THANK YOU REV2024 SPONSORS!

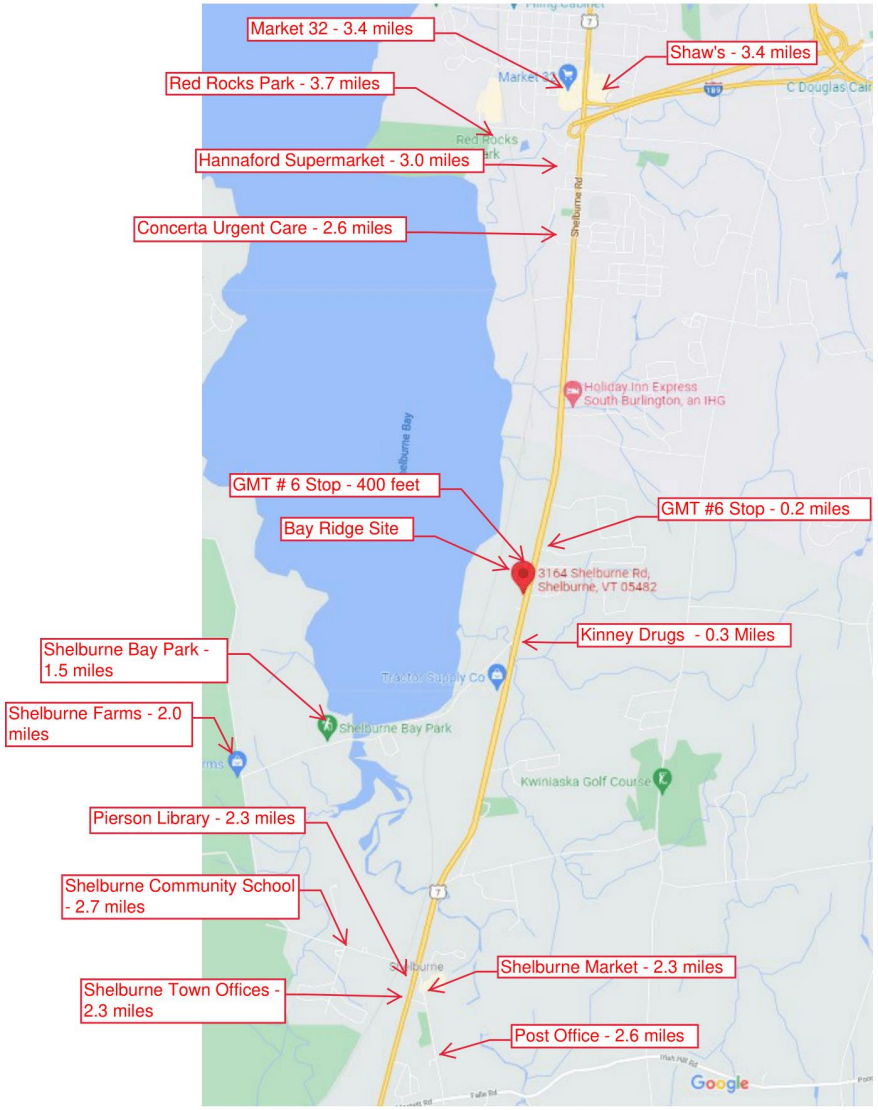
BAY RIDGE SOLAR
Sustainable Buildings, Sustainable Budgets

Jess Neubelt
Developer
Evernorth

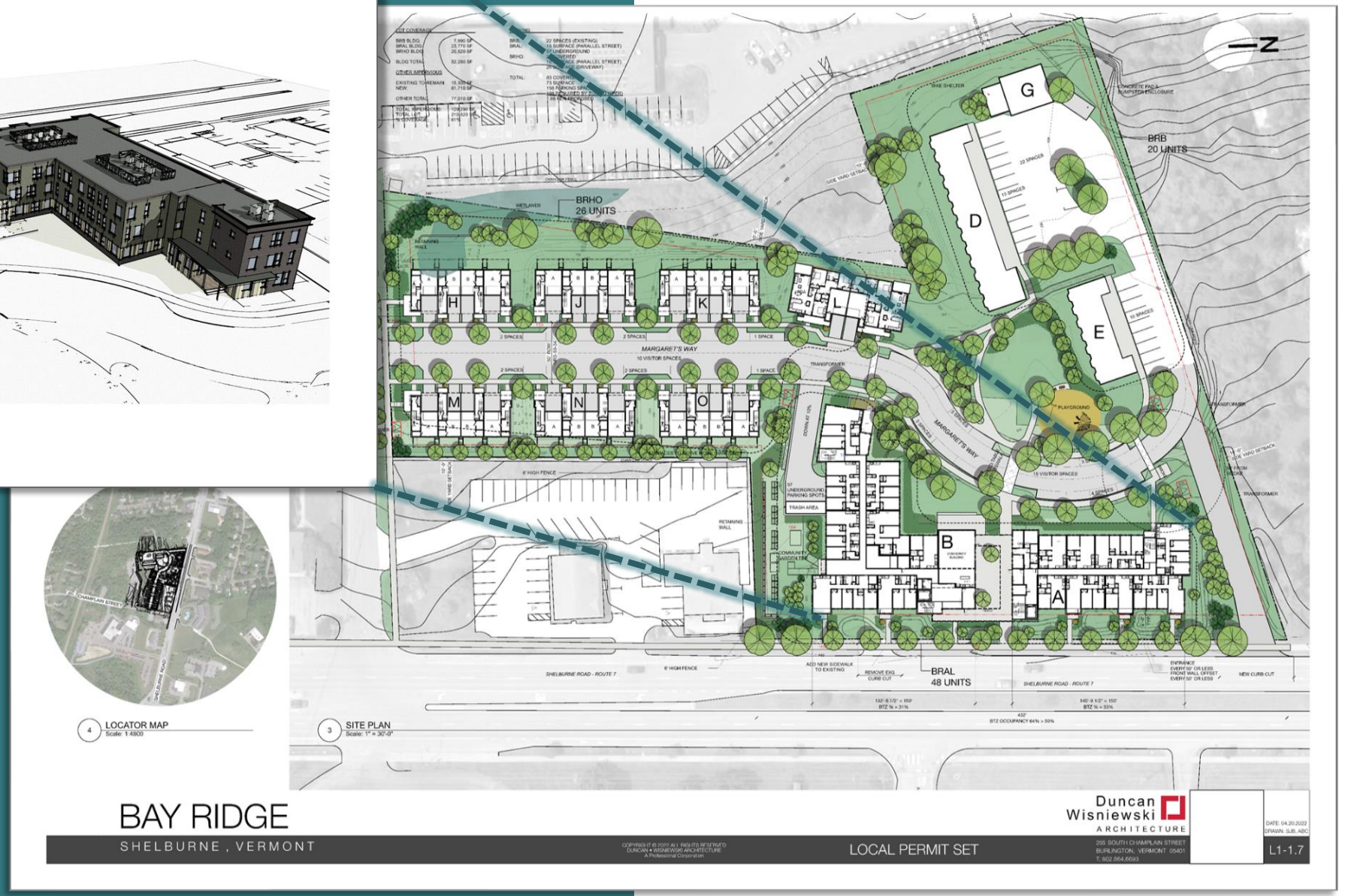
Introducing Bay Ridge

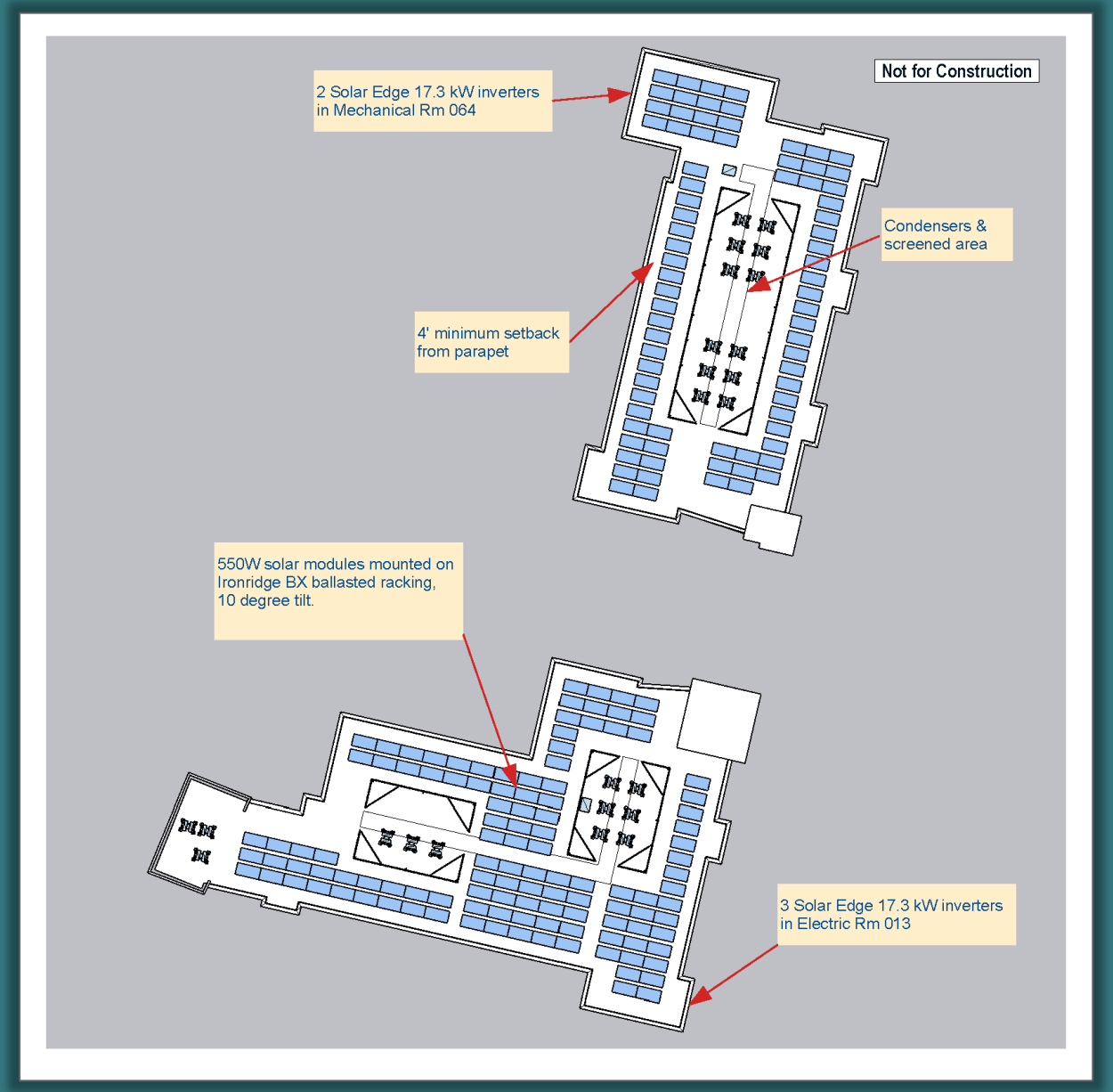
- A new mixed-income neighborhood
- Co-developed with Champlain Housing Trust
- 68 Affordable Apartments
- 26 Shared Equity Homes
- Location: Shelburne

Bay Ridge Location Map – 3164 Shelburne Road, Shelburne, VT 05482



Bay Ridge Site Plan



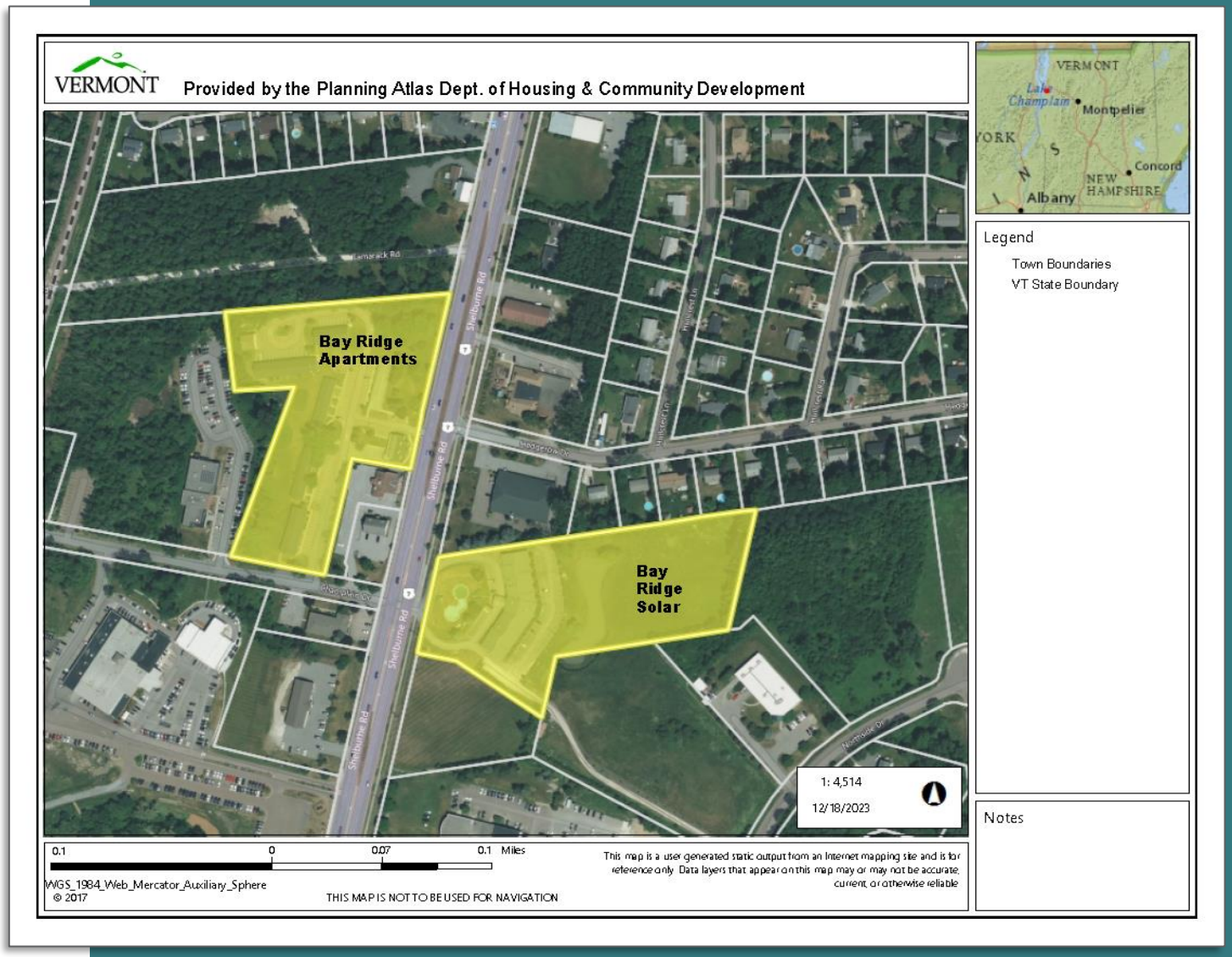


Bay Ridge Rooftop Solar

- Allows for ~87 kw of PV solar
- Would offset approximately 15% of the usage of 68 apartments
- More than 90% incentivized:
  - 30% ITC
  - 10% Energy Community Bonus
  - 20% Low-Income Communities Bonus
  - 4% LIHTC (covers ~33% of costs)
- Preferred Site

Bay Ridge Aerial View

- Allows for 150kw of solar
- Room for more but CPG process much costlier
- Nearly 85% incentivized:
  - 30% ITC
  - 4% LIHTC (covers ~33% of costs)
  - $150,000 VLITE
- Not a Preferred Site



Bay Ridge Solar Site Plan

Bay Ridge Solar Rooftop & Off-Site

The capital costs for the combined solar arrays is $882,000 which is almost $13,000/unit.

	Rooftop	Offsite	Combined
kwh production	113,500	270,800	384,300
net-metered credits generated	$17,971	$32,875	$50,846
% total usage offset	15%	36%	51%

Benefits of Bay Ridge Solar

For Environment

- Solar credits help offset the high cost of operating and maintaining heat pumps, enabling the greener choice
- The buildings' robust thermal shells and electric HVAC systems enable the project to avoid of 189 tons of carbon emissions; solar helps to offset an added ~162 tons/year

For Owner

- Financial sustainability
- Expected 1st year savings of ~$51,000 in OpEx
- Better cashflow allows for:
  - More permanent debt, enabling public funds to spread further (up to $630,000 in this case);
  - More investments in programming and amenities

For Residents

- No utility bill
- No need to navigate new utility accounts
- Air conditioning provided by the owner
- No need to choose between staying cool/warm and other pressing expenses
- Participation in the green transition

As of December 2022, there were over 2,500 community solar projects, operating in 43 states and Washington D.C., with Florida, New York and Minnesota leading the way.

But only about 2% of the nationwide solar capacity has been dedicated to low-income communities—something the IRA aims to change.

For low- to moderate-income residents in multifamily housing who do not have access to a roof, do not own their property...community solar creates an opportunity to access renewable energy and lower utility costs.

Source: Enterprise Community Partners, November 13, 2023

BAY RIDGE SOLAR
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Jess Neubelt
Developer
Evernorth

October 16th , 2024

Net Zero Energy
Factory-Built Affordable Housing

Peter Schneider
Principal Engineering Consultant

Efficiency Vermont

Factory-Built Variety

Mobile

- Pre-1976
- No code

Manufactured

- Post-1976
- HUD code just updated after 30yrs – launch May 2023

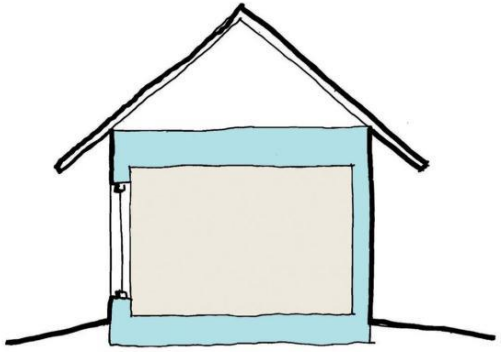
Volumetric Modular

- Meets local building & energy codes

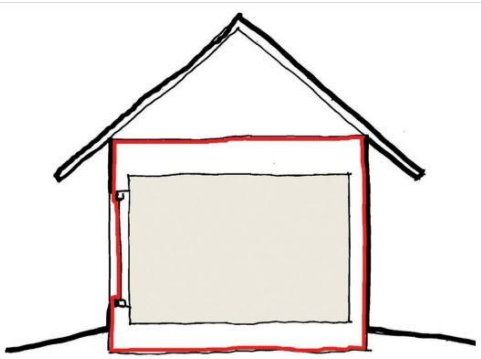
Panelized

- Meets local building & energy codes

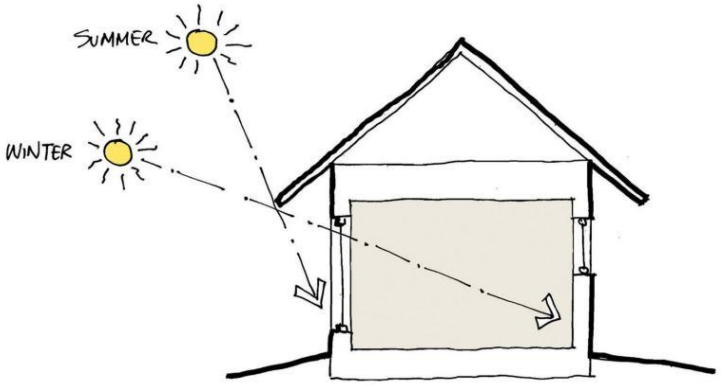
NZE Ready Standard



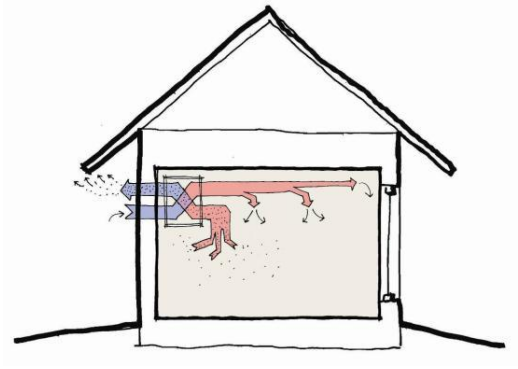
SUPER-INSULATED



AIRTIGHT



HIGH PERFORMANCE WINDOWS



AR&T Architects

FRESH AIR VENTILATION

ENERGY STAR

ALL- ELECTRIC


TITAN HOMES

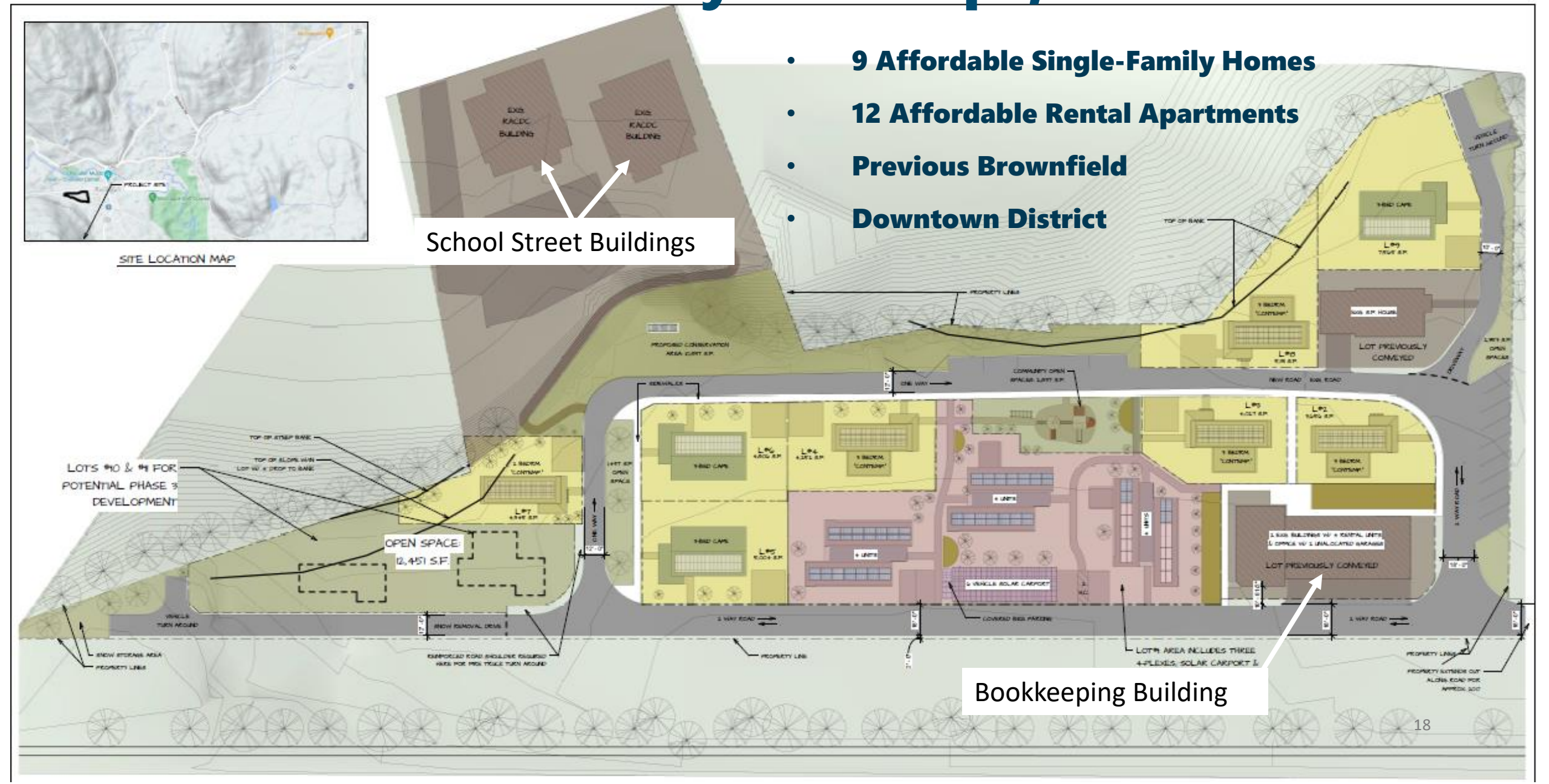

WARNING!

Salisbury Square DC Microgrid

Efficiency Vermont

An Affordable Community – Randolph, VT

- **9 Affordable Single-Family Homes**
- **12 Affordable Rental Apartments**
- **Previous Brownfield**
- **Downtown District**



1 Northwest View

4 Southwest View Copy 1

Multifamily

	Lot #	Type	Usage	Solar	Generation	Net
PHASE 1	2a unit 1	4plx - 1BD	4,601	19.0	4,681	(80)
	2a unit 2	4plx - 1BD	4,601		4,681	(80)
	2a unit 3	4plx -2BD	5,480		4,681	799
	2a unit 4	4plx -2BD	5,480		4,681	799
	2b unit 1	4plx - 1BD	4,601	19.0	4,681	(80)
	2b unit 2	4plx - 1BD	4,601		4,681	(80)
	2b unit 3	4plx -2BD	5,480		4,681	799
	2b unit 4	4plx -2BD	5,480		4,681	799
	2c unit 1	4plx - 1BD	4,601	19.0	4,681	(80)
	2c unit 2	4plx - 1BD	4,601		4,681	(80)
	2c unit 3	4plx - 1BD	4,601		4,681	(80)
	2c unit 4	4plx - 1BD	4,601		4,681	(80)
	2	3BD/2FL	8,792	7.5	7,243	1,549
	3	Bradford	7,092	10.0	11,266	(4,174)
PHASE 2	4	3BD/2FL	8,792	7.5	7,243	1,549
	5	3BD/2FL	8,792	7.5	7,243	1,549
	6	3BD/2FL	8,792	7.5	7,243	1,549
	7	3BD/2FL	8,792	7.5	7,243	1,549
	8	3BD/2FL	8,792	7.5	7,243	1,549
	9	3BD/2FL	8,792	7.5	7,243	1,549
PHASE 3	10	3BD/2FL	8,792	7.5	7,243	1,549
	11	3BD/2FL	8,792	7.5	7,243	1,549
	6 Vehicle Carport			23.0	29,218	(29,218)
azx gvc			144,948	158	161,843	(16,895)
	Rem Modeling plus 25%		181,185		161,843	19,342

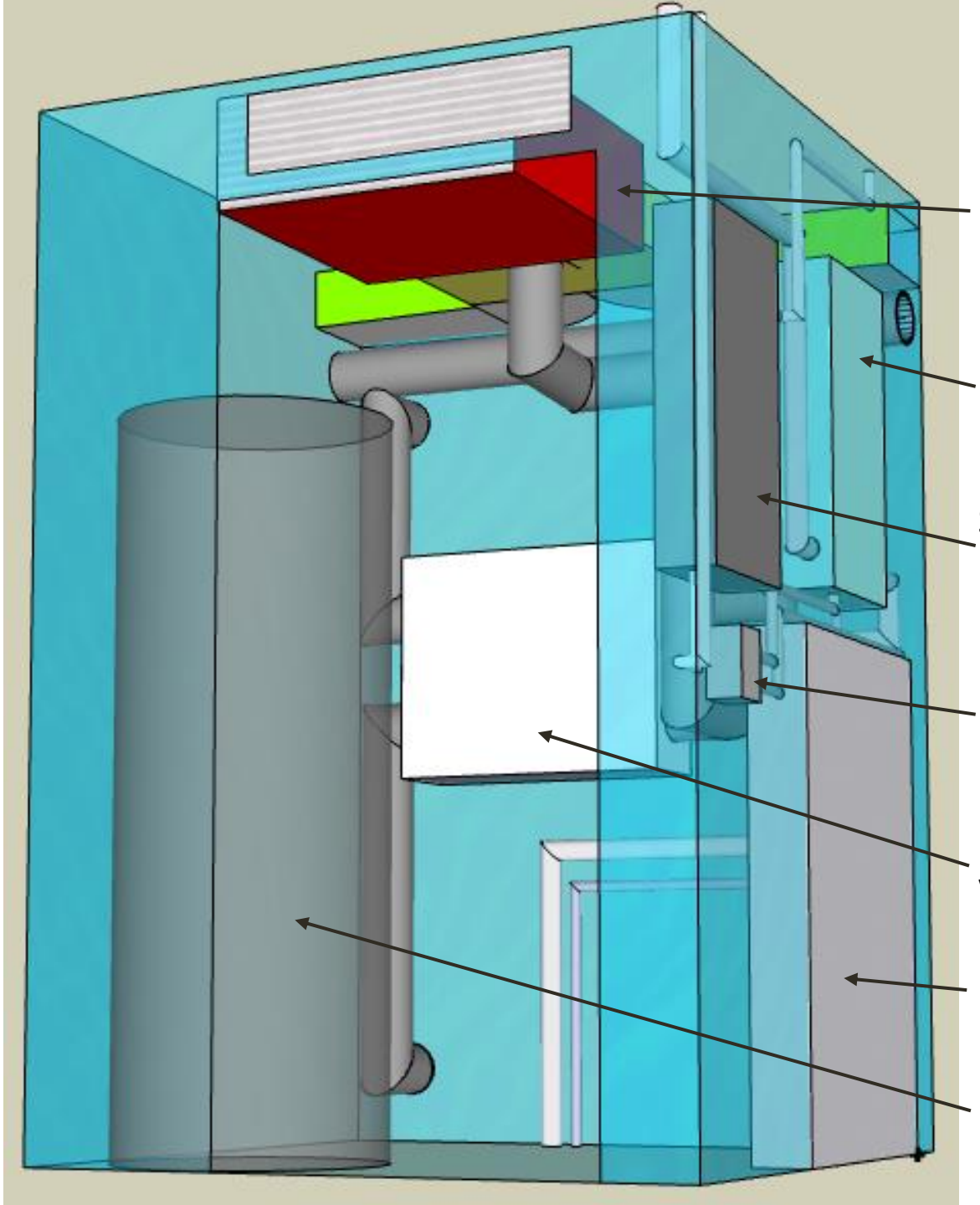
Why a DC Microgrid?

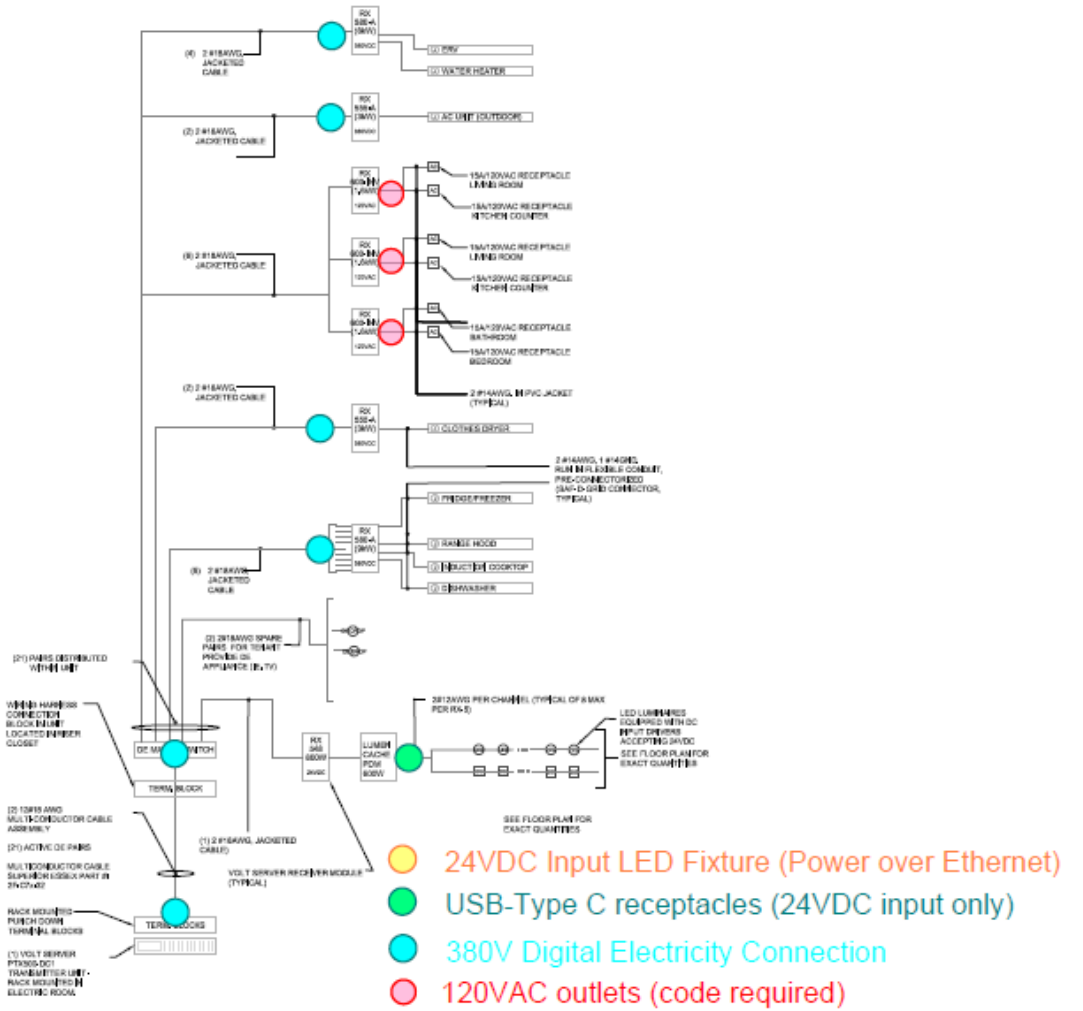
- **Resilience & reliability optimized**
- **Asset Utilization – solar+storage**
- **Utility Compatibility – enhanced demand response**
- **Reduce Overall Demand**
- **Reduce Carbon Footprint**

A DC Microgrid

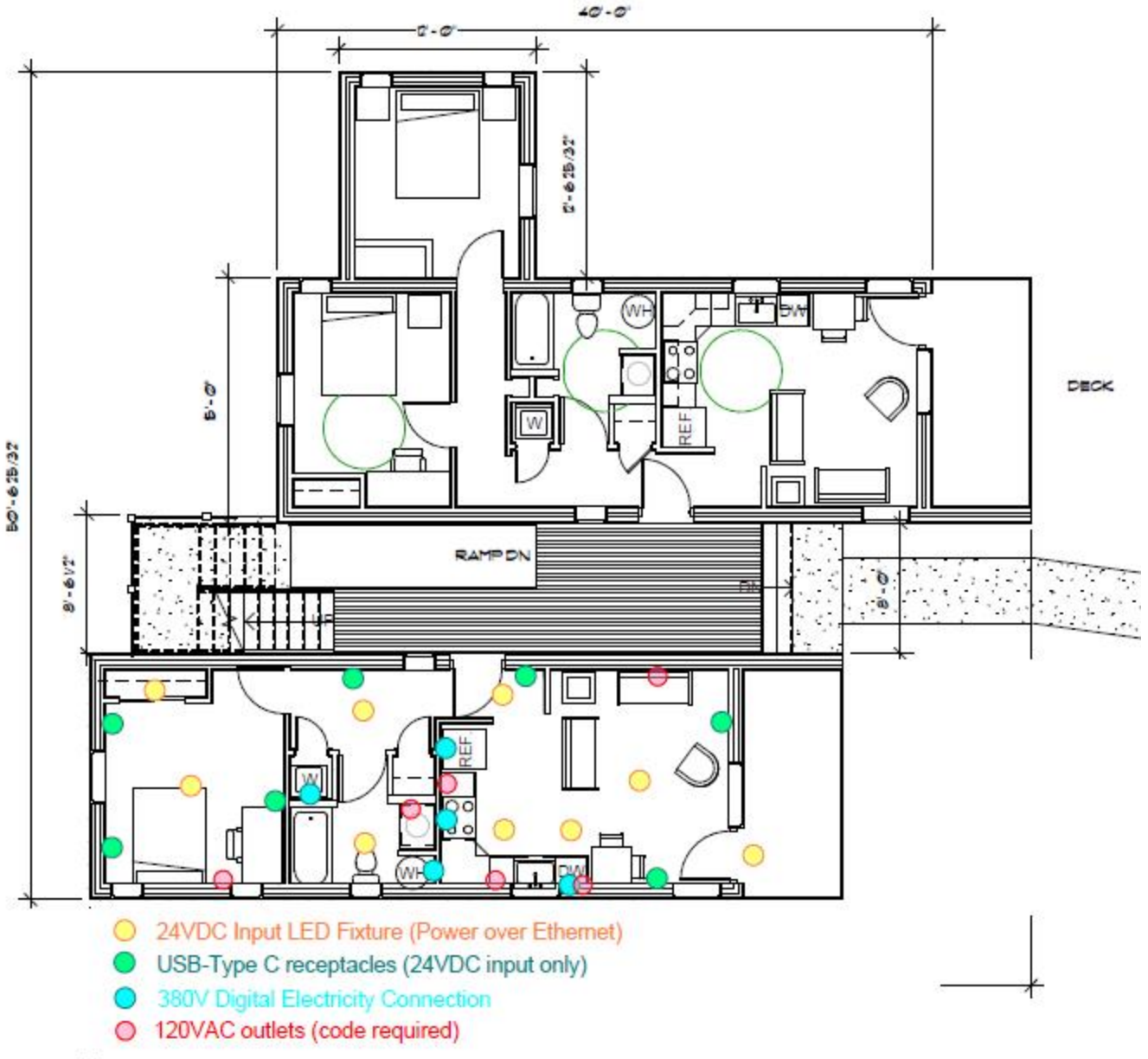
First of its kind

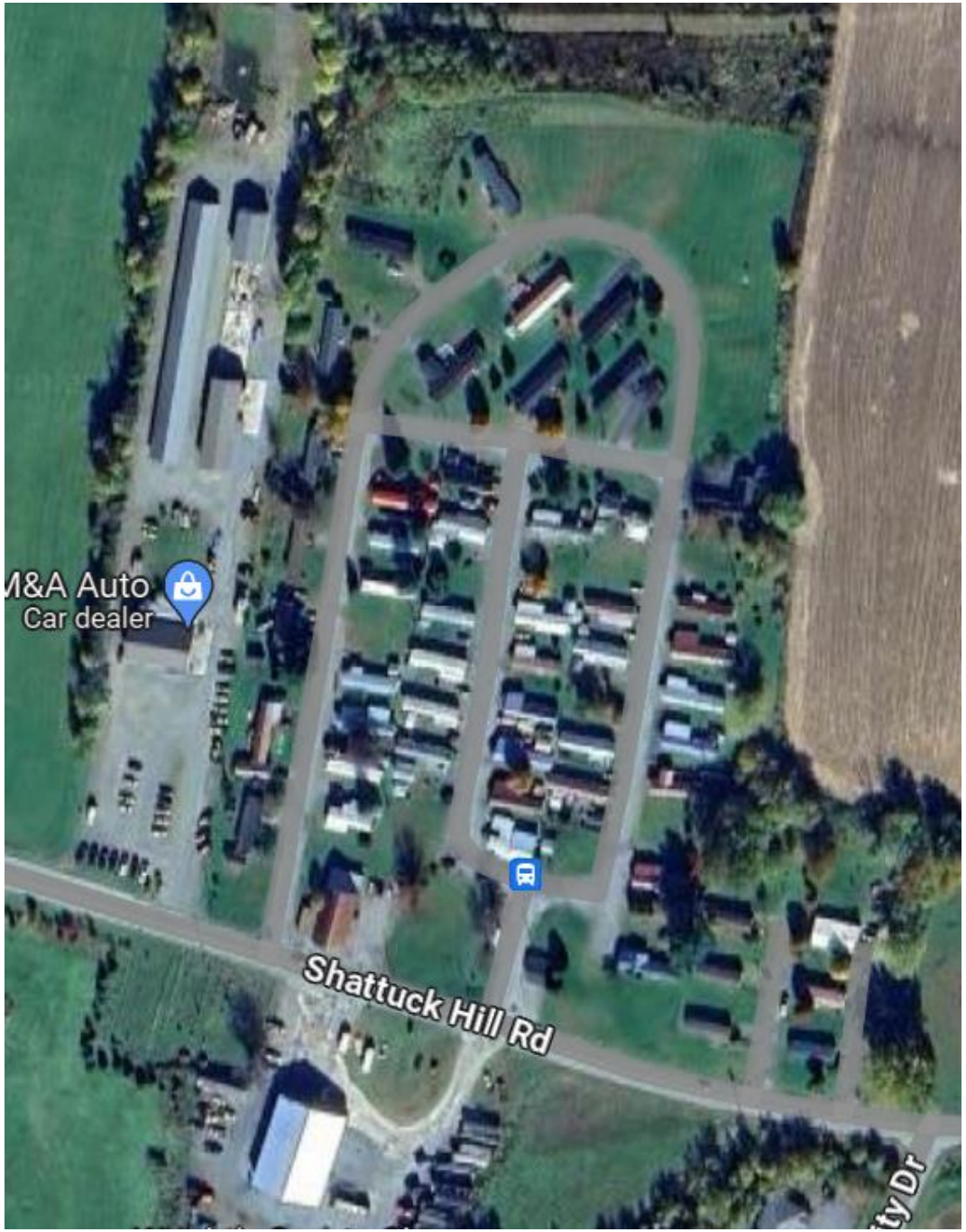
- Community where each home generates, distributes and consumes power as direct current (DC) for highest operating efficiency;
- Each home will share its locally generated power with neighboring homes for operational autonomy (resilience against grid outages);
- Each home will be equipped with high-efficiency DC lighting and appliances that will operate alongside legacy Alternate Current (AC) appliances even during islanded mode of operation.





A5.206 - TYPICAL UNIT THREE BEDROOM
DIGITAL ELECTRICITY SINGLE LINE





Manufactured Housing Communities

Efficiency Vermont

Advanced Manufactured Home Initiative

- Based on the Department of Energy's Zero Energy Ready Home standard
- Qualifies for the 45L IRA $5,000 tax credit (goes directly to plant for each ZERH home delivered)
- Factories are ZERH Certified through a Quality Assurance Provider
- Efficiency VT developed two higher tiers that incorporate additional measures around health and energy efficiency.
- Work closely with Vermont Housing and Conservation Board, Vermont Housing Finance Agency, Champlain Housing Trust, Vermont Low Income Trust of Energy (VLITE), and other organizations
- Introduced as missing housing option for many niches where $300+/SF not an option

Efficiency Vermont

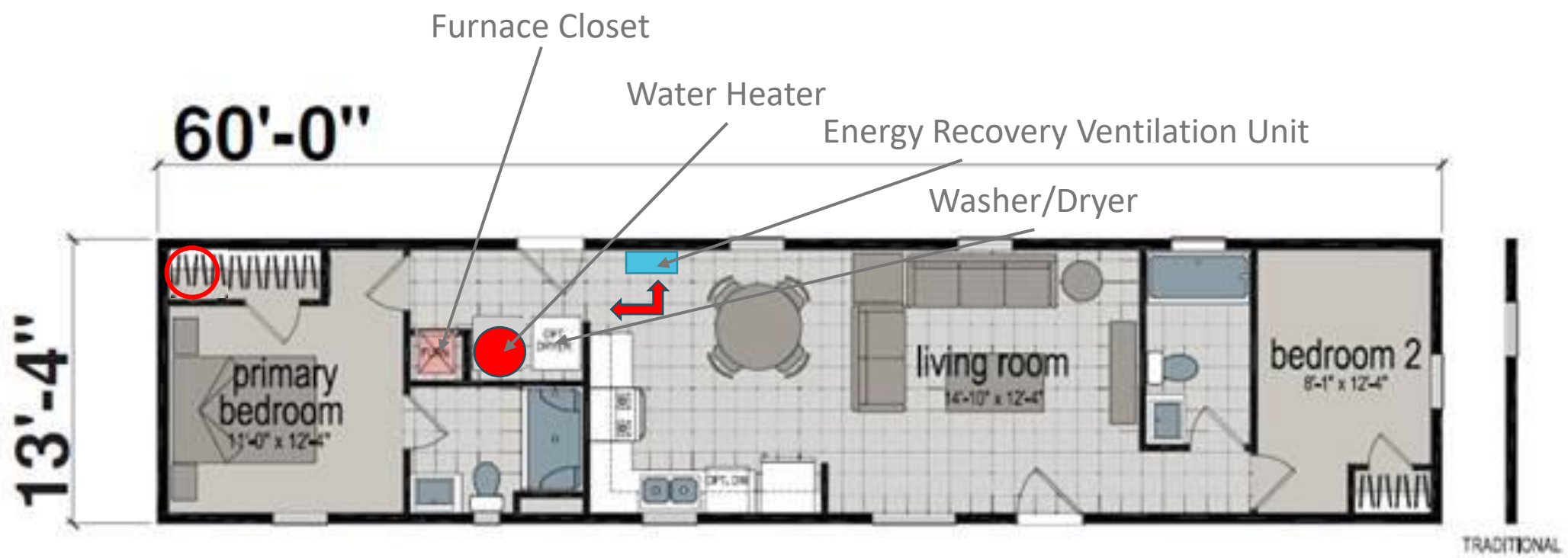
Advanced Manufactured Home (AMH)

Assembly	Efficiency VT AMH Tier 1	Efficiency VT AMH Tier 2
Co-requisite	**ENERGY STAR – MH & ZERH – MH certification**	
Walls	R-21	R-24
Floor	R-27	R-33
Ceiling	R-38	R-38/R-49 (2-section homes)
Windows	U-0.30 (R-3)	U-0.25 (R-4)
Doors	U-0.30 (R-3)	
Air leakage	3 Air Changes per Hour @ 50 Pascals	
Heating	ENERGY STAR or NEEP ccASHP	
Cooling	ENERGY STAR or NEEP ccASHP	
Ventilation	Efficiency VT H/ERV QPL	
Hot Water	Heat Pump Water Heater >/=3.3 UEF	
Thermostat	Programmable	
Duct Leakage	4 Cubic Feet per Minute (CFM) @ 25 Pascals per 100 square feet	
Duct Insulation	Floor cavity: enclosed by insulation. All other spaces: R-8	
Lighting	100% LED	
Appliances	ENERGY STAR	


UFP Wrap
ICC-ES AC-38 • ESR-3431
UFP Distribution, 2701 Ada Drive, Elkhart IN 46514


UFP Wrap
ICC-ES AC-38 • ESR-3431


UFP Wrap
ICC-ES AC-38 • ESR-3431
WINDOW WRAP

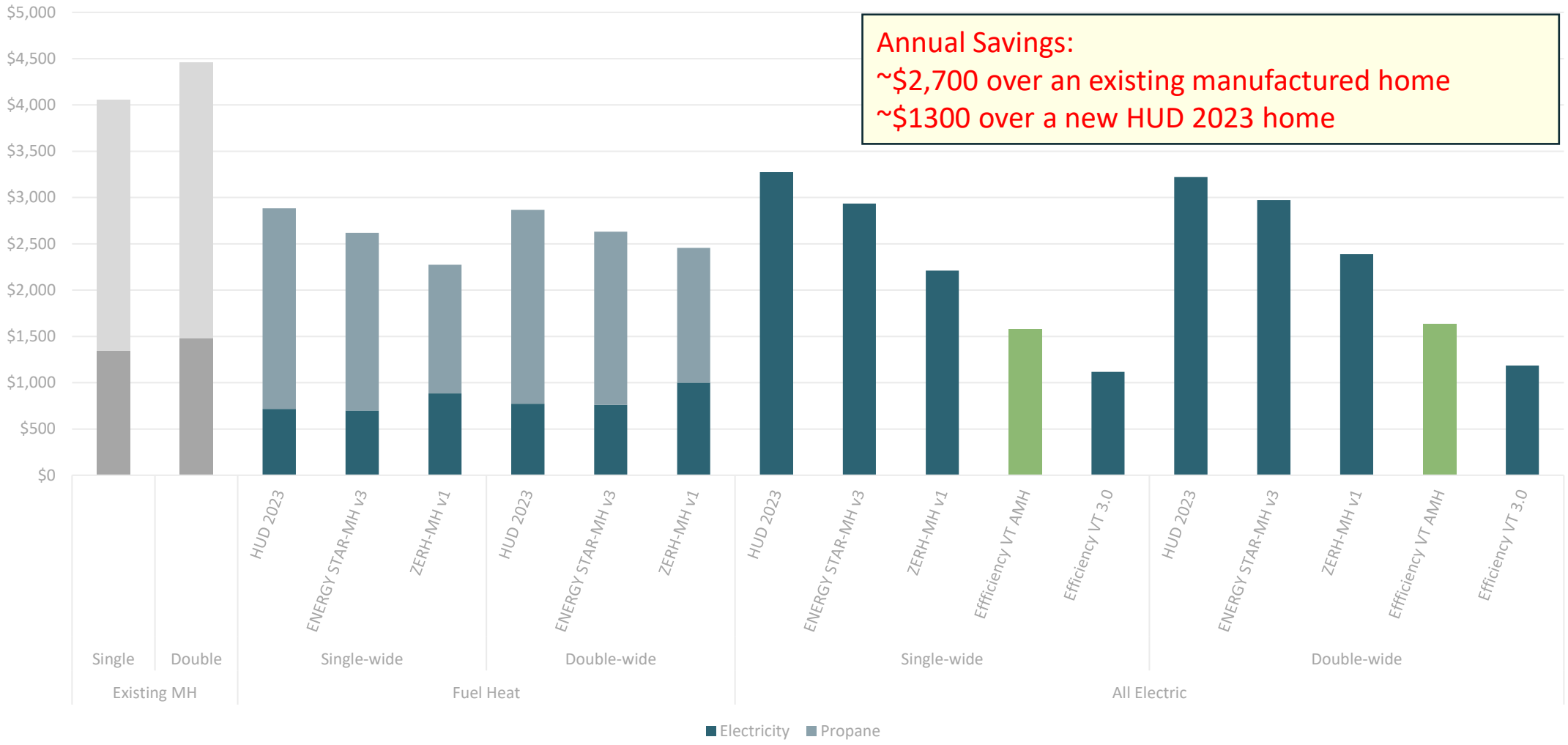


1460H22101 (19-8252)

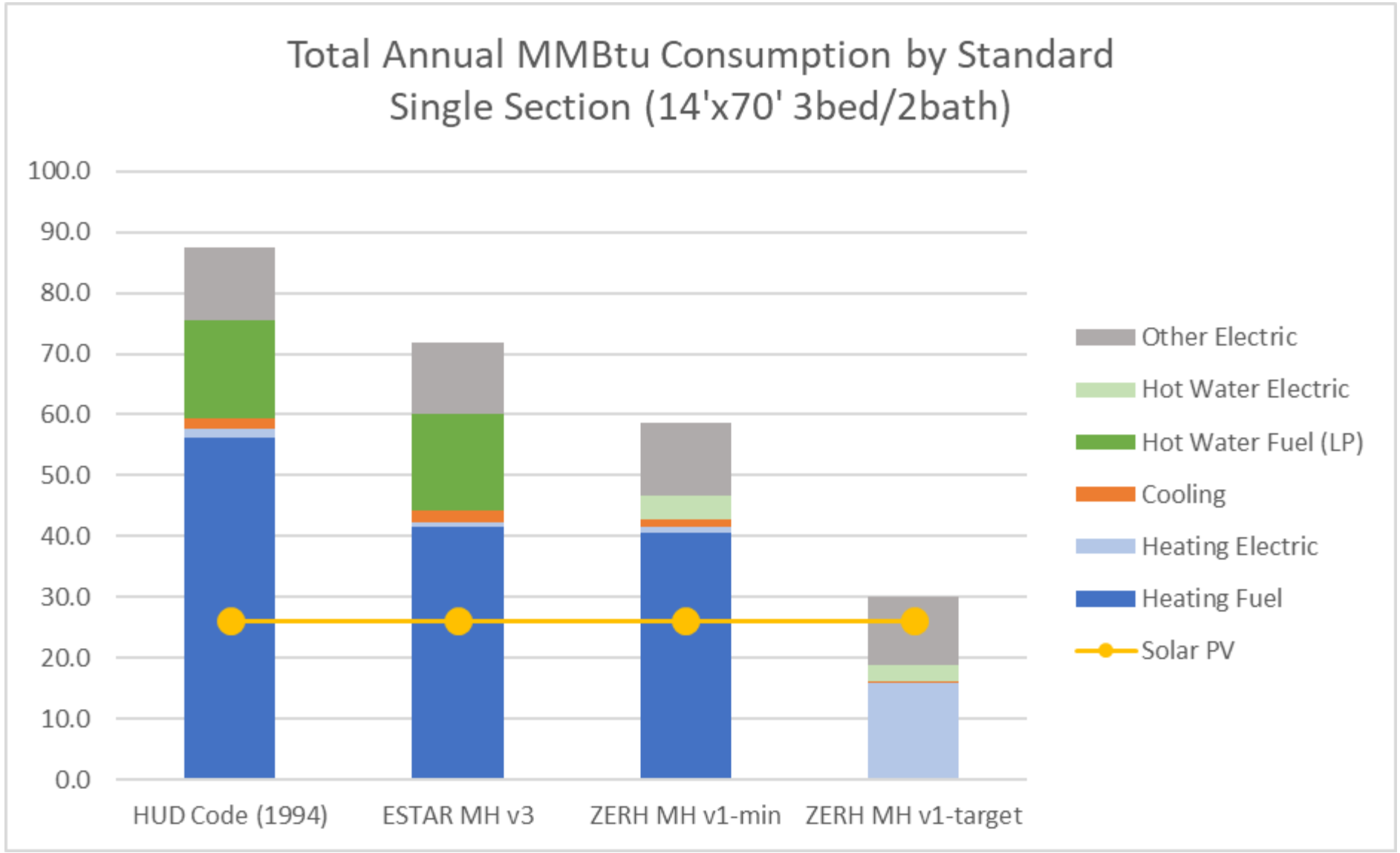
TITAN HOMES


Rheem

Modeled Annual Energy Costs



*Assumptions: $0.18/kWh (electricity); $3.00/gal (propane)


Total Annual MMBtu Consumption by Standard
Single Section (14'x70' 3bed/2bath)
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
HUD Code (1994)
ESTAR MH v3
ZERH MH v1-min
ZERH MH v1-target
Other Electric
Hot Water Electric
Hot Water Fuel (LP)
Cooling
Heating Electric
Heating Fuel
Solar PV

Base Cost 13-4'x60' 3Bed/2Bath		$60,208
Base Cost 13-4'x70' 3Bed/2Bath		$69,375
Delivery	$2,600	
Home/Slab Removal	$5,000	
Infrastructure Upgrades	$3,000	
Installation	$4,198	
Washer/Dryer	$2,238	
HVAC install	$15,700	
Utility Tie-in	$3,000	
Insulated Skirting	$6,500	
Stairs and Rails	$1,422	
Foundation	$12,000	
Solar array - 7kW system	$28,000	
Total	$83,658	
Project Management	$8,365.80	
60' Total	$152,232	
70' Total	$161,399	

$143/SF without Solar PV
$173/SF with Solar PV
Other affordable housing $350-$550/SF/unit

Questions?

- Peter Schneider
- Principal Engineering Consultant

- E pschneider@veic.org
- T (888) 921-5990

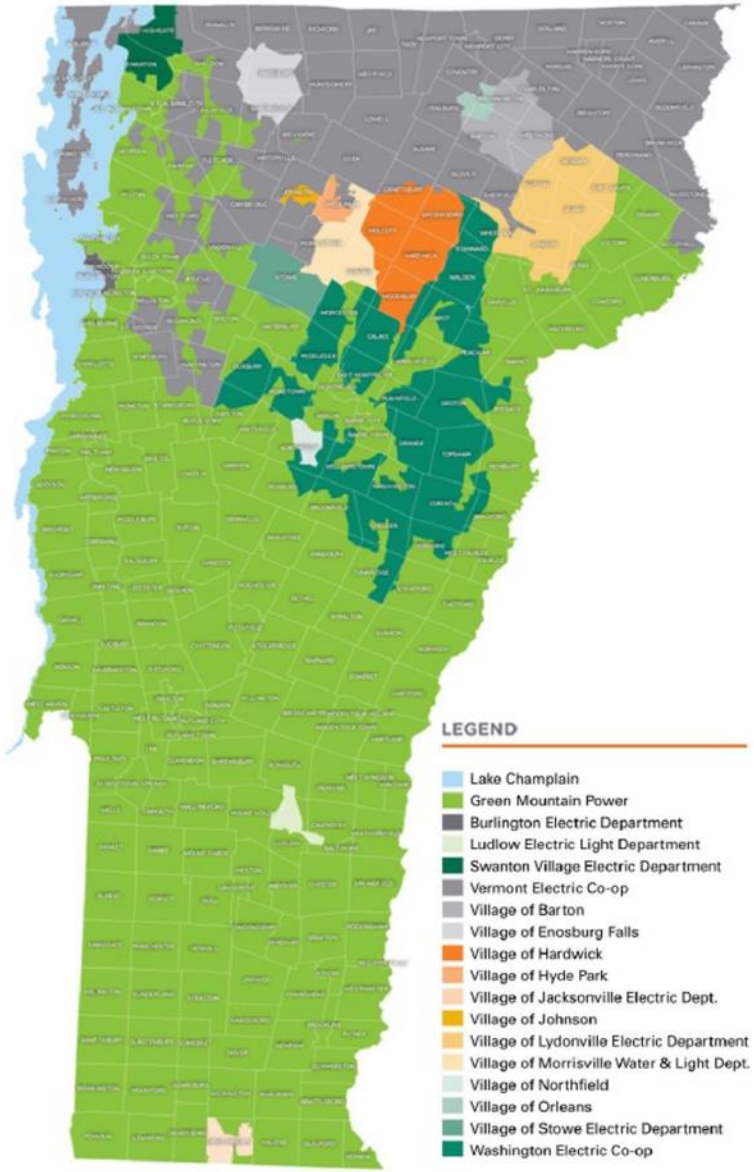
20 Winooski Falls Way, 5th Floor

Winooski, VT 05404

efficiencyvermont.com

Efficiency Vermont

Green Mountain Power: Who We Are



- GMP serves 275,000 customers, covering 77% of Vermont
  - 85% residential customers, 15% businesses
  - 12,500 miles of distribution lines
  - 1,011 miles of sub-transmission
  - 15 district offices with teams across Vermont
  - About 510 employees, 285 are members of the IBEW Local 300
  - Annual energy mix is 100% carbon free, 80% renewable
  - Will be 100% renewable by 2030
  - Certified B Corp

Certified B Corporation

Clean, Reliable, Resilient: Helping Vermont Electrify

Top sources of carbon pollution in VT

- Heating
- Transportation

Climate change is accelerating extreme weather

- Past 12 months
  - 18 storms = outages for 700,000 GMP customers

Partnering with customers on resiliency

- Strengthening the grid so customers can choose clean electrification and stay safe and connected

GMP: Cutting Carbon and Costs for All Customers

New programs supported by federal funding help income-qualified customers electrify

- Energy Storage Access Program ($1.5M ARPA)
  - Home battery back up
- Home Electrical System Upgrades ($10M ARPA)
  - 200 amp panel and service upgrades
- GMP Energy Transformation Line Extension Tariff

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