BURNING DOWN THE HAUS

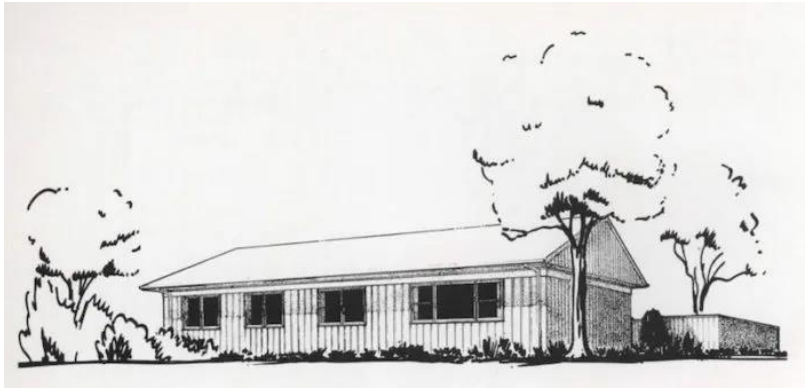
Neil Rosen AIA, LEED Fellow, CPHC, CEM

Actively Going Passive *TM*

WHAT DO YOU THINK OF WHEN YOU THINK PASSIVE HOUSE?

SASKATCHEWAN

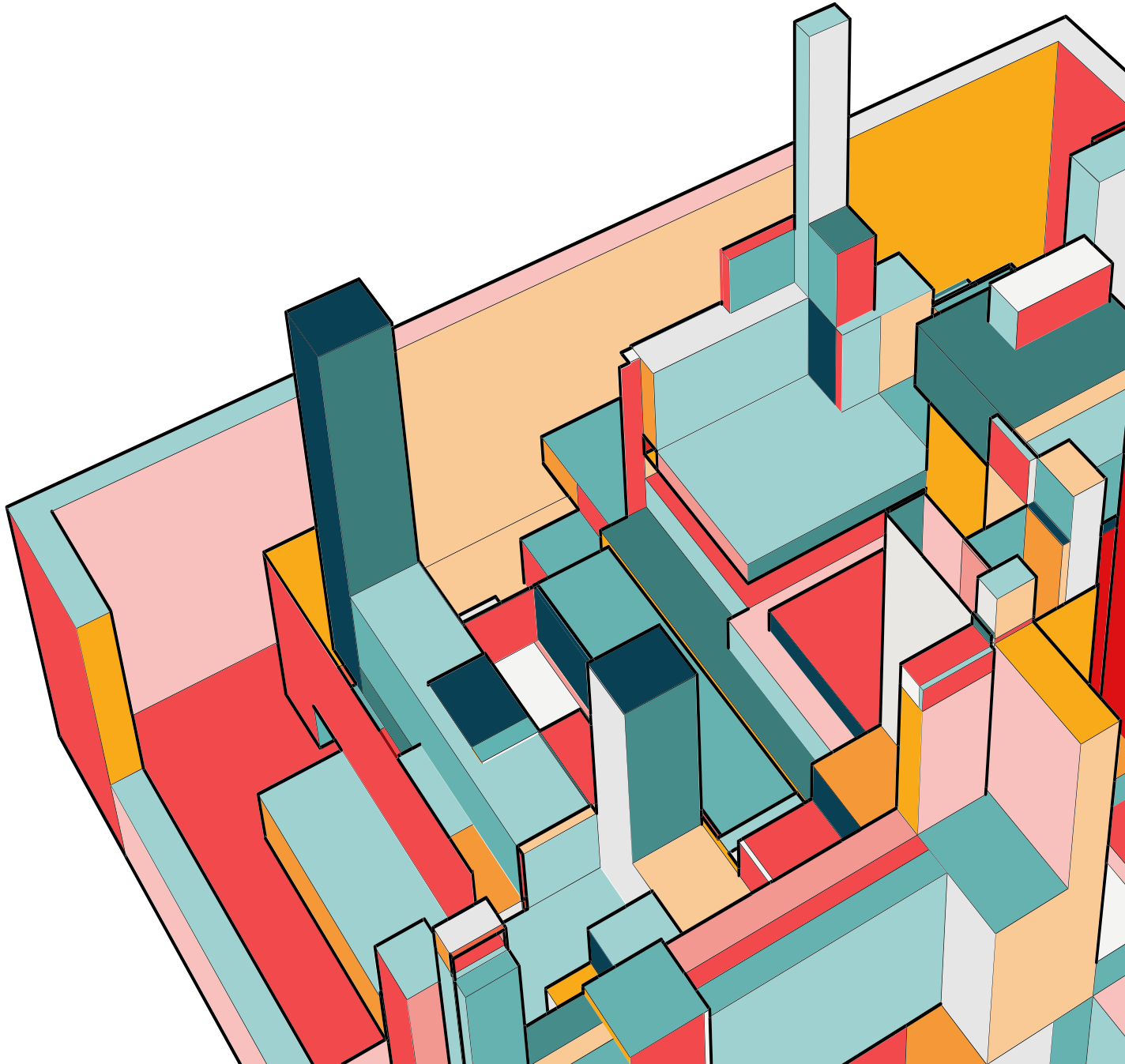
SMITH



Lo-Cal

PAS·SIVEHAUS
/ˈPASIVHOUSE/

Passive house (German: Passivhaus) is a voluntary standard for energy efficiency in a building, which reduces the building's ecological footprint. It results in ultra-low energy buildings that require little energy for space heating or cooling.



PASSIVE HOUSE INSTITUTE US

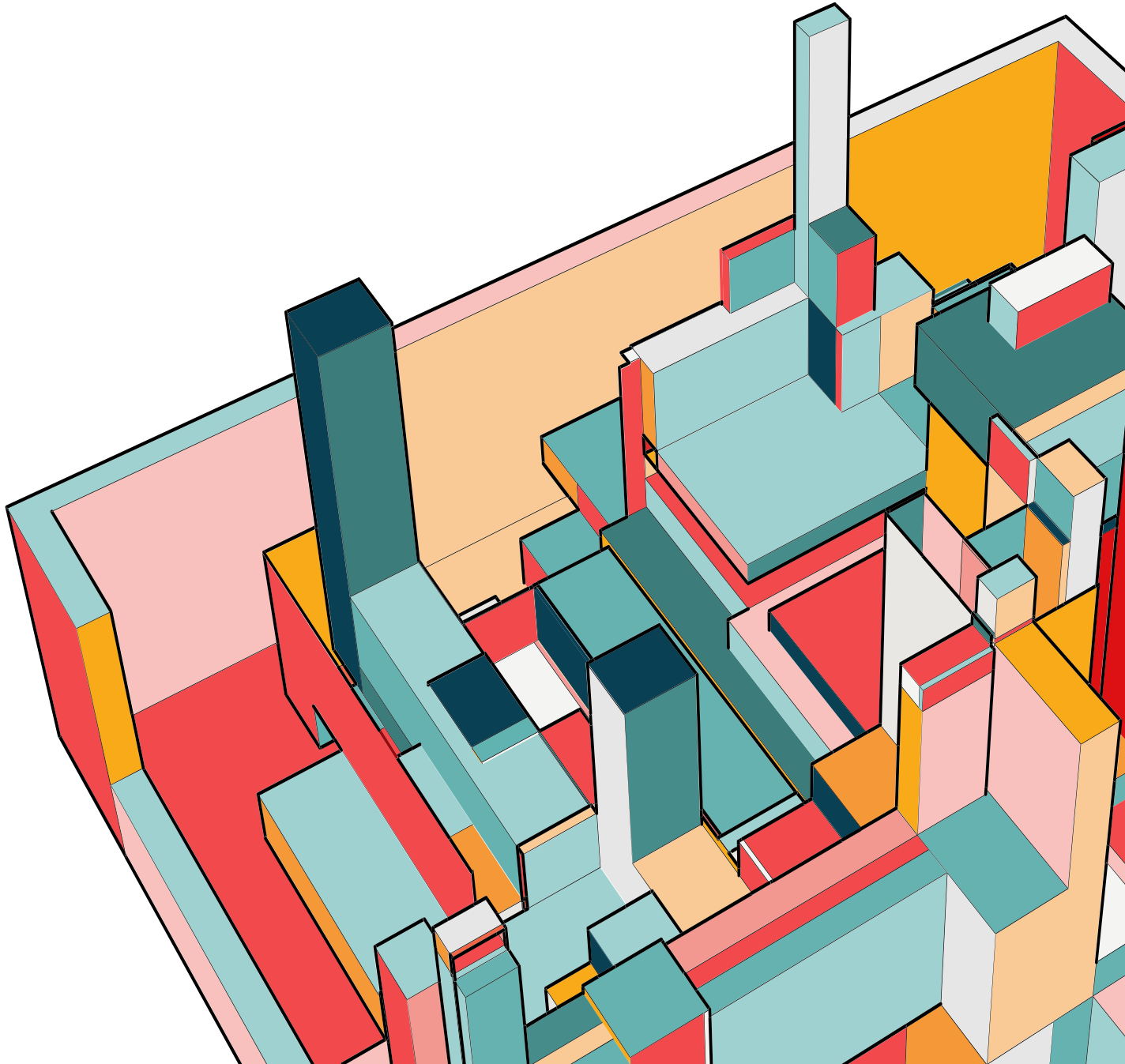
noun

Highly Regarded, Industry-Leading, Sustainable Building Rating System.

applicability

All Building Types

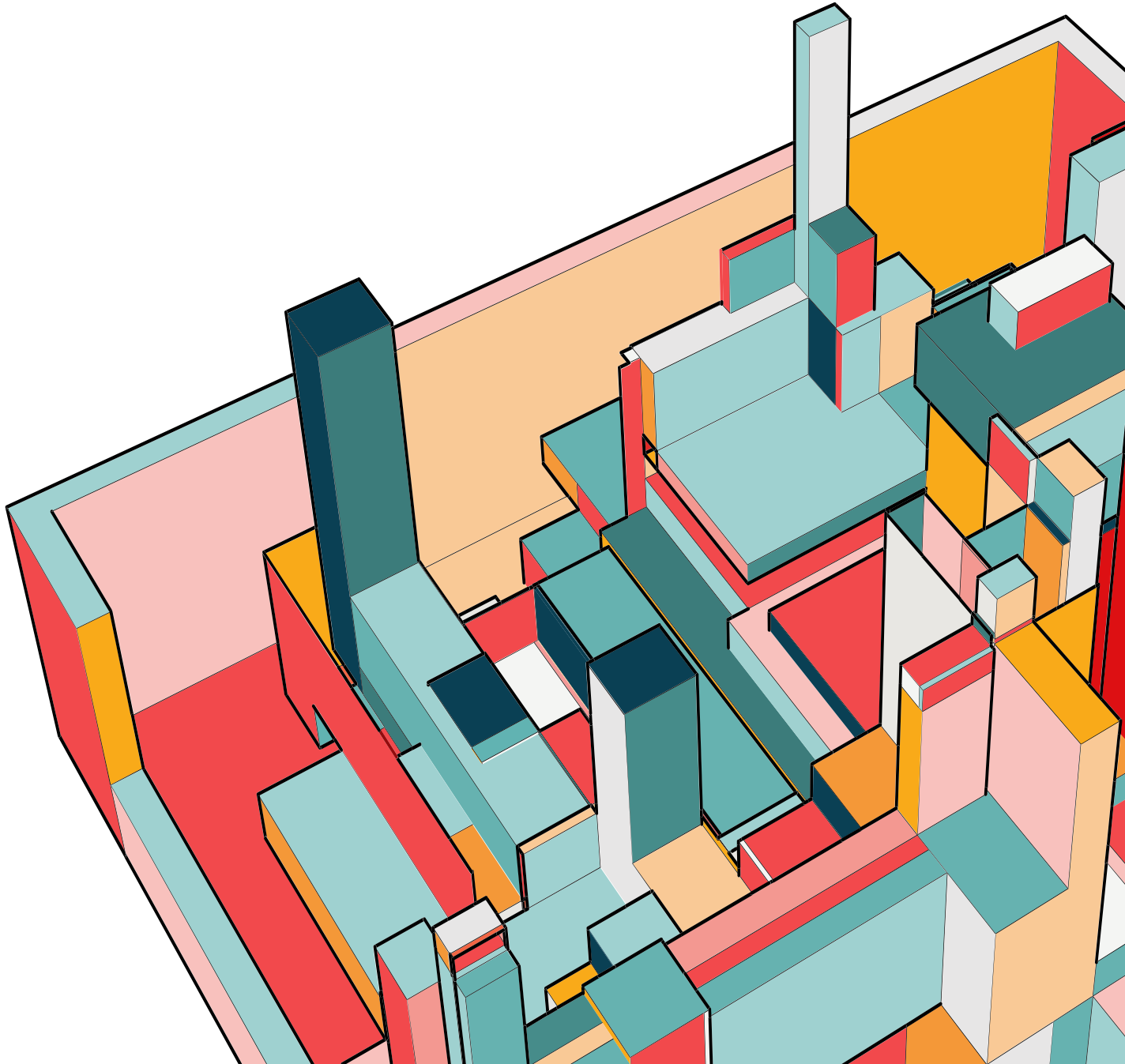
phius



PAS·IVEGEBÄUDE
/ˈPASIVBUILDING/

noun

The unsuccessful combination of the German words for Passive and Building together

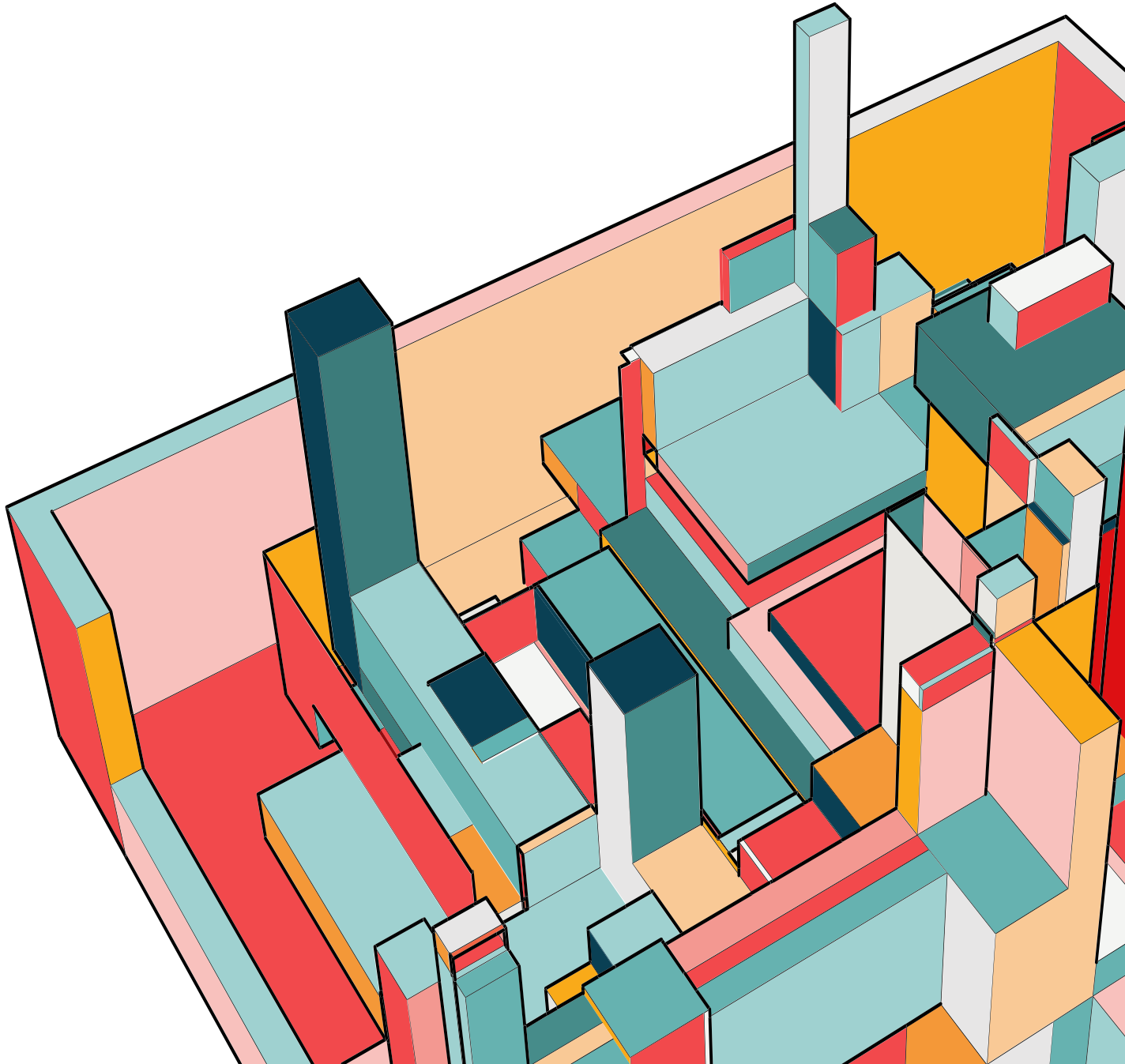


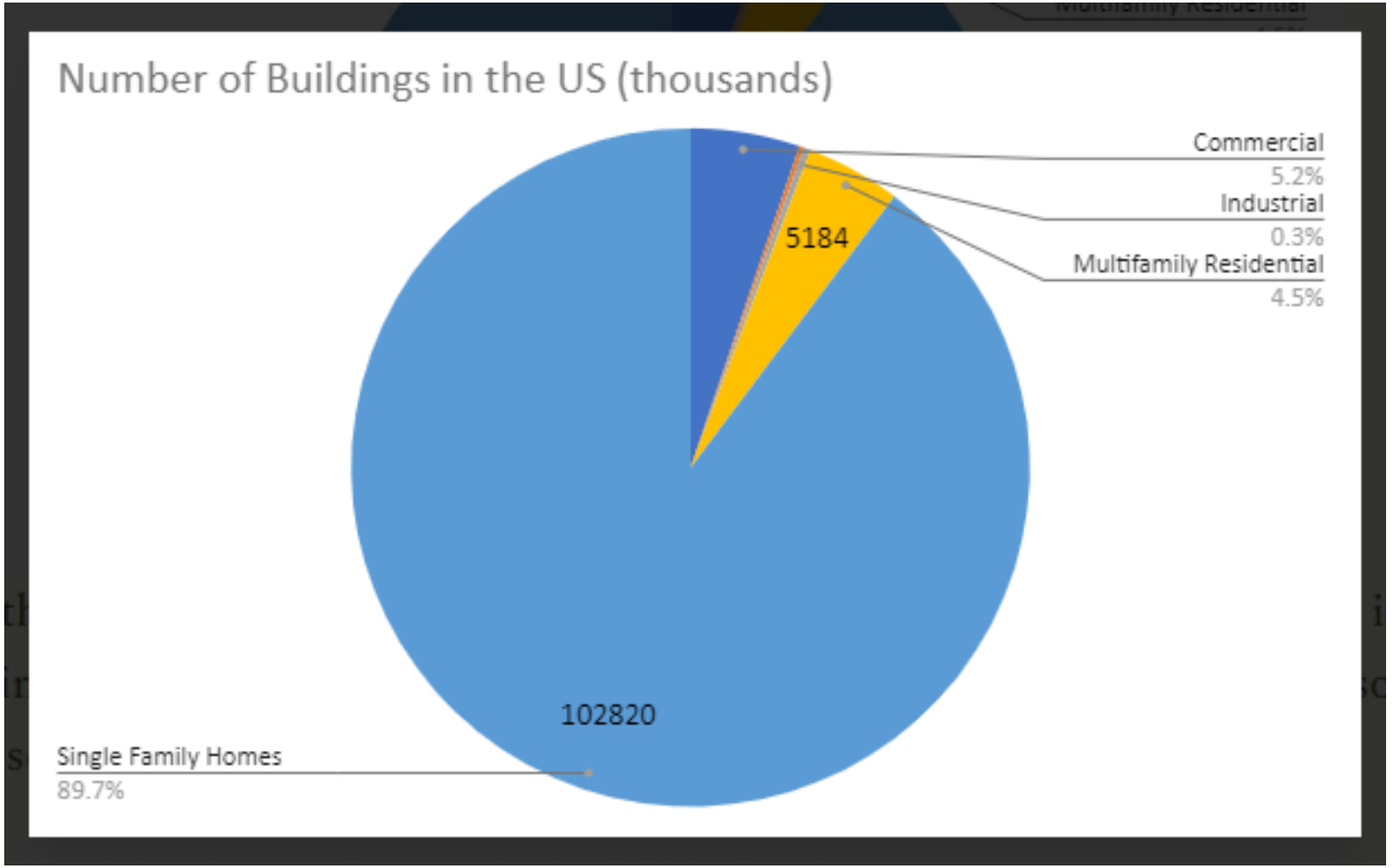
PASSIVGEBÄUDE INSTITUTE US

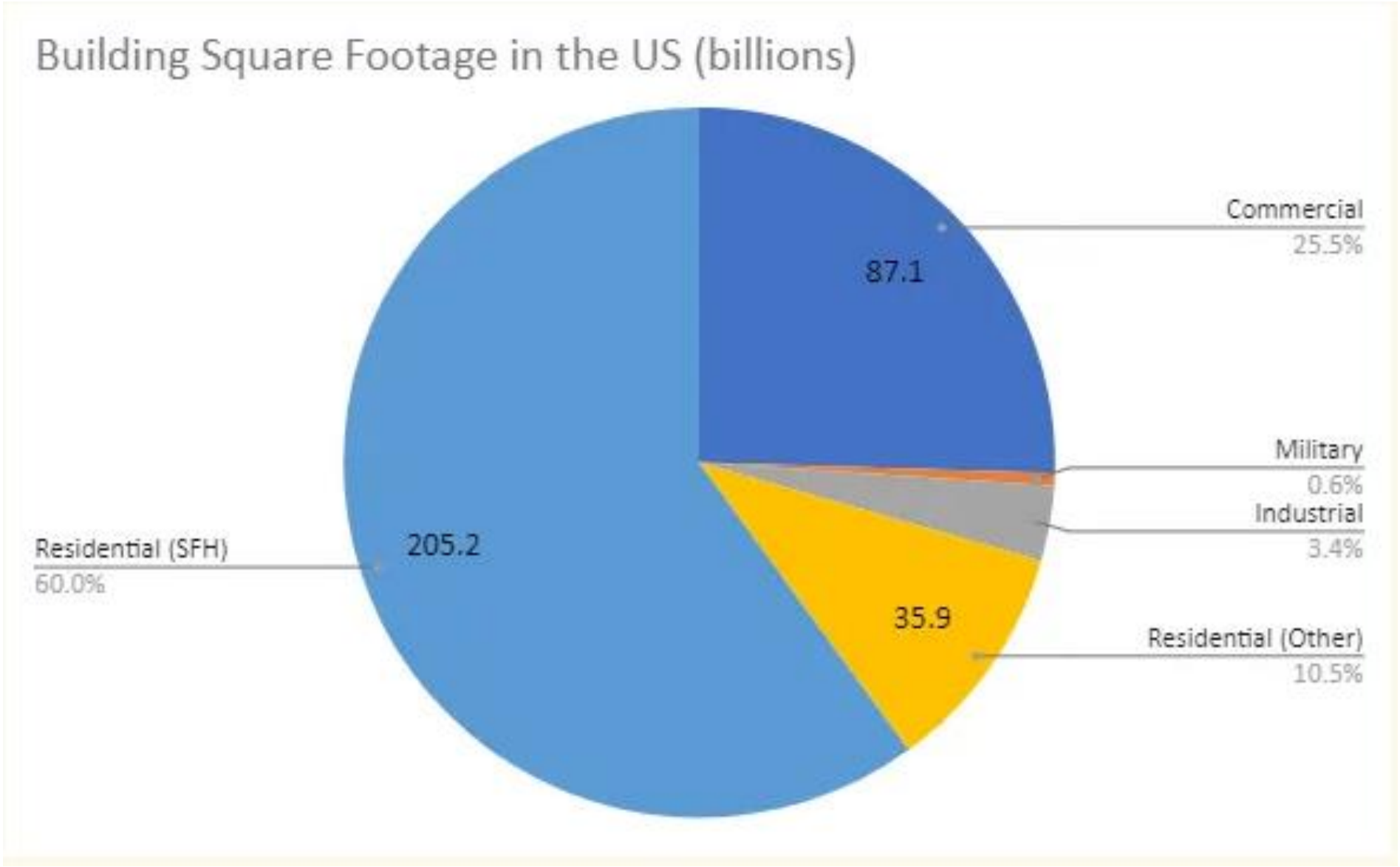
noun

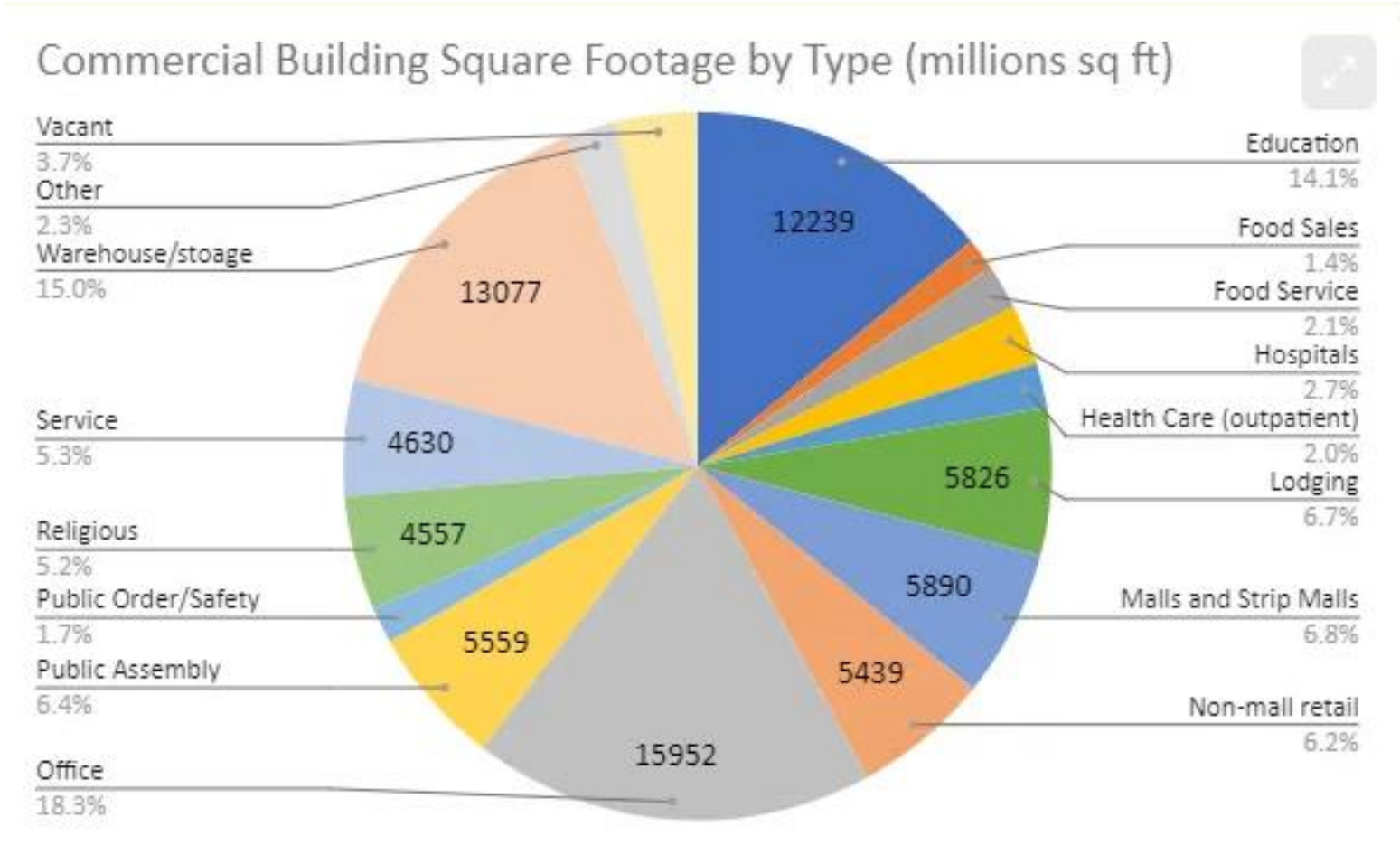
Potential naming opportunity for cutting-edge organization dedicated to Passive Buildings in the United States with no apparent acronym.

pgius



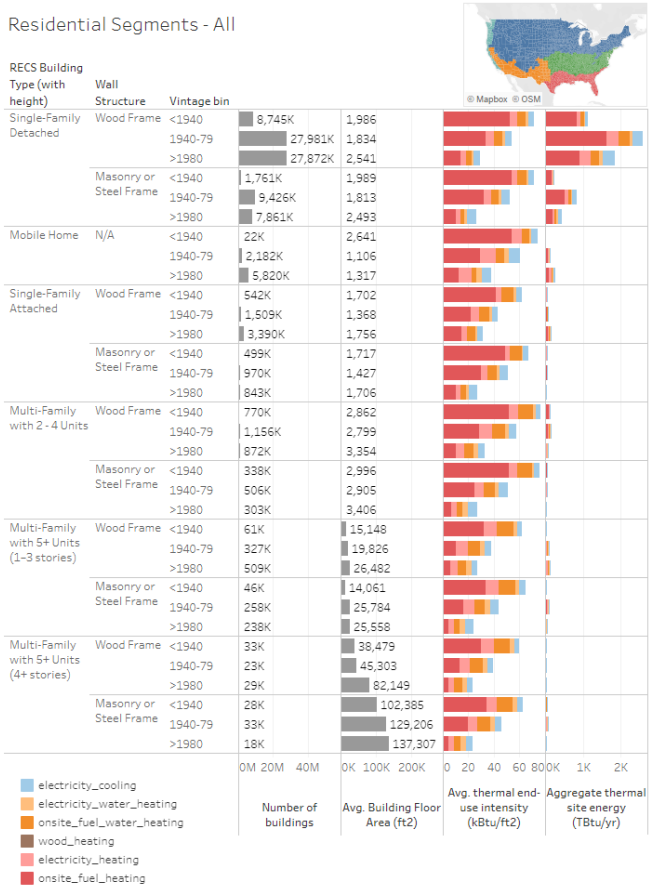

Number of Buildings in the US (thousands)
Commercial
5.2%
Industrial
0.3%
Multifamily Residential
4.5%
5184
102820
Single Family Homes
89.7%


Building Square Footage in the US (billions)
87.1
Commercial
25.5%
Military
0.6%
Industrial
3.4%
35.9
Residential (Other)
10.5%
205.2
Residential (SFH)
60.0%

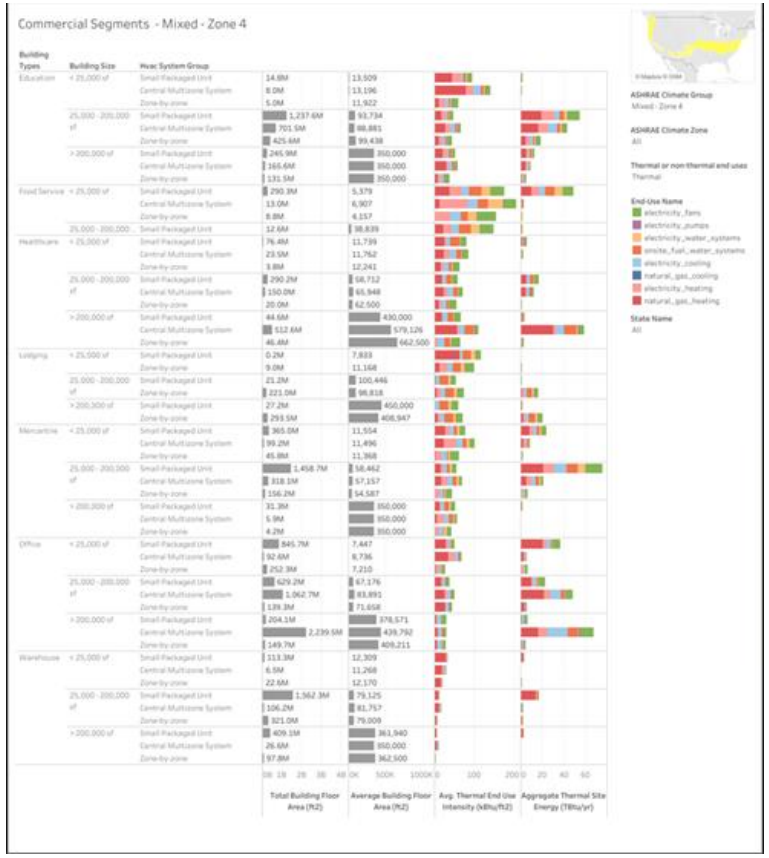

Commercial Building Square Footage by Type (millions sq ft)
Vacant
3.7%
Other
2.3%
Warehouse/stoage
15.0%
Service
5.3%
Religious
5.2%
Public Order/Safety
1.7%
Public Assembly
6.4%
Office
18.3%
Education
14.1%
Food Sales
1.4%
Food Service
2.1%
Hospitals
2.7%
Health Care (outpatient)
2.0%
Lodging
6.7%
Malls and Strip Malls
6.8%
Non-mall retail
6.2%
12239
13077
4630
4557
5559
15952
5439
5890
5826

ENERGY USE IN THE BUILT ENVIRONMENT

RESIDENTIAL



COMMERCIAL



Release date: May 2018

Table CE1.1 Summary annual household site consumption and expenditures in the U.S.—totals and intensities, 2015

	Number of housing units (million)	Site energy consumption[1]				Energy expenditures[1]			
	Total U.S.[2]	Total (trillion Btu)	Per household (million Btu)	Per household member (million Btu)	Per square foot (thousand Btu)	Total (billion dollars)	Per household (dollars)	Per household member (dollars)	Per square foot (dollars)
All homes	118.2	9,114	77.1	30.3	38.4	219.34	1,856	728	0.92
Census region and division									
Northeast	21.0	1,984	94.4	38.1	45.2	47.66	2,269	915	1.09
New England	5.6	547	97.3	40.3	44.5	14.31	2,541	1,054	1.16
Middle Atlantic	15.4	1,436	93.4	37.3	45.5	33.36	2,169	866	1.06
Midwest	26.4	2,486	94.3	37.8	41.4	46.42	1,760	706	0.77
East North Central	18.1	1,755	97.0	38.1	43.1	31.88	1,762	693	0.78
West North Central	8.3	731	88.3	37.0	37.8	14.54	1,757	737	0.75
South	44.4	3,064	68.9	27.3	35.6	85.19	1,917	758	0.99
South Atlantic	23.5	1,584	67.5	27.0	33.8	46.09	1,963	787	0.98
East South Central	7.2	498	69.2	27.5	37.0	13.72	1,907	757	1.02
West South Central	13.8	981	71.3	27.6	38.1	25.38	1,843	713	0.98
West	26.4	1,581	59.9	22.3	33.4	40.06	1,518	565	0.85
Mountain	8.5	631	74.1	28.7	36.9	13.94	1,638	634	0.82
Mountain North	4.2	357	84.0	31.4	38.7	6.74	1,586	593	0.73
Mountain South	4.3	274	64.3	25.8	34.9	7.20	1,688	678	0.92
Pacific	17.9	949	53.1	19.4	31.5	26.12	1,461	534	0.87
Census urban/rural classification[3]									
Urban	94.7	7,181	75.8	29.9	39.2	167.97	1,773	700	0.92
Urbanized area	82.2	6,239	75.9	29.7	39.1	146.57	1,782	698	0.92
Urban cluster	12.5	942	75.2	31.4	40.4	21.40	1,710	714	0.92
Rural	23.5	1,933	82.4	31.6	35.5	51.37	2,190	841	0.94

U.S. Energy Information Administration

2015 Residential Energy Consumption Survey: Energy Consumption and Expenditures Tables

Broad Category	Primary Function	Further Breakdown (where needed)	Source EUI (kBtu/ft²)	Site EUI (kBtu/ft²)	Reference Data Source - Peer Group Comparison
Healthcare	Ambulatory Surgical Center		138.3	62.0	CBECS - Outpatient Healthcare
	Hospital	Hospital (General Medical & Surgical)*	426.9	234.3	Industry Survey
		Other/Specialty Hospital	433.9	206.7	CBECS - Inpatient Healthcare
	Medical Office*		232.8	97.8	Industry Survey
	Outpatient Rehabilitation/Physical Therapy		138.3	62.0	CBECS - Outpatient Healthcare
	Residential Care Facility		213.2	99.0	Industry Survey
	Senior Living Community*		213.2	99.0	Industry Survey
	Urgent Care/Clinic/Other Outpatient		145.8	64.5	CBECS - Clinic/Outpatient
Lodging/Residential	Barracks*		107.5	57.9	CBECS - Dormitory
	Hotel*		146.7	63.0	CBECS - Hotel & Motel/Inn
	Multifamily Housing*		118.1	59.6	Fannie Mae Industry Survey
	Prison/Incarceration		156.4	69.9	CBECS - Public Order and Safety
	Residence Hall/Dormitory*		107.5	57.9	CBECS - Dormitory
	Residential Care Facility		213.2	99.0	Industry Survey
	Senior Living Community*		213.2	99.0	Industry Survey
	Single Family Home		N/A	N/A	None Available
	Other - Lodging/Residential		143.6	63.6	CBECS - Lodging
Manufacturing/Industrial	Manufacturing/Industrial Plant		N/A	N/A	None Available
Mixed Use	Mixed Use Property		89.3	40.1	CBECS - Other
Office	Medical Office*		121.7	51.2	CBECS - Medical Office
	Office*		116.4	52.9	CBECS - Office & Bank/Financial
	Veterinary Office		145.8	64.5	CBECS - Clinic/Outpatient
Parking	Parking		N/A	N/A	None Available

SKIN-LOAD DOMINATED BUILDINGS

A SKIN-LOAD DOMINATED BUILDING HAS THE LARGEST PROPORTION OF SPACE CONDITIONING ENERGY LOADS DETERMINED BY THE BUILDING ENCLOSURE.

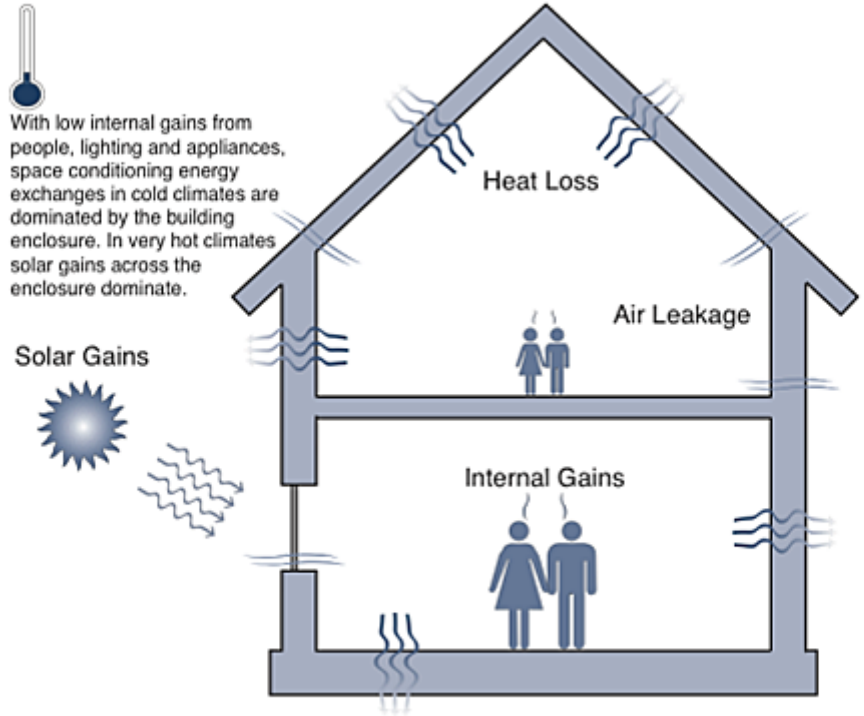


Figure 4. Skin-load dominated buildings benefit the most from high-performance building enclosures, and can take the best advantage of passive control strategies.

INTERNAL-LOAD DOMINATED BUILDINGS

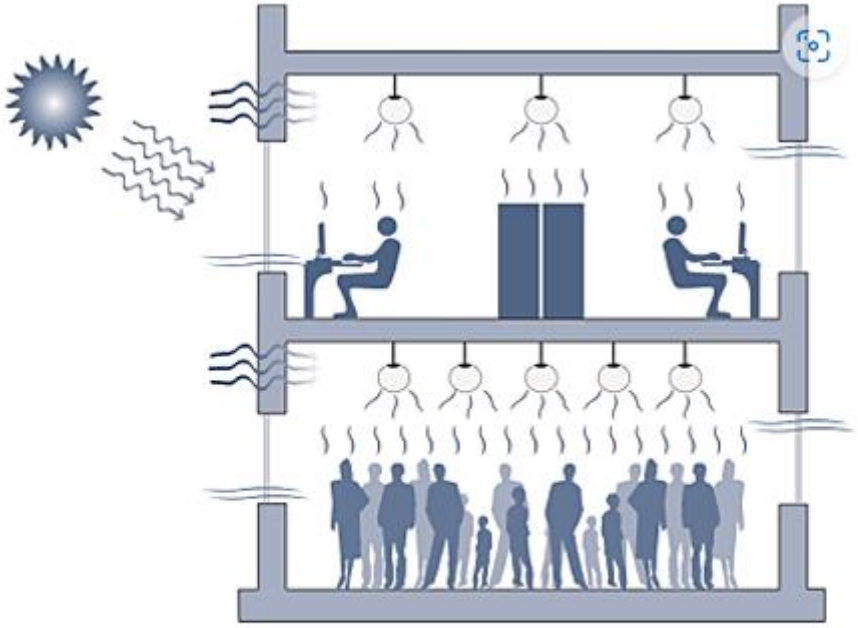


Figure 5. The energy performance of internal-load dominated buildings is strongly influenced by the window-to-wall ratio, effective U-value and solar heat gain coefficient of the glazing, and the airtightness of the building enclosure. Heat recovery for ventilation air and lighting system efficiency are the two most critical considerations for active building systems in these types of buildings.

Buildings that have high occupant densities and high internal gains from lighting and/or equipment are considered internal-load dominated buildings

BARRIERS TO ENTRY

PERCEPTION

It says it in the Name…Passive House. It isn't Passive Building After All

TESTED

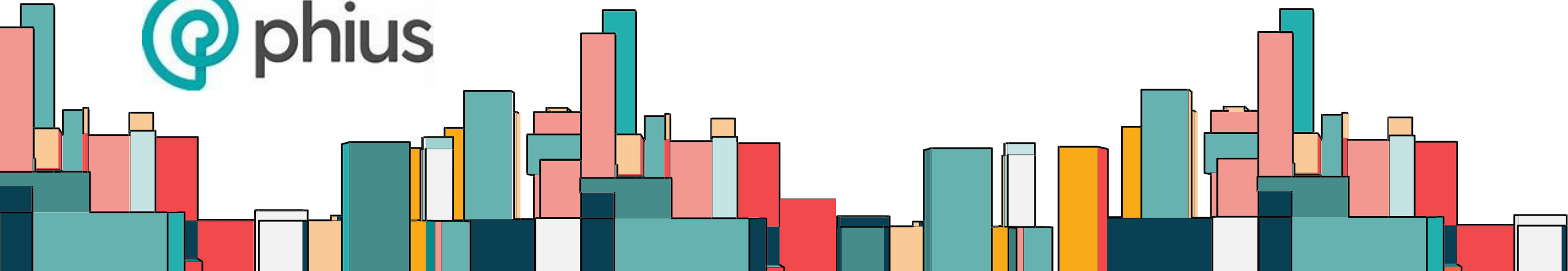
You are going to make me test my building. It's probably gonna fail….AND It's going to cost me!!!

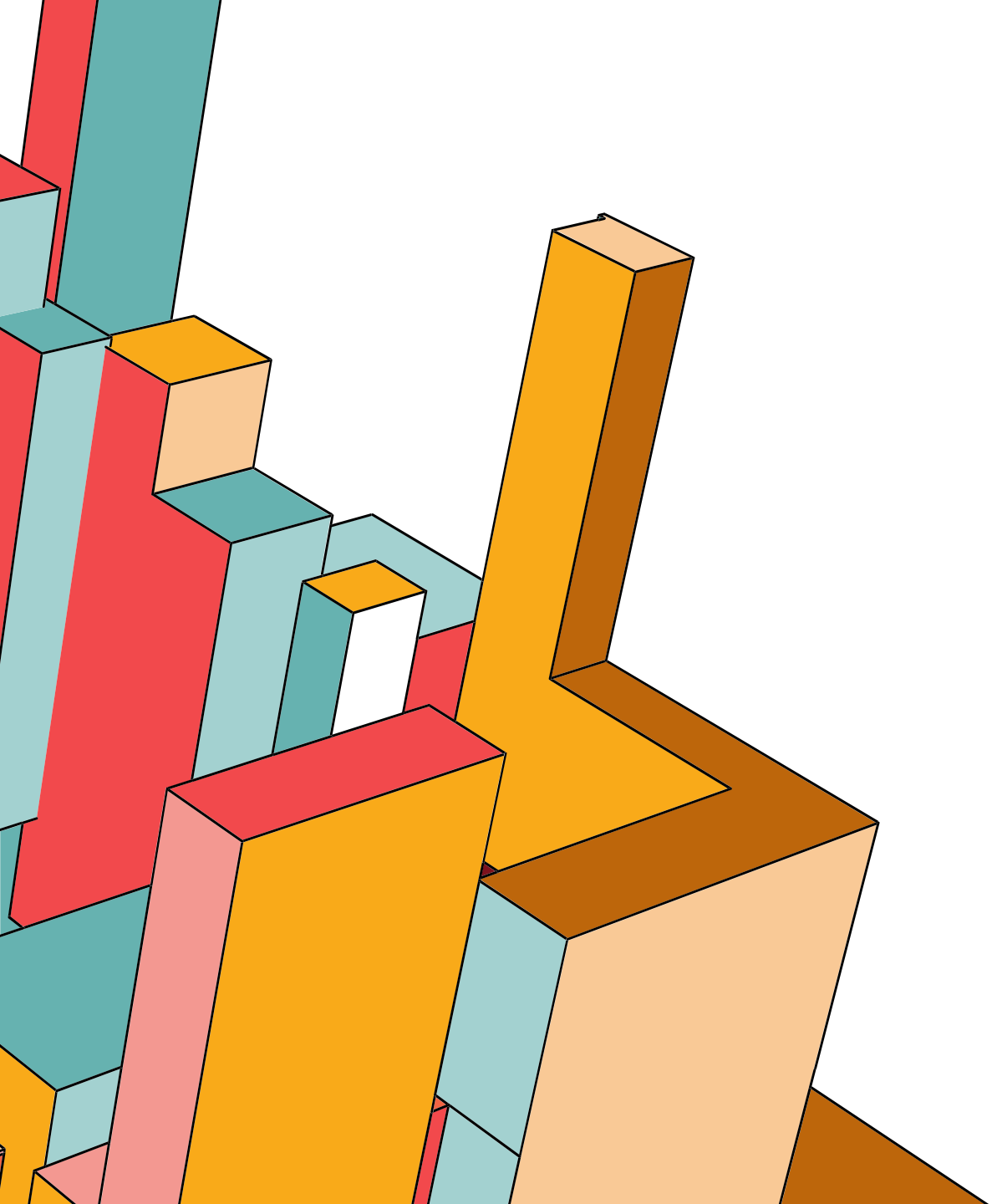
FIRST TO MARKET

It's nice to be green…but that doesn't mean I need to be First

AUTHENTIC

The "original" Passive House is meant to use only internal and solar gains to heat the building, that doesn't really work. Is it really Passive House if you add systems into it?





SOLUTION

DISPEL PERCEPTIONS/ EXPLAIN THINGS

Illustrate areas where the smart application of the Tenets of Building Science can be applied, ultimately representing savings in both costs and emissions

ILLUSTRATE TRACK RECORD

Passive House has been around for at least 50 years, it has been around for as long as building science has existed.

COST SAVINGS

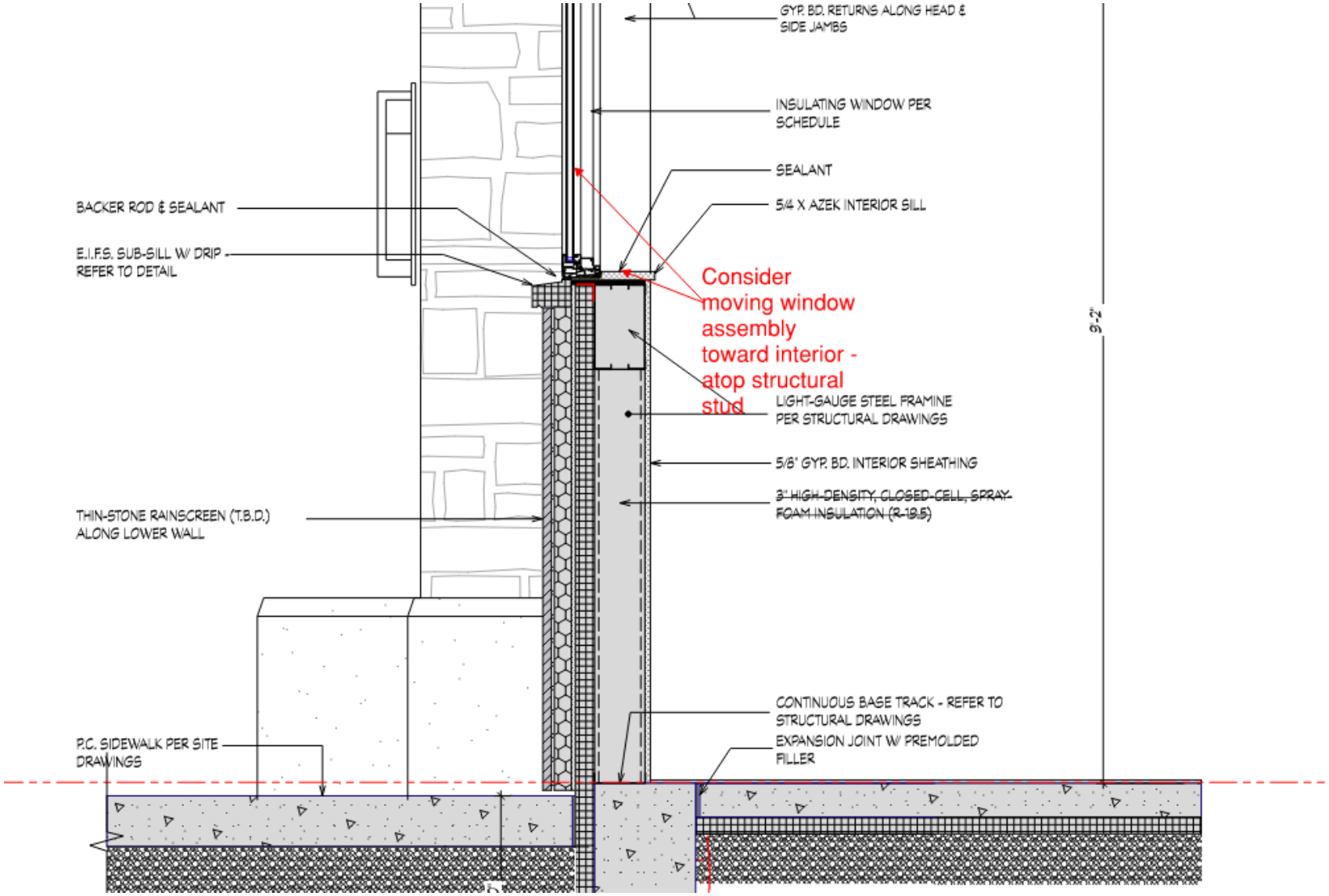
Reduce expenses for building electricity, heating and air conditioning

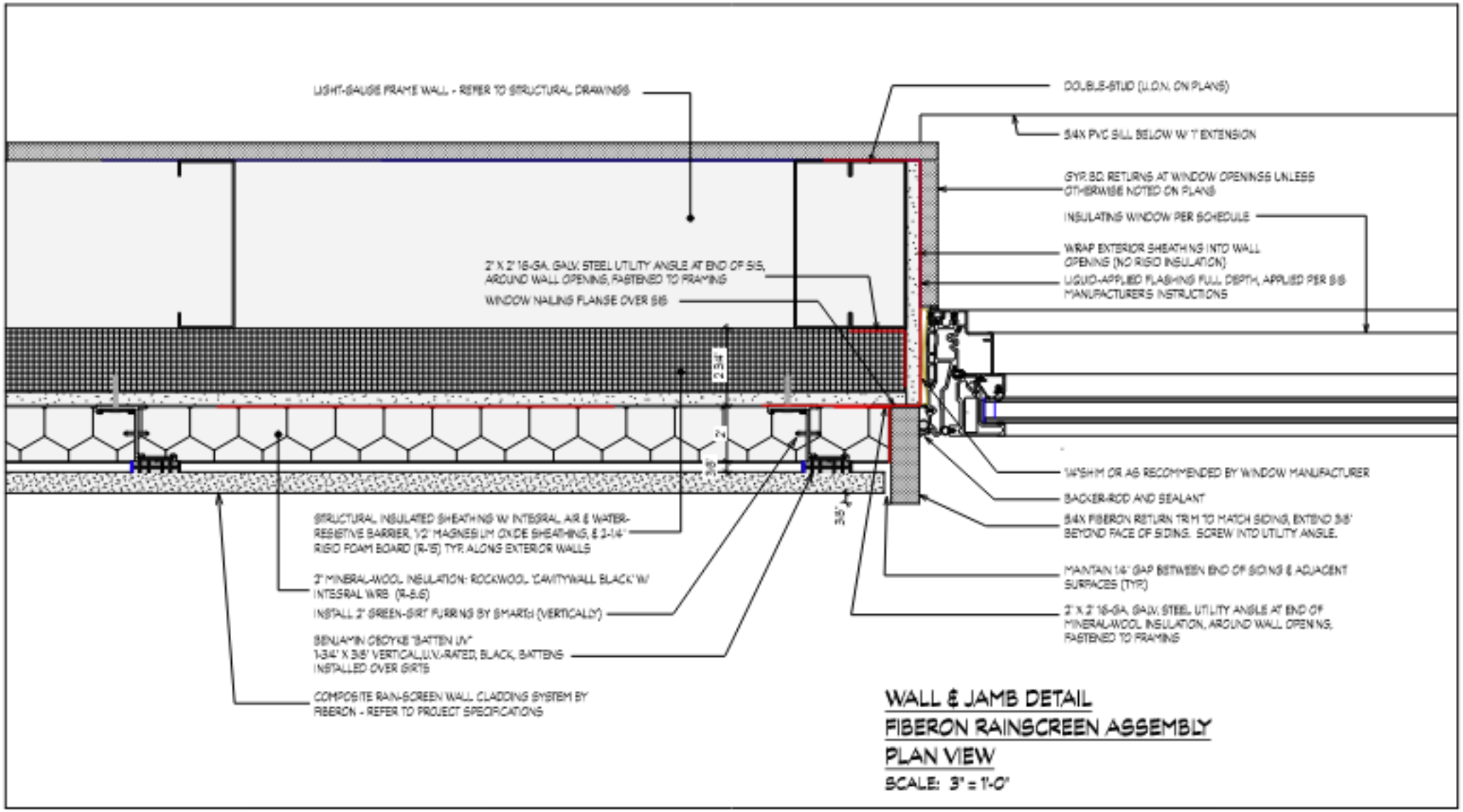
IT JUST MAKES CENTS (DOLLARS AND CENTS)

Building a tight, well-insulated envelope will lower the life cycle operational costs of the building


ALLEN MEDICAL
ASSOCIATES


ADULT MEDICAL CARE

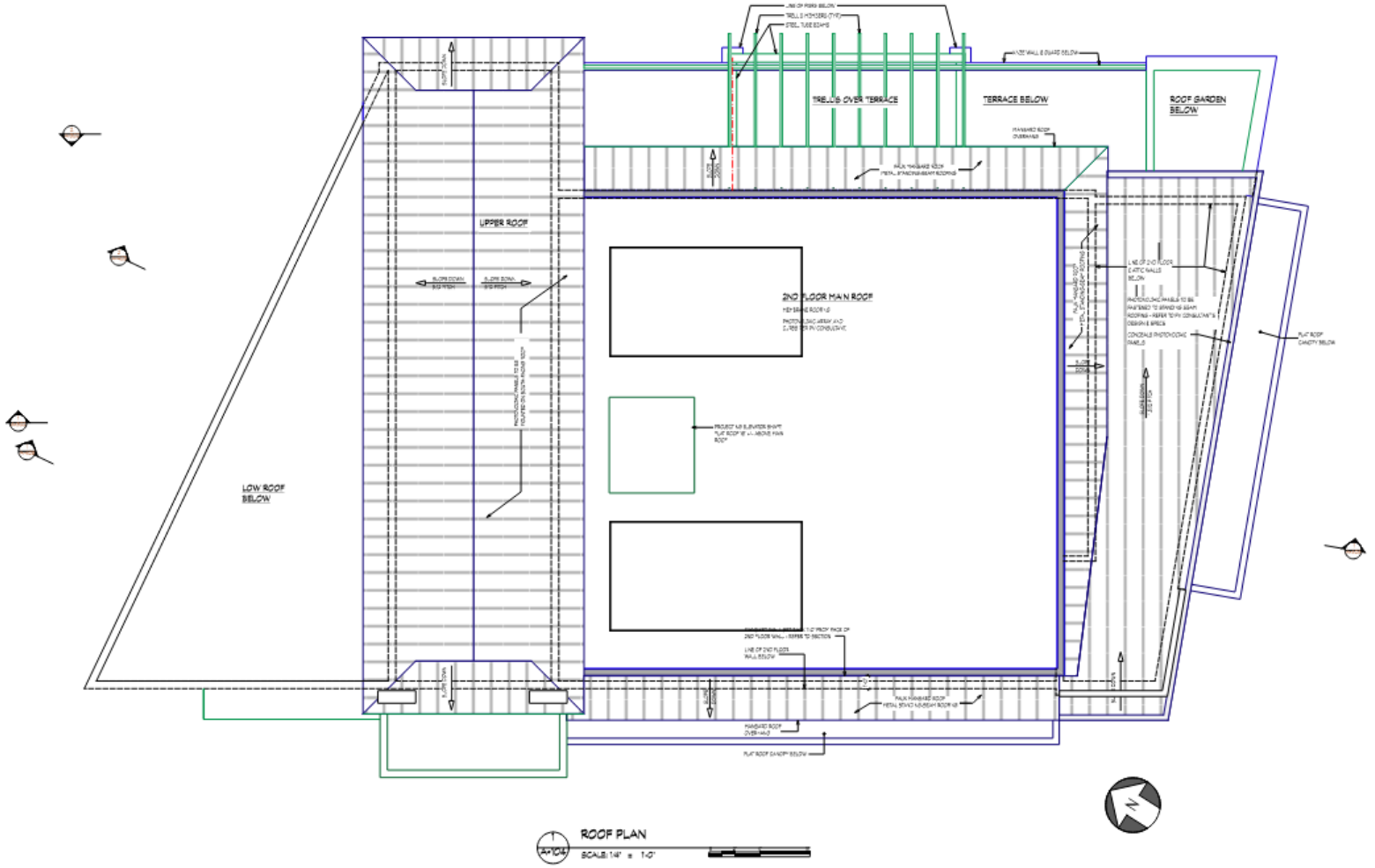

GYP. BD. RETURNS ALONG HEAD & SIDE JAMBS
INSULATING WINDOW PER SCHEDULE
SEALANT
5/4 X AZEK INTERIOR SILL
BACKER ROD & SEALANT
E.I.F.S. SUB-SILL W/ DRIP - REFER TO DETAIL
Consider moving window assembly toward interior - atop structural stud
9'-2"
LIGHT-GAUGE STEEL FRAMINE PER STRUCTURAL DRAWINGS
5/8" GYP. BD. INTERIOR SHEATHING
3" HIGH-DENSITY, CLOSED-CELL, SPRAY-FOAM INSULATION (R-19.5)
THIN-STONE RAINSCREEN (T.B.D.) ALONG LOWER WALL
CONTINUOUS BASE TRACK - REFER TO STRUCTURAL DRAWINGS
EXPANSION JOINT W/ PREMOLDED FILLER
P.C. SIDEWALK PER SITE DRAWINGS



WALL & JAMB DETAIL
FIBERON RAINSCREEN ASSEMBLY
PLAN VIEW

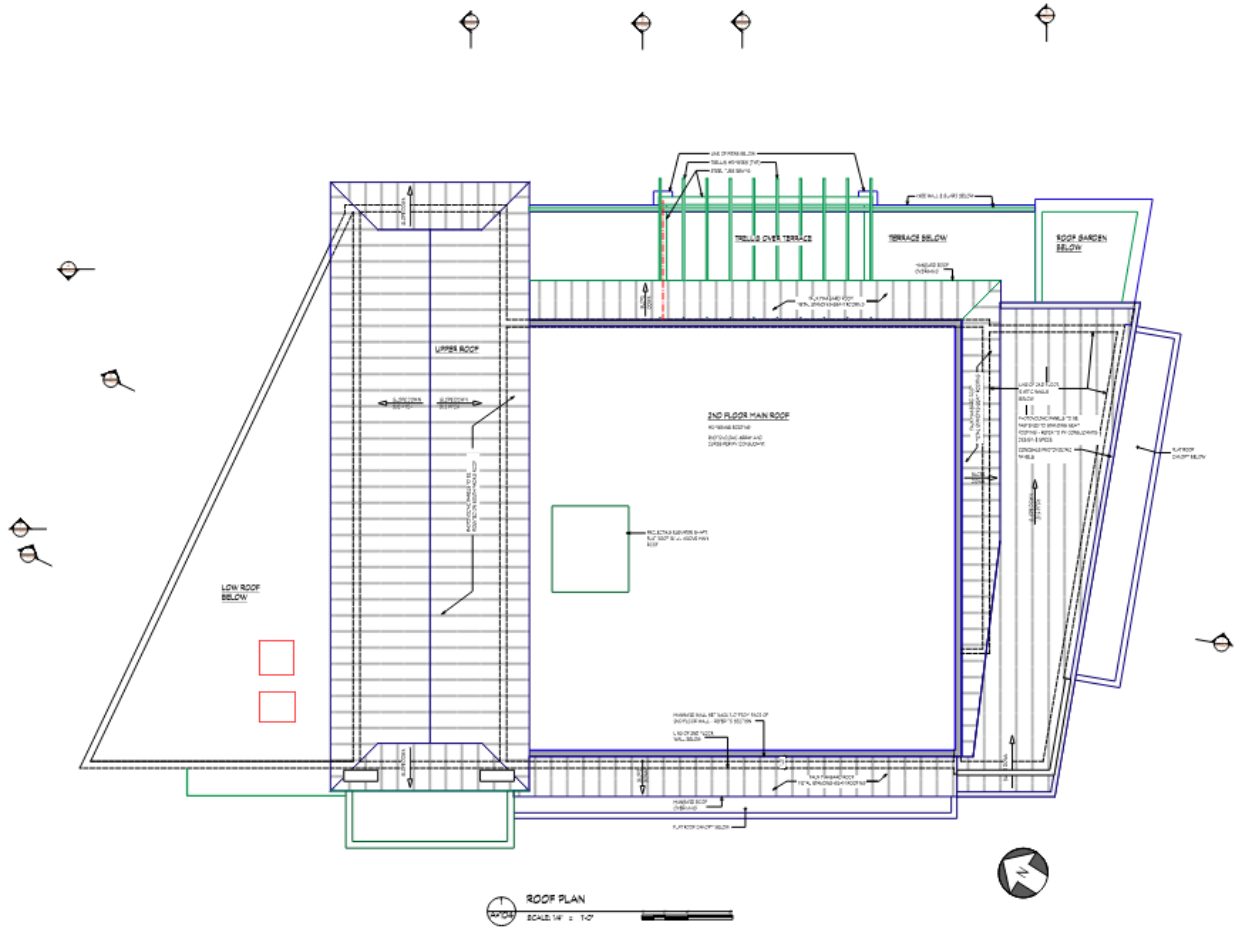
SCALE: 3" = 1'-0"

FIRST PROBLEM
ENGINEER'S PROPOSED DESIGN

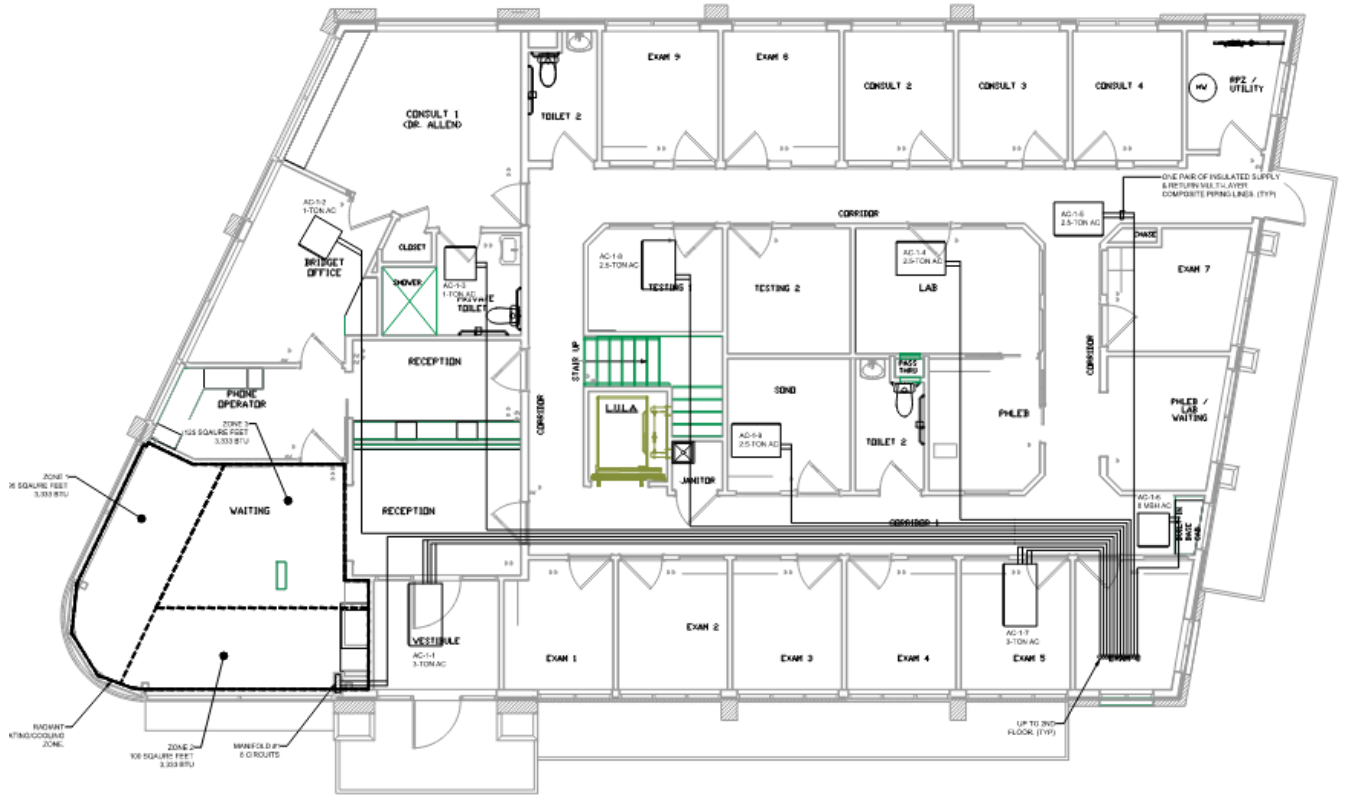


PROGRES

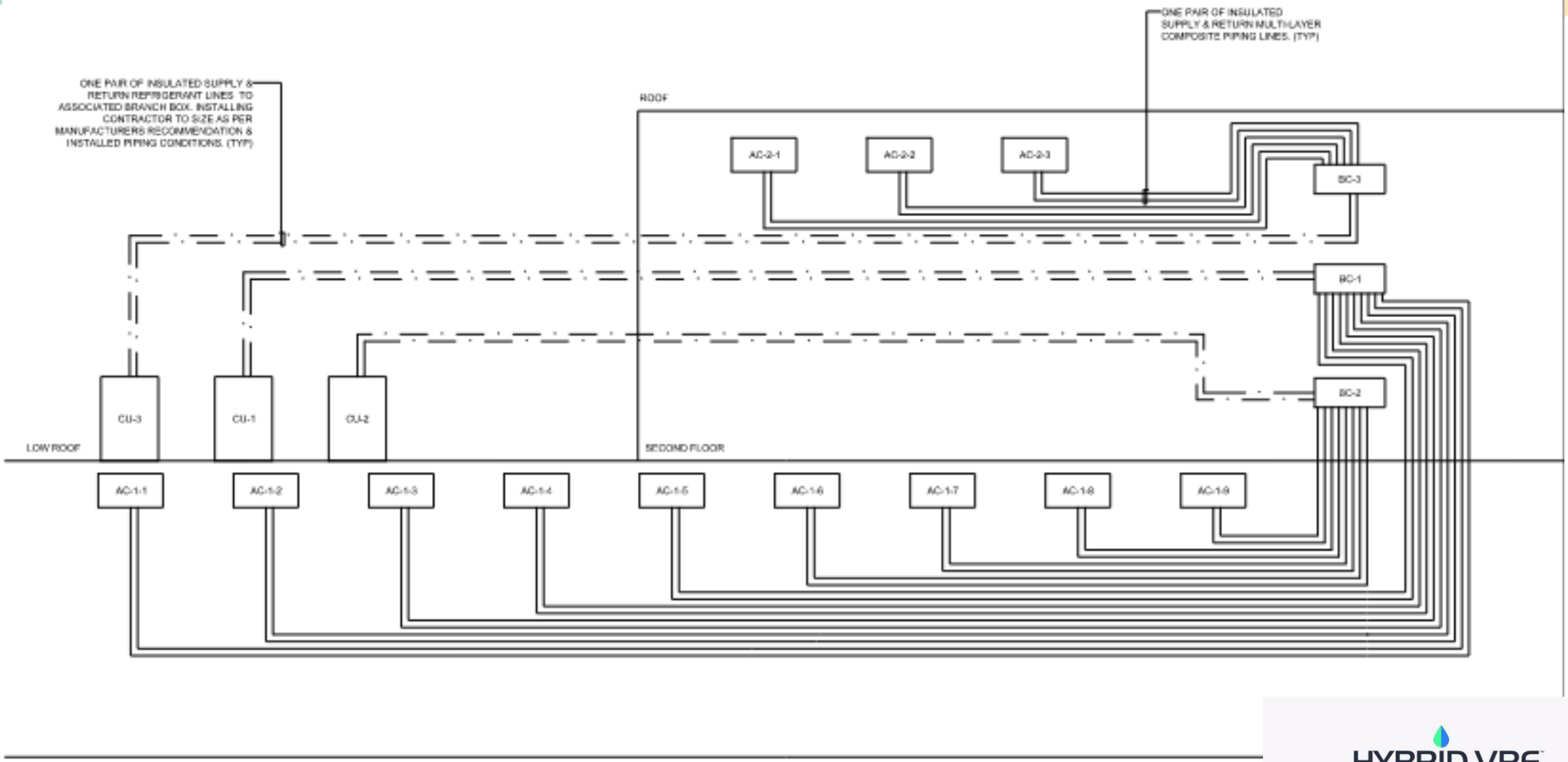
WHAT THE ARCHITECT ENVISIONED



ORIGINAL IDEA



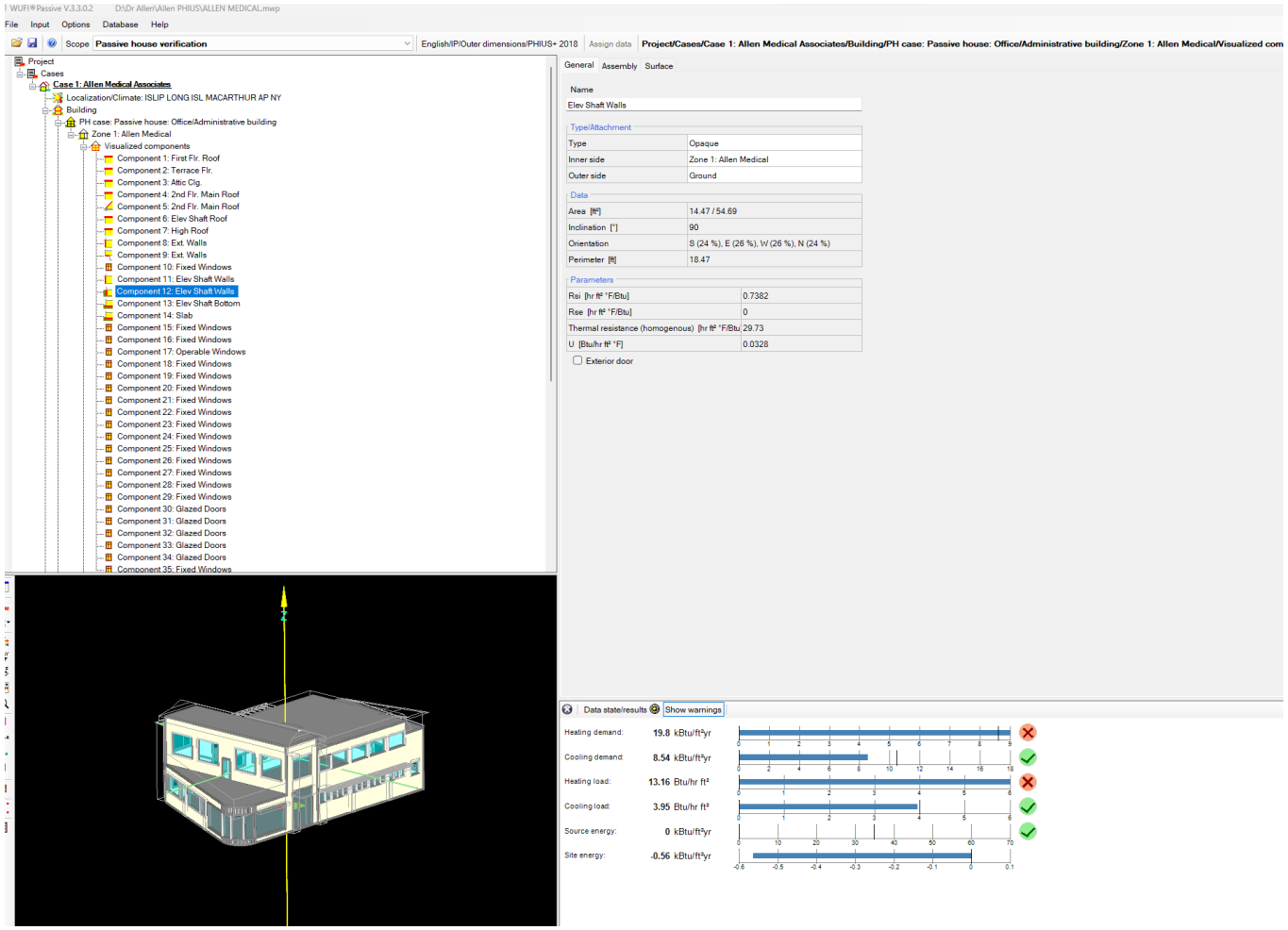
Current Plan

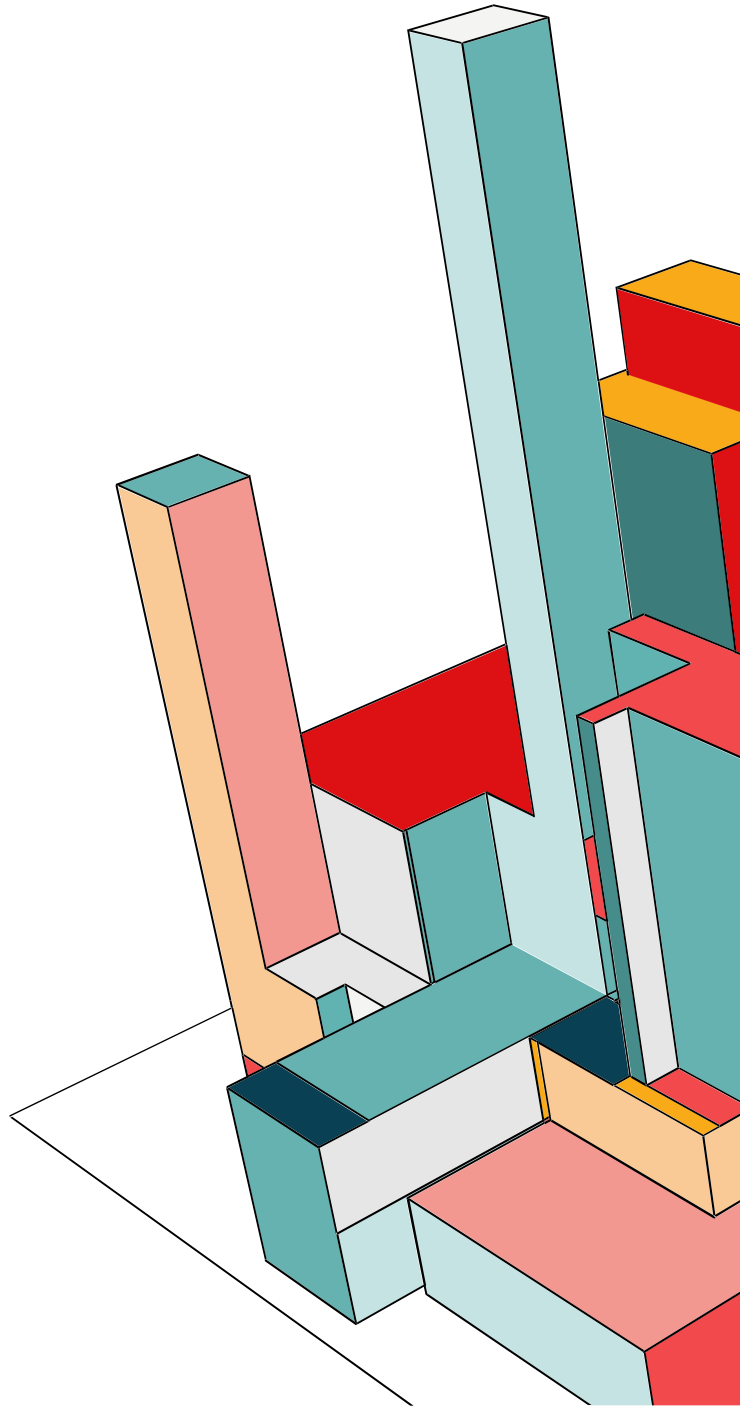


HYBRID VRF™

A Two-Pipe Hybrid Hydronic VRF System
That Heats and Cools Simultaneously

STILL WORKING ON THE MODEL





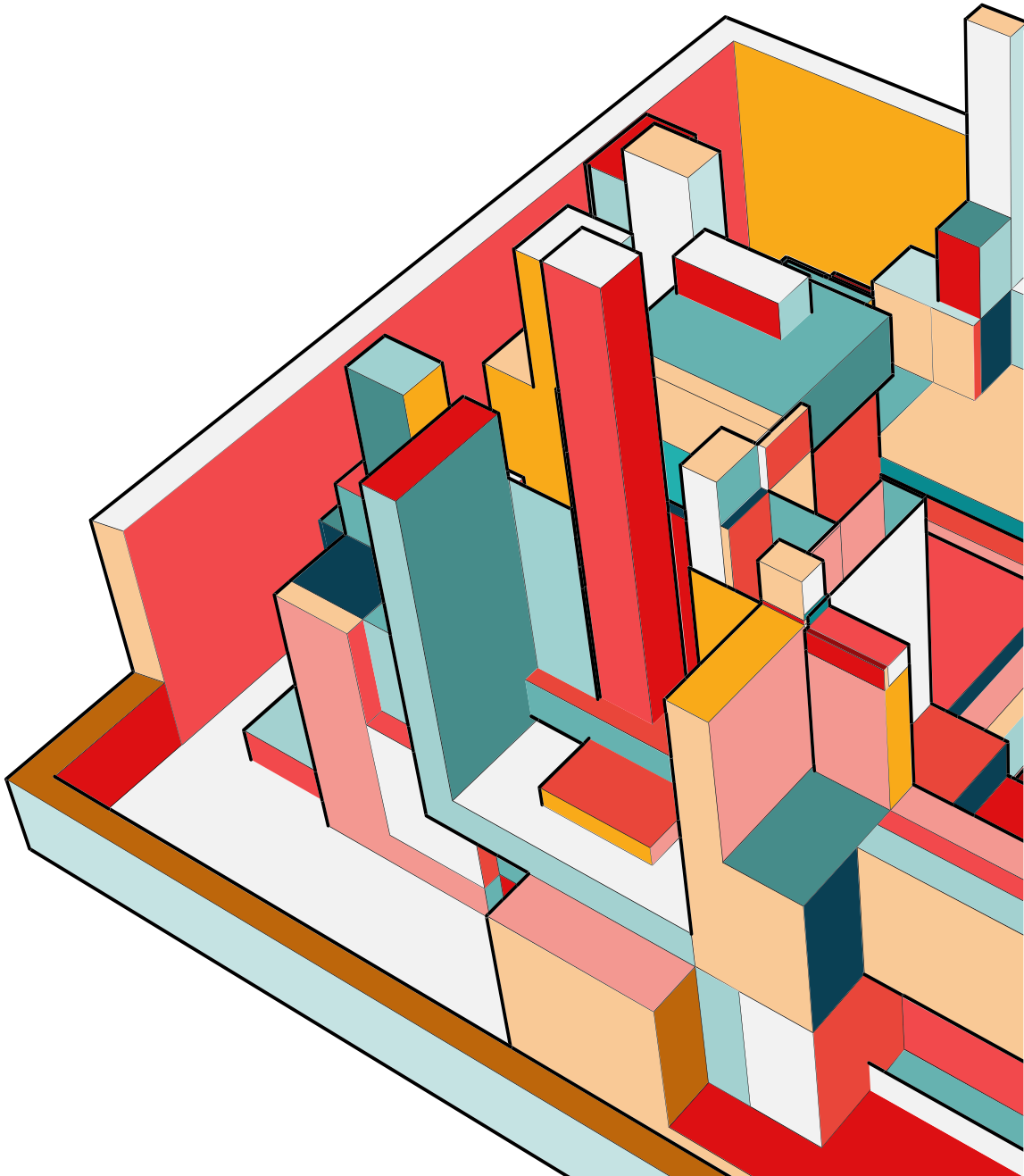
SUMMARY

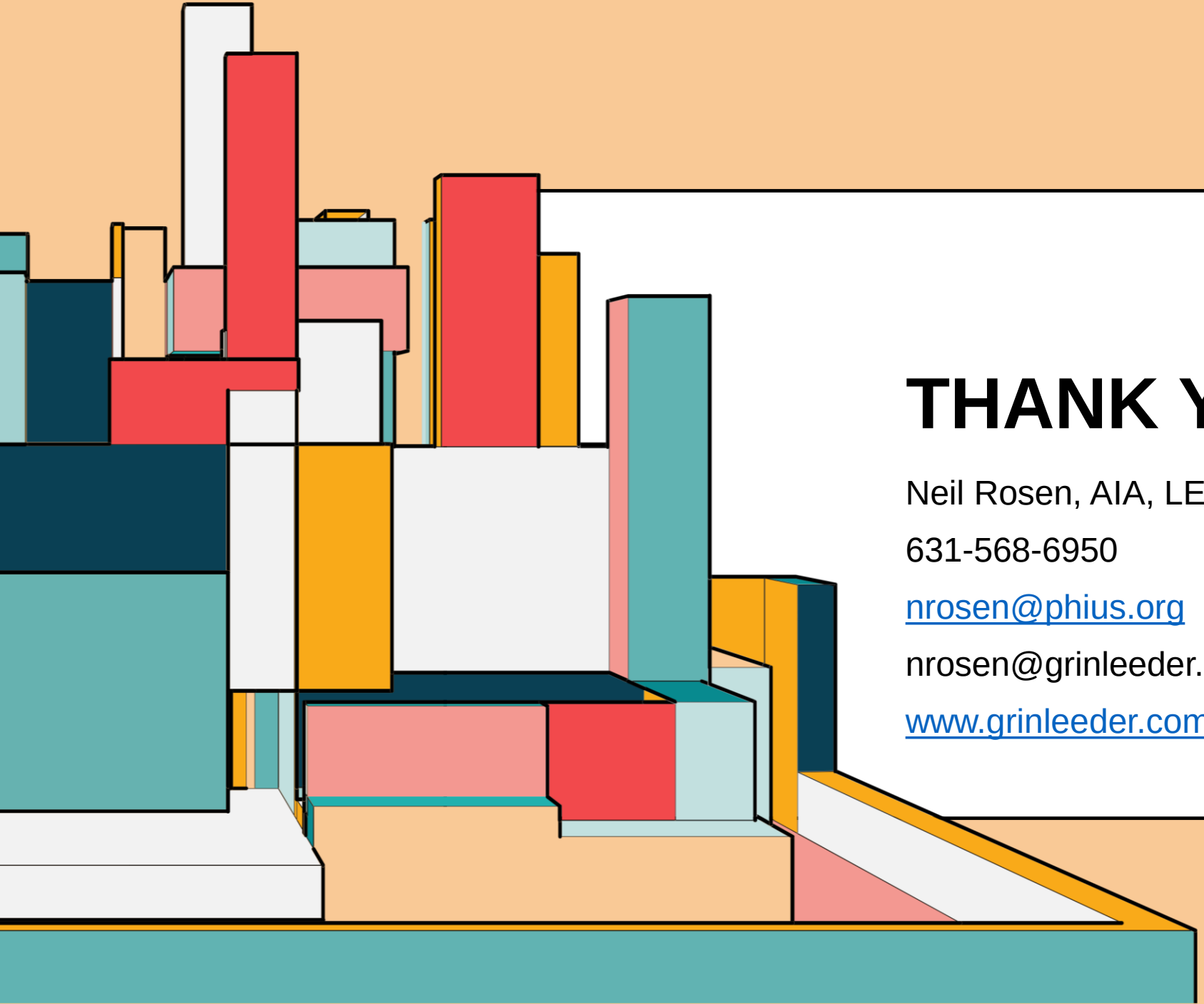
Phius works for Non-Residential Buildings

Windows are less of a driver in an Internal Load Dominated Building

– Less Expensive

- Helping to limit another Barrier to Entry





THANK YOU

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