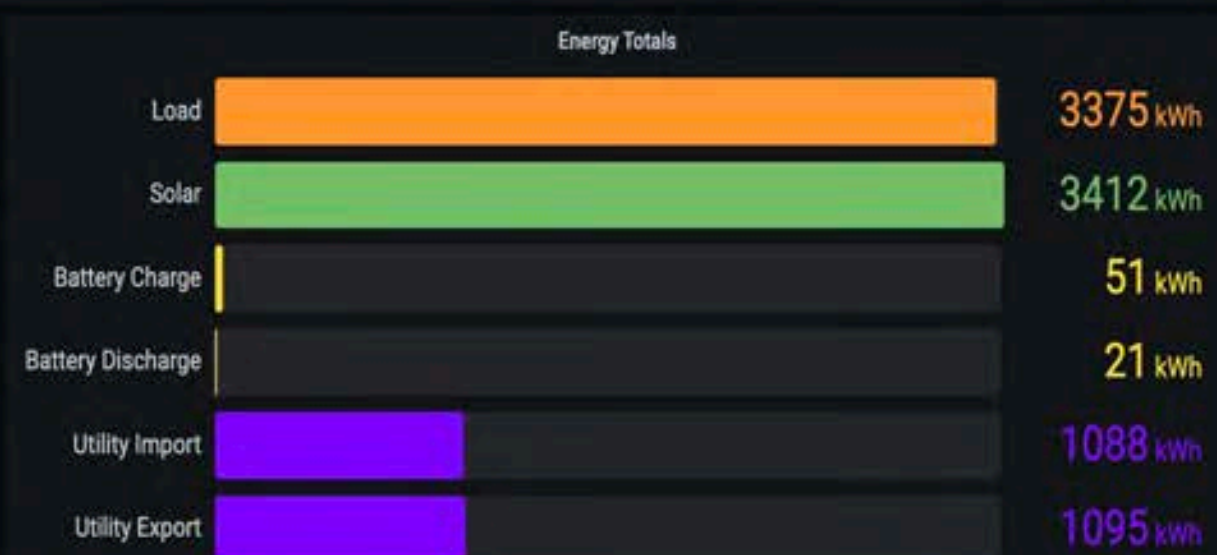




INV #	BMS #	PV #	UTIL #	LOAD #
2	4	8	1	3

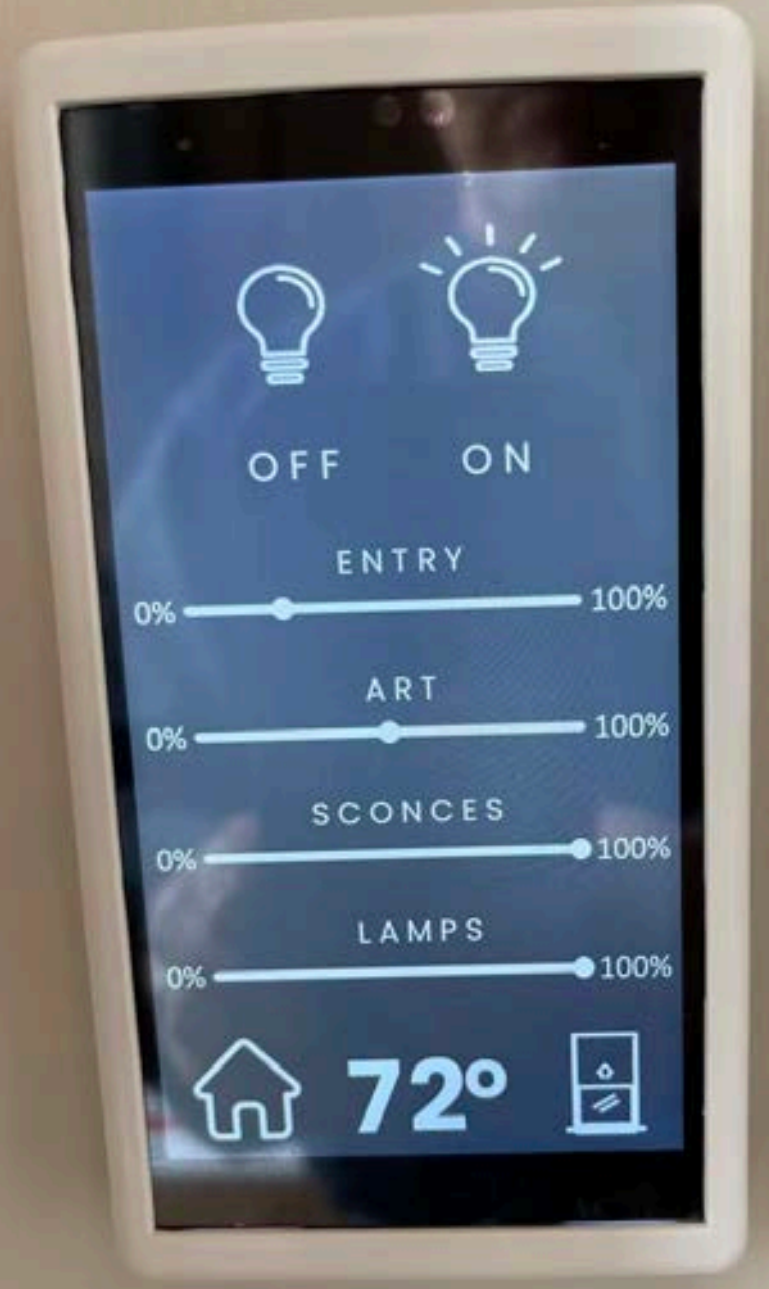
INV	BMS	PV	UTIL	LOAD
0 kW	0.963 kW	0 kW	157 kW	156 kW

BUS Voltage	BUS Frequency	BMS Capacity	CO2 Offset
489 v	60.02 Hz	5.1 hrs	164 tons



















powerCharge

This EV charger managed by
evconnect

To use this charging station:

- Download & launch the EV Connect app
- Scan the QR Code or type in Station ID
- Press Charge Now, then plug in vehicle

Or tap your access card

We're Here to Help!
If you are experiencing issues with this charging station,
please contact EVConnect Driver Support at
(866) 816-7584



Tap EVConnect Card Here

STATION PORT ID



PC1857

powerCharge

This EV charger managed by
evconnect

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Tap EVConnect Card Here

STATION PORT ID



PC1857



100% Electric

HOTEL
MARCEL

100% Electric
HotelMarcel.com 203.780.7800

203.780.7800
HotelMarcel.com

**Hotel Marcel**

LEED BD+C: Hospitality (v4)

PLATINUM, AWARDED JAN 2023

**SUSTAINABLE SITES**

AWARDED: 5 / 10

Prereq	Construction activity pollution prevention	0/0
Credit	Site assessment	1/1
Credit	Site development - protect or restore habitat	2/2
Credit	Open space	1/1
Credit	Rainwater mgmt	0/3
Credit	Heat island reduction	0/2
Credit	Light pollution reduction	1/1

**WATER EFFICIENCY**

AWARDED: 9 / 11

Prereq	Outdoor water use reduction	0/0
Prereq	Indoor water use reduction	0/0
Prereq	Building level water metering	0/0
Credit	Cooling tower water use	0/2
Credit	Water metering	1/1
Credit	Outdoor water use reduction	2/2
Credit	Indoor water use reduction	5/6

**ENERGY & ATMOSPHERE**

AWARDED: 29 / 33

Prereq	Fundamental commissioning and verification	0/0
Prereq	Minimum energy performance	0/0
Prereq	Building level energy metering	0/0
Prereq	Fundamental refrigerant mgmt	0/0
Credit	Enhanced commissioning	3/6
Credit	Advanced energy metering	1/1
Credit	Demand response	2/2
Credit	Renewable energy production	1/3
Credit	Enhanced refrigerant mgmt	0/1
Credit	Greenpower and carbon offsets	2/2
Credit	Optimize energy performance	18/18

**MATERIAL & RESOURCES**

AWARDED: 11 / 13

Prereq	Storage and collection of recyclables	0/0
Prereq	Construction and demolition waste mgmt planning	0/0
Credit	Building life-cycle impact reduction	5/5
Credit	Building product disclosure and optimization - environmental product disc.	1/2
Credit	Building product disclosure and optimization - sourcing of raw materials	1/2
Credit	Building product disclosure and optimization - material ingredients	2/2
Credit	Construction and demolition waste mgmt	2/2

**INDOOR ENVIRONMENTAL QUALITY**

AWARDED: 9 / 16

Prereq	Minimum IAQ performance	0/0
Prereq	Environmental Tobacco Smoke Control	0/0
Credit	Enhanced IAQ strategies	2/2
Credit	Low-emitting materials	3/3
Credit	Construction IAQ Mgmt plan	1/1
Credit	IAQ assessment	0/2
Credit	Thermal comfort	0/1
Credit	Interior lighting	2/2
Credit	Daylight	0/3
Credit	Quality views	1/1
Credit	Acoustic performance	0/1

**INNOVATION**

AWARDED: 5 / 6

Credit	Innovation	4/5
Credit	LEED Accredited Professional	1/1

**REGIONAL PRIORITY CREDITS**

AWARDED: 4 / 4

Credit	Optimize energy performance	0/1
Credit	Enhanced IAQ strategies	1/1
Credit	Surrounding density and diverse uses	1/1
Credit	Access to quality transit	0/1
Credit	Bicycle facilities	1/1
Credit	Building life-cycle impact reduction	1/1

**LOCATION & TRANSPORTATION**

AWARDED: 10 / 20

Credit	LEED for Neighborhood Development location	0/38
Credit	Sensitive land protection	1/1
Credit	High-priority site	1/2
Credit	Surrounding density and diverse uses	5/5
Credit	Access to quality transit	0/5
Credit	Bicycle facilities	1/1
Credit	Reduced parking footprint	1/1
Credit	Green vehicles	1/1

**INTEGRATIVE PROCESS CREDITS**

AWARDED: 0 / 1

Credit	Integrative process	0/1
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TOTAL

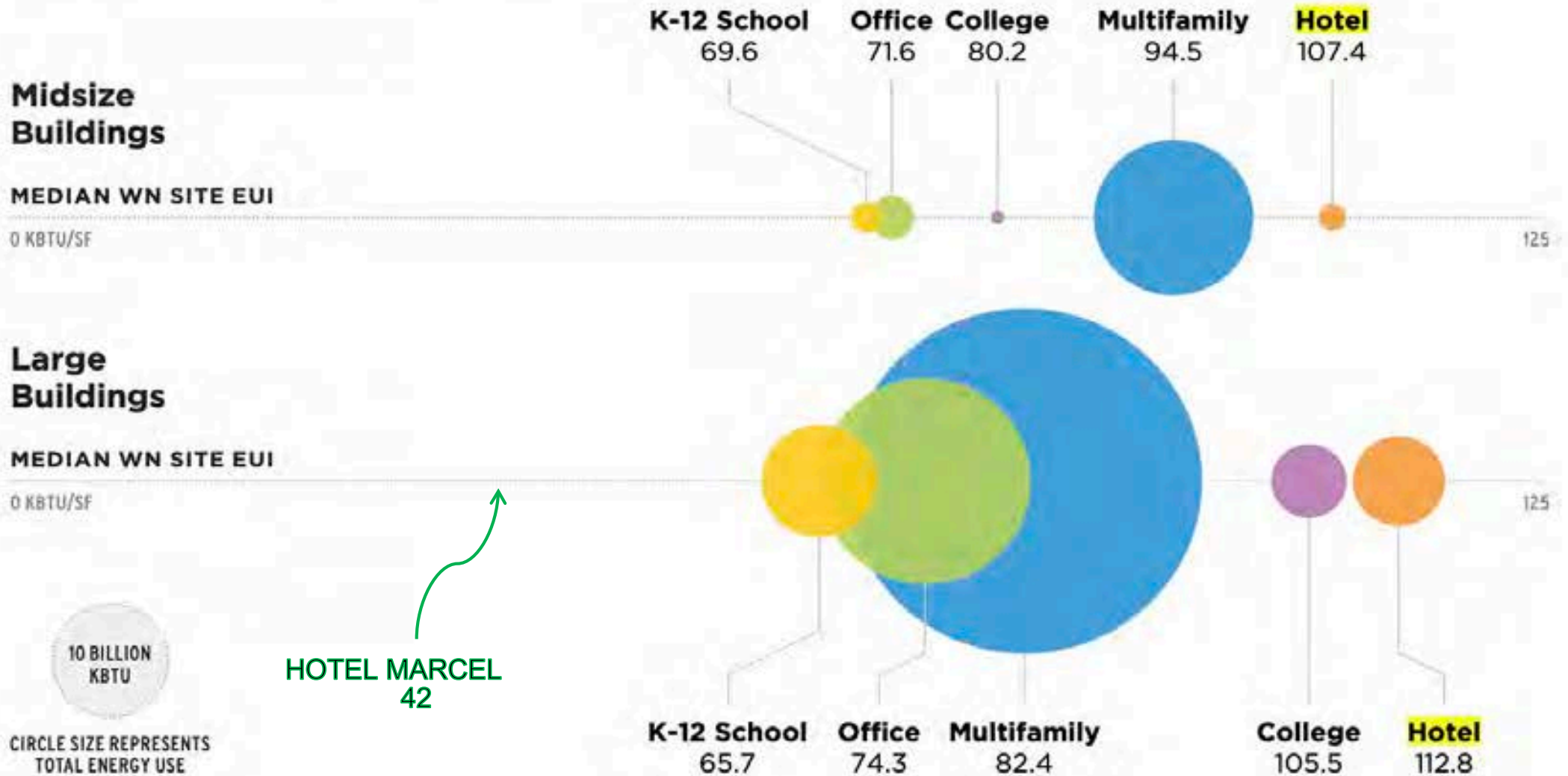
81 / 110



FIGURE 5

Total Site Energy Use and Intensity by Building Sector, 2019

Data: LL84 2019 filtered for data quality, emissions, energy and property type; N = 18,039



Hotel 260 PROPERTIES

300 KBTU/SF

Median WN Source EUI



Median WN Site EUI



HOTEL MARCEL

42

2010

2013

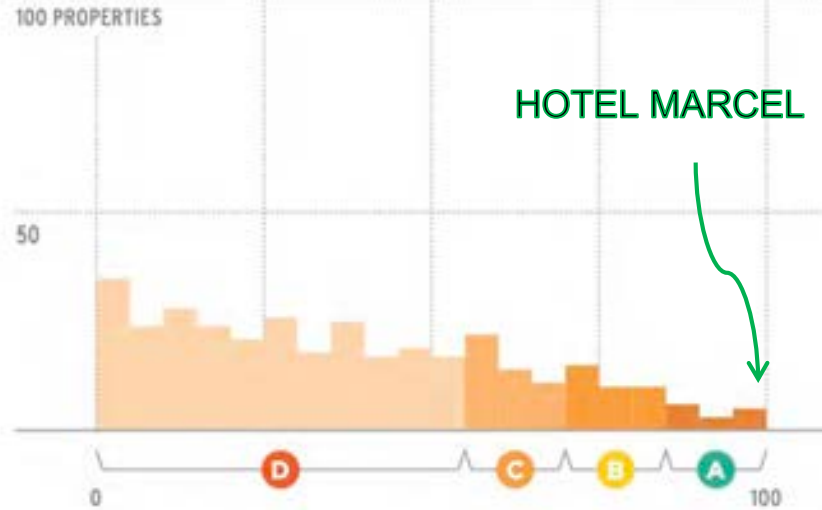
2016

2019

Energy Star Scores by Building Sector, 2019

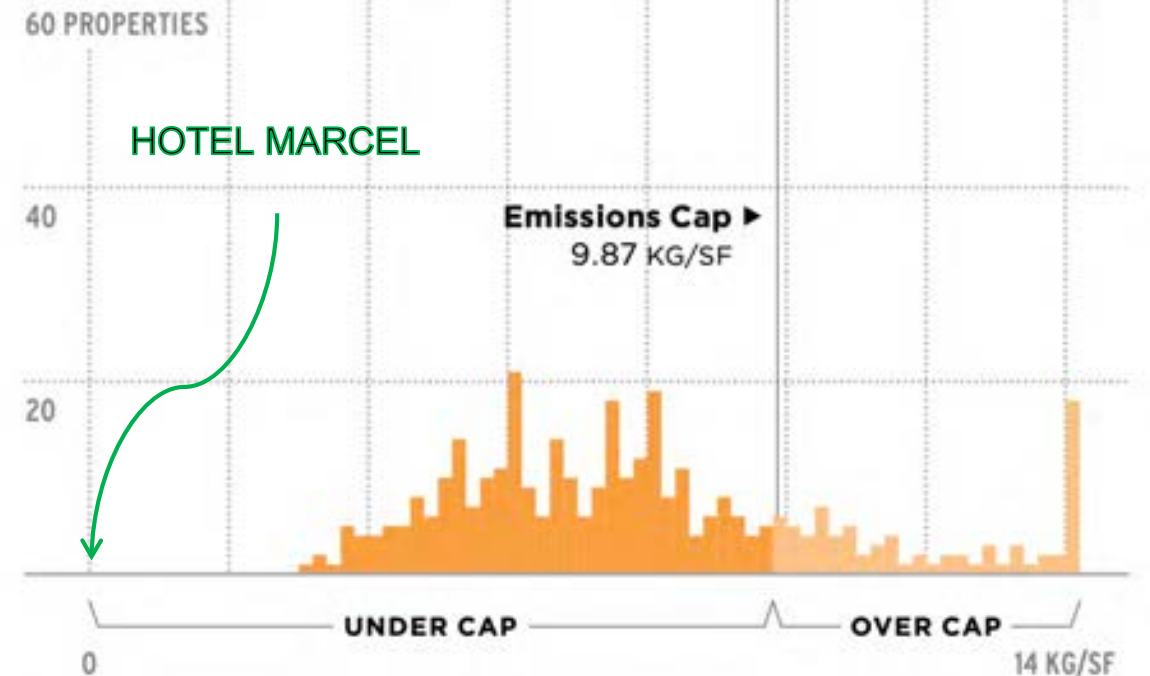
Data: LL84 2019 filtered for data quality, emissions, energy and Energy Star reporting

Hotel 350 PROPERTIES



HOTEL MARCEL

Carbon Emissions Intensities by Building Sector, 2019



HOTEL MARCEL

Emissions Cap ▶
9.87 KG/SF

UNDER CAP

OVER CAP

14 KG/SF

Hotel Marcel's model for 3-step Solution to the Climate Crisis:

1. Reduce Energy Requirements as much as possible
 - Recycle entire buildings before building new
 - Super-insulate and seal building envelope (Passive House)
 - Use POE Lighting, highest efficiency HVAC, heat recovery, active shading, occupancy controls, and battery storage to reduce total and peak energy needs
2. Electrify Everything
 - Kitchen (induction ranges)
 - Laundry (electric dryers),
 - HVAC (VRF heat pumps)
 - Domestic hot water (high capacity air source heat pumps)
 - Transportation (12 Tesla superchargers and 12 destination chargers, plus EVs for hotel staff and shuttle)
3. Make all Electricity and Power from Renewable On-site Sources





HOTEL
MARCEL



HOTEL
MARCEL





ARTICLES ABOUT HOTEL MARCEL'S SUSTAINABLE FEATURES AND ARCHITECTURAL DESIGN

[Dislodging emissions from the hotel industry: New Haven's Hotel Marcel aims to reach net-zero carbon](#) Yale Daily News - February 2023

[From Headquarters to Hotel](#) Detail Magazine - Cover Feature - January 2023

[Architecture to See in 2023](#) Financial Times - December 2022

[Net-zero hotels: 6 top stays for travelers who prioritize sustainability](#) CNN - November 2022

[Hotel Marcel named 2022's most "Eco- or Socially Conscious Hotel"](#) Hospitality Design - November 2022

[New England's New Breed of Design Hotels](#) The Times of London - September 2022

[Brutalist Marcel Breuer hotel among 2022 Modernism in America Award winners](#) Dezeen - September 2022

[Inside the Sustainable Hotel Everyone's Talking About](#) AFAR - August 2022

[Overnight with Breuer](#) Interior Design - August 2022

[That Weird Building on the Highway Is Actually Famous and Now a Hotel](#) Daily Beast - July 2022

[In New Haven, a Landmark Brutalist Building Becomes America's First Fossil Fuel-Free Hotel](#) Vogue - July 2022

[Hotel Review - Hotel Marcel](#) SLEEPER - July 2022

['Hotel Marcel' By Becker + Becker Opens in New Haven, CT](#) DesignBoom - July 2022

[New Haven's Hotel Marcel is a Brutalist beauty — and at 'net zero,' it's a gentle one, too](#) Boston Globe - June 2022

[It's Electric: Hotel Marcel Owner Bruce Redman Becker on Developing a Net-Zero Hotel](#) Lodging - June 2022

[Marcel Breuer's brutalist office in Connecticut reopens as Hotel Marcel](#) Dezeen - June 2022

[How a Landmark Marcel Breuer Building Became a Groundbreaking, Energy-Conscious Hotel](#) Dwell - June 2022

[This Marcel Breuer-Designed Brutalist Building Has Reopened as a Net-Zero Luxury Hotel](#) Architectural Digest - June 2022

[In New Haven, A Marcel Breuer Classic Is Reimagined as a Net Zero-Energy Hotel](#) Architectural Record - June 2022

[Hotels with Net Zero Ambitions](#) New York Times - April 2022

[How 'net-zero' hotels could make travel more climate-friendly](#) National Geographic - April 2022

[Former Pirelli Tire Building is about to open as planned net-zero energy hotel](#) Hartford Courant - April 2022

[The World's 6 Most Beautiful Buildings That Redefine Sustainable Architecture](#) Architectural Digest - April 2022

['Captain Zero' and his amazing hotel from the future!](#) Connecticut Magazine - April 2022

[A Brutalist Connecticut office building sat empty for years. Now it's a net-zero energy hotel](#) Boston Globe - March 2022

[How an Iconic Brutalist Building Became One of the Most Sustainable Hotels in the U.S.](#) Buildings - February 2022

[15 Most Anticipated High Design Hotel Openings of 2022](#) Architectural Digest - December 2021

[This Eco-friendly Hotel Will Make U.S. History When It Opens in 2022](#) Travel + Leisure - December 2021

[Hotel Marcel to Open April 2022 in New Haven, Connecticut](#) HospitalityNet - December 2021

[Stay at the First Net Zero Hotel](#) Gotham - November 2021

[This revived architectural landmark could be the first net-zero hotel in the US](#) CNN - October 2021

[Hotel Marcel will be the World's most Energy Efficient](#) Fox5 New York - September 2021

[Historic Pirelli Building becomes Hotel Marcel](#) Treehugger - September 2021

[A Brutalist Building by a Bauhaus Master is Reborn as a Net Zero Hotel](#) Fast Company - August 2021

[New Haven Landmark Becomes a Symbol of Climate Action](#) Techonomy - July 2021

[Nation's 1st "Net Zero" Hotel Takes Form](#) New Haven Independent - June 2021

[Hotel Marcel Opening its Passive House Doors](#) Passive House Accelerator - June 2021

[An Icon of Brutalist Architecture Gets a Second Life as a Hotel](#) Metropolis - June 2021

[The Retool of an Aging Marcel Breuer Showstopper Takes the High Road](#) The Architect's Newspaper - May 2021

[Greenest Hotel to Open in New Haven, CT](#) WNBC 6 o'clock TV News - April 2021

[This Hotel One Hour Outside of NYC is Poised to become the Greenest in the U.S.](#) Time Out - April 2021

[This Architectural Icon Will Soon Be the Greenest Hotel in the U.S. - Hotel Marcel Brings Marcel Breuer into the Future](#) Thrillist - April 2021

[Hotel Marcel To Become The First Passive House Design Hotel In The US](#) Forbes - April 2021

[Concrete Dreams - One Hotel Portends a New Future for Long Wharf](#) Yale Journal of Politics and Culture - March 2021

[Marcel Breuer's Icon of Brutalist Architecture in CT Reimagined as a Hotel](#) Wallpaper* - February 26, 2021

[Artistic Vision - Bruce Becker Transforms Iconic Buildings](#) New Haven Biz - February 2021

[Hotels are a New Frontier for Net Zero](#) - Green Building Advisor - December 2020

[Hotels Lag in Energy Sustainability. One Project May Change That.](#) In The New York Times - November 10, 2020

VIDEOS ABOUT HOTEL MARCEL'S SUSTAINABLE FEATURES AND ARCHITECTURAL DESIGN

Undecided with Matt Ferrell - November 2022 [How Big can you make a Passive House?](#)

AIA Film Challenge - <https://vimeo.com/610769197>

Bruce Becker's presentation to Urban Green Council May 25, 2022:

<https://www.youtube.com/watch?v=BUEAcUf7gso>

The First Net Zero Hotel – Pivot Projects video by Steve Hamm

https://www.youtube.com/watch?app=desktop&v=Zg_jy_ilseA

How Tech and Sustainability Go Hand in Hand – Presentation by Bruce Becker Hotel Technology Conference HT-NEXT December 7, 2022

<https://youtu.be/QqRHqLQe2f0>

Following are professionally made films made by some of Hotel Marcel's Contractors and Suppliers that focus on Hotel Marcel's sustainability strategies and their contribution to the project:

Mitsubishi - https://www.youtube.com/watch?v=cMXFDeplx_A

Assa Abloy - https://www.youtube.com/watch?v=mqwFw5cM_ec

Steven Winter Associates - <https://youtu.be/z8vuVgVucjs>

Consigli Construction - <https://youtu.be/z8vuVgVucjs>

