PASSIVE
AGRESSIVE

A National
Net-Zero-Energy-Capable
Affordable Housing Initiative

Tim McDonald
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215.783.5591

ONION FLATS

DEVELOPMENT

ONION FLATS

ARCHITECTURE

ONION FLATS

CONSTRUCTION

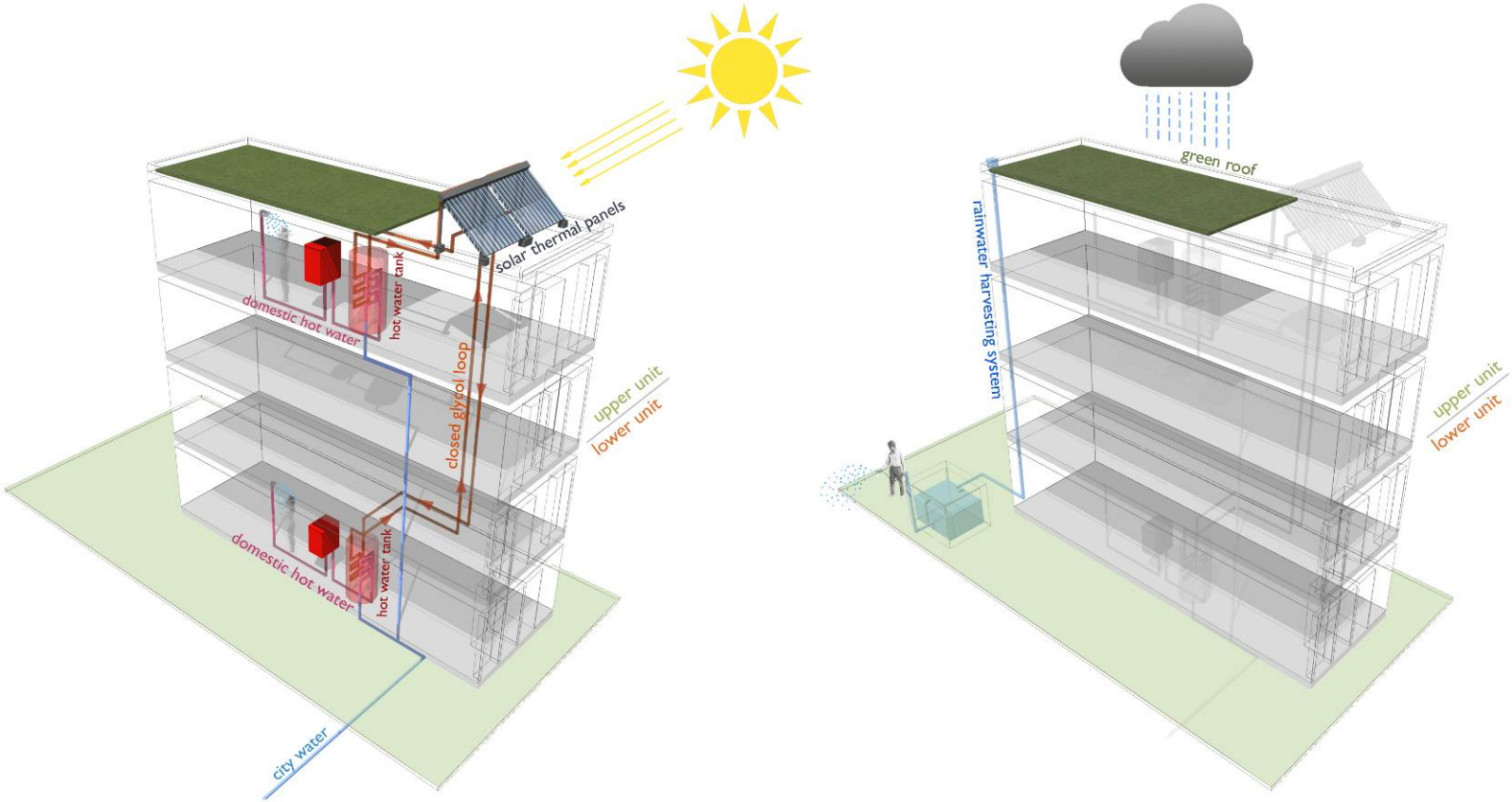
ARCHITECTURE
RESEARCH
CENTER

TEMPLE UNIVERSITY

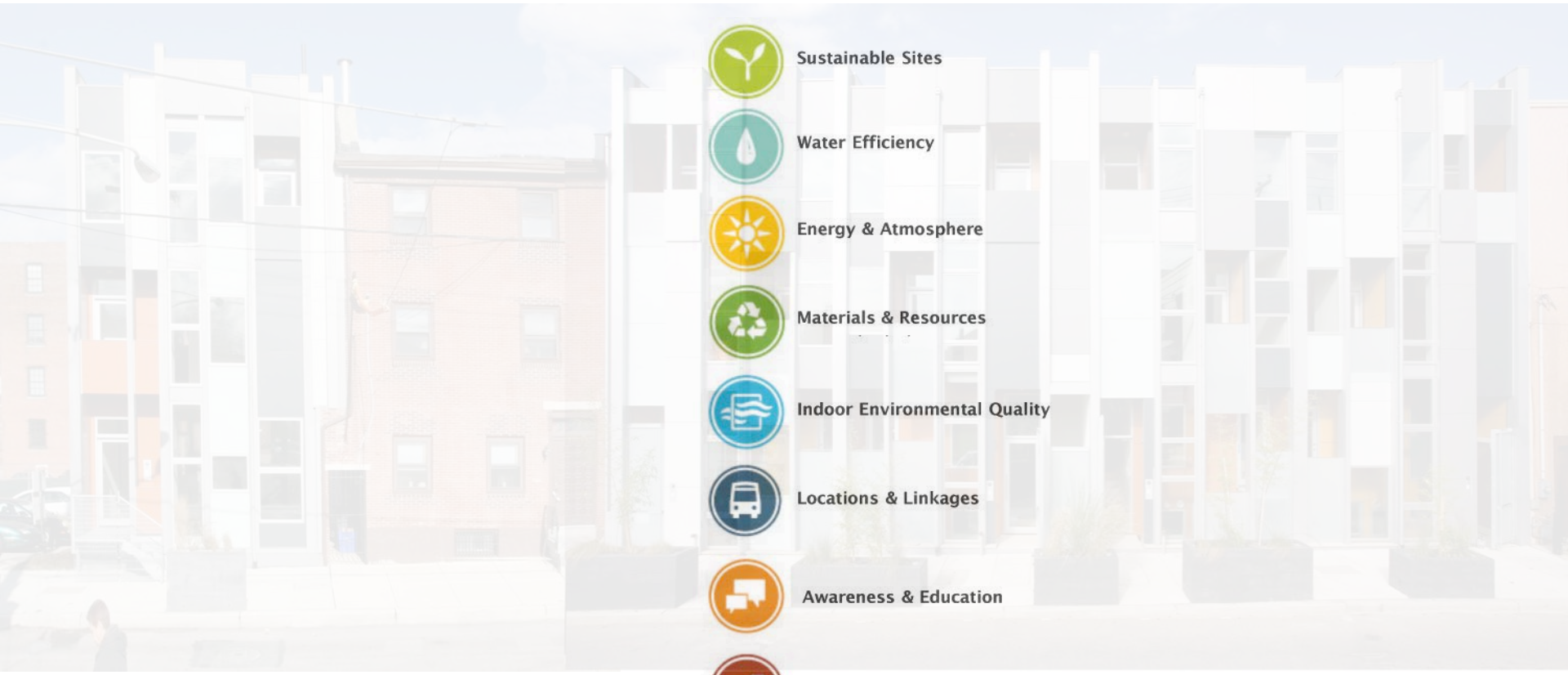
THIN FLATS, 2008: 9 units 1STLEED PLATINUM DUPLEXES IN THE USA

ONION FLATS


UPPER UNIT
LOWER UNIT


solar thermal panels
hot water tank
domestic hot water
closed glycol loop
upper unit
lower unit
hot water tank
domestic hot water
city water
green roof
rainwater harvesting system
upper unit
lower unit


1009-1010 N HANCOCK



- Sustainable Sites
- Water Efficiency
- Energy & Atmosphere
- Materials & Resources
- Indoor Environmental Quality
- Locations & Linkages
- Awareness & Education
- Innovation in Design
- Regional Priority

U.S. GREEN BUILDING COUNCIL
LEED PLATINUM
USGBC

Ed Mazria, Greenbuild Philly 2013

Ed Mazria, Greenbuild Philly 2013

An area equal to 3.5 times the entire building stock of U.S.

By 2030,

900 billion ft^2 (84 billion m^2)

of new and rebuilt buildings
will be constructed in cities worldwide.

Sources:
UN Habitat, *State of the World's Cities 2010/2011*; McKinsey Global Institute.

RADICAL

AFFORDABLE

SCALABLE

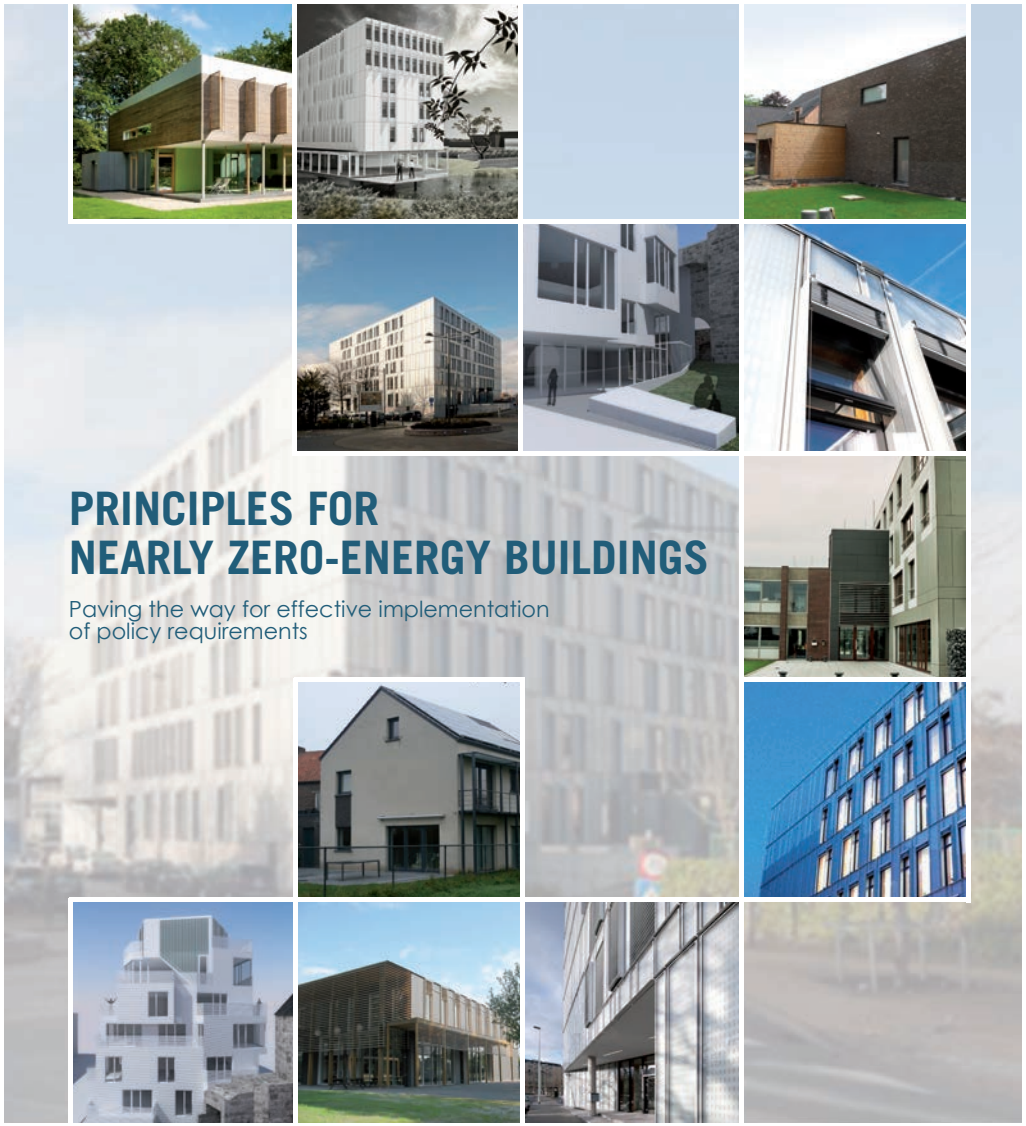
2015 United Nations Climate Conference, COP 21

PARIS, France

"…..FIRST year that over 200 countries signed the agreement in global solidarity"

BRUSSELS 2015

"….calls for all buildings to be Nearly-Zero Energy Buildings by the end of 2020…. Brussels' new regulation is based on the Passive House Standard, making it mandatory for all new builds as well as all retrofits as of January 2015." IPHA



BPIE

Mayor de Blasio Commits to 80 Percent Reduction of Greenhouse Gas Emissions by 2050, Starting with Sweeping Green Buildings Plan

September 21, 2014

Building Code Revision Launches California Toward Zero Net Energy Buildings

Bill Roth | Monday November 11th, 2013 | 2 Comments

Starting in 2014, California is implementing a tsunami of building code revisions called Title 24. These revised building codes will move California's residential and commercial buildings toward Zero Net Energy (ZNE). In a ZNE building, the annual energy consumption is equal to its annual production of renewable energy. Under Title 24, all new residential construction is to be ZNE by 2020 with all new commercial buildings achieving this ZNE goal by 2030.

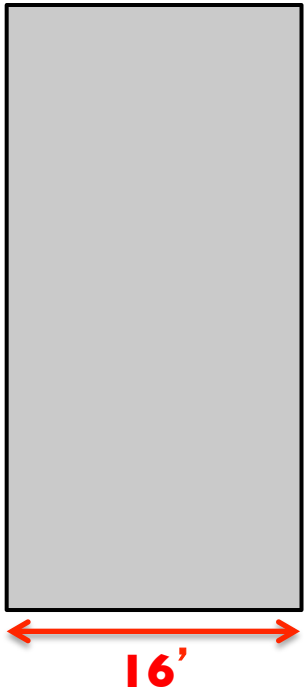
Title 24 moves building design toward "comprehensive building solutions." This building design approach first focuses upon reducing energy consumption through the integration of smart and energy efficient technologies. The final design step after reducing the building's energy consumption is to install onsite renewable energy generation like solar panels.

NET-ZERO-ENERGY-CAPABLE

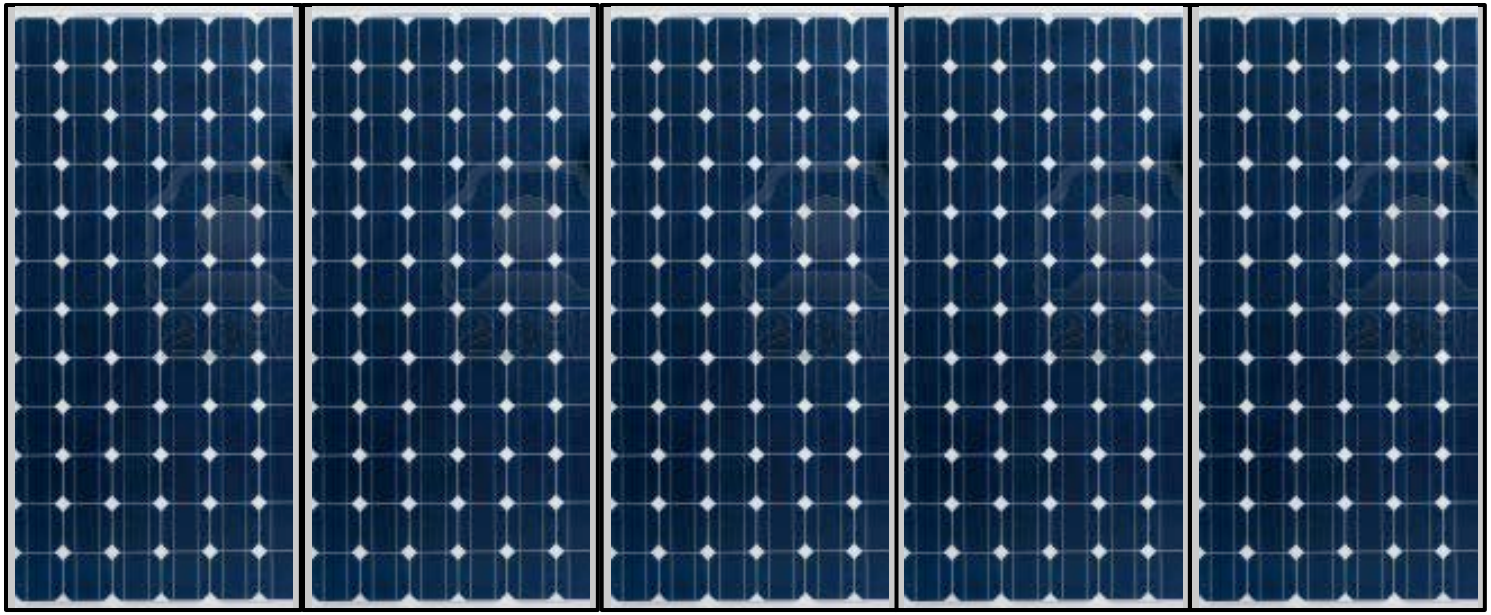
A building must GENERATE

NET-ZERO-ENERGY-CAPABLE

ALL it needs to survive
on it's own site



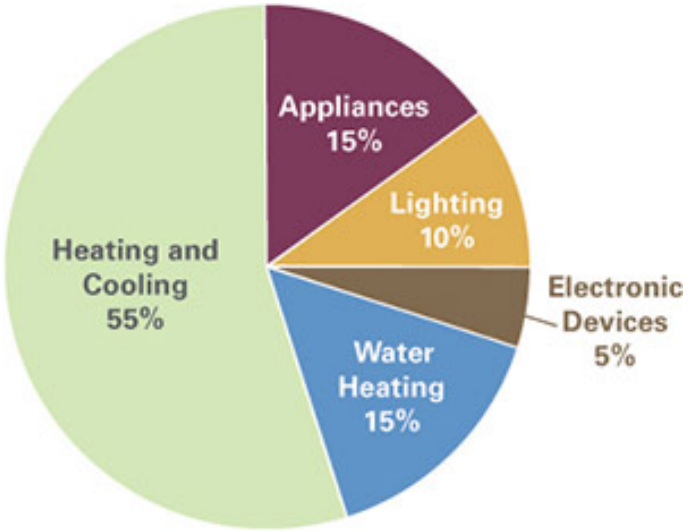
1900 sf home
39,000 kWh/yr



1900 sf home
39,000 kWh/yr
2832 sf roof

80% REDUCTION

4.5 kWh/sf/yr

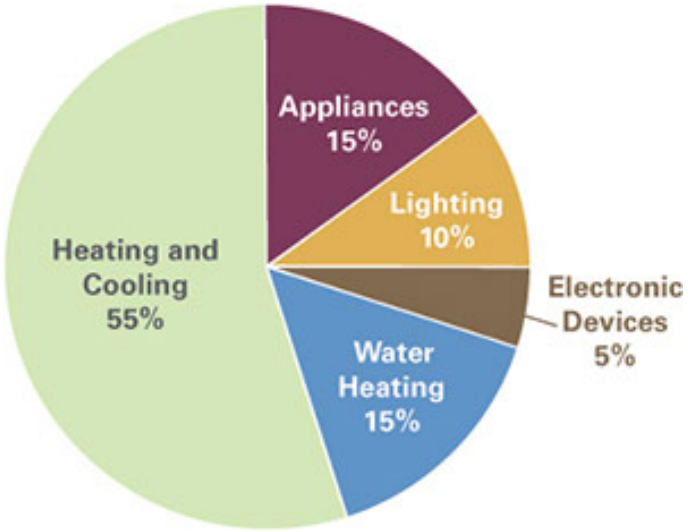


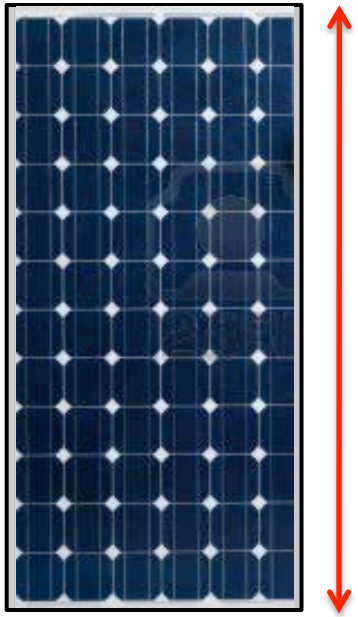
40’

16’

80% REDUCTION

4.5 kWh/sf/yr





80% REDUCTION

4.5 kWh/sf/yr

Certified
Passive House
Passive House Institute

“Fabric First” approach

80% REDUCTION

4.5 kWh/sf/yr

Certified
Passive House
Passive House Institute

Envelope and Thermal Comfort Principles

1. **Continuous Insulation-** creating steady indoor temperatures that won't drop below 50 degrees without heating source

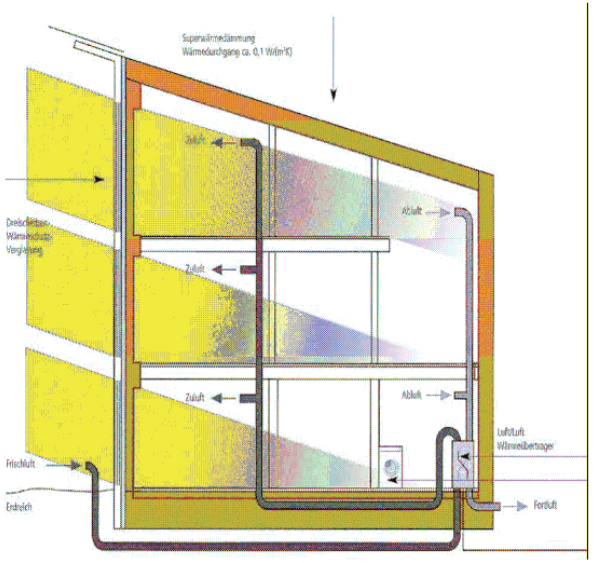
2. **Thermal Bridge Free Construction-** minimizes condensation/ building deterioration

3. **Compact Building Shape-** excellent surface-to-volume ratio (< 1)

4. **Airtightness-** minimizes moisture diffusion into wall assembly

5. **Balanced Ventilation with Heat Recovery with minimal Space Conditioning System -** exceptional efficiency, indoor air-quality and comfort

6. **Optimal Solar Orientation and Shading** – maximizing solar gains for winter, minimizing gains for the summer case



7. **Energy Efficient Appliances and Lighting-** highly efficient use of household electricity

8. **User Friendliness -** user manuals are recommended to be given homeowners

PHIUS
Passive House Institute US

BLDG MPG

PERFORMANCE

Certified Passive House
Passive House Institute

Requirements

1. Specific Space Heating/ Cooling Demand	4.75 kBTU/sf/yr
2. Air-Tightness	.6 ACH50
3. Specific Primary Energy Demand	38 kBTU/sf/yr
SOURCE factor of 2.5	15 kBTU/sf/yr

Conversion to kWh of 3.412 — **4.5 kWh/sf/yr**

EUI — **10-20 kBTU/sf/yr**

Certified
Passive House
Passive House Institute

Consumption

PH METRIC

4.5 kWh/sf/yr

(Site Energy)

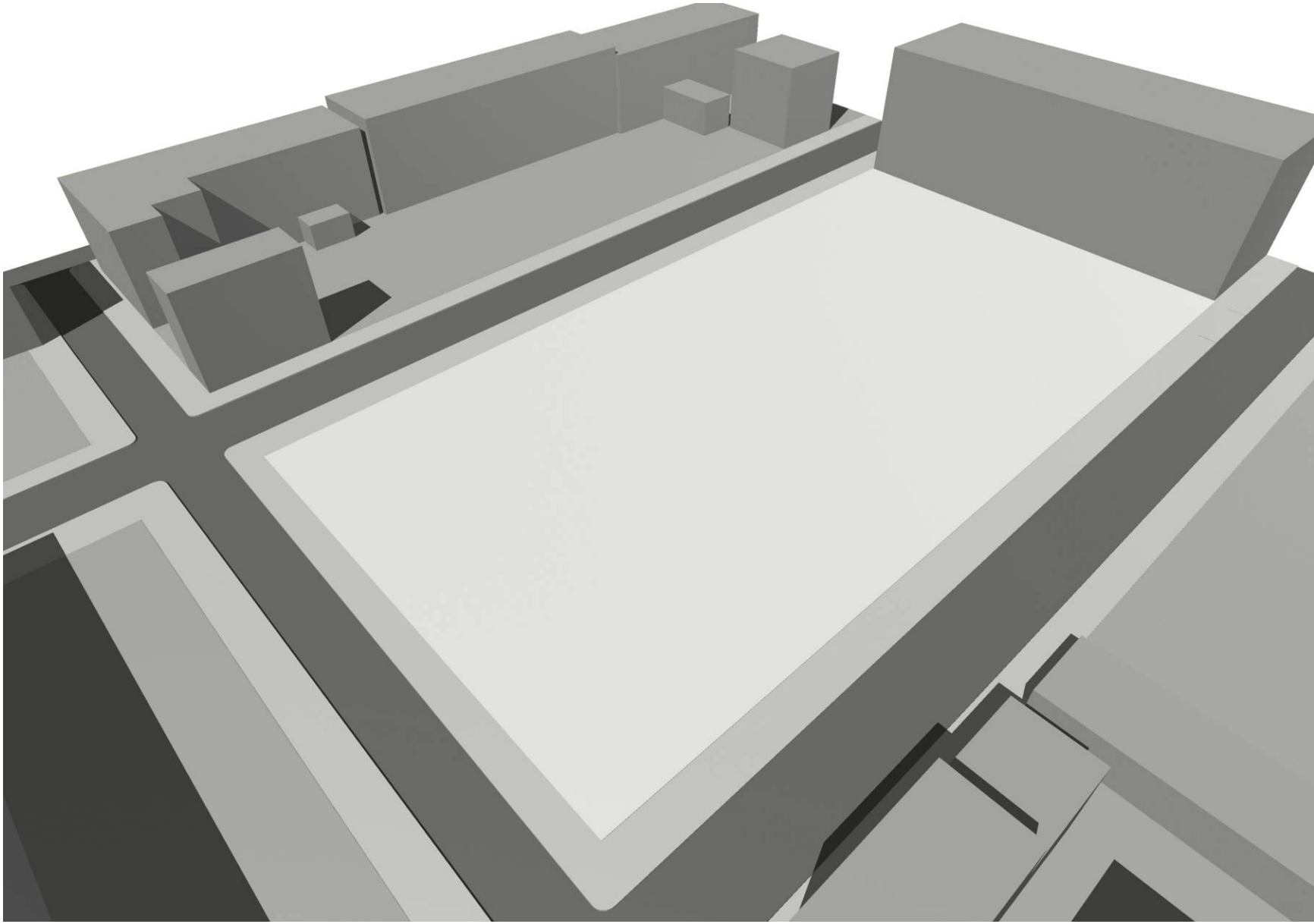
Production

ROOF METRIC

4.5 kWh/sf/yr

(Site Energy)

STABLES 2015: 27 townhomes



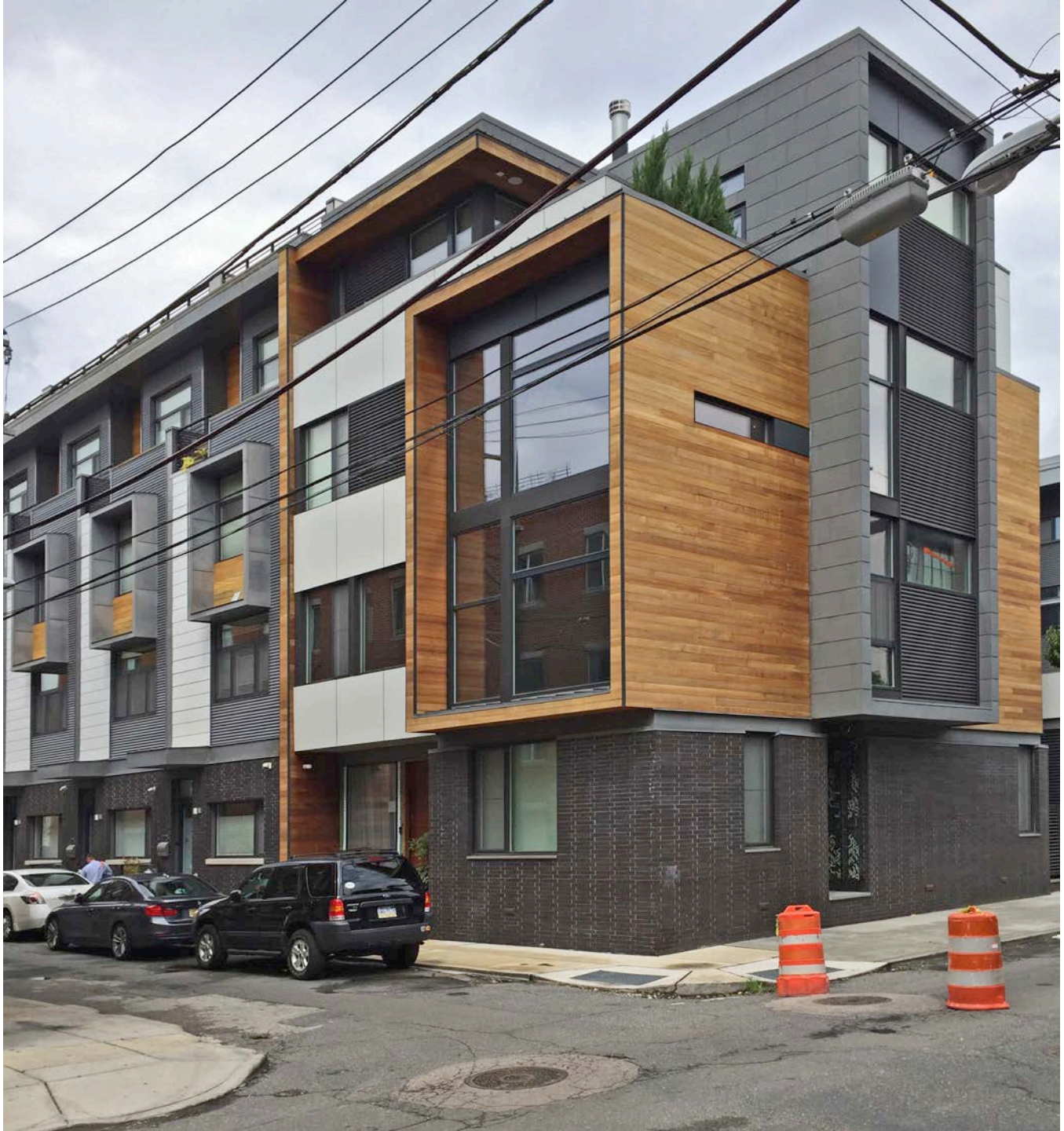

VERNAL EQUINOX: 50°


VERNAL EQUINOX: 50°


SUMMER SUN
WINTER SUN
solar electric
solar hot water

ONION FLATS

ONION FLATS



MaGrann ASSOCIATES

ENERGY/BUILDING CONSULTANTS & ENGINEERS

One Crescent Drive • Philadelphia, PA 19112 • 1-888-MAGRANN • www.magrann.com

New Jersey • Pennsylvania • Kentucky • Ohio

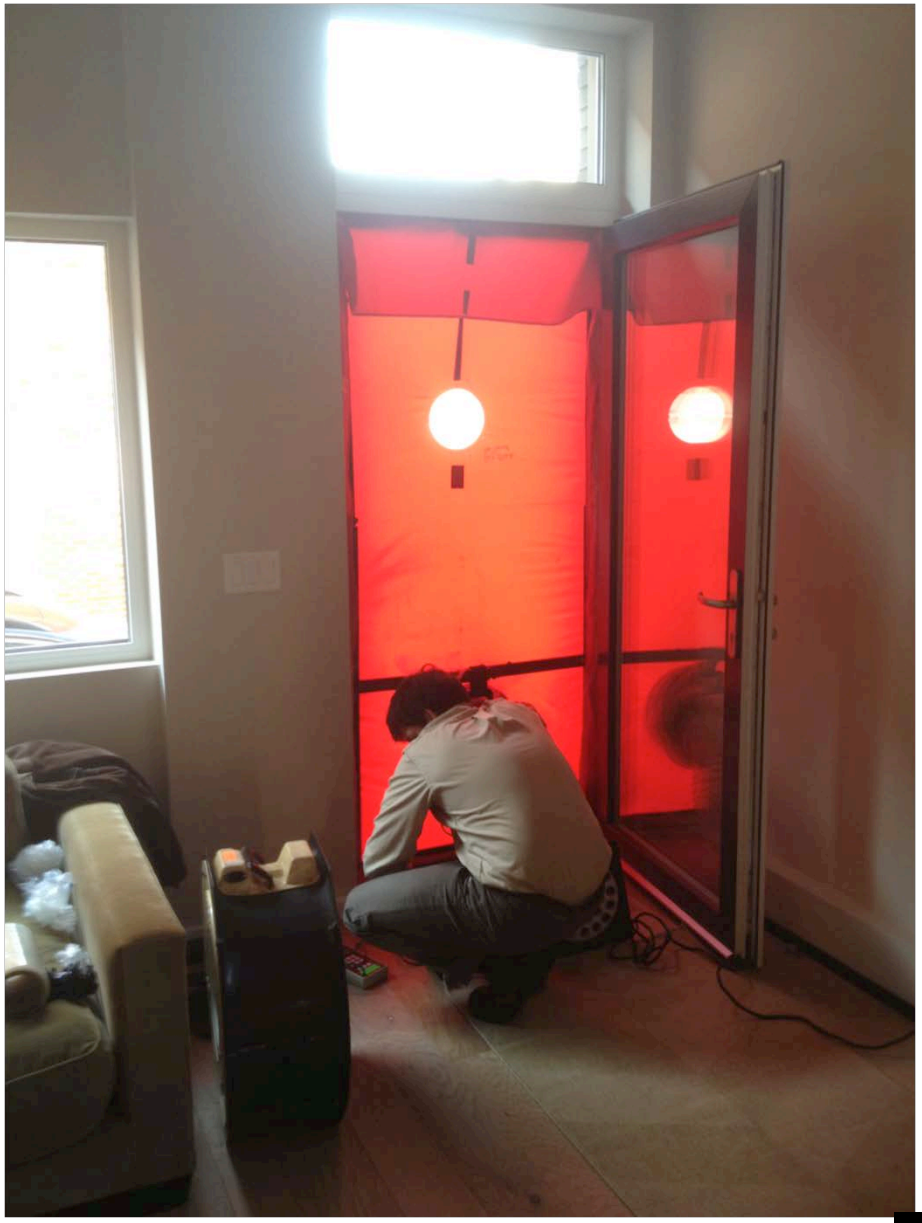
BUILDING LEAKAGE TEST COMPARISON

Test #1		Test #2	
Test File:	Depressurization File	Test File:	Pressurization File
Date of Test:	7/5/2012	Date of Test:	7/5/2012
Customer:	Onion Flats, LLC 111 West Norris Street Philadelphia, Pennsylvania 19122	Customer:	Onion Flats
Phone:	215-783-5591		

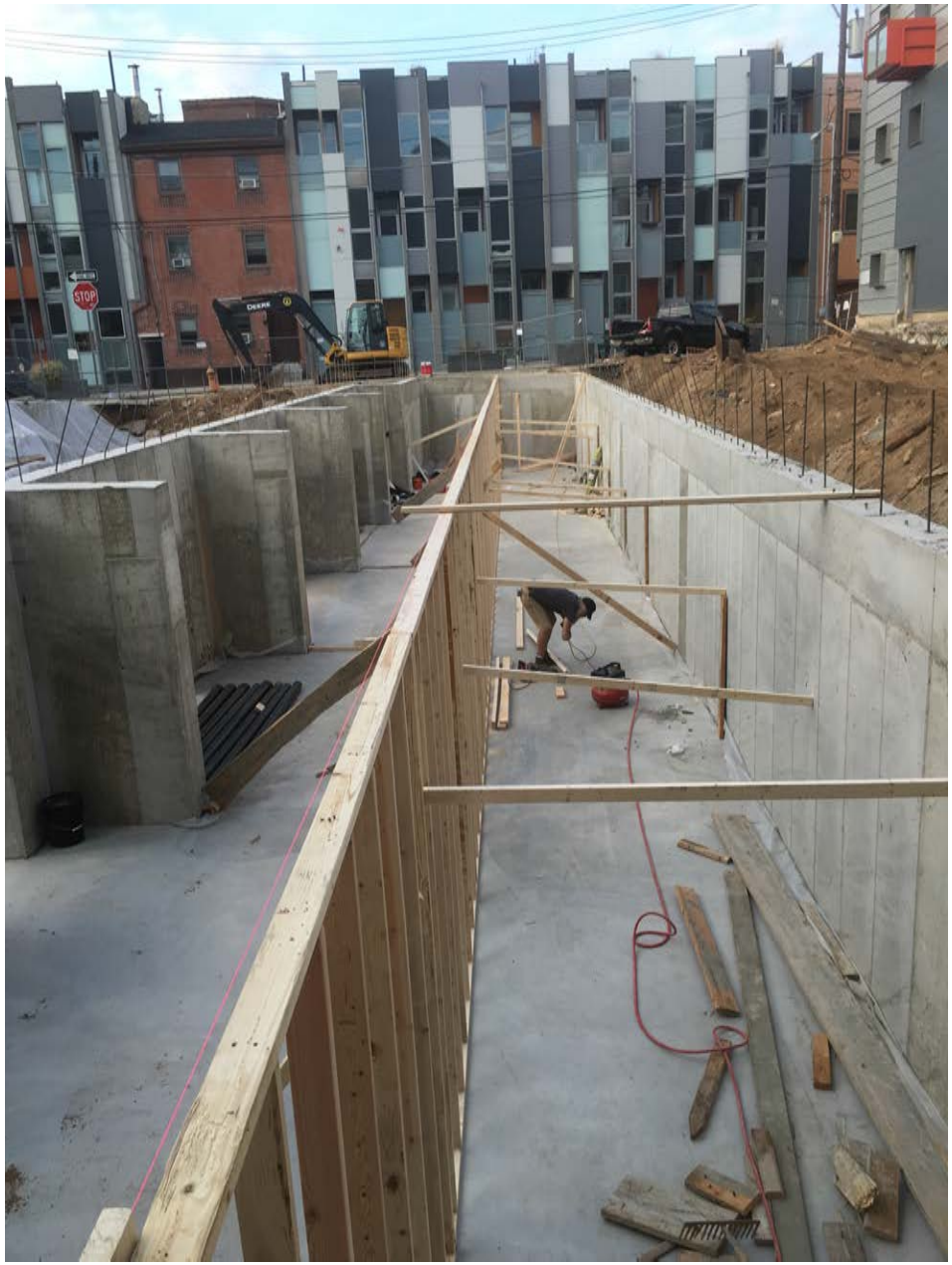
Test Results

	Test #1	Test #2	Change	Percent
1. Airflow at 50 Pascals:	293 CFM	201 CFM	-92 CFM	-31.4 %
	0.48 ACH	**0.33 ACH**	-0.15 ACH	-31.4 %

FINAL AIRFLOW **.49 ACH 50**



ONION FLATS



CAPITAL FLATS 2 2016: 25 “Micro” units, Net-Zero-Energy

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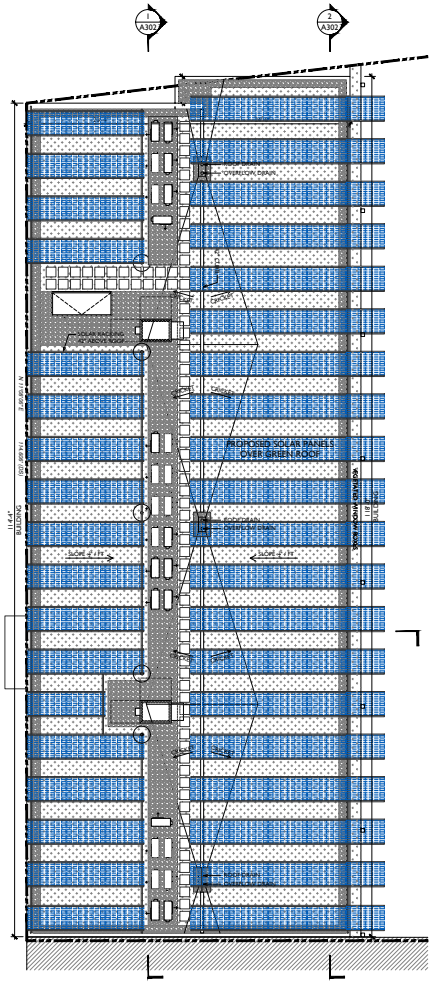

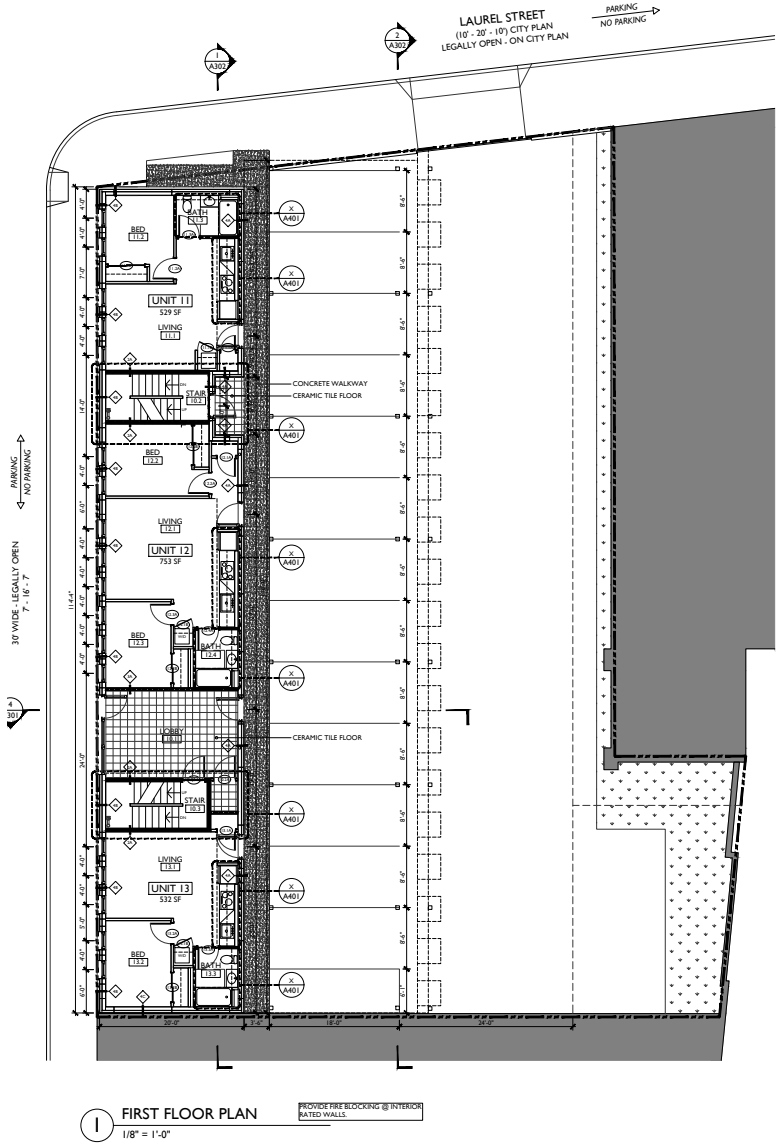

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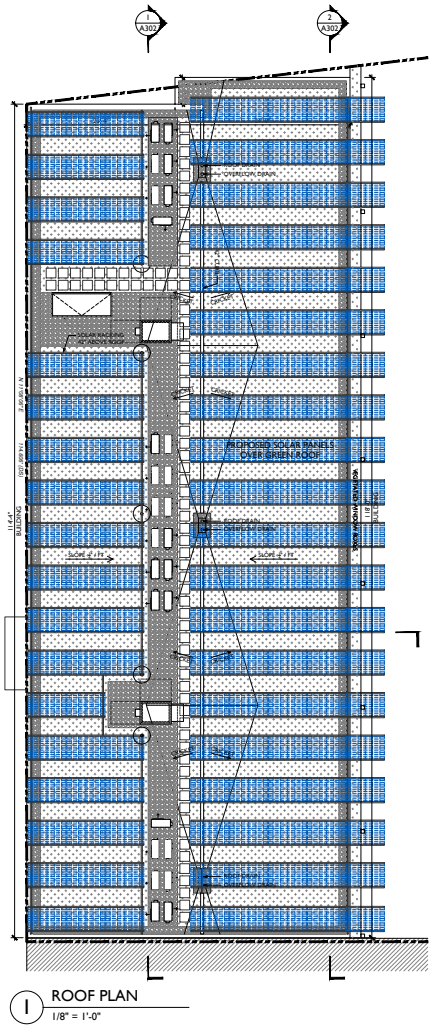
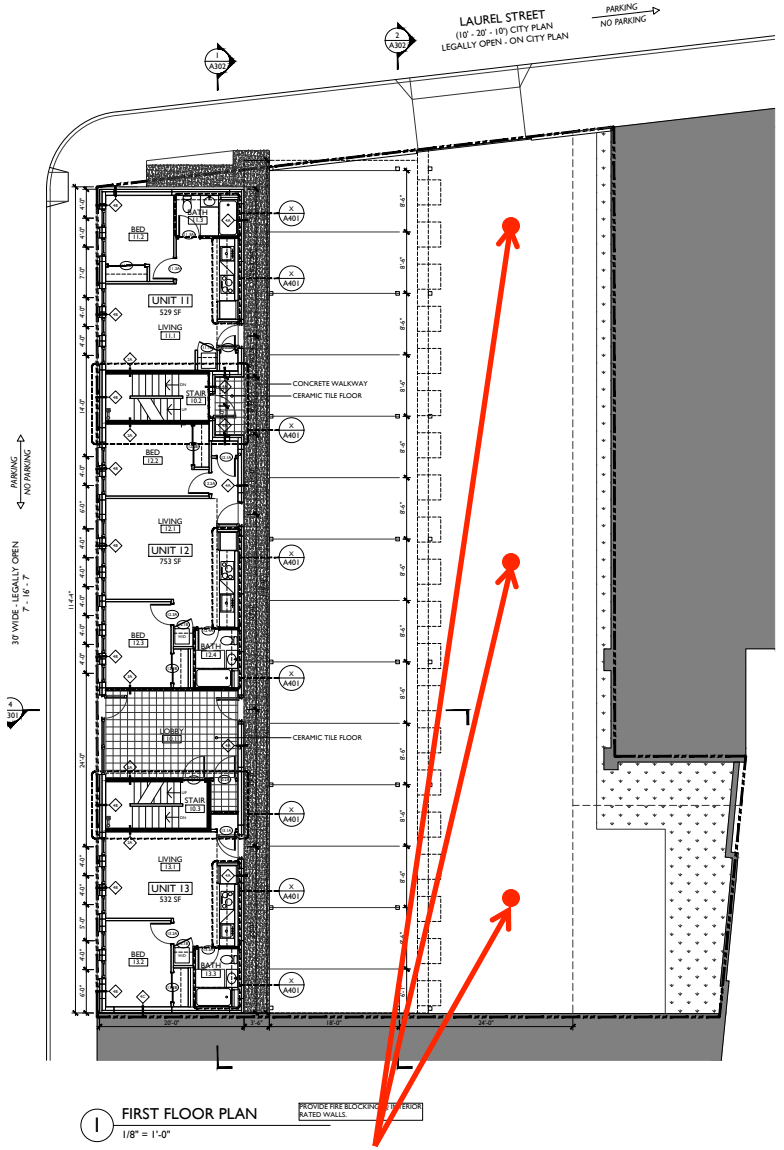
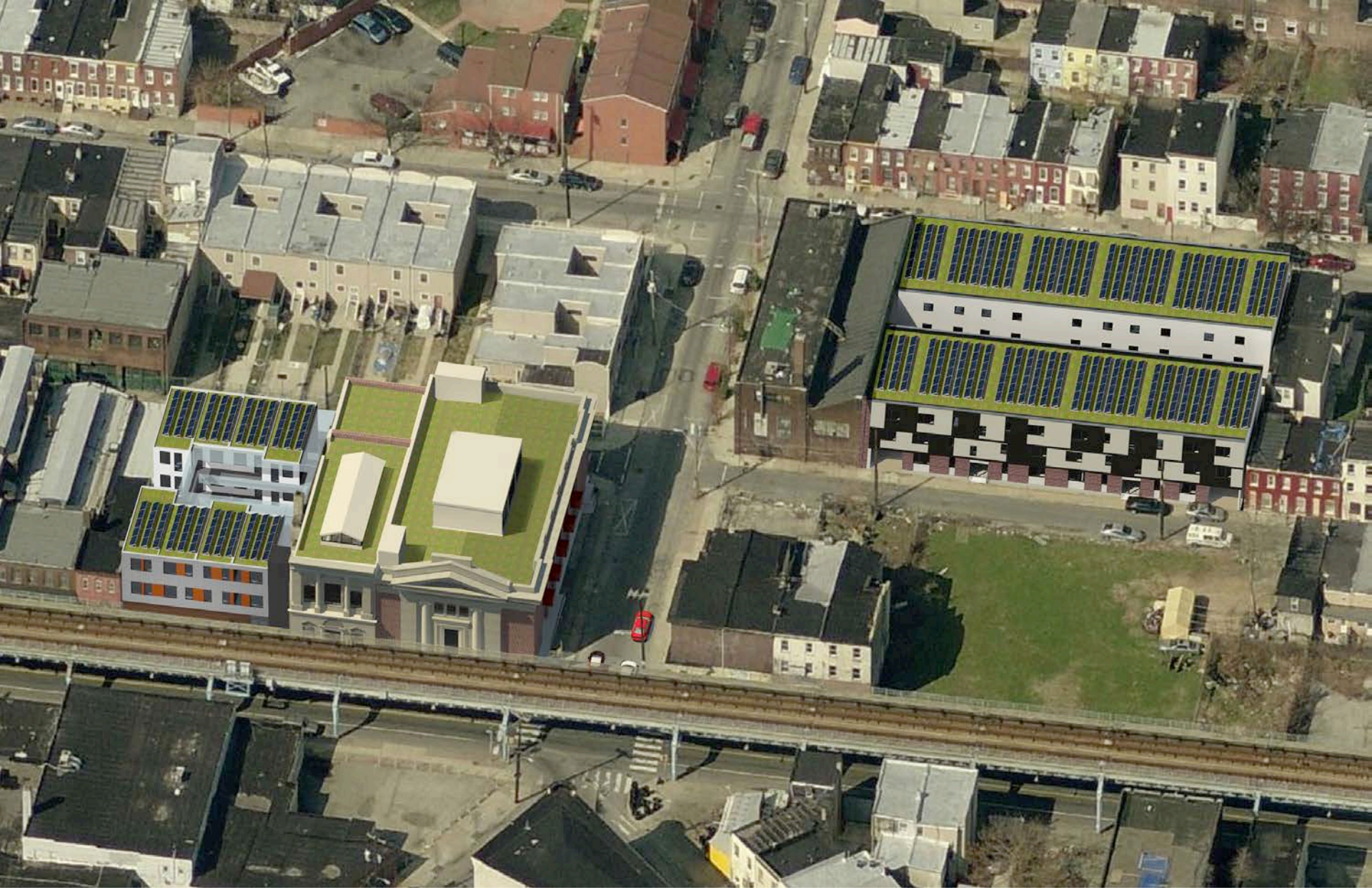




3 – 1000' deep Standing Column Geothermal Wells
ALL heating/cooling and domestic hot water for ALL 25 apartments

CAPITAL FLATS 2 2016: 25 "Micro" units



BANK FLATS 2016: 31 units and retail

NLG 2018: 50 units

ONION FLATS

BANK FLATS 2016: 31 units and retail

BELFIELD HOMES

PHILADELPHIA, PENNSYLVANIA 19141

ONION FLATS

NON-PROFIT COMMUNITY ORGANIZATION

RAISE OF HOPE

PHILADELPHIA REDEVELOPMENT AUTHORITY

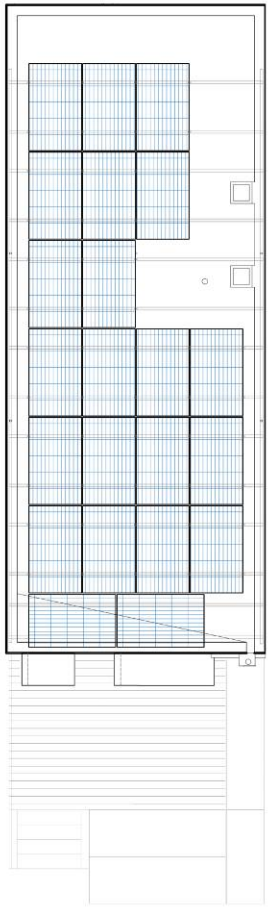
ZERO ENERGY
ZERO PREMIUM
ZERO DEBATE

BELFIELD HOMES
PHILADELPHIA, PENNSYLVANIA 19141

ONION FLATS

NON-PROFIT COMMUNITY ORGANIZATION
RAISE OF HOPE

PHILADELPHIA REDEVELOPMENT AUTHORITY



UNIT ROOF LVL

0 4 8 16

UNIT PLAN LVL 3

0 4 8 16

UNIT PLAN LVL 2

0 4 8 16

UNIT PLAN LVL 1

0 4 8 16

FIRST

CERTIFIED

PASSIVE HOUSE
IN
PENNSYLVANIA

START: APRIL 20, 2012

CERTIFICATE OF OCCUPANCY: JULY 20, 2012

Certified Passive House
Passive House Institute

RECIPIENT OF THE
2014 INTERNATIONAL
PASSIVE HOUSE AWARD

PHIUS
Passive House Institute US

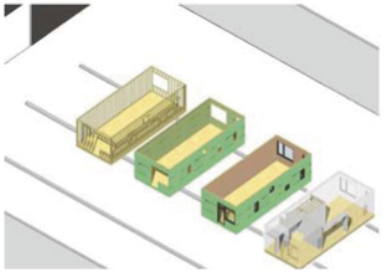
SECOND PLACE WINNER
2015 PHIUS AWARD
"AFFORDABLE HOUSING"

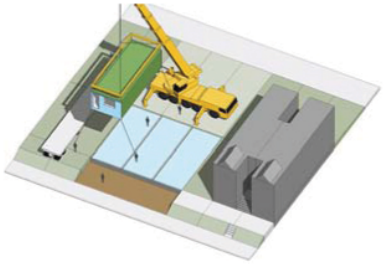
2014
Passive House Award
Award Recipient
Passive House Institute

2013
AIA
HONOR
AWARD

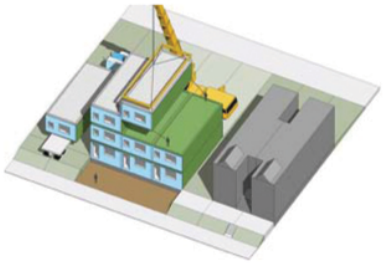

ONION
FLATS

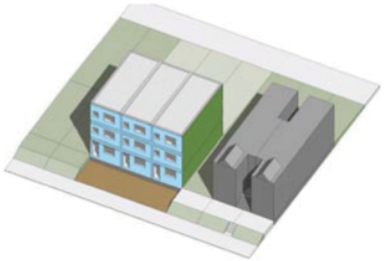
FACTORY BUILD

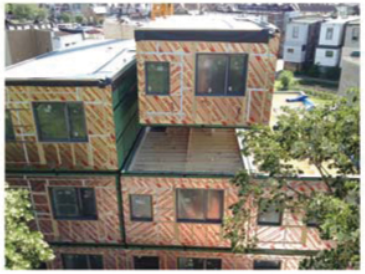


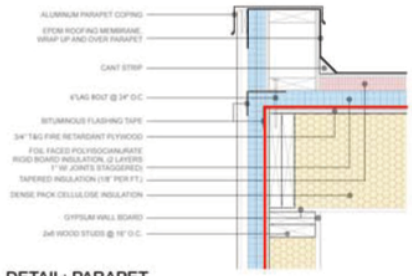


SITE ASSEMBLE

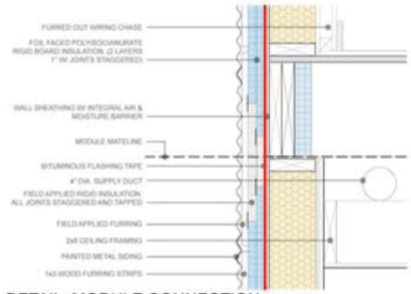




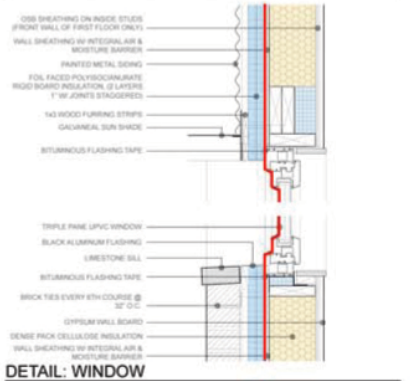




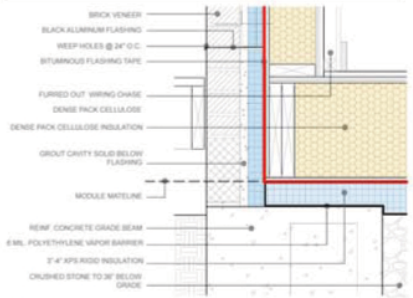
DETAIL: PARAPET



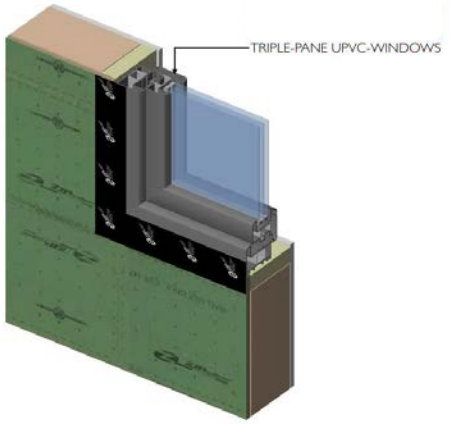
DETAIL: MODULE CONNECTION

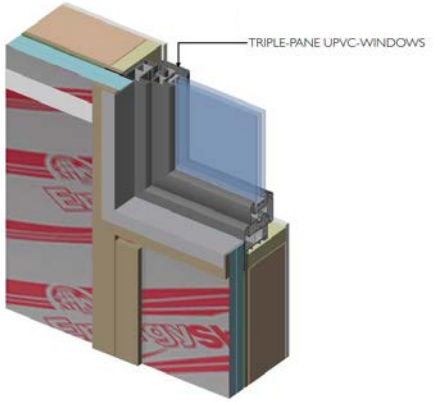


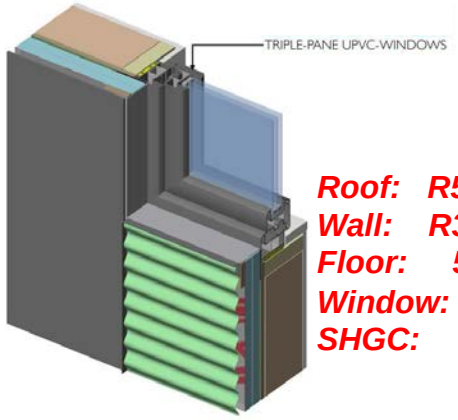
DETAIL: WINDOW



DETAIL: FOUNDATION







Roof: R52.3
Wall: R33.6
Floor: 58.4
Window: .11
SHGC: .63

ENERGY/BUILDING CONSULTANTS & ENGINEERS
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New Jersey • Pennsylvania • Kentucky • Ohio

BUILDING LEAKAGE TEST COMPARISON

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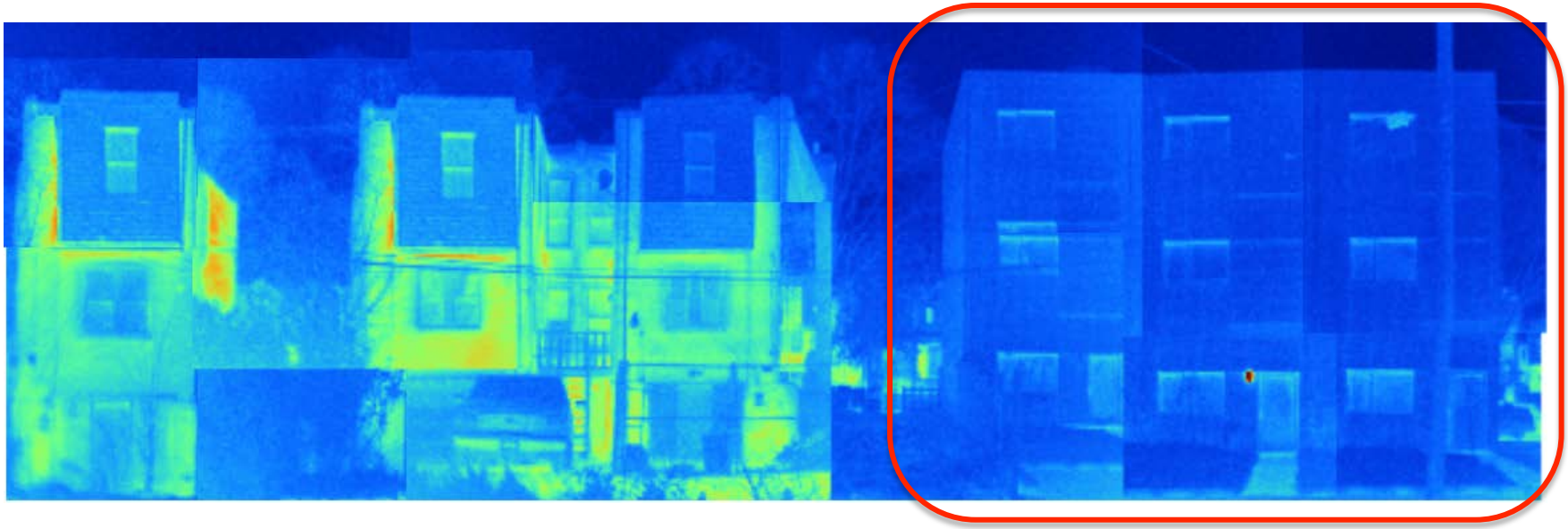
	0.48 ACH	**0.33 ACH**	-0.15 ACH	-31.4 %

FINAL AIRFLOW: **0.405 ACH 50**

PASSIVE HOUSE MAX **0.6 ACH 50**

ONION FLATS



ONION FLATS


$129/sf


Why isn’t ALL
AFFORDABLE HOUSING
Built to the PH standard?


PHFA
PENNSYLVANIA HOUSING FINANCE AGENCY

MAKE ALL AFFORDABLE HOUSING NET-ZERO-ENERGY-CAPABLE BY 2030


USE PASSIVE HOUSE AS THE TOOL


HOW?

QAP

Qualified Allocation Plan

POINTS-BASED SYSETEM

Total points	**120**
Community and Economic Impact	**30**
- Underserved Areas	
- Senior Occupancy Developments	
- Preservation	
Development Characteristics	**25**
- Smart Site Selection	
- Enterprise Green Communities	
Resident Population and Services	**50**
- Income and Rent Targeting	
- Designated Populations and Supportive Services	
- Accessible Units	
- Large Families	
Development Process	**15**
- Noncompliance	
- Ability to Proceed	
Development Cost Savings	**10**

POINTS-BASED SYSETEM

Total points	**130**
Community and Economic Impact	**30**
- Underserved Areas	
- Senior Occupancy Developments	
- Preservation	
Development Characteristics	**25**
- Smart Site Selection	
- Enterprise Green Communities	
- PASSIVE HOUSE	**10**
Resident Population and Services	**50**
- Income and Rent Targeting	
- Designated Populations and Supportive Services	
- Accessible Units	
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- Noncompliance	
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Development Cost Savings	**10**

THE PHFA PROJECT

OCT 2014

“PASSIVE HOUSE points” introduced to PHFA 2015 QAP

THE PHFA PROJECT

OCT 2014

“PASSIVE HOUSE points” introduced to PHFA 2015 QAP

FEB 2015

85 Multi-family project applications were received

THE PHFA PROJECT

OCT 2014

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JUNE 2015

39 projects awarded funding

THE PHFA PROJECT

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38% applied as Passive House projects

THE PHFA PROJECT

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8 Passive House Projects awarded funding

THE PHFA PROJECT

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422 new Passive House/Net-Zero-Energy-Capable units in PA

THE PHFA PROJECT

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JUNE 2015

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38% applied as Passive House projects

8 Passive House Projects awarded funding

422 new Passive House/Net-Zero-Energy-Capable units in PA

$COST$ “Negligibly different” from NON-PH projects

THE PHFA PROJECT

Construction Cost Summary from PHFA Applications

2015 Costs

Single Family / Townhouse

Proj. No.	County	Climate Zone	Units (by BR Qty) 0	1	2	3	4+	Total Units	Bldg. Area	Constr. $	$ /Unit	$/SF
SF-1	Franklin	5A			33	21		54	70,218	7,051,522	130,584	100
SF-2	Schuylkill	5A		3	9	5		17	21,151	2,238,725	131,690	106
SF-3	Philadelphia	4A		5	19	31	5	60	79,795	9,363,626	156,060	117
SF-4	Allegheny	5A			26	19		45	63,548	8,863,631	196,970	117
SF-5	Lycoming	5A		16	34			50	66,147	8,141,437	162,829	123
SF-6	Bradford	5A		10	24	16		50	62,956	7,964,823	159,296	127
SF-7	Centre	5A			20	20		40	53,652	7,523,233	188,081	140
SF-8	Lebanon	5A			46	16		62	84,168	11,742,459	189,395	140
SF-9	Bradford	5A		2	26	12		40	59,954	8,369,296	209,232	140
SF-10	Butler	5A		3	39	18		60	67,904	9,827,275	163,788	145
SF-11	Erie	5A			9	34		43	53,454	7,870,669	183,039	147
SF-12	Dauphin	5A		3	3	25	4	35	61,504	9,192,750	262,650	149
SF-13	Berks	5A		22	20	16		58	62,097	9,305,340	160,437	150
SF-14	Franklin	5A		7	25	24		56	77,469	11,791,991	210,571	152
SF-15	Luzerne	5A		26	15	15		56	56,250	8,968,491	160,152	159
SF-16	Union	5A		5	12	8	6	31	43,868	7,071,066	228,099	161
SF-17	Chester	4A		48	12			60	58,349	9,809,238	163,487	168
SF-18	Allegheny	5A		4	30	18		52	77,351	12,979,386	249,604	168
SF-19	Berks	5A		10	21	11		42	57,722	9,785,000	232,976	170
SF-20	Montgomery	4A		16	24	15		55	61,480	11,113,700	202,067	181
SF-21	Delaware	4A		8	34	14		56	65,790	12,184,074	217,573	185
SF-22	Philadelphia	4A			17	16	2	35	45,476	8,905,240	254,435	196
SF-23	Allegheny	5A		14	9			23	28,205	5,552,583	241,417	197
SF-24	Westmoreland	5A		28	8			36	43,872	8,331,567	231,432	245
SF-25	Philadelphia	4A		10	19	11		40	46,757	11,453,809	286,345	245

Adaptive Reuse

AR-1	Lehigh	5A		34	4	11		49	65,339	6,392,809	130,465	98
AR-2	Erie	5A		29	16			45	53,021	6,152,972	136,733	116
AR-3	Philadelphia	4A	12	54				66	77,975	9,751,707	147,753	125
AR-4	Allegheny	5A	2	49	4			55	65,577	9,514,764	172,996	145
AR-5	Delaware	4A		53				53	51,690	8,030,480	151,518	155
AR-6	Philadelphia	4A		44				44	49,406	8,361,579	190,036	169
AR-7	Montgomery	4A		33	3	7		43	55,832	9,468,816	220,205	170
AR-8	Philadelphia	4A			28	10		38	53,840	9,515,893	250,418	177
AR-9	Dauphin	5A	5	17	6			28	45,434	8,075,064	288,395	178
AR-10	Allegheny	5A		33	3			36	50,664	9,436,523	262,126	186
AR-11	Philadelphia	4A		46				46	56,478	10,795,027	234,675	191
AR-12	Philadelphia	4A		27	10			37	48,768	9,658,098	261,030	198
AR-13	Philadelphia	4A		30	21			51	62,509	13,609,683	266,857	218
AR-14	Washington	4A		17	7			24	35,299	7,856,113	327,338	223
AR-15	Philadelphia	4A		62				62	70,991	25,995,741	419,286	366

Multi-Story / Elevator

MS-1	Northumberland	5A		35				35	40,397	4,276,084	122,174	106
MS-2	Dauphin	5A		22	14	14		50	88,314	10,055,562	201,111	114
MS-3	Dauphin	5A		18	59			77	92,000	10,668,511	138,552	116
MS-4	Lancaster	5A		46	6			52	71,758	8,456,719	162,629	118
MS-5	Blair	5A		33	20			53	82,070	9,727,007	183,528	119
MS-6	Chester	4A		46	15			61	76,340	9,638,964	158,016	126
MS-7	Lancaster	5A		13	39	26		78	88,910	11,681,226	149,759	131
MS-8	Clearfield	6A		24	6			30	42,254	5,551,584	185,053	131
MS-9	Indiana	5A		40				40	36,743	4,898,995	122,475	133
MS-10	Bradford	5A		50	6			56	57,817	7,738,172	138,182	134
MS-11	Cambria	5A		32	11			43	44,887	6,341,616	147,479	141
MS-12	Dauphin	5A		38	16			54	58,335	8,201,250	151,875	141
MS-13	Mifflin	5A		30	4			34	39,447	5,559,187	163,506	141
MS-14	Fayette	5A		12	12			24	29,586	4,192,325	174,680	142
MS-15	Allegheny	5A		24	12	13		49	67,340	9,698,634	197,931	144
MS-16	Lackawanna	5A		44	4			48	49,460	7,159,738	149,161	145
MS-17	Lehigh	5A		54	7			61	63,949	9,318,159	152,757	146
MS-18	Centre	5A		37	11			48	57,959	8,490,644	176,888	146
MS-19	Chester	4A		41	3	5		49	54,287	8,007,477	163,418	148
MS-20	Fayette	5A		21	3			24	36,064	5,407,359	225,307	150
MS-21	Chester	4A		61	3			64	70,083	10,557,500	164,961	151
MS-22	Allegheny	5A		54	12			66	70,689	10,787,052	163,440	153
MS-23	Allegheny	5A		40	6			46	58,617	9,134,790	198,582	156
MS-24	Wayne	6A		36	4			40	40,959	6,460,530	161,513	158
MS-25	Centre	5A			12			12	16,796	2,683,900	223,658	160
MS-26	Beaver	5A		40	12			52	55,361	9,468,440	182,085	171
MS-27	Lancaster	5A		51				51	51,500	8,871,635	173,954	172
MS-28	Allegheny	5A		52	8			60	66,733	11,716,729	195,279	176
MS-29	Montgomery	4A		40	4			44	44,687	8,202,314	186,416	184
MS-30	Montgomery	4A		50				50	42,265	8,029,015	160,580	190
MS-31	Crawford	5A		36	4			40	38,953	7,490,675	187,267	192
MS-32	Philadelpia	4A		9	8	7		24	31,220	6,031,050	251,294	193
MS-33	Westmoreland	5A		47				47	49,080	9,825,224	209,047	200
MS-34	Philadelphia	4A		58	4			62	56,120	11,262,762	181,657	201
MS-35	Philadelphia	4A	60					60	57,672	11,915,227	198,587	207
MS-36	Philadelphia	4A		20	4			24	26,284	5,523,620	230,151	210
MS-37	Philadelphia	4A		34	11			45	42,523	8,964,723	199,216	211
MS-38	Philadelphia	4A		52				52	50,275	10,703,403	205,835	213
MS-39	Philadelphia	4A		39	11			50	53,416	11,371,112	227,422	213
MS-40	Philadelphia	4A		45	5			50	55,099	11,747,269	234,945	213
MS-41	Philadelphia	4A		24				24	24,284	5,194,462	216,436	214
MS-42	Philadelphia	4A		45				45	46,754	10,118,014	224,845	216
MS-43	Philadelphia	4A		53				53	50,312	10,900,733	205,674	217
MS-44	Philadelphia	4A		54				54	48,965	10,664,381	197,489	218
MS-45	Philadelphia	4A	88					88	79,650	18,005,791	204,611	226

$COST$ **“Negligibly different” from NON-PH projects**

THE PHFA PROJECT

Pennsylvania

85 Projects

32 PH projects — **Average cost = $169/sf**

53 NON-PH projects — **Average cost = $165/sf**

< 2%

$COST$ "Negligibly different" from NON-PH projects

THE PHFA PROJECT

OCT 2014

"PASSIVE HOUSE points" introduced to PHFA 2015 QAP

FEB 2015

85 Multi-family project applications were received

JUNE 2015

39 projects awarded funding

38% applied as Passive House projects

8 Passive House Projects awarded funding

422 **new Passive House/Net-Zero-Energy-Capable units in PA**

$COST$ "Negligibly different" from NON-PH projects

YEAR 1 *of* ***The PHFA Project****: A NATIONAL Net-Zero-Energy Initiative by* ***2030***

8 **Passive House Projects awarded funding**

THE PHFA PROJECT

Wynne Senior Residences *Sacred Heart* *Washington Square* *Hillcrest Senior Residences*
Wynne Senior Residences *Heritage Point* *Saint John Neumann* *Mann Edge II*

8 Passive House Projects awarded funding

THE PHFA PROJECT

PENNROSE Properties, LLC

ARTIST'S RENDERING

DATE: 29 OCTOBER 2013 | K&A #: 12134

Kitchen & Associates
Architecture • Engineering • Planning • Interiors

WYNNE - SENIOR RESIDENCE
Philadelphia, Pennsylvania

Wynne Senior Residence
54th and Arlington Streets
Philadelphia, PA

51 one and two bedroom senior affordable apartment units with Community Room, Management Suite, and a Retail space.

THE PHFA PROJECT

DATE: 23 FEBRUARY 2015 K&A #: 12137.007

Kitchen & Associates
Architecture • Engineering • Planning • Interiors

SACRED HEART RESIDENCES
Allentown, Pennsylvania

Sacred Heart Residences
5th and Turner Streets
Allentown, PA

61 one and two bedroom senior affordable apartment units with Community Room, Management Suite, and two retail spaces.

THE PHFA PROJECT

Heritage Point
56 units, 5 buildings

THE PHFA PROJECT

SEDA - COG
HOUSING DEVELOPMENT
CORPORATION
201 Furnace Road, Lewisburg, PA 17837
Tel: (570) 524-4491

MANN EDGE II
100 EAST WATER STREET, LEWISTOWN, PA 17044

02/21/14
A-0.1

ARCHITECTURAL CONCEPTS, PC
www.arconcepts.com
610.518.1596 T 610.873.1587 F
The Grimmet Mansion
626 West Lincoln Highway
Exton . Pennsylvania 19341

Mann Edge II
Lewistown, PA
34 units

THE PHFA PROJECT

Exterior View from St. John Neumann Place I

St. John Neumann Place II - New Seniors Housing

prepared for:

Archdiocese of Philadelphia

BLACKNEY HAYES ARCHITECTS

St. John Newman Place 1
Philadelphia , PA
52 units, Senior Housing

THE PHFA PROJECT

architectural site plan by RDL Architects, LLC

ZA+D design
ZA+D interiors
ZA+D passiv
Redefining the Building Potential

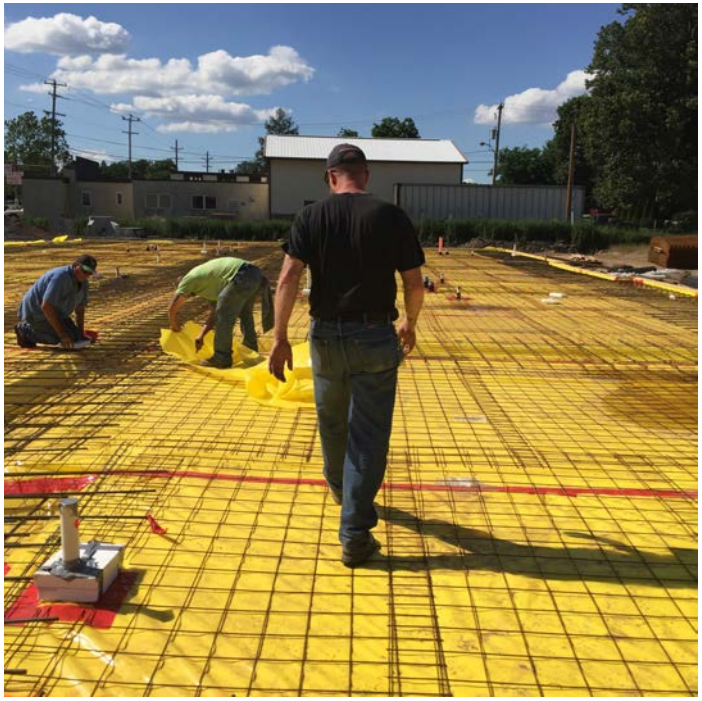
Washington Square Town Homes
Chambersburg, PA
54 units, Apartments and town homes

THE PHFA PROJECT

RDL Architects

Hillcrest Senior Residences
Pittsburgh, PA
65units, Senior Housing

THE PHFA PROJECT



The Whitehall
Old Schuylkill Road
East Vincent Township, PA
49 one and two bedroom senior affordable apartment units with Community Room, Management Suite

THE PHFA PROJECT

The Whitehall
Old Schuylkill Road
East Vincent Township, PA
49 one and two bedroom senior affordable apartment units with Community Room, Management Suite

THE PHFA PROJECT

PRE-DRYWALL BLOWER DOOR TEST
September 26, 2016

.5 ACH50

The Whitehall
Old Schuylkill Road
East Vincent Township, PA
49 one and two bedroom senior affordable apartment units with Community Room, Management Suite

THE PHFA PROJECT

Construction Cost Summary for PHFA 2016 Applications

	Proj. No.	County	Climate Zone	Units by BR Qty 0	1	2	3	4+	Total Units	Resid. Bldg. Area	Resid. Constr. $	$ / Unit	$ / SF
Single Family / Townhouse	SF-01	Dauphin	5A		14	16	15	15	60	99,625	10,419,031	173,651	105
	SF-02	Lebanon	5A		9	32	14		55	78,627	8,446,000	153,564	107
	SF-03	Lycoming	5A		20	40			60	82,730	9,436,382	157,273	114
	SF-04	Columbia	5A			7	17		24	48,499	5,669,777	236,241	117
	SF-05	Philadelphia	4A		5	19	31	5	60	79,795	9,739,093	162,318	122
	SF-06	Wyoming	5A			30	12		42	72,100	9,168,380	218,295	127
	SF-07	Erie	5A		8	20	18		46	85,819	10,964,900	238,367	128
	SF-08	Lancaster	5A		6	33	21		60	78,825	10,259,118	170,985	130
	SF-09	Cumberland	5A			18	34		52	75,275	9,921,606	190,800	132
	SF-10	Centre	5A		6	24	18		48	75,737	10,193,457	212,364	135
	SF-11	Lehigh	5A		19	27	16		62	71,254	9,631,860	155,353	135
	SF-12	Lancaster	5A		41	79	18		138	154,370	21,137,388	153,169	137
	SF-13	Erie	5A			9	31		40	53,454	7,870,669	196,767	147
	SF-14	Montgomery	4A			19	29		48	59,976	8,858,000	184,542	148
	SF-15	Lebanon	5A			49	13		62	82,974	12,349,192	199,181	149
	SF-16	Cumberland	5A			10	30	10	50	72,707	10,865,524	217,310	149
	SF-17	Schuylkill	5A		1	11	5		17	21,544	3,225,548	189,738	150
	SF-18	Berks	5A		10	21	11		42	57,722	8,755,000	208,452	152
	SF-19	Berks	5A		22	20	16		58	62,097	9,440,383	162,765	152
	SF-20	Franklin	5A		6	21	21		48	66,583	10,404,256	216,755	156
	SF-21	Lehigh	5A		9	15	20	4	48	53,333	8,377,963	174,541	157
	SF-22	Chester	4A		19	18	11		48	58,541	9,248,927	192,686	158
	SF-23	Cumberland	5A		5	22	8		35	44,186	7,656,200	218,749	173
	SF-24	Montgomery	4A		8	21	15	6	50	65,907	11,589,411	231,788	176
	SF-25	Allegheny	5A		35	16	14		65	87,255	15,376,648	236,564	176
	SF-26	Delaware	4A		8	34	14		56	65,212	11,914,849	212,765	183
	SF-27	Philadelphia	4A			17	16	2	35	45,476	9,441,620	269,761	208
	SF-28	Armstrong	5A			24			24	28,812	6,017,450	250,727	209
	SF-29	Philadelphia	4A			28	14		42	47,964	10,022,268	238,625	209
	SF-30	Philadelphia	4A		11	10	11		32	31,619	6,732,433	210,389	213
	SF-31	Philadelphia	4A		8	19	24	4	55	66,383	19,011,723	345,668	286
	SF-32	Philadelphia	4A	45					45	23,302	7,408,602	164,636	318
Adaptive Reuse Bldgs.	AR-01	Monroe	5A		36	4			40	54,215	5,753,672	143,842	106
	AR-02	Luzerne	5A	6	54	2			62	88,489	9,900,711	159,689	112
	AR-03	Philadelphia	4A	12	54				66	77,978	10,123,117	153,381	130
	AR-04	Allegheny	5A		33	8			41	70,409	9,181,888	223,948	130
	AR-05	Butler	5A		44	18			62	73,114	10,046,992	162,048	137
	AR-06	Washington	5A		24				24	41,046	6,169,663	257,069	150
	AR-07	Allegheny	5A	2	49	4			55	65,190	10,592,039	192,583	162
	AR-08	Delaware	4A		50				50	50,548	8,727,828	174,557	173
	AR-09	Philadelphia	4A		60				60	65,041	11,803,992	196,733	181
	AR-10	Philadelphia	4A		74				74	93,285	20,223,060	273,285	217
	AR-11	Philadelphia	4A	20	37				57	63,960	14,005,881	245,717	219
	AR-12	Perry	5A		28	3			31	36,152	8,548,665	275,763	236
Multi-Story / Elevator Buildings	MS-01	Berks	5A		40	20			60	62,149	7,432,636	123,877	120
	MS-02	Tioga	6A		34	6			40	48,735	5,999,734	149,993	123
	MS-03	Dauphin	5A		35	2			37	43,964	5,421,065	146,515	123
	MS-04	Bradford	5A		38	12	6		56	63,768	8,446,000	150,821	132
	MS-05	Lancaster	5A		46	6			52	92,370	12,565,629	241,647	136
	MS-06	Fayette	5A		12	12			24	28,904	3,942,323	164,263	136
	MS-07	Cambria	5A		32	11			43	49,491	6,879,001	159,977	139
	MS-08	Clearfield	6A		24	6			30	41,915	5,855,263	195,175	140
	MS-09	Chester	4A		56	3			59	64,180	9,033,100	153,103	141
	MS-10	Centre	5A		16	34			50	60,912	8,666,068	173,321	142
	MS-11	Clinton	5A		28	4			32	37,454	5,333,806	166,681	142
	MS-12	Allegheny	5A		24	12	13		49	67,340	9,698,634	197,931	144
	MS-13	Luzerne	5A		32	3			35	44,543	6,503,636	185,818	146
	MS-14	Dauphin	5A		20				20	19,157	2,803,860	140,193	146
	MS-15	Butler	5A		68				68	66,845	9,821,302	144,431	147
	MS-16	Westmoreland	5A		15	13	8		36	46,095	6,855,424	190,428	149
	MS-17	Lackawanna	5A		12	12	8	4	36	50,019	7,560,000	210,000	151
	MS-18	Northumberland	5A		32				32	38,240	5,789,694	180,928	151
	MS-19	Centre	5A		37	11			48	57,959	8,781,136	182,940	152
	MS-20	Lackawanna	5A		44	4			48	49,460	7,493,999	156,125	152
	MS-21	Allegheny	5A		30	34			64	69,605	10,837,117	169,330	156
	MS-22	Dauphin	5A		43	11			54	51,319	8,411,465	155,768	164
	MS-23	Montgomery	4A		60				60	58,681	9,643,959	160,733	164
	MS-24	Adams	5A		39	4			43	50,532	8,515,443	198,034	169
	MS-25	Clarion	5A		48				48	53,668	9,090,720	189,390	169
	MS-26	Allegheny	5A		40	6			46	56,969	10,124,143	220,090	178
	MS-27	Allegheny	5A		28	8			36	42,500	7,582,274	210,619	178
	MS-28	Chester	4A		47	13			60	61,551	10,982,435	183,041	178
	MS-29	Delaware	4A		38	3			41	47,797	8,539,207	208,273	179
	MS-30	Allegheny	5A		52	8			60	63,861	11,647,354	194,123	182
	MS-31	Philadelphia	4A		37	44			81	93,000	17,635,125	217,718	190
	MS-32	Crawford	5A		36	4			40	38,953	7,552,475	188,812	194
	MS-33	Westmoreland	5A		47				47	49,080	9,801,657	208,546	200
	MS-34	Bucks	4A		56	10			66	61,576	12,448,922	188,620	202
	MS-35	Lycoming	5A		23	11			34	35,437	7,169,151	210,857	202
	MS-36	Philadelphia	4A		61				61	60,137	12,416,322	203,546	206
	MS-37	Bradford	5A		40	10			50	56,580	11,852,026	237,041	209
	MS-38	Philadelphia	4A		58	4			62	57,653	12,079,768	194,835	210
	MS-39	Philadelphia	4A		52				52	46,619	9,903,739	190,457	212
	MS-40	Philadelphia	4A	60					60	56,672	12,174,301	202,905	215
	MS-41	Philadelphia	4A		45				45	48,351	10,464,750	232,550	216
	MS-42	Montgomery	4A		50				50	42,265	9,236,729	184,735	219
	MS-43	Allegheny	5A		29	4			33	37,592	8,284,054	251,032	220
	MS-44	Philadelphia	4A		46	4			50	46,640	10,701,164	214,023	229
	MS-45	Philadelphia	4A		53				53	50,312	11,711,200	220,966	233
	MS-46	Philadelphia	4A		34	11			45	42,520	10,560,747	234,683	248
	MS-47	Philadelphia	4A		24				24	24,284	6,040,593	251,691	249
	MS-48	Philadelphia	4A		60				60	65,340	17,249,402	287,490	264
	MS-49	Luzerne	5A		36				36	27,296	7,653,000	212,583	280
	MS-50	Philadelphia	4A		48				48	46,000	12,915,822	269,080	281

YEAR 2 ***of The PHFA Project: A NATIONAL Net-Zero-Energy Initiative by*** **2030**

2016

ONION FLATS

Pennsylvania

94 Projects applied, 27 as Passive House projects

YEAR 2 ***of The PHFA Project: A NATIONAL Net-Zero-Energy Initiative by 2030***

2016

THE PHFA PROJECT

10 PH projects awarded Average = **$167/sf**

33 NON-PH projects awarded Average = **$168/sf**

YEAR 2 *of* ***The PHFA Project****: A NATIONAL Net-Zero-Energy Initiative by* ***2030***

2016

THE PHFA PROJECT

10 PH projects awarded **Average = $167/sf**

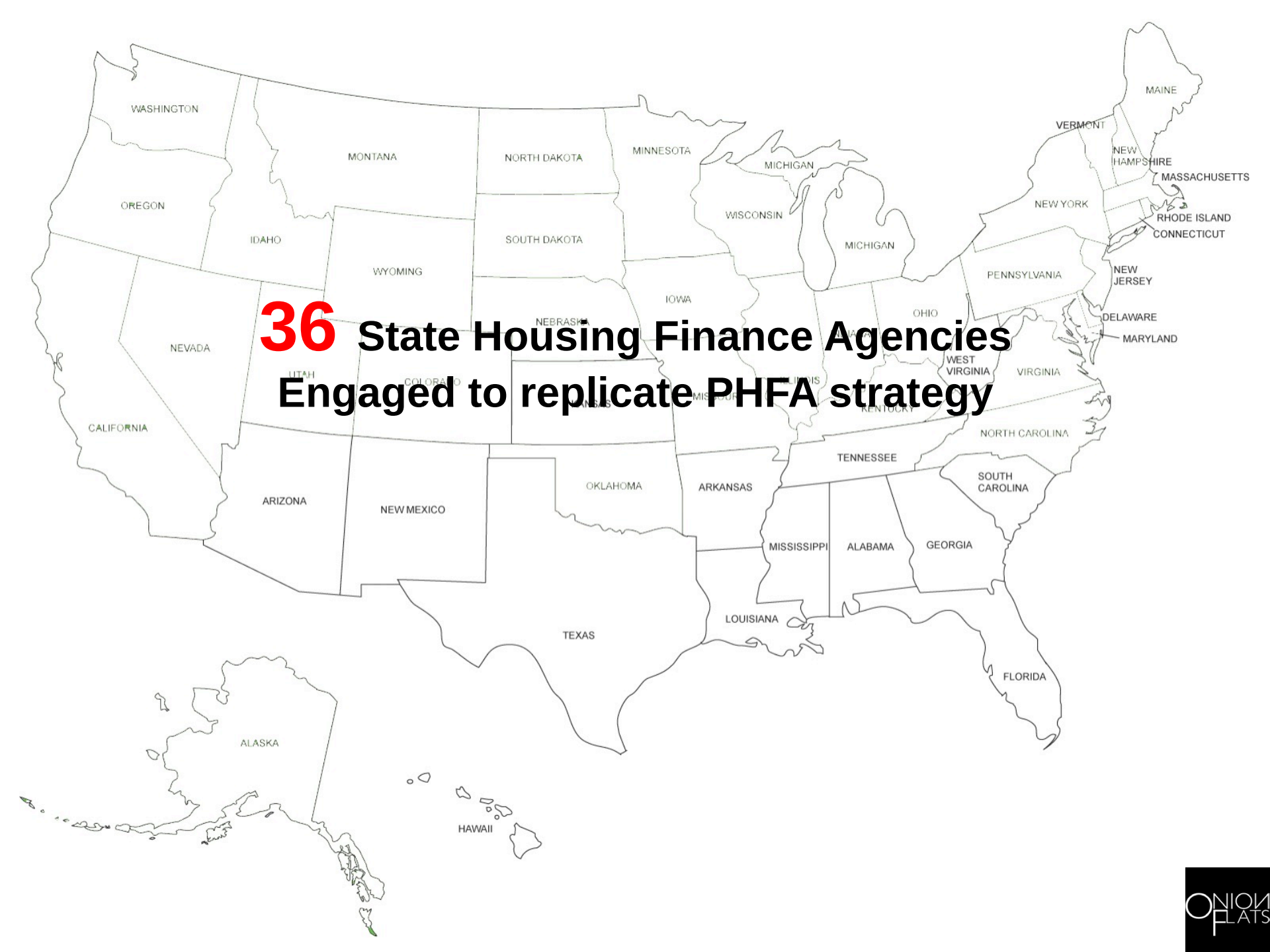
507

New PH/Net-Zero-Energy Capable units in PA

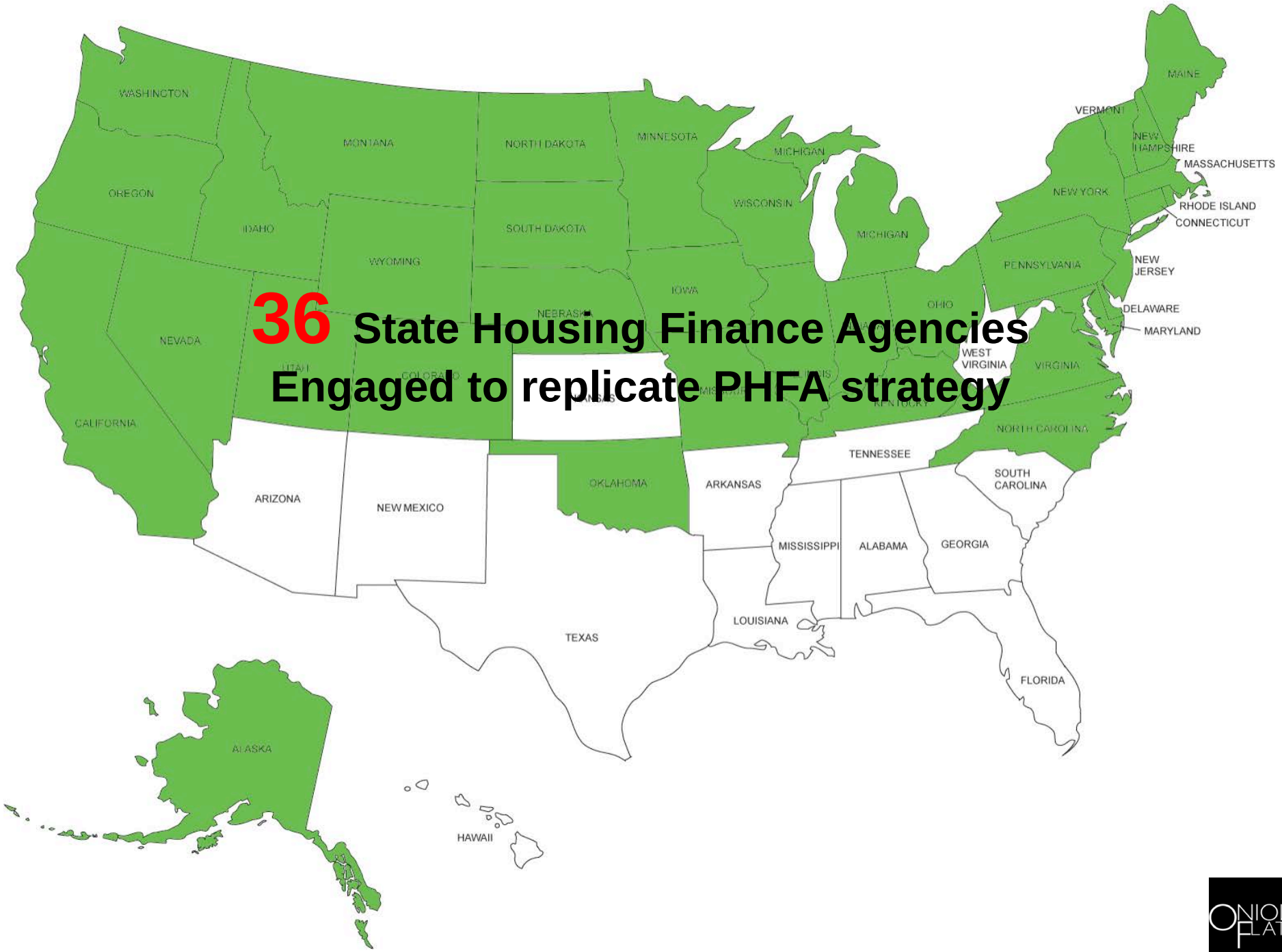
YEAR 2 ***of The PHFA Project: A NATIONAL Net-Zero-Energy Initiative by*** ***2030***

2016


WASHINGTON
OREGON
CALIFORNIA
IDAHO
NEVADA
MONTANA
WYOMING
UTAH
ARIZONA
COLORADO
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
WISCONSIN
ILLINOIS
MICHIGAN
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA
GEORGIA
FLORIDA
SOUTH CAROLINA
NORTH CAROLINA
VIRGINIA
WEST VIRGINIA
PENNSYLVANIA
NEW YORK
MAINE
VERMONT
NEW HAMPSHIRE
MASSACHUSETTS
RHODE ISLAND
CONNECTICUT
NEW JERSEY
DELAWARE
MARYLAND
ALASKA
HAWAII



36 State Housing Finance Agencies Engaged to replicate PHFA strategy


36 State Housing Finance Agencies
Engaged to replicate PHFA strategy
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CALIFORNIA
NEVADA
IDAHO
MONTANA
WYOMING
UTAH
COLORADO
ARIZONA
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
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GEORGIA
FLORIDA
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NORTH CAROLINA
VIRGINIA
WEST VIRGINIA
PENNSYLVANIA
NEW YORK
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REAL ESTATE

World's Tallest Passive House Breaks Ground on Roosevelt Island

By ALISON GREGOR JUNE 12, 2015

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ME AND EARL AND THE DYING GIRL

An apartment tower on Roosevelt Island that began construction this month will be the tallest passive-house high-rise in the world when it is completed in 2017, according to the Passive House Institute in Germany. And at about 270,000 square feet, it will also be the largest, said David Kramer, a principal with Hudson Companies, which is developing the building in partnership with Cornell Tech, the applied sciences campus of Cornell University, and the Related Companies.

The tower will rise 270 feet, contain 350 units and house about 530 graduate students, faculty and staff on a new 12-acre campus for Cornell Tech, which has been operating out of temporary facilities in the Google building in Chelsea since 2012. And because the building

Ground has been broken for a passive-house apartment tower on the Cornell Tech campus on Roosevelt Island. Ruth Fremson/The New York Times

Development team picked for largest Passive House project in North America

The 24-story curved building would be 70% more efficient than comparable housing in New York City.

GREEN | MAY 16, 2016 | JOHN CAULFIELD, SENIOR EDITOR

A 24-story building with 241 affordable housing units will include a charter school, medical center, cultural spaces, and a supermarket. Image: Dattner Architects

A 24-story, 300,000-sf building that is being dubbed the largest residential Passive House project in North America will rise on the former site of a public school in the Mott Haven section of The Bronx, New York.

What is Passive House?

A building constructed to "Passive House" standards must meet strict energy efficiency criteria for its insulation, space heating and cooling, and primary energy demand within the building. These standards require minimizing heating and cooling loads through substantial insulation; the "passive" use of solar heat and internal heating sources, such as people and electrical equipment, to heat the building; solar shading to cool the building; and heat recovery systems for space heating. Because the building is essentially airtight, a continuous supply of low volume filtered fresh air must also be supplied to living and working spaces, and stale air regularly exhausted from spaces with high-efficiency heat exchange to minimize heating losses.

Passive House standards can be applied to both new construction and renovations. For the renovation of existing buildings, the performance standard is slightly more lenient, but still results in a roughly 90 percent reduction in average heating and cooling energy usage and up to a 75 percent reduction in primary energy usage. A Passive House building can also be any type of building, including an apartment building, a school, an office building, a factory, a supermarket, or a single-family house.

Case Study: Knickerbocker Commons Affordable Housing

803 Knickerbocker Avenue, Brooklyn
Architect: Chris Benedict, R.A.
Owner: Ridgewood Bushwick Senior Citizen's Council
General Contractor: Galaxy Construction
Construction Cost: $180/square foot
No. of Units: 24

Knickerbocker Commons, the first mid-sized apartment building designed to Passive House standards in the United States

Knickerbocker Commons, a six-story residential building containing 24 units of affordable housing, is the country's first mid-sized apartment building to conform to Passive House design standards. To achieve the strict Passive House standards, each rental unit in Knickerbocker Commons has its own ventilation system and small radiators for heating and airtight window air conditioning units for cooling. In addition, the building features triple-paned windows and a sculpted exterior that shade windows from the sun in the summer and maximize exposure in the winter. According to the project's architect, Chris Benedict, the building will use 85 percent less energy than is typically required to heat a New York City apartment building in the winter.

The apartment is located in the Bushwick neighborhood of Brooklyn and was developed through HPD's Low Income Rental Program. Of the 24 units, six units will be rented to households earning up to 30 percent of Area Median Income (AMI), five units will be rented to households earning up to 50 percent of AMI, 12 units will be rented to households earning up to 60 percent of AMI, and one unit will be set aside for a building superintendent. In addition to the residential units, the project includes almost 5,000 square feet of community facility space.

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White House Announces Passive House Initiative

President Obama has announced a comprehensive plan to bring renewable energy and energy efficiency to households across the U.S. Among the initiatives just announced is the establishment of a Passive House track by New York State Homes and Community Renewal (HCR)…"to encourage a significant increase in the energy efficiency of New York's affordable housing stock". The White House **press release** goes on to say:

> "HCR intends to work closely with NYSERDA to monitor the ongoing energy use intensity of any Passive House projects tha may be selected for funding under the RFP, in order to provide valuable data to the market to accelerate the trend toward construction of Passive House certified affordable multifamily buildings."

The HCR request for proposals can be found **here**. Passive House is referenced under the section "c. Optional Green Building Program Participation (5points)" starting on page 58, along with Enterprise Green Communities, LEED, and the National Green Building Standard. It states:

> Passive House Institute Certification:
>
> Projects may qualify in either the Passive House Institute US (PHIUS), or the International Passive House Institute (iPHI) programs. Certification shall be obtained under PHIUS+ 2015 Passive Building Standard – North America, or newer, based on the construction timeframe, or certified under iPHI protocols. The applicant shall submit a form of a receipt from PHIUS or iPHI that the project was accepted into their program, or submit a letter of agreement between the applicant and a PHIUS or iPHI certified Passive House consultant or designer (CPHC or CPHD) that includes oversight of the design and construction as necessary for pre-certification and final certification. The letter of agreement must be fully executed by the applicant and the CPHC or CPHD, and accompanied with the CPHC's or CPHD's certification from the US or International Passive House Institute. Final closeout of the project shall be contingent upon final certification from PHIUS or iPHI that their standard was met.

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(1) Enterprise Green Communities, Mandatory + 35 optional points or higher;
(2) Leadership in Energy and Environmental Design (LEED), Silver or higher;
(3) National Green Building Standard (NGBS), Silver or higher;
(4) Climate Choice Homes Program/Energy Star Tier 3 Participation; ~~Achievement of a Final HERS Index of 45 or below for each unit.~~
(5) Living Building Challenge; or
(6) Passive House

Alternatively, for three points, applicants may select one of the following green building options:

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Weinberg Commons: PH Retrofit
Southern Ave. + Benning, DC

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13. Net Zero Energy and Living Building Challenge Preference (Maximum 5 points)
Preference points will be awarded projects that go beyond the minimum threshold Green Building Act requirements and commit to achieving specific certifications defined below. Any project claiming this preference must demonstrate the capacity and experience to achieve certification, and the architectural plans and project budgets (development and operating) submitted in the application must reflect the commitment to certification.

- **3 points = Nearing Net Zero**. Three prioritization scoring points will be awarded to project teams pursing 2015 Enterprise Green Communities Criteria (GCC) that demonstrate that they will meet 2015 GCC 5.2b Advanced Certification: Nearing Net Zero. Project teams must demonstrate that they are pursuing these points with Enterprise and plan to certify with Passive House Institute US (PHIUS), Living Building Challenge Net Zero Energy Building Certification, or DOE Zero Energy Ready Home. All project teams pursuing these points must also incorporate solar photovoltaics in their project and maximize their rooftop generation potential to the maximum extent as allowable by District codes and regulations.

DCHD: DC Dept. of Housing and Community Development

COMMITTED: PH introduced to QAP in April 2016

ONION FLATS

e.2. Passive House Design

Points
6

Points may be awarded for projects designed to meet Passive House standards. Submit plans and specifications at a level of 40% or higher with detailed wall sections, a detailed scope of Passive House design measures prepared by a Certified Passive House Consultant or Designer in coordination with the Project Architect, and a preliminary modeling anaylsis/output report through the PHPP (Passive House Planning Package) as developed by the Passive House Institute (PHI) http://passiv.de or WUFI Passive as developed by the Passive House Institute United States (PHIUS) www.phius.org indicating that preliminary data meets Passive House criteria.

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Rhode Island Housing
working together to bring you home

STATE OF RHODE ISLAND

2016 QUALIFIED ALLOCATION PLAN

EFFICIENCY

Up to 3 points may be awarded to those developments that exceed Energy Star Version 3.1 Version 8 Program Standards or meet Passive House Certification (nationally or internationally) for energy efficiency. See Design and Construction Guidelines and www.passivehouse.us or http://passiv.de/en/ for additional guidance.

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"We are creating a pilot program in 2016 in which we will choose 10 PROJECTS that will achieve EGC + Passive House…..we will pick up soft costs and cost increases in order to clearly examine the cost of Net-Zero….." Mass Housing, 10/7/15

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"We propose recognizing the Passive Housing model as an option for obtaining points under 'Exceptional Development: Creative Design' category….." OHFA, 9/24/15

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2016-2017
Qualified Allocation Plan

B) Energy Efficiency and Sustainability

1) Green Initiative Standards

Projects whose architectural design and construction meet or exceed green initiative standards, evidenced through submission of the Scoring - Green Initiatives Certification, available on the Website, can earn up to three (3) points as follows:

Points	Green Initiative
1	• Commit to obtaining EPA Energy Star certification **–or-** • Minimum 10% improvement for new construction (5% for rehab) above ASHRAE 90.1 2010 proven by a completed energy model, **-or-** • HERS rating of 75 or lower
2	Commit to obtaining a sustainable building certification from one of the following: • U.S. Green Building Council LEED certification **-or-** • Enterprise Green Communities 2015 certification **-or-** • ICC 700 National Green Building Standard certification **-or-** • Passive House Certification through PHIUS or PHI
3 **2) 2)** **Reh**	Meet minimum standards in the Authority Standards for Architectural Planning and Construction indicated for water conserving fixtures; and Commit to obtaining a sustainable building certification from one of the following: • Certification through Living Building Challenge **–or-** • Alternative certification for a high performance building achieving 'Net Zero Capable' s atus as approved by the Authority.

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Idaho Housing and Finance Association

Developments which incorporate the following optional "green building" certifiable program standards or items into their design. max 8

To receive points in this category, a licensed architect's "preliminary" certification that lists the standards or items to be incorporated must accompany the application (See Exhibit C-2 for required format). At placed in service, an "as built" certification by a licensed architect that lists the incorporated standards or items will be required along with official program certification, if applicable. (See Exhibit D-2 for required format.)

NOTE: The intent is that all code and standards cited are the most current versions.

LEED for Homes 8
NW Energy Star..... 8
ICC 700 National Green Building Standard..... 8
Enterprise Green Communities..... 8
Indoor Air Plus..... 8
Passive House US (PHIUS) or Passive House Institute (PHI).....8

….19 ON THEIR WAY!!

….19 ON THEIR WAY!!

MAINE

BANGOR DAILY NEWS

Brewer's 'passive housing' project largest of its kind in US

Courtesy of Community Housing of Maine

A 48-unit passive housing project is in the works at the former State Street School site in Brewer.

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MAINE
VERMONT

Groundbreaking for first Multifamily LIHTC Passive House

May 2, 2016

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MARYLAND
KENTUCKY

Kentucky Housing Corporation
VERY INTERESTED: Lecture Oct 4, 2016

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Green Building News

Up-to-date reports from GBA's news department

Passivhaus Apartment Complex Would be a Giant

0 Helpful?

Scheduled to begin construction in October, this 276-unit multifamily project in Kansas City will seek certification from PHIUS

POSTED ON SEP 16 2015 BY SCOTT GIBSON

When ready for occupancy in early 2017, the 276-unit riverfront apartment complex would be the largest Passivhaus-certified building in the country and, according to its developer, help Passivhaus construction shed its "boutique" status and begin to interest big institutional investors.

The "Second and Delaware" project, named for its location in a historic warehouse district just north of downtown Kansas City, will include a range of apartment sizes, from 550-square-foot studios to 1,300-square-foot, two-bedroom models. It also will feature rooftop gardens and an underground 500-vehicle parking garage.

Image 1 of 2

This illustration shows a proposed 276-unit apartment complex in Kansas City. Once built and certified, it would become the largest Passivhaus building in the country. Developers hope to open the doors to tenants in 2017.

The $60 million project is the work of the Arnold Development Group, which hopes to show that projects that are good for the environment and for the people who live in them also can have an attractive bottom line. It would dwarf what is now the largest Passivhaus project in North America, the 57-unit Orchards at Orenco project in Hillsboro, Oregon.

Largest PH multi-family housing project in country underway

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STATISTICS

37,500 GSF
4 STORIES

60 STUDIO UNITS (325NSF)
- SUPPORTIVE HOUSING SERVING THE FORMERLY HOMELESS OR THOSE AT RISK OF HOMELESSNESS
- SINGLE OCCUPANT UNITS

Wisconsin Housing and Economic Development Authority

New QAP in June 2017, working with team on PH info

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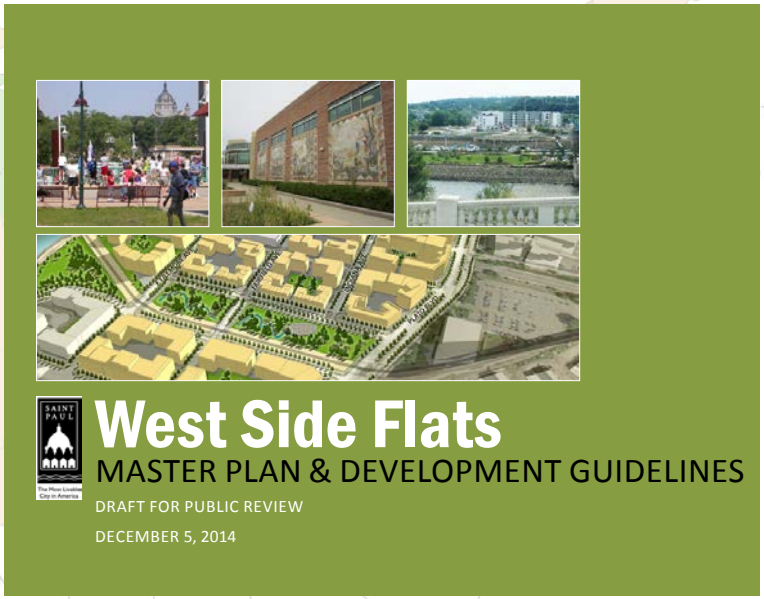

Minnesota Housing Finance Agency

QAP discussions informed by large PH projects

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WASHINGTON

Washington State Housing Finance Commission

Presentation June 25, 2015; VERY INTERESTED; 2017 QAP in Spring

Presenting at Oct 5, 2016 23rd Annual Housing Conference in Tacoma

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OREGON

This Is The Largest Passive House Building In The US

November 19th, 2014 by Steve Hanley

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Building Code Revision Launches California Toward Zero Net Energy Buildings

Bill Roth | Monday November 11th, 2013 | 2 Comments

Starting in 2014, California is implementing a tsunami of building code revisions called Title 24. These revised building codes will move California's residential and commercial buildings toward Zero Net Energy (ZNE). In a ZNE building, the annual energy consumption is equal to its annual production of renewable energy. Under Title 24, all new residential construction is to be ZNE by 2020 with all new commercial buildings achieving this ZNE goal by 2030.

Title 24 moves building design toward "comprehensive building solutions." This building design approach first focuses upon reducing energy consumption through the integration of smart and energy efficient technologies. The final design step after reducing the building's energy consumption is to install onsite renewable ener generation like solar panels.

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Business

Developer plans new Anchorage housing that will produce more energy than it uses

Sean Doogan | Alaska Dispatch News | January 11, 2015

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An Alaska design and architectural firm is partnering with a nonprofit housing agency to design and erect a building that gives more than it takes.

The building, planned for 2 acres on Muldoon Road near its intersection with the Glenn Highway, would be home to 20 apartments for low-income families and residents with disabilities. If the architect and designers have their way, the multifamily housing unit will produce more energy than it consumes and use on-site water and sewer reclamation systems.

RurAL CAP plans to expand its Safe Harbor project for low-income housing with apartments at the location of the former How-How restaurant on Muldoon Road.
McCool Carlson Green illustration

RELATED:

New 'super-insulated' homes rising across Alaska's North Slope

Anchorage attracting new retailers despite big downturn in state revenue

Nonprofit RurAL CAP runs a housing program called Safe Harbor, providing housing to Anchorage residents with very low incomes. The new ultra energy-efficient units are set to be built next door to an existing 50-unit complex inside the old Ramada Inn on Muldoon Road. Managers there say that without the housing they provide to people who are at least 50 percent below the median income level (about $51,000 per year for a family of four), most of the families would be homeless. Many current Safe Harbor residents were homeless before finding housing with RurAL CAP, according to the agency; dozens more low-income Anchorage families are on a waiting list for affordable housing.

Alaska Corporation for Affordable Housing

INTERESTED; Waiting to see costs from PHFA Projects

ONION FLATS

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AFFORDABLE HOUSING

AFFORDABLE HOUSING

Architects, Engineers, Builders

THE PHFA PROJECT

AFFORDABLE HOUSING

↑ ↑

Architects, Engineers, Builders

↓ ↓

MARKET-RATE HOUSING

THE PHFA PROJECT

Catalyst for radical and significant transformation of the HOUSING INDUSTRY…..

AFFORDABLE HOUSING

↑ ↑

Architects, Engineers, Builders

↓ ↓

MARKET-RATE HOUSING

RADICAL

AFFORDABLE

SCALABLE

NET-ZERO-ENERGY-CAPABLE

RADICALLY

STANDARD

THANK
YOU

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