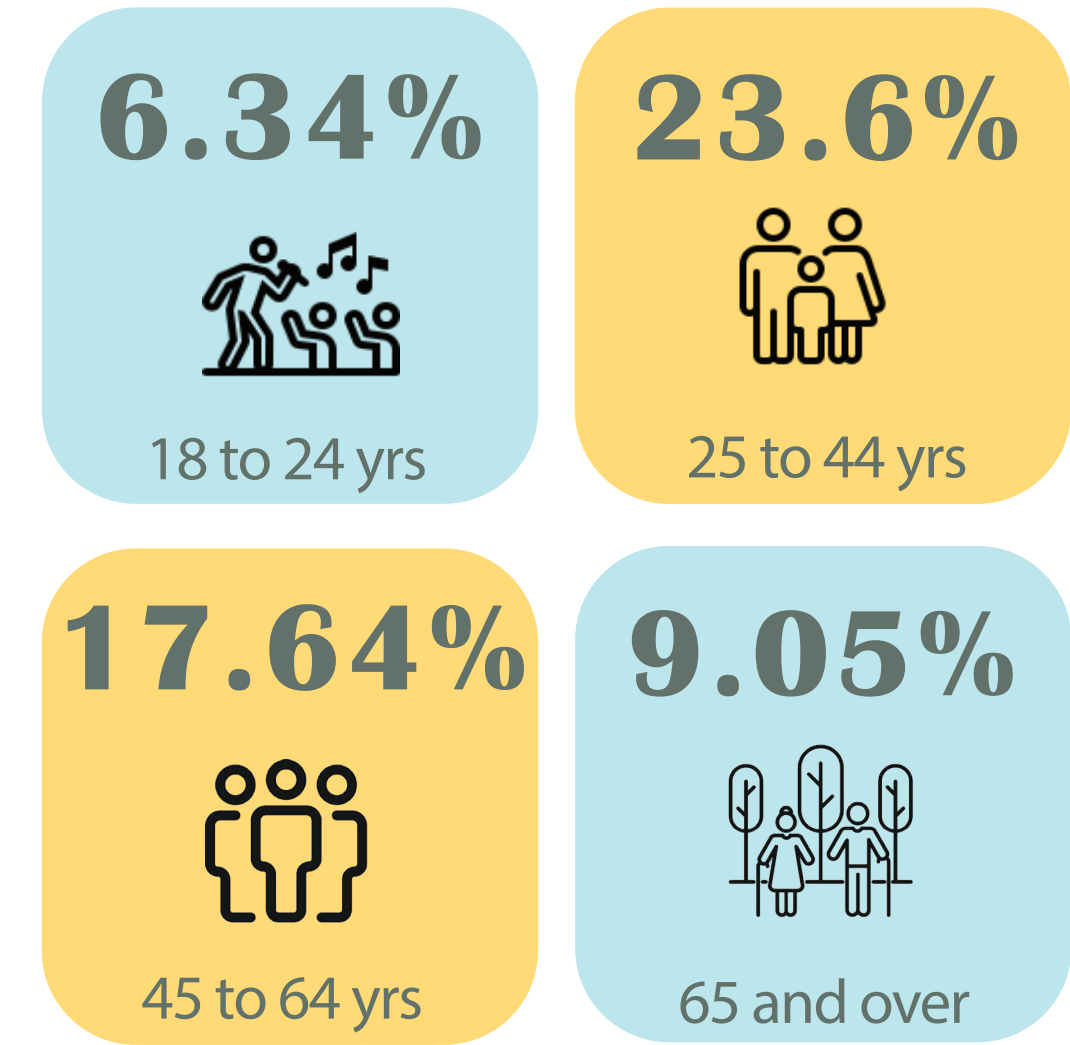


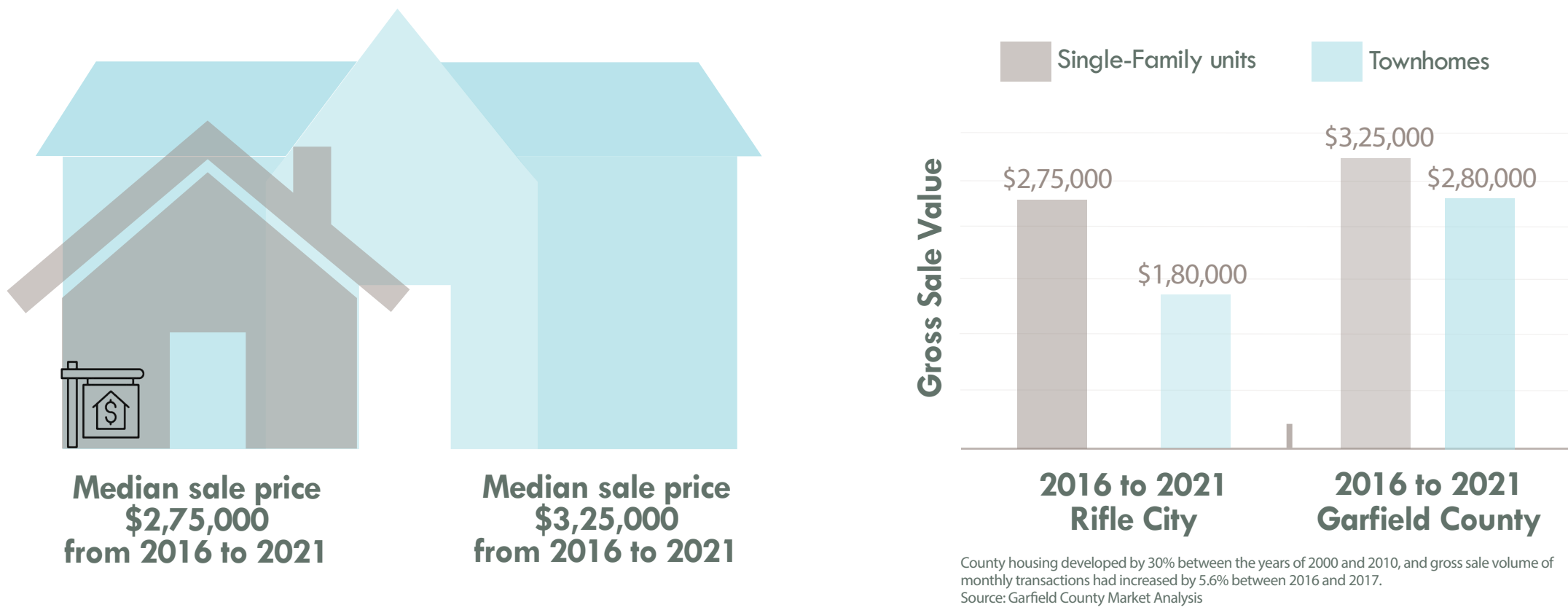
GREEN AFFORDABLE HOUSING

WAPITI COMMONS, RIFLE, CO

Population Distribution



Housing Trend



Single-Family units

Townhomes



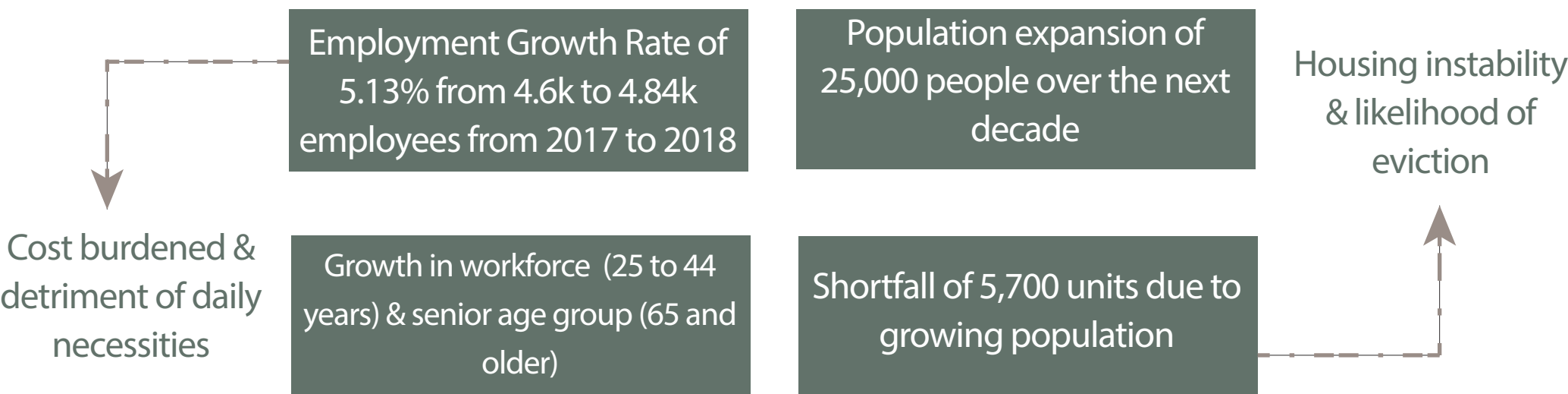
Location	Single-Family units	Townhomes
2016 to 2021 Rifle City	\$2,75,000	\$1,80,000
2016 to 2021 Garfield County	\$3,25,000	\$2,80,000

County housing developed by 30% between the years of 2000 and 2010, and gross sale volume of monthly transactions had increased by 5.6% between 2016 and 2017.
Source: Garfield County Market Analysis

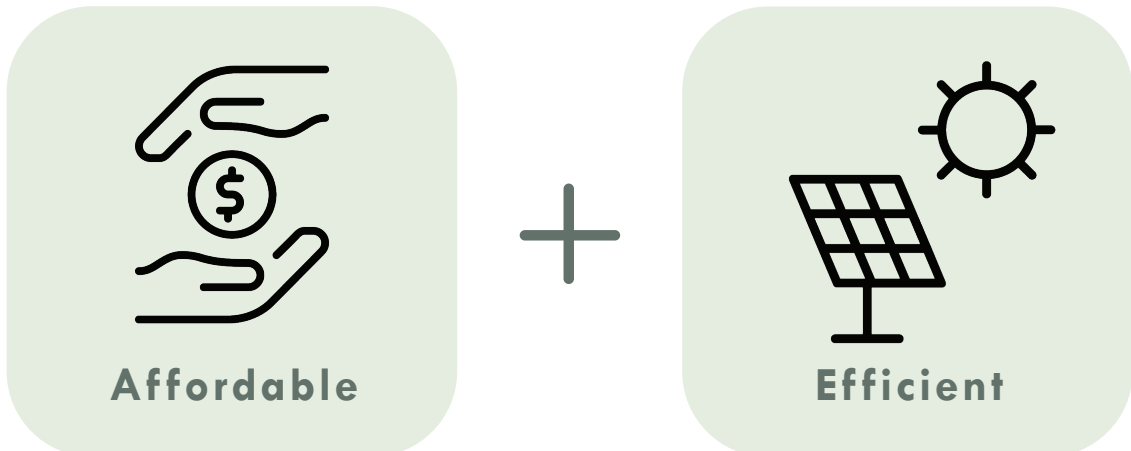
Employment Opportunities



Why is there a Shortage of Housing?



Goals



- Derive at a market rate for 18 for-sale affordable homes, to make them affordable to families earning 80% AMI.
- Present passive solar strategies based on building efficiency scenarios.
- Assess appropriate construction methods based on micro-climate & surrounding physical conditions.

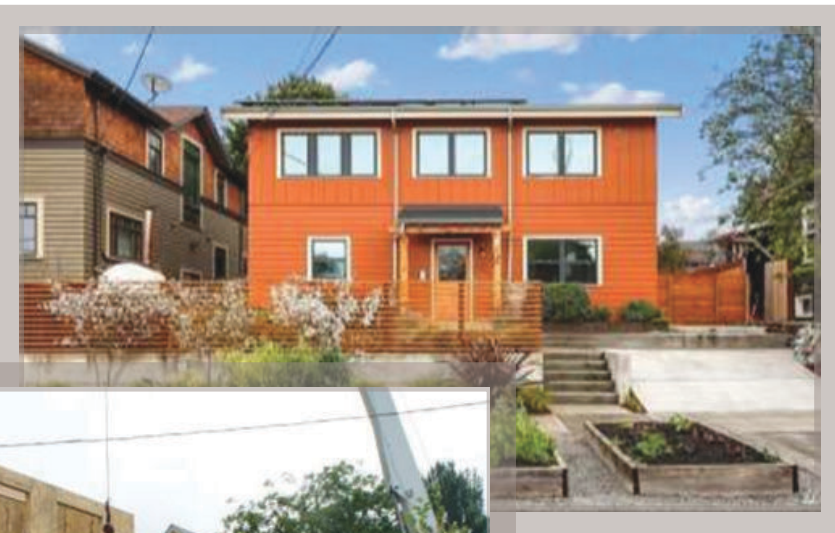
Case Studies

Orchards at Orenco, Hillsboro, OR
Area: 53,000 SqFt
Completion: Jun 2015



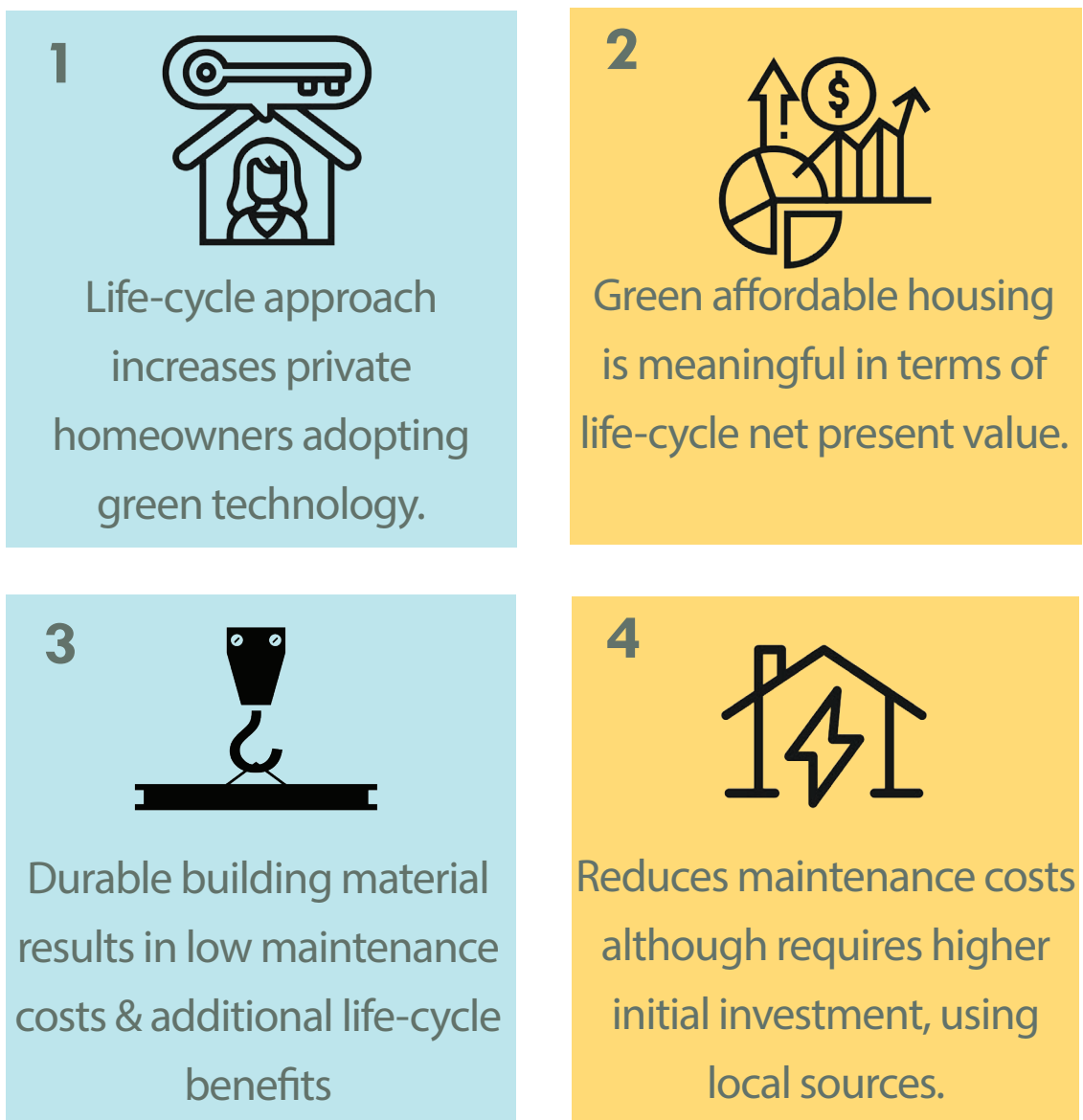
- NA first certified multifamily affordable Passive project
- Built on the property of mineral wool insulayion, triple glazed argon filled window, poly-iso foam insulation with TPO membrane roofing
- HERS index score of -1, certified to be a zero-energy home
- Estimated cost benefits were \$33,500, with 3.1% return on investment % \$30-\$45/ month/unit

Thomas/Salmon Residence, Seattle, WA
Area: 1,915 SqFt
Completion: Oct 2011

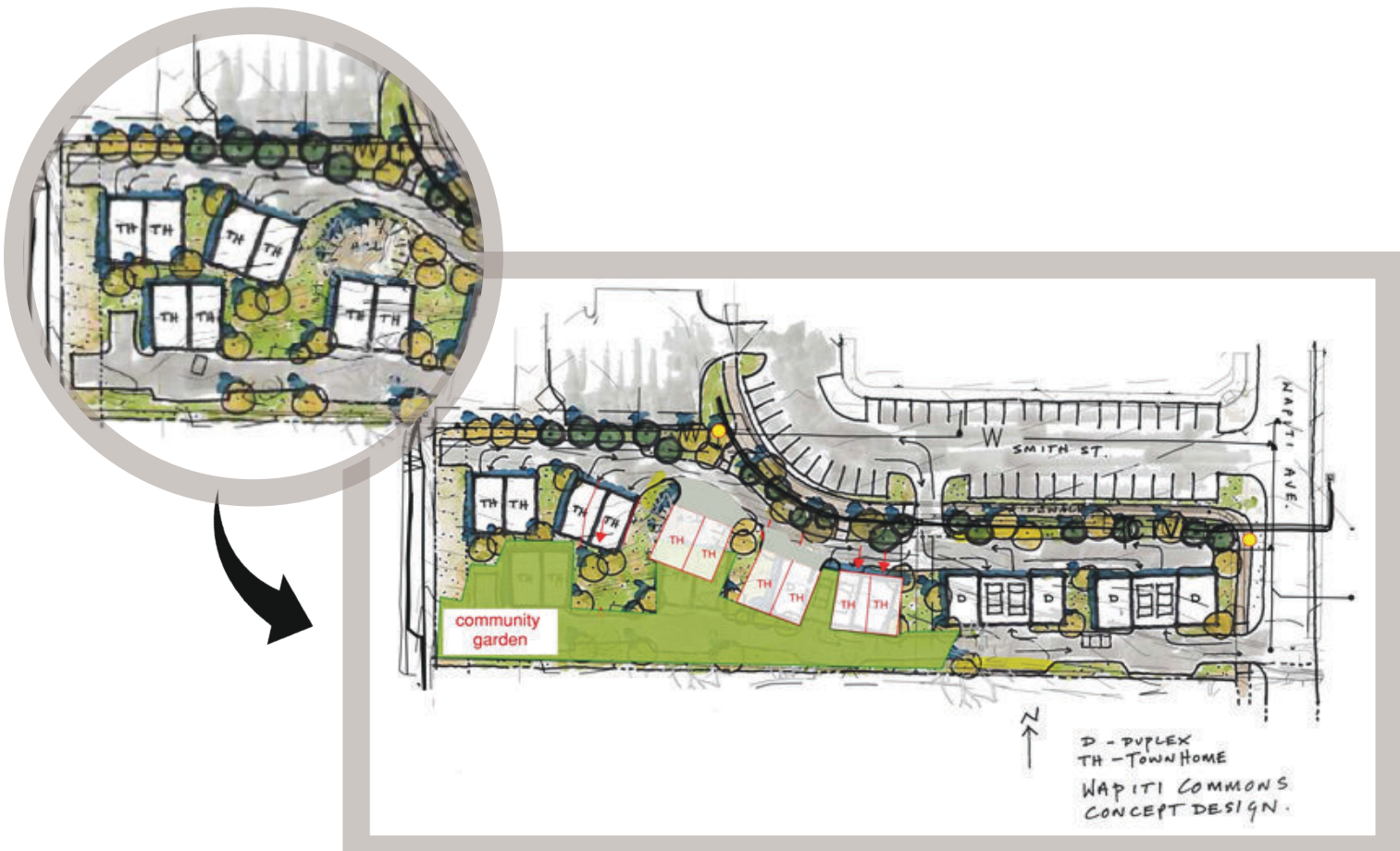


- Seattle's first true zero-energy home
- Built on the property of thermal mass, SIP as a thermal blanket, airtight triple glazed windows, cross ventilation, XPS foundation, 6.44kW PV panels
- HERS index score of -1, certified to be a zero-energy home
- Projected annual utility cost savings of approximately \$1,344 & a projected annual utility cost of \$74

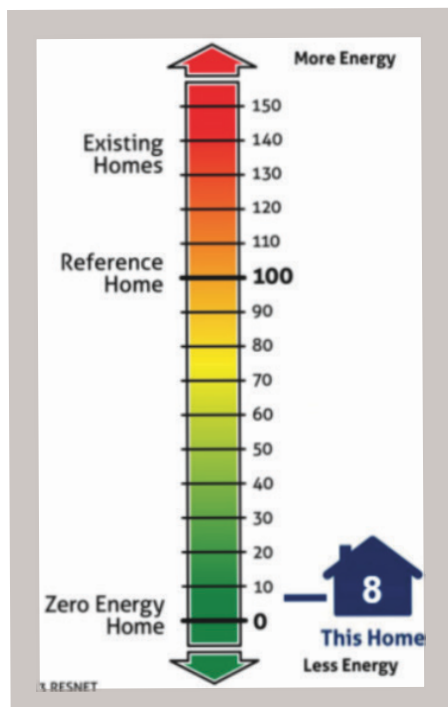
Key Findings



Recommendations



- Reducing the optimal area to volume (A/V) ratio from 1.3 m²/m³ to a minimum of 0.7 m²/m³
- Buildings on NW corner to be displaced with openings on south-east or south-west, instead of south facing



- HERS score of 8 based on metric of only PV panels, an energy/yr of \$290 & lifetime savings cost of \$39k, close to a NetZero Home.
- HERS of -2 : PV & passive design -2, saving 1-2% usage, \$124 energy/ yr & \$43k lifetime cost savings.

