SUSTAINABLE HOUSING

“What’s the use of a fine house if you haven’t got a tolerable planet to put in on?”
Henry David Thoreau

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Project Background

- Why Sustainable Housing?
- Who was our audience?
- Our methodology
Sustainable Housing
A Guide to
Invest in a Healthy Future

Sustainable Home
Looking for Your First

Effective - Conservatory
High-performing
Green - Environmentally
Affordable - Local to Local
Visible and Accessible - to

A Sustainable Home is

Choosing a Sustainable Home.
Additional Information and Ideas

This brief guide will point you

Long-term and Utility to your

Making a Great Start
Resilience and Opportunity

Customizing your Home for the
Sustainable homes are Visitable and Accessible

Making your home “visitable” to all, including those with mobility limitations, provides a basic level of access with three key features:

- One step-free entry
- Wide doorways: at least 32”
- Main-floor bathroom with wheelchair access

Visitable homes not only welcome guests, but may save thousands of dollars if a resident has a progressive or sudden impairment. Visitability is easy and inexpensive to build into a home from the start.

Visitable homes are not just for “special populations”. They also make it easy for anyone to move strollers, bicycles, furniture, and other large items through doors.

Beyond basic access, the many elements of “universal design”, or UD, make homes more functional and comfortable, while enhancing safety and independence. Some UD features are:

- Lever door and faucet handles
- Lighting controls: 35” above floor (max.)
- Electrical sockets: 25” above floor (max.)

Sustainable homes are Affordable

First-time Home Buyers may benefit from assistance in navigating the process to qualify for a loan or to identify a home they can afford.

Some Important Steps:

1. Attend a home buyer’s class
2. Keep track of your financial documents, e.g., pay stubs, bills
3. Check your Credit score at http://www.creditscore.com; a 680 is the current minimum.
4. Consider your net rather than gross income: How much is left after your household expenses?

In some locations, you can qualify for a larger “location-efficient” mortgage if you locate where you can walk to most destinations.

Sustainable homes are Green and Efficient

Environmentally friendly features may also save dollars and improve health. Many “green” features are affordable and accessible to home-owners, with subsidies and support from state and federal programs.

Major Energy Star Appliance Savings

<table>
<thead>
<tr>
<th>Appliance Type</th>
<th>Annual KWH Savings</th>
<th>% Energy Savings</th>
<th>Savings Over Unit Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothes Washer</td>
<td>140</td>
<td>56%</td>
<td>$486</td>
</tr>
<tr>
<td>Dishwasher</td>
<td>72</td>
<td>24%</td>
<td>$135</td>
</tr>
<tr>
<td>Refrigerator</td>
<td>68</td>
<td>13%</td>
<td>$82</td>
</tr>
<tr>
<td>Freezer</td>
<td>44</td>
<td>10%</td>
<td>$71</td>
</tr>
<tr>
<td>Room Air Conditioner</td>
<td>76</td>
<td>10%</td>
<td>$71</td>
</tr>
</tbody>
</table>
Triple Bottom Line

- Economy
- Equity
- Environment
Economy

Equity

Environment
So You Want An Affordable House?

1) Attend a new homebuyer’s education session

2) Check your credit score

3) Keep track of documents

4) Consider your NET, not your gross income
Save Money with Energy-Efficient Appliances

<table>
<thead>
<tr>
<th>Appliances</th>
<th>Annual Life Cycle Cost (USD)*</th>
<th>Savings* (USD)</th>
<th>Simple Payback Period (yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Energy Star</td>
<td>Conventional Unit</td>
<td></td>
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<tr>
<td>Clothes Washer</td>
<td>$1,530</td>
<td>$1,752</td>
<td>$223</td>
</tr>
<tr>
<td>Dishwasher</td>
<td>$850</td>
<td>$922</td>
<td>$71</td>
</tr>
<tr>
<td>Freezer</td>
<td>$960</td>
<td>$994</td>
<td>$33</td>
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<tr>
<td>Refrigerator</td>
<td>$1,583</td>
<td>$1,653</td>
<td>$71</td>
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<tr>
<td>Dehumidifier</td>
<td>$1,114</td>
<td>$1,339</td>
<td>$225</td>
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<tr>
<td>Central Air Conditioners</td>
<td>$8728</td>
<td>$9,915</td>
<td>$1,187</td>
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<tr>
<td>Room Air Conditioners</td>
<td>$1,244</td>
<td>$1,299</td>
<td>$55</td>
</tr>
<tr>
<td>Heat Pump</td>
<td>$17,573</td>
<td>$19,758</td>
<td>$2,186</td>
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<tr>
<td>Furnace</td>
<td>$9,364</td>
<td>$10,289</td>
<td>$925</td>
</tr>
<tr>
<td>Room Air Cleaners and Humidifiers</td>
<td>$443</td>
<td>$597</td>
<td>$154</td>
</tr>
</tbody>
</table>

“Energy-improving actions generally save more energy than curtailing use of intrinsically inefficient equipment.”

Federal and State Renewable Energy Tax Credits

- Photovoltaic high upfront costs.
- 30% tax credits to overcome these costs.
What Can Homeowners Do?

- Install new EnergyStar appliances
- Make informed decisions about their use
- These changes can amount to 30% reduction in household energy consumption
What is included Social Equity?

- Visitability
- Universal Design
- Affordability
- Consumer Education
- Construction Labor Practices
- Regional Accessibility
Visitability Allows Access For All

- One step-free entrance, or one entrance of no more than 1”
- Interior and exterior entryways a minimum of 32”
- Hallways between 36” and 42” wide
- Accessible, habitable living space
- In multi-level homes, an accessible bathroom on the first floor
Universal Design

- Caters to broad spectrum of ages and disability conditions
- Qualities:
  - Lighting controls approx. 36” above floor
  - Electrical sockets approx. 25” above floor
  - Level handles for doors and faucets
  - Counters and sinks an accessible height for those in wheelchairs
No Step/Low Step Entrances

Affordable

Luxury

No Step

Single, Low Step
Universal Design and Open Floor Plan

- Wide Entrance
- Low Lighting Controls
- Wide Hallways
- Open Floor Plan
“Requires, with exceptions, newly constructed, federally assisted single-family houses and town houses to include at least one level that complies with the following accessibility features for persons with disabilities:

- accessible entrance and interior doors
- accessible habitable space and an accessible bathroom
Site Selection and Development

1. Choose an appropriate site
2. Limit site disturbance
3. Limit quantity of run-off
4. Manage quality of stormwater run-off on site
5. Make sustainable landscaping choices

Source: LEED, Sustainable Sites Initiative
Conserving Materials and Resources

- Resource Efficiency
- Innovative Designs
  - Require less materials or generate less waste
- C&D Waste Management Plan
  - “Diverting 90% of construction jobsite waste and over 80% of demolition debris from landfill disposal is not uncommon.”

Energy and Water Efficiency

Best ways to improve energy and water efficiency:

- **Problem**
  - North Carolina’s building code is based on the 2006 International Energy Conservation Code (IECC).
  - This code is outdated and not well-enforced.
Indoor Air Quality Issues

- Ventilation
  - Bathrooms
  - Kitchens
  - Combustion Appliances

- VOCs
  - Found in adhesives, paints, primers, floor coatings, varnishes, and carpeting
  - Adverse Health Effects
THE EARTHSHIP

A Sustainable Housing Case Study
What Is It?

- A housing model built from recycled materials
- Requires little or no outside water or energy
- Similar cost to conventional house but holds value longer
- Little or no utility bills and ability to grow food inside
Environment—Recycled Tires
Environment—Recycled Glass Bottles
Finished Earthship Examples
Environmental Benefits

Pickering Knob, WA
Economic Benefits

Buried tires, which take thousands of years to decompose

VS.

Buried tires, which take thousands of years to decompose

$\land$
Economic Benefits

Save on transportation costs

Grow your own food
Equity—Earthships Are Affordable
Why not everywhere?

- Difficulty complying with a county/state “Uniform Building Code.”
- Codes create incentives for inspectors to disqualify Earthships.
Final Word(s)

- Problem of Connectivity between three E’s
- Future Considerations
  - What forces will encourage standardization?
    - How can we create lasting changes?
  - How to incorporate: Site Location, sense of community, intergenerational living, etc