



Sustainable Design and Building for Affordable Housing in Kaua'i

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AIA Communities by Design
ENVISION. CREATE. SUSTAIN.



Focus

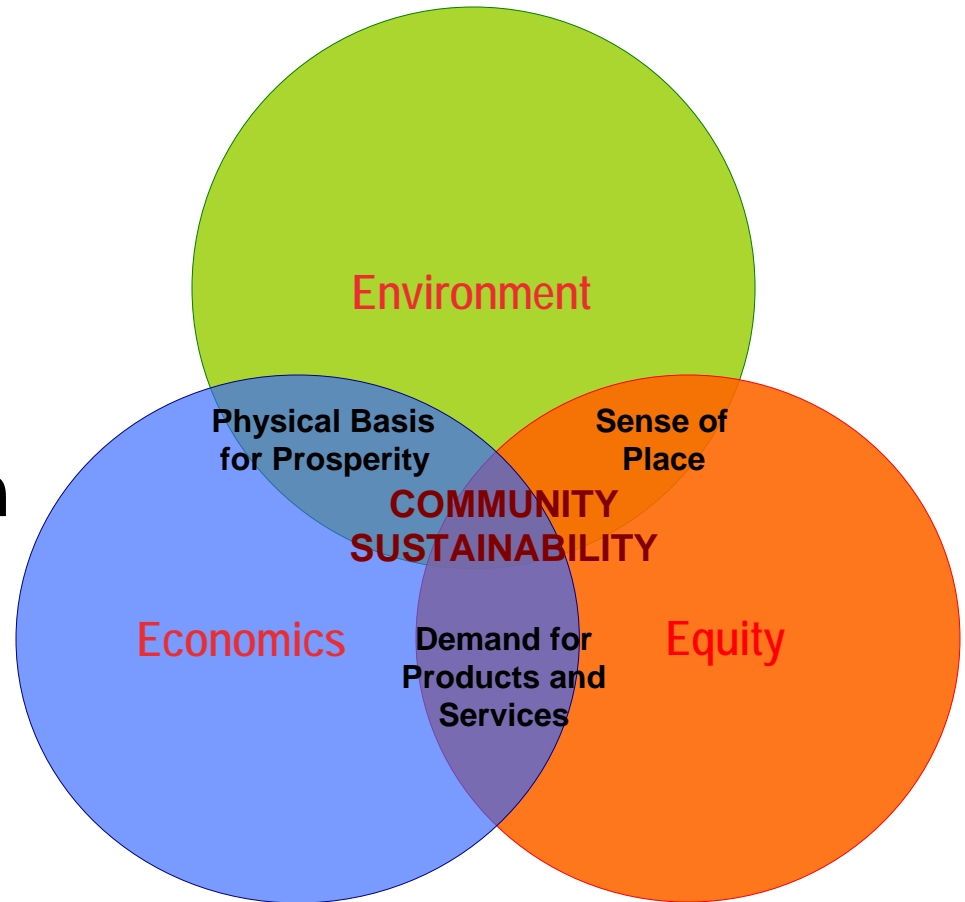
The common elements or drivers between housing affordability and sustainability



Three integrated parts of Sustainability

- **Environmental Stewardship**
- **Social Equity**
- **Economic Development/Growth**

All planning decisions must be assessed based on all three elements- advances in only one, to the detriment of the others, is not sustainable.



Four elements of Sustainable and Affordable Housing

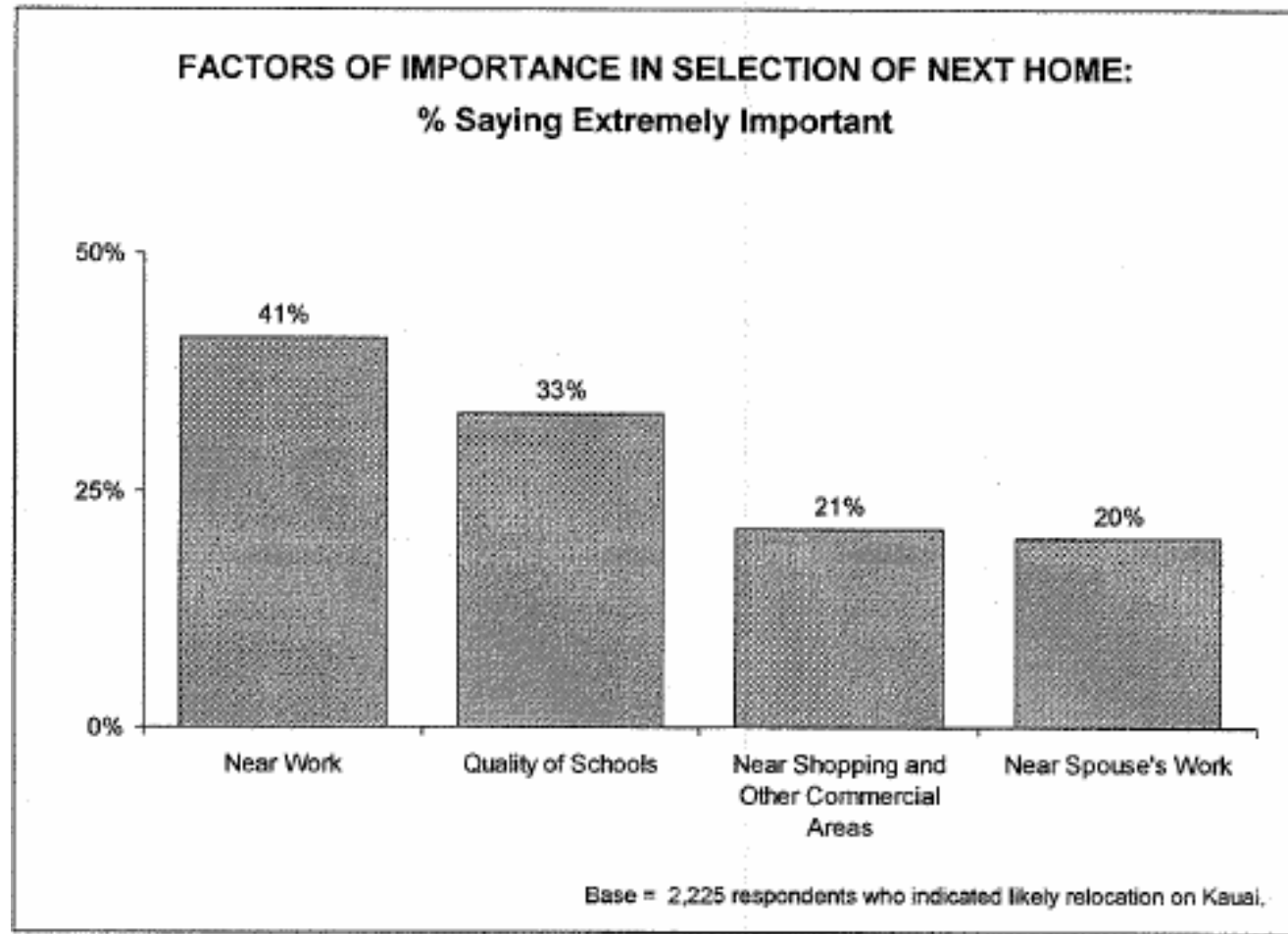
1. Site / Land
2. Building Construction / Renovation
3. Financing / Market
4. Operating / Owning



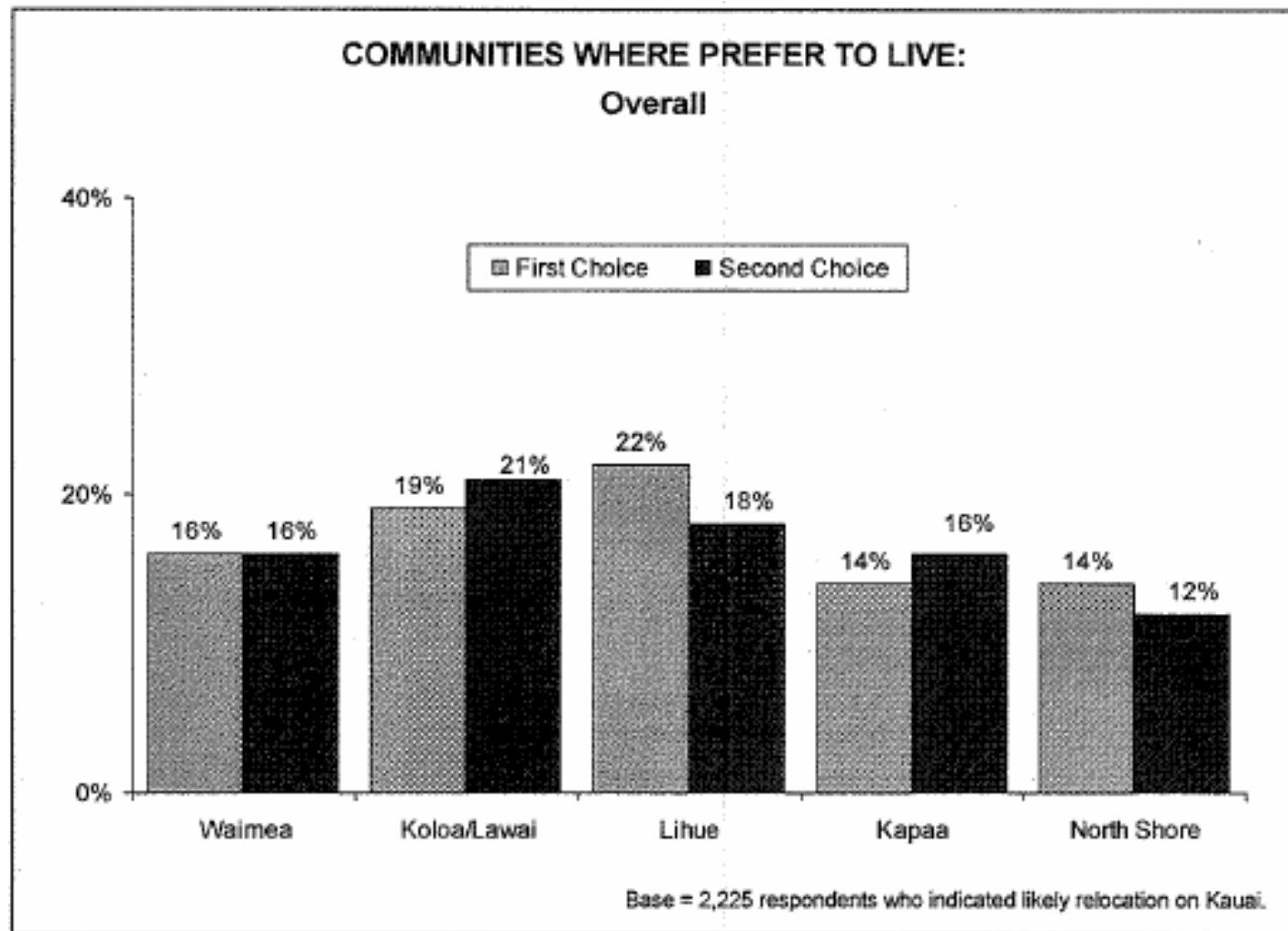
1. SITE and LAND

Land cost drivers:

- Market
- Location



1. SITE and LAND



1. SITE and LAND

Sustainable housing drivers:

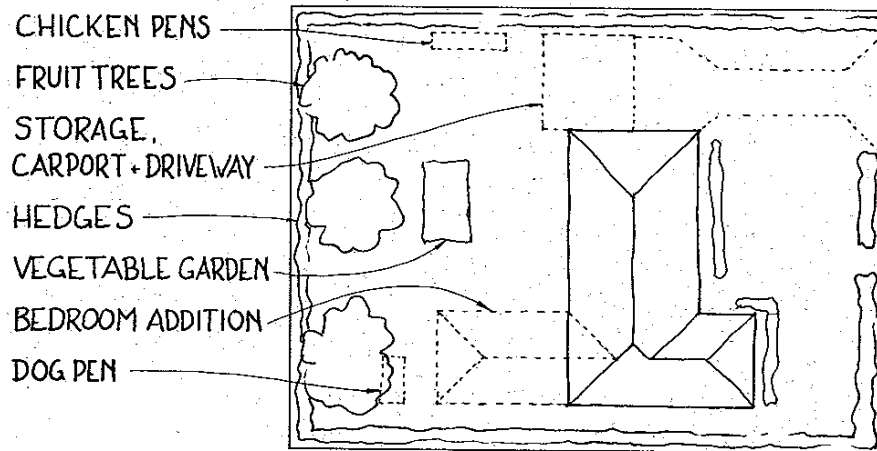
- Location and Linkages
- Sustainable Site Design
- Water Efficiency (site)

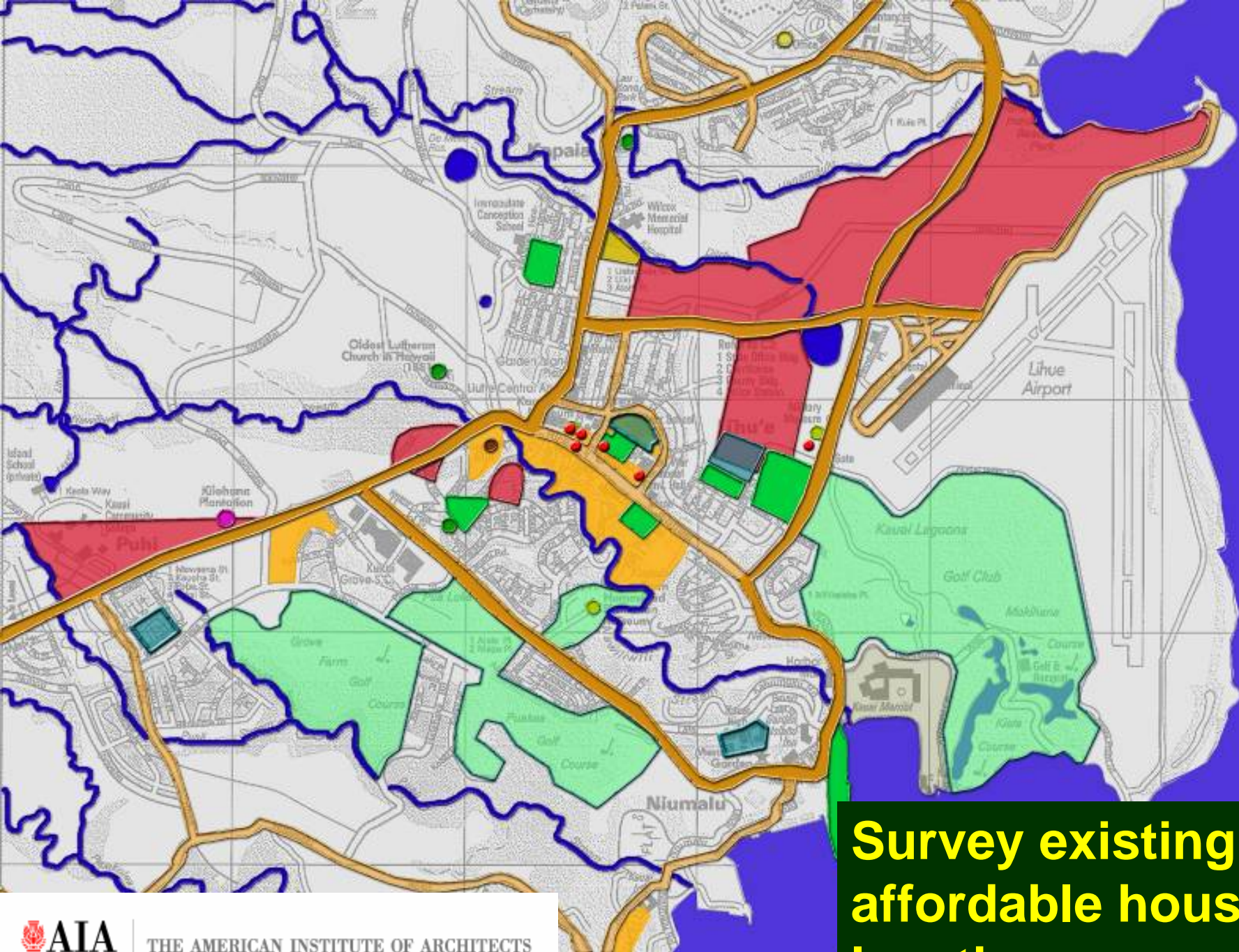


1. SITE and LAND

One house on one lot may no longer be sustainable or affordable

TYPICAL PLOT PLAN

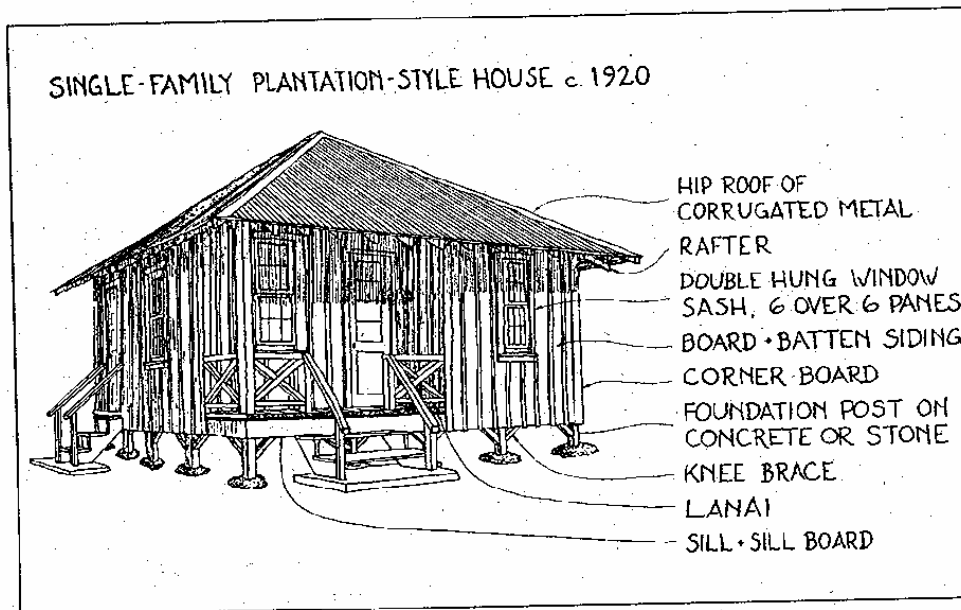




**Survey existing
affordable housing
locations**

2. BUILDING CONSTRUCTION

- **Construction techniques have changed but sustainability principles haven't**



Sustainability was once the only option



Modern housing can be sustainable using long standing principles of design.



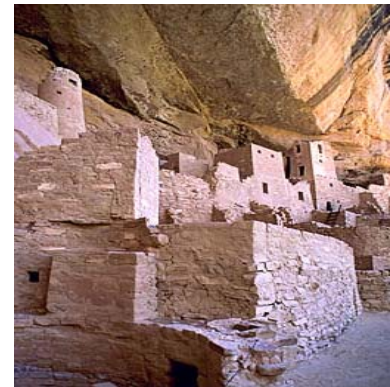
Igloo Uses Snow as Insulation



Pueblo Uses Earth for Thermal Mass



Teepee Design Provides for Natural Ventilation



Pueblo Orientation Takes Advantage of Sunlight



BUILDING CONSTRUCTION

**“Construction” applies to both new and existing buildings:
Existing Buildings are often priced lower than new ones**

“The most sustainable building is an existing one”



BUILDING CONSTRUCTION

Construction cost drivers:

- **Commodity materials based on house size**
- **Features added to house**
- **Finishes selected**
- **Equipment installed**



2. BUILDING CONSTRUCTION

- **Sustainable Housing drivers :**

- **Water Efficiency**

- **Materials and Resources**

- **Indoor Air Quality**

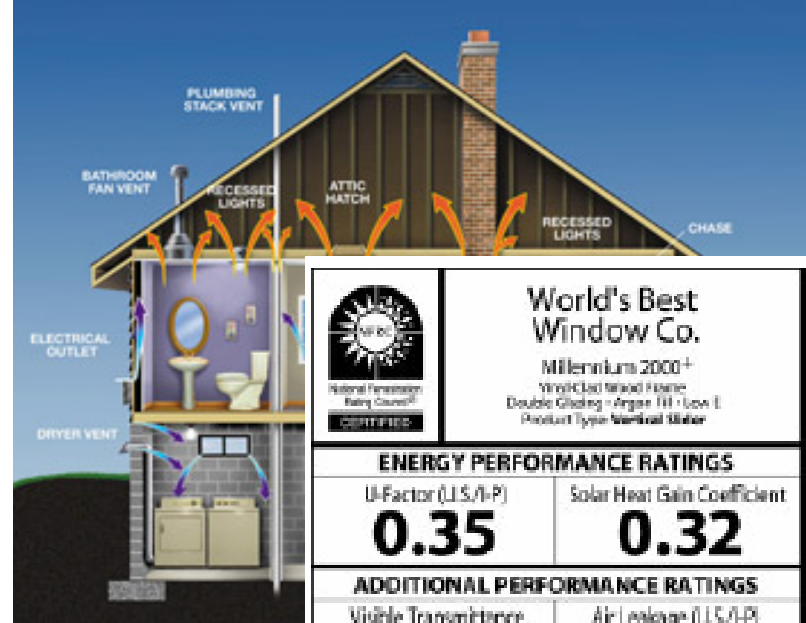
- **Homeowner Education**


- **Energy Star**



2. BUILDING CONSTRUCTION

- Energy
Priorities –
Building
Envelope:
- Insulation
- Air Infiltration
- Windows



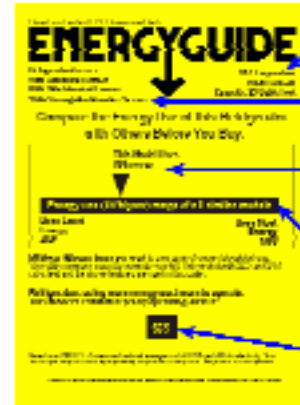
 National Fenestration Rating Council® CERTIFIED	World's Best Window Co. Millennium 2000+ Vinyl Low E Triple Pane Double Glazing - Argon Fill - Low U Product Type: Residential Window
ENERGY PERFORMANCE RATINGS	
U-Factor (U.S./I-P)	Solar Heat Gain Coefficient
0.35	0.32
ADDITIONAL PERFORMANCE RATINGS	
Visible Transmittance	Air Leakage (U.S./I-P)
0.51	0.2
Condensation Resistance	—
51	
<small>Manufacturer declares that these ratings conform to applicable NFRC procedures for determining window product performance. NFRC ratings are determined from test set of environmental conditions on a specific product size. NFRC does not warrant any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for alternative performance information. www.nfrc.org</small>	



2. BUILDING CONSTRUCTION

Energy – Electrical and Mechanical:

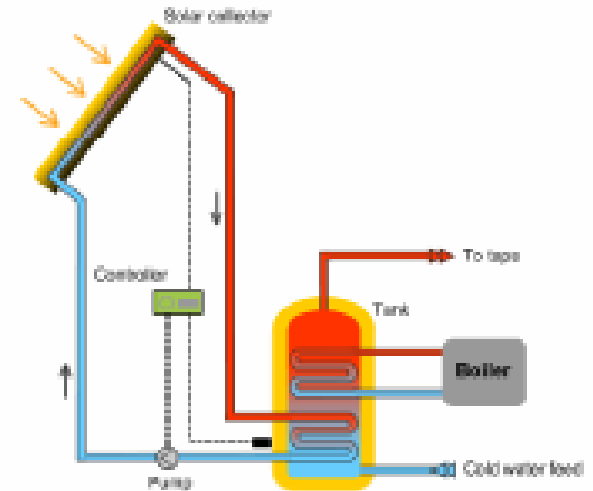
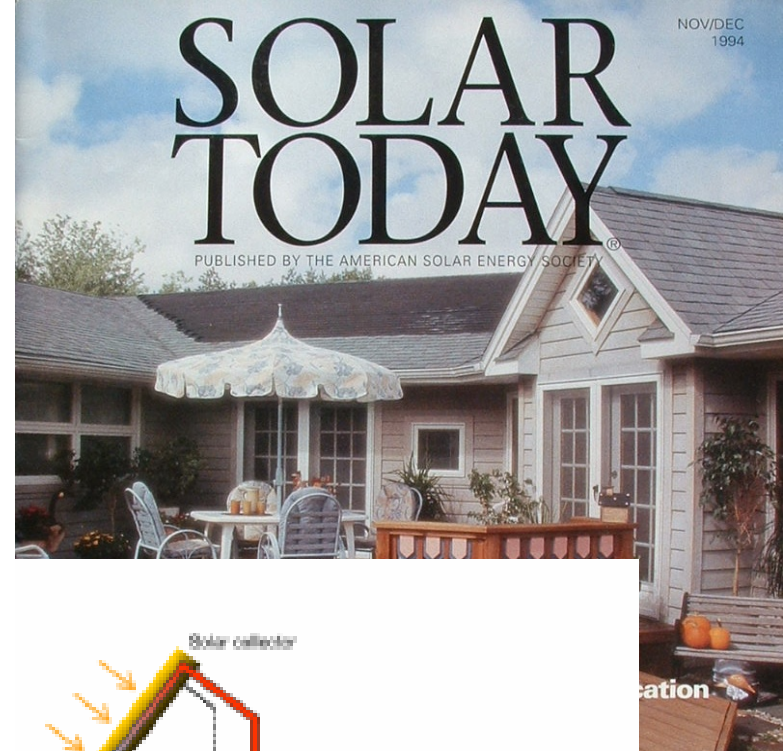
- Heating/Cooling
- Water Heating
 - Lighting
 - Appliances



Energy Guide label

2. BUILDING CONSTRUCTION

Renewable Energy



3. HOUSING FINANCING

- **Principal and Interest**

- **It's not**

- “how much?”**

- it's “how much down
and how much a
month?”**



Context

If the
current median costs of housing are

Single family residence - \$515,000

Condominium - \$520,000

And

Median household income is \$47,176



and

If housing costs are limited to 30% of the household income, then \$1,180 is available per month for a mortgage

This means all you can afford is an \$180,000 house



4. OWNING / OPERATING

- **Property Taxes**
- **Property Insurance**
- **Purchased energy**
- **Water and sewer**
- **Maintaining building materials and systems**
- **All of these are influenced by the 3 prior elements**

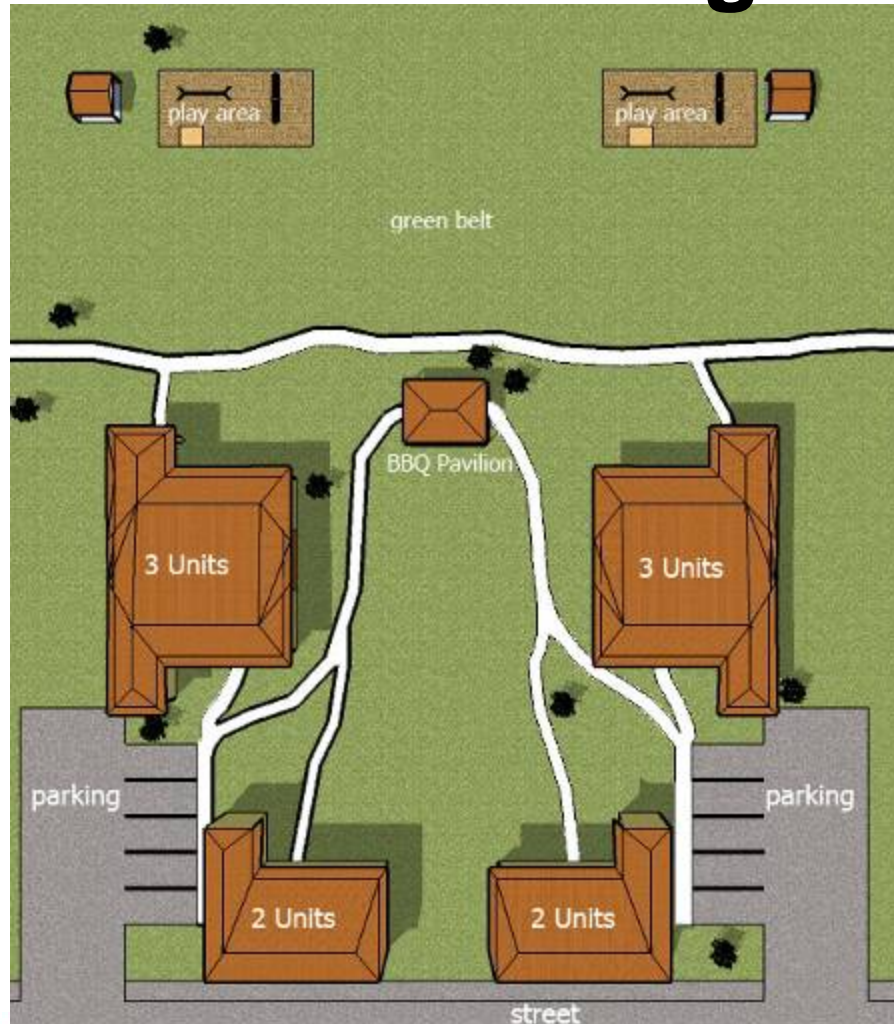


ALTERNATIVES

**There are other
options:
Focus on
community,
not just
housing**



Another model – cluster housing





**Tepeyac Haven
Pasco, WA**

15 units per acre

29% improvement of
attic insulation heat
resistance over
state code energy

44 homes available for
low-income families



Other models – Co-housing is a lot like plantation living





Nbanusit Neighborhood and Farm

Takoma Village, Washington, D.C.



twenty-two townhouse style buildings incorporate green building materials, sustainable design techniques , energy star systems and common eating spaces that reduce waste



Eco-village Ithaca, New York



Only 80% of the total land in the community is built on leaving the rest as fields and open pasturelands



The future is up to us



AIA Center for Communities by Design: Contact Information

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