

City of West Hollywood Green Building Program Update

Stakeholder Working Group Meeting #2
April 26th, 2018



Meeting #1 Recap

- Water is an emerging issue with the greatest potential for innovation.
- The energy code has gotten increasingly stringent as we move towards NZE – is this the next step?
- Let's not ignore infrastructure in our consideration of the updated Green Building Program.
- How do we take advantage of West Hollywood's unique characteristics (i.e. east-west orientation, topography, passive design, etc.)?



Discussion

- How can the updated ordinance continue to demonstrate leadership?
- Are there specific design strategies, technologies, or standards that should be addressed?
- What is the potential to fold in emerging topics, including resilience and well-being?
- What type of development should we be planning for in the future?

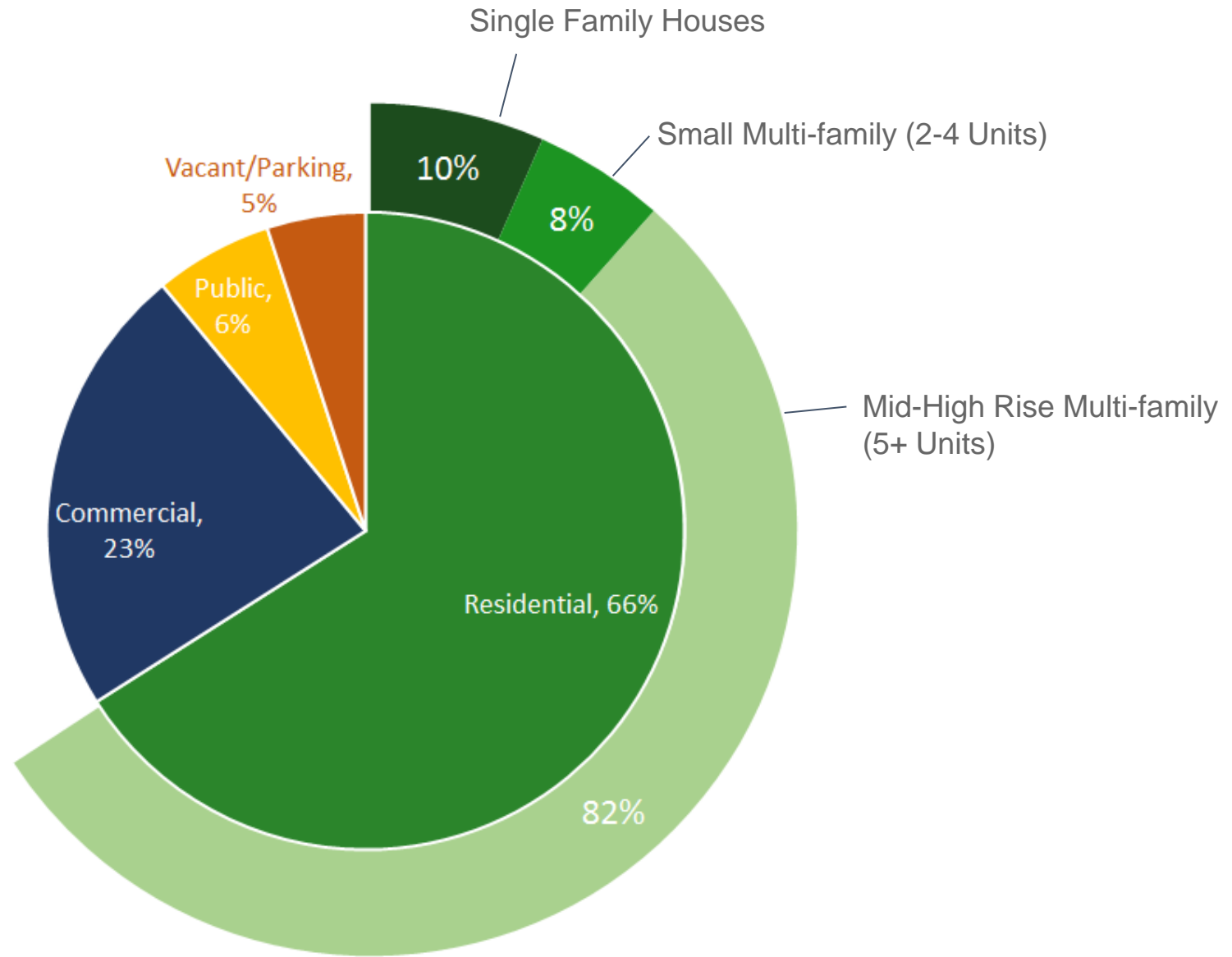


CITY OF WEST HOLLYWOOD

DEEP DIVE INTO ENERGY

Celia Hoag, DNV GL
April 26th

EXISTING LAND USE



NEW CONSTRUCTION

56

Planning Entitlements

48

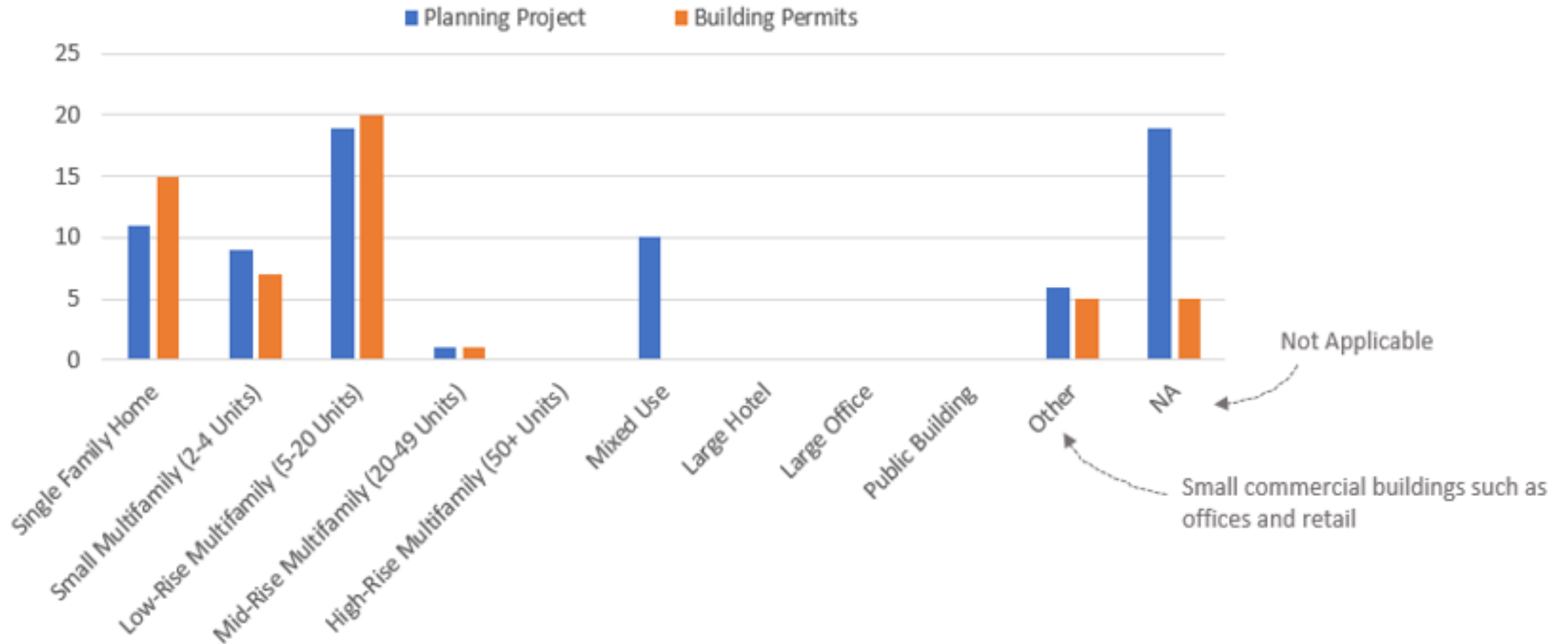
Building Permits

90%

Residential

10%

Commercial



CA ENERGY CODE
COMPLIANCE
(NEW CONSTRUCTION)

HOW BUILDINGS MEET CODE

PRESCRIPTIVE

Each individual component (wall, roof, HVAC, windows, etc.) **MUST** meet a prescribed minimum energy requirement.

Least flexible for design

Simplest compliance path (think checkboxes)

PERFORMANCE

Energy model accounts for interactive effects between components and allows for energy trade-offs between measures (envelope, lighting, and mechanical) to meet or exceed **building energy performance** above standard

Greatest flexibility

Requires more effort

Note: Building Performance is measured by Key Performance Indicator such as Energy Used per Building Area. (Other example = EDR, TDV, etc.)

TRADE-OFF EXAMPLE

STANDARD DESIGN

Lighting Design: 0.9 W/sf

Mechanical System:
Split Air Conditioner
with efficiency of 13
EER




Energy Usage Intensity:

19 kBtu/sf

PROPOSED DESIGN

Lighting Design: 0.5 W/sf 

Mechanical System:
Split Air Conditioner
with efficiency of 10
EER 



Energy Usage Intensity

16 kBtu/sf

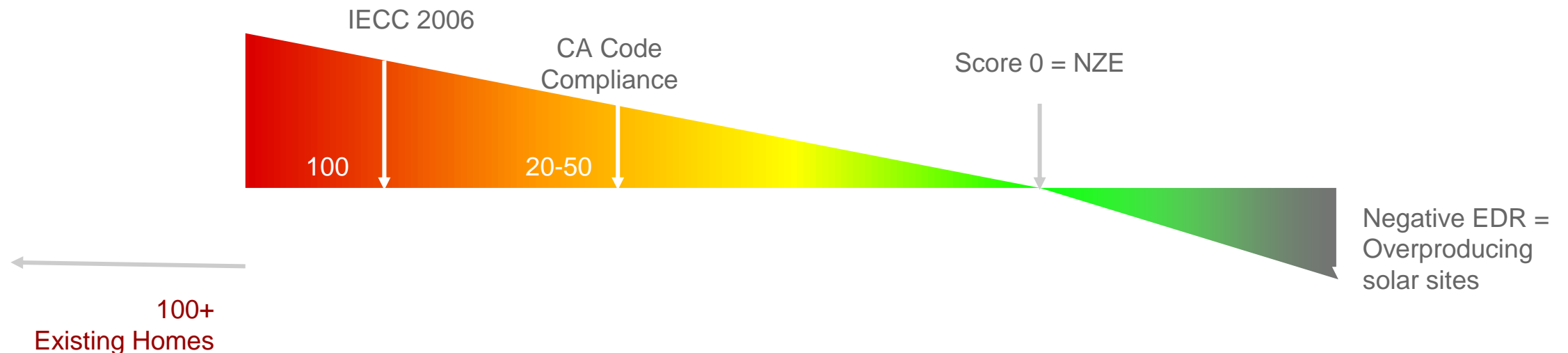


TECHNICAL WITHOUT GETTING TOO TECHNICAL

Energy Usage Intensity is a performance metric to evaluate building energy performance, often expressed in annual energy usage per square feet.

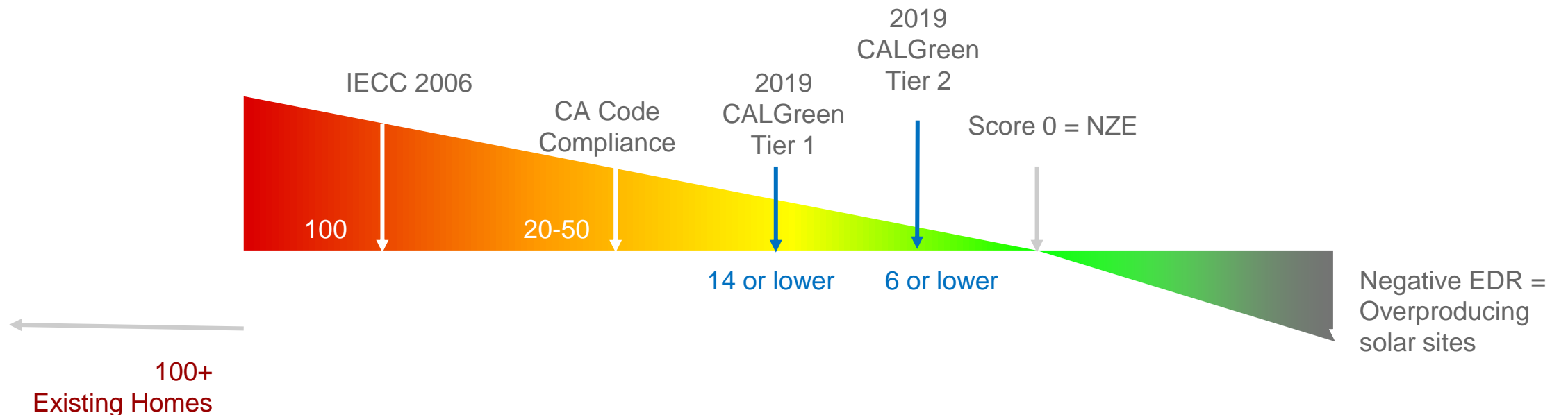
$$\text{EUI} = \frac{\text{Annual Energy Usage [kBtu]}}{\text{Area [square feet]}}$$

Energy Design Rating (EDR) is alternative way to express energy performance of a home using a score of 100 to 0.



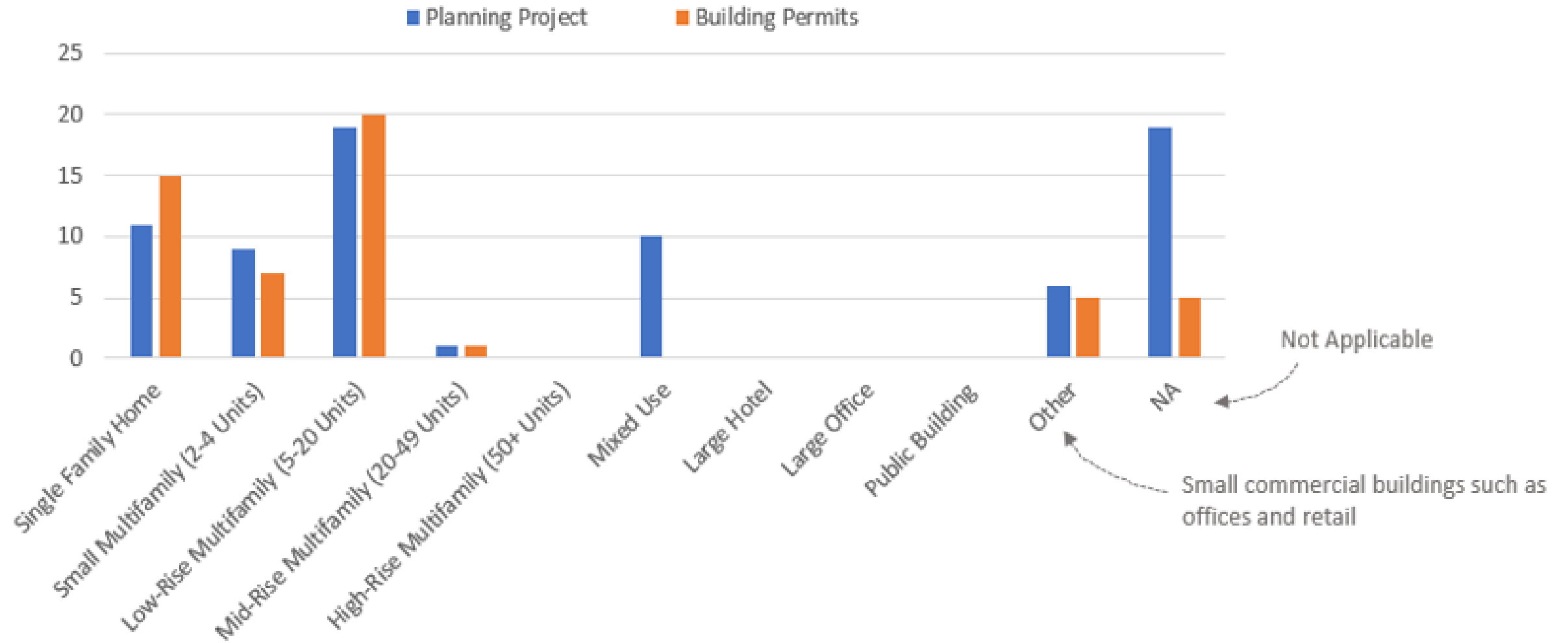
WHAT ABOUT CALGREEN?

	2016 Standards	2019 Standards
Tier 1	<ul style="list-style-type: none"> ● Residential: 15% better than 2016 Code ● Non-Residential: 5% better than 2016 Code 	<ul style="list-style-type: none"> ● Residential: <ul style="list-style-type: none"> ○ % Better is replaced with EDR scores ○ EDR score of 14 or lower
Tier 2	<ul style="list-style-type: none"> ● Residential: 30% better than 2016 Code ● Non-Residential: 10% better than 2016 Code 	<ul style="list-style-type: none"> ● Residential: EDR score of 6 or lower



PRELIMINARY ENERGY MODELING

BUILDING STOCK



SELECTED PROTOTYPES SO FAR



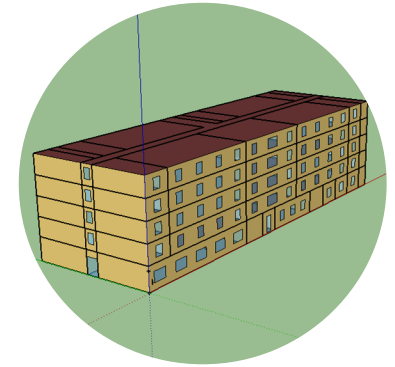
SINGLE FAMILY HOME



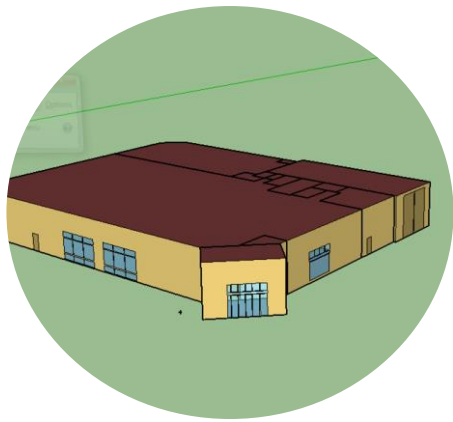
LOW-RISE MF (2-4 Units)



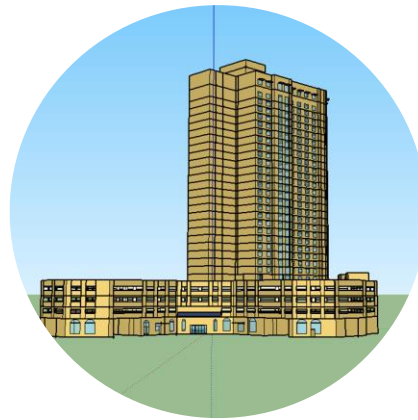
LOW-RISE MF (5-20 Units)



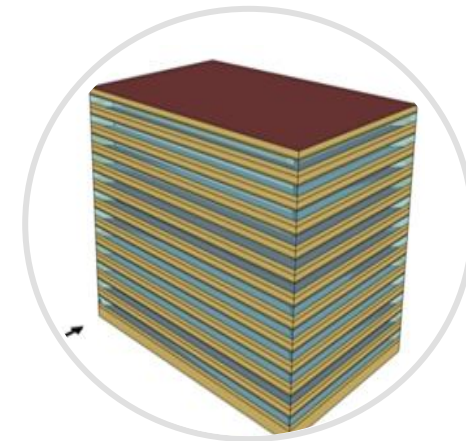
MIXED USES (5 stories)



PUBLIC FACILITY

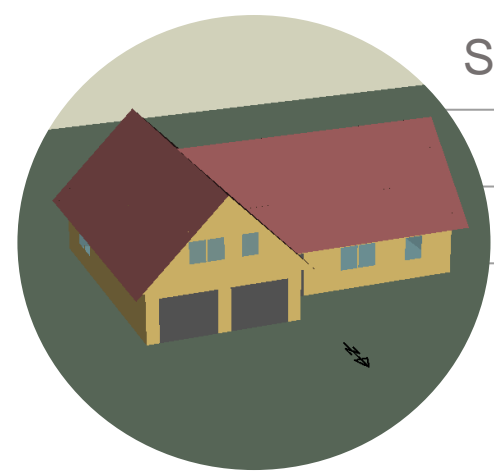


LARGE HOTEL (500k sf+)



LARGE OFFICE (500k sf+)

SINGLE FAMILY HOME



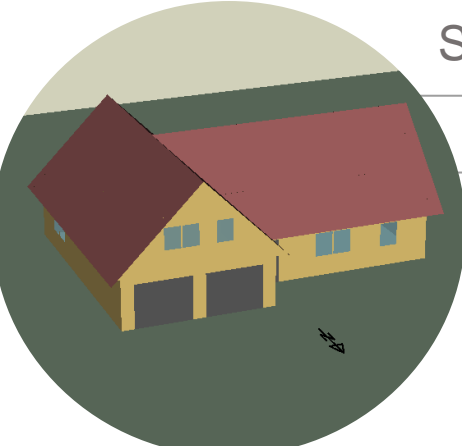
# Stories	0	# Bedrooms	3
# Dwelling Units	1	Total Area (sf)	2,100

	Title 24 - Standard 2016	Title 24 - Standard 2019	All Electric (Living Building Challenge)
Exterior Roof Name	R-30 Roof	R-30 Roof*	R-30 Roof
External Wall Name	R-15 Wall	R-15 Wall*	R-19 Wall
Windows Name	Double Pane Windows	Double Pane Windows	Double Pane Windows
Windows U-Value	0.3	0.3*	0.3
Windows SHGC	0.23	0.23*	0.23
Primary HVAC System	SplitAirCond	SplitAirCond	SplitAirCond
Secondary HVAC System	Furnace	Furnace	Electric
General Cooling Efficiency	14 SEER / 12 EER	14 SEER / 12 EER*	16 SEER/ 13 EER
General Heating Efficiency	80% AFUE	80% AFUE	100%
Water-Side Systems	n/a	n/a	n/a
Domestic Hot Water System	Conventional Gas Heater	Conventional Gas Heater	Heat Pump Water Heater
Required Solar?	Solar-Ready	Yes**	Yes**

*Modeling assumptions based on 2019 CBECC software (research or beta version). As 2019 progresses, CPUC notes its calculations and results can change.

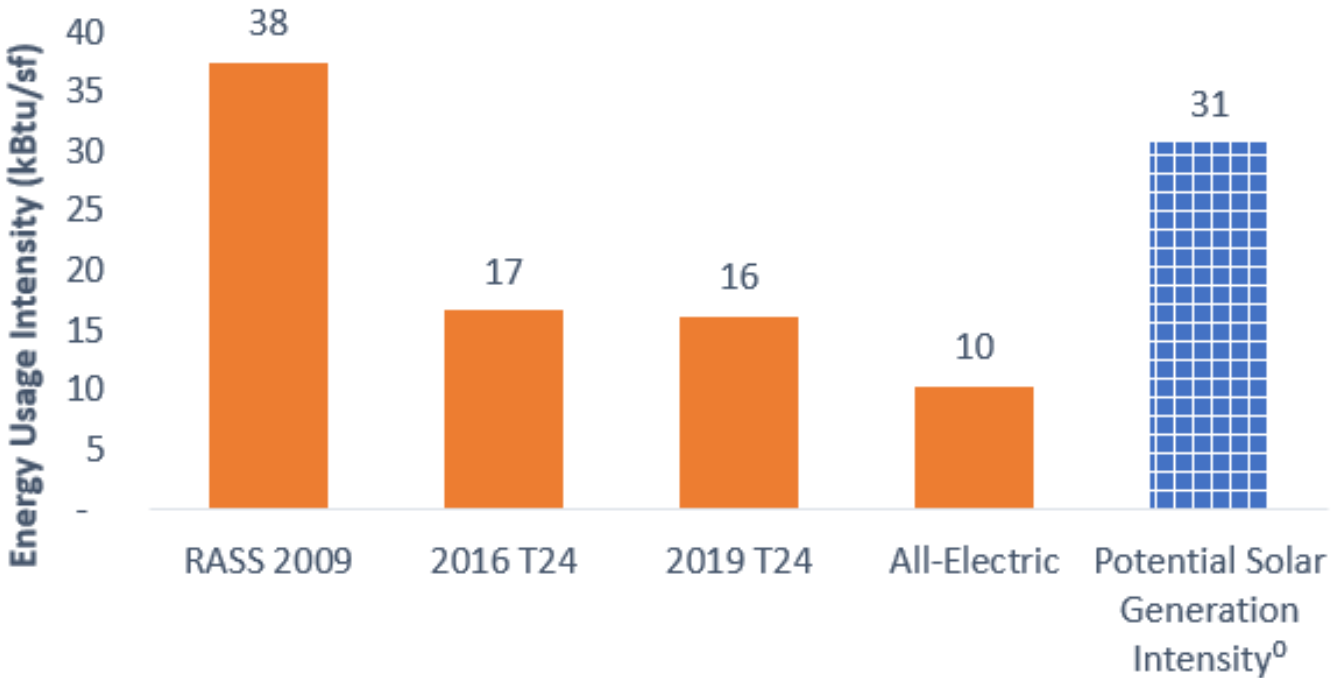
** Solar requirement to meet 2019 code requirements has language to reduce solar system sizing based on certain criterias.

SINGLE FAMILY HOME



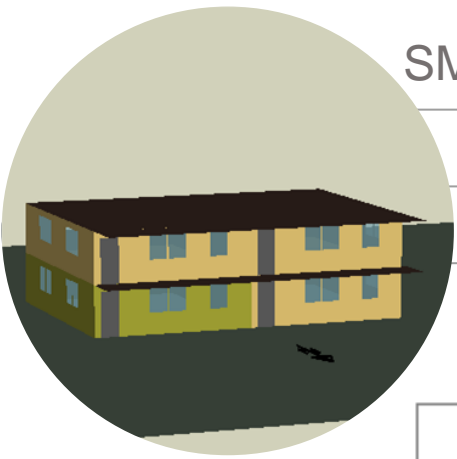
# Stories	0	# Bedrooms	3
# Dwelling Units	1	Total Area (sf)	2,100

Single Family Home Energy Usage Intensity (EUI)



* RASS 2009 is the Residential Appliance Saturation Study (similar to CEUS but for residential), collecting energy usage data of existing buildings. The data shown is derived from the survey collected in WeHo climate zone.
⁰ Potential Solar Generation Intensity is an estimation based on 70% of the available roof and basic rule of thumb. Potential of solar generation intensity will decrease if the number of stories increase. Actual values would vary based on project design and available space.

SMALL LOW-RISE (2-4 units)



# Stories	2	# Bedrooms	6
# Dwelling Units	4	Total Area (sf)	3,480

	Title 24 - Standard 2016	Title 24 - Standard 2019	All Electric (Living Building Challenge)
Exterior Roof Name	R-30 Roof	R-30 Roof*	R-30 Roof
External Wall Name	R-15 Wall	R-15 Wall*	R-15 Wall
Windows Name	Double Pane Windows	Double Pane Windows	Double Pane Windows
Windows U-Value	0.3	0.3*	0.3
Windows SHGC	0.23	0.23*	0.23
Primary HVAC System	SplitAirCond	SplitAirCond	Heat Pump
Secondary HVAC System	Furnace	Furnace	Electric
General Cooling Efficiency	14 SEER / 12 EER	14 SEER / 12 EER*	14 SEER / 12 EER*
General Heating Efficiency	80% AFUE	80% AFUE	8.2 HSPF
Domestic Hot Water System	Conventional Gas	Conventional Gas	Heat Pump Water Heater
Required Solar?	Solar-Ready	Yes**	Yes**

*Modeling assumptions based on 2019 CBECC software (research or beta version). As 2019 progresses, CPUC notes its calculations and results can change.

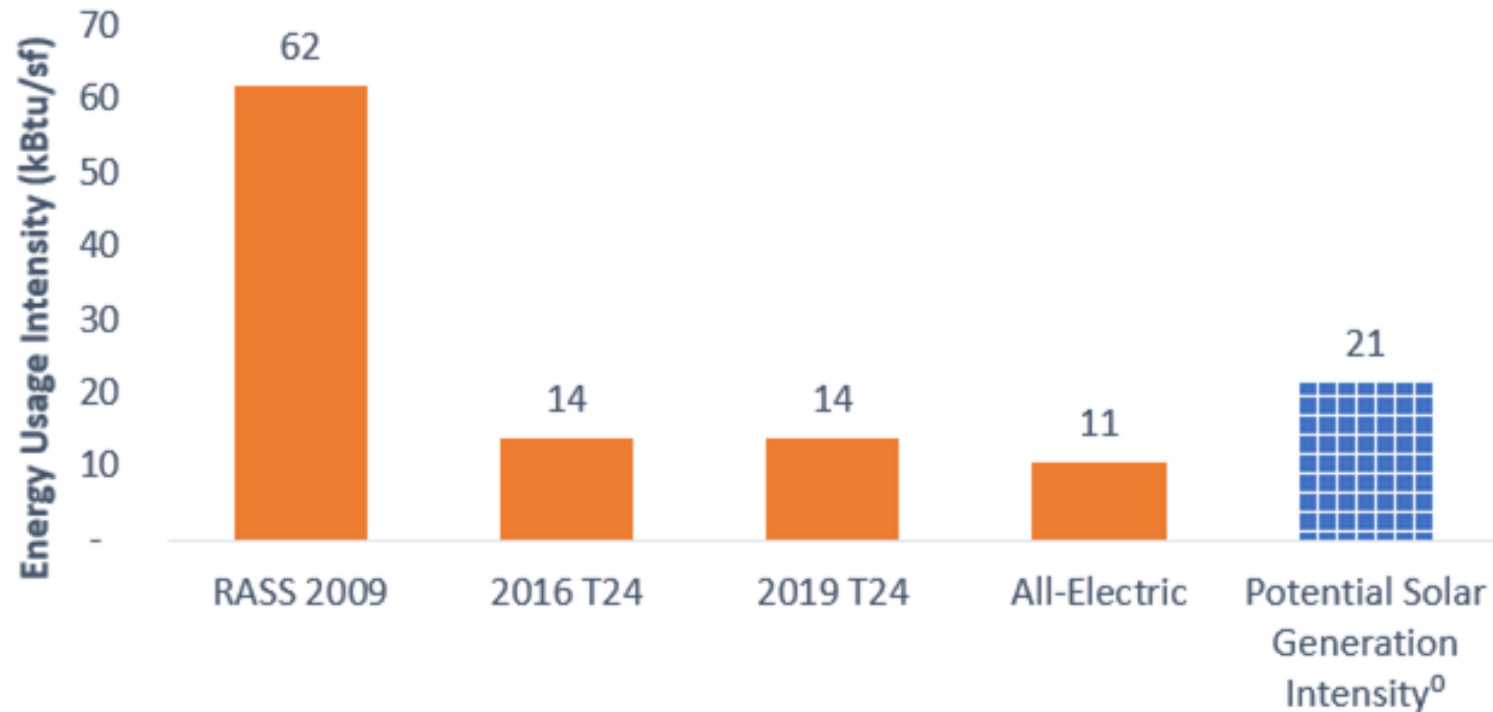
** Solar requirement to meet 2019 code requirements has language to reduce solar system sizing based on certain criterias.

SMALL LOW-RISE (2-4 units)



# Stories	2	# Bedrooms	6
# Dwelling Units	4	Total Area (sf)	3,480

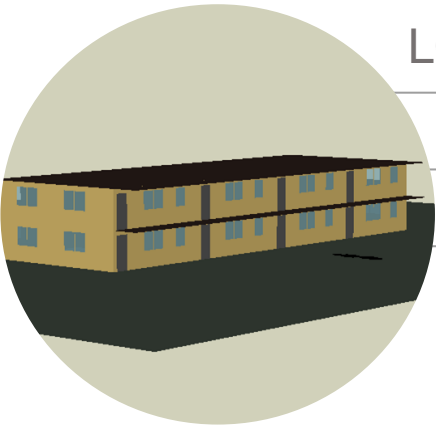
Low-Rise (2-4 Units) Energy Usage Intensity (EUI)



* RASS 2009 is the Residential Appliance Saturation Study (similar to CEUS but for residential), collecting energy usage data of existing buildings. The data shown is derived from the survey collected in WeHo climate zone.

⁰ Potential Solar Generation Intensity is an estimation based on 70% of the available roof and basic rule of thumb. Potential of solar generation intensity will decrease if the number of stories increase. Actual values would vary based on project design and available space.

LOW-RISE (5-20 units)



# Stories	2-3	# Bedrooms	12
# Dwelling Units	8	Total Area (sf)	6,960

	Title 24 - Standard 2016	Title 24 - Standard 2019	All Electric (Living Building Challenge)
Exterior Roof Name	R-30 Roof	R-30 Roof*	R-30 Roof
External Wall Name	R-15 Wall	R-15 Wall*	R-19 Wall
Windows Name	Double Pane Windows	Double Pane Windows	Double Pane Windows
Windows U-Value	0.3	0.3*	0.3
Windows SHGC	0.23	0.23*	0.23
Primary HVAC System	SplitAirCond	SplitAirCond	Heat Pump
Secondary HVAC System	Furnace	Furnace	Electric
General Cooling Efficiency	14 SEER / 12 EER	14 SEER / 12 EER*	14 SEER / 12 EER*
General Heating Efficiency	80% AFUE	80% AFUE	8.2 HSPF
Water-Side Systems	n/a	n/a	n/a
Domestic Hot Water System	Conventional Gas	Conventional Gas	Heat Pump Water Heater
Required Solar?	Solar-Ready	Yes**	Yes**

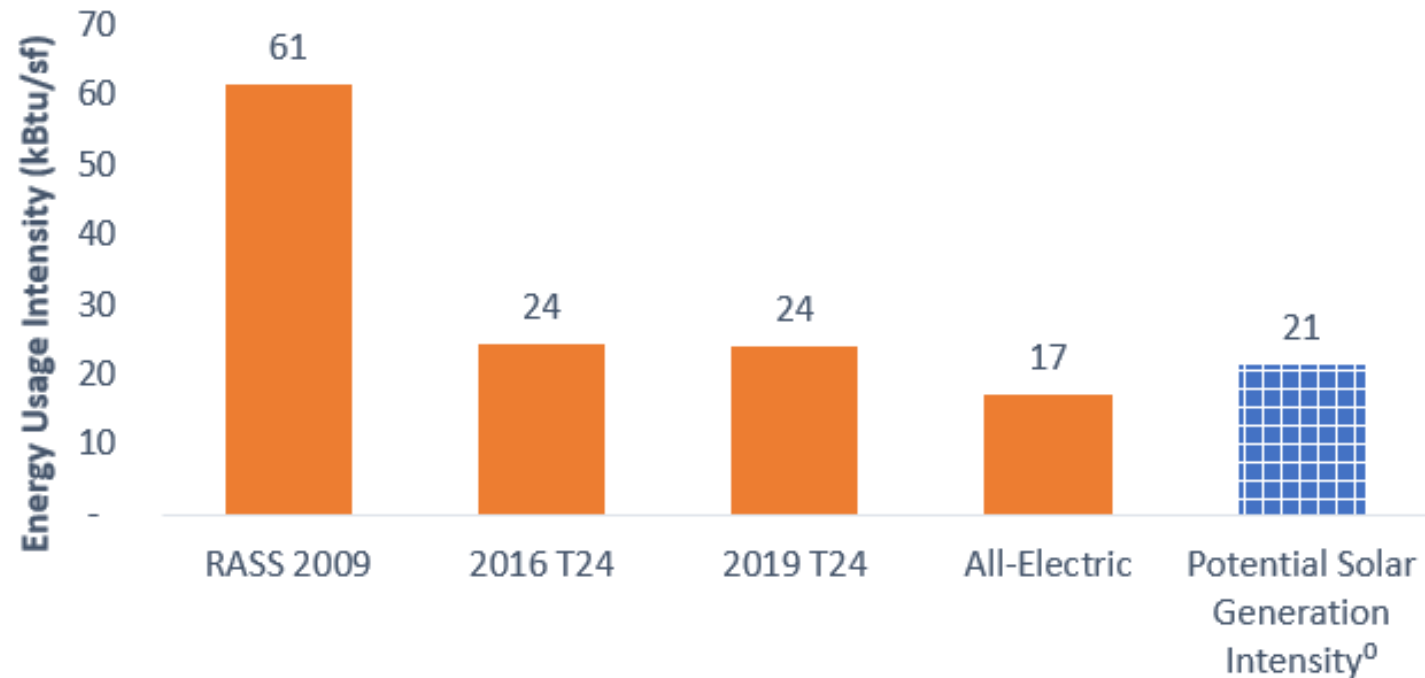
*Modeling assumptions based on 2019 CBECC software (research or beta version). As 2019 progresses, CPUC notes its calculations and results can change.

** Solar requirement to meet 2019 code requirements has language to reduce solar system sizing based on certain criterias.

LOW-RISE (5-20 units)

# Stories	2-3	# Bedrooms	12
# Dwelling Units	8	Total Area (sf)	6,960

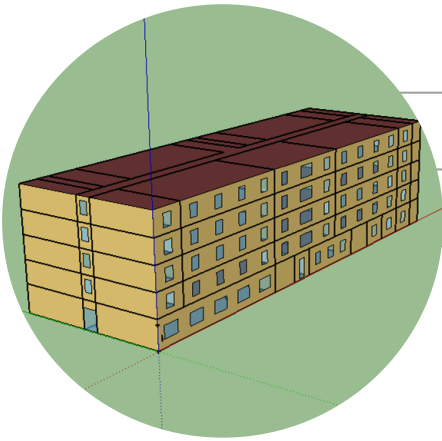
Low-Rise (5+ Units) Energy Usage Intensity (EUI)



* RASS 2009 is the Residential Appliance Saturation Study (similar to CEUS but for residential), collecting energy usage data of existing buildings. The data shown is derived from the survey collected in WeHo climate zone.

⁰ Potential Solar Generation Intensity is an estimation based on 70% of the available roof and basic rule of thumb. Potential of solar generation intensity will decrease if the number of stories increase. Actual values would vary based on project design and available space.

MIXED USE



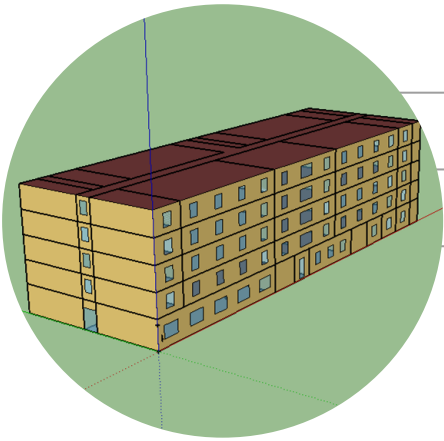
# Stories	5	Res Area (sf)	34,000
# Dwelling Units	20	Total Area (sf)	54,000

	LEEDv4	Title 24 - Standard 2016	Title 24 - Standard 2019
Exterior Roof Name	R-20 Roof	R-30 Roof	R-30 Roof*
External Wall Name	R-15 Wall	R-15 Wall	R-15 Wall*
Windows Name	Fixed Window	Double Pane Windows	Double Pane Windows
Windows U-Value	0.6	0.36	0.3*
Windows SHGC	0.25	0.25	0.23*
Primary HVAC System	Central Air System	SplitAirCond	SplitAirCond
Secondary HVAC System	PTAC	Furnace	Furnace
General Cooling Efficiency	3.5 COP	14 SEER / 12 EER	14 SEER / 12 EER*
General Heating Efficiency	80%	80% AFUE	80% AFUE
Water-Side Systems	No	n/a	n/a
Domestic Hot Water System	Conventional Gas	Conventional Gas	Conventional Gas
Required Solar?	No	Solar-Ready	Yes**

*Modeling assumptions based on 2019 CBECC software (research or beta version). As 2019 progresses, CPUC notes its calculations and results can change.

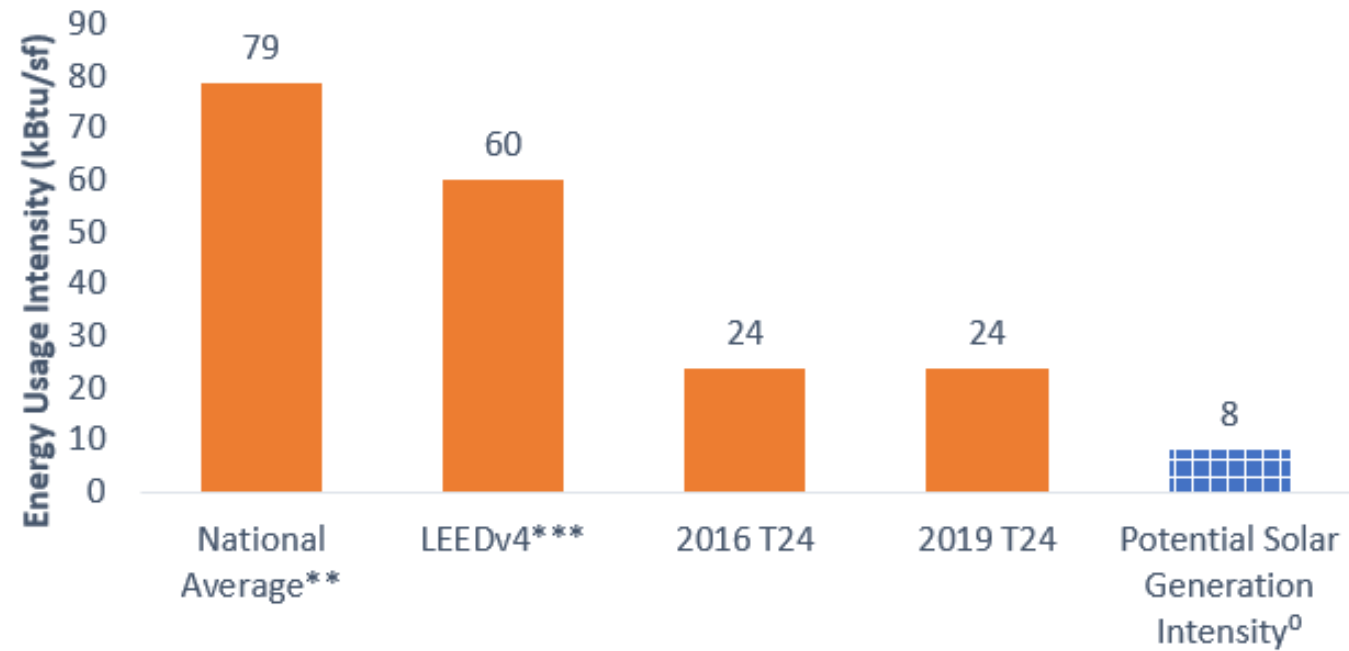
** Solar requirement to meet 2019 code requirements has language to reduce solar system sizing based on certain criterias.

MIXED USE



# Stories	5	Res Area (sf)	34,000
# Dwelling Units	20+	Total Area (sf)	54,000

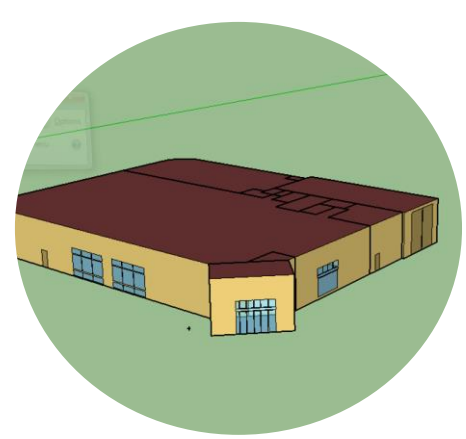
Mixed Uses Energy Usage Intensity (EUI)



** National Average EUI referenced Energy Star.

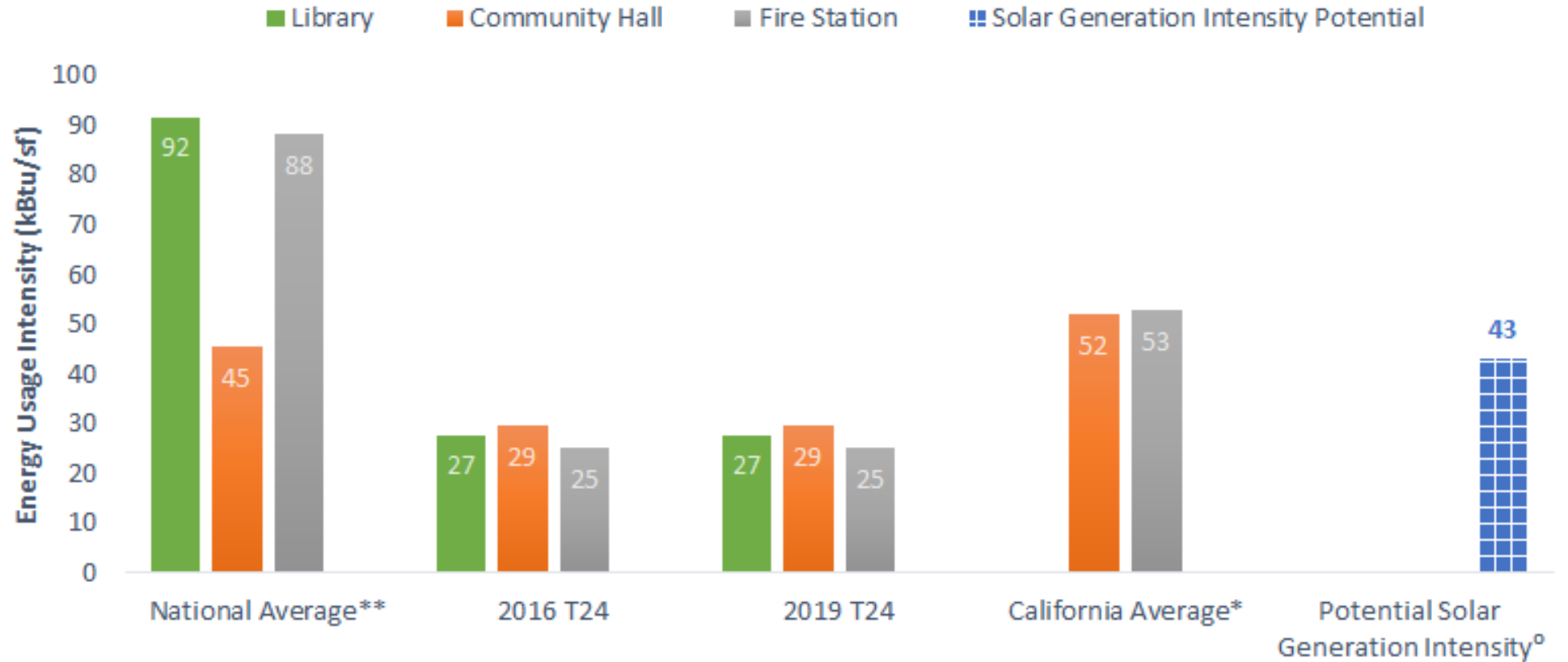
*** LEEDv4 requires 5% better than ASHRAE 90.1 - 2010.

⁰ Potential Solar Generation Intensity is an estimation based on 70% of the available roof and basic rule of thumb. Potential of solar generation intensity will decrease if the number of stories increase. Actual values would vary based on project design and available space.



PUBLIC FACILITY

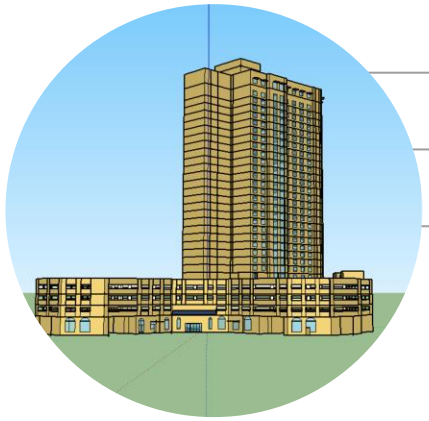
Public Facilities Energy Usage Intensity (EUI)



* California Average EUI referenced California End Use Survey (2006) and project experience inside California of municipal buildings.

** National Average EUI referenced Energy Star.

^o Potential Solar Generation Intensity is an estimation based on 70% of the available roof and basic rule of thumb, assuming most municipal buildings are 1-story buildings. Potential of solar generation intensity will decrease if the number of stories increase. Actual values would vary based on project design and available space.

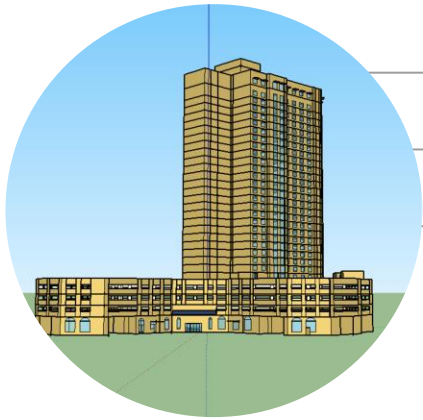


LARGE HOTEL

# Stories	15+	Non-Res Area (sf)	310,000
GuestRoom Area (sf)	140,000	Total Area (sf)	450,000

	LEEDv4	Title 24 - Standard 2016	Title 24 - Standard 2019
Exterior Roof Name	R-20 Roof	R-30 Roof	R-30 Roof*
External Wall Name	R-15 Wall	R-15 Wall	R-15 Wall*
Windows Name	Fixed Window	Double Pane Windows	Double Pane Windows
Windows U-Value	0.6	0.36	0.36*
Windows SHGC	0.25	0.25	0.25*
Primary HVAC System	Central Air System	Central Air System	Central Air System
Secondary HVAC System	PTAC	Fan Coil Terminal Units	Fan Coil Terminal Units
General Cooling Efficiency	3.5 COP	4.7 COP	4.7 COP*
General Heating Efficiency	80%	80%	80%*
Water-Side Systems	No	Yes	Yes
Domestic Hot Water System	Conventional Gas	Conventional Gas	Conventional Gas
Required Solar?	No	Solar Ready	Solar Ready

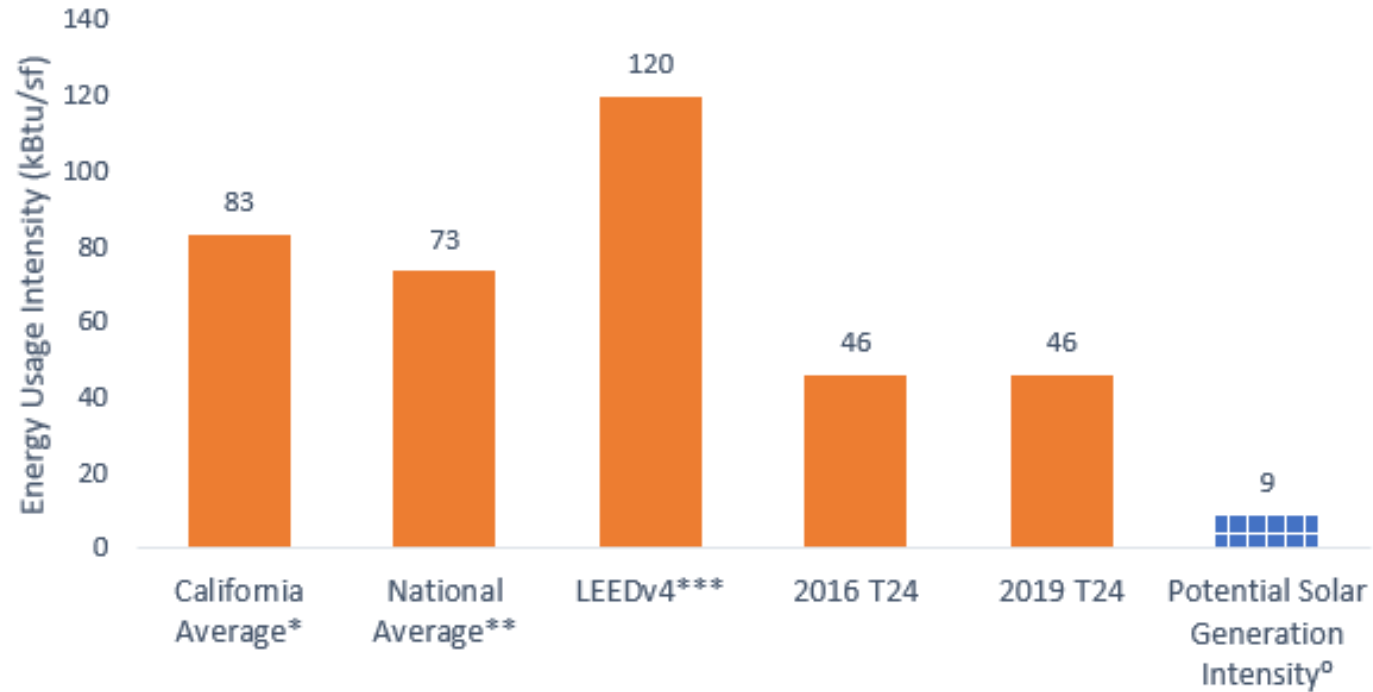
*Modeling assumptions based on 2019 CBECC software (research or beta version). As 2019 progresses, CPUC notes its calculations and results can change.



LARGE HOTEL

# Stories	15+	Non-Res Area (sf)	310,000
GuestRoom Area (sf)	140,000	Total Area (sf)	450,000

Large Hotel Energy Usage Intensity (EUI)



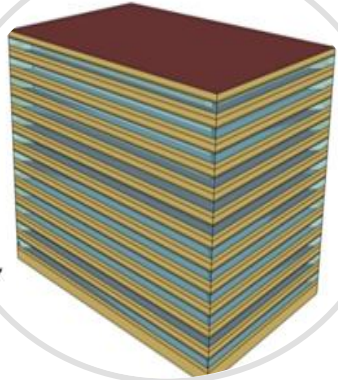
* California Average EUI referenced California End Use Survey (2006).

** National Average EUI referenced Energy Star.

*** LEEDv4 requires 5% better than ASHRAE 90.1 - 2010.

° Potential Solar Generation Intensity is an estimation based on 70% of the available roof and basic rule of thumb. Potential of solar generation intensity will decrease if the number of stories increase. Actual values would vary based on project design and available space.

MEDIUM OFFICE

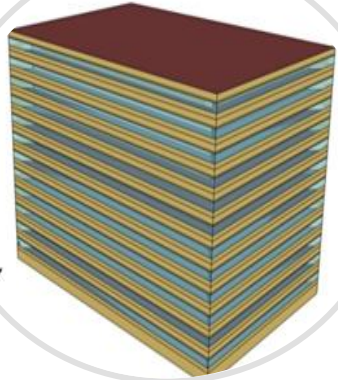


# Stories	8-10+
Total Area (sf)	500,000

	LEEDv4 (5% than ASHRAE 90.1 -2010)	Title 24 - Standard 2016	Title 24 - Standard 2019	All Electric (Living Building Challenge)
Exterior Roof Name	R20 Roof	R-21 Roof	R-21 Roof*	R38 Roof
External Wall Name	R-12 Walls	R-15 Wall	R-15 Wall*	R-34 Wall
Windows Name	FixedWindow	FixedWindow	FixedWindow	FixedWindow
Windows U-Value	0.65	0.36	0.36*	0.36
Windows SHGC	0.25	0.25	0.25*	0.25
Primary HVAC System	Central Air	Central Air	Central Air	Central Air with Radiant Heating
General Cooling Efficiency	5.5 COP	6 COP	6 COP*	7 COP
General Heating Efficiency	80%	80%	80%*	100%
Water-Side Systems	Yes	Yes	Yes	Yes
Domestic Hot Water System	Conventional Gas	Conventional Gas	Conventional Gas	Electric
Required Solar?	No	Solar-Ready	Solar-Ready	Yes

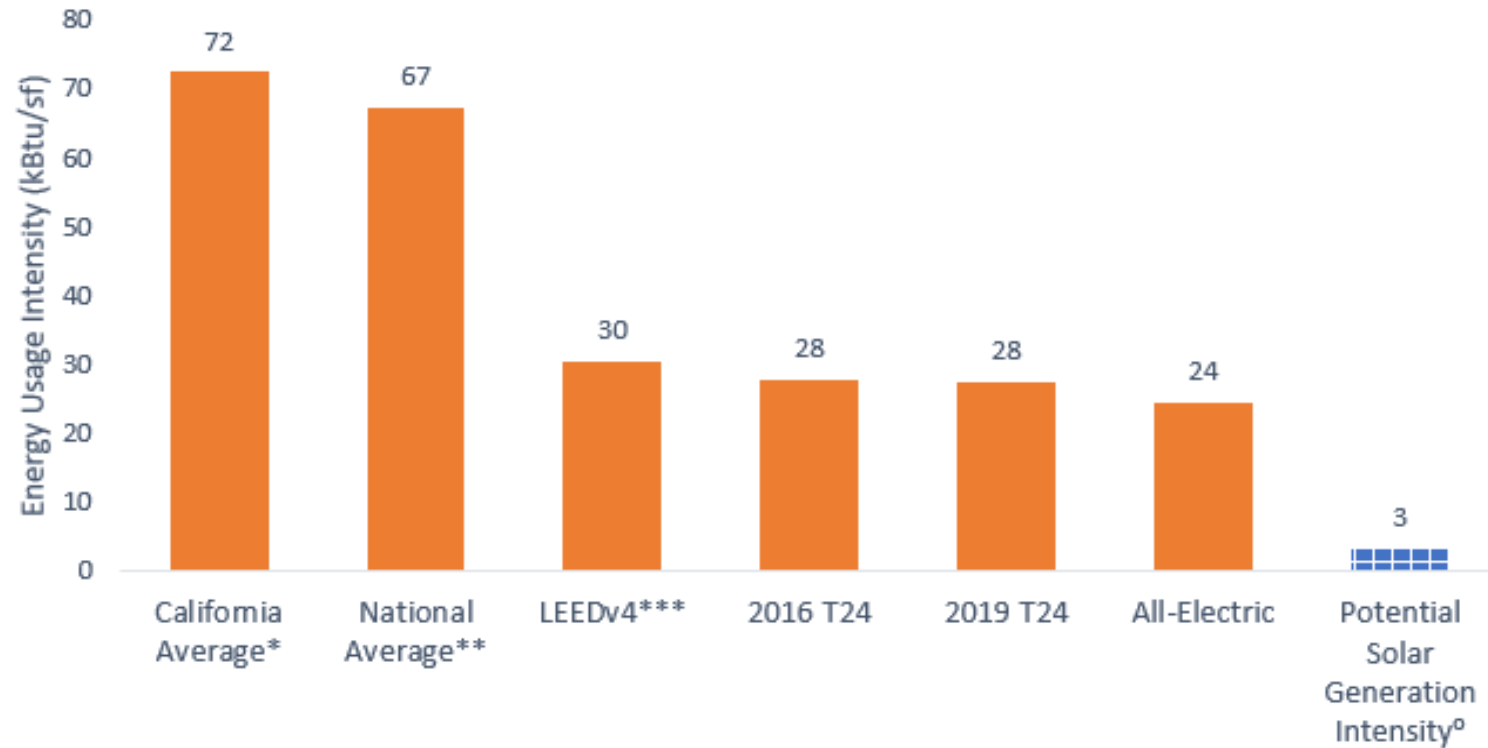
*Modeling assumptions based on 2019 CBECC software (research or beta version). As 2019 progresses, CPUC notes its calculations and results can change.

MEDIUM OFFICE



# Stories	8-10+
Total Area (sf)	500,000

Office Energy Usage Intensity (EUI)



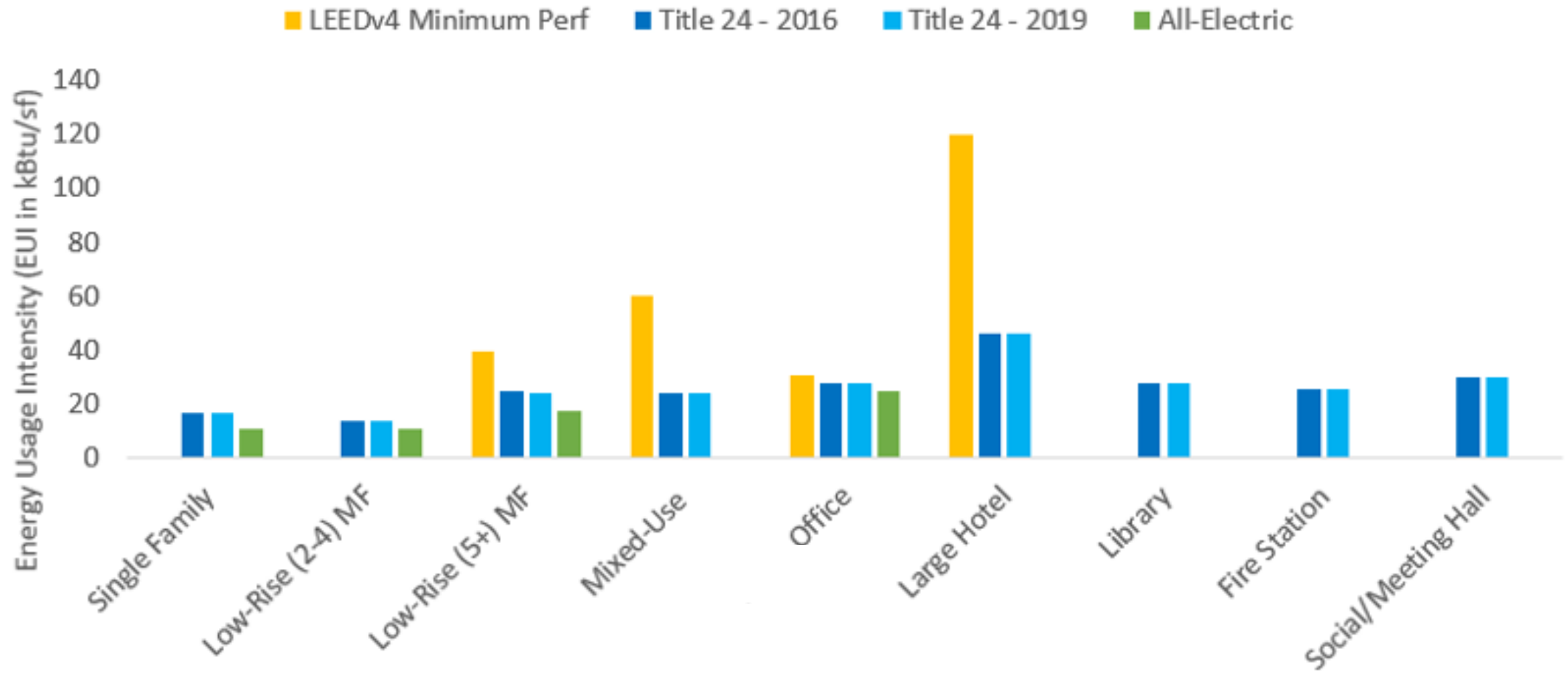
* California Average EUI referenced California End Use Survey (2006).

** National Average EUI referenced Energy Star.

*** LEEDv4 requires 5% better than ASHRAE 90.1 - 2010.

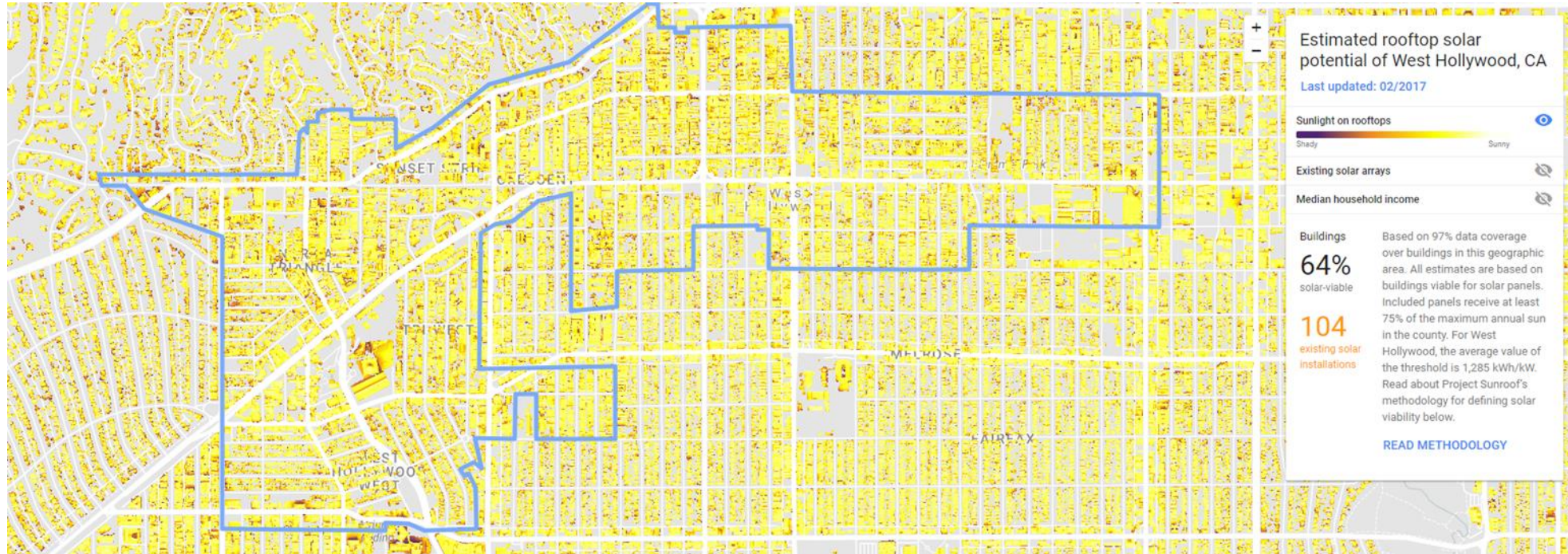
° Potential Solar Generation Intensity is an estimation based on 70% of the available roof and basic rule of thumb. Potential of solar generation intensity will decrease if the number of stories increase. Actual values would vary based on project design and available space.

IN SUMMARY



GETTING TO ZERO (ENERGY)

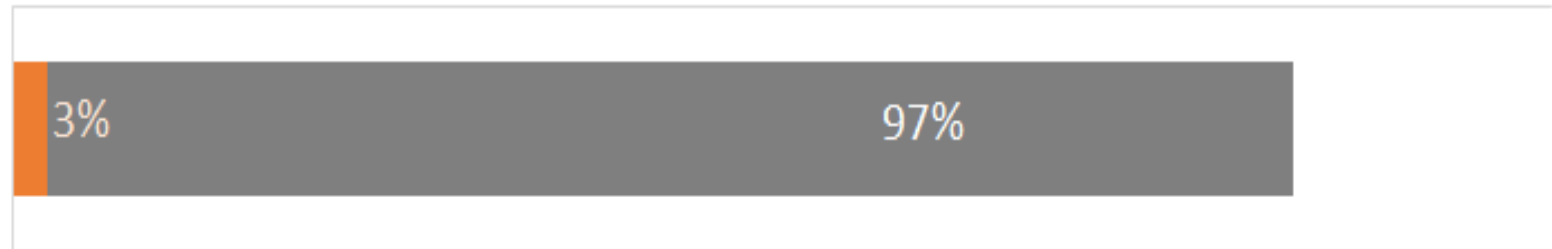
CITY'S SOLAR CAPACITY



■ Existing Solar Installations

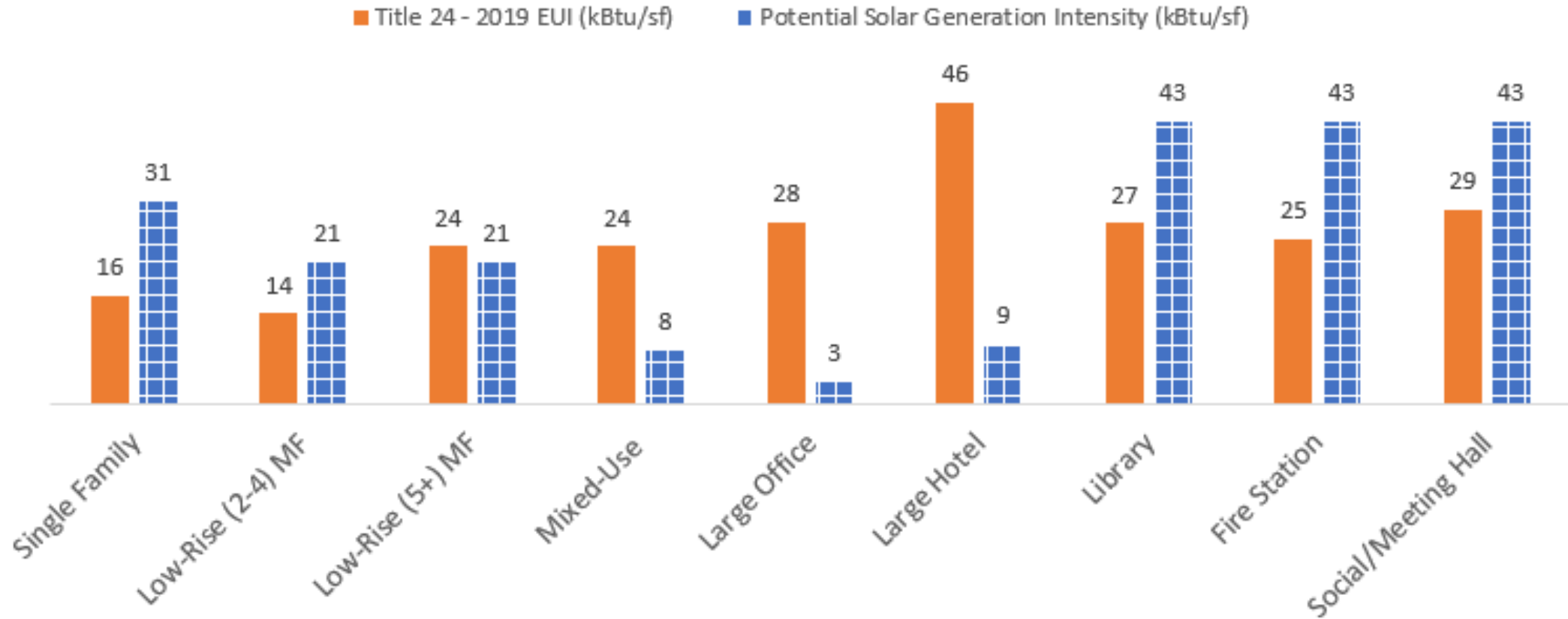
■ Available Roofs for Solar Install

WEHO ROOF CAPACITY



IS ZNE POSSIBLE?

Code Compliance Energy Use Intensity vs Solar Generation Potential



LOOKING AT SOLAR

		Solar-Ready Req.	Solar Install Req.	Notes
1	LEEDv4	✗	✗	<ul style="list-style-type: none">Installation of renewable system is optional.
2	WeHo Green Building Ordinance (2008)	✓	✗	<ul style="list-style-type: none">Tenant improvements are exempt.WeHo Solar Ordinance - Streamlining solar installation permits for small residential (single family, duplexes).
3	Title 24 - 2016	✓	✗	<ul style="list-style-type: none">Only require solar-ready.
4	Title 24 - 2019 Standards (Currently Draft)	✓	✓	<ul style="list-style-type: none">For residential, PV sizes may be reduced by 25 percent if installed in conjunction with a battery storage system (meet qualification listed in JA12 and minimum 8kWh in size). Commercial - TBD

EMPOWERING THE OCCUPANT

Encouraging Integration of Smart Control Devices



Utilizing existing D&R residential programs
(Example: OhmConnect)



As simple as flipping a light switch.



1. Receive notification



2. Reduce



3. Get Paid

Breakout Discussion



Energy

Water

Resource Recovery

Administration & Verification