

## Little Eden Project – A Model for Sustainable Living

**PURPOSE:** The primary purpose of the Little Eden Project is to develop & demonstrate a practical model for a healthy, balanced and sustainable post-economic crisis lifestyle in an affordable, small footprint solar-powered home on an ecologically managed rural homestead. The secondary purpose is to create a spiritual retreat center to support a psychotherapeutic recovery program and to provide a home base for several small, green technology businesses and non-profit organizations. Little Eden will be a living laboratory for jumpstarting The New Green Economy, and the Project Development Partners should benefit greatly from their participation.

**VISION:** A well-designed, easy to self-build, affordable solar home that features a “Do It Yourself with community assistance” panelized & modular construction system that begins with a cabin-sized dwelling but allows for future modules to be added easily for expanded space requirements and/or specialized purposes. The core module is fully self-contained, with mechanical room, bathroom & kitchen, bedroom, living space, south facing solar collector system, rooftop rainwater collection, and other green technology innovations. Each module can be built upon a standardized I-beam frame truss for ease of transport to a prepared housepad site via a flatbed truck, similar to the delivery process for mobile homes, or assembled onsite like a Deltec Home Kit. The prototype homestead site is a carefully chosen location with a spring-fed fish pond, lower flood plain organic gardening area, and sufficient sunlight & wind to power its renewable energy systems.

FIGURE A

### Saltbox Solar Home

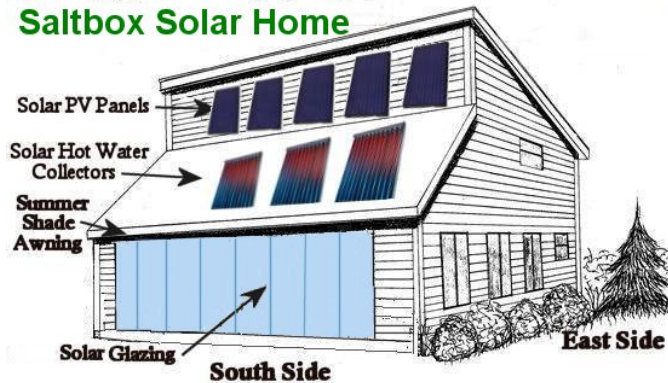
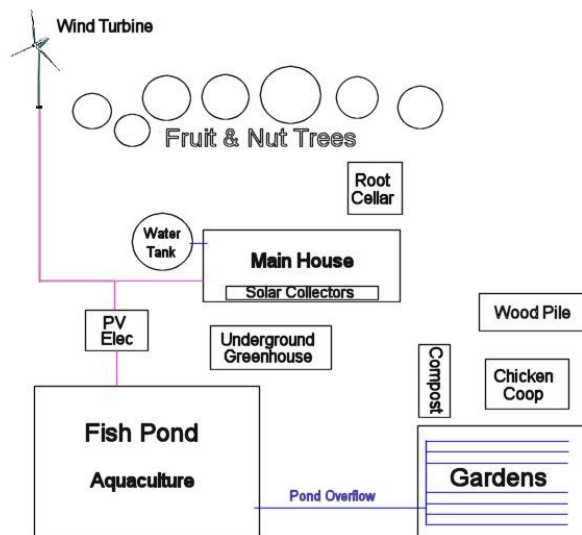


FIGURE B



FIGURE C



FIGURES D & E



Panelized construction allows standardized wall components to be pre-fabricated and inventoried for future construction projects.



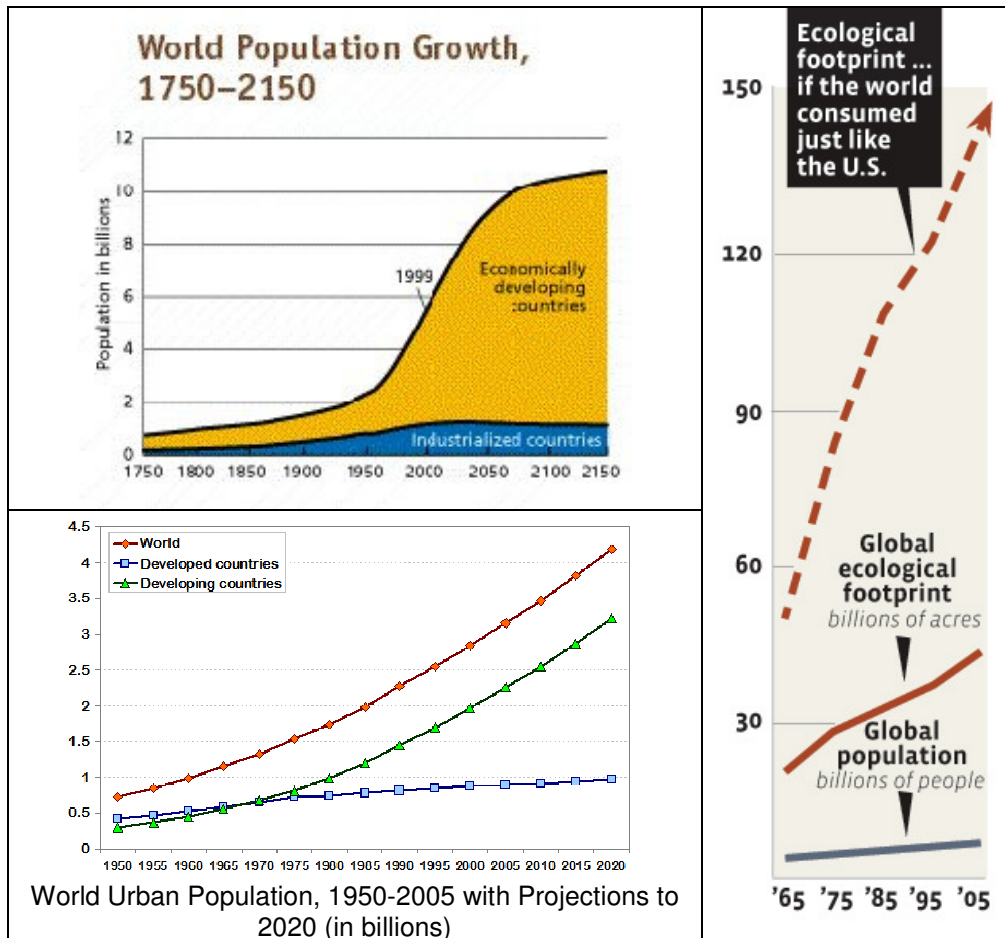
Panels are easily maneuvered into place for fast assembly with very basic tools & skills.

A DIY-friendly building system!

**REASON:** The three-fold explosion of human population in the 20<sup>th</sup> century necessitated an economically-forced lifestyle transition from small, sustainable, human-sized rural villages into vast, resource consuming, over-sized urban megalopolises with their accompanying large footprint suburban sprawl. As this civilizational model spread around the world, the total global ecological footprint of the human race increased 2-fold, setting in motion the noticeable beginnings of a global greenhouse effect, massive climate change, accelerating natural resource depletion, and growing international economic & political mega-competition. Clearly these trends are not sustainable into the foreseeable future, and significant technological, policy and behavioral changes will be required to steer humanity through the challenges that now lie ahead.

While national & international planners & policymakers wrestle with systemic solutions to these emerging global problems, smaller groups of concerned citizens can begin a more modest effort to develop workable models for post-crisis, ecologically sustainable lifestyles that can symbiotically co-exist with the scattered remnants of the unspoiled natural world. The components for these workable models can be drawn from the most practical & innovative technologies created by the emerging Green Economy, with the goals of simplicity, affordability, maintainability and suitability to long-term ecological sustainability to guide their development. The spin-offs from these development projects could become the basis for many small-scale, green businesses that, in turn, could grow & profit from assisting others with duplicating its desirable results.

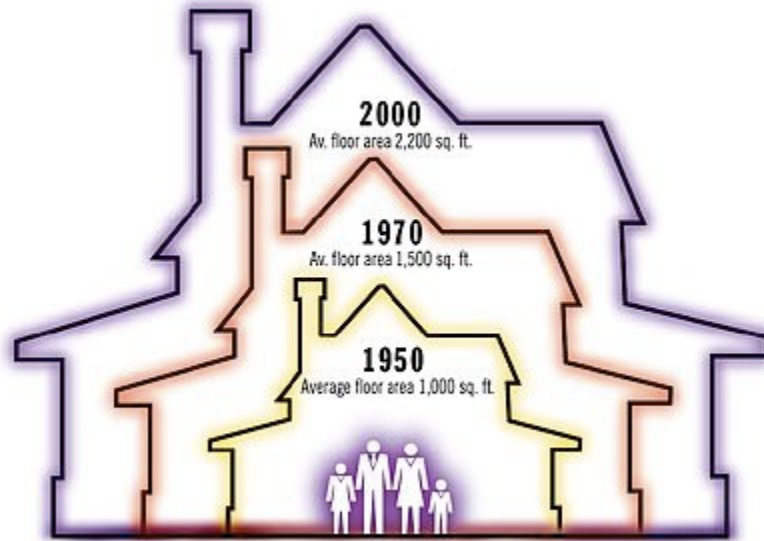
### Corroborating Statistics



Source: United Nations, Department of Economic and Social Affairs, Population Division (2006). World Urbanization Prospects: The 2005 Revision. New York: United Nations. Between 1950 and 2005 the global urban population has more than tripled to reach 3.15 billion. While urbanization has considerably slowed down in developed countries, the developing

world is where cities are growing the most. It accounted for 68% of the urban population in 2000 and by 2020, 77% of the global urban population is expected to be in developed countries.

## Home Size Changes in the US from 1950-2008



According to the [National Association of Home Builders](#), the average home size in the [United States](#) was 2,330 square feet in 2004, up from 1,400 square feet in 1970.

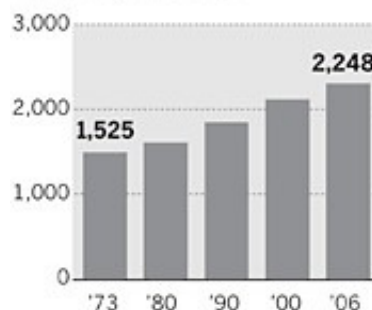
The average size of a new home in Q3 2008 was 2,438 square feet, a 9 percent drop from 2,629 square feet in Q2 2008, according to the U.S. Census Bureau.

Likewise, the median size of a new home in the third quarter of 2008 was 2,090 square feet, down from 2,291 in the spring of 2008.

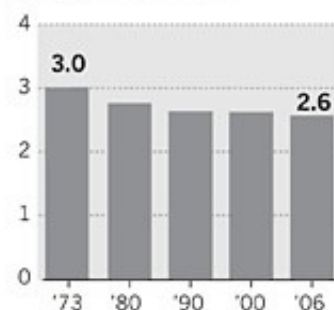
### Less in more

As the median size of homes has increased, the median household size has decreased.

Median square feet



People per household

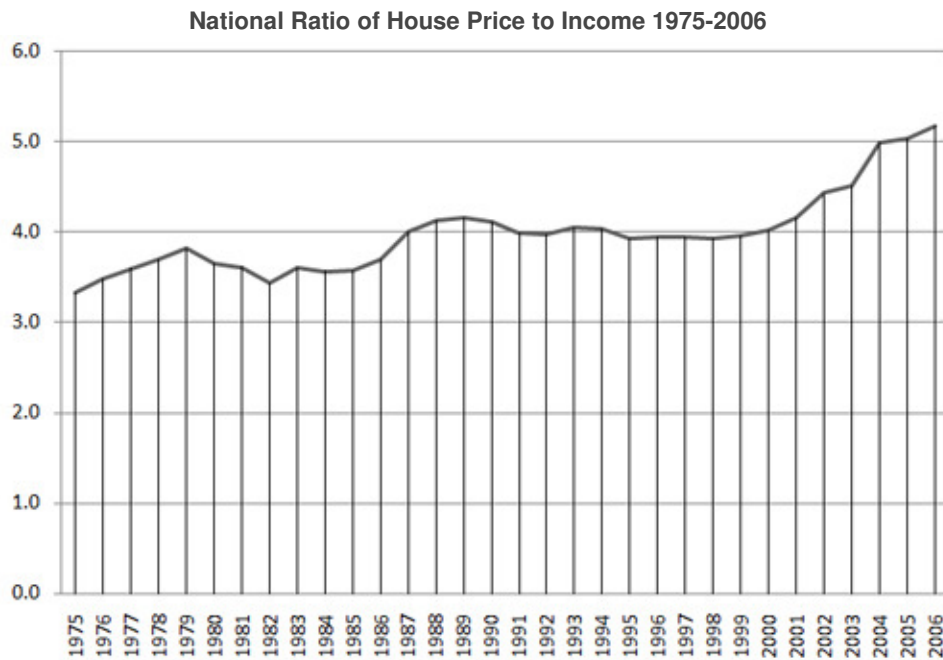
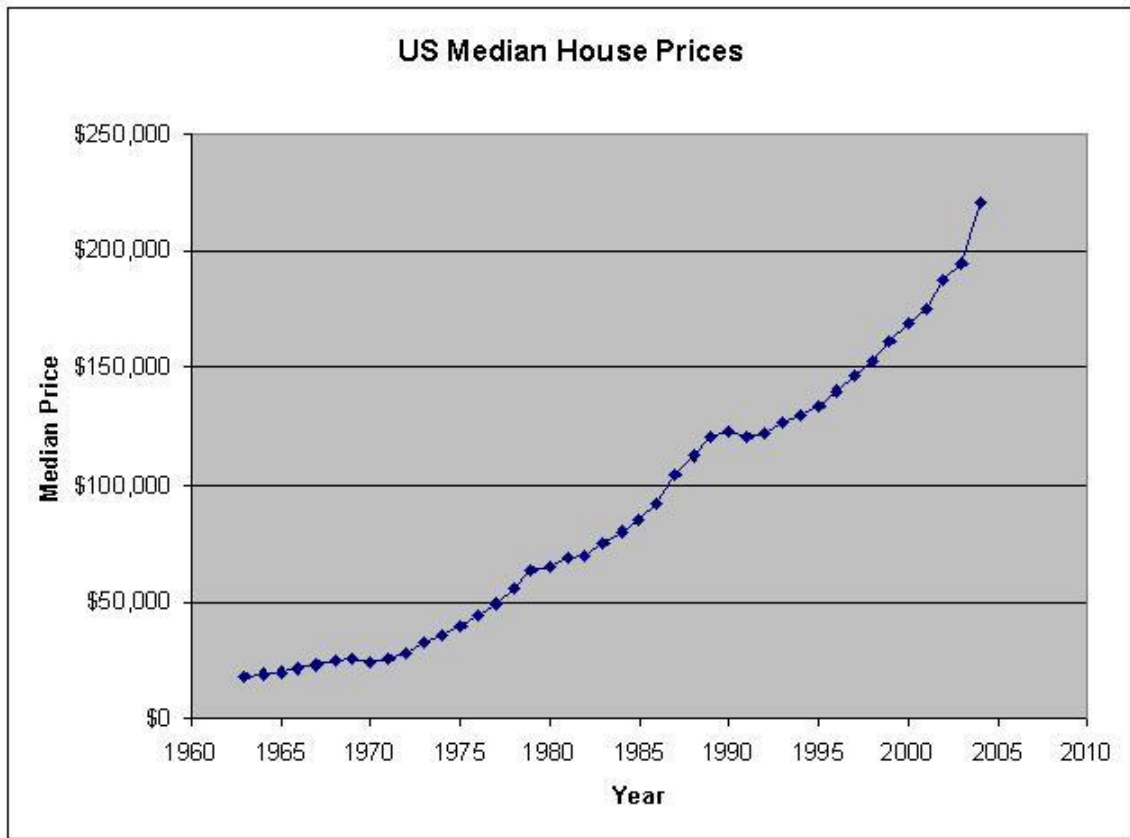


Square footage is floor space in newly completed single-family homes.

Sources: National Assn. of Home Builders, U.S. Census

Los Angeles Times

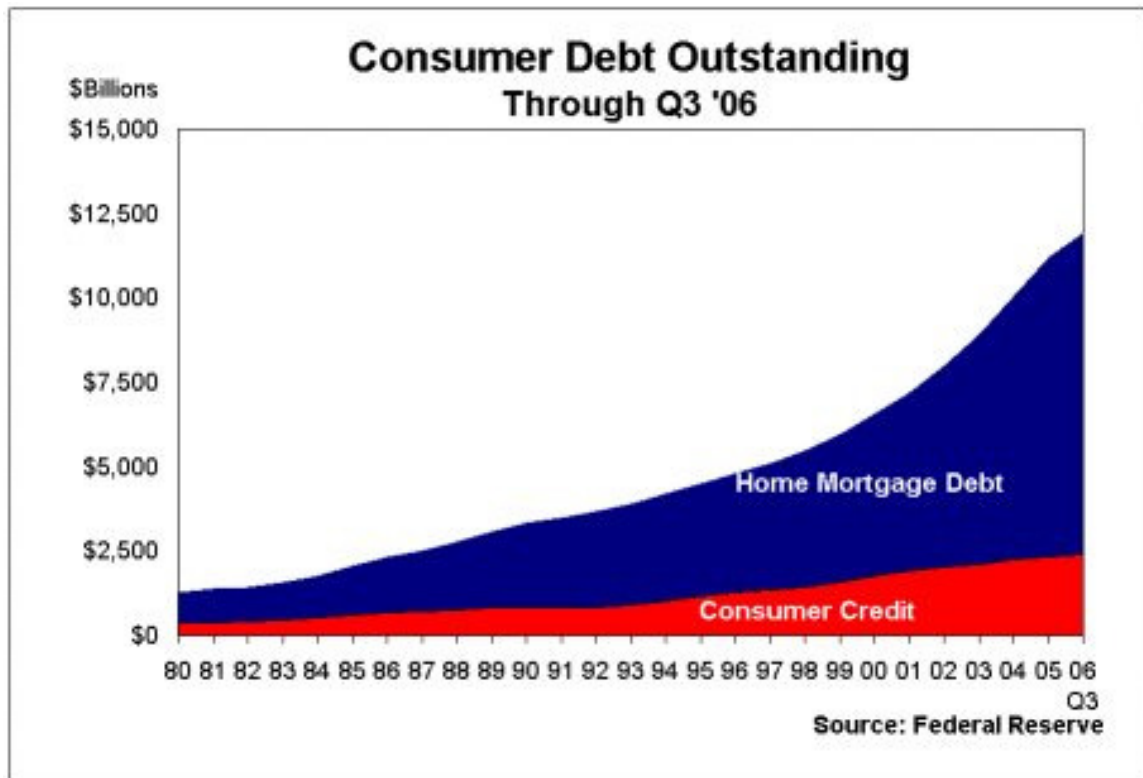
In a sure sign of profligate extravagance, median US home sizes increased while median household size actually decreased: **more space for fewer people!**



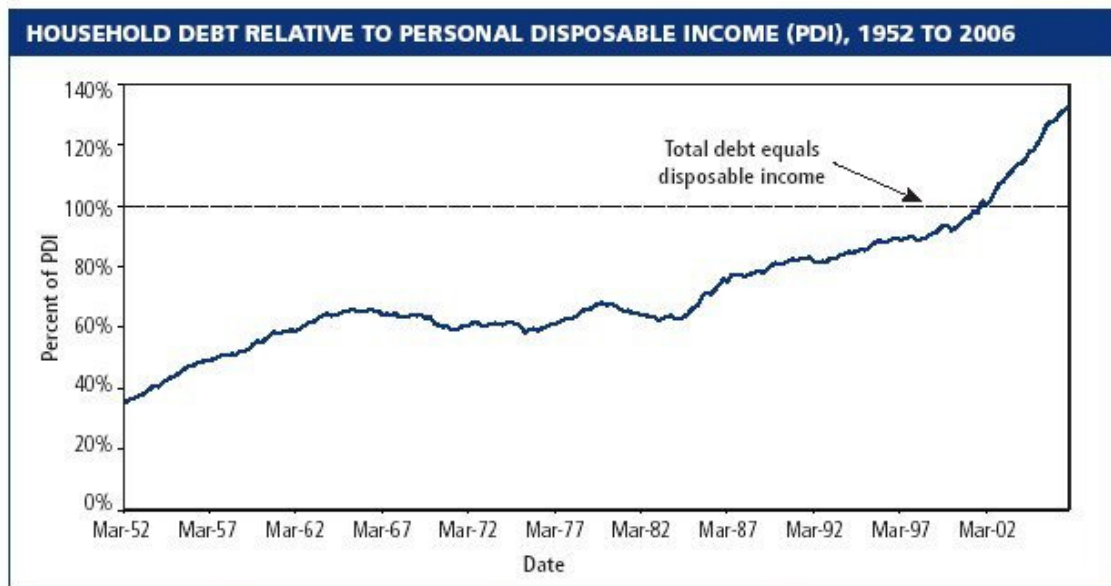
Nationally, the ratio of house price to income increased 58% from 3.3 in 1975 to 5.2 in 2006. The only way this can occur is if 58% more debt is serviced by the same income.

Source: <http://www.irvinehousingblog.com/blog/comments/how-big-was-the-bubble>

## Anatomy of a Consumer Debt Bubble



## Over-leveraged Households



Calculations based on Board of Governors, Federal Reserve, 2006, Flow of Funds of the United States, Washington, D.C.: BOG.

Now that the consumer debt bubble has collapsed, the Old US Economy is going to steadily contract until a New Economy can be jumpstarted and capitalized for renewed growth.

# Project Coordination: Green Equity Builders

Green Equity Builders (see [www.greenequitybuilders.org](http://www.greenequitybuilders.org)) will be a startup, non-profit organization that is designed to facilitate the building of affordable green homesteads. Sweat equity ownership, with community building assistance, will be used within a planned eco-friendly homestead design. This "**Green Equity Building System**" will be designed for working people who want to subscribe to a modest, sustainable, healthy, green lifestyle. We plan to distill what we learn from our R&D into an open source Guide to Affordable Sustainable Living in the 21st Century

Our open source guide will be a freely distributed knowledgebase of tried & true models and technologies for affordable sustainable living that will include web-based resource links, design, planning & management software, and lots of multimedia presentations that show people things that **really** work. Our multimedia presentations will demonstrate realistic, workable models that can easily be replicated by anyone with minimal construction skills and access to basic tools.

The Little Eden Development Project will be our first model project, and it will become our test bed for deploying & evaluating new green technologies for use in the real world of sustainable homesteading.

## Project Development Partners

At this stage in the project planning cycle, one of the most important decisions is which organizations to attempt to partner with in order to improve the probability of a successful project outcome. Since the outcome needs to include both not-for-profit and commercial components, it is critical to involve a mix of non-profit and commercial organizations in the development process. A restatement of project goals can help clarify the rationalization for partner selection.

Goals:

- ❑ Develop an open source green homestead knowledgebase that makes widespread replication of the development model possible, so that many others will implement a green, sustainable lifestyle for themselves.
- ❑ Aggregate the skillsets necessary for successful green homestead development: environmental assessment, homestead design & development planning, solar homebuilding assistance, permaculture design & management training, green technologies systems engineering & maintenance, and homestead economics & operational management training.
- ❑ Obtain project funding from sources with an on-going interest in supporting the proactive development of The New Green Economy and sustainable Green Jobs with a real future. Assist funding sources with creating appropriate independent funding vehicles that are aimed at long-term financing options for comprehensive sustainable development projects.
- ❑ Promote widespread adoption of the Green Equity Building System and the Little Eden Homestead Model thru public education, internship training, multimedia presentations & educational materials, open source web-based project knowledgebase, and links to partners' websites. Become eco-evangelists for practical sustainable development & environmental restoration.

With these goals in mind, here are examples of local organizations that we are partnering with and some that might wish to approach for either full partnership or board of advisors inclusion:

## Current Partners

**Blue Ridge Computer Recycling:** BRCR (see [www.brcrecycling.com](http://www.brcrecycling.com)) is a commercial business that specializes in recycling used computers & electronic equipment to keep their toxic components out of local landfills. Refurbishable computers are repaired, free open source software is installed, and then sold for extremely low prices. Non-repairable devices are disassembled for bulk sale to electronic component recyclers, who have specialized equipment for mass removal of discrete electronic components, precious metals and rare earths. BRCR has hundreds of recycled PC's for under \$100, and we are working with them to make recycled computers available for education, green tech projects, low-income consumers, non-profits, and startup small businesses. Proprietor Chris Evich can be reached at 412-477-2029 or via email at [chris.evich@gmail.com](mailto:chris.evich@gmail.com).

**Carolinas Document Imaging:** CDI (see [www.carolinasdocumentimaging.com](http://www.carolinasdocumentimaging.com)) is a local solution provider specializing in paperless office technology, including enterprise content management, knowledgebase distribution, offsite database replication & disaster recovery, and high security/high availability document archiving & retrieval systems. They utilize products & services from EMC, aXs, Microsoft, Dell, HP, and other tier one vendors. Owner Stuart Guignilliat can be contacted at 828-301-6898 or by email at [stuartg@carolinasdocumentimaging.com](mailto:stuartg@carolinasdocumentimaging.com).

**LANCOPS SecureNET Services:** LANCOPS (see [www.lancops.com](http://www.lancops.com)) is one of our small businesses that provides network security, network installation, and IT tech support services to our clients, which includes tier one Service Providers and their Fortune 1000 customers. We are extremely experienced in the installation & support of complex software applications, and recently extended our capabilities into the installation & troubleshooting of commercial wifi systems. In the near future we will be offering low-cost, customized PC-based security systems & network monitoring appliances.

## Proposed Partners

**AB Technical College:** the new ABTech Construction Science Program lead by Ken Czarnomski and Heath Moody (see [www.abtechconstructionscience.com](http://www.abtechconstructionscience.com)) brings together many years of homebuilding experience, construction project management, CAD design, and green technology innovation. Their recent successful completion and sale of a healthy-built home building project, see <http://www.greenequitybuilders.org/abthome.htm>, is proof of their construction engineering & project management prowess. Plus, the various trade skills departments could bring other essential capabilities to bear on our various future projects.

**Haywood Community College:** Haywood Community College, see [www.haywood.edu](http://www.haywood.edu), is a primary center for both training the area's workforce and for providing direct assistance to small business development. HCC is also a partner with other organizations leading economic development efforts. The college is involved with the Haywood County Economic Development Commission, the Haywood County Chamber of Commerce and the WNC Advanced Machining Center project, efforts which are designed to attract new industry to the area, retain existing industry and build an environment that fosters economic growth and prosperity. My wife works in their Adult Education program in conjunction with the JobLink program.

**Long Branch Environmental Education Center:** LBEEC has a distinguished history of teaching environmental education, thanks to director Paul Gallimore, via hands-on demonstration projects that feature DIY green technology components, and they are commercially experienced with performing critical Environmental Assessments to guide land development projects. Also, they define themselves as "sharing positive strategies of sustainability and local self-reliance in the areas of environmental design, appropriate technology, resource conservation, recycling, wildlife protection, ecological restoration, and improved environmental quality." More info at: <http://www.longbrancheec.org/>.

**Sustainable Futures:** a new eco-business venture by our friend Jim Daubert, MS Horticulture and former Educational Program Director at The Chicago Botanical Garden, which has the mission of developing products and educational resources to help customers achieve a sustainable lifestyle, including raised bed organic gardening, custom window boxes, and premium soil mixes. Jim has also built several affordable, small footprint homes that have attracted widespread attention for their beauty, energy efficiency, and low cost per sqft. Jim can be reached at 828-778-0726 or via email at [jd2003@buncombe.main.nc.us](mailto:jd2003@buncombe.main.nc.us).

## Current Advisory Board

**Donald McRae:** certified commercial & residential real estate appraiser with over 25 years of experience, including student instruction.

**Maggie Barton, CSW, MSW:** masters in Social Work from Columbia University, experience with running a retreat center, adult education, psychotherapeutic intervention, and group dynamics.

## Contact Information

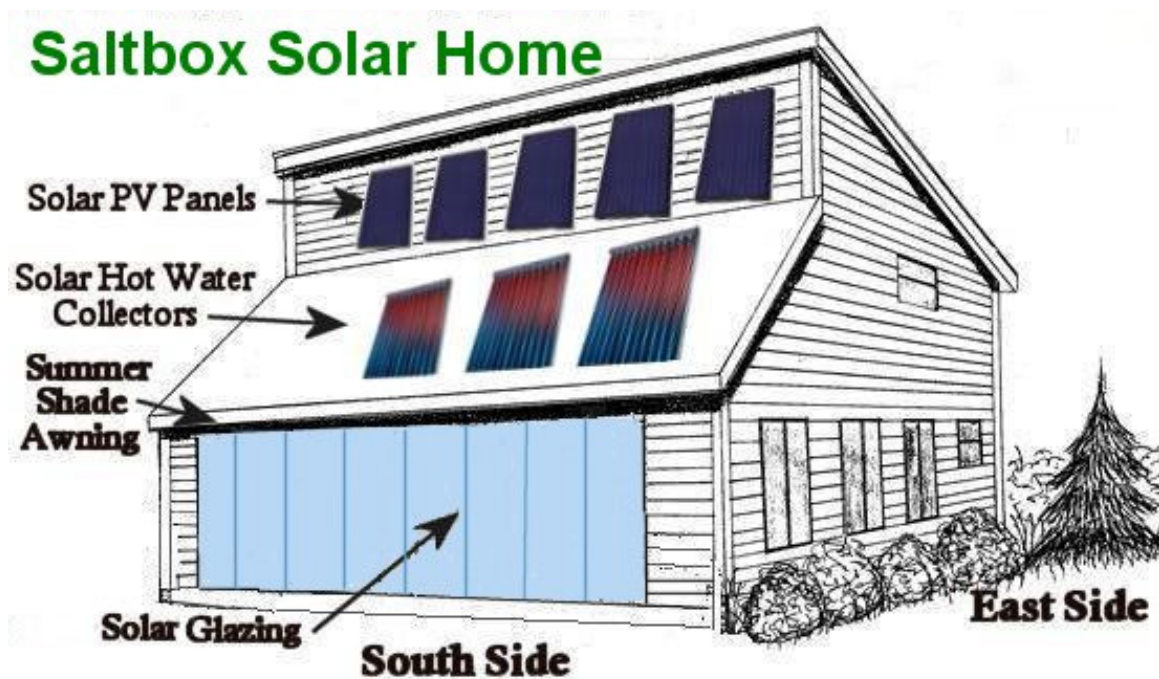
**Alan McRae:** computer systems engineer, technology generalist, systems designer, researcher, webmaster, and sustainable living activist. Website: [www.greenequitybuilders.org](http://www.greenequitybuilders.org)

**Phone:** 828-492-0364      **Mobile:** 828-226-0136

**Email:** [alan.mcrae@charter.net](mailto:alan.mcrae@charter.net)

## Project-Related Illustrations

Figure A – Conceptual Diagram of Proposed Solar Home Design



The design goal is an affordable, DIY, small footprint solar home that can be erected from community pre-built wall panels & standardized components, customized in numerous ways, superinsulated, and tricked out with solar PV, solar hot water and other renewable energy subsystems. Also, the unit needs to be expandable via adding additional modules in the future, and it should be movable to a new location like a mobile home. A permanent investment in sustainable living!

**Note the similarity to LBEEC's Orchard House:**



Perhaps someone has done some direct gain calculations on Orchard House or gathered other performance data of relevance? How about cost per sqft, labor-hrs to construct, materials cost, etc? This looks like a good, real world starting point for developing a model design.

Assemble indoors onto a steel frame like a mobile home or assemble onsite like a Deltec home kit.

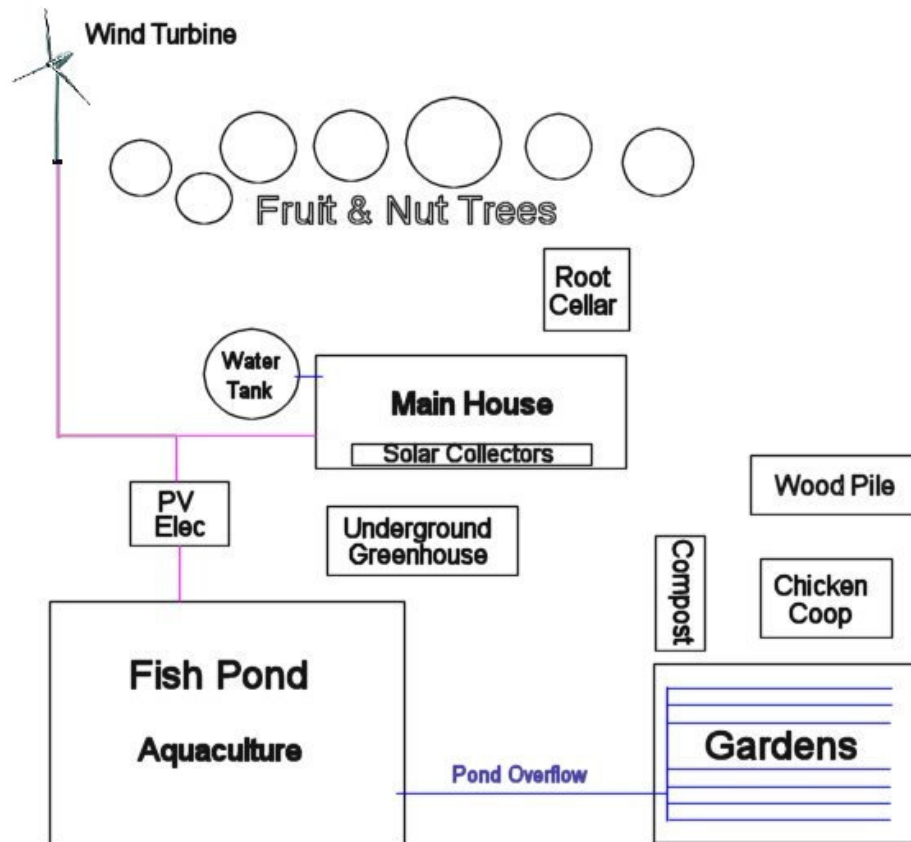
Figure B – Steel Frame Platform



AB Tech's innovation in their healthy-built home project was to custom fabricate a steel frame on wheels for indoor assembly of the home. In this photo, the two side-by-side frames allowed the front & rear sections of the house to be built adjacent to each other but temporarily disconnected for ease of later transport. The completed home sections will be towed outside, loaded onto a flatbed truck, driven to the homesite, and then lifted into place by crane. By integrating the frame into a house design, the resulting sections could be disassembled and moved again if necessary at a future time.

Integrate Homestead Components into a Sustainable System

Figure C – Homestead Site Systems Plan



Panelized Construction allows for easy mass production & inventorying of standardized panel types for use in assembling modular units indoors or for fast assembly onsite.



Panelized construction methods are a tried & proven technique for fast, efficient homebuilding, and they can empower a community of people to assist each other with ongoing Do It Yourself construction projects. The standardized panels could be built and inventoryed during community “panel building parties”, where a potluck gathering in a covered workspace could be dedicated to mass producing panels at several standardized workstations. Various methods of labor accounting could be applied to apportion completed panels to the participants based upon their hourly contribution to the construction effort, and then those panels could be withdrawn from inventory for use in various building projects.

## SOURCES:

**Yes Magazine:** [www.yesmagazine.org/50facts](http://www.yesmagazine.org/50facts)

WE'RE MANUFACTURING MONEY, NOT GOODS:

Manufacturing made up the biggest share of the GDP in 1950. By 2008, the financial sector had taken its place.

**Gross-Domestic-Product-by-Industry Accounts, 1947-2008, Value Added by Industry as a Percentage of GDP**

Bureau of Economic Analysis, U.S. Department of Commerce, April 2009  
<http://www.bea.gov/industry/gpotables>

WE'RE USING UP THE EARTH :

If everyone lived like Americans, we'd need about five Earths.

**Living Planet Report 2006**, World Wildlife Fund

[http://www.panda.org/what we do/footprint/one planet living/about opl/solutions](http://www.panda.org/what_we_do/footprint/one_planet_living/about opl/solutions)

Global ecological footprint, in billions of acres; global population 2008

**Data Tables**, Global Footprint Network

[http://www.footprintnetwork.org/en/index.php/GFN/page/ecological\\_footprint\\_atlas\\_2008](http://www.footprintnetwork.org/en/index.php/GFN/page/ecological_footprint_atlas_2008)

CALCULATE YOUR OWN ECOLOGICAL FOOTPRINT:

<http://sustainability.publicradio.org/consumerconsequences>

## Green Building



### Western North Carolina Green Building Council

A 501C3 non-profit organization whose mission is to promote environmentally sustainable and health conscious building practices through community education.

see: <http://www.wncgbc.org/>



### The Natural Home Building Source

Sustainable housing design, passive solar, zero-energy, high thermal mass (HTM™) do-it-yourself solar house plans are featured along with septic system parts and consultation; Infiltrator® chamber leach fields; greywater reuse, greywater recycling systems; Clivus Multrum® and Sun-Mar® waterless composting toilets; Servel® non-electric gas refrigerators; drywell kits for storm water, sewage, washer drainage or erosion sediment control; Kobe® stainless steel hoods; and energy saving products like shade cloth, heat storage tubes, and battery operated flood alarms. see: <http://www.thenaturalhome.com/index.html>



**GreenHomeBuilding:** you can find a wide range of information about sustainable architecture and natural building systems at this excellent website. "How we build our homes, both in design and choice of materials, is one of the most significant ways that we can affect our future. We need to live more lightly on the earth, because the degradation of our environment is compromising not only our survival, but the survival of most other living beings on the planet. We can no longer ignore the impact we have on the earth's ecosystems. The way we live, the choices we make in providing for our needs, will have an enormous influence on the quality of life of those who will follow us." It's about choices... see: <http://www.greenhomebuilding.com>



### Green Building: *Builders, Consumers and Realtor' Primer*

Green Buildings are really resource efficient buildings and are very energy efficient, utilize construction materials wisely -- including recycled, renewable, and reused resources to the maximum extent practical -- are designed, constructed and commissioned to ensure they are healthy for their occupants, are typically more comfortable and easier to live with due to lower operating and owning costs, and are good for the planet. If you are a builder unfamiliar with the simple approach to green building, this material should give you a starting point for further exploration of the topic, and a better ability to ask the right questions.

see: <http://www.energybuilder.com/greenbld.htm>

## Model Projects



### ASHEVILLE BUNCOMBE TECHNICAL COMMUNITY COLLEGE, **HEALTHY BUILT HOME #1**

AB TECH Construction Management Program is now showing a 25' x 50', student built 1250 square feet single story sustainable modular home. The construction principals used received an acknowledgement by the Asheville Meteorological Society for environmental stewardship in 2007. Not yet located on a lot, the home features natural day lighting, regional recycled materials, non-toxic materials, low voltage illumination, flexible rooms and furnishings to reduce costs over the life-cycle of the home. The home will be sold 90% complete with electrical wiring/illumination and plumbing fixtures. Click [HERE](#) for more information. Green Renovation Blog at <http://renovatetogreen.blogspot.com>



### **LaShell Family Deltec Home: *The House That Community Built***

Here in the Smoky Mountains of Western North Carolina, community spirit is alive & well and still helping neighbors to build a house they can afford to live in. Relatives, friends, neighbors, colleagues, and church community volunteers all combined with the family & a paid construction advisor to gradually assemble and finish a two story Deltec Home Kit. Like a modern day version of a traditional Amish barn raising, even inexperienced folks lent a hand by doing whatever they could, and many of us stretched a little to learn new, valuable construction skills. Because of Deltec's factory built, panelized construction system, the pre-cut building components arrive by truck stacked neatly on pallets and ready for fast, efficient assembly. A dried-in structure can be achieved relatively quickly, and inside work like plumbing, electrical, HVAC, drywall, etc can be accomplished as time & money permit. Just one example of the "Green Equity Building System" at work. see: <http://www.outdoorfun.com/helpbuilddeltec.htm>

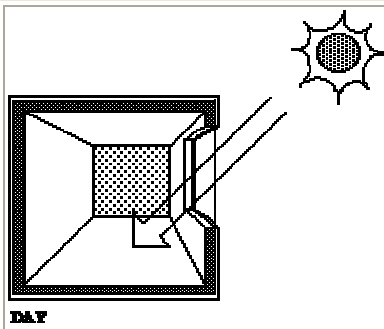


### **Lebensold Earthship**

This passive solar home has hybrid photovoltaic and microhydro power system, grey-water and black-water treatment systems, energy and water efficient appliances, and a tire and earth berm structure. The American Solar Energy Society has featured the home in the national Solar Home Tour 3 years running. Based on the pioneering work of Michael Reynolds, this is a good place to start your learning process.

see: [here](#)

## Solar Design



### A Sourcebook for Green and Sustainable Building - Passive Solar Guidelines

Solar energy is a radiant heat source that causes natural processes upon which all life depends. Some of the natural processes can be managed through building design in a manner that helps heat and cool the building. The basic natural processes that are used in passive solar energy are the thermal energy flows associated with radiation, conduction, and natural convection.

see: <http://www.greenbuilder.com/sourcebook/PassSolGuide1-2.html>



### A Proper Understanding of Convection Improves Passive Solar Design

Radiant sunshine comes into the passive solar home, with the home itself being the solar collector.

- Make the heat move itself to where you want it, when you need it.
- Power a fresh air system to keep you comfortable.
- Make that fresh air warm in the winter and cool in the summer.

see: [http://www.earthshelters.com/passive\\_solar\\_design.html](http://www.earthshelters.com/passive_solar_design.html)

## Sustainable Community



### Community Sustainability Assessment

The Global Ecovillage Network is developing the concept of sustainability auditing to provide measuring rods for individuals and for existing villages and communities to compare their current status with ideal goals for ecological, social, and spiritual sustainability. In addition, these tools are learning instruments - pointing out actions aspiring individuals and communities can take to become more sustainable. *"How sustainable is your present community?"*

see: <http://gen.ecovillage.org/activities/csa/English/index.php>



### E. F. Schumacher Society

Named after [the author of \*Small Is Beautiful: Economics As If People Mattered\*](#), this educational non-profit organization is a good place to start your research on practical ways to organize, incorporate, finance and grow your sustainable community. Look here for info on community land trusts, legal local currencies, microcredit loans, and other tested models.

see: <http://www.smallisbeautiful.org/index.html>