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The Wells Fargo logo consists of a solid red square with the words "WELLS" and "FARGO" stacked vertically in a bold, yellow, sans-serif font.

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[housingconference.uli.org](http://housingconference.uli.org)

July 13-15, 2015  
Hyatt Regency  
Minneapolis, MN



# Net Zero: Myth and Reality

9:45 a.m. – 11:00 a.m.

*Moderator*

**Sarene Marshall**

Executive Director, Center for Sustainability, Urban Land Institute

*Discussion Leaders*

**Gina Ciganik**

Vice President, Housing Development, Aeon

**Sunshine Mathon**

Director, Design and Development, Foundation Communities

**Timothy McDonald**

Associate Professor, Practice in Architecture, Temple University, and President, Onion Flats, LLC

**Hillary Noll**

Enterprise Rose Architectural Fellow, First Community Housing

**#HousingOpp2015**



Homes for Generations

Gina Ciganik

Vice President – Housing Development



AEON SOUTH QUARTER: THE ROSE  
FINAL EXTERIOR RENDERINGS  
01.24.2014

MSR

710 South 2nd Street, 8th Floor  
Minneapolis, Minnesota 55401-2285

PORTLAND AVE. AND FRANKLIN AVE.  
PERSPECTIVE OF THE MAIN ENTRY FROM SOUTH EAST CORNER OF SITE

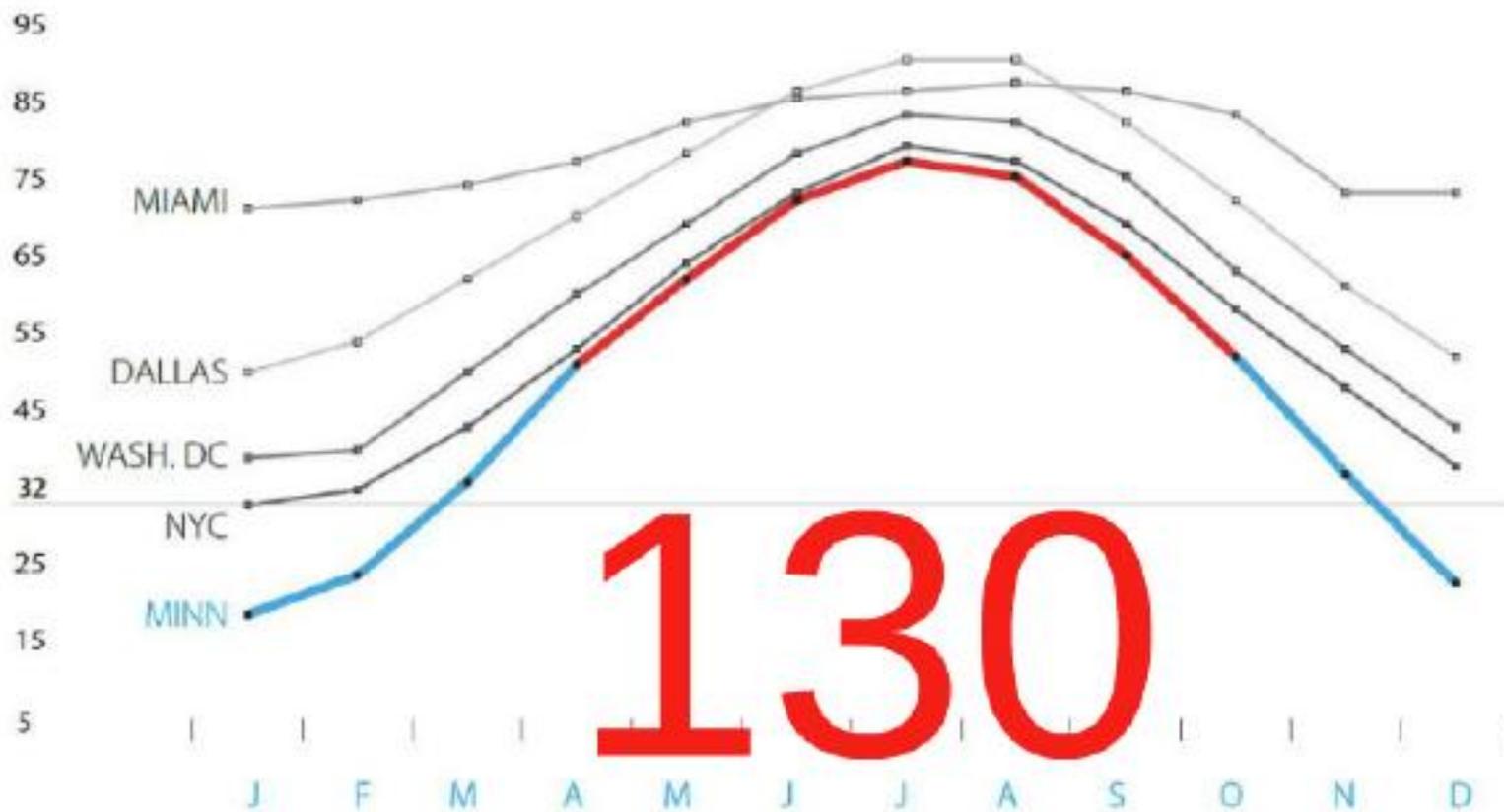


MSR  
msrdesign.com

 **aeon.**  
Homes for Generations

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Homes for Generations

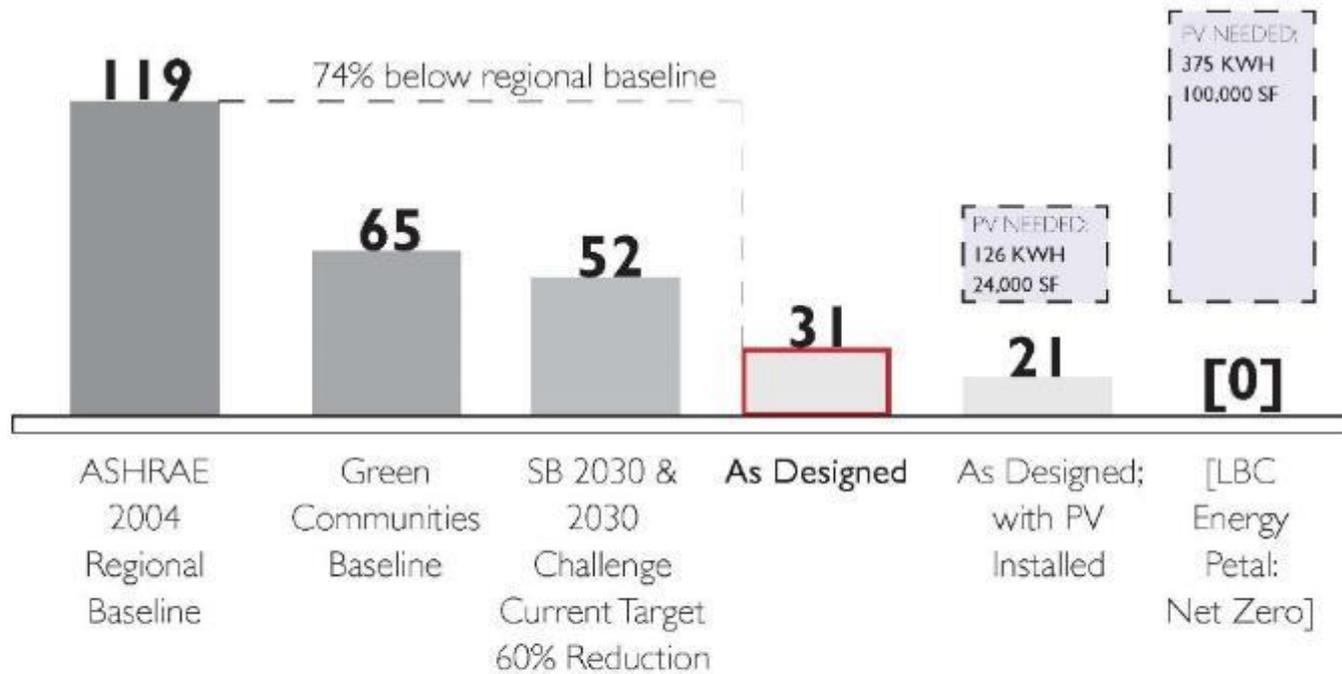
MONTHLY AVERAGE TEMPERATURE °F



# ENERGY Energy Use Intensity (EUI)

What does this add up to?

Design EUI **31** kbtu / sf / year



# Sunshine Mathon

Director, Design and  
Development,  
Foundation Communities



## M STATION

2011

150 1-, 2- and 3-bed apartments  
Learning center, preschool childcare, TOD



## ARBOR TERRACE

2012

120 efficiencies  
Deep energy rehab old motel, courtyard, 30% solar



## CAPITAL STUDIOS

2014

135 efficiencies  
Downtown, interior courtyard, solar thermal + electric



## HOMESTEAD

2015

140 1-, 2- and 3-bed apartments  
Learning center, 29-acre wooded site, solar for residents



## BLUEBONNET STUDIOS

2016

107 efficiencies  
Urban core, NZEB goal



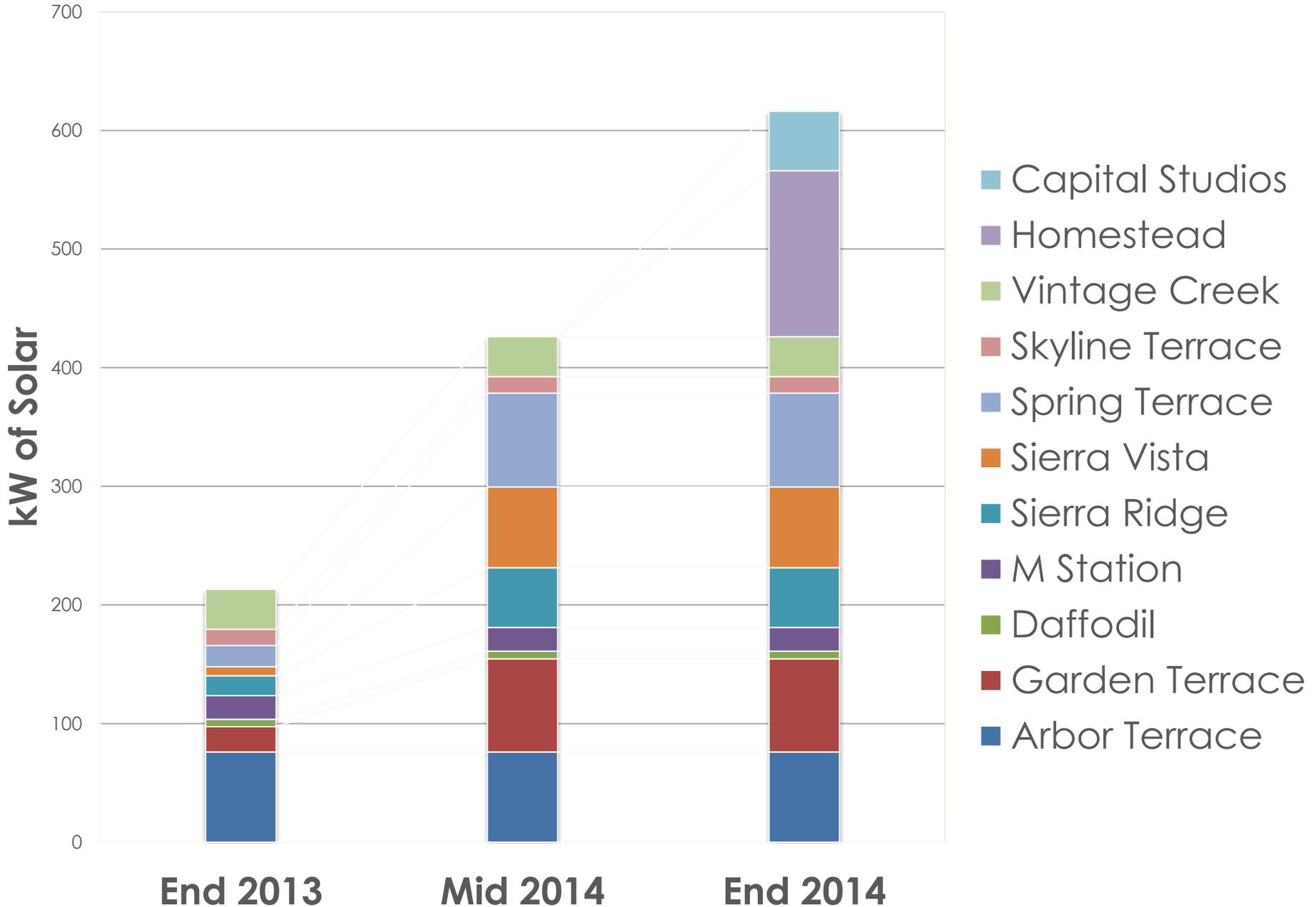
## LAKELINE STATION

2016

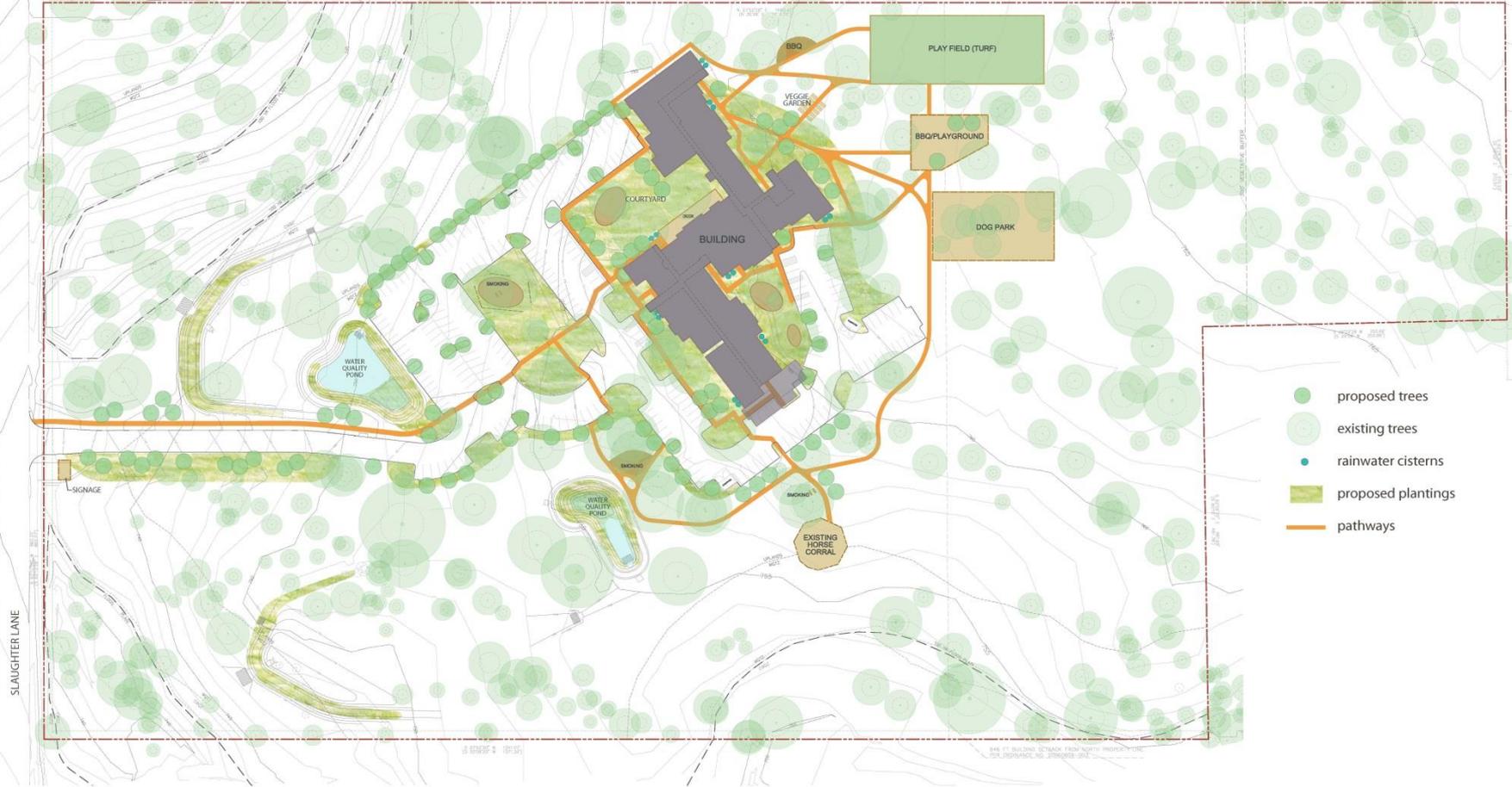
128 1-, 2- and 3-bed apartments  
Full LBC Learning Center goal, large communal green, TOD



# Foundation Communities Solar



SLAUGHTER LANE



HOMESTEAD OAKS LANDSCAPE PLAN - AMENITIES AND PATHWAYS

Scale 1" = 40' 12.16.2013



# HOMESTEAD OAKS

29-acre wooded site  
 140 one-, two- and three-bed apartments  
 Solar directly serving residents



SLAUGHTER LANE



SLAUGHTER LANE

### HOMESTEAD OAKS LANDSCAPE PLAN - AMENITIES AND PATHWAYS

Scale 1" = 40' 12.16.2013



\$\$\$ = 50% (municipal solar rebate) +  
 30% (Federal ITC via LIHTC investor) +  
 20+% (LIHTC Utility Allowance Adjustment)



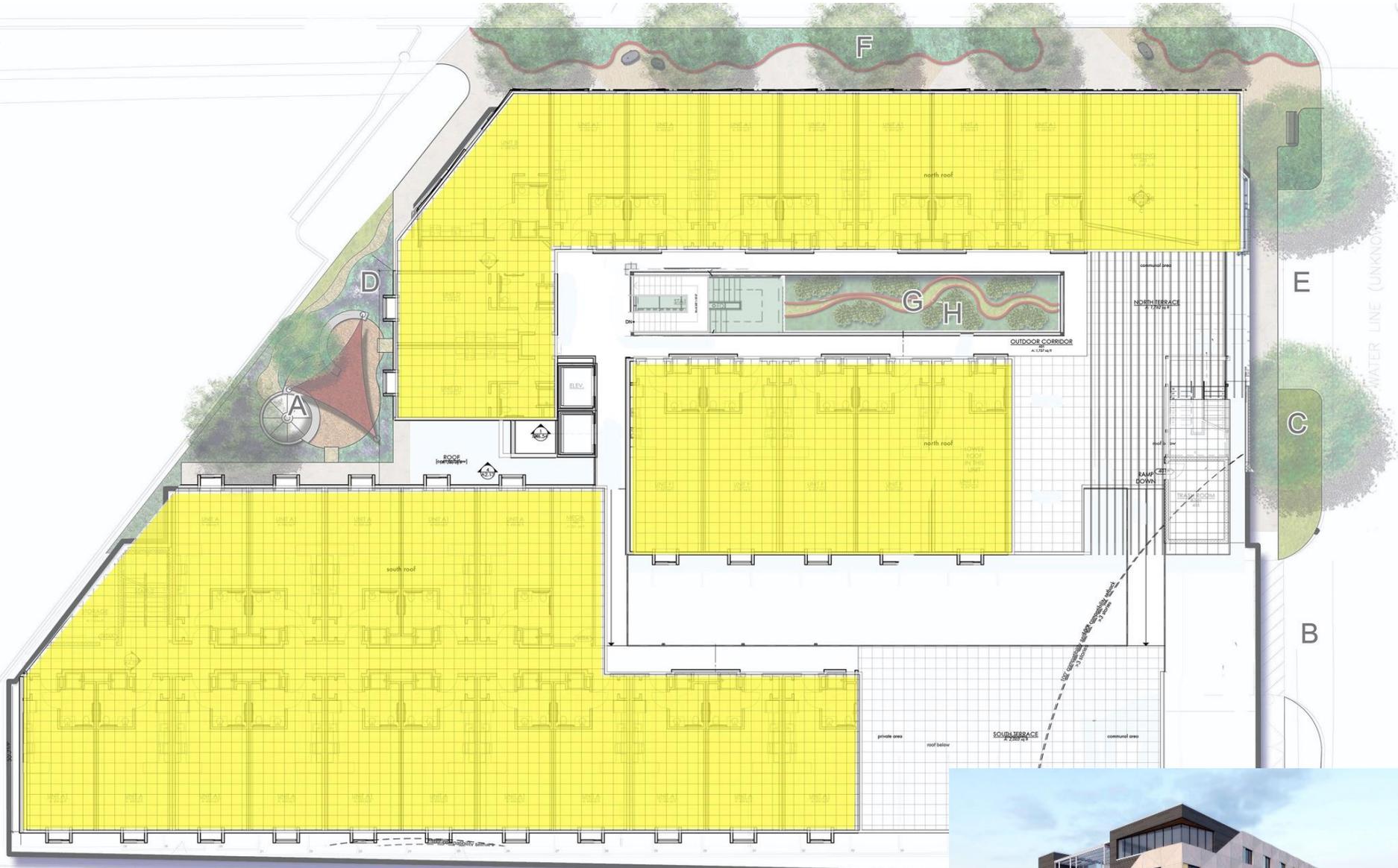
ho  
 HOMESTEAD OAKS



## BLUEBONNET STUDIOS

0.6-acre urban site  
 107 efficiency apartments  
 Net Zero goal for common area





# BLUEBONNET STUDIOS

0.6-acre urban site  
 107 efficiency apartments  
 Net Zero goal for common area



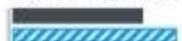
# Energy Intensity Has **Decreased** by **50%** Since 1980

## What is Energy Intensity?

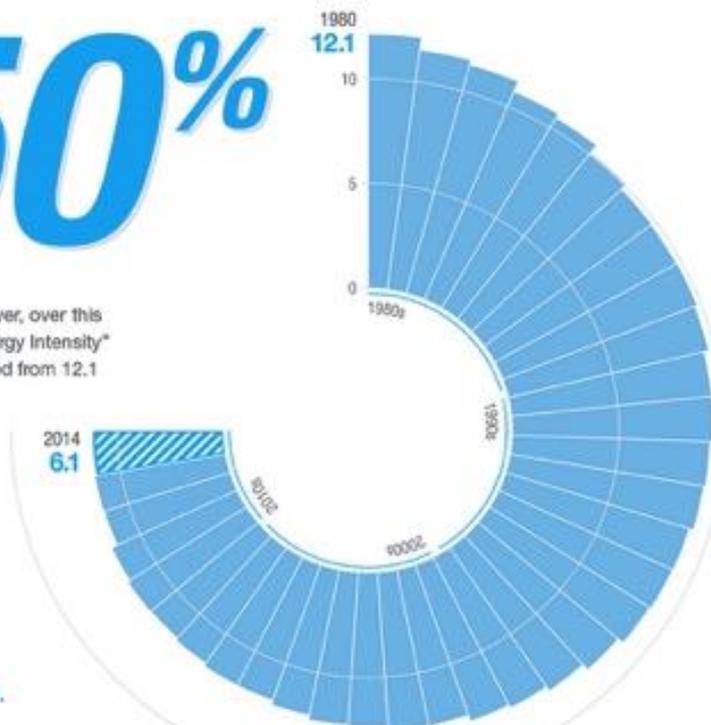
From 1980 to 2014, US energy consumption increased by **26%**. However, over this same period, US gross domestic product (GDP) increased **149%**. "Energy Intensity" is defined as energy use per real dollar of GDP. Energy intensity declined from 12.1 thousand Btu per dollar in 1980 to 6.1 in 2014.

■ 1980 ■ 2014

US ENERGY USE

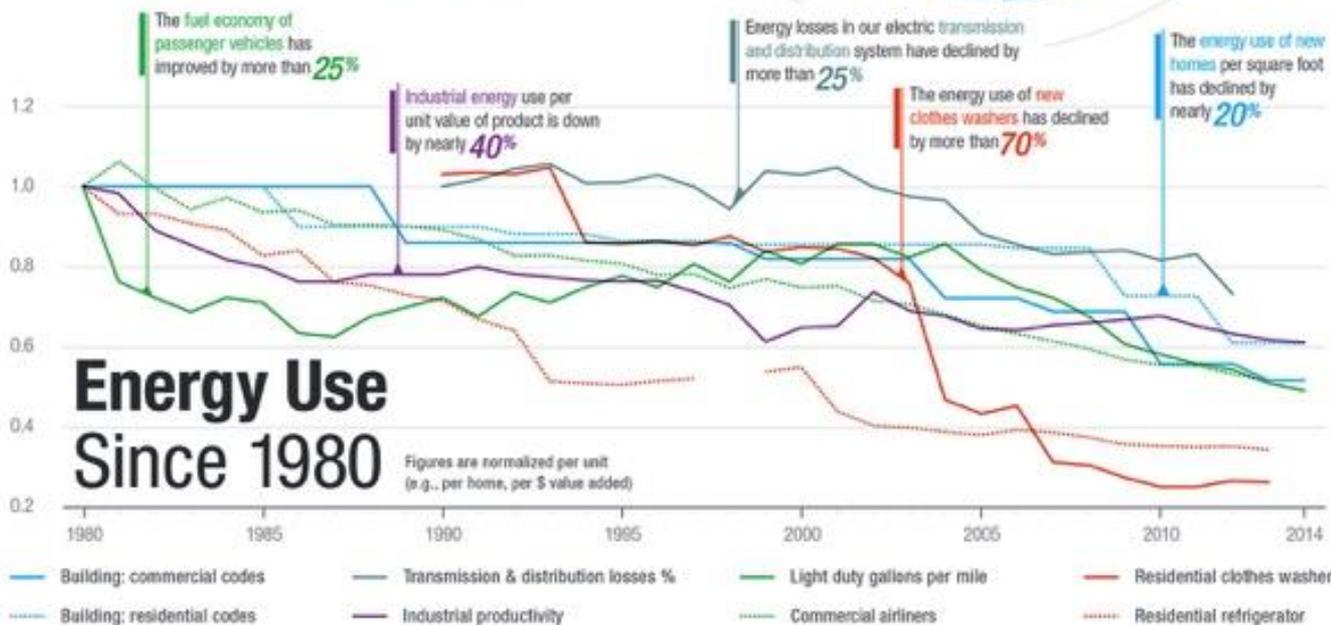


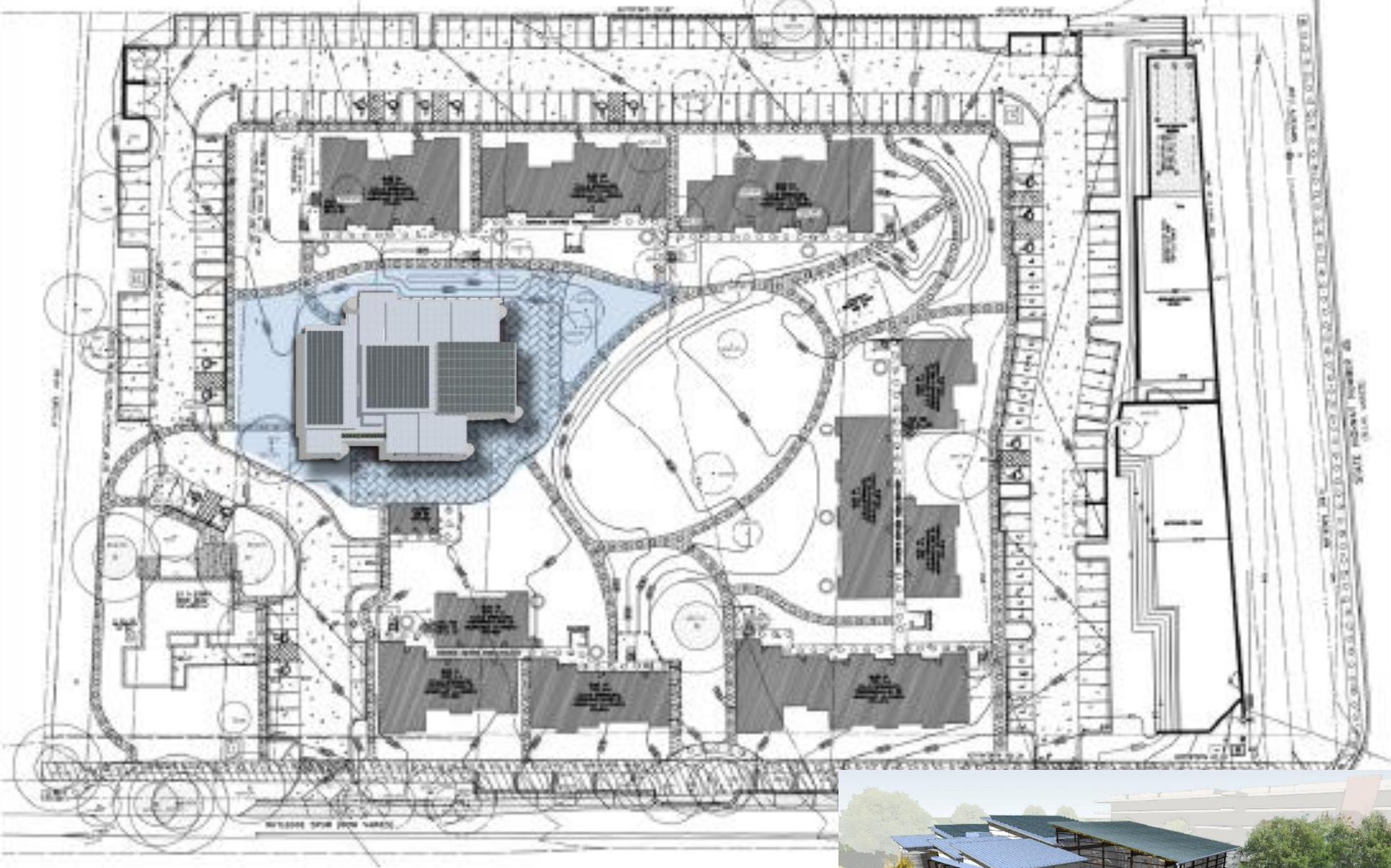
US GDP



## What does this savings mean for the US economy?

US consumers and businesses conservatively saved \$800 billion in 2014 (based on the average 2014 energy price). Dividing by the US population, **energy efficiency saved about \$2,500 per capita in 2014.**





## LAKELINE STATION

7.5-acre TOD site  
128 one-, two-, and three-bed apartments  
Solar directly to residents + Living Building Challenge Learning Center





U  
hō  
Hatch + Urban Green  
© 2011 UG 1





**M STATION**

2011

150 1-, 2- and 3-bed apartments  
Learning center, preschool childcare, TOD



**ARBOR TERRACE**

2012

120 efficiencies  
Deep energy rehab old motel, courtyard, 30% solar



**CAPITAL STUDIOS**

2014

135 efficiencies  
Downtown, interior courtyard, solar thermal + electric



**HOMESTEAD**

2015

140 1-, 2- and 3-bed apartments  
Learning center, 29-acre wooded site, solar for residents



**BLUEBONNET STUDIOS**

2016

107 efficiencies  
Urban core, NZEB goal



**LAKELINE STATION**

2016

128 1-, 2- and 3-bed apartments  
Full LBC Learning Center goal, large communal green, TOD



# Second Street Studios

Living Building Challenge  
Framework for Affordable Housing:  
A Case Study

Hilary Noll, LEED AP BD+C, Assoc. AIA  
Project Manager | Enterprise Rose Architectural Fellow

First Community Housing  
San Jose, CA



# First Community Housing

San Jose, California

Since 1986

Portfolio of 20 Properties serving families, seniors and individuals, including those with developmental disabilities, special needs and chronic illnesses.

Nearly 1400 Units primarily on infill, transit-oriented sites.



# Regenerative Healthy *Impactful* Design

Since 1986: *We design, develop and build affordable housing projects that use healthy, green materials and sustainable design to enhance the surrounding community.*

Pioneer in LEED Mid-Rise  
Platinum certification

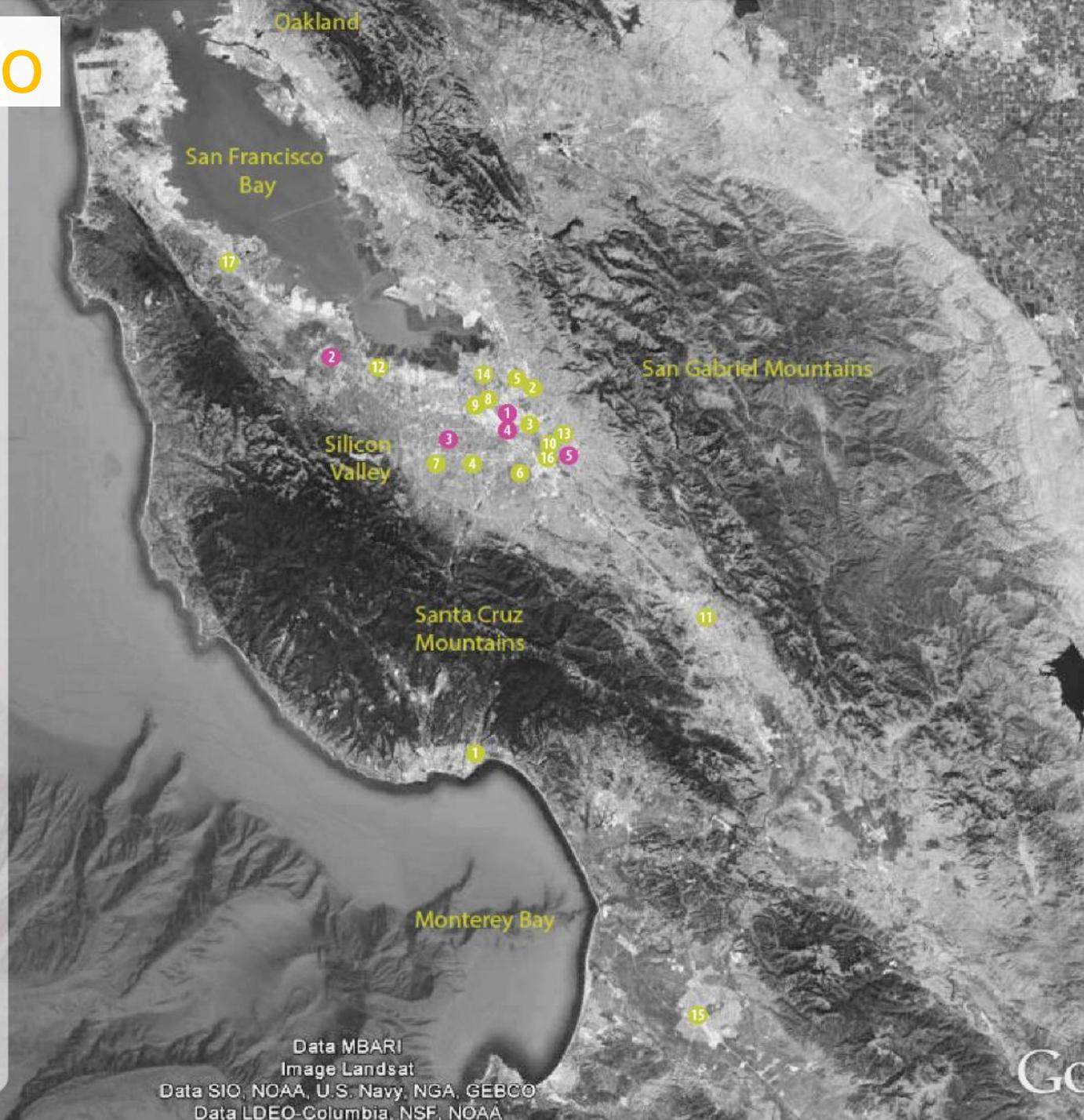


# Our Portfolio

- 1 Bay Avenue Senior Apartments
- 2 Betty Ann Gardens
- 3 Casa Feliz
- 4 Craig Gardens Senior Housing
- 5 Creekview Inn
- 6 Curtner Studios
- 7 El Paseo Studios
- 8 Fourth Street Apartments
- 9 Gish Apartments
- 10 Guadalupe Apartments
- 11 Murphy Ranch
- 12 Orchard Gardens
- 13 Paula Apartments
- 14 Rincon de Los Esteros
- 15 Salinas Gateway Senior Apartments
- 16 Troy Apartments
- 17 Villa Montgomery

## First Community New Projects

- 1 Japantown Senior Apartments
- 2 1585 Studios in Mountain View
- 3 Leigh Avenue Apartments
- 4 North San Pedro Apartments
- 5 Second Street Studios



Data MBARI  
Image Landsat  
Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
Data LDEO-Columbia, NSF, NOAA

Go

# Project Summary

## South Second Street Studios

Location: San Jose, CA

Developer: First Community Housing

Project Size: 91,021 sf Housing / 9,000 sf Retail /  
35,400 sf Underground Parking

Transect: L5 Urban Center Zone

FAR: 2.0

Total Units: 134

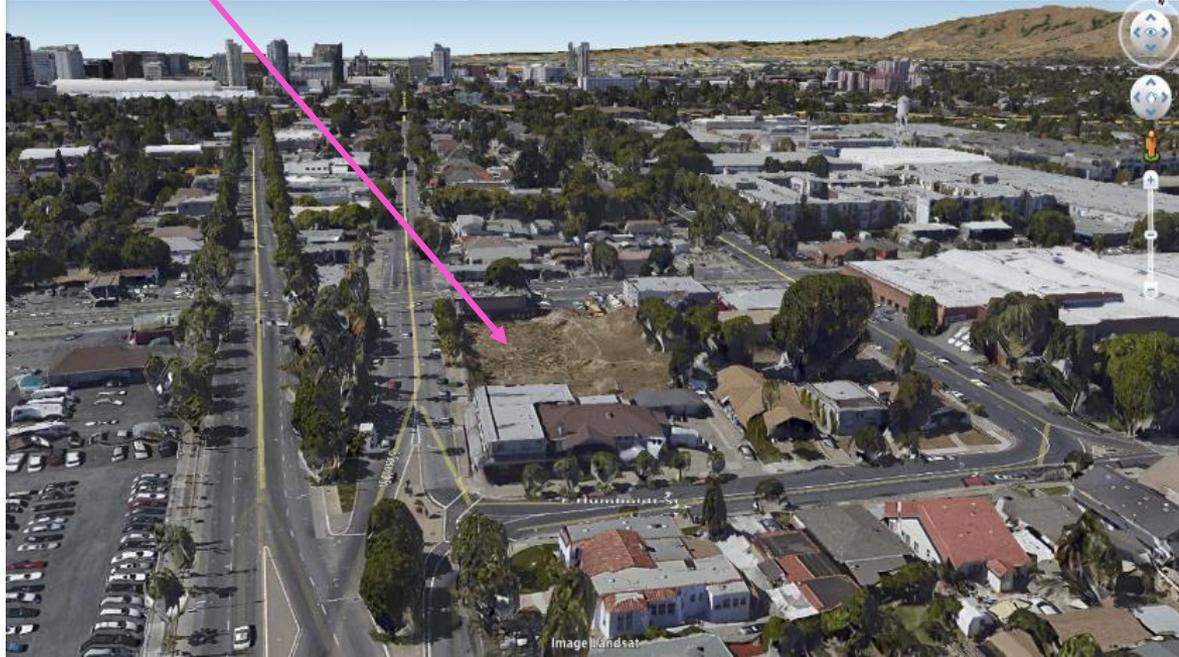
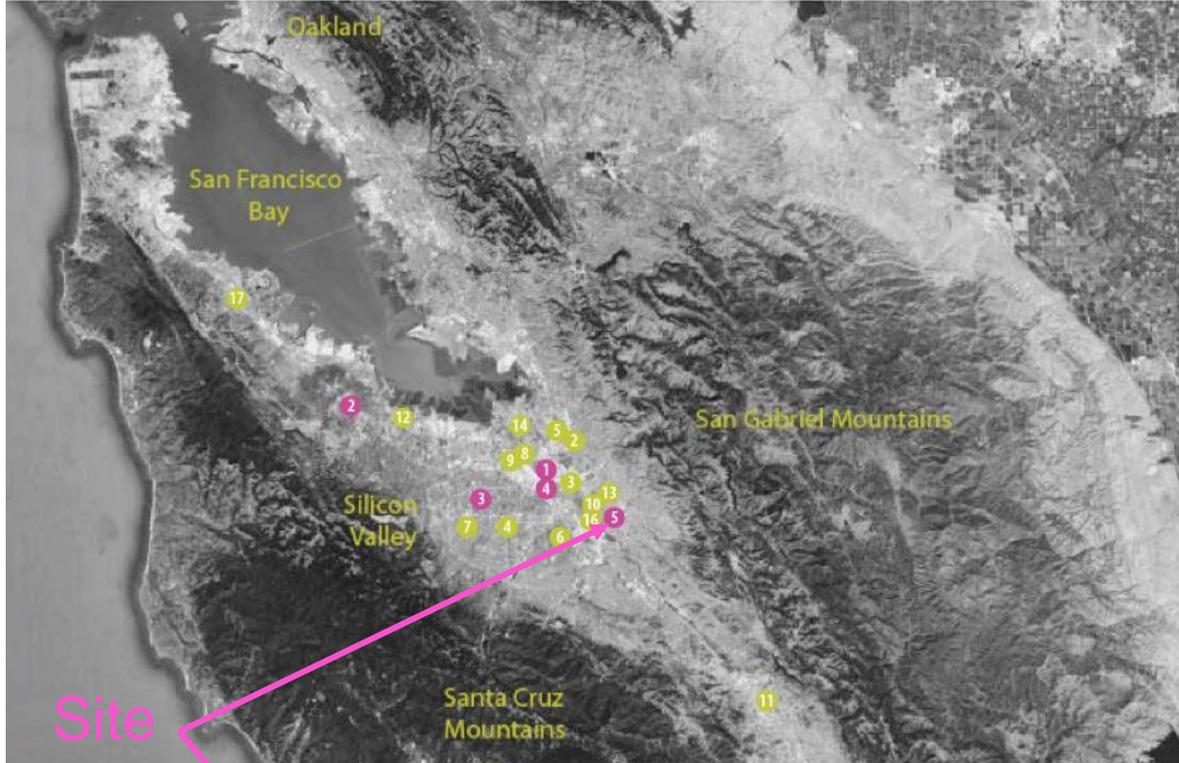
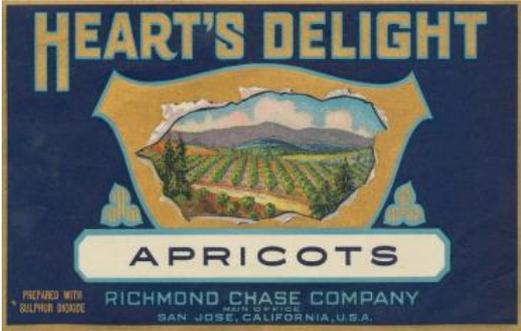
Construction Cost: \$32 million

Cost/sf: \$350/sf

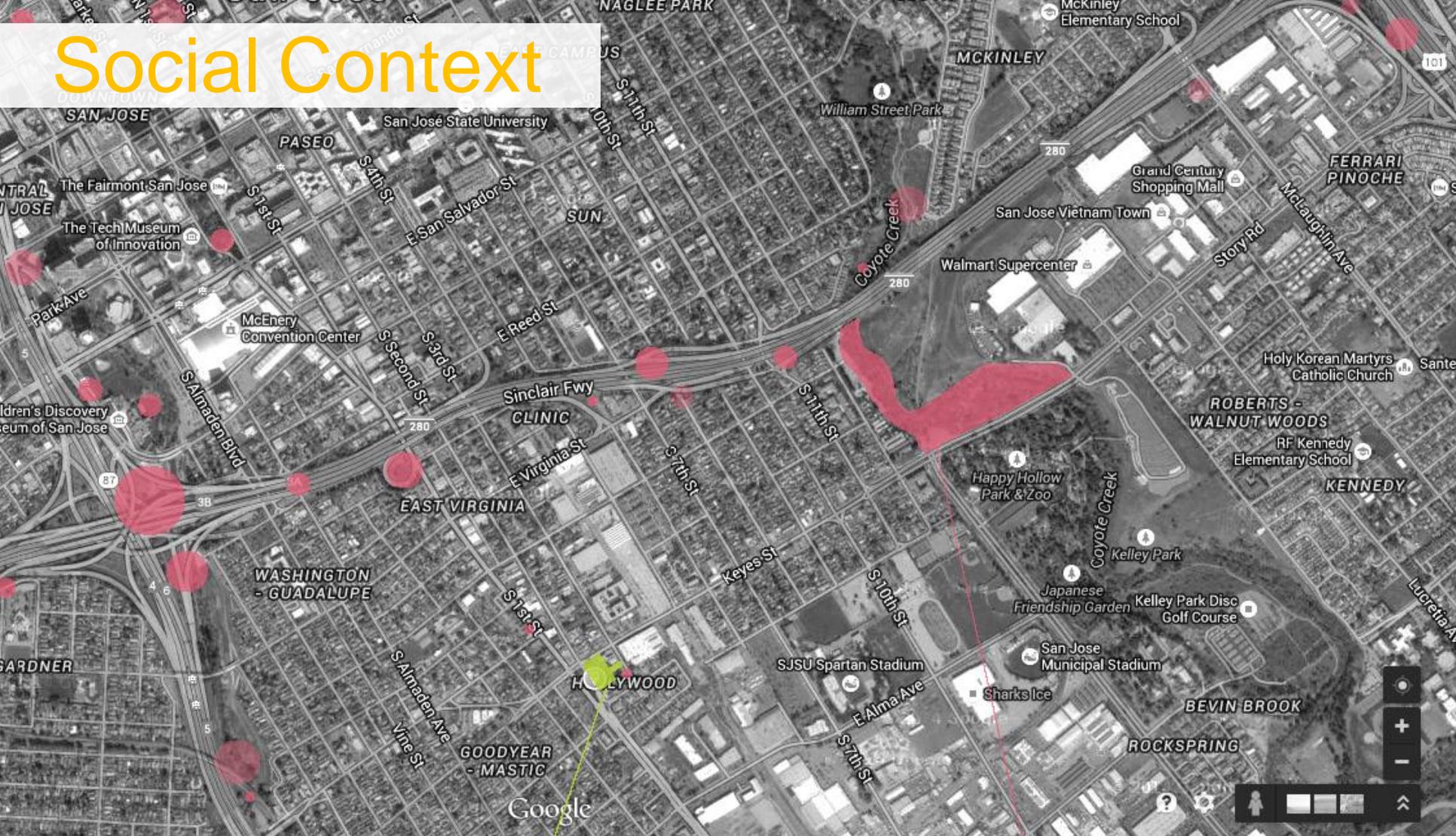
Construction Start Date: February 2016

Construction Completion Date: July 2017

# Historic Context



# Social Context

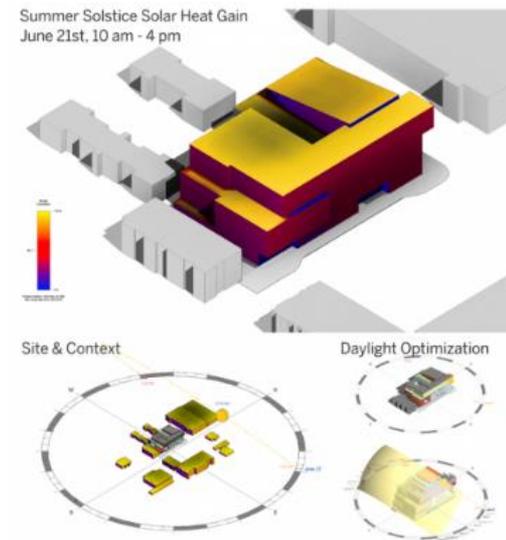
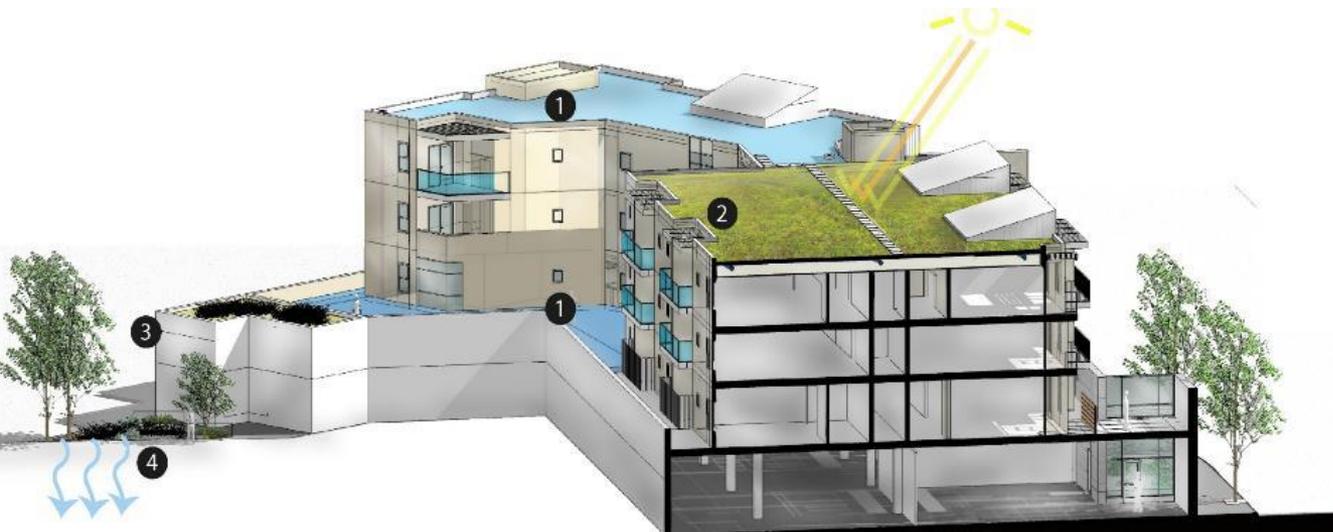
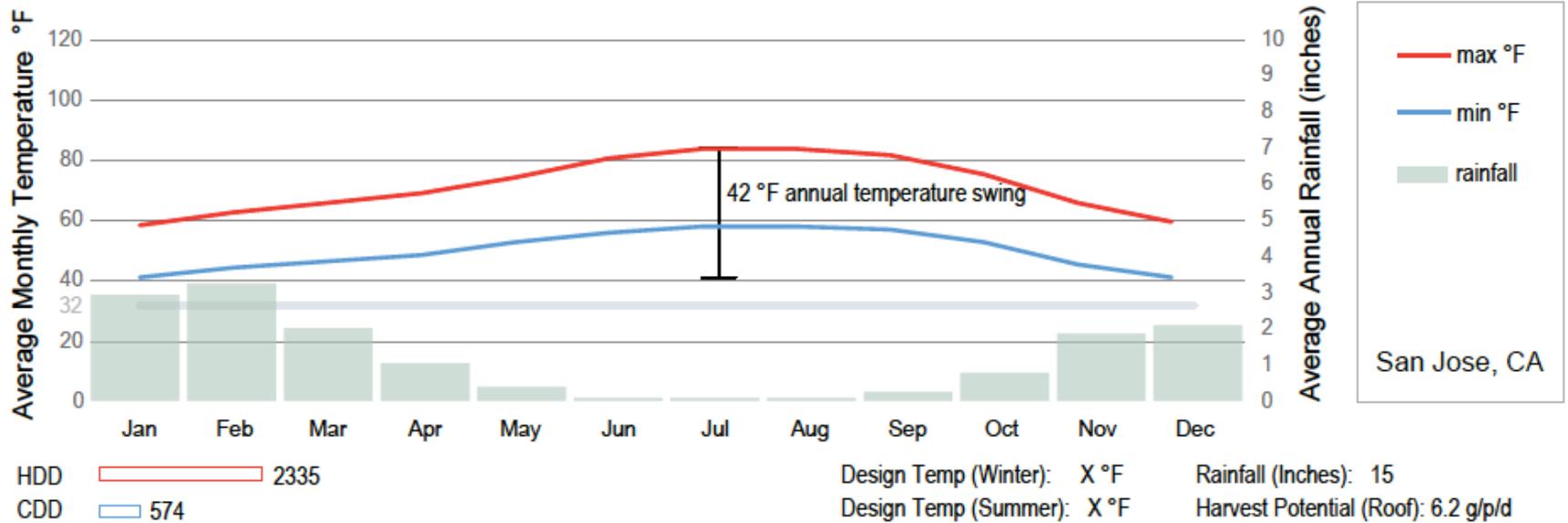


Future site of the  
**Second Street Studios**  
1140 S. 2nd Street at Keyes Street



The Second Street Studios is a planned 135-unit affordable housing development by First Community Housing. It is designed to be LEED Platinum and includes two levels of parking, ground floor commercial space, green roofs, two large courtyards and community gardens.

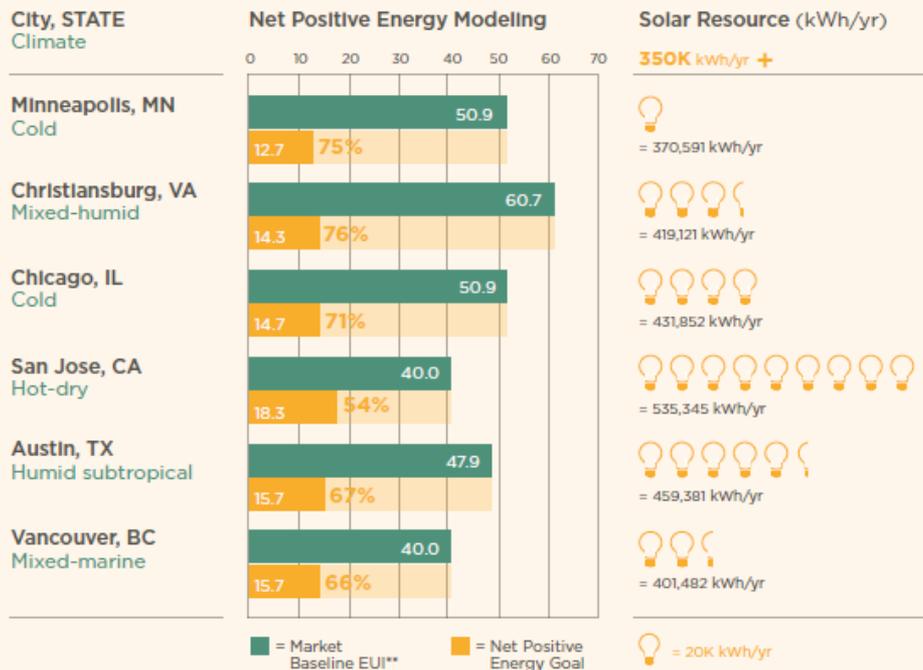
# Ecological Context



# Net Positive Energy

## Net Positive Energy Modeling by Location, 100% PV Coverage\*

Figure 5: Net Positive Modeling by Location



\* Calculations based off of 100% roof coverage by photovoltaics. Space Adjacent to arrays for maintenance and fire code set back were excluded for modeling simplicity.



## South Second Street Studios: Building Envelope + Systems

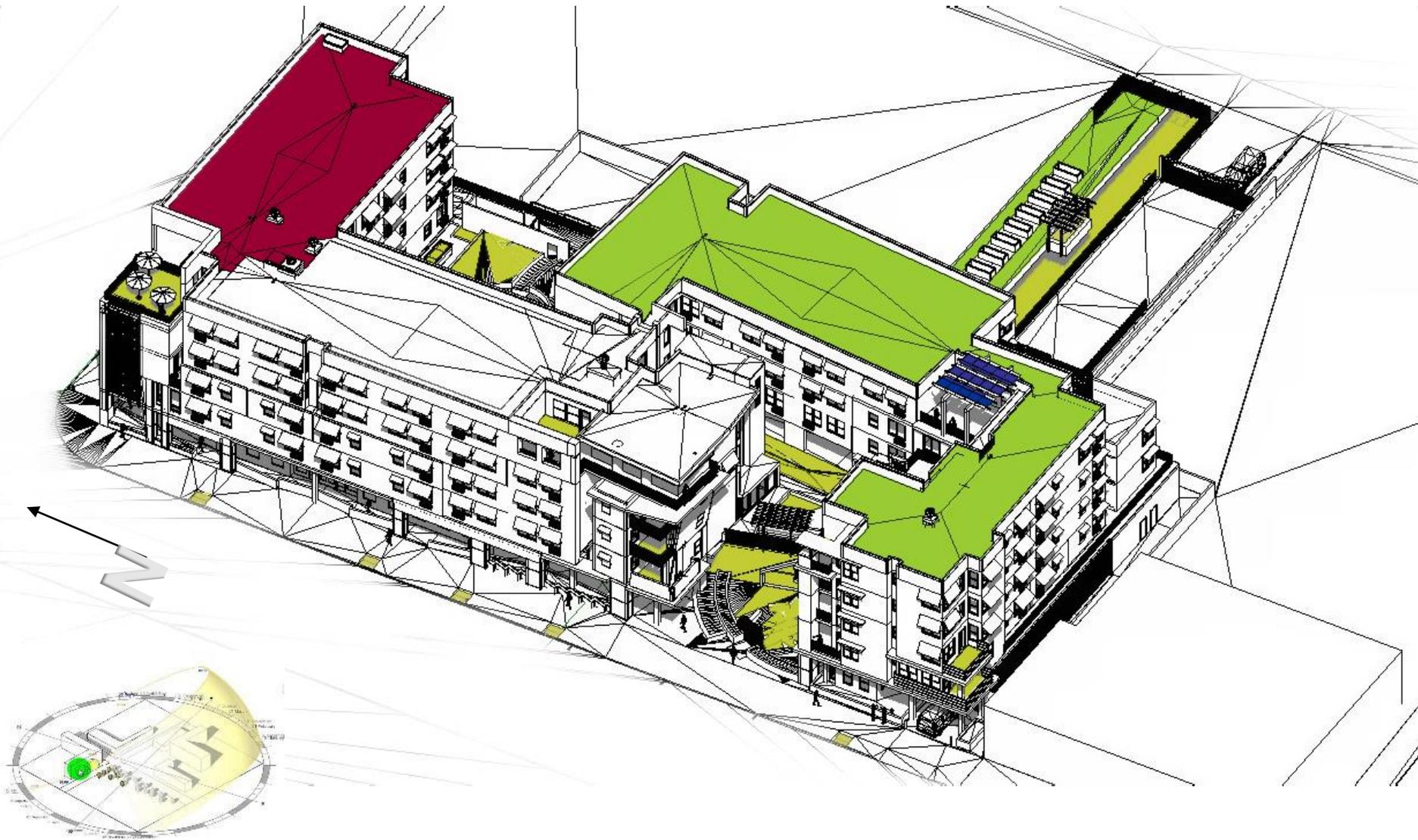
### Building Envelope:

- Walls: R-17.8  
2x6 wood construction with R-21 batt and 0.5" polyiso continuous rigid insulations
- Roof: R-30 (before the green roof is applied which will increase the R-value)  
Wood construction with batt and polyiso insulations
- Floor: Modular construction above concrete podium
- Windows: Milgard double-hung double-pane vinyl with Low-E Solarban 70XL

### Space Conditioning and Domestic Hot Water:

- HVAC: Individually packaged terminal air conditioners (PTACs) in the units and stand-alone VRV units in common spaces.
- Domestic Hot Water (DHW): Considering solar thermal

# Building Design and Massing



# EUI



unit: kbtu/sf/yr

Oh so close!

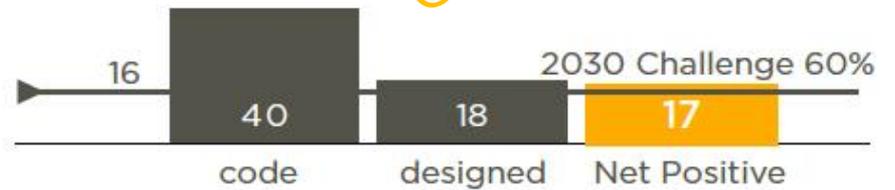
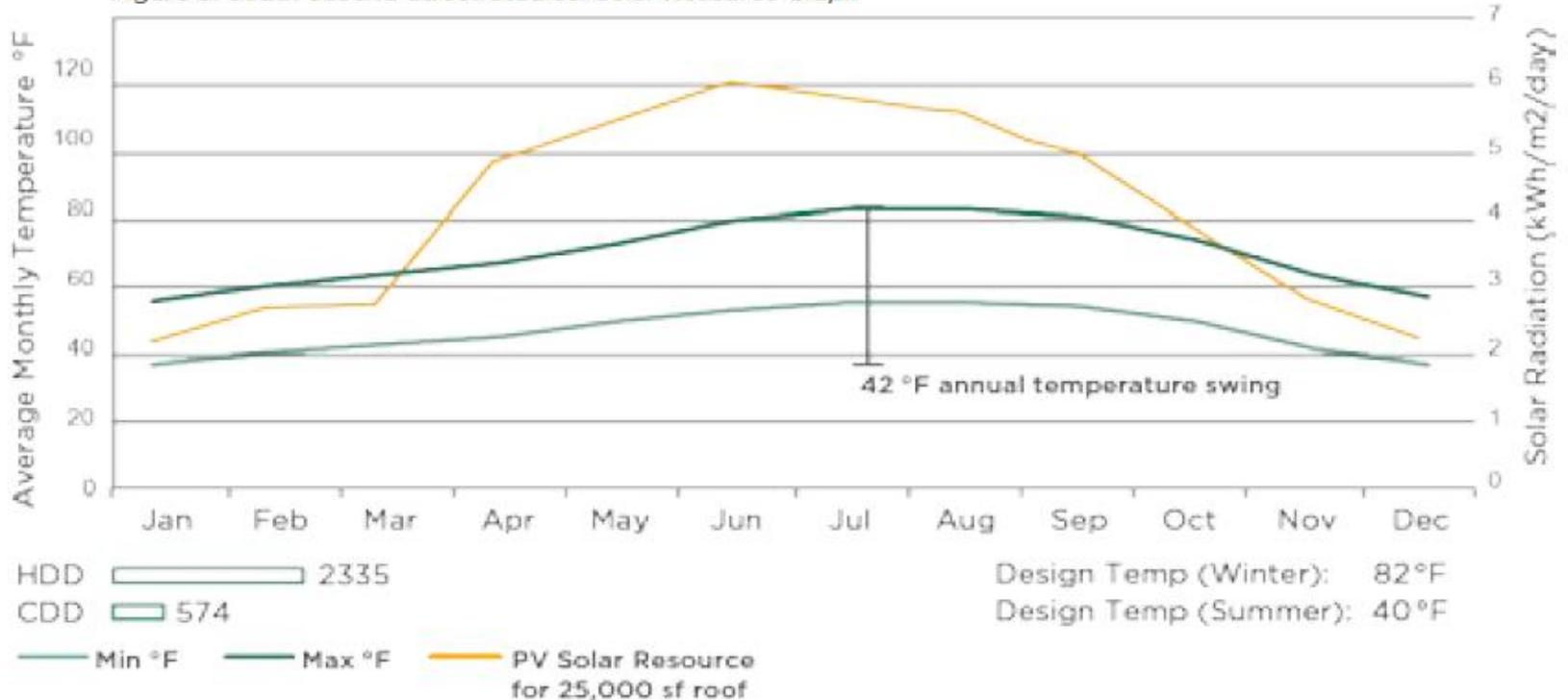


Figure 8: South Second Street Studios: Energy Usage Intensity Comparisons

Figure 9: South Second Street Studios: Solar Resource Graph



# Technical Barriers

Efficiency and Output of PV

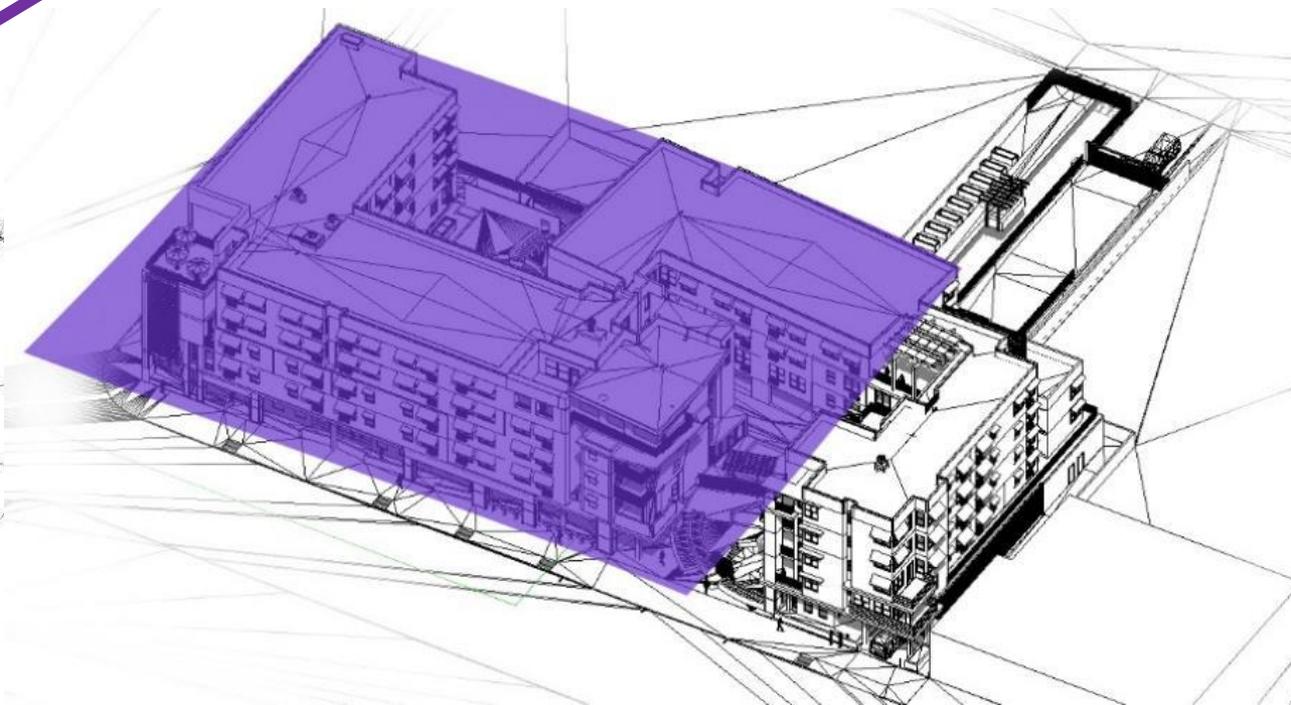
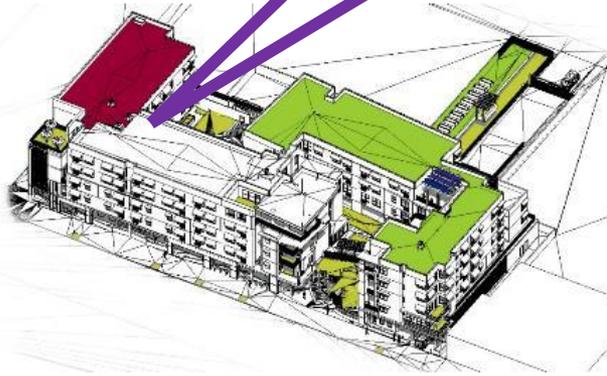
Backup Emergency Generators

Physical Limitations of Space:

ONLY 4800 SF AVAILABLE

>30,000 SF REQUIRED

ROOF = <27,000 SF



# Technical Solutions

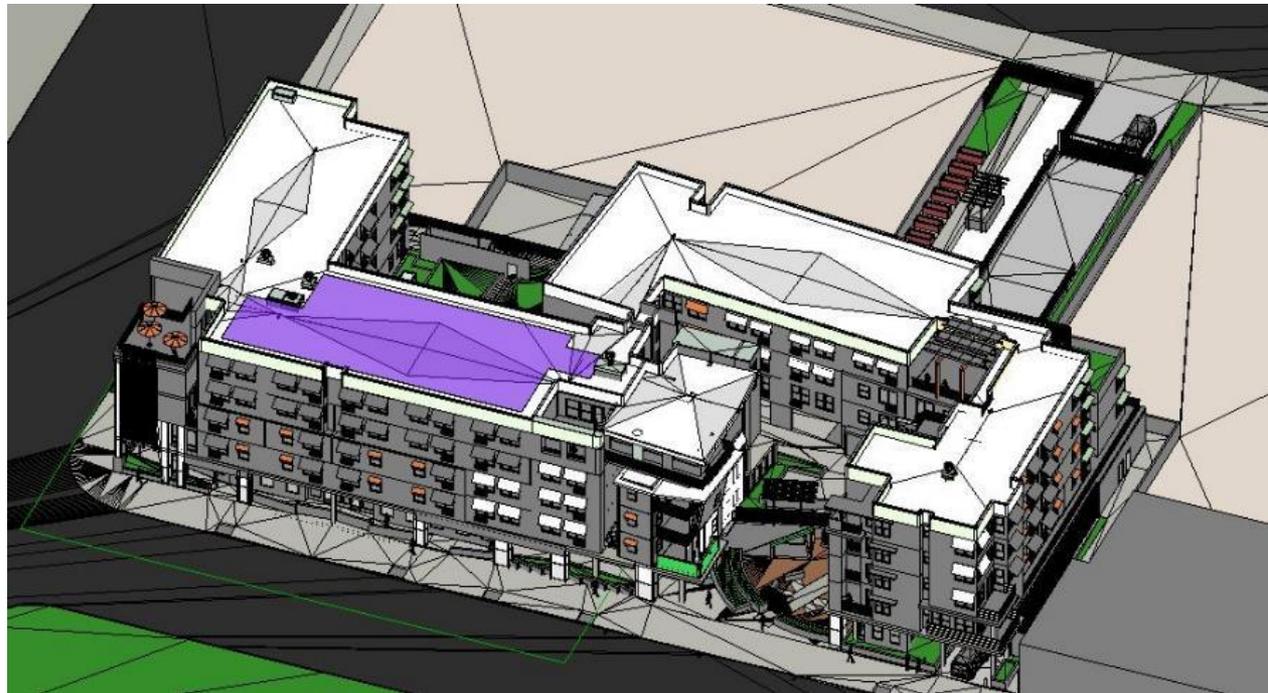
Size to Fit Roof  
>30,000 SQ FT REQUIRED  
= <27,000 SF TOTAL ROOF

Floating PV roof as secondary structure

Investigate Building Integrated PV and Façade Applications, such as with shading devices

Site Mounted on projects where space exists.

Scale Jump to Adjacent Properties.



# Financial Barriers

TCAC: COST CONTAINMENT OF 130%

UTILITY ALLOWANCES

CEC/ CPUC:  
BASE MODELING



# Financial Solutions

TCAC: SOLAR INTEGRATED  
POST OCCUPANCY

UTILITY ALLOWANCES:  
ADVOCACY AND REFORM  
FOR STANDARDIZATION

CEC/ CPUC:  
BASE MODELING



# Regulatory Barriers

CITY/ BUILDING/ ZONING: Building Height

Multi Family Metering Regulations

CEC Energy Modeling Baseline for Mid Rise

TITLE 24/ TCAC requirement for Solar DHW

# Regulatory Solutions

CITY/ BUILDING/ ZONING: Variance for PV

CEC/ CPUC: VIRTUAL NET METERING

CEC: RESIDENTIAL > 4 STORIES

TITLE 24/ TCAC AND SOLAR THERMAL



# Social Barriers

Increased occupant density: often, multi-generational families to live in one apartment.

Increased FTE Hours – more time spent at home.

No mechanism to control behavior and plug loads.

# Social Solutions

Regulate tenants' visitors.

Sub-meter the energy consumption of individual units, providing a financial incentive for tenants to limit their energy consumption..

Continue educational programs that emphasize conservation, particularly with children at multifamily properties.



wegowise



# Key Findings

Set goals and integrate early on!!

In mild climates, look to passive ventilation and cooling (design challenge of double loaded corridors)

Design from the “roof down”

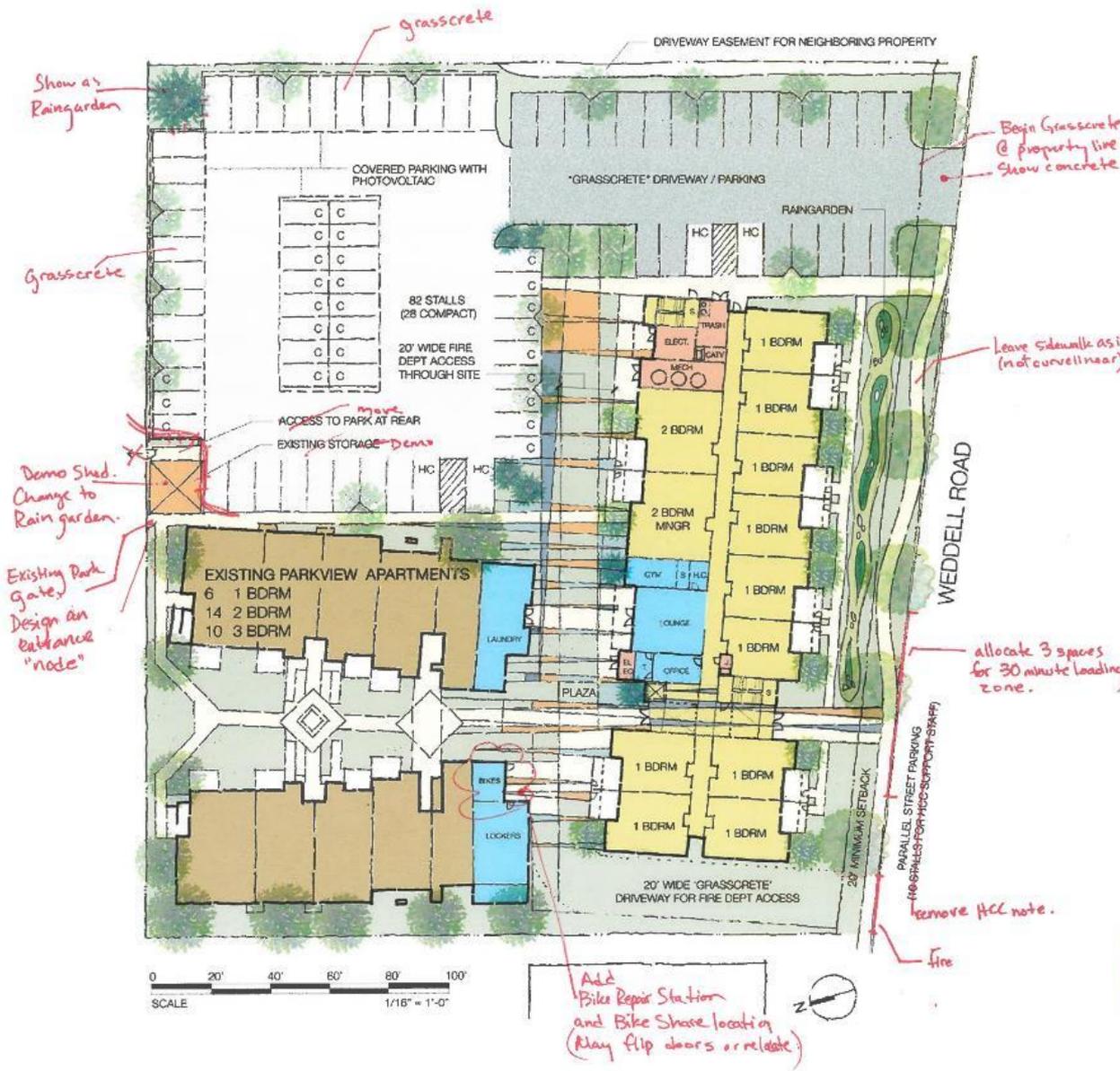
Explore cost effective BIPV

Advocate for CEC energy modeling for mid rise residential building typology

Advocate for policy change to reform the UA system for EE Schedules



# Next Steps:



## DEVELOPMENT INFORMATION (COMPLETED DEVELOPMENT)

**SITE ADDRESS**  
300 E. WEDDELL ROAD, SUNNYVALE CA 94089

**APN**  
110-12-93

**SITE AREA**  
75,750 SQ FT (1.74 ACRES)

**ZONING**  
R-4

**UNITS**  
Parkview:  
3 bedroom units = 10 (Existing)  
2 bedroom units = 14 (Existing)  
1 bedroom units = 6 (Existing)  
(ground floor carport to be converted to laundry/storage)  
Parkview Unit total = 30

New Building:  
2 bedroom units = 4  
2 bedroom units (DD) = 4  
1 bedroom units = 10  
1 bedroom units (DD) = 39  
New Building Unit total = 57

**Total Units = 87**

**DENSITY**  
87 UNITS @ 50 DU PER ACRE

### PARKING

Unit Type	Width	Area (sq ft)	Required Spaces	Proposed Spaces/Unit	Proposed Total Spaces
Parkview					
3 bdrm	10'	2	20	2	20
2 bdrm	8'	2	26	2.5	22
1 bdrm	6'	1	5	1	5
<b>New Building</b>					
2 bdrm	4'	2	8	1.5	6
2 bdrm DD	4'	0.6	2.3	0.2	1.7
1 bdrm	1.9'	1	82	1	10
1 bdrm DD	1.9'	0.5	23.4	0.2	13.7
<b>TOTAL</b>			<b>87</b>	<b>56</b>	<b>78</b>

Total number of stalls required for project = 76  
Total number of stalls provided = 82

### BICYCLE PARKING

43 spaces + guest racks + repair station + in-unit wall mounts

### BUILDING HEIGHT

Four stories at 10' + parapet = 43 feet  
Elevator height approx. 52'  
Architectural canopy at lobby approx 50'

### SITE AREAS

Buildings footprint = 20,086 SQ FT  
Parking / Driveway = 26937 SQ FT  
Landscape / Hardscape = 29,727 SQ FT (39% OF SITE)  
TOTAL SITE AREA = 75750 SQ FT

- EXISTING PARKVIEW APARTMENTS
- NEW RESIDENTIAL UNITS
- COMMUNITY SPACE
- UTILITY

use former format (no + excell chart)

\* will have green roof & gardens

How much does this exceed req't?

# Thank you!



Hilary Noll, LEED AP BD+C, Assoc. AIA

Project Manager | Enterprise Rose Architectural Fellow

[hilaryn@firsthousing.org](mailto:hilaryn@firsthousing.org)

408-291-8650 x24

First Community Housing San Jose, CA

# *THE PHFA PROJECT*

*A National Net-Zero-Energy Initiative*

ARCHITECTURE  
RESEARCH  
CENTER

Tim McDonald  
[tim.mcd@temple.edu](mailto:tim.mcd@temple.edu)  
215.783.5591

A photograph of an industrial facility, likely a power plant or refinery, with several tall smokestacks emitting thick plumes of white smoke. The scene is set against a bright, hazy sky, possibly during sunrise or sunset. The foreground shows some industrial structures and a large, dark, angular structure on the right side.

and contribute

**45%**

of U.S. GHG emissions

EIA 2012



urban environments emit **75%** of global GHGs

UN Habitat



By 2030,

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

**900 billion ft<sup>2</sup>** (84 billion m<sup>2</sup>)

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**



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

September 21, 2014

# One City Built to Last

The City of New York  
Mayor Bill de Blasio

Mayor's Office of Long-Term Planning and Sustainability  
Anthony Shorris, First Deputy Mayor

## 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.

REAL ESTATE

# The Passive House in New York

By ALISON GREGOR MARCH 27, 2015



New York buildings adhering to passive-house principles include 803 Knickerbocker Avenue, Bushwick, Brooklyn. Pablo Enriquez for The New York Times

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It was less than a decade ago that a building design philosophy from Germany called “passive house” jumped the Atlantic Ocean and quietly took root in [Brooklyn](#).

Now, with a few dozen homes and small projects built or retrofitted to this still exotic standard, passive buildings appear poised to enter [New York City’s](#) housing market in a much bigger way. Large projects delivering hundreds of new passive units to market are in the works, and city officials are watching closely.

Passive buildings maintain a comfortable interior climate without active heating and cooling systems — that means no more radiators or air-conditioning units for people who live in environments more temperate

# World's Tallest Passive House Breaks Ground on Roosevelt Island

By ALISON GREGOR JUNE 12, 2015

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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

**OREGON**



# This Is The Largest Passive House Building In The US

November 19th, 2014 by [Steve Hanley](#)

What do you think about this?

▲ Interesting

1

▼ Not Interesting

Originally published on [Green Building Elements](#).



The largest [Passive House](#) structure in the US, called The Orchards At Orenco, is under construction in Hillsboro, Oregon, a suburb of Portland. The 57 unit residential building is being built by [REACH Community Development](#), a non-profit developer dedicated to lowering overall living costs for residents. REACH believes delivering truly affordable housing places a minimal burden on the finances of low-income families by keeping utility costs as low as possible.

**OREGON.gov**

Oregon Housing and Community Services

## Building Code Revision Launches California Toward Zero Net Energy Buildings



Bill Roth | Monday November 11th, 2013 | [2 Comments](#)



63



7



81



Share

119

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.

## Business

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

Sean Doogan | Alaska Dispatch News | January 11, 2015

Email Print

Like 1k

Tweet 38

+1 2

Text Size

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.

## 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.

By Nick McCrea, BDN Staff

Posted May 13, 2015, at 3:14 p.m.

**BREWER, Maine** — Construction began Wednesday on what's expected to be one of the largest passive housing projects in the United States.

Village Centre Apartments, a 48-unit affordable housing complex, is being built at the former State Street School site. Crews have been doing abatement work there since last year after the demolition of the old school.

**MAINE**

KAPLAN THOMPSON  
ARCHITECTS



## Case Study - Habitat for Humanity of Washington DC



**Habitat for Humanity of Washington DC:**  
Winner of a 2012 Mayor's Sustainability  
Award

**Project: EMPOWERHOUSE**

### THE NEW SCHOOL HONORED BY HABITAT FOR HUMANITY FOR SUSTAINABLE HOME DESIGN

Thursday, November 20 at 7 pm in Washington, D.C.

Solar Decathlon Winning Design Adopted for Affordable Housing Projects Nationwide

NEW YORK, Nov. 20, 2014—Two years after New School students designed and built an affordable, energy-efficient home for low-income families in Washington, D.C., three leaders of the project will be honored at Habitat For Humanity of Washington D.C.'s Raising The Roof celebration fundraiser on Thursday, Nov. 20.

The event at Union Station, 40 Massachusetts Ave. NE will honor **Sheila Johnson**, New School trustee and chair of [Parsons The New School for Design's](#) board of governors; **Joel Towers**, executive dean of Parsons The New School for Design; and **Dee MacDonald Miller**, a senior vice president in the Tenant Representation Division of Jones Lang-Lasalle.



Empowerhouse in its current location in Deanwood, a neighborhood of Washington, D.C.

# PITTSBURGH



## Uptown Lofts with Alpen Windows Celebrates PHIUS+ Certification and Ribbon Cutting

Date: Mar 31, 2015 Categories: [General News](#)

Pittsburgh, PA –

On February 26, [ACTION Housing held its ribbon cutting ceremony](#) at Uptown Lofts on Fifth to celebrate its grand opening and achievement of [PHIUS+ Passive House Certification for Multifamily Buildings](#). The Uptown Lofts project is a new housing development of two buildings that will serve low-income individuals and youth who have aged out of the foster care system. One building at Uptown Lofts is certified by the Department of Energy as meeting Energy Star V.4 Standards, and the other is PHIUS+ Passive House Certified by Passive House Institute, US (PHIUS).

Both buildings integrated Alpen high performance fiberglass windows into their building envelopes. Alpen's 325 Series windows were selected for the Energy Star V.4 building, offering thermal performances up to R-3.8 or U-0.26 and SHGC<0.30 to meet Energy Star 30/30 requirements. And in the passive house certified building, the design team chose [Alpen's 525-S Series windows which recently received PHIUS Certified Window Performance Data Certificates](#) in February 2015.

Alpen is pleased to report that we continue to receive notes of praise from the project design and construction teams, as well as people in the community and window manufacturing sector, who remark on the high quality and thermal efficiency our Alpen windows supplied to these precedent-setting projects. We have also heard thanks for the excellent service our sales and support team provided in keeping this fast-paced, high volume commercial project on-time and on-budget at every stage.



Alpen would like to congratulate all of the design/build team for their excellence at Uptown Lofts, we extend special thanks to:

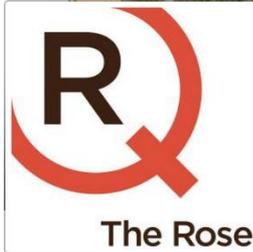
- [ACTION-Housing](#)
- [FortyEight Architects](#)
- [Kaplan-Thompson Architects](#)
- [Mosites Construction](#) (three cheers for your incredible 'before-drywall' blower door test result <60 ACH-50!),

## Developers Get Aggressive With Passive House Design

By [Donna Kimura](#)



# MINNESOTA



Home / News / Sustainable: Aeon building ultra-efficient affordable apartments



Gina Ciganik, Aeon's vice president of housing development, stands on the construction site of The Rose, an affordable apartment development at 1920 Portland Ave. S. in Minneapolis. "It is poor people in poor communities who are most in need of healthy great places to live because they have such limited options," Ciganik said. (Staff photo: Bill Klotz)



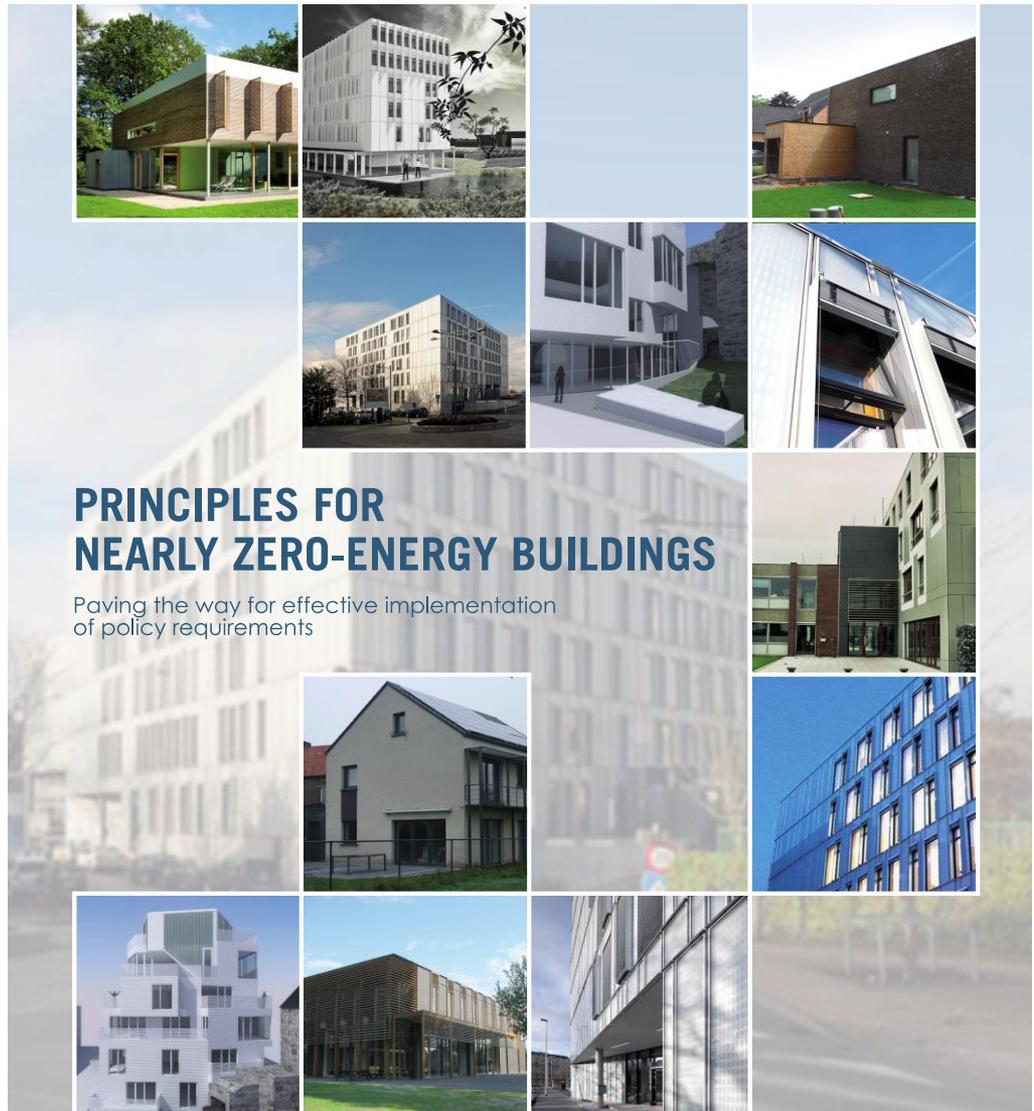
## Sustainable: Aeon building ultra-efficient affordable apartments

By: Frank Jossi | February 2, 2015 1:40 pm

A new four-level apartment building under construction in south Minneapolis is considered one of the largest projects in the country designed to meet the rigorous building certification tool called "The Living Building Challenge."

The Seattle-based International Living Future Institute sponsors the [Living Building Challenge](#), which has been called "LEED on steroids," a reference to Leadership in Energy and Environmental Design certification program developed by the [U.S. Green Building Council](#) of Washington, D.C.

# **BRUSSELS 2014**



## **PRINCIPLES FOR NEARLY ZERO-ENERGY BUILDINGS**

Paving the way for effective implementation  
of policy requirements

# MPG for buildings



## PERFORMANCE 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

**EUI**

**12** kBTU/sf/yr

ONION  
FLATS



PLUMBOE



JIG  
INC



ARCHITECTURE  
RESEARCH  
CENTER  
TEMPLE UNIVERSITY



**FIRST CERTIFIED PASSIVE HOUSE IN PA**



**START: APRIL 20, 2012**

**CERTIFICATE OF OCCUPANCY: JULY 20, 2012**

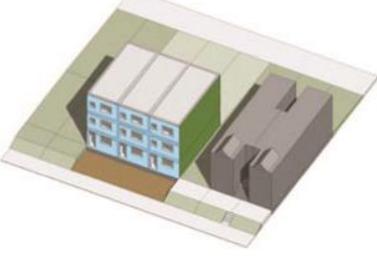
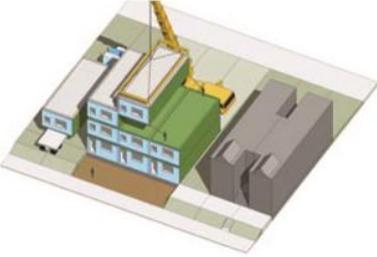
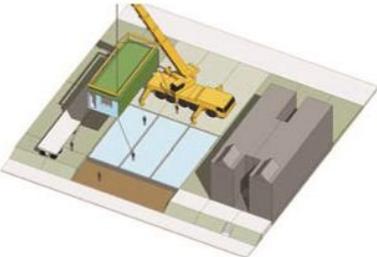
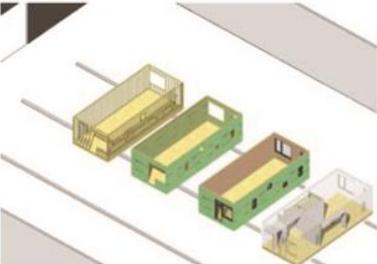
**RECIPIENT OF THE**

**2014 INTERNATIONAL  
PASSIVE HOUSE AWARD**

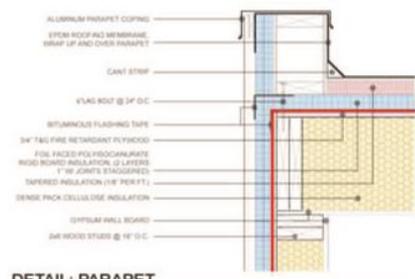


**ONION  
FLATS**

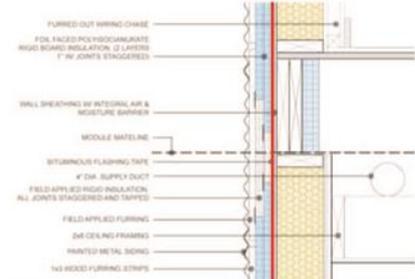




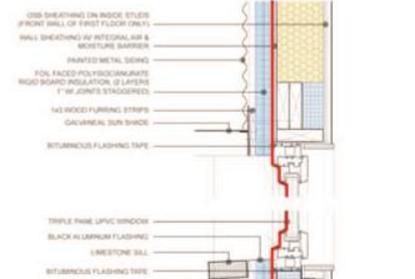
FACTORY BUILD



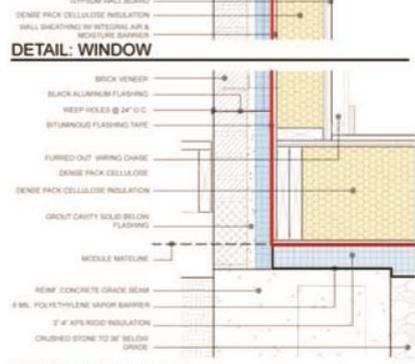
DETAIL: PARAPET



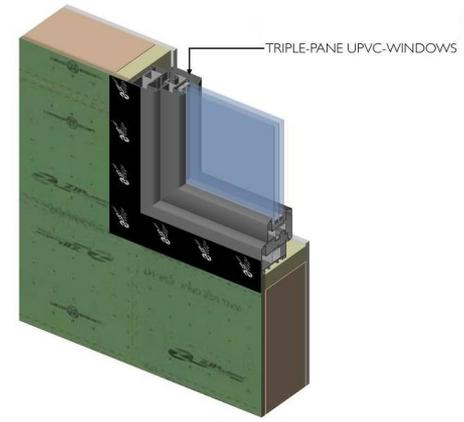
DETAIL: MODULE CONNECTION



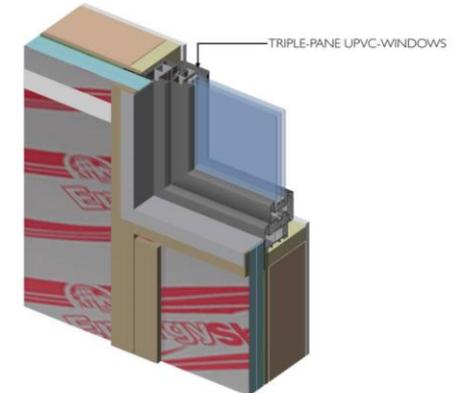
DETAIL: WINDOW



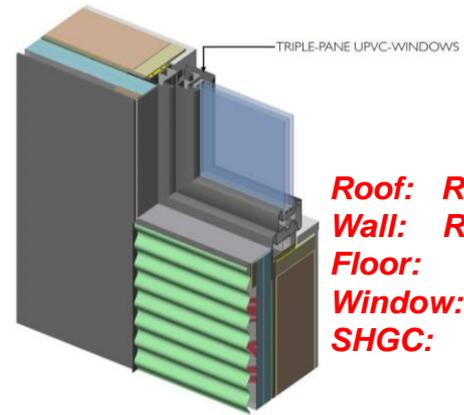
DETAIL: FOUNDATION



TRIPLE-PANE UPVC-WINDOWS



TRIPLE-PANE UPVC-WINDOWS



TRIPLE-PANE UPVC-WINDOWS

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

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 <b>0.48 ACH</b>	201 CFM <b>0.33 ACH</b>	-92 CFM -0.15 ACH	-31.4 % -31.4 %

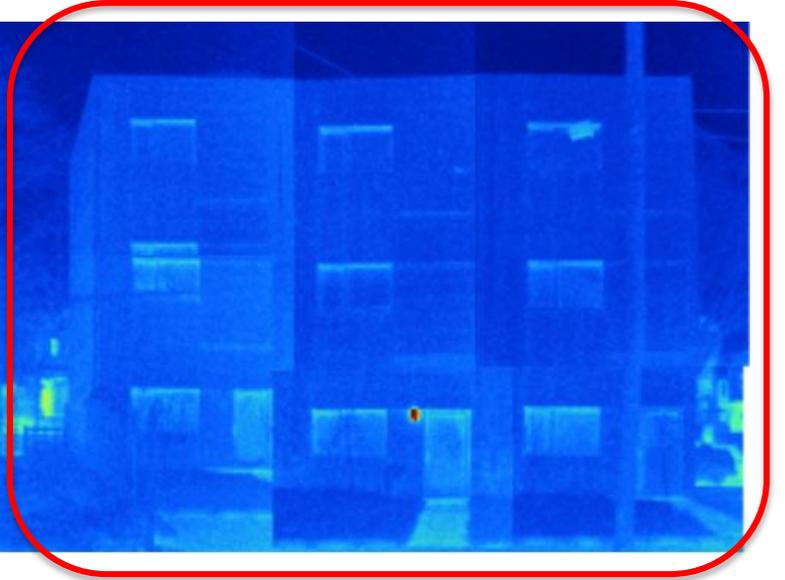
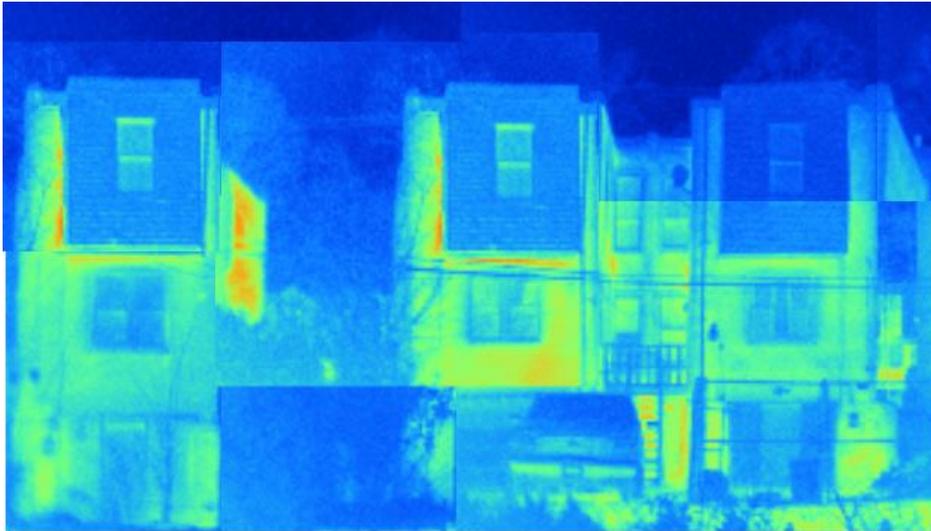
FINAL AIRFLOW:

**0.405 ACH 50**

PASSIVE HOUSE MAX

**0.6 ACH 50**









**\$130/sf**

An aerial photograph of a city. In the foreground, a modern, multi-story building with a flat roof and solar panels is visible. The building has a grey facade and several windows. In the background, a dense residential area with many houses and apartment buildings is visible. The sky is blue with white clouds. The text is overlaid on the image.

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



# PHFA

PENNSYLVANIA HOUSING FINANCE AGENCY

**25 “Stakeholders” from across PA propose that PHFA:**

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



**USE PASSIVE HOUSE AS THE TOOL**

**Energy Efficiency goals readily met by developers, time to  
“RAISE THE BAR”**

**Low Income Housing Tax Credit (LIHTC) Program  
2015 QUALIFIED ALLOCATION PLAN**



**“Point-based-system”, 130 points total**

**25% of applications get funded, EXTREMELY COMPETITIVE**

A development that achieves Overall 50 points may be awarded 10 points of the 110 points that are given to these developments, and the following optional points set forth in the Enterprise Green Communities Criteria: 25 points for new construction and 20 points for substantial/moderation rehabilitation projects (which would include Preservation projects).

Energy Efficiency Goals – up to **10 points** may be awarded to those developments which meet **Passive House certification** standards for energy efficiency. (See Multifamily Housing Application and Guidelines and [www.passivehouse.us](http://www.passivehouse.us) or [www.passivehouseacademy.com](http://www.passivehouseacademy.com) for additional guidance.)

Please review the 2015 Guidelines for specific requirements for the above criteria.

# 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

**7** Passive House Projects awarded funding

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

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

## Construction Cost Summary from PHFA Applications

### 2015 Costs

Single Family / Townhouse

Proj. No.	County	Climate Zone	Units (by BR Qty)					Total Units	Bldg. Area	Constr. \$	\$/Unit	\$/SF
			0	1	2	3	4+					
SF-1	Franklin	5A			33	21		54	70,218	7,051,522	130,584	100
SF-2	Schuykill	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

# THE PHFA PROJECT

Multi-Story / Elevator

MS-1	Northumberland	5A			35				35	40,397	4,276,084	122,174	106
MS-2	Dauphin	5A		22	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	5,599,187	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	44,667	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	Philadelphia	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	228

# \$COST\$

“Negligibly different” from NON-PH projects

# THE PHFA PROJECT

## Pennsylvania

**85** Projects

**32 PH** projects

**53 NON-PH** projects

Average cost = **\$169/sf**

Average cost = **\$165/sf**

**< 2%**

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

# THE PHFA PROJECT

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FEB 2015

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**38%** applied as Passive House projects

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**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**

# THE PHFA PROJECT

*Catalyst for radical and significant market penetration of Passive House/Net-Zero-Energy-Capable housing not just in Pennsylvania.....*

**AFFORDABLE HOUSING**

*Developers, Architects, Engineers, Builders, Investors*

**MARKET-RATE HOUSING**

# *THE PHFA PROJECT*

*A National Net-Zero-Energy Initiative*

## **STATE**

**35** Housing Finance Agencies

**Engaged by ARC to replicate PHFA strategy**



# THE PHFA PROJECT

*A National Net-Zero-Energy Initiative*

***Replicate PHFA's "Passive House points" strategy in 35 States***

Energy Efficiency Goals – up to **10 points** may be awarded to those developments which meet **Passive House certification** standards for energy efficiency. (See Multifamily Housing Application and Guidelines and [www.passivehouse.us](http://www.passivehouse.us) or [www.passivehouseacademy.com](http://www.passivehouseacademy.com) for additional guidance.)

***Establish ARC as the repository of product manufacturers, pricing and expertise for high performance building materials and services***

**THANK  
YOU**

**ARCHITECTURE  
RESEARCH  
CENTER**

**Tim McDonald**  
**[tim.mcd@temple.edu](mailto:tim.mcd@temple.edu)**  
**215.783.5591**



[housingconference.uli.org](http://housingconference.uli.org)

July 13-15, 2015  
Hyatt Regency  
Minneapolis, MN



# Net Zero: Myth and Reality

9:45 a.m. – 11:00 a.m.

*Moderator*

**Sarene Marshall**

Executive Director, Center for Sustainability, Urban Land Institute

*Discussion Leaders*

**Gina Ciganik**

Vice President, Housing Development, Aeon

**Sunshine Mathon**

Director, Design and Development, Foundation Communities

**Timothy McDonald**

Associate Professor, Practice in Architecture, Temple University, and President, Onion Flats, LLC

**Hillary Noll**

Enterprise Rose Architectural Fellow, First Community Housing

**#HousingOpp2015**