California Housing Partnership
California's Experts on Affordable Housing Finance, Advocacy & Policy

SCANPH
Southern California Association of NonProfit Housing

Demystifying Rehab Electrification

2023 LA Affordable Housing Decarbonization Summit

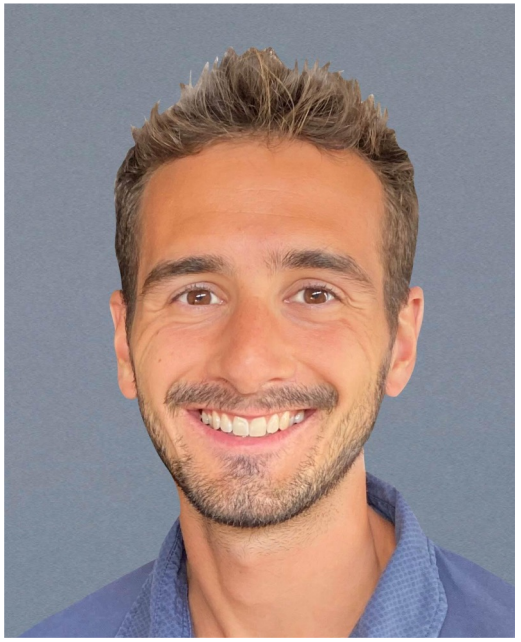
Panelists

Tim Kohut
Director of Sustainable Design
National CORE

Karen Krygier
Senior Asset Manager
Community Corp of Santa Monica

Panelists

Michael Rangel
Asset Management Assistant
Holos Communities



Luca Costa
Senior Associate
Association for Energy Affordability

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2023 LA Affordable Housing Decarbonization Summit

Tim Kohut

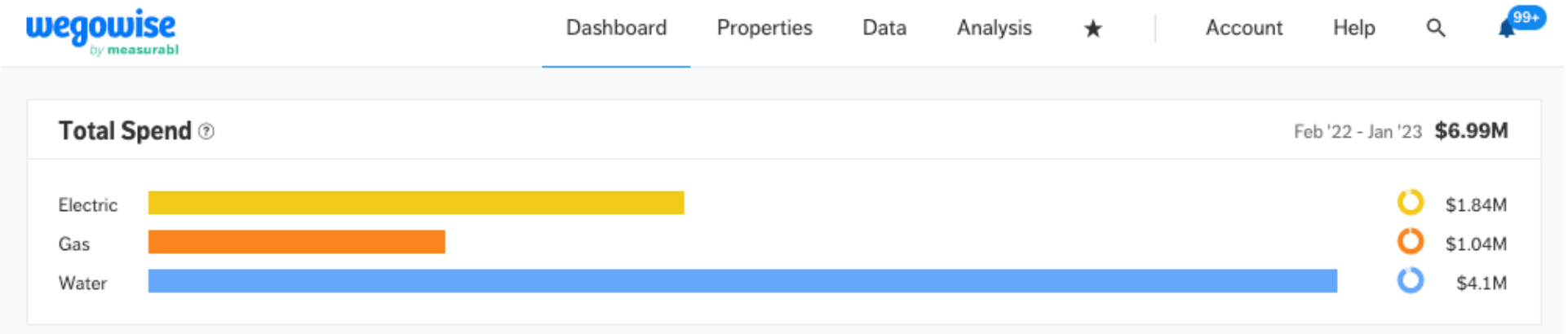
Fuel Switching
At No Cost (or for Profit!)

Tim Kohut, AIA, CEA
Director of Sustainable Design
National Community Renaissance
tkohut@nationalcore.org

Why rebate and economic analysis should drive your long-term planning…

Existing Portfolio – Managing Energy, Optimizing Cash Flow

It's about understanding the data…



National CORE spends $1.84M/year in electricity – adding renewables will help with this

National CORE spends $1.04M/year in natural gas – fuel switching and adding photovoltaics will help with this

National CORE spends $4.1M/year on water – this is 100% of our projects' water. We are making progress on this

wegowise by appfolio

Dashboard | Properties | Data | Analysis | ★ | Account | Help | 33

Trailing 12 months (Feb 2022 - Jan 2023) | Refresh data | Back to top | About this table

	Water				Energy				Total	
Property	Usage vs. Benchmark	Consumption per Bedroom	(gal) YoY Deviation	Spend	Usage vs. Benchmark	Consumption per Square Foot	(Btu) YoY Deviation	Spend	($) YoY Deviation	Spend
Las Palmas		19.5k gal	-34%	$13.7k		27.7k Btu	17%	$13.4k	6%	$27.1k
Lexington Square	–	–	–	–	–	–	0%	$4.34k	6%	$4.34k
Little Lake Village		9.22k gal	-51%	$39k		59.3k Btu	-5%	$65.1k	13%	$104k
Marv's Place		30.1k gal	-8%	$8.94k		33.1k Btu	0%	$14.8k	12%	$23.7k
Melrose Villas		12.9k gal	-18%	$112k		18.1k Btu	-9%	$40.5k	-6%	$153k
Mission Cove		26.6k gal	8%	$144k		12.2k Btu	-16%	$101k	4%	$245k
Mission Pointe		52.7k gal	-9%	$32k		9.05k Btu	6%	$15.6k	1%	$47.6k
Mission Village Senior		15.2k gal	6%	$50.2k		27.1k Btu	-32%	$42.9k	1%	$93k
Monterey Village		18.4k gal	-7%	$133k		6.09k Btu	166%	$10.7k	-4%	$143k
Mountainside		15.1k gal	0%	$226k		14.1k Btu	-1%	$79.2k	5%	$305k
Northgate Village		5.38k gal	-18%	$13.8k		5.1k Btu	4%	$23.6k	6%	$37.4k
Oakcrest Heights		10.6k gal	-15%	$10.7k		18.5k Btu	56%	$13.9k	-20%	$24.6k
Oakcrest Terrace		23k gal	3%	$24.9k		13k Btu	-54%	$9.73k	-18%	$34.6k
Olive Meadow		27k gal	1%	$21.1k		23.5k Btu	74%	$19.4k	-7%	$40.6k
Park View Terrace		11k gal	-17%	$19.4k		70.8k Btu	-9%	$36.9k	7%	$56.3k
Parkside	–	–	–	–		74.6k Btu	0%	$14.7k	9%	$14.7k
Paseo Del Oro Apts		21k gal	-14%	$107k		72.1k Btu	-1%	$81.1k	2%	$188k
Plaza at Sierra		13k gal	-34%	$23.9k		11.9k Btu	-7%	$31k	-11%	$54.9k
Promenade		13.6k gal	-1%	$15.9k		68.2k Btu	9%	$20.2k	-2%	$36.1k
Rancho Verde		16.8k gal	0%	$134k		16.7k Btu	-49%	$139k	9%	$273k
Total				$4.1M				$2.89M		$6.99M

SOMAH (Solar on Multi-Family Affordable Housing)

This is game changing for residents in affordable housing – but benefits electrical only)

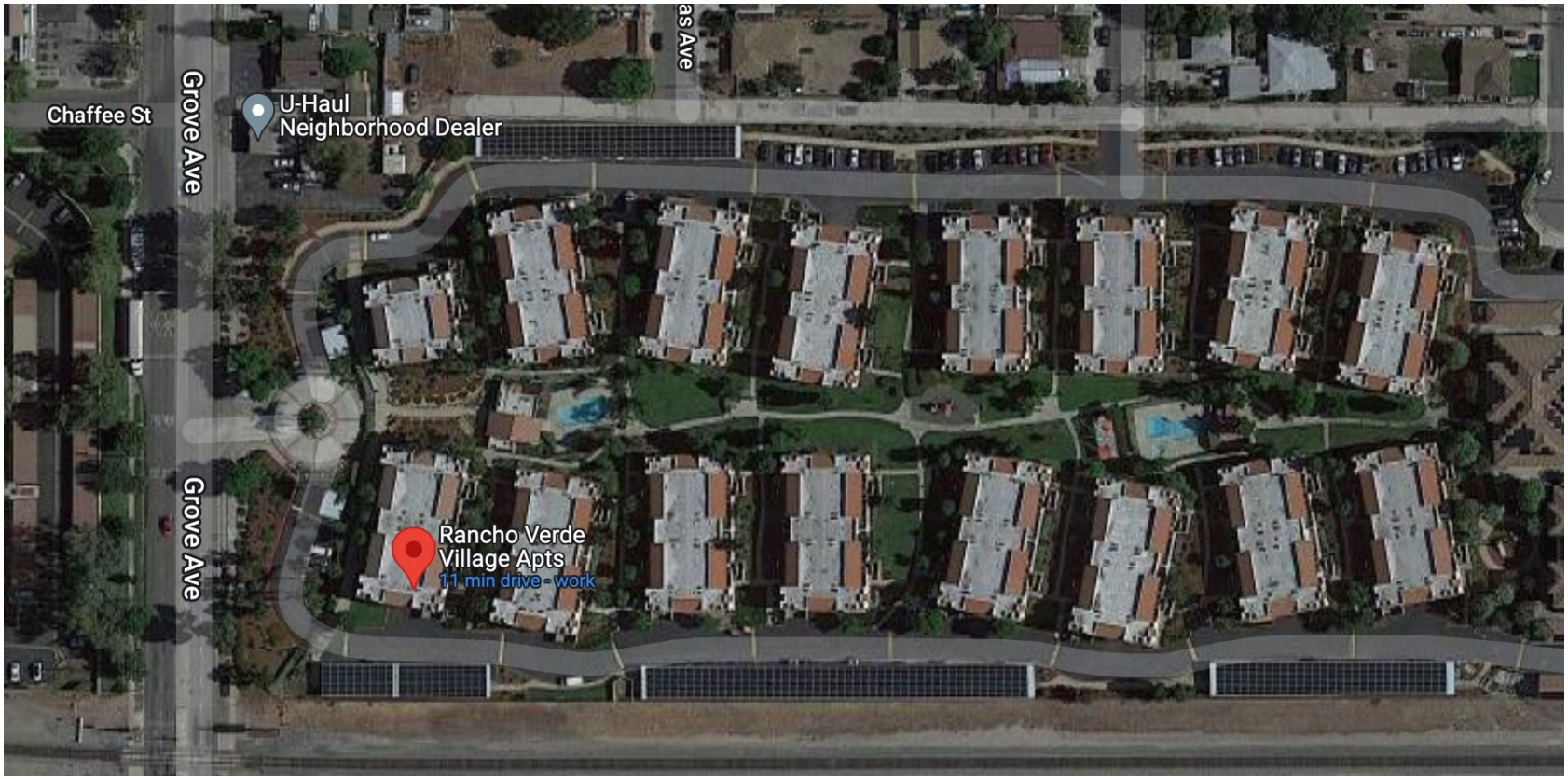
National CORE is in the midst of installing 15MW of SOMAH Funded PV on 55 different projects

We have leveraged more than $20M in rebate funds

Without coming out of pocket, our residents electricity bills will go to near zero, and our operational energy costs will be reduced by at least 40%.

National CORE – Fuel Switch
Pilot Project No. 1
Rancho Verde Village
Rancho Cucamonga, CA

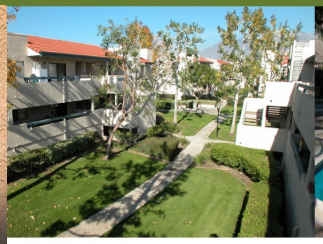
Rancho Verde Village – TECH Pilot

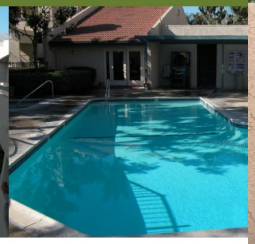


248 Units – Affordable Family

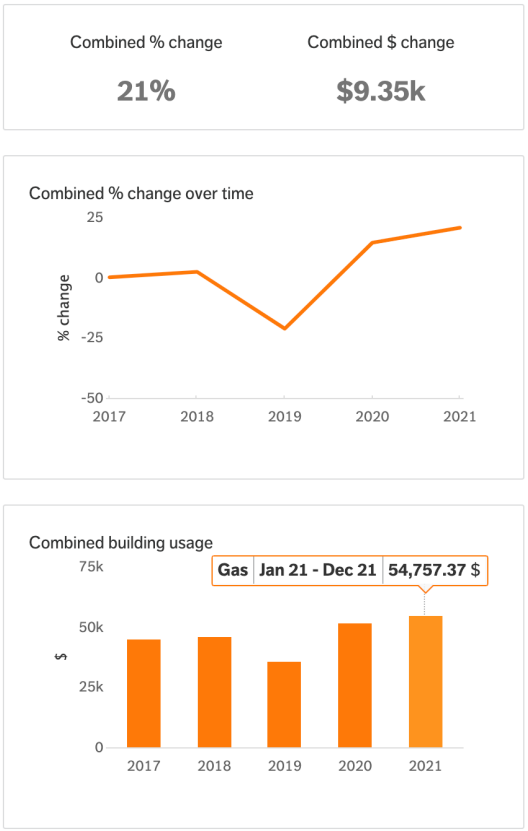
RANCHO VERDE VILLAGE

8837 Grove Avenue • Rancho Cucamonga, California 91730

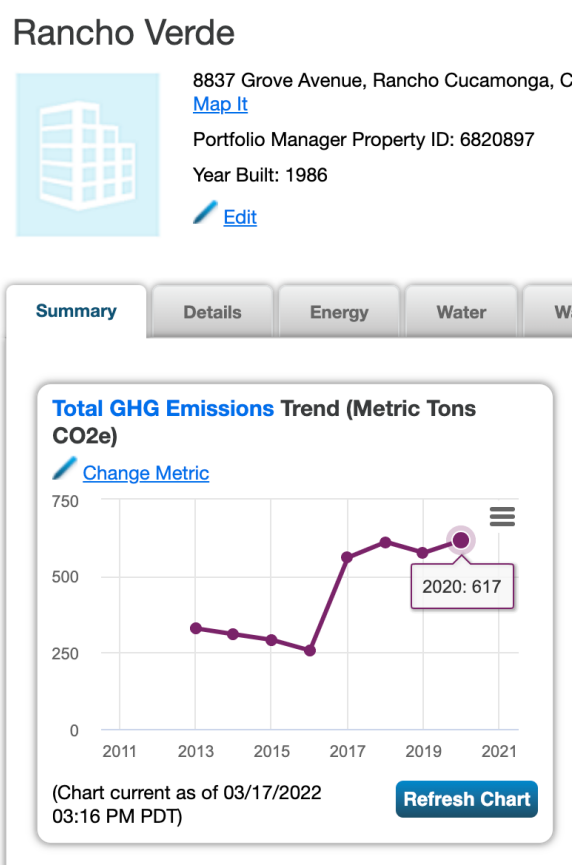




Rancho Verde Village – TECH Pilot

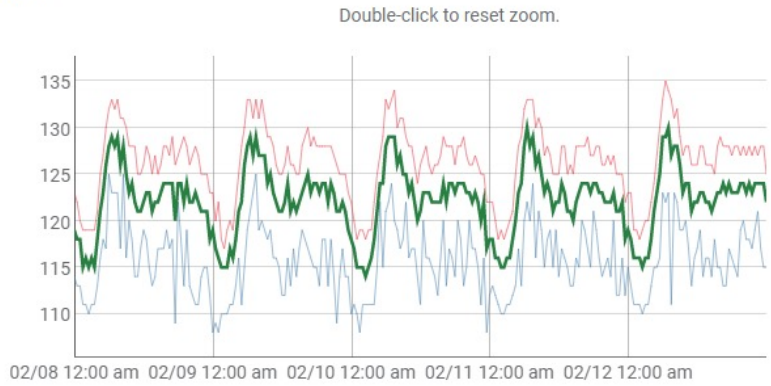


- 16 nearly identical buildings, 248 units
- Annual spend on natural gas - $55K
- 617 Metric Tons of CO2/Year (one of the worst performing buildings for GHG)
- Natural gas limited to hot water heating and laundry rooms.
- Project has a large MASH funded PV Footprint
- Goal is to fuel switch DHW, maybe laundry, and lease rooftop PV

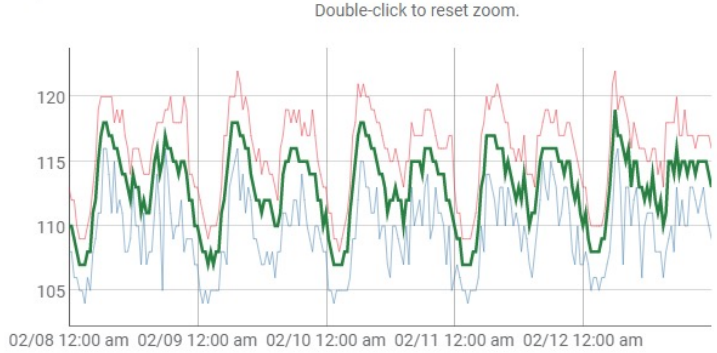


EDC Monitoring: Gas Boiler

Temperature Sensor 2: Storage 1 outlet



Temperature Sensor 5: Delivery Post Temp Valve



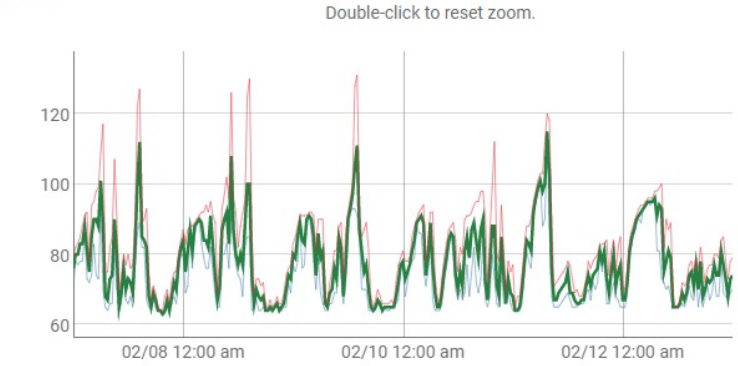
Rancho Verde

Project Summary:

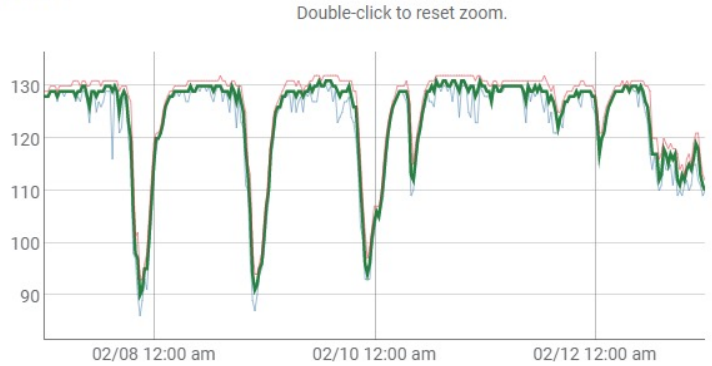
- Rancho Cucamonga, CA
- 248-Unit Affordable Housing Project
- 8 Aging Centralized Gas Boiler Systems
  - High operational cost
- SanCO2 Heat Pump Boiler Conversion
  - 4 heat pumps in each system paired with 2 storage tanks and an electric resistance tank
- Claimed Incentives
  - $785,720.00
- Project Cost
  - $778,256
- EDC Performance Monitoring Platform

EDC Monitoring Data: SanCO2

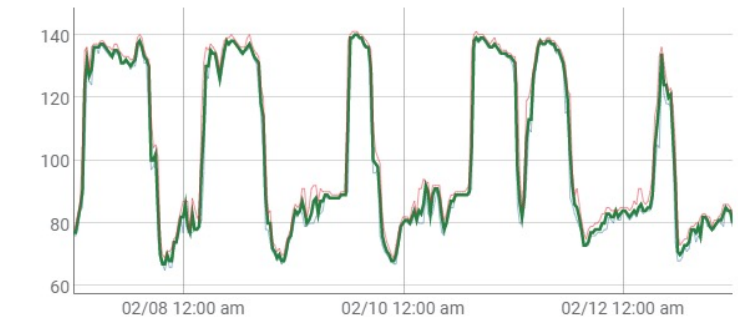
Temperature Sensor 1: Storage to Pumps



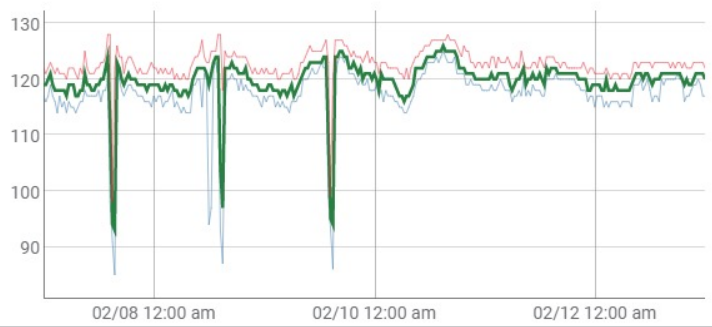
Temperature Sensor 5: Delivery Post Temp Valve



Temperature Sensor 2: Storage 1 outlet



Temperature Sensor 6: Heat Pump 1 Outlet



Rancho Verde - M&V

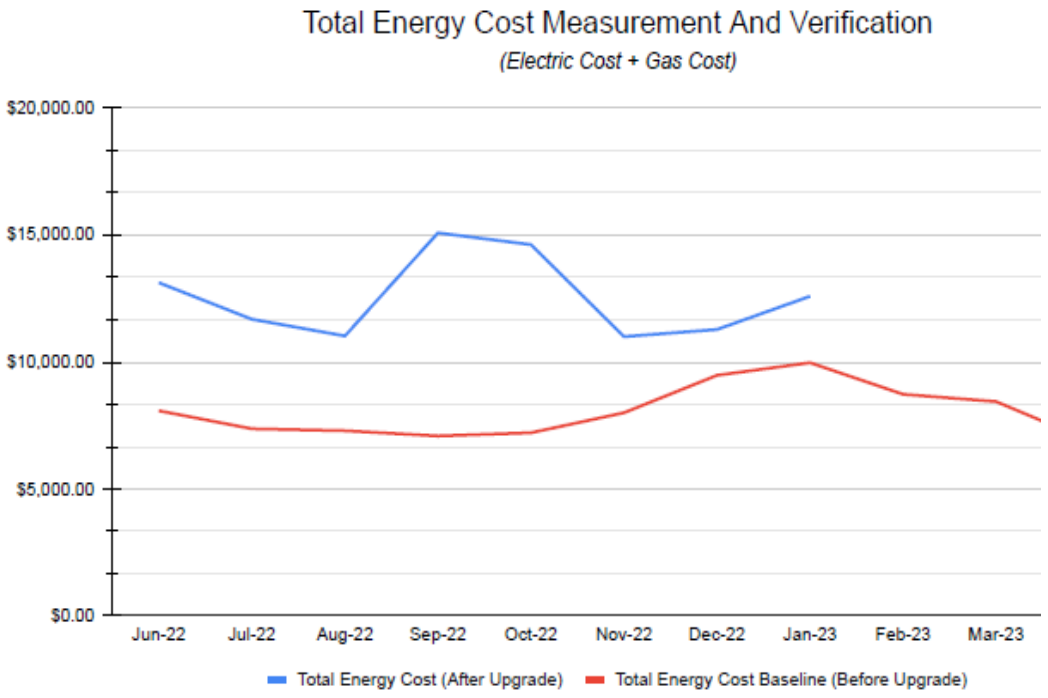
Summary:

- Gas costs have greatly decreased; however, the electricity costs have greatly increased. Overall, we have had an additional cost of $46,000
- How we are adjusting:
  - More solar on the project
  - Adjusting water heating times to off-peak Time-of-Use Rates {Smart water heater controllers}

Electricity Data	Total
Electricity Cost Pre Upgrade (Jun 2021 - May 2022)	$24,318.50
Electricity Cost Post Upgrade (Jun 2022 - May 2023)	$96,265.79
Electricity Cost Difference ($)	***$71,947.29***
Electricity Consumption Pre Upgrade (Jun 2021 - May 2022) kwh	128,706
Electricity Consumption Post Upgrade (Jun 2022 - May 2023) kwh	284,924
Electricity Consumption Difference (kWh)	***156,218***

Gas Data	Total
Gas Cost Pre Upgrade (Jun 2021 - May 2022)	$29,981.94
Gas Cost Post Upgrade (Jun 2022 - May 2023)	$4,154.26
Gas Cost Difference ($)	***-$25,827.68***
Gas Consumption Pre Upgrade (Jun 2021 - May 2022) therms	26,233
Gas Consumption Post Upgrade (Jun 2022 - May 2023) therms	1,602
Gas Consumption Difference (Therms)	***-24,631.68***

Total Energy Cost Data	Total
Total Energy Cost Pre Upgrade (Jun 2021 - May 2022)	$54,300.44
Total Energy Cost Post Upgrade (Jun 2022 - May 2023)	$100,420.05
Total Energy Cost Difference	***$46,119.61***

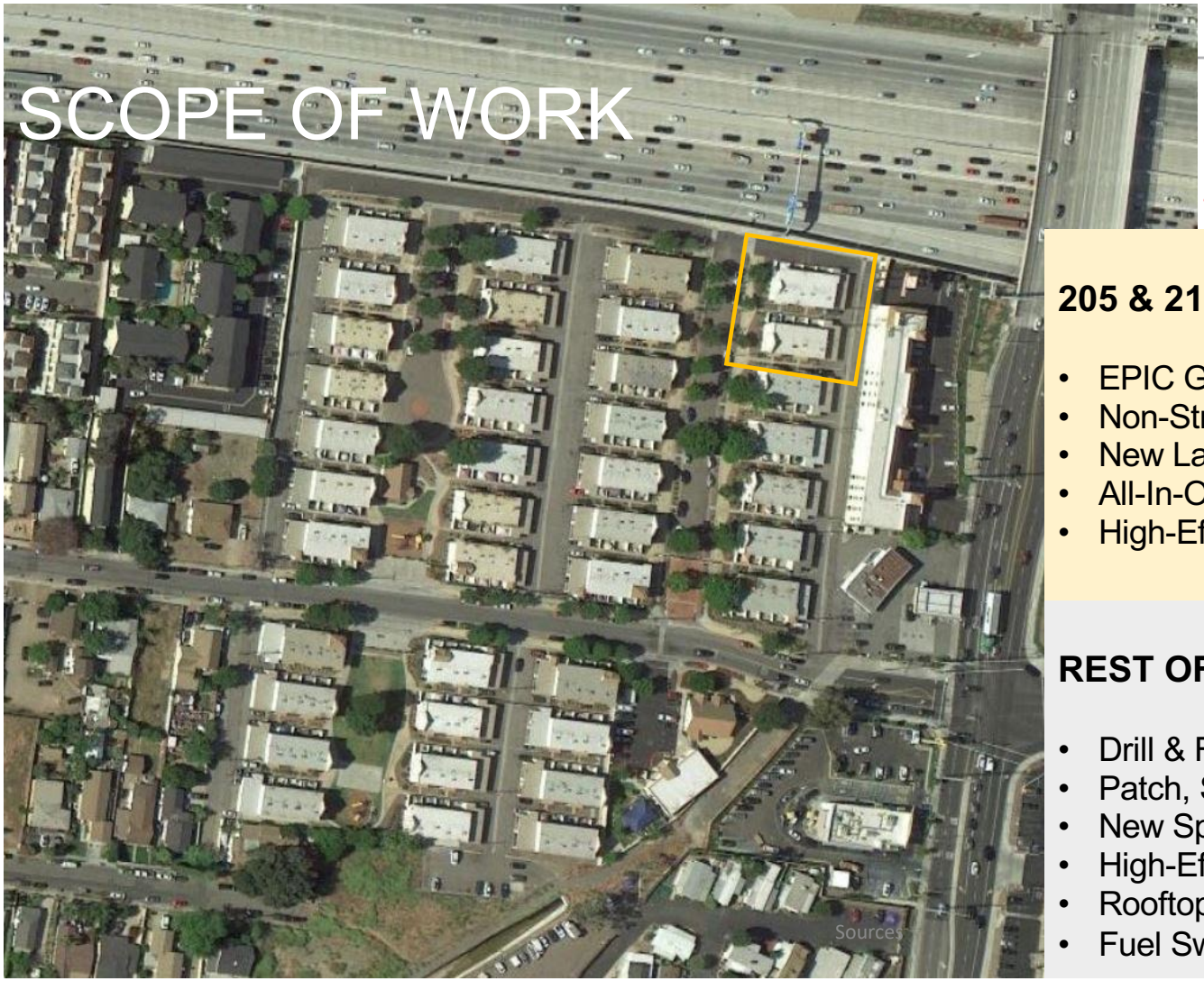


National CORE – Fuel Switch
Pilot Project No. 2
Corona del Rey
Corona, CA

CORONA DEL REY

- Year built: 1966
- Location: Corona, CA
- Building size: 2 story townhomes; 4 units per building

SCOPE OF WORK



Corona del Rey

40 Buildings, 160 Units;

Where do the Funds Come from to do this Retrofit?

205 & 217 ISABELLA AVE

- EPIC Grant – Panelized Demonstration
- Non-Structural Prefabricated Wall Panels
- New Lateral Bracing
- All-In-One Mechanical Pod (205)
- High-Efficiency Heat Pump and HRV (217)

REST OF SITE

- Drill & Fill Insulation
- Patch, Seal Stucco
- New Spray Foam Roof
- High-Efficiency, All-Electric Systems
- Rooftop PV
- Fuel Switch if Funding is Available

PROPERTYNEEDS

- No wall or roof insulation. Energy use and comfort are major issues
- Addressing deferred maintenance on general plumbing is a high priority
- Rooftop PV and electrification area also high owner priorities
- Major stucco damage and some interior pest and dry-rot damage
- Interior gyp and exterior stucco are both hot (asbestos)
- No exterior sheathing, inadequate and damaged lateral bracing

Corona del Rey – Challenges (Typical for Many Existing Affordable Housing Projects)

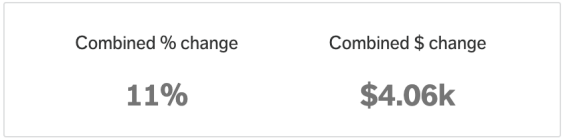
Fuel Switching Central Gas Boilers and adding additional heat pump boilers would save the property +/-$35K/year

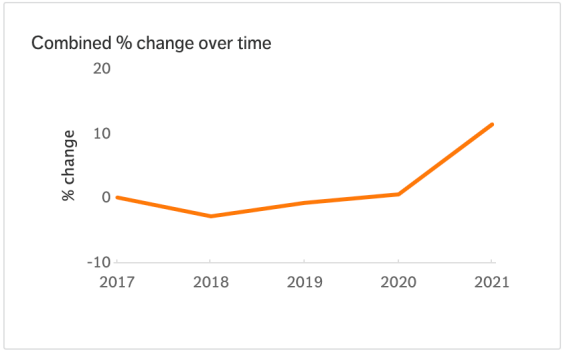
HVAC systems currently oversized to meet the load (107 degree design high) with no insulation in walls or roof.

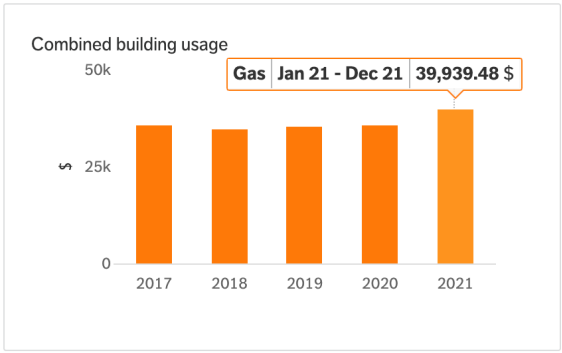
Project has asbestos in exterior stucco and interior drywall, making insulating envelope expensive and challenging

Failing Plumbing system needs replacement

Fuel switching would leverage $1M in rebates, but possibly not enough to cover costs for energy related retrofits







Gas Boilers + Laundry Rooms)

What We'd like

- Fully Insulated Walls (expensive, this project has asbestos everywhere)
- New Code Compliant windows (U=0.32, SHGC = 0.25)
- Heat Pump Water Heaters (Energy Factor 3.5 or greater)
- Air-to-Air Heat Pumps (19 SEER or Better)
- Induction Ranges / Convection Ovens
- ~~Most of us~~ We all want this…
- How do we pay for this?

	9RLFCD Heat Pump	12RLFCD Heat Pump	18RLFCD Heat Pump
Nominal Cooling *BTU/h*	9,000	12,000	18,000
Min~Max Cooling *BTU/h*	3,100~12,000	3,100~13,600	3,100~20,100
Nominal Heating *BTU/h*	12,000	16,000	21,600
Min~Max Heating *BTU/h*	3,100~18,000	3,100~19,400	3,100~25,600
HSPF	12.2	11.5	11.3
SEER	21.5	20.0	19.7
EER *Clg*	14.5	12.8	12.0

g Operating Range °F(°
g Operating Range °F(°
Moisture Removal *Pt./h(*
Voltage/Frequency/Pha
MAX.CRT.BKR
Static Pressure *In. W.*
Circ. *C.F.M. (m³/h) Clg/Htg:*
Mediu
L
Qu

Compare

GCRI3058AD | MSRP $1,699.00

Frigidaire Gallery 30" Freestanding Induction Range with Air Fry

★★★★½ 4.5

Layering on Incentives…

TECH (for EVERYONE! Not Just Affordable

TECH CLEAN CALIFORNIA

Incentives

About | Incentives | Quick Start Grants | Permitting Pilot | Tariffed On

TECH Clean California incentives are available **statewide as of December 7, 2021** installing Heat Pump HVAC systems and Heat Pump Water Heaters can earn **at le** with opportunities to earn **up to $6,600** in select regions where utilities have partı California.

This page details where incentives are currently available, qualifying equipment, ir to be eligible to receive incentives.

If you're a customer and want to find a TECH Clean California Participating Contra contractor directory.

Electrical Upgrades

TECH Clean California will also be providing electrical upgrade incentives to support with transitioning the dwelling unit to all-electric.

Incentives for Electrical Panel Upgrades

Previous Equipment	System Type	Total Incentive (Per Apartment Receiving Electrical Upgrade)
Undersized apartment electrical infrastructure that is upgraded as part of an apartment's HPWH or HP HVAC installation	Apartment panel or sub panel upgrades, feeder upgrades, or service disconnect upgrades	$1,400 Apartment unit must have received a TECH-funded HP HVAC or HPWH and must be all-electric after the electrical upgrade

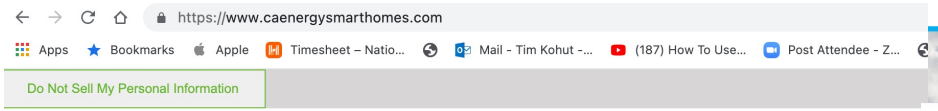
Multifamily Heat Pump Water Heating Incentives

The following incentives are available for unitary HPWHs in apartments and communal spaces, central HPWHs, and HPWHs heating spas or pools.

Incentives for Unitary Heat Pump Water Heaters

Previous Water Heater Heat Source	HPWH Tank Size	Total Incentive Per System
Gas or propane	< 55 gallons	$1,400
	>= 55 gallons	$2,100
Electric resistance	All	$700

California - Energy Smart Homes



CALIFORNIA ENERGY-SMART HOMES

California Energy-Smart Homes

The California Energy-Smart Homes Program is a residential new construction and alterations program that provides incentives to adopt advanced energy measures and transition to all-electric construction. The program is an all-in-one solution that offers incentives for single family, duplex, multifamily low-rise, additions, alterations, accessory dwelling units, and manufactured housing.

CALIFORNIA ENERGY-SMART HOMES ALL-ELECTRIC

Participation Requirements for All-Electric Projects

- Receive electric or gas service from SDG&E®, PG&E®, or SCE® and pay the Public Purpose Program Charge
- Meet minimum program pre-requisites and energy efficiency requirements
- Submit 2019 Title 24 (T24) energy models authored by a professional that holds CABEC's residential

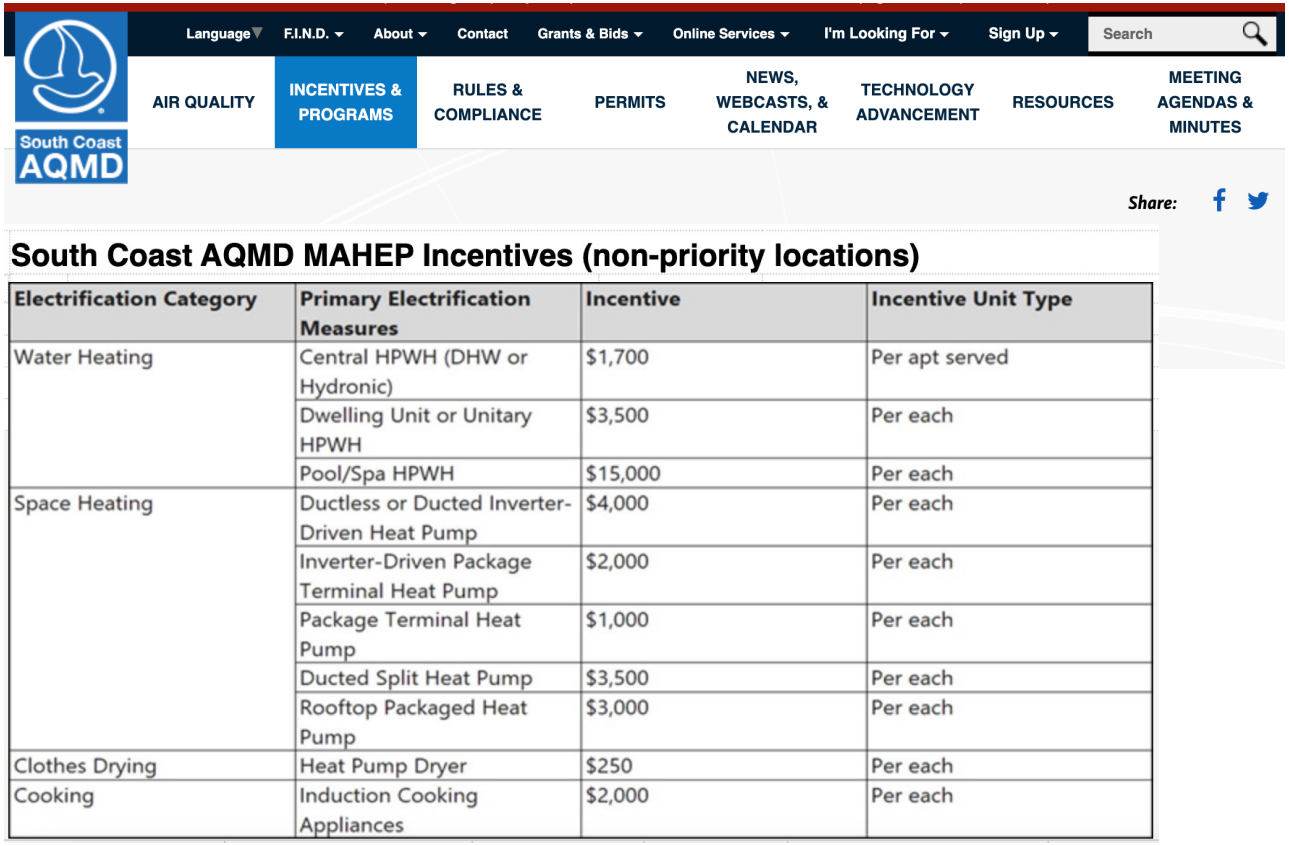
Incentives

	Base Incentive Delta EDR≥1.0			
New Construction Project Type	**2022**	**2023**	**2024**	**2025-2026**
Single Family/Duplex	$3,500	$2,900	$2,500	$2,200
Multifamily Low-Rise	$2,200	$1,800	$1,500	$1,200
Additions and ADUs	$1,750	$1,450	$1,250	$1,100

Heat Pump Clothes Dryer Replacing Gas Clothes Dryer	$500 per heat pump dryer
Ductless Mini-Split Heat Pump (SEER 15 to SEER 18, HSPF 8.5 to HSPF 8.8)	$325 per ton for Multifamily low-rise buildings
Residential Central Heat Pump Replacing Residential Split Air Conditioner and Furnace	$90 per ton for Single family/Duplex homes
Heat Pump Water Heater Replacing Storage or Tankless Natural Gas Water Heater	$450 per Heat Pump Water Heater

Program funds are limited. Incentives are available on a first-come, first-served basis until funds are no longer available.

SCAQMD - MAHEP



South Coast AQMD MAHEP Incentives (non-priority locations)

Electrification Category	Primary Electrification Measures	Incentive	Incentive Unit Type
Water Heating	Central HPWH (DHW or Hydronic)	$1,700	Per apt served
	Dwelling Unit or Unitary HPWH	$3,500	Per each
	Pool/Spa HPWH	$15,000	Per each
Space Heating	Ductless or Ducted Inverter-Driven Heat Pump	$4,000	Per each
	Inverter-Driven Package Terminal Heat Pump	$2,000	Per each
	Package Terminal Heat Pump	$1,000	Per each
	Ducted Split Heat Pump	$3,500	Per each
	Rooftop Packaged Heat Pump	$3,000	Per each
Clothes Drying	Heat Pump Dryer	$250	Per each
Cooking	Induction Cooking Appliances	$2,000	Per each

The Incentive

- $3.2M in total energy improvement costs
- $2.2M in layered incetives
- This is great, but there's still $1M in unfunded work.
- How to pay for this?

OTHER NON-CALCULATED MEASURES

Lever	Cost to
SoCalREN	$192,000
SCAQMD	$500,000
LIWP	$953,370
TECH	$320,000
REALIZE	$250,000
TOTAL INCENTIVES	$2,215,370
REMAINING NON-LEVERAGED PROJECT COSTS SUBTOTAL	**$1,066,148**
COST COVERAGE	**68%**

Corona del Rey

Project Summary:

- Corona, CA
- 160-Unit Affordable Housing Project
- 42 Centralized Gas Water Heaters
- SanCO2 Heat Pump Conversion
  - With 2 Heat Pump at each system
- Claimed Incentives
  - $862,827.00
- Project Cost
  - $853,429.00
- Lack of Monitoring Platform

Corona del Rey - M&V

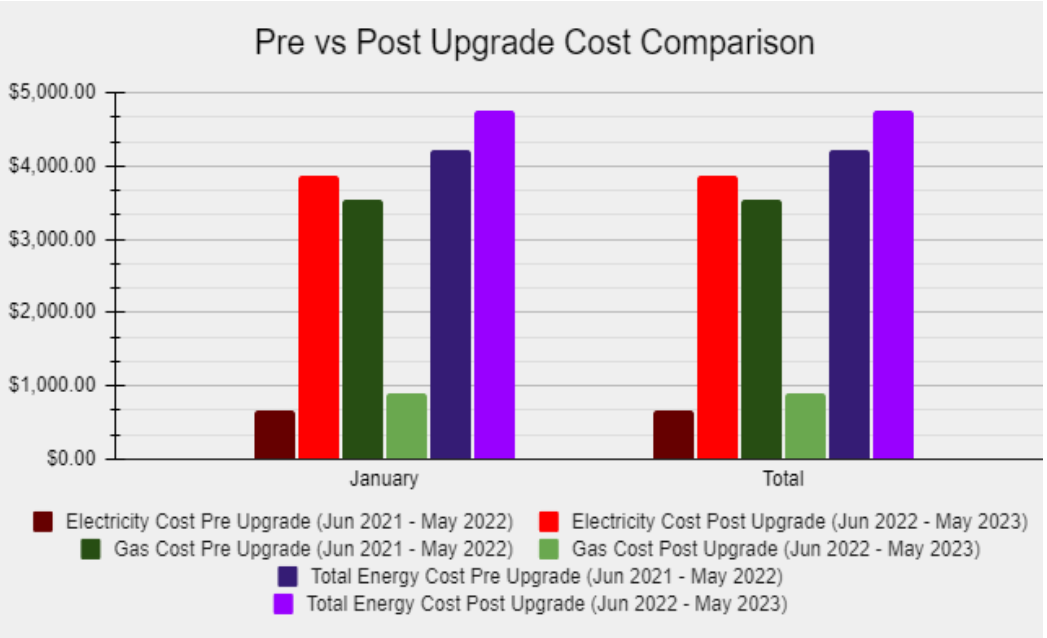
Summary:

- Gas costs have greatly decreased while the electricity costs have slightly increased. Overall, we have had an additional cost of $547.33
- This is what we expect to see on all fuel switch projects with solar

Electricity Data	January	Total
Electricity Cost Pre Upgrade (Jan 2021 - Dec 2022)	$665.01	$665.01
Electricity Cost Post Upgrade (Jan 2022 - Dec 2023)	$3,868.35	$3,868.35
Electricity Cost Difference ($)	***$3,203.34***	***$3,203.34***
Electricity Consumption Pre Upgrade (Jan 2021 - Dec 2022) kwh	2,999	2,999
Electricity Consumption Post Upgrade (Jan 2022 - Dec 2023) kwh	14,432	14,432
Electricity Consumption Difference (kWh)	***11,433***	***11,433***

Gas Data	January	Total
Gas Cost Pre Upgrade (Jan 2021 - Dec 2022)	$3,545.72	$3,545.72
Gas Cost Post Upgrade (Jan 2022 - Dec 2023)	$889.71	$889.71
Gas Cost Difference ($)	***-$2,656.01***	***-$2,656.01***
Gas Consumption Pre Upgrade (Jan 2021 - Dec 2022) therms	1,493.93	1,494
Gas Consumption Post Upgrade (Jan 2022 - Dec 2023) therms	177.55	178
Gas Consumption Difference (Therms)	***-1,316.39***	***-1,316.39***

Total Energy Cost Data	January	Total
Total Energy Cost Pre Upgrade (Jan 2021 - Dec 2022)	$4,210.73	$4,210.73
Total Energy Cost Post Upgrade (Jan 2022 - Dec 2023)	$4,758.06	$4,758.06
Total Energy Cost Difference	***$547.33***	***$547.33***



National CORE – Fuel Switch
Pilot Project No. 3
Arbor Village
Yorba Linda, CA

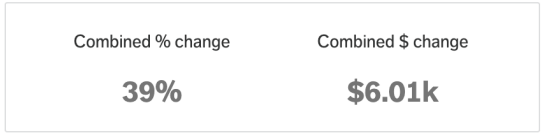
Arbor Villas – LIWP + TECH + SoCalREN

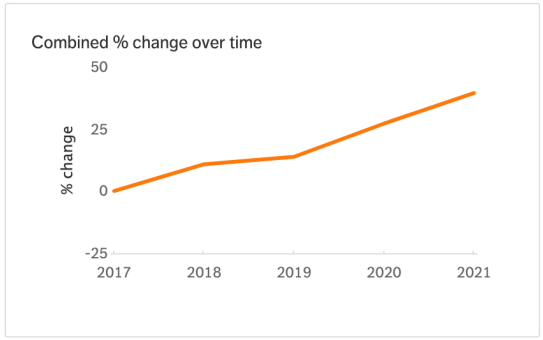
Arbor Villas – LIWP + TECH + SoCalREN

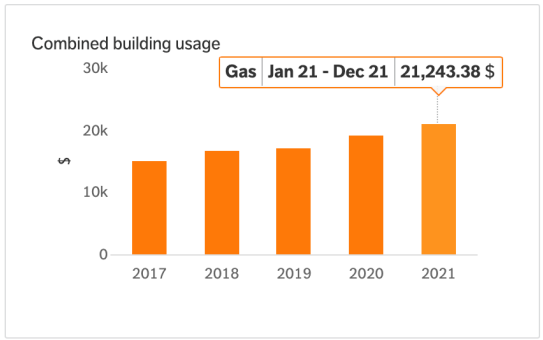
ARBOR VILLAS

4661 Plumosa Dr. • Yorba Linda, California 92886

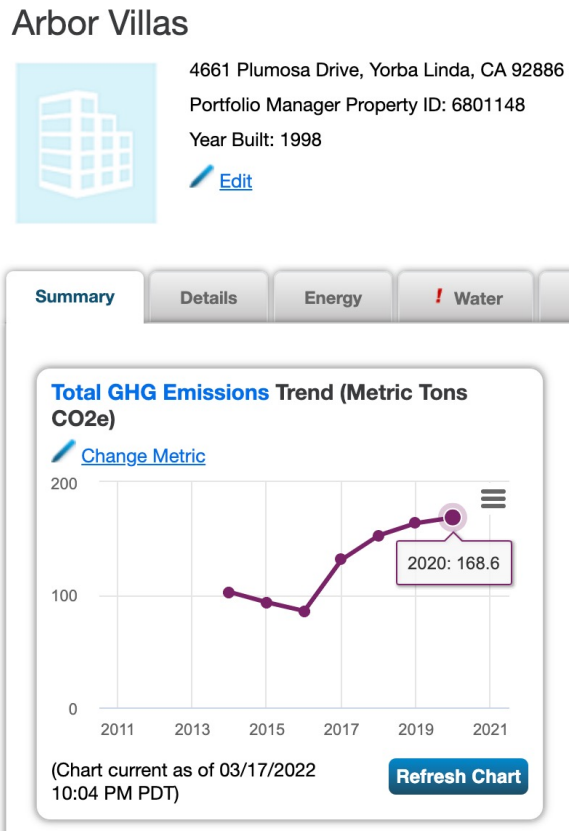
Arbor Villas – LIWP + TECH + SoCalREN







- 16 nearly identical buildings, 67 units
- Annual spend on natural gas - $21K
- 168 Metric Tons of CO2/Year (one of the worst performing buildings for GHG)
- Natural gas used for hot water heating, cooking, community room furnace, and laundry rooms.
- Project has a large SOMAH funded PV
- Goal is to fuel switch DHW, laundry, and increase SOMAH funded PV



Arbor Villas – LIWP + TECH + SoCalREN

Arbor Villas

4661 Plumosa Drive, Yorba Linda, CA

LIWP Incentive Worksheet

	Measure	Estimated Install Cost	Status	Site Energy Savings %*	GHG Savings	Completion Date	Funding Cycle
PLANNED ENERGY SAVINGS MEASURES			**Accepted?**		**MTCO2**		
1	Low Flow Aerators		Yes	0.1%	0.16	Before 2/28/2022.	FY 19-20 (Round 6)
2	In-Unit LED Lighting - *Required*		Yes	1.1%	2.10	Before 2/28/2022.	FY 19-20 (Round 6)
3	Common Area and Exterior LED Lighting		Yes	0.1%	0.23	Before 2/28/2022.	FY 19-20 (Round 6)
4	High Efficiency Washing Machines (MEF > 2.4, WF < 4.0)		Yes	0.4%	0.64	Before 2/28/2022.	FY 19-20 (Round 6)
5	Attic Insulation		No	0.0%	0.00	Before 2/28/2022.	FY 19-20 (Round 6)
6	HVAC - High Efficiency Heat Pump	$335,000	Yes	7.1%	12.55	Before 2/28/2022.	FY 19-20 (Round 6)
7	Duct Sealing - *Required*		Yes	1.2%	2.08	Before 2/28/2022.	FY 19-20 (Round 6)
8	DHW - Central HPWH (Min. storage per CalSolar bid)	$233,935	Yes	39.3%	49.05	Before 2/28/2022.	FY 19-20 (Round 6)
9	DHW - Central HPWH **Alt** (Increased storage - Min. 15gal/bedroom)	$72,000	Yes	39.3%	49.05	Before 2/28/2022.	FY 19-20 (Round 6)
10	Enovative Demand Control Commissioning		No	0.0%	0.00	Before 2/28/2022.	FY 19-20 (Round 6)
11	Electric Dryers		No				
12	Induction Stoves		No				
13							
OTHER NON-CALCULATED MEASURES							
15	Required Combustion Safety Repairs	TBD					

Leveraged Incentives Summary	**PROJECTED**
PROJECT MEASURES TOTAL GROSS COSTS	$640,935
LIWP	$225,525
TECH	$335,000
SoCalREN	$80,400
TOTAL INCENTIVES	**$640,925**
REMAINING NON-LEVERAGED PROJECT COSTS	-$10

- DHW Fuel switch (SanCO2 HP boilers + Storage), change out gas dryers to electric resistance, other LIWP work: cost of work, $641K
- Incentives = $641K
- National CORE Out of Pocket = $0K
- Potential Operational Savings: $18K/year – Cost of PV lease payment, TBD

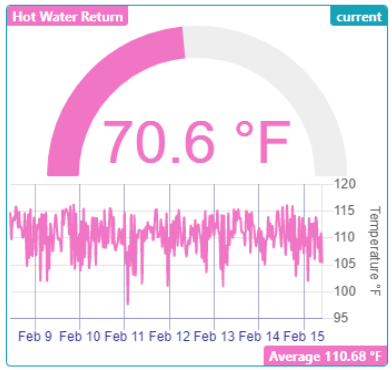
Arbor Villas

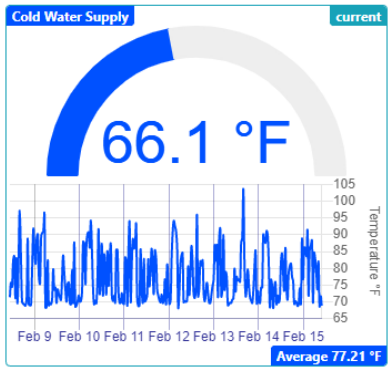
Project Summary:

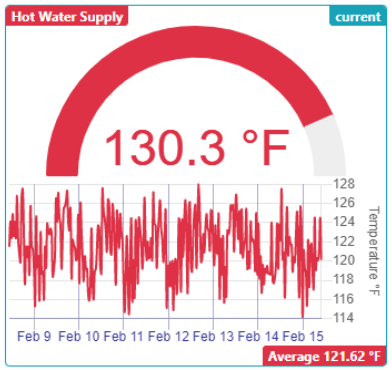
- Yorba Linda, CA
- 67-Unit Affordable Housing Project
- 8 Centralized Gas Boiler Systems
- SanCO2 Heat Pump Conversion
  - With 2 heat pumps at each system
- Reserved Incentives
  - $279,874.00
- Project Cost
  - $279,874.00
- AutoHot Performance Monitoring

Arbor Villas: AutoHot Monitoring

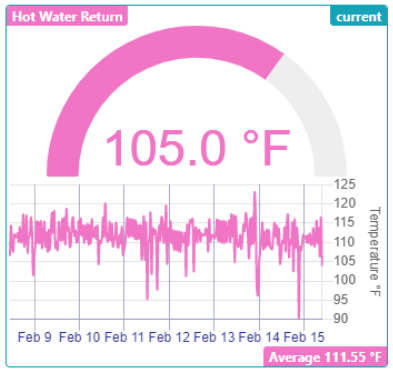
Existing Gas Boiler System:

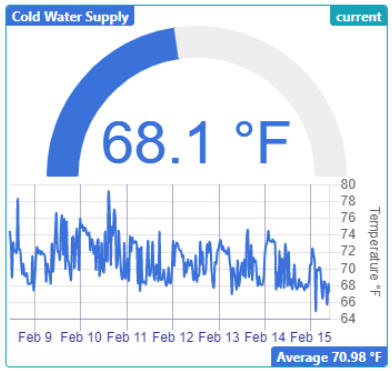


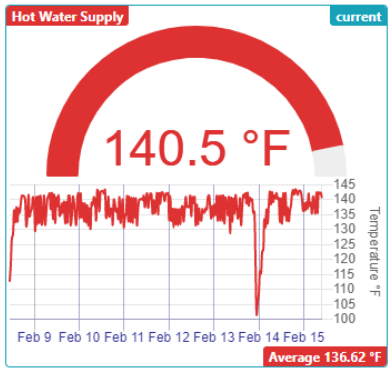




New SanCO2 Heat Pump System:







Arbor Villas - M&V

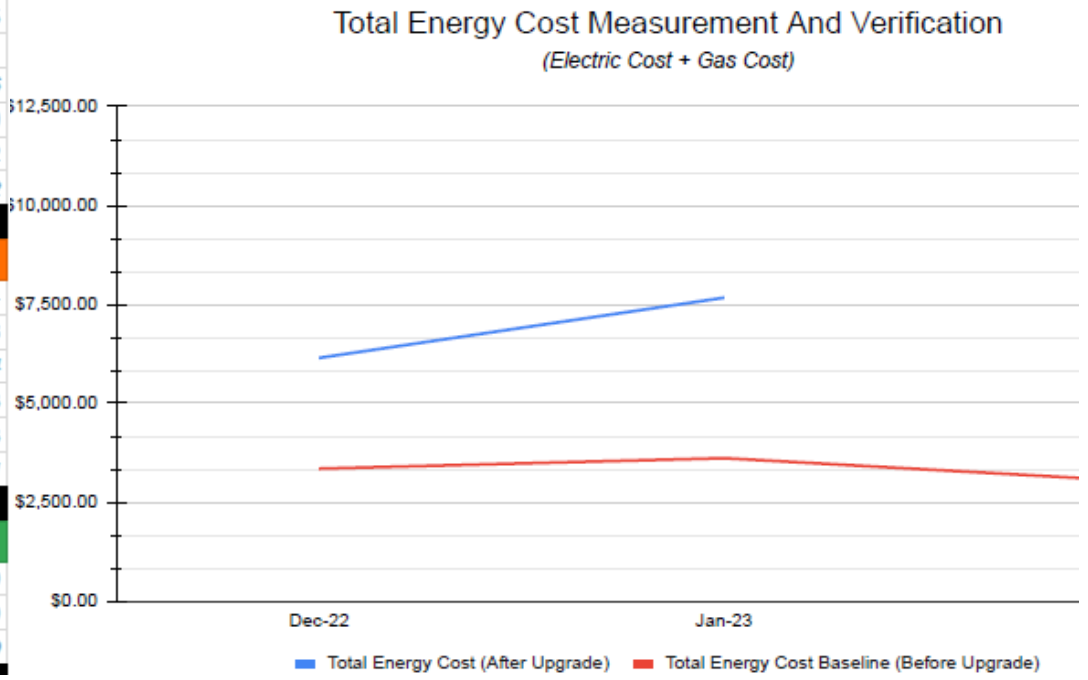
Summary:

- Gas costs have greatly decreased; however, the electricity costs have greatly increased. Overall, we have had an additional cost of $7,500
- How we are adjusting:
  - More solar on the project
  - Adjusting water heating times to off-peak Time-of-Use Rates {Smart water heater controllers}

Electricity Data	Total
Electricity Cost Pre Upgrade (Dec 2021 - Nov 2022)	$1,263.85
Electricity Cost Post Upgrade (Dec 2022 - Nov 2023)	$8,235.01
Electricity Cost Difference ($)	***$6,971.16***
Electricity Consumption Pre Upgrade (Dec 2021 - Nov 2022) kwh	6,860
Electricity Consumption Post Upgrade (Dec 2022 - Nov 2023) kwh	31,232
Electricity Consumption Difference (kWh)	***24,372***

Gas Data	Total
Gas Cost Pre Upgrade (Dec 2021 - Nov 2022)	$5,005.84
Gas Cost Post Upgrade (Dec 2022 - Nov 2023)	$5,605.58
Gas Cost Difference ($)	***$599.74***
Gas Consumption Pre Upgrade (Dec 2021 - Nov 2022) therms	4,183
Gas Consumption Post Upgrade (Dec 2022 - Nov 2023) therms	1,803
Gas Consumption Difference (Therms)	***-2,379.91***

Total Energy Cost Data	Total
Total Energy Cost Pre Upgrade (Dec 2021 - Nov 2022)	$6,269.69
Total Energy Cost Post Upgrade (Dec 2022 - Nov 2023)	$13,840.59
Total Energy Cost Difference	***$7,570.90***

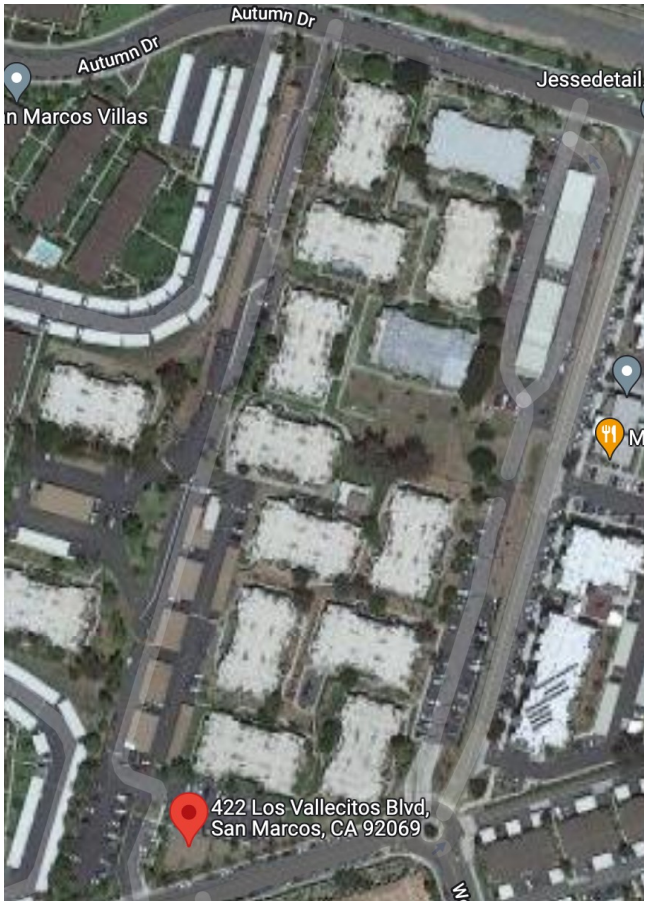


National CORE – Fuel Switch
Pilot Project No. 4
Sierra Vista
San Marcos, CA

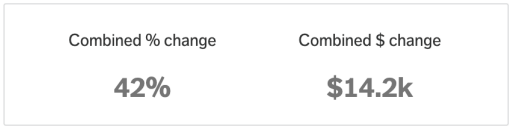
Sierra Vista – LIWP + TECH + SoCalREN

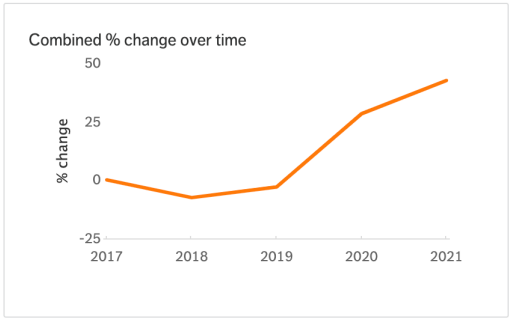
SIERRA VISTA

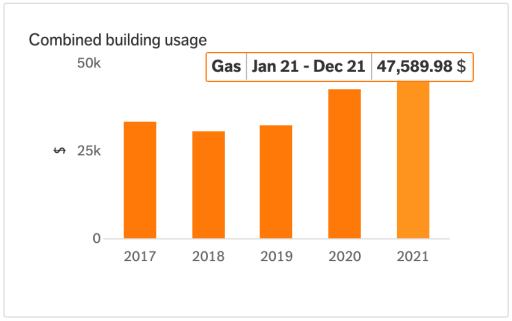
422 Los Vallecitos • San Marcos, California 92069



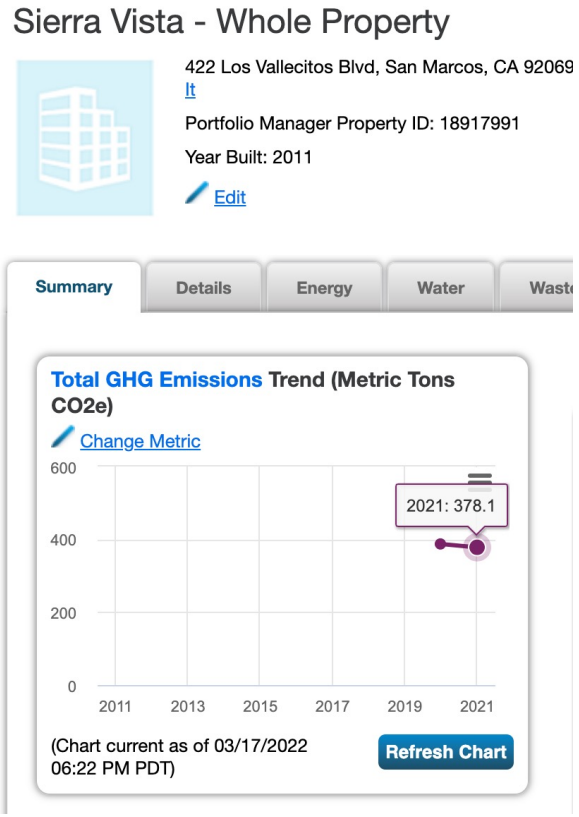
Sierra Vista – LIWP + TECH + SoCalREN







- 15 nearly identical buildings, 248 units
- Annual spend on natural gas - $47K
- 378 Metric Tons of CO2/Year (one of the worst performing buildings for GHG)
- Natural gas limited to hot water heating and laundry rooms.
- Project is planning on a 574kW DC SOMAH funded PV system
- Goal is to fuel switch DHW, maybe laundry, and add more SOMAH funded PV



Sierra Vista

Project Summary:

- San Marcos, CA
- 192-Unit Affordable Housing Project
- 17 Centralized Gas Boiler Systems
- SanCO2 Heat Pump Conversion
  - With 3 heat pumps at each system
- Reserved Incentives
  - $890,820.00
- Project Cost
  - $730,400.00
- Electrical Consumption Monitoring

Sierra Vista - M&V

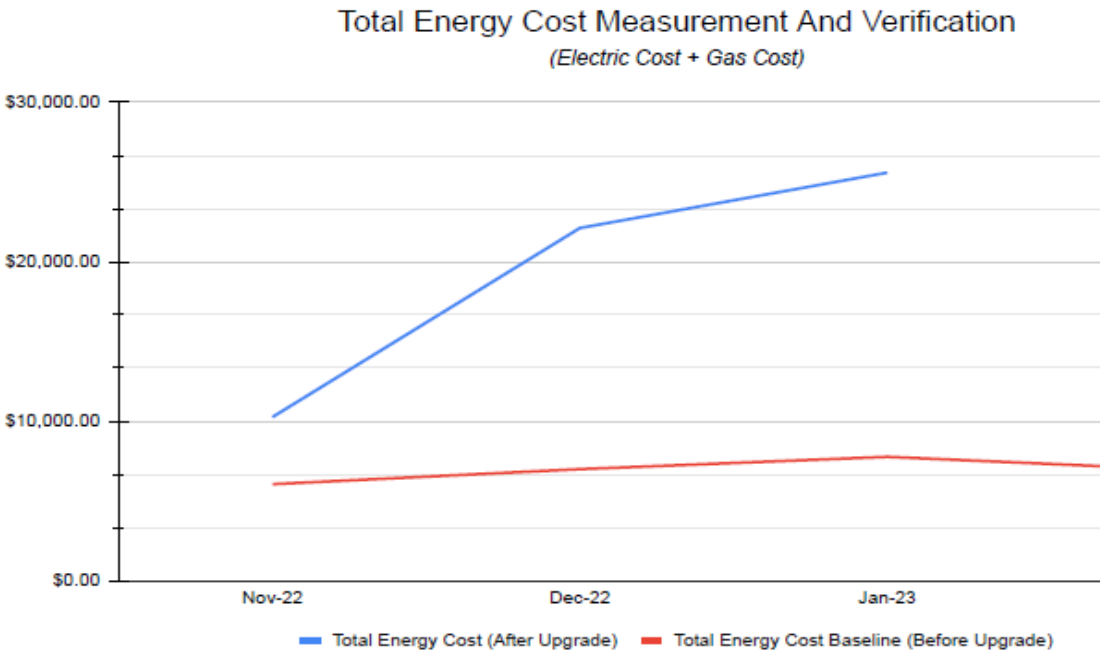
Summary:

- Gas costs have greatly decreased; however, the electricity costs have greatly increased. Overall, we have had an additional cost of $40,000
- How we are adjusting:
  - More solar on the project
  - Adjusting water heating times to off-peak Time-of-Use Rates {Smart water heater controllers}

Electricity Data	Total
Electricity Cost Pre Upgrade (Nov 2021 - Oct 2022)	$6,209.67
Electricity Cost Post Upgrade (Nov 2022 - Oct 2023)	$49,682.76
Electricity Cost Difference ($)	***$43,473.09***
Electricity Consumption Pre Upgrade (Nov 2021 - Oct 2022) kwh	22,376
Electricity Consumption Post Upgrade (Nov 2022 - Oct 2023) kwh	99,247
Electricity Consumption Difference (kWh)	***76,871***

Gas Data	Total
Gas Cost Pre Upgrade (Nov 2021 - Oct 2022)	$11,738.75
Gas Cost Post Upgrade (Nov 2022 - Oct 2023)	$8,292.58
Gas Cost Difference ($)	***-$3,446.17***
Gas Consumption Pre Upgrade (Nov 2021 - Oct 2022) therms	7,675
Gas Consumption Post Upgrade (Nov 2022 - Oct 2023) therms	3,404
Gas Consumption Difference (Therms)	***-4,270.36***

Total Energy Cost Data	Total
Total Energy Cost Pre Upgrade (Nov 2021 - Oct 2022)	$17,948.42
Total Energy Cost Post Upgrade (Nov 2022 - Oct 2023)	$57,975.34
Total Energy Cost Difference	***$40,026.92***



Stay tuned for…

Lessons Learned from National CORE's Fuel Switch Pilots

Fuel Switching
At No Cost (or for Profit!)

Tim Kohut, AIA, CEA
Director of Sustainable Design
National Community Renaissance
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California Housing Partnership
California's Experts on Affordable Housing Finance, Advocacy & Policy

SCANPH
Southern California Association of NonProfit Housing

2023 LA Decarbonization Summit

Karen Krygier

Community Corp. of SANTA MONICA
40 YEARS OF BUILDING COMMUNITY

Ongoing Lessons Learning

The largest hurdle is the available electrical capacity to accommodate fuel switching initiatives

Choosing First Projects

Understanding your portfolio from different criteria:

- Gas Polluters – Greenhouse Gas Emissions – Energy Star Portfolio Manager
- High Utility Expenses – Tracking usage as well as expense – Yardi Pulse or Wegowise
- Replacement Reserve Funds – When incentives fall short (where we initially erroneously focused)

Utilizing Solar

- Accessing the SOMAH Program – currently working on 14 projects with Sunrun

2112 - 2120 Delaware Ave, Santa Monica, CA

Property Details

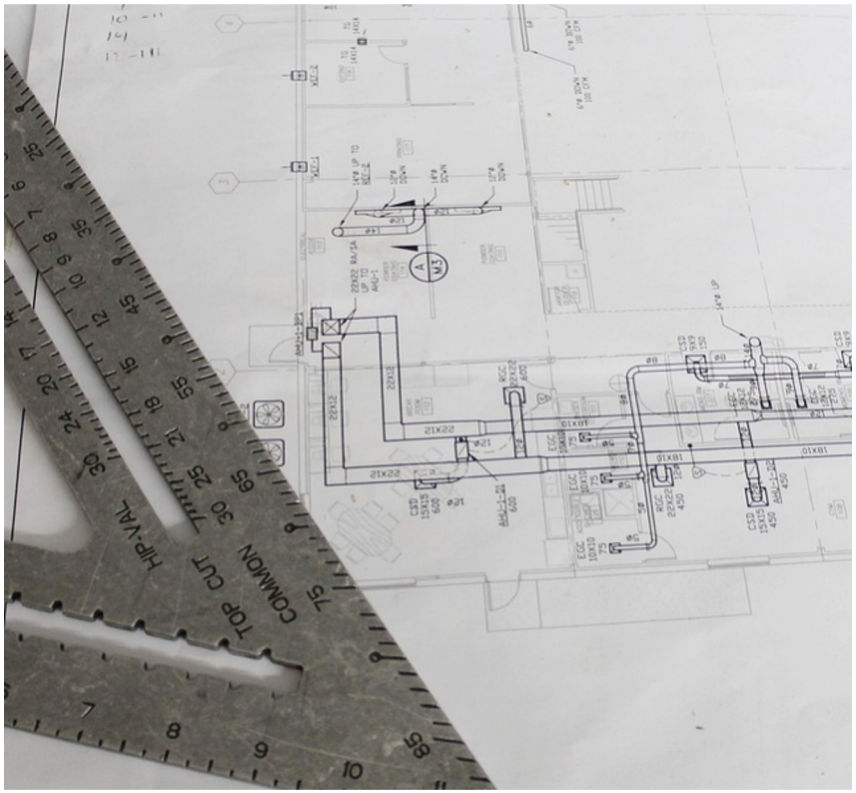
- 38 units, 3 buildings
- Built in 1963
- Acquired in 2000

Scope of Work

- 24 in-unit water heaters, 1 central water heater for 12 units in central building
- 38 heat pump HVAC units
- Total estimated cost (pre-incentives): **$20,000/unit**
  - Incentives TBD
- Insufficient electrical capacity to replace gas stoves (phase 2)

Additional Considerations

- Having sufficient building plans necessary for schematic electrical design
- Proceeding with electrical design ahead of knowing incentives in order to obtain actual bids
  - Allows developers to be in a position to move more quickly into decarb work



Questions?

Karen Krygier
Senior Asset Manager
Community Corp. of Santa Monica
kkrygier@communitycorp.org

Planning for Electric Rehabs

Presented By

Michael Rangel

holos communities

Motivation for pursuing all electric design:

Experienced blackouts due to outdated design

An increase in natural disasters such as Hurricane Maria in Puerto Rico

Sustainability in effort to combat climate change

Planning Strategy for Electrifying Rehabs

- Work with 3rd party who can help with TA
- Identify programs/grants available like SOMAH, MAHEP, etc.

CHALLENGES

Space

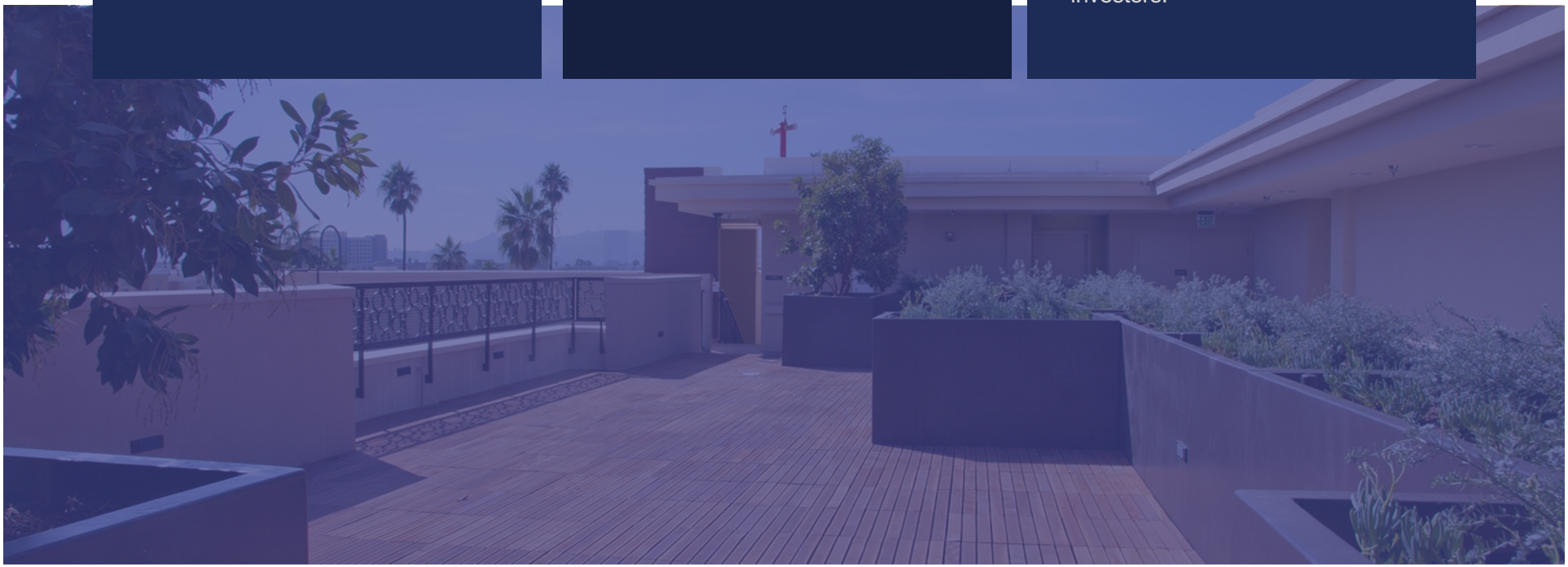
Most properties lacked adequate roof space for solar panels as well as storage space.

Cost

Program funding was limited, and installation included unexpected costs.

Permission

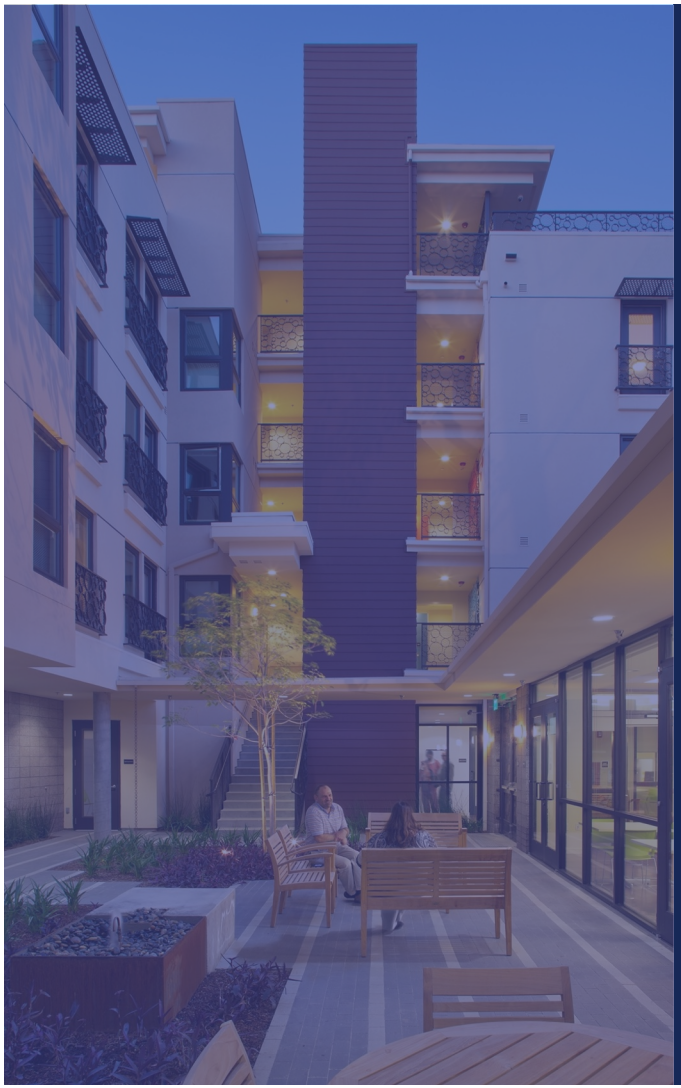
The complex nature of LIHTC property ownership required the approval of many partners and investors.



Solutions:

Resilience Kits

By focusing on a smaller footprint and more portable kit we were able to conduct our own research that would allow smaller properties access to solar power and battery storage capabilities.



Recommendations

- Prioritize projects with larger roof space
- Build out all future projects to include capacity for battery storage
- Try to secure funding in addition to incentive programs/grants
- Work with 3rd party who is well versed in electrification and solar energy


Thank You
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ASSOCIATION FOR ENERGY AFFORDABILITY INC.

Demystifying Rehab Electrification

Los Angeles Affordable Housing Decarbonization Summit

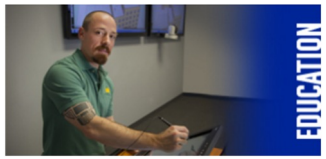
Luca Costa, AEA
Senior Associate, Projects
February 16, 2022

ASSOCIATION FOR ENERGY AFFORDABILITY INC.

Energy Efficiency is our Specialty, Affordable Housing is our Priority

The Association for Energy Affordability, Inc. is dedicated to achieving energy efficiency and clean energy in new and existing buildings in order to foster and maintain affordable and healthy housing and communities, especially those of low-income.

- Energy Efficiency Program Design and Implementation
- Energy Research & Demonstration Projects
- Energy Audits and Green Building Design for New Construction and Existing Buildings
- Currently provide 4 California MF Electrification Programs, as well as direct consulting to buildings on electrification best practices



For more information, visit us at aea.us.org

Incentives for Multifamily Electrification

Sample Programs

LOW INCOME WEATHERIZATION PROGRAM

- Electrification, energy efficiency, Solar PV
- Must meet affordability requirements (>66% at/below 80% AMI), DAC
- Whole building, must achieve >15% modeled savings (25% if co-leveraging other programs)
- Incentive based on annual CO2 savings
  - Owner savings: $3,000/MTCO2
  - Tenant savings: $4,500/MTCO2

LA DWP CAMR

Comprehensive Affordable Multifamily Retrofits Program

- LADWP territory only
- Electrification, energy efficiency, PV
- Must meet affordability requirements (>66% at/below 80% AMI), 5+ units, DAC
- Whole building, must achieve 5% electric savings
- Incentive based on annual CO2 savings
  - Owner savings (5-64 units): $5,400/MTCO2
  - Owner savings (65+ units): $6,200/MTCO2
  - Tenant savings (5-64 units): $6,750/MTCO2
  - Tenant savings (65+ units): $7,750/MTCO2

Sample Programs

MAHEP

Multifamily Affordable Housing Electrification Program

- South Coast AQMD territory only
- Electrification
- Must meet affordability requirements (>66% at/below 80% AMI), 5+ units, DAC
- Allows for single-system electrification upgrades
- Higher incentives available if located in a priority territory

Electrification Category	Primary Electrification Measures	Incentive	Incentive Unit Type
Water Heating	Central HPWH (DHW or Hydronic)	$1,700	Per apt served
	Dwelling Unit or Unitary HPWH	$3,500	Per each
	Pool/Spa HPWH	$15,000	Per each
Space Heating	Ductless or Ducted Inverter-Driven Heat Pump	$4,000	Per each
	Inverter-Driven Package Terminal Heat Pump	$2,000	Per each
	Package Terminal Heat Pump	$1,000	Per each
	Ducted Split Heat Pump	$3,500	Per each
	Rooftop Packaged Heat Pump	$3,000	Per each
Clothes Drying	Heat Pump Dryer	$250	Per each
Cooking	Induction Cooking Appliances	$2,000	Per each

Sample Programs

TECH CLEAN CALIFORNIA

- Midstream incentives to contractors for HPWH and HP HVAC systems
- HPWH/HP HVAC installed must be replacing non-heat pump system
- First round of TECH Multifamily incentives is currently fully reserved
- Second round of TECH Multifamily incentives is anticipated to launch around Q2 and Q3 2023

Making use of program offerings

Next steps:

1) Identify project partners, including those that provide technical assistance (implementers, incentive programs and contractors)

2) Understand your property's electrical site and grid capacity.

3) Consider project phases for property upgrades (per building, per unit)

4) Incorporate all funding opportunities to buy down the cost

5) Include tenant engagement, ensuring long term savings through behavioral change from tenant and on-site staff.

Space Heating Electrification Measures

- **A/C Already Existing?** Could be same form factor
  - Split DX Heat Pump
  - Packaged DX Heat Pump
  - Packaged Terminal Heat Pump

- **No Existing A/C?** Less benefit from traditional types, can consider new equipment types
  - Mini-Split Heat Pump
  - High Performance Unitary Heat Pumps

Water Heating Electrification Measures

Heat Pump Water Heaters

- In-unit Residential
- Central Multifamily
- Dedicated Laundry
- Pool

Other Measure Opportunities

- Electric Cooking
- Electric Laundry Drying
- Electrical Capacity
- Complimentary Programs
  - Solar PV
  - Electric Vehicle Charging
  - Battery Storage
  - Load Shifting

Comprehensive Decarbonization: Electrification + Energy Efficiency

- **Reduce loads** to make equipment smaller, easier, and cheaper; minimize overall utility bills
- **High performance envelope and ventilation** systems
- **Efficient plumbing** fixtures and improved distribution systems
- **Efficient Lighting and Appliances** to reduce overall electricity consumption

Electrification Project Challenges

- Electrical Upgrades - space for new dedicated breakers / capacity)
- Building modifications
- Upfront cost
- Consumer knowledge
- Contractor knowledge
- System sizing
- Range of options (many pros and cons)
- Programmatic quantification/reporting metrics

Electrical Infrastructure – Plan Ahead!

- With all systems powered by electricity, projects may need **larger electrical service**, and/or panels.
- Consult with electrical engineer early-on and ensure they know that project will be all-electric.
  - Creativity is key!
- Start talking to your electric utility ASAP.

Visalia Project: Baseline conditions

Incentives & Savings

	LIWP	TECH
Exterior LED Lighting	X	
Attic Insulation + Cool Roof	X	
Dual Pane Vinyl Windows	X	
Central Heat Pump Water Heater	X	X
Recirculation Pump + Control	X	
Duct Leakage + Insulation	X	
Smart Thermostats	X	
Solar PV (in process)	X	
TOTAL INCENTIVE	**$209k**	**$27k**
Project Cost	**$400k**	
Remaining Costs (post-incentives)	**$164k**	

Benefits

- Many annual repairs/leaks eliminated
- Improved tenant comfort (priceless!)
- No increasing gas prices
- Ability to offset with Solar PV

Yorba Linda Project: Baseline conditions

Incentives & Savings

	LIWP	SoCalREN	TECH
Low Flows	X		
LED Lighting	X	X	
Washing Machines	X	X	
Electric Dryers	X		
Central HPWH	X	X	X
Laundry HPWH	X		
Duct Sealing	X		
TOTAL INCENTIVE	**$184k**	**$16k**	**$80k**
Project Cost	**$280k**		
Remaining Costs (post-incentives)	**$0!**		

Post-Retrofit

- Wall-mounted heat pump water heaters (residential + laundry)
- Comprehensive LED retrofit
- Sealed return plenums
- Efficient laundry

Challenges

- Physical constraints
- New system design
- Optics – no PV

Questions?

Luca Costa
Senior Associate, Projects
Association for Energy Affordability
lcosta@aeacleanenergy.org | 510-831-6810

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QUESTIONS?

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THANK YOU!

Questions?

Email rdiaz@chpc.net

California Housing Partnership
California's Experts on Affordable Housing Finance, Advocacy & Policy

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Southern California Association of NonProfit Housing

LUNCH 12:30 - 1:30 PM

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Policies for the Decarbonization of Los Angeles' Affordable Housing

2023 LA Affordable Housing Decarbonization Summit

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2023 LA Affordable Housing Decarbonization Summit

Daniel Huynh, LAHD

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John Weight, LADBS

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David Jacot, LADWP

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Southern California Association of NonProfit Housing

THANK YOU!

Questions?

Email jloop@scanph.org & bdelacruz@chpc.net

California Housing Partnership
California's Experts on Affordable Housing Finance, Advocacy & Policy

SCANPH
Southern California Association of NonProfit Housing

2023 LA Affordable Housing Decarbonization Summit

Closing & Announcements

Coming Soon in 2023!

- Free, Virtual Electrification Training Series
  - *Electrification Technologies*
  - *Financing Electrification: New Construction and Retrofits*
  - *Operating All-Electric Affordable Housing (O&M)*
- Tailored to affordable housing professionals
- Organized by the Partnership and in coordination with SCANPH, CCRH/SJVHC, NPH, & SDHF
- Trainers: Association for Energy Affordability
- Date: TBD 2023

Stay Engaged!

- Post-Summit Survey - check your email!
- Help us shape:
  - decarb policy for LA City's existing buildings
  - IRA-funded programs
- 3rd Affordable Housing Decarb Summit Report

Special thanks to our sponsor, speakers, and all our participants!