

SUSTAINABILITY

What's it really about?

&

Why all the fuss?

Stuart W. Rose, Ph.D.
stu@gardenatriums.com

Here's a story, told in more personal terms, about "Sustainability."

Is this the most scholarly, authoritative treatise out there?

Perhaps not.

Rather, it's simply a sharing of a world of learning I've experienced since around 1993. The issues related to sustainability affect our entire planet ... all of mankind. And ... the issues cannot be more serious. They will affect both our ability to sustain, as a species, and the very quality of our life experience.

Is that serious enough?

(Not necessarily "gloom and doomy" ... but serious.)

What you're about to read is divided into three sections, by chronology. First is a brief history of what I learned in 1993 and what I've been doing as a result, since then. Second is a kind of "report card" ... a list of lessons learned, which – because we're exploring such new territory – is vital to the success of any subsequent steps. And third is a summary of research that lays the groundwork for a "next effort" and a picture of where we'll be heading ... with some very surprising twists that I never had expected might be a part of this topic. So, to begin ...

I. BACKGROUND

For years, my partner, Trina Duncan, and I have worked as consultants to architects, consulting engineers, environmental scientists, landscape architects, interior designers – the "design professions." One of our services is "Strategic Planning," helping firms maintain successful practices, by positioning themselves in markets that have a growing demand for their services. To help clients identify growth markets, we are obliged to read about trends shaping our country and our world.

Most newspaper articles typically report "events." If a sequence of events forms a pattern, you can begin to identify a trend, and forecast the future. In a sense, when you see 28 dots in a row, you can guess with some reliability where the 29th dot will be. Several publications – books such as "Megatrends" or "The Popcorn Report" or "The Singularity is Near" or "The Chaos Point" ... or periodicals such as "FuturEdition" or "Vital Signs" or "Technology Review" – focus on trends.

In the early 1990s, an increase in media space was devoted to a new term, "Sustainability." Initially, I thought the term was another catch phrase coined by environmentalists, to arouse renewed support for their causes. Eventually, I saw that many of the writers literally meant: our ability to sustain life on Planet Earth.

The severity and enormity of that concept is almost unbelievable!

How can we possibly burn out an entire planet?

As I explored further, I realized that we are doing just that.

Oil and water shortages dominate today's news ... but ... by 2016 China's need for food will exceed the world's available surplus. And that's a "best case" scenario. Globally, 40 million already starve to death every year. And the number's growing.

Is this feeling serious enough yet?

As issues arise in our lives, each of us finds one that becomes personally compelling. "Sustainability" became that for Trina and me. Then I asked ...

*"With an issue that's so huge and so complex,
what can I personally do about it?"*

Have you ever been to Bermuda?

All buildings there are required to have cisterns. Rainwater hits the roof, is purified by a wash they apply to the roof, and flows into a cistern. If a cistern runs dry – which happens maybe once a year – a water truck refills it. However – the rate at which the water truck takes water from Bermuda's aquifer is less than the rate at which the aquifer naturally recharges itself. The process can continue indefinitely.

That's "Sustainable."

As everyone needs a house, we decided to create a small development of homes that take care of themselves with what nature provides, and would not deplete the earth's resources if millions were created. Being an architect, and Trina an interior designer, we also can't create environments we don't think are beautiful. Our goal:

*Create sustainable homes that sell in the open marketplace, in competition with traditional housing ... so they can become *mainstream*.*

Sustainable homes must become a successful "product" for homebuilders, if we are to ever create the huge number of such homes that's needed to make a difference, globally. Technically, achieving sustainability isn't actually all that difficult. The methods and technology have been around for years. The real test, from a research perspective, is seeing if sustainable homes can become a "commodity" ... so they can become as widespread as the usual subdivisions have been.

The first step involved creating a theme ... a design concept that would readily support sustainable housing.

From a heating and cooling perspective, long, thin buildings – such as strip centers or rambling ranch homes – are most difficult; they have a lot of skin for the square footage ... akin to the villi of the small intestine, which are designed for absorption. The most efficient geometric form from an energy perspective is the exact opposite form ... a sphere or a dome. And the closest example of that kind of shape?

Probably the snow house, or igloo ... where protection from the cold is so vital. In more temperate climates, the best example may be the atrium house.

Atriums have been around since the ancient Indus civilizations. Roman homes featured them. You see them today in temperate climates, such as Mexico. Atriums provide a way to gain privacy in an urban setting. However ...

By placing a large skylight over the atrium, the space becomes a “heat sink” for passive solar heating. The atrium – akin to a traditional home’s “Great Room” – is also very quiet. As solar homes need to be “tight” – to minimize heat loss by infiltration – indoor air quality can become a concern. However, by adding an abundance of broad-leafed plants, inside air quality can actually be better than outside.

Having a central garden of tropical plants, with flowers, is also an aesthetic treat.

That thinking led to the birth of the “Garden Atrium” concept.

Next, we embarked on a three-step process. Using the Garden Atrium as a theme, our first step was to list what we saw as different aspects of sustainability: heating, cooling, electric power, water, wastewater treatment, solid waste management, air quality, land use, food, etc. Through our consulting work, we identified specialists who could lend expertise to each aspect. For example ...

- Rodney Wright, one of the most proficient passive solar architects in the United States, to ensure the home heats and cools itself, easily.
- John Spears, a sustainability consultant with special proficiency in photovoltaic design – using sunlight to provide electrical power.
- Paul Klatt, an Idaho civil engineer with experience in “Rainwater Harvesting” – a process that’s increasingly common out west. And,
- Dr. B. D. Wolverton, leader of NASA’s research in long-term space voyage air quality, and author of *“How to Grow Fresh Air.”*

The second consideration: **“Net Zero”**

Terms such as “Green” or “Environmentally friendly” are not measurable. When you see a sale advertising, “20% off,” you might wonder ... “Off what?” “Low fat” is not measurable; “Fat Free” is. “Net Zero” means that your home provides 100% of what you need, in that aspect of sustainability, annually.

Next ...

How do you achieve Net Zero for each aspect?

Budgeting.

This process is very much like what we all do in creating a family budget. List expenses on one side. List income on the other side. Then, if expenses are greater

than income, we see if we can reduce expenses without hurting our quality of life. If needed, we can then see if we need to generate some additional income. “Net Zero” is technically a balanced budget.

Might you have surplus revenue one month, which you use to offset increased expenses encountered during another month – for a family vacation or holiday gifts? Absolutely. “Net Zero” means you have balance at the end of a one-year cycle.

For example ...

Looking at heating, begin by selecting your desired indoor winter temperature. Most use 68°, but you may technically use whatever is most comfortable for you. Then, look at the average low temperature in your area. This information is readily available in “Local Climatic Data” sheets, which you can get from NOAA, the National Oceanic and Atmospheric Administration. While each winter may have one night that is quite mild and one that is unusually frigid, select an average daily temperature that accommodates virtually all conditions for that month.

Now for your budgeting ...

On the “Heat Loss” side, list all the ways in which your 68° home can lose heat to the cold outdoors ...

- Through walls.
- Through your roof.
- Through cracks under doors.
- Around the glass of a double-hung window.

You can determine the insulating capacity of your walls and your roof, in terms of heat loss per square foot, per hour. By multiplying, you can actually come up with a daily heat loss measurement for each element, and a total daily BTU heat loss.

On the “Heat Gain” side, list all the ways in which your home can add heat ...

- Cooking.
- Light bulbs.
- Warmth from human (or pet) bodies.
- Refrigerator, TVs, microwaves, and other appliances.
- Insolation ... warmth from sunshine coming into south-facing windows.

A variety of handbooks or Internet tables can provide numbers of BTUs for each of these heat-gaining aspects, with you estimating the number of hours you’re in the house, number of meals cooked, hours of TV, etc. Then ...

You multiply gain for each aspect, and arrive at a total daily BTU heat gain.

For most homes, traditionally, as heat losses are greater than heat gains, you just let the furnace balance your budget. However, the fuels that power your furnace are

usually not renewable, so they're not "sustainable." And the cost of those fuels is climbing rapidly. For example ...

In August 2007, USA Today printed an article about a family in East St. Louis, Illinois. Their power bill in:

January, \$172 ... normal for them.
February, \$600.72 ... a serious jump.
March, \$1,024.31 ... totally unaffordable.

To bring their budget back into balance, the wife reportedly had to sell her wedding rings, to pay past bills. The husband took on a weekend job, to pay future bills. The imbalance has had a huge impact on their quality of life. So ...

If you see that your heat losses are greater than your gains ...

Decrease heat losses through surfaces by adding insulation. (In this aspect, by the way, don't be timid. When your walls get up to R-24 to 35, and your roof up to R-40 to 75, you'll see your heat loss numbers take a serious dive.)

Conduct a "Blower Door" test. A technician will come to your home, give it a small amount of pressure, and identify places where air flows out. It's amazing how wind can seemingly blow right through your home ... removing expensive heat, and leaving your home drafty. When you've identified places with infiltration losses, you can remedy them with devices such as weatherproofing gaskets, changing double-hung windows to wood casements, or sealing air leaks that go through your walls.

After you've minimized your losses, if they're are still greater than your gains ...

Increase your gains.

The least expensive method – if you have southern exposure – is through increased insolation. Increase the amount of south-facing glass, until your gains match your losses. For example ...

- You could move a window from a north wall to a south wall.
- You could increase the size of south-facing windows.
- You could add an "attached sunspace" – like a greenhouse patio – to the south wall of your home. Or ...
- You could add a trombe wall ... a masonry wall, with 2x4 studs on the outside, stained black, and covered with Plexiglas. The space between the Plexiglas and masonry heats. (It gets hot!) Small openings into your home at the top and bottom let cool air enter at the bottom, heated air rise up, and very warm air pour into your home.

Other methods exist, as well ... but you get the idea. Keep increasing your heat gain until it matches your losses. That's "Net Zero." One caveat ...

Repeat this heat budgeting process for each month. You rarely read about it, but solar homes can overheat in March or April. When income exceeds expenses, it's not so bad. But when your heat gains are greater than your losses, how do you reduce your excess gains so your home remains comfortable?

- Overhangs that stop insolation when the sun is higher in the sky.
- Close openings into and from the trombe wall. Or ...
- Use advanced technology: open a window!

You need to repeat this process for virtually every other aspect of sustainability, as well. The process can be a bit tedious – especially the first time you do it. But the results can be outstanding! Some aspects have to be viewed a bit differently ...

- For land use, look at ways to use your site more efficiently. Traditional subdivisions usually have totally unused space between homes. People cut their lawns there, but the spaces have no privacy, so are rarely used. That's a lot of wasted land. Clustering, or Conservation Districting, typically places what would have been wasted land into shared recreational spaces, for ball fields, jogging or walking paths, ponds, gardening, etc.
- Air quality "budgeting" might be seen as minimizing ways in which air quality is reduced – such as by using non-off-gassing materials – and maximizing ways in which air can be enhanced – such as by use of broad-leafed plants that soak up CO₂ and emit O₂, or plants such as the Boston Fern, that soak up air-borne toxins.

Many efforts to create sustainable environments focus purely on heating, cooling, and electrical power. The more elements you include in your efforts to live more sustainably, the healthier you'll be. Yes, most utility bills can be eliminated. But instead of seeing your efforts as eliminating a negative, why not have a more positive focus: creating a better quality of life?

Ok, at this point, you've listed all aspects of sustainability you wish to address. And you've found a way to achieve Net Zero for each. However ...

We may be asleep when it's raining. And we may want a drink of water when it's not raining. So ...

For each aspect of sustainability, you determine your annual demand, and then how you'll make that aspect available when you need it. Your third consideration:

"Storage"

How do you store the sun's daytime heat, so you're comfortably warm all night?

"Thermal mass."

Fabrics don't store heat. But water or dense materials – brick, concrete, porcelain tiles, slate – do. The sun's rays need to strike floors and walls that can absorb the heat ... just as the ocean does. In a Garden Atrium, for example ...

The Atriums feature a south-facing skylight, sloped 90° to the winter sun. (Solar radiation bounces, and you want to capture all the radiant heat you can.) Increase the size of south-facing glass until heat gain matches heat loss, at the temperature you desire.

As the sun's rays strike the masonry floor, the floor absorbs the heat. A desired 68° atrium may warm to 72° or 74° by late afternoon. When the sun sets, the floor gently radiates that heat back into the home ... gradually cooling as it does so. By 6:00 a.m., the atrium may be 64°. As the sun rises, the atrium returns to the desired temperature. Gentle increases and decreases, like the ocean.

In terms of water ...

You've computed the amount of water you need to live comfortably. You've reduced demand with devices such as water-saving showerheads or toilets. And your Local Climatic Data sheet tells you how much rainfall you can expect annually, and how long you might go without rain. In Garden Atriums, for example ...

Average annual rainfall provides more than enough water from the roof. Rainwater flows to gutters, to downspouts, and into an underground cistern. We know that for the year, we have Net Zero.

If we know that we might use 200 gallons of water a day, and that we might go 2 weeks without a drop of rain, we'll need a 2500-gallon cistern. For emergency back up, you can use a well.

Electrical power sustainability presents slightly different challenges ...

First, go through the same balanced-budget procedure:

List all the uses you have that require electricity.

Then identify ways to reduce power consumption – without any compromise to your quality of life. Compact fluorescent bulbs use 20 to 25% the power of incandescent bulbs, for the same amount of light. And they don't generate heat that has to be removed with air conditioning. The new LED bulbs, such as LLF's LR6 bulb, uses

so little power it hardly registers on a power meter! The bulb costs more, but it lasts roughly 55 years! And it provides 2700 Kelvin (full spectrum) light.

Instead of reading ads at your appliance store, go to the Department of Energy's web site, which has the actual power ratings for every appliance. Some appliances with "Energy Star" ratings actually use three times the power of others.

Once you've minimized power consumption, how do you generate the power you need? For small installations, such as a home, two primary choices exist. If your home site happens to have sufficient wind, a wind machine will provide the least expensive power of any power-generating method. Some small machines have blade diameters of only 8 to 10 feet, and generate roughly 6 kilowatts ... almost double what you'll need. With south exposure, photovoltaic panels can work well.

The most difficult aspect of power is storage.

Thermal mass stores heat. Cisterns store water. How do you store electricity?

If you're connected to the power grid, and if you're in a state that requires the power company to buy power back at the same rate they sell it to you, you can request a reversible meter. By day, you generate more power than you use. By night, you take power back from the grid. At year's end ... Net Zero.

That's the cheapest form of storage.

Batteries are another alternative, if you're not connected to a power grid. Good ones have a life of over 10 years. They're often 95% recyclable. But – they are more expensive.

A slightly larger development of homes with a sloping site, could use excess daytime or wind power to pump water to a pond, atop the hill. When that power is needed, release water through turbines. ("Low-head hydro.")

Devices now exist for burning solid waste and generating power. At times when no wind or daylight exists, you could dispose of waste by converting it into power.

None of these methods are as simple as thermal mass, for heat storage, or cisterns, for water storage. But at least several options exist, from which to select.

Cooling also presents a few unique twists ...

Again, begin by selecting your target indoor summer temperature. 78° is generally accepted; some prefer 76° or 72°. Next, look at the heat gain side of the "ledger" ...

"In what ways can we prevent undesired heat from the outside?"

First, just as insulation slows heat loss in winter, it slows heat gain in summer. "Super-insulation" and infiltration elimination also reduce summer heat gain.

A second means for preventing heat gain is “shading.” Years ago, houses had awnings, porches, and deep eaves that shaded a house in summer, but not winter. For example, Garden Atriums have shades that cover south-facing skylights. They reflect much of the solar radiation back out, cutting the maximum cooling load for the whole house to just under 2 tons. They also soften the light in the atrium.

Third, low E glass reduces summer energy demands 25%. In Garden Atriums, all windows and all glazed doors from bedrooms to patios use low E glass.

Fourth, trees absorb heat and can create a microclimate that’s 10° cooler than in the sunshine, a few feet away. Large plants in a Garden Atrium also soak up heat.

Fifth, nighttime ventilation can cool the thermal mass of your home. A relatively new device, known as an “Energy Recovery Ventilator,” exchanges outside and inside air and lowers relative humidity – a real problem in summers – increasing comfort. When the sun rises, sending solar radiation into your home, it takes 2-4 hours to exceed your desired temperature, slicing the hours your air conditioner has to run ... a huge energy savings.

That’s the “reduce heat gain” side of the ledger.

What about the “increase cooling” side?

The sun provides warmth. How do you get “coolth”?

The easiest means lies in the earth beneath your feet. Below six feet, the earth temperature is the same as the average annual temperature for the locale. In Washington, D.C., for instance, the average annual temperature is 59°. In southeast Virginia, it’s 60°. In Minnesota, it’s in the low 50°s.

Notice how cool basements are?

The earth outside the walls is cool ... cooling the walls. As indoor air flows across the surface of the walls, it cools. Technically, this is called “earth-to-air heat exchange.” It’s the least expensive means for cooling your home.

For example ...

Have you ever visited Thomas Jefferson’s home, Monticello?

The home sits on a hill. Under it are the wine cellars ... which have masonry walls touching the cool earth. When the home above becomes too warm, they open windows at the base of the dome. Warm air rises out of the home ... sucking cooler air into the home, through grills that are in the ceiling of the wine cellar and the floor of the first floor.

Another example ...

In the mid-1800s, hog farmers in Illinois needed a way to keep hogs cool when it became too warm outside. They dug a trench ten feet deep from the barn to the woods, across the barnyard. They lined the lower part of the trench with stone, to create a small tunnel ... like a stone duct. Then, they backfilled the trench. One end of the tunnel opened into the barn. The other end in the woods.

When the temperature became too warm for the hogs, the farmers herded them into the barn and closed the door. The cupolas atop the barn had black shingles, which created a heat bubble. As the heat escaped, it sucked cool air through the tunnel ... and, in a sense, air-conditioned the entire barn.

That method is known as “cool pipes.”

Some cool pipes use flexible hose ducts – perforated, to let condensation seep into the soil – buried at the bottom of a trench. For greater cooling capacity, some run the pipes through septic tanks that are filled with rocks. In a house, you open a high window – known as a “solar chimney.” As warm air rises to the outdoors, it sucks cool air through the cool pipes and into your home.

If a water table is too high, a closed-loop geothermal system is about as efficient as you'll get. The system sends 97° summer-heated fluid into the ground, where the temperature is a lot cooler – perhaps 60°. When the fluid returns to the surface, it's “dumped” its heat into the earth and has cooled to perhaps 63°. (The same process, in reverse, can provide “back-up” heating in winter.) This system costs more initially, but uses less than half the energy of traditional heat pumps, needs a fraction of the maintenance, and has three to five times greater life expectancy.

As briefly discussed before, most literature related to sustainability focuses on energy – for heating, cooling, electrical power, and cars. One other aspect of sustainability that's essential to our survival and well-being is ... air quality.

Two aspects of air quality are most important:

1. The percent of air comprised of oxygen, and ...
2. Air toxicity.

Quoting from Dr. Ervin Laszlo's book, *“The Chaos Point”* ...

“Evidence from prehistoric times indicates an oxygen content of the atmosphere well above today's 21 percent of total volume. Oxygen ... has decreased in recent times ... The oxygen content of the atmosphere now dips to 19 percent over impacted areas and is down to 12 to 17 percent over major cities. This level is insufficient to keep body cells, organs, and the immune system functioning at full efficiency; cancers and other degenerative diseases are likely to develop.”

Dr. Ervin Laszlo

Beyond heating, cooling, electricity, water, and air quality ... food is a growing sustainability issue. The good news, from Steve Jones of Mt. Shasta, California ...

“Currently, there is enough food grown on the planet to provide every single man, woman and child with approximately 3500 calories of nutrition per day. (A normal healthy diet takes in between 2000 – 2500 calories per day.)”

The bad news, from multiple Googled sources ...

Between 18 and 40 million people (statistics vary) now die every year of starvation. 6 million are children. In fact, malnutrition is a growing problem even in the United States.

Global warming causes “desertification.” Yearly, arable land the size of Rhode Island is no longer available to feed growing populations.

From Dr. Ransom Myers & Dr. Boris Worm, *“Only 10% of all large fish are left in global oceans. 90% of all large fish, including tuna, marlin, swordfish, sharks, cod and halibut are gone.”*

At this point, you have a picture of what sustainability really is, why sustainability is important, and some methods for living more sustainably.

In a sense, that’s theory.

And you’ve learned many of the steps for achieving sustainability.

Scores of “experts” are writing books and giving talks about sustainability. But ...

What’s sustainability like in a “real world” application?

We decided to “dive into the water” and see what a sustainable house would really be like ... to build, to experience, and to sell in an open real estate marketplace.

What follows is the story of an attempt to create and market sustainable housing ...

II. THE GARDEN ATRIUMS OF POQUOSON

With no real experience as developers or homebuilders – and with our personal assets at risk – we sought out a successful developer who would agree to act as our “development coach.”

I phoned 25 successful developers identified by the National Association of Homebuilders as the most innovative in the Washington, D.C. metropolitan area ... where we lived. Not one would meet with me! Paraphrasing one developer ...

“If you want to build homes, see what’s in the magazines and see what other local builders are building. That’s how you make money in homebuilding. If you get away from the mainstream, you lose money.”

Technically, that’s good advice ... from a business perspective. See what seems to be hot. Build the same ... with maybe some small twist. Appraisers need to have comparables that are as close to what you’re doing as possible, so they can give reliable assessments to lenders. Lenders need to know how much they can get for a house, should a borrower default. The problem is:

No evolution.

Our lives have changed because of computer power, the Internet, and global wireless telecommunication. While minor style differences can be noted, housing today is about the same as it was 50 years ago. The world is changing; housing hasn’t.

I finally found a successful developer in southeast Virginia ... the Hampton Roads area. He had me share visions, goals, and design ideas. Then he said ...

“You’re kind of a pioneer with these ideas. And pioneers are people with arrows in their backs! With your best efforts and my best advice, your houses still might not sell. Don’t be mad at me if they don’t.”

He helped identify a small site in Poquoson, Virginia, a small town at the bottom of Chesapeake Bay. The reasons:

- The site had room for only 7 homes, because we could learn whether or not the homes were marketable without building 100 homes.
- Poquoson has the highest per capita income in Hampton Roads, and “Early Adapters” – people who like to try new ideas first – tend to have more income.
- The specific site he recommended is on a main street, which has a lot of traffic and high visibility ... which would showcase these more unusual-looking homes. And ...
- Technical people from nearby NASA, Jefferson Labs, Langley Air Force Base, and hi-tech consulting firms might be more apt to give up the “Colonial Look” for a home with more modern technology.

As the project crystallized, several areas of resistance surfaced ...

- Poquoson did not have a cluster-zoning ordinance, which enabled more efficient use of the development site. Several local residents tried to essentially kill the project, because *“It just looks different.”*

- Several banks refused to finance the project, because *“While your financial statement is fine, this just isn’t the kind of project we finance. It’s too different.”*

When the City Council conducted their hearing about cluster zoning, it was on local cable and is regularly watched by local residents. After doing some research about benefits that have accrued due to cluster zoning – and sharing this information with the City Council – the cluster ordinance passed. The City Council and the community had learned a new and more productive way to use land.

And one bank did agree to provide funding.

Next, the design of the Garden Atriums ...

- Drawings were finalized ensuring nearly 100% passive solar heating. The first home has a full, symmetrical skylight over the atrium. Aesthetically great, but not as efficient as subsequent Garden Atriums, which have skylights only to the south, and sloped 90° to the winter sun. In the first house, back-up heating comes on for a few hours a dozen times a year or so, when outdoor temperatures fall below 34°; in later houses, the back-up heating never comes on. That’s 100%.
- Cooling uses closed-loop geothermal, powered by photovoltaics. The water table is only two feet down, too high for cool pipes. With the shades under the skylight, maximum cooling load is under 2 tons!
- Electric power is produced by photovoltaics. Power storage uses the grid, with batteries for reliability if the grid is down. Virginia requires utilities to repurchase power at the same rate they sell it. The homes are designed to have zero power cost after 12 months.
- Rainwater harvesting serves toilets and hose bibs, accounting for 95% of the home’s water needs. Homes have 2500-gallon cisterns that have not gone dry. Potable water comes from the public utility.
- 100% of the hot water comes from solar panels. And ...
- Recycled materials were used where practical: the exterior veneer is recycled granite; wood flooring is recycled ship’s planks. Other materials, such as ceramic tiles, are in no way “endangered.”

For this initial development, wastewater treatment, solid waste management, and recycling use the established local municipal services. Regulatory agencies seem skeptical of new technologies, and are more comfortable when the development stays with the “tried and true.”

The fifth Garden Atrium went totally off of the water grid. Rainwater goes from the cistern, through both UV irradiation and reverse osmosis filters, to provide 100% of

the home's water ... with no connection to the local water utility. However, by that time, some credibility was established. Going off of established utility grids is more an issue of regulatory approvals than technical capability.

Some other design details ...

The initial reason for the atrium was to create a "heat sink" for passive solar heating. We initially thought of plants as an aesthetic treat. Then we thought ...

"Plants consume carbon dioxide and emit oxygen. I wonder how the Garden Atrium compares with traditional houses?"

We had a toxicologist measure the air. Outdoor and indoor carbon dioxide measured 280 to 310 parts per million (ppm). Most homes have between 1000 and 1500. Over 1500, residents experience headaches, allergy and flu-like symptoms, rashes, etc. And oxygen content was actually higher than outdoors. Broad-leafed plants – such as Birds of Paradise and Peace Lilies – do the best job of improving air quality. Accordingly, some are included in each Garden Atrium home.

In terms of toxicity ...

Three materials in a home contribute most to off-gassing problems:

1. **Paint.** Volatile Organic Compounds (VOCs) off-gas for ten years. But, before then, you repaint! Garden Atriums use zero VOC paint.
2. **Carpeting.** Dyes in fabrics are set with formaldehyde, which is why your eyes water in a fabric shop. Garden Atrium carpets are dye-free wool, with all-natural hemp backing. No off-gassing.
3. **Cabinets.** Melamine or plywood in kitchen cabinets or bath vanities also off-gas. Garden Atriums use solid wood, throughout.

In "How to Grow Fresh Air," Dr. B. D. Wolverton, a former NASA air quality research scientist, lists 50 plants that detoxify air. One of the "stars" is the Boston fern, a hearty little plant ... that's also provided in each Garden Atrium. For "payback" ...

Improving home air quality has no financial "payback." But it is healthier living!

Residents have lost allergies. One youngster that had annual pneumonia bouts ceased to have them. One guest found his life-long allergy symptoms vanishing within a couple of days. Most guests seem to sleep better and about 30 to 45 minutes longer than normal. And many visitors report allergy symptoms somehow vanishing within 30 to 45 minutes.

Too many variables exist to draw scientific conclusions, though outcomes seem consistent. As "sustainability" might include helping us live a better quality of life, going beyond direct money-in, money-out ROI measurements seems valid.

Other standard Garden Atrium features include ...

- Elegant porcelain tiles in Garden Atrium, baths & kitchen. They provide both visual delight and low maintenance surfaces. They also provide thermal mass for absorbing daytime solar gain and radiating it through the night, giving you constant comfort.
- Rooms surrounding the Garden Atrium feature full-height walls of plate glass, providing a flood of healthful and energizing sunlight throughout the home. (My own eyesight actually improved. My astigmatism vanished and lens prescription was reduced. Daylight is easier for reading and generally more healthful for our eyes.)
- Kitchen sinks have under-counter R.O. filters, so you never buy bottled water again. That can save families \$1,000 a year or more, and can help eliminate the largest item put into landfills.
- Oversized storage includes: master dressing room; over-sized foyer closet; bedroom walk-in closet with 35 ft. of hanging rod, and a food pantry with 70 ft. of shelving, and an oversized garage that can accommodate two-foot deep shelving all the way around. Need for renting mini-storage facilities is reduced or eliminated.
- For 21st century living, all rooms have cable, phone, and data ports.
- Single floor living with levered faucets and door handles throughout, and a walk-in master bath shower make living easier at any age.
- Every bedroom has a private, visually isolated patio ... an outdoor space just for the occupant of that bedroom. Toys for kids and their friends; a fire pit or table & umbrella for adults for outdoor privacy ... and sanity! Clustering enables more efficient use of land.

How about exterior aspects of sustainability?

Shifting now from house features to site features ...

The Garden Atrium project uses the same density required prior to cluster zoning. However, instead of the full square footage per house surrounding each house, only about half is included in each homeowners "lot." The remainder is part of a shared space that provides amenities that all homeowners share ...

- Vegetable, berry, and herb gardens, and a small orchard, are hobby scale, but help residents eat better for less ... and support food sustainability. A potting shed provides space for residents with gardening interests to store seeds, tools, etc. Many children had never grown their own food or learned when to harvest fruit from trees.

- The large pond exceeds stormwater retention requirements, provides a gazebo in the middle – reached with a bridge – and has visual amenities, such as a solar-driven fountain, lily pads and lotus.
- Concrete driveway pavers let rain soak into the ground, leaving you puddle free and recharging aquifers under the site. Pedestrian walkways are surfaced with small stones, for the same reason.
- A private park, roughly 250' x 250', provides secure space, under mature shade trees, for a variety of sporting activities.
- A boat dock enables residents to take small craft into the nearby river or out onto Chesapeake Bay.
- Houses are linked with 6' high privacy fences. North walls have no windows – to block summer sun and winter wind – so space between houses is used for bedroom patios. Linking houses also keeps cars (and strangers) on the outside, and pedestrians, (residents and guests,) on the “inside.” Even pets cannot run out into the street.
- Grass lawns in the shared space are limited to the private park, where a groundcover that supports pedestrian activity is most suitable. The balance of the site features xeriscaping, using native trees and shrubs and mulch. Maintenance and water use is minimal.

Garden Atriums are owned on a “fee simple” basis. Each homeowner owns his or her home and lot ... and also one seventh of the shared space. A Homeowners' Association governs the shared space ... only. Decisions are made using a consensus model, so that everyone is involved and no one can be “voted down.”

That's a description of the Garden Atrium homes and the site. The sustainability aspects have worked. The real test has been “mainstream marketability” ...

Garden Atriums meet the new home marketplace ...

Our first attempt to market Garden Atriums involved building a single model home, hosting weekend open houses, and assuming that one visitor in a thousand (or so) would be both excited and be looking for a new home ...

“These are amazing homes!

“We'd like to talk to you, to see if you could do one for us.”

The open houses had huge crowds ... largely because the homes were unusual. On the first two weekends, roughly 3500 people came through the model home!

Over the next six months, several couples did approach us, about creating a Garden Atrium tailored to their needs and interests. In each case, as the design evolved and came close to meeting their needs, the couple backed away!

Our developer-coach indicated that people often ...

- Cannot visualize, and get a clear sense of what something new will look and feel like, in reality.
- Have no patience, to wait six months or so, for construction. When people are in the market for a new home and see what they want, they want it now.

He also thought the initial home, 4928 sq. ft. was a great place to visit, but was too large and too expensive for most people to buy. He explained that the real estate market is like a Christmas tree. A few can afford a \$5 million home. A few more can afford \$1 million. Many more can afford \$500,000. And many, many more can afford \$300,000. His advice ...

“Get your square footage and your cost a lot lower, to make your Garden Atriums much more affordable.

“And build a second home, on ‘spec,’ so that visitors are presented with a simple option: buy or don’t buy. They can move in very quickly, and will know exactly what the price is and what they’re getting.”

We sold our Washington D.C. home, moved into the model home – to experience what it was like on a more permanent basis – and built a second Garden Atrium, of 2352 sq. ft. ... selling for less than \$500,000, with little to no utility bills.

Open houses regularly had 25 to 50 couples each weekend ... in the initial model home and in the near-complete second home. And the result ...

When the second Garden Atrium received its certificate of occupancy, we had three contract offers! Then came a second lesson ...

Neither of the couples that did not get the house waited six months for us to build one for them. Our developer-coach was right. Home buying seems somewhat akin to impulse shopping. Those who are unhappy with their current home and who see one they like, want to make the change as soon as possible. And people relocating to the area will not rent for six months while a home is being built for them.

However ...

Because of the enthusiastic response, we decided to build two more, on spec ... a three bedroom and a four bedroom.

As before, open houses attracted many times more people than visited traditional now home subdivisions. However, the housing market declined and the two homes required considerably more time to become occupied.

One other change that's occurred since the beginning of this venture ...

The Hampton Roads area of Virginia tends to be very conservative. Many people come here to "settle down," not to cause any kind of change. What's familiar is more comfortable. Instead of, "*It's just different*" negativity, positive interest in sustainable housing has grown ... enormously.

- Garden Atriums have had articles published about them in 14 newspapers and magazines – regional, national and international.
- Garden Atriums have had brief TV features on two TV stations and were featured in a full PBS program. And ...
- Presentations about Garden Atriums and sustainable development were requested for conferences in Finland, Ireland and Canada.

In fact, one article caused one couple to come to the site, with no open house, and Garden Atrium #5 is being built for them.

In terms of marketing difficulties for sustainable housing ...

People shopping for new homes compare choices on a cost per square foot basis. The underlying assumption is that all homes are "reasonably well built and energy efficient." For two equally attractive houses in equally desirable neighborhoods, unit cost can be a deciding factor. But – what if those factors are not similar?

Adding super insulation or photovoltaic panels increases a home's cost – but – you decrease monthly utility bills. Comparing Garden Atriums with traditional homes, you need to look at total monthly costs – mortgage and utilities. For example ...

Sales price:	\$579,000	\$464,000
100% mortgage, 30 yr. @ 6%:	\$3447/month	\$2782/month
Heating & cooling costs	0	400
Electric power costs	0	150
Water utility costs	<u>1</u>	<u>30</u>
Monthly cost subtotal	\$3448	\$3362
Interest payments, year #1:	\$34,740	\$27,840
Tax deduction @ 20% bracket:	6,948	5,568
Monthly tax savings	<u>579</u>	<u>464</u>
Total monthly costs	\$2869	\$2898

Mortgage interest is tax deductible; utility bills aren't. Thus, traditional homes costing \$115,000 less actually cost more than Garden Atriums when you look at monthly costs of mortgage and utilities. As oil prices escalate, the gap increases.

However, although you can show people budgets such as these, and even show them your actual utility bills, it's a different way to think about house buying.

And paradigm shifts take time to achieve.

That's the first marketing concern.

A second marketing concern: **Financing.**

Many buyers fear that lenders will give them no credit for all the sustainability features, or will simply not provide a mortgage for an unusual house. Over the past few years, many lenders actually began to give better loans to more efficient houses ... but most buyers need to talk to a lender to believe that.

A third marketing concern: **Resale.**

If buyers believe they may, at some future time, need to sell their home, they believe that a home that's similar to everyone else's home will sell more quickly.

And a fourth marketing concern: **Appraisals.**

If an appraiser goes to his or her computer to identify comparable homes that have recently sold, they'll come up with no Garden Atrium comparables. Alternative methods do exist for appraising homes; they just require more effort.

That's Garden Atriums sustainable development story ... the homes, the site, the marketing efforts. As the project began a while ago, what are the "lesson learned"?

2008 Lessons Learned ...

Anytime you initiate a first-of-a-kind project, or unique research effort, no matter how brilliant and experienced the cadre of people with whom you surround yourself, some aspects are going to turn out much better than expected, and some not as good as expected. While the project is not yet complete, this is a good time to learn from both outcomes ...

- Our expressed goal is to see if sustainable housing can be marketable, in competition with traditional housing, so that it can become mainstream, in order to reach the volume of sustainable housing needed to make a difference. Garden Atriums are no longer seen as an oddity, and, in fact, are being seen as "the way things will be."
- The Garden Atrium project has had a much larger impact on people than we could imagine. Over 10,000 people have now visited a Garden Atrium. While the vast majority are not buyers, their experience

in the home and on the site ... and their learning from explanations about why things were done ... will lead many of those people to change the ways they've been doing things. In a way, the Garden Atriums are "demonstration classrooms."

- The private bedroom patios – using the space between homes – have turned out to be a valued feature. Parents can let children play on their own with absolutely no concerns for their safety. And need for them to clean up in the usual way are minimal.
- The daylighting slashes costs for artificial lighting. It eliminates any traces of Seasonal Affective Disorder (SAD). And it leads to actually improved eyesight, as daylight reading is easier on the eyes.
- Residents and guests are amazed at how quiet the atriums are ... and how pleasant that experience is.
- The larger amounts of storage – with the pantry, the larger walk-in closets, and the over-sized garage – has been valued as "essential."
- The phone, data port, and cable outlets in each room are useful. Buttons in many doorjamb, which act as light switches, preventing people from leaving lights on accidentally, are useful. But – the Smart House technologies have not proven worthwhile, because the technology is not as usable as we perceived – and is expensive.
- The shades that cover the skylight during the summer months do reduce the maximum cooling load to less than 2 tons. Even more, they soften the daylighting in the atrium, so people don't have to wear sunglasses indoors and feel great lighting comfort.
- Some adults get into gardening; others don't. All children seem excited to see their seeds and plants grow, to harvest and eat their own vegetables, and to learn when fruit is ripe – so they can pick them and eat them right off of the fruit tree.
- Berries must be covered with a net, or birds eat them all. Fruit trees (with soft fruit) must be sprayed with a thin layer of clay, so birds won't eat them; and raccoons love peaches! (Raccoons: 37, Stu: 0)
- The covered, screened verandas that overlook the pond are really enjoyed. They're both buying features and living features.
- We underestimated air quality's importance. Efforts to create sustainable living focus on heating, cooling, and power; the impact of air quality is huge! Atrium plants were selected for aesthetics ...

*“What can be grown indoors that’s beautiful
and can’t be grown outside?”*

With broad-leafed plants and Boston ferns, air quality has extremely high levels of O₂, (much better than traditional home indoor air or low pollution outdoor air.) It’s had a consistently positive effect on everyone, and seems a lot more important than initially thought.

- We overestimated the importance of sustainability to buyers. Every resident was asked why he or she wanted to buy a Garden Atrium – especially as so many options exist. Everyone had the same three reasons ...

1. “It’s gorgeous!”

No matter how “sustainable” a house is, people won’t pay a mortgage unless the home is really attractive.

2. “It’s really well built!”

Garden Atriums have oak trim, and no plastic doors or “woodwork.” The metal roof is warranted against 90 mph (hurricane-level) winds. The closed-loop geothermal system – with an Energy Recovery Ventilator – is “top of the line.”

3. “The prospect of lower utility bills is appealing.”

This is the only direct link to sustainability goals. No one is against “sustainability.” It’s like being against motherhood. But sustainability is “invisible” ... it’s not a reason buyers will buy. In fact ...

Not one visitor whose allergy symptoms disappeared during a tour became a buyer. We may create these homes to provide sustainable environments, but people are going to buy them, for their reasons ... They need to be attractive. They need to be well built.

Energy prices are escalating. And they’ll continue to escalate. Plus, we’re living in more of a climate of fear now than we have in the past. However, instead of buying a Garden Atrium out of fear ... to escape fearfully escalating utility costs, the better focus is to provide people with a better quality of living experience ... that also happens to be sustainable.

Well ... you’ve read about the theories and methods underlying sustainability. And you’ve learned about one example, the Garden Atriums of Poquoson. The next question, then is:

What will we need to do, to be sustainable in the future?

What follows is the result of in-depth research about the future of sustainability, done over the past year and a half. It began innocently enough, by asking ...

“What have we not been able to accomplish with our first Garden Atrium effort?”

As the research continued, it evolved ... and evolved ... and evolved. And as it got “way out there,” I kept asking if this aspect was truly integral to “sustainability.” And the answer was, “Yes.” So, be prepared for some depth of information, for explorations into dimensions you might never have considered to be part of “sustainability,” and for conclusions ... or, at least, a hypothesis about what we’ll need to do to sustain in the future. Two “Sneak Preview” comments ...

1. We will be living in a time of major and widespread change, which inherently will be uncomfortable ... even painful. And ...
2. I believe the end-product will be absolutely glorious!

With those prelude comments, here are the results of my research into ...

III. THE FUTURE OF SUSTAINABILITY

In the time since the beginning of our effort to create sustainable housing, the biggest difference – and cause of change in the world – has been the dominance of the impact of reaching Peak Oil, globally. The spin-offs ...

- Transportation;
- Power supply, and (perhaps most critically) ...
- Food production ...

... are enormous. The aging municipal infrastructures and disruption of utility services are also becoming more apparent. Plus, Pew Research recently completed a study indicating that public confidence in long-trusted institutions is low and getting lower. In a sense, our confidence that our government can solve any of these sustainability problems is dropping even lower than it’s been. In fact ...

The influence of nation-states, our civilization’s global organization, as well as the leaders of those states, has been dropping. Multi-national corporations are seen as having considerably more ability to shape how we live. But – their goal, consistent with their charters, is profitability, not “the betterment of mankind.” To whom do we turn, then, to help us out of so enormous a bind as “sustainability”?

We are all part of a system ... our civilization. I don't believe anarchy will have the connectedness to solve sustainability issues. I don't think running into the woods to survive will contribute to our civilization's evolution. I believe the Internet has helped us create "one world" ... which will stay that way. And while I've heard multiple consistent projections of what a likely outcome will be, I believe it's best to begin by looking at the end of my own arm for a helping hand, and asking ...

*"What is it that I can do make a difference,
and to support true sustainability?"*

The first Garden Atriums are grid-connected. The power grid is used for storage, with batteries for times when the grid is down. Municipal water and wastewater is not an option. Connection to food markets is easy. Because of Peak Oil, the next generation of Garden Atrium homes will need to be free of all grids ... power, water, wastewater, solid waste, and even food. (We may connect to the power grid, for the emotional comfort of buyers, but must operate in a totally stand-alone manner.)

This concept may be the only way people who are not wealthy can sustain, and can sustain with a high "Quality of Life" experience. People seem to look at their immediate environment and also fairly short-term. They also seem uncertain and nervous about looking up, looking out, and looking more expansively into the future. *"The future is scary!"* That leaves the vast majority of people vulnerable to a fearful "deer in the headlight syndrome" response if a major disaster were to strike.

We're all still dependent on the social, economic, and governmental environment in which we now live. It's all we know, and – good or bad – it's fundamental to our daily lives. To help ease the change from what's familiar and comfortable, people will need to experience another alternative. Then they may say ...

*"I can do that."
"This is really nice."
"I can easily live this way."*

The "2nd generation" sustainable development needs to provide that positive model.

The following dimensions likely need to be addressed in the 2nd generation sustainable development. Priority numbers reflect our gut sense of that's dimension's importance, "10" being high. Comments reflect the results of initial investigations.

x10 Community

Many people have recently written about emerging living trends, especially related to sustainability. Here are some excerpts. The flow's a bit choppy, but a theme does begin to emerge. From Barker & Erickson's *"Five Regions of the Future" ...*

"Local Techers" prefer small to big, but don't focus on size for its own sake. The "village" is a model for human development. Shouldn't be too big, or dehumanizing.

Not too small, either, or we'll miss the richness of variety in life. Scale is the key. Proper scale is what humans can effectively manage in any environment.

In what the authors describes as a "Local Tech" region, we'll live in:

Human-scaled villages and communities with technology that helps us use the resources of nature in a way that protects the planet and allows us to work in a way that fully develops our humanity.

In a sense, the motto is:

"Small and local is beautiful."

Next, some thoughts from Joel Garreau's "Radical Evolution" ...

"Much later it occurs to me that Felipe Mendoza's world is a metaphor for Prevail. It is this intensely local yet vastly global arrangement that's very complex and very authentic whose pivot literally is flavor. Mendoza is no poster child for going back to some static nature, Lanier observes. Mendoza talks about all the varieties of chili they are experimenting with to see how far they can push their business. His livelihood depends upon people coming to Hatch (NM) and saying Hatch is special. He is both a man of the world and is grounded in that place. He is clearly somebody who has the flavor of the valley. He is the essence of being connected while relishing differences."

Mendoza has a chili restaurant in Hatch, New Mexico. Garreau believes ...

Localities need authenticity to maintain a true local character, and that such character is valued. The pattern that's emerging is like the bumper sticker ...

"Think globally, but live locally."

Referring to Michael H. Shuman, in "Going Local" ...

"To succeed in a world of shifting loyalties, a community going local must simultaneously retain a global perspective."

"The Rule of 150" is another concept of historic importance ...

Evidently due to the size of the human brain cortex, we can generally maintain about 150 relationships – at a level at which we truly care about people, and will walk over to greet or join them when we see them. Bill Gore built his GorTex company around that rule, so no building or division exceeded 150. The idea:

If people care about one another, they'll make the company work.

Religious sects and clans also revolved – consciously or not – around that 150-person size limit. Above that number, sects and clans – and company divisions – would routinely subdivide.

Using the 150-person maximum as a rule, and an average U.S. household having 2.2 people, a 2nd generation sustainable village maximum should be 68 homes.

So far, we've considered community size.

How about community vitality?

Some small towns are “pits,” while others become “happening places.” In tests, the dimension, “Social Capital,” consistently parallels perceptions of “Quality of Life.” Social Capital seems largely influenced by the degree to which people feel they can shape or influence their community ... empowerment. Group Facilitation techniques – such as “Synthesizing Triads” – can be used to gain a true consensus ... even from large groups, and in a fairly short amount of time. That process will be tested in the Homeowners' Association in the initial Garden Atrium project.

Rather than predetermining what amenities should be available in the village center, use the process that reflects the residents' actual felt interests. This decision-making process replaces all the “Robert's Rules of Order” systems of operation, to which we've been conditioned since high school. Instead of a control model ...

Participation, not representation.

Here's another thought from “*Radical Evolution*” ...

“You can't have modern democracy (says Fukuyama) unless you have this basic belief in equality, which means that you should empathize with suffering and feelings of other people and recognize their rights as equal to your own.”

His concern is that the divisions between The Enhanced, The Naturals, and The Rest may be so profound as to make past ruptures over race and religion seem quaint and paltry. This attitude – along with a total involvement, consensus-based governance process – seems essential. One other supporting thought ...

“Dependency, especially on political and religious authority, is the distinguishing mark of a barbarous and primitive society, while autonomy – liberty – is the mark of a modern and civilized one.” (Arthur Herman.)

This thinking is quite different than what we are accustomed to expect in our current day-to-day lives. And from Shuman's “*Going Local*” we add ...

“The larger a political entity, the more difficulty a citizen has identifying with or caring about his or her neighbors. For people to have a mean-

ingful feeling of community, they need to know, communicate, work with, and trust their neighbors.”

The more people are directly involved in making decisions that govern their lives, the stronger their confidence in themselves, their neighbors, and their community to solve problems that may come along. Recent surveys evince a decline in our belief in the effectiveness of our current authorities to solve the problems we face. But – what’s the alternative? These ideas suggest a different model.

Next, from Planning and Design Institute – a Milwaukee consulting firm that specializes in helping small communities become more lively and more vital and, overall, better places in which to live – here are some guidelines for making a community a lively and rewarding environment in which to live. The primary key is ...

Shared public experience.

People need a reason to use a space ... which, in turn, causes elbow rubbing. People will go to *active* coffee houses, to share experiences with others. Some uses that are proven to work include ...

- A spa, sauna, etc.;
- An exercise room, perhaps with lap pool;
- A central “post office” – for mail, UPS & FedEx packages, etc.; and ...
- Equestrian trails – whether they own or rent a horse.

Additional uses that are likely to work equally well include ...

- An orchard – tending to fruit.
- Winter gardening, in a greenhouse;
- Planning, preparing, enjoying gourmet food;
- Health care, provided once a week, at the Inn;
- Walking ... especially through a hardwood forest;
- A winery – many people enjoy making their own wine.
- Personal storage: walking to it, like having a giant closet;
- Repairing – going to a shop, with tools provided, to fix things;
- Art – studios for pottery, drawing & painting, weaving, sculpting, etc.
- Kinko-type service – services or products; and ...
- Concierge service – such as: dry cleaning; tickets for events; pizza delivery; watering plants or feeding pets while on vacation; providing greeting cards. Concierge services also cause a huge information exchange among residents.

A key component for this new vision is an inn. It becomes a hub for many events – and provides a place for many paths to cross. Physically, activities should occur near a “crossroads” – such as the inn’s lobby or a nearby outdoor square. Some activities will evolve incrementally, from residents ... such as pottery or chess playing or winemaking or gourmet cooking. The inn is emerging as essential for many reasons. Spaces that accommodate living, working and playing add excitement.

Another key factor influencing the quality of life:

Happiness.

According to an ABC News special, five major factors increase happiness ...

Close and supportive relationships between people is the first and likely the biggest predictor of happiness. Happiness expert Prof. David Myers states simply ...

"Close, supportive, and connected relationships make for happiness..."

"Social support – feeling liked, affirmed, and encouraged by intimate friends and family – promotes both health and happiness. A friend is someone with whom you feel comfortable being yourself. They enable us to be known and accepted as we truly are."

According to Prof. Myers, short of torture, society's worst punishment is solitary confinement. People want companions. We seek others to do things with and to share the experience of being human. Companionship combats loneliness and promotes well-being. Friends often exchange favors in helping each other meet the demands of ordinary living. It's a big plus if we have a friend, or friends, on whom we can count for help when the rough spots in life occur. So ...

The "Rule of 150," the opportunities for people to meet and cultivate relationships – at crossroads and in shared activities – and direct participation in governance of the community should increase residents' actual feelings of happiness.

The second happiness factor, **work**, comes when we test our skills through some meaningful activity.

Happiness increases if the work is fulfilling.

How do we describe "fulfilling" work?

"Flow" describes a work situation in which a person is totally absorbed in the activity, to the point at which hours pass without the person realizing it. An artist works for hours on a piece of art, being absorbed the whole while in the act of creation, and finding the whole experience very rewarding. "Flow" occurs when a person is using his or her highest skills in doing work he or she finds challenging. Flow experiences boost our sense of self-esteem, competence, and well-being.

A key ingredient of satisfying work is whether or not it's challenging. The most satisfied workers find their skills tested, their work varied, and their tasks significant.

As the community is not necessarily work-related, one of the key support services that could help in this dimension is Executive Coaching ... helping people identify meaningfulness, and then acting on their beliefs.

The third key happiness factor is the level of "**personal control**" a person has over his or her life. "Control Theory" distinguishes between an internal and an external locus of control.

An internal locus of control is a belief that life outcomes are largely the result of our own attributes and behaviors.

An external locus of control is the belief that outcomes are largely determined by factors and forces out-side our control.

People with an external locus of control are more susceptible to depression, learned helplessness, a sense of victimization, and negative responses to aversive stimuli. People with an internal locus of control tend to be happier.

The consensus model for making decisions governing the community should provide a considerable boost to residents' internal locus of control.

The fourth happiness factor is **optimism**. Author John Powell states that research points to a common denominator among people who are happy ...

They are "Goodfinders." They look for and find what is good in themselves, others, and in all situations in life. Consider this contrast:

"Two men looked out from prison bars.

One saw mud and one saw stars."

Looking for good enables brighter feelings; we can usually find something good in others and things if we try. And if things aren't perfect, or are seemingly unacceptable, we may find there are redeeming characteristics found in the existing good amidst the flaws. If Powell is right, we may find ourselves smiling more often as we look for the good in other people and in things ... or in ourselves.

Not much in the community fabric will necessarily build (or hurt) optimism. Self-empowering activities, in which residents participate in a consensus process to address and solve community-related issues, may cause people to feel more positive about their ability to influence their destiny ... which may engender optimism.

And the fifth key happiness factor is **spiritual faith**. Where there's spiritual hunger, there's a forthcoming emotional sustenance from spirituality. Are spiritually committed people happier than those who aren't? According to Gallup polls ... yes.

"The highly spiritual were twice as likely to say they were `very happy.'"

The community's CSA farming will be biodynamic ... a system developed by clairvoyant Rudolph Steiner. Ideas from Machaelle Small Wright's co-creation work at Peralandra will likely be a factor for bringing human and nature spirit energy together. Other than providing a positive environment for "connecting," for meditation or for dialogue ... it's not really a religious community, per se, so nothing in the fabric *necessarily* is likely to bolster (or diminish) spirituality among residents.

In terms of the sense of community created by the design of the site, some additional thoughts from Planning and Design Institute ...

Either locate the village and Inn at the entry from the road, with the farm structures as a distant "polar opposite" ... or ... locate the farm structures at the entry – and create an "enter through the farm hamlet" experience – with the village across the farmland, as a polar opposite. If the latter, consider ...

- The Inn, which is a larger structure than the individual houses, needs high visibility – "eye candy" – a powerful, commanding design.
- The road across the farm fields to the village needs to be "Napoleonic" ... narrow, with trees lining the way ... and focused on the strong visual statement created by the Inn and village. And ...
- Houses in the village need especially nice garage doors, to help set and reinforce a statement of character for the village.

Those are some thoughts about creating a positive sense of community, and an environment in which people will feel happier and will enjoy a better quality of life. Another essential need in a community is ...

x10 Health Care

Clinicians need to see 105 patients/week. These villages are too small to even support one clinic. A town of 500 or so can support a part-time chiropractor. So ...

The villages need to be within, say, 20 miles of a medical center. That way, a variety of medical services can be available within half an hour. Trips to a larger community that has a medical center can be shared, so that if gas is used, the per-person cost is reasonable. Electric cars can go 65 to 125 miles on a single charge, and so can also make the 20 mile round trip, easily and economically.

The pattern is consistent with the "Local Techer" style in Barker & Erickson's book:

Treat people "locally, when possible, and moved to medical centers only when needed. Individual care in small settings is the best kind of

healthcare, anyway. With information, diagnosis, and skill provided through the Web, treatment can be as effective in small local settings as in large medical centers.”

“Local Techers also embrace the use of edible medicinal plants, even though herbal plants, until recently, have been largely shunned by Western science.” “Local Techers utilize plants and plant extracts from their locally grown flora to counter illness and disease.”

Recalling previous dialogue about different aspects of sustainability, while heating and cooling and power and water command most of the media attention, food will be one of the biggest factors essential for our sustainability.

x8 Food

Several stable trends point to potential issues in feeding our global population:

1. Desertification. Every year, we lose farmland to desert the size of Rhode Island. In addition ...
2. We've unquestionably passed Peak Oil, at least functionally. Every day, there is less oil available, per person, on the planet ... which puts us into a "lifeboat" exercise, wars, etc. While we can drive fewer miles and in more efficient cars, agribusiness uses oil-based pesticides and fertilizers. Before the industrial revolution, agriculture fed 650 million; we have over ten times that now, which isn't sustainable ... even with better seeds and farming practices.
3. We're running out of water. The world's largest aquifer, the Ogallala, under the Midwest U.S., is a third of what it was, and is non-rechargeable. India and Pakistan fight over Kashmir supposedly for ethnic reasons; both countries overpump their aquifers, for irrigation. Their water tables are dropping 1.5 meters/year. Kashmir, in the headlands to the Himalayas, has three huge rivers. China's Yalu River has been dry at least one month a year for almost 20 years ... with accompanying crop failures.

According to WorldWatch Institute ...

“Satisfying the food demands of the growing human population while at the same time sustaining freshwater and terrestrial ecosystems presents enormous challenges. Already, as much as 10 percent of global food production depends on the overpumping of groundwater. In India, where millions of wells have run dry, that figure is closer to 25 percent. These hydrologic deficits create a bubble in the food economy that is

bound to burst, and they raise questions about from where the additional water needed for future food production will come.”

Desalinization is now inexpensive. But – constructing pipelines to the central parts of countries for irrigation purposes is incredibly costly and can take decades.

4. In 1997, China announced it was importing food for the first time in its history. Actually, they had a 25-year straight-line decline in food production that simply crossed from diminishing exports to the start of imports that year. The problem:

If that declining line continues, because of China's size, the rest of the world will not have enough surplus to sell it, best case, by 2016 ... a very few years. By 2005's end, the line hadn't changed; China's import tonnage equaled Canada's entire harvest. The problem will surface before then, but may not be heeded. Africa now loses over half a million people every month just to starvation.

To be “sustainable,” a community will need to be able to provide for all the food needs of its residents. How can that be accomplished?

- Agriculture Extension services, usually affiliated with universities, have people – students and faculty – with interest in sustainable farming, aquaculture, organic foods, etc. They may be helpful in planning and even in staffing.
- Chinese aquaculture uses sustainable systems that are 5,000 years old. A group in West Virginia sells fish to New York City buyers. They've volunteered to help.
- The closest to non-oil-based farming seems to be the Amish. In addition to grains, vegetables, fruits, berries, fish, herbs ... we'll need: some cows, for dairy and manure; some chickens, for eggs and meat; some horses, for plowing and manure. And finally ...
- CSA, Community-Supported Agriculture, may be a key resource for operations. They drafted a business plan that includes all food provisions, that they believe is workable for the village. CSA trains its farmers at Wilson College, in Chambersburg, PA. Referring again to the Barker & Erickson book ...

“One pattern of local food growing has become a trend in many parts of the U.S. Farms close to metro areas are inviting families to invest in their harvest. Several hundred families put money up in the spring to finance the planting and harvesting of all sorts of garden vegetables.

“This lowers the cost of financing for the farmer, and guarantees sold products. Some farms require investing families to spend one weekend day per month at the farm.

“An important food technology in this region is the greenhouse. In many climates, local food production can be maintained by using greenhouses.”

Without calling the practice “CSA,” their description is a perfect fit for the pattern that should work to address totally sustainable and high-quality food provision.

Initial estimates are: a third of an acre, per person, is needed for total food supply. That includes space for root cellars, greenhouses (for longer growing seasons, winter salads, and for starting seeds in winter,) small sheltered areas for winter crops, spaces for canning food products, and small structures for growing “fingerling” fish, and other “start-up” animals.

Once we’ve considered what it takes to create and live in an exciting and life-enriching community ... and once we have a feeling that our physiological needs – including health care and food – have been addressed, one of the next considerations might be how we invest our free time ...

x7 **Leisure**

“Leisure” is defined as anything not part of “work.” It can be incredibly pervasive, as most of our lives are spent in leisure times. Plus, leisure probably has the greatest impact on the quality of our lives. Arnold Toynbee had a great quote ...

*“To be able to fill leisure intelligently
is the last product of civilization.”*

In contacting leisure studies specialists, internationally, they all knew of Toynbee’s quote, but none had anything definitive in response.

A lot of leisure studies look at recreation, and are supported by money from resorts or sports equipment manufacturers. But leisure goes well beyond. It includes travel, lifelong education, developing special skills, human idea exchange – dialogue – as well as fitness and sports and all the entertainment options.

Pre-industrial revolution, the wealthy didn’t have to work, and so were known as “The Leisure Class.” We may be at a point in which the needed hours of work are fewer, which can place a multitude of us with a lot of leisure time. The question ...

What’s the “stupid” use of leisure and
what constitutes “filling leisure intelligently”?

This area needs a lot more investigating, so the community can facilitate the best opportunities. It may be an important opportunity never before seen by humanity.

One possibility: Just as an Executive Coach helps leaders be more effective in both business and personal domains, perhaps a “Leisure Counselor” – someone who listens, helps people discuss and clarify personal preferences and goals, then crystallize actions to achieve those goals – might be an especially valuable asset.

While quality of life within a sustainable community might be excellent, we’re not alone. We do need to connect to outside communities, which leads us to ...

x6 **Transport**

Clustered villages reflect the “New Urbanism” beliefs – replacing driving with walking. The developer of the first New Urbanism project indicated that people readily walk up to ¼ mile. This area can accommodate 1200-2000 people, depending on the village’s housing density. Transport within the village can be walking and bicycling. Moving of goods on site – or of people who are not fully ambulatory – can readily be via electric carts ... already in regular use in many resort developments.

What are the best sustainable transport alternatives when we’re moving off site?

Movement from the site to a larger nearby community can be by car. PV panels could provide sustainable power for a small fleet of electric cars – highway speed with a minimum range of 65 to 125 miles. Several options exist ...

- The **Twike**. A combination car and bike. 3- wheeled. Uses muscle-power with pedals to supplement the electric engine. Goes over 50 mph. 50 miles per charge; more if you pedal. In Switzerland since 1997; a good commuting alternative.
- The **REVA** is made in India. It’s inexpensive. Top speeds about 50 mph, with 60 – 120 miles per charge, depending on battery type. Coupled with PV panels, you’ll have sustainable, emission-free local driving.
- **Think** is a Norwegian-produced electric car that’s been in Europe for some time. Ford bought their North American rights – essentially to prevent it from coming here. They sold the rights back in early 2008 and Think announced they’d be coming to the U.S. in 2009. They have a small sedan, a small truck, and a convertible. Top speed is 65 mph and range of 125 miles or so.

A truck would be needed for bringing goods to the community – or taking surplus food products to a farmers’ market. The farm can produce the needed ethanol – or – an all-electric truck should also be able to do the job.

Movement between larger communities likely needs to be via light rail or heavy rail. That will likely be a huge problem in the U.S. It’ll likely require a private initiative to connect larger communities, such as ...

- Using highway rights-of-way for rapid transit.
- Intermediate speed rail – 100-120 mph – could connect secondary cities, such as a Charlottesville, VA with major cities, such as Washington, D.C. in under two hours.
- High-speed rail – 180 mph – could connect Washington, D.C. to Chicago or Atlanta in about 4 hours. But – governments have been unable to solve the problem, and also have been reluctant to let go, once they control a system. Warren Buffett recently is reputed to have purchased a major railroad ... which could signal a shift.

Virtually all highway funds are already used just for maintenance. Increasing fuel prices along with an aging pool of drivers bodes poorly for trucking. Goods will likely shift almost totally to rail transport, with trucks only moving containers regionally, to local distribution centers and to outlet stores. Within a few years, the Interstate highways may be virtually devoid of the traditional convoys of semis. As for air travel ...

Airplanes seem destined for longer distances, such as over 1,000 miles, or across the oceans ... distances and routes for which they are unquestionably the best.

Another major factor that influences the appeal of communities – and affects the value of homes in a real estate market – is the school system. Looking even more broadly than K-12 education, however, how would a sustainable community best deal with the education of residents ... at all ages?

x6 Education

The single most successful form of education – in terms of levels of educational achievement – is home schooling. The movement began mostly with Fundamental Christians. It's spread to increasing numbers for non-religious reasons ...

- Diminishing confidence in public school effectiveness.
- Quality educational media are already available in a huge range of subjects.
- The Internet provides far-reaching sources for information. And ...
- Home schooling lesson plans are available to guide parents. In a sense, "TLC" – with solid support media – seems to do best.

There have been some abuses. Some parents tell their school system that their children are being home schooled ... but don't actually do the schooling. Being a

state responsibility, home-schooled children will be periodically tested, to ensure they are receiving the education they are supposed to receive.

The claim that lack of socialization – not being among a lot of peers – will harm the social growth of children seems to have no supporting evidence. Home-schooled children simply play with others during normal recreational times, and have shown no negative effects, socially. Home schooling is also safer – a growing concern.

Parents have begun to fatigue, however. Therefore, they are increasingly getting together to home school their children in small groups. One parent takes Monday, one Tuesday, etc. It's still small, personal, and individualized education. But it's less stressful on parents.

The most likely scenario seems to be the “one room schoolhouse” located in different homes, or at the Inn. And education for all levels, including some higher education – perhaps in collaboration with organizations such as Phoenix University – and “lifelong learning” could occur. Lifelong courses could range from advanced degree programs to short courses in gourmet cooking, yoga, art, nutrition, literature, philosophy, reading groups ... virtually anything of interest. In fact ...

The potential for continuing human growth is unprecedented and amazing. One of the pioneers of American education, John Dewey, defined quality education as:

An experience that opens new doors ...
and causes a person to want to learn more.

The community will probably need someone, such as the Leisure Coach – full or part time – to inventory interests and organize quality educational programs for anyone in the community who expresses interest. This could be big ... a mainstay in contributing to better leisure experience and to overall quality of life feelings.

No matter how spectacular a sustainable community might be, it will not likely stand alone. Civilizations have always needed some form of ...

x6 Trade

Our entire economic system will likely shift, and fairly soon. It probably won't totally collapse, as human needs and the need for trade will always exist. People will still need services – medical, dental, legal, accounting, etc. But ...

It may revert to something like pre-industrial revolution economies. The industrial revolution gave rise to a large middle class. That class is already diminishing, and polarization – into a greater number of wealthy and poor – is occurring ... with associated social tensions. (People living on dirt floors watching reruns of “*Bay Watch*” begin to feel frustration and anger ... which can also lead to terrorism.)

In addition to oil, another motivation for the Iraq invasion was protection of the “Petro-dollar.” Iran and Iraq were negotiating with France and Germany to trade oil in Euros. The “Petro-dollar” has been a global standard for a long time. Confidence in the dollar is one of the underpinnings of our economy. Personal trade is readily accomplished using international currency: VISA or AmEx. But they need a currency exchange base. Evidently, a shift from the dollar to another currency – such as the Euro – as a standard, would be disastrous for the U.S. economy.

India and China are experiencing tremendous surges in economic growth, based largely on providing cheap labor for manufacturing. India is also providing more skilled services, such as operating call centers for product distributors or writing new software, for Microsoft and others. However, both countries suffer from extreme environmental degradation, water depletion, and strain on their ability to provide food for their populations. According to WorldWatch Institute ...

“If not reversed, environmental deterioration threatens to become a major impediment to the economic development of China and India.”

Further ...

“As China and India add their surging consumption to that of the United States, Europe, and Japan, the most important question is this:

“Can the world’s ecosystems withstand the damage – the increase in carbon emissions, the loss of forests, the extinction of species – that are now in prospect?”

“The rise of China and India is the wake-up call that should prompt the people in the United States and around the world to take seriously the need for strong commitments to build sustainable economies.”

Dr. David Martin, a global economic advisor, described pacts, known as Basel-1 and Basel-2, that facilitate international banking movement, to which banking systems have agreed. They went into effect on Jan 1, 2008. Dr. Martin reported that no U.S. bank went to the table to comply. The result could be a shift by countries, such as China, and multinational corporations to begin banking in other countries and currencies. If this happens, Dr. Martin indicated that confidence in the dollar could plummet, and the U.S. economy could take a major “hit.”

How do sustainable community residents deal with global economic instability?

One approach could be to look at the community as a self-contained entity – as it is with regard to power, water, etc. Then, the system would have two parts ...

1. Someone would need to examine all the needs the community has ... garden maintenance, farming, food canning, geothermal equipment maintenance, operating the educational system, serving in a coffee shop, leisure coaching, etc. For each task, estimate the amount of

time needed, and when that time is needed, (as harvesting will likely demand more time at some times of the year than others, and a coffee shop might be busier at some times than others.)

2. Someone may need to serve as a personal growth coach for each resident. He or she would help the resident identify his or her biggest interests and growth needs. If interests correspond to a need the community has, a match is made. If interests don't – such as painting or writing or meditating – that's still OK. Often, people can kick in a part of their time to help satisfy a community need – even though it clearly doesn't support their personal growth needs. Or ...

They can use cash or something like a barter system to compensate for (for example) the food they're receiving from the community.

Using a personal growth coach this way also could have a major positive impact on *“the intelligent use of leisure,”* on lifelong education and on *“Quality of Life”* feelings.

Next, how will *“widget manufacturing”* occur?

Each sustainable community will need some commodities – from computers to toilet paper – to satisfy the needs of residents. Some thoughts from *“Going Local”* ...

“Johan Galtung, a leading peace theorist from Norway, elaborates the rationale for communities to become self-reliant:

“Produce what you need using your own resources, internalizing the challenges this involves, growing with the challenges, neither giving the most challenging tasks (positive externalities) to somebody else on whom you become dependent, nor exporting negative externalities to somebody else to whom you do damage and who may become dependent on you.

“... The justification for doing so is clear: we will enjoy the positive externalities, rather than giving them away, and at the same time will be responsible ourselves for the negative externalities. ... We can fight the negative consequences ourselves, the distance between cause and effect being a short one.”

Continuing with additional thoughts from *“Going Local”* ...

“A community can – indeed, must – maintain economic relationships with the rest of the world, provided it retains control of these relationships. Three categories can help accomplish this:

“The first is to nurture businesses that reduce imports for basic needs. A sound local economy is one that provides everyone with the necessi-

ties of life, and trades surplus production for less-essential goods and services.

“The second is to keep ownership of business local, so that the sudden departure of a firm on which the community depends is virtually impossible.

“The third strategy is to channel local savings and investment capital into the building of the local economy.

“A community committed to import substitution, however, aims to minimize population growth. The goal is to expand the quantity and quality of jobs without drawing new people. Where jobs grew fastest, family income grew more slowly than the national average. Where employment growth was slowest, income growth was above the national average.

“People with rising incomes tend to buy goods featuring higher levels of technology, such as VCRs, personal computers, software, and ...

medical instruments. The delinking of production from bulk materials diminishes the importance of locating a factory near natural resources.

“And this opens up more opportunities for community corporations almost anywhere to produce a greater variety of goods.

“Services requiring a high degree of human skill – which are becoming a larger and larger fraction of the nation’s economy – will necessarily remain local.

“If services, knowledge, and technology are substituting for materials, it follows that the most competitive communities will be those that are smartest, not largest.

“Of the 90,000 manufacturing companies in the Emilia-Romagna region (of Italy), 97 percent employ fewer than 50 employees. A network typically forms temporarily to create a specific product for a well-defined “niche” market. Participating firms pool their resources and share the risk. Once the project is complete, the network disbands. Following successful models in Europe, more than 50 flexible manufacturing networks have been set up in the United States.”

This trend opens new opportunities for decentralized production ...

“The increasing capability to span boundaries and borders that networking affords to business would seem to have tilted the playing field

decisively against locally elected and appointed economic development planners vis-à-vis the plant location managers of the multinational companies at the hubs or apexes of the network.

“Yet at the same time, precisely because the networking principle allows concentrated business organizations to coordinate operations across an ever more dispersed field of play, more decentralized production becomes increasingly feasible.”

“Therefore, a critical feature of a needs driven economy is local ownership. The relatively small size of CSAs, ESCOs, WASCOs, and recycling makes local ownership not only possible but also probable. And for complex goods and services that can be produced only on a larger economy of scale ... networks of locally owned businesses – whether clustered in one community or spread out globally – can do the job.

“The key to transforming the local economy was not to combat business but to remake it. Today, more than 1,500 cooperatives in the Emilia-Romagna region employ 60,000 workers. Many of these small businesses export high-tech products that compete internationally. Creatively blending public-private partnerships with worker ownership transformed a once-impoverished agricultural area into ...

... the fastest growing part of Italy, with the tenth highest per capita income among the 122 official regions of the European Community.”

One other concern expressed by people concerned over the instability of the dollar centers around identifying a more stable means of exchange. Bartering has grown for decades, largely as a means of tax avoidance. It's more widespread than most people know, and is growing. Exchange groups have already worked out ways to equate tomatoes with dental services. *“Going Local”* goes further ...

“Today, hundreds of communities worldwide print their own currencies to induce residents to pump up their local economies. A community currency, whether in the form of coins, paper bills, checks, or computer-tallied credits and debits, is essentially a system to promote local purchasing. The managers of the system decide which goods and services qualify for exchange, and exactly what residents need to do to join. With the time-consuming tasks of screening already performed, consumers and producers know that any purchase or sale within the money system helps the local economy.

“The Local Exchange Trading System – LETS – uses a simple computer program and a currency called “green money.” Residents barter different goods and services with one another, and report the transactions. Each person’s account has credits and debits posted.

“LETS is both self-propelling and self-regulating. It’s self-propelling because individuals whose accounts are in surplus have an incentive to go out and strike deals with others in the community. It’s self-regulating because anyone can log onto the computer system, see anyone else’s tally, and decide not to do business with a person whose account was too deep in the hole. Most operating LETS place a limit on indebtedness.

“One of the shortcomings of LETS is they tend to involve individual craftsmen and service providers, not large businesses. The first one had 500 participants, but only 5 were shops, all small. The key is ensuring that real needs, as opposed to peripheral pleasures, can be met through a LETS.”

Finally ... one additional source of information about trade, about money and currency systems, and – more important – about how they impact on sustainability. These incredibly detailed yet wonderfully expansive thoughts essentially about “commerce and life” come from “*The Future of Money*,” by Bernard Lietaer.

The following public “*Warning to Humanity*” was unanimously agreed upon by 1,600 scientists, including a majority of living Nobel Prize winners in the sciences:

“A great change in stewardship of the Earth and the life on it is required, if vast human misery is to be avoided and our global home on this planet is not be irretrievably mutilated. If not checked, many of our current practices may so put at serious risk the future that we wish for human society and the plant and animal kingdoms, and may so alter the living world, that it will be unable to sustain life in the manner that we know. Fundamental changes are urgent if we are to avoid the collision our present course will bring about.”

Unless precautions are taken, there is a 50-50 chance that the next five to ten years will see a dollar crisis amounting to a global money meltdown. Aspects of our monetary system that met the objectives of another age, the Industrial Revolution, are inadequate for the challenges facing us in an Information Age. In fact ...

Working solutions are underway. Thousands of communities, globally, have their own money initiatives. They create new wealth, while solving social problems without taxation or regulation. They are empowering self-organizing communities, while increasing overall economic and social stability. And they enable the creation of essential social capital. Money has the potential to contribute to global abundance, sustainability, and peace of mind if used wisely; when restricted in its flow, it also has the ability to engender unfathomable suffering and hardship.

Using different currency types results in different social outcomes.

Some money systems foster cooperation; others competition. Between a third and a half of conventional monetary functions will be picked up by new currencies. Result: recession and unemployment severity is significantly reduced. By being aware of their effects, we can choose among these currencies when making different financial transactions.

Beyond the standard federally sanctioned currencies, many options exist. A fourth of global trade uses barter – no currency at all. Barter has been around since the dawn of mankind so it is often seen as an “inferior” or “primitive” form of exchange, sometimes associated with the underground economy. This has totally changed over the past decades. The barter industry even has two major trade organizations, the International Reciprocal Trade Association and the Corporate Barter Council.

Another manner of exchange is “Complementary currency,” an agreement among a group of people or corporations to accept non-traditional currency as an exchange medium. They’re complementary as they don’t replace conventional national currency but perform social functions that official currency is not designed to handle.

In January 2000, over 2,500 complementary currency systems operated in over a dozen countries; 400 in the UK alone. These currencies are emerging money revolution prototypes. The future of money lies with both further computerization of conventional currencies – such as dollars, euros or yen via smart cards and other new technologies – *and* with mainstreaming of complementary currencies. In fact:

Our ability to make knowledgeable choices in money systems allows us to imagine, devise and support different futures.

In a traditional money system, the application of interest has three outcomes:

1. Interest indirectly encourages systematic competition among the participants in the system.
2. Interest continually fuels the need for endless economic growth, even when actual standards of living remain stagnant.
3. Interest concentrates wealth by taxing the vast majority in favor of a small minority.

What is “natural” – competition or cooperation?

Kyoto University professor Imanishi showed Darwin’s vision of nature as a struggle for life to be blind to co-evolution, symbiosis, joint development, and harmonious coexistence that prevails in all domains of evolution. Our bodies would not survive without the symbiotic collaboration of billions of digestive tract microorganisms.

Evolutionary biologist Elisabet Sahtouris shows that predominantly competitive behavior is a characteristic of a young species during its first forays in the world. In contrast, in mature systems (e.g. an old-growth forest,) the competition for light is

balanced by intense cooperation among species. Species that do not learn to cooperate with the species with which they are codependent, invariably disappear.

Interest causes a systemic transfer of wealth from the bottom 80% of the population to the top 10%. This transfer is due exclusively to the monetary system in use, and is completely independent of the degree of cleverness or industriousness of the participants, the classic argument to justify large income differences. In the US, the top 1% now has more personal wealth than the bottom 92%, combined.

The most powerful catalyst of the Information Age transformation is not information but the *communication* revolution. Information tends to leak. The more it leaks, the more we have, and the more of us have it. Government classifications, trade secrecy, intellectual property rights, and confidentiality are all attempts at artificially reducing this natural tendency to leak. These artificial attempts fail because the conduits of its delivery system can be owned, not the actual information.

Information expands as it is used.

Information spontaneously tends towards abundance, not scarcity. In a way, this is a drawback: we all complain of information overload. What remains scarce and competitive is human attention – our ability to understand, turn into knowledge, and use all the information available to us. The switch to “information-as-a-resource” means that governments are ...

... less able to intervene in the high-speed train of social transformation that is headed our way. Information is more *accessible* to more people than the world’s key resources have ever been before. In the nature of *things*, the “few” had access to key resources; the “many” did not. Information-as-a-resource encourages:

- Spreading benefits rather than concentrating wealth; information can be more readily shared than petroleum, gold, or even water.
- Maximizing choice rather than suppressing diversity; the informed are harder to regiment than the uninformed.

Key differences between the concepts of data, information, knowledge and wisdom:

Data are undigested observations without context. A list of phone numbers is an example of raw data.

Information is data organized according to some system aimed at making it retrievable and useful. An alphabetical listing in a phone book organizes phone number raw data in such a usable way.

Knowledge is information you’ve internalized, integrated into everything else you know from experience and study, and have available as a basis for action in your life. You know a particular phone number is your friend’s number; this links with everything else you know

about that friend. An increasingly important form of knowledge is learning *how* to find the information that's useful to you.

Wisdom adds depth, perspective and meaning to knowledge by integrating ways of knowing other than logic and analysis, such as intuition, intelligence or compassion of the heart. It's multi-dimensional, crossing boundaries between different fields of knowledge. It's an ultimate synthesis; it can't be forced on or taught to someone else:

*"We can be knowledgeable with other people's knowledge,
but we cannot be wise with other people's wisdom."*

Michel de Montaigne

What matters most is not the technology, but *the way we use it*. The whole money game is going to change. Additional choices beyond national currencies are both unavoidable and necessary. The starting point is:

Be aware that choice in money systems exists,
and that choice matters.

Here are four scenarios to consider ...

Scenario #1: "The Corporate Millennium"

- Of the 100 richest economies, 51 are corporations. For instance, sales by General Motors are greater than Denmark's GDP, or Ford than South Africa.
- The world's 200 largest corporations now control 28% of the global economy, yet need to employ only 0.3% of its population to achieve that.
- The sales of the world's largest 200 corporations are equivalent to 30% of global domestic product. Their total annual sales are larger than the combined GDP of 182 countries – all but the largest nine.
- About one-third of global trade is really intra-corporate trade, i.e. one subsidiary exporting to another subsidiary controlled by the same corporation.
- US corporations pay less US taxes than they receive in taxpayer subsidies.
- In 1997, *Business Week* reported that average compensation for CEOs of these publicly subsidized corporations soared to \$5.5 million/year; wages of the working population were stagnant. The trend

has continued. In the 1960s, CEO salaries were 30x greater than those of the average worker ... compared with 200x in 2008.

- For every dollar in total taxes (local, state, and federal) paid by individuals, corporations used to pay 76 cents in the early 1950s. By 1980-92 corporate taxes were down to 21 cents per dollar of individual taxes.

Mainstream media aims not so much to inform or report, as to shape public opinion in accordance with agendas of prevailing corporate powers. As a result ...

“Virtually everywhere, the mass media provide people primarily with commercial messages. It is hard to discover in most of today’s news media the kind of information that would help citizens of democratic societies reach well-informed political decisions. The media have been called ‘Weapons of Mass Distraction.’ “

It is almost as though we were being invaded by alien beings intent on colonizing the planet, reducing us to serfs, then excluding as many of us as possible.

“The main problem of the future will be the glut of unnecessary people who will be irrelevant to the needs of corporations, and therefore ...

... will be uneducated, untrained, ageing and resentful ... The slow redistribution of wealth to which we became accustomed after World War II is already rapidly reversed, so the future is one of inequality. We are entering an age of hopelessness, an age of resentment, an age of rage ... The world belongs to the global corporation. The nation state is desperately sick.”

Scenario #2: “Careful Communities”

It’s a modern version of Western Europe in the centuries after the Roman Empire collapse. It’s a return to small-scale homogeneous communities, fragmented by vast forests. Each has its own currency, administration and in-bred worldviews.

The “Big Monetary Crash” will occur when the US\$ comes under attack. It is not a question of whether, but only a question of when. The instabilities of the official monetary system will assail that linchpin currency of the global money system. People will have to reorganize their lives to be more local and self-sustaining, and use different forms of governance. Control over local currencies can be used to lock people into a safety cocoon. Local currencies can be used positively or negatively. In the Careful Community scenario, their restrictive potential is revealed.

Scenario #3: “Hell on Earth”

Instead of people organizing into self-contained communities, an individualistic “free for all” ensues. It is the world that results if enough people believe that the solution to any breakdown is to buy more bullets for their guns. (“Mad Max”)

Scenario #4: “Sustainable Abundance”

It is ironic that only monks who don’t own anything, or possibly the very rich, or the extraordinarily gifted, can afford equanimity about money. The rest of us, the vast majority – even in the richest countries – succumb to the obligation of “making a living” that does not really coincide with what we’d like to be doing or being.

**How much do we give up of our being,
of who we really want to be,
in making a living?**

Many do not dare to find out what they’d really like to do, out of fear that it would be too painful to go back to a “normal” job after that. The game we play is that – when we retire, and have put enough money aside – then we will take care of our dreams. Some take it in little installments; we rush through a week, looking forward to the weekend or a vacation, when we will do what we really want to do.

These scenarios present options. The question is ...

How do currency choices affect conditions
such as “sustainability”?

One definition, from a scoutmaster arriving at a campsite ...

“Leave the place in better shape than you found it.”

“Abundance” is what provides enough freedom of choice in the material domain to as many people as possible, so they can express their passion and creativity. Such creativity is the expression of their highest form of consciousness, their highest calling, and provides a sense of meaning in their life.

To realize the benefits of an Information Society, the transition will require *both* knowledge and wisdom. If we opt to have wisdom prevail, the Information Revolution could help us create Sustainable Abundance, rather than other scenarios.

Would you continue doing what you are doing if
you had all the money you would ever need?

If the answer is yes, you’re among the fortunate ones whose work and job coincide. Evidence indicates jobs without meaning can make you sick and even kill you.

“If the economic problem (the struggle for subsistence) is solved, mankind will be deprived of its traditional purpose ... Thus for the first time since his creation man will be faced by his real, his permanent problem

... There is no country and no people. I think, who can look forward to the age of leisure and abundance without a dread. It is a fearful problem for the ordinary person, with no special talents occupy himself, especially if he no longer has roots to the soil or in custom or in the beloved conventions of a traditional society."

John Maynard Keynes

If Keynes is right, for the first time in history we'll be forced to reinvent ourselves, to find other ways to identify who we are. We'll no longer identify with "professional labels." We'll need other identities, other reasons that give purpose to our lives. There's enough work to be done in your community to keep everyone busy for the rest of his or her life. Work can express our unique creativity.

Have we become so hypnotized by our fear of money scarcity that we also fear lack off work?

Most people will be involved part time in both economies. Within a family, some members may be employed mostly in the global competitive economic loop, while others might be active mostly in the local economy. Both might be "*following their bliss*," ideally both having the opportunity for their work also to be their job. Such an outcome is possible within an "Integral Economy," which consists of ...

- The traditional competitive economy on one side, and ...
- A local cooperative economy on the other.

The former produces financial capital, and the latter social capital. They can operate in symbiosis with each other.

What's most surprising is how close we were to such a solution in the 1930s. However, governments did not give this approach a chance. They stopped it because it worked *too* well without the need for central government involvement. Some examples of successful complementary currency systems ...

Stamp scrip was applied in **Worgl**, Austria. Population: 4,500, with 500 jobless people, and another 1,000 in the immediate vicinity. 200 families were penniless. The mayor placed 40,000 Austrian schillings in a bank – a pittance compared to what needed to be done to improve the city – then issued 40,000 schillings' worth of stamp scrip. He used the stamp scrip to pay for his first project.

As a stamp was applied each month (at 1% of face value), everybody paid with the stamp scrip was sure to spend it quickly, providing work for others. When people ran out of ideas of what to spend their stamp scrip on, they paid their taxes early.

Worgl repaved streets, rebuilt the water system and all the projects on the mayor's list, they built new houses, a ski jump, and a bridge. The bulk of the work was provided by the circulation of the stamp scrip *after* the first people contracted by the

mayor spent it. In fact, each schilling of stamp scrip created between 12 and 14 times more employment than the normal schillings circulating in parallel.

Worgl's demonstration was so successful, it was replicated in 200 Austrian townships. Then the central bank panicked and asserted its monopoly rights. It became a criminal offense in Austria to issue "emergency currency." Worgl returned to 30% unemployment. Widespread social unrest exploded throughout Austria. That led to the emergence of a new leader – in this case, Hitler. The rest is history.

Stamping out popular grass-roots initiatives where people try to solve their problems locally, pushed a sophisticated and educated society into violently suppressing its minorities, towards less and less democracy and, ultimately, towards war.

WIR is a Swiss complementary currency run by a community of individuals and small business people. It is the oldest continuous system in the modern Western world, founded in 1934 by 16 members in Zurich. It has continuously grown in both participant numbers and business volume. It proves complementary currencies make sense, even in a conservative, hard-nosed capitalist country with one of the world's highest living standards. By 1994, WIR grew to 2.5 billion Swiss francs annual volume (over \$2 billion) with 80,000 members from all over the country.

Several other complementary currency systems operating successfully include ...

The Local Exchange Trading System, **LETS**, is the most frequently used complementary currency system. Invented in the 1980s by Michael Linton, in British Columbia, Canada, it uses a local non-profit corporation as a mutual credit company. The only actual asset is the personal computer for record keeping. You pay a small set-up fee and an annual membership fee, to cover record-keeping costs.

Electronic or physical notice boards indicate someone offering a specific service. If you buy it, your account is debited; the seller's is credited. The amount is negotiated, and can combine "green dollars" and national currency. Participants handle the cash. Green dollars exchanges are phoned in or sent by note or email. All participants can see all accounts, so no one's likely to hoard or overspend. In 2000, Canada had 25-30 LETS operating, more in the UK, and it's quickly spreading.

In **Time Dollars**, someone gets an hour of credit for an hour of help. That hour – recorded on a computer or manual system – can be spent buying goods or services elsewhere. As one gets a credit, as another gets a debit, the sum of all Time Dollars in the system is always zero. And everyone gets the help or goods they want.

Retirement homes using Time Dollars found that the money knit the group together. People say hello to each other, celebrate birthdays, look out for each other, and do things as a community, such as having a community garden. This simple device changes the way people relate to each other. People feel that their contributions are rewarded. They feel valued. One unexpected side effect:

Participants got healthier!

(To encourage its use, a Brooklyn, NY health insurance company, Elderplan, accepts 25% of the premiums for its senior health programs in Time Dollars.

Ithaca HOURS were set at \$10, the average wage in the area. They issue physical currency in different denominations. And they publish a bi-monthly newspaper that advertises the products and services of people and businesses that accept Ithaca HOURS. The paper typically includes about 1,200 listings, including over 200 businesses. Advertisers can provide quotes in both currencies, e.g. \$10/hour, 60% in Ithaca HOURS, 40% in US dollar currency. (Paul Glover has a \$25 kit describing how to set up the system.)

By the year 2000, 39 “Ithaca HOURS” systems were fully operating.

The system is workable. The risk, the Ithaca Reserve Board has to decide how much currency to issue – or they could experience inflation. They also develop hour variances – e.g. an hour of a house painter versus an hour of a neurosurgeon.

Tlaloc, named for an Aztec rain god, is a mutual credit system in which the currency is issued in the form of paper checks. The checks have ...

endorsement spaces on the back, so the first user can endorse it for the next user, and so on. The last endorser brings the check to the center, where the last user is credited and initial issuer is debited. The system therefore has both mutual credit and paper currency. It requires only a personal computer to keep accounts.

Some complementary currencies are local loyalty schemes aimed at creating local employment; small businesses will be the major source of future employment. They make sense socially, economically and from a business viewpoint. Findings:

- Complementary currencies make possible transactions and exchanges that otherwise would not occur. This means in practice that more economic activity – implying more work and wealth – is being created than would otherwise be the case.
- Additional work and wealth is being generated where it is needed most, without need for taxes, government bureaucracy and without creating the risk of inflation in the mainstream economy.
- Small businesses can easily accept the currency, because they can spend it in the community, e.g. farmers using local harvest labor.

World over, we hear the same complaint ...

*“Things aren’t the way they used to be.
We used to have a better sense of community.”*

Consequences include vandalism against common property and criminality, particularly in the younger generation. The US social identity median has moved from the nuclear family to the single parent family; 51% of all US children live in a single parent home. In a recent survey of the priorities of the American population, the desire to “rebuild neighborhoods and communities” received the highest ranking for an astounding 86% of the population. Anthropologists have found ...

A sense of community is based on reciprocity in gift exchanges.

A commercial transaction is a closed system; you buy a box of nails from a hardware store and give them money. However, if a neighbor happens to have extra nails and gives them to you, that leaves an imbalance in the transaction that some possible future transaction completes ... such as asking you for a cup of sugar. A gift transaction creates something that the monetary exchange does not. A new thread has been woven into the community fabric. From the Latin ...

Cum means *together, among each other.*

Munus means *gift*, or the verb *munere*, to give.

Hence “community” equals ...

“To give among each other.”

In Japan, gifts often take the form of sharing one’s talents in art, calligraphy, culture or other social graces.

**It is not the monetary value of the gift that matters;
What counts is the intention, the quality of the personal touch.**

To unravel the community fabric, do the opposite of what created it. Communities break down when non-reciprocal monetary exchanges replace gift exchanges.

Governments support complementary currency systems at three levels of effort:

“Passive tolerance” is most common. *“It doesn’t break any laws, so let it be.”*

“Mildly supportive” – as in New Zealand and the US – has local governments funding and helping to organize complementary currency start-ups. Adding more police is proven, time and again, to not reduce crime. Throwing money at failing education does not remedy the problem. Nothing can replace a community where people watch out for each other, or where older children mentor younger ones.

“Strongly supportive” involves systematic funding for complementary currency initiatives that provide better social results at a lower governmental cost. The Japanese government is completely funding eco-currency activities, and is considering paying for the accounting and clearing systems for Healthcare Time Accounts.

The hard part of creating currency is not conceiving a new variation of complementary currency, or even starting it. The hard part is:

Having it accepted and used in a community.

As for all currencies, what is most needed is credibility; without it, nothing will happen. The most important factor to start a local currency is local leadership. Someone, or group, needs vision, entrepreneurial capability and charisma. The best leadership is when at the end people claim they did it themselves.

If a local currency does not tie into the national one, the unit that makes the most sense is the hour. The hour is a universal standard and almost all contemporary systems which do not tie their unit to the national currency are using it.

Two important reasons why a mutual credit system – backed by some commodity standard, such as gold – is preferable to a fiat system – backed by pure trust – particularly for systems designed to be scaled up or replicated in large numbers:

1. The amount of currency remains the same. As people engage in transactions in the opposite direction of their initial trade (e.g. someone who had a credit in one transaction, and uses the credit to purchase a good or service brings his or her balance back to zero.) This self-regulating feature is important, because it eliminates the most tricky and treacherous decision in currency management.
2. The second reason is strategic. Mutual credit complementary currencies do not pose such a threat, and therefore could grow in importance in time without interfering with central bank duties.

Historian Arnold Toynbee found two causes for the collapse of 21 past civilizations:

1. Extreme concentration of wealth; and ...
2. Inflexibility in the face of changing conditions.

The three ways to persuade people to engage in non-spontaneous behavior change:

1. Education and moral persuasion;
2. Regulation; and ...
3. Financial interest.

History shows whenever financial interests contradict regulations, financial interests usually end up the winners. When financial interests run up against moral pressure, the battle is often more difficult. Many people decide they either cannot afford, or do not care enough, to follow moral advice when it costs them something.

A 20th century pioneer, Duane Elgin, claims that humanity has always been at its best when its capacities are challenged to the maximum. We either radically and consciously change toward sustainability, in all regards, or we disappear like the great lizards did before us. The secret of the current shift is a succession of three waves, which overlapped in time around the turn of the century ...

1. A **Value-Shift Wave**, when modernist values are gradually commuted into values of the Age of Integration, where designs are done in an integrated environment, driven by incremental cost analyzers.
2. The **Information Wave**, which enabled unprecedented access to knowledge for vast numbers of people; and ...
3. The **Money Wave**, whereby new money systems complemented the old national currency system.

In the 1990s most people were only aware of the Information Wave. The media focused on it. In reality, all three mutations were already well on their way ... if we looked beyond the reports from officialdom. Finally ...

A continuously evolving money system operates simultaneously on different levels, from global to local. The advantage of a multiple-level money system is:

**Each activity is supported by the currency
best adapted to the circumstance.**

Convertibility among the different currencies is ensured on the Net whenever that is needed. The following table sets out the criteria for classifying the different currency types.

	Yang (masculine energy)	Yin (feminine energy)
Effects on Relationships	Scarce/ Competition inducing	Sufficient/ Cooperation-promoting
Manner of Creation	“Fiat”, created by a Central authority	“Mutual credit”, created by the participants themselves

Social capital is best nurtured by cooperation-inducing Yin currencies, while global industrial trade would be best handled by competition-generating Yang currencies.

Different currency types tend to induce different kinds of relationships among users. Where you want a cooperative, egalitarian, Yin type of relationship, use Yin type currencies.

They build social capital.

In contrast, trading with Yang currencies will tend to shape competitive hierarchical relationships, perfectly appropriate for certain business contexts.

They build financial capital.

Awareness of the need for “social capital” in a healthy society is growing. Cooperative currencies are simply a tool to foster it. In the Yang cycle, financial capital is fostered. The Yin cycle nurtures and develops social capital. Both types of capital – financial and social – are indispensable for human activity to flourish.

The goal of an Integral Economy is to create “Integral Wealth.” This is developed when all four types of capital – natural, social, financial and physical – are in balance. By confusing wealth with only financial capital, we risk believing we can deplete our natural or social capital indefinitely. Below a certain level of natural or social capital, financial capital no longer has relevance; a huge bank account in a wasteland of social disorder or ecological collapse is meaningless and worthless.

To achieve Integral Economy balance, four levels of currency are essential:

1. A Global Reference Currency
2. Three main Multinational Currencies
3. Some National Currencies
4. Local Complementary Currencies

Two Sustainability studies – “*Beyond the Limits*” and the Global Business Network’s “Sustainability” – showed that *both* value shifts and technological shifts are needed concurrently. After evaluating and modeling the relationships between global resources, population, industrial output and pollution, the authors concluded:

“The potential for technological innovations only buys time – there is still a collapse, but it is delayed until the middle of the 21st century. Radical behavioral and attitudinal changes are explored too, but it turns out that these alone are not enough either – there is still a crash in the mid-21st century. It is only when both these kinds of changes are applied together that a crash is avoided.”

This combination is happening. It’s an historically extraordinary shift in values in less than one generation. The “Cultural Creative” subculture is leading this Value-Shift Wave. The two types of Cultural Creatives are ...

- “Green” Cultural Creatives (13% or 21 million in the US) are concerned with environment and social concerns from a secular viewpoint. They tend to be public arena activists. They focus on solving problems “out there” and are less interested in personal change.

- “Core” Cultural Creatives (10.6% or 20 million) have personal evolution and green values. They are engaged in psychology, spiritual life, self-actualization, self-expression. They enjoy mastering new ideas and are concerned with social and ecological sustainability.

Another Duane Elgin study indicates this shift is happening globally ...

“Considered together, trends seem to indicate that a global paradigm shift is underway.”

The global population at large is everywhere ahead in the transition compared to both their official leaders and their media. Modernist opinion leaders, separately, often dismiss each of these trends, as a “quirk” or an insignificant “fashion.” However, when considered together, the pattern reveals a major shift towards Yin values in all aspects of society.

The pattern includes disparate concerns about:

- The environment;
- Physics chaos theory;
- Holistic health practices;
- The women’s equal rights movement;
- Bridging the Cartesian split between matter and spirit;
- And networks replacing hierarchical structures (Net & Virtual Organizations),

As a caterpillar evolves into a butterfly, civilization is in the dissolution phase. Imaginal cells use cybersphere to interconnect outside traditional communication channels. Sustainable Abundance, as the butterfly, is an available outcome.

Another factor affecting modern world sustainability ...

x5 The Internet

Somehow, it will likely still be with us ... though it may evolve with better and better features. English seems to be the language of the world, boosted largely by computers and the Internet. It’s the second language in India, China, most of Europe, and even in little Himalayan countries such as Nepal or Bhutan. There is a global feeling that to be part of the modern world, you need to know English. The Internet enables us to secure data and commodities from anywhere ...

- In addition to research data, a huge number of international newspapers are available on-line, free.
- We can travel anywhere, as virtually all transportation and lodging is available on the Internet.
- We can buy products from anywhere, and have them come to us via any number of carriers.

The Internet is melting national boundaries – which creates headaches for governments looking to collect taxes, or control information. But it seems to be an irreversible direction. As civilization sustains and continues, future communities will likely be “connected,” hence, we have reinforcement of an earlier quote ...

“Think globally, but live locally.”

And the final “sustainability” dimension for which research was done, is ...

x3 Infrastructure

This dimension concerns power, water, wastewater collection and treatment, solid waste management, recycling, etc. ... the enabling physical environment. Trends in all aspects of infrastructure have been moving towards smaller, decentralized systems. Equipment should be more and more readily available. However, the issue is not just generation; storage is often the bigger issue ...

- A clear day with PV panels generates power – but someone does laundry in the evening, watches TV, etc.
- It’s windy all night, but everyone’s asleep; not much power needed.
- It rains all night ... as everyone’s asleep; not much water needed..

Power is readily created. Stanford completed a survey of over 8,000 sites around the world, to determine the potential for wind power. They found the world has more than enough ability to satisfy all power needs with wind alone, including room for growth. It’s also reputed to be the least expensive form of power generation, if nuclear includes the cost to produce the rods and dispose of waste.

Projections that “alternative sources” might contribute 3% or 5% have no foundation in fact, whatever. Some northern European countries are already generating half or more of all their power with wind machines.

In the U.S, both Warren Buffet and T. Boone Pickens have announced multi-billion dollar commitments to develop wind farms. Mr. Pickens, asked if he was doing it as a way of supporting sustainability or as a way to make money, responded ...

Money!

Wind machines will likely continue to sustain a huge rate of growth.

Photovoltaics are dropping in price per amount of power provided. The panels are now backlogged over five months, suggesting public concern for increasing oil prices. The panels are also becoming more and more efficient. And they continue having a huge rate of growth, (though most growth is in Japan, then in Europe.) And tidal power may be the most promising yet. The biggest problem in power is ...

Storage. People need the power "whenever." Pittsburgh, for example, generates huge amounts of hydropower. But – the amount of power is the same, hour after hour, while demand fluctuates. They use excess power – such as exists during the night – to pump water to a reservoir. As demand increases in the morning, they release water through turbines. It's a good way to match supply with demand. But – small communities can't build giant reservoirs.

How to enjoy power availability when the sun's down and there's no wind?

Batteries work, but are questionable as a long-term solution. They're expensive, have a 5-10 year life, use some toxic materials, and may not be as available, long term. While hydrogen fuel cells are touted as the savior source, they're really only a means of energy storage, not a "source." One basic law of physics is:

"Energy in = Energy out."

How to create hydrogen?

Electrolysis, used for pulling hydrogen from water, is only 38% efficient. Using fossil fuels would require over 2½ times the energy we now spend – which makes no sense. Some companies (in Canada & UK) are working on small units that use solar power to create the hydrogen. Storing the hydrogen is doable, but not easy ... as it's the smallest element.

Generating power from hydrogen does work nicely.

So – the jury is still out on power storage. Perhaps batteries, short-term, then solar-produced hydrogen when available. Batteries are now 100% recyclable. Some extremely good batteries, made in Canada, should serve our storage needs nicely. And many research efforts are currently under way to improve batteries. Also ...

Purdue University just produced a device that converts waste – organic and inorganic – to electricity, with a bi-product of ash that can be used in the soil. Such a device could lead to a reduced need for batteries, as well as provide a means of solid waste disposal. Just turn it on when the sun's down and there's no wind.

Water will depend on geography. The first Garden Atriums use cisterns, which provide more than enough water. A community might share a giant cistern, which would be a reservoir. Ultra violet irradiation and Reverse Osmosis filters can be used as water enters a house, eliminating the need for buying bottled water.

Hose bibs and toilets use the most water in a home. Moving away from grass lawns to landscape materials not requiring constant watering has a big impact. Moving to one of several brands of waterless toilets will also help – if people are ready to make that transition. (If not, use water, as the other could hurt sales.)

A community in a hilly area might opt to create a small reservoir for storing both rainwater and power. A hilltop pond also has recreational and aesthetic potential.

Community-sized wastewater systems are readily available. The positive outcome: gray water for agricultural irrigation; sludge for compost ... for food and gardens. Some intriguing perceptions and water management systems come from “*Growing Clean Water*” by Dr. B. C. Wolverton and John D. Wolverton ...

- The 21st century will feature buildings having their own microenvironments, with natural ecosystems to treat waste and purify the air.
- Less than 0.1 percent of all available fresh water remains for lakes, creeks, streams, rivers and rainfalls. It’s enough to meet our needs – but – it must be used again and again.
- Until the 20th century, the world’s population took some 600,000 years to reach 1.6 billion. Since then, it has increased to over 6 billion. By 2050, 4 billion people will likely lack sufficient water.
- Toxins are also more prevalent in water than ever before. Because of multiple exposures to synthetic chemicals on a daily basis, it is nearly impossible to identify specific substances associated with cancer. Unheard of until the last century, cancer is now the leading cause of disease-related death among children in the U.S. Childhood cancers are rising at the alarming rate of approximately 10 percent each year! In 1876, less than one third of one percent of Americans died of cancer. Now, over 500,000 annually die of cancer.
- Making use of treated or partially treated water must become common practice. Nature has proven its innate ability to cleanse itself. The harnessing of these powers is a use whose time has come.

Studies have shown that aquatic plants – such as bulrush, duckweed, water hyacinths, cattail and reed – excrete a variety of substances that act as bactericides, fungicides and algaecides. While substances excreted from plant roots kill pathogenic bacteria, they are not harmful to microflora commonly found in the rhizo-sphere. In this way, domestic wastewater can serve as a complete hydroponic fertilizer for growing such vegetables as cherry tomatoes or green beans.

Tertiary level wastewater treatment has resulted after only seven days. Phytotechnologies can be a viable wastewater treatment option, while also producing valuable bi-products such as: crops; animal feed; and raw materials for industrial manu-

facturing applications. Nature has provided the means for us to treat our waste with a safe, economical alternative to engineered mechanical systems.

Technically, septic tanks of appropriate size enable solids to settle to the bottom. The fluid flowing from those tanks then passes through “rock/plant” filters ... long channels sized for the volume needed. 12 inches or less of wastewater is covered by 406 inches of rocks. The plants grow without soil. A wastewater contact time of 48 hours can achieve tertiary level treatment.

Thanks to the U.S. space program, which fostered this NASA research, this system of natural wastewater treatment is emerging as the method of choice for small towns and communities all over the world. And the system’s cost?

Only about one fourth the cost of a mechanical system.

It also operates at a fraction of the cost of a mechanical system, and provides valuable crop assets.

Solid waste management and recycling systems already exist. It needs less innovation – other than adaptation for small communities. County planners usually indicate that whatever passes the state’s health department is just fine with them.

Barker & Erickson cite two technologies that are relevant for waste treatment ...

1. Clivus Multrum. Waterless toilet that converts household (kitchen and bathroom) waste into compost and fertilizer right at the house. Kills pathogenic bacteria so can be used for enriching gardens. Mainstream residents may not be ready for waterless toilets, however, no matter how good.
2. TDP. The Thermal Depolymerization Process makes “waste” products into energy assets. Invented by Changing World Technologies, in Philadelphia, it can convert any carbon-based waste into burnable gas, fuel oil, and minerals suitable for manufacturing. It works with old tires, knocked down houses, old computers, and organic waste. Devices for using trash to produce fuel may eliminate the need for batteries, for nighttime power.

Composting reduces waste disposal and contributes to the agricultural operation. The problem: people are lazy. Placing waste that can be composted into a container (e.g. a pail) must be easy, such as a bin at the kitchen sink. People won’t carry the pail a block or two. It may have to be gathered by a “compost collector” who goes house to house, accesses the compost bin from outside the house, and swaps a clean one for a full one. The easier it is, the more people will participate.

Recycling needs to be made about that easy, as well.

Pulling all these dimensions together, here’s the start of an emerging picture ...

Summary

When the first Garden Atrium site is complete, we should have seed money to begin the next venture. At \$9-11,000/acre, a farm of 65-80 or so acres will run about \$1 million. That's enough land for 150 people, in 68 homes. Following the "Rule of 150," it's large enough to provide for population diversity, and small enough to be manageable, for a prototype effort.

The vision includes: Clustered homes; a village surrounded by farmland; homes with PV power; on a hill, the community may have a wind machine and small reservoir; and a pond at the bottom stores water, and is used for aquaculture. (Aquaculture people prefer three ponds, so that any sick fish can be isolated.) Also ...

Water features can be used for recreation – gazebos, canoes, etc.

Coming from off-site, residents and their guests need to be able to drive to their homes – with garages and on-street parking – as that's what they expect. Movement within the village would be walking, biking, and – where needed – electric carts. Movement in the agricultural area would be by foot, electric cart (or horse.)

The community might eventually have a small fleet of vehicles, which can be "leased" hourly to residents. Most would be electric. A truck might be needed for hauling. Leased vehicles can be depreciated (via a non-profit homeowner's association,) further reducing costs to residents. To stay "normal" ... this comes later.

Recreational uses can be made of lanes between crops as well as the hillside. That accommodates walking, jogging, horseback riding and biking. Some site areas can also be designated for recreation, such as tennis or basketball courts.

The inn must be an easy walk from any home, ¼ mile maximum. The village center needs "uses of interest" – which need to be defined by the residents. The decision process needs full participation in a consensus-building system. However ...

The village is not large enough to support a Starbucks. The best way to create a gathering place and a way for residents to have additional guest rooms available, when needed, may be a "Country Inn." The Inn would likely have 6-8 sleeping rooms, a meeting room or two – for use by residents for short courses, weddings or holiday celebrations – and dining facilities, for guests and community residents.

The food facility provides a gathering place for mornings or evenings, a place for Sunday brunch, or even a place for dining out when residents don't feel like cooking. The Inn might also advertise to outsiders, as a true country experience, with farm, can be a delightful weekend get-away for people living in nearby cities.

The Inn needs to provide a space for sundries and small convenience services, such as a dry cleaning drop-off and pick-up. Having guest rooms at the Inn enables peo-

ple to buy a smaller, more affordable home. They can have two bedrooms instead of three or four, knowing that guest rooms are available with a two-minute walk. They also don't have to heat or cool or clean rooms that are only used a day or two a month. And the Inn can simply charge guest costs to the resident.

Many guests actually prefer their own accommodation, after a day of visiting.

Recalling the importance of aesthetics, physical designs need an elegance that suggests:

“Sustainability” is a lot more than “survival.”

Designs can be expressed through architecture, through delightful walkways, and through commanding gardens and ancillary features. In John W. Reps' *“The Making of America”* comes a description of open spaces ...

*“In the layout of gardens we find the same techniques Renaissance architects advocated for the design of new towns and the reconstruction of old. The use of major and minor axes, the introduction of buildings, fountains, or statues as terminal points of major circulation routes, **the planning of open spaces at intervals, to add interest and variety** – these features were shared by town and garden design.”*

According to J. B. Jackson, a foremost scholar of the American landscape ...

“In the last generation we've lost the assurance and capacity, or the temerity, to contrive Utopias. It's no use trying to resurrect vanishing forms, beautiful though they may have been; their philosophical justification is gone. All we can do now is produce landscapes for unpredictable men where free and democratic intercourse of the Jeffersonian landscape can combine with the intense self-awareness of the solitary Romantic.”

Bottom line, as people experience the community, they need to conclude ...

“This feels like a great place in which to live!”

In a sense, the community needs to be an *inspiring* environment in which to live. It needs to convert the fear – that Peak Oil spin-offs will trigger – into positive energy. The site needs a vista ... a view that gives it a sense of “place” ... the place to be.

This second-generation sustainable development may be even more of a departure from “the usual” than the first. Regardless of how well everything works, or how glorious everything looks, we're back at Square #1, trying to attract Cultural Creative Early Adapters. The test needs to occur in a geography that is experiencing growth – which leaves the northern states out, except for a city that has immigration. For example ...

- The corridor along U.S. 29 from Charlottesville to Washington, D.C. has in-migration that should continue for years, and a fairly progressive attitude. Charlottesville has an airport, a train station, several medical centers and universities, and is two hours from Washington, D.C.
- Eastern West Virginia and the eastern Pennsylvania hills – not far from Hagerstown, Maryland – offer similar in-migration and amenities, due to proximity to Washington, D.C. and Baltimore.

The biggest questions, then ...

How to test the vision's marketability?

What features would make it *more* marketable?

One idea, from Jeremy Heyes of WATG, the world's leading planner and designer of resort and leisure developments ...

"The project needs an established and respected brand. For example, if it carries the name Ritz-Carlton, people will instantly see all the innovations as positive and well done. Plus – a resort operator knows how to run reservations, food service, concierge services, housekeeping and maintenance, etc. And – they could rent unsold spec houses, by the day, week or month ... until they are sold."

Because the effort is new and therefore untested, any simulations or methods for increasing the odds of success and/or reducing risk are welcome ... and essential!

One pragmatic question for making a sustainable community real, and a critical question for selling this model of sustainable living is ...

Who will make a (fairly high-end) buying decision now, based on likely (but not guaranteed) future events?

James Smith, a health economist at the RAND Corporation, surveyed research related to longevity. The only factor he found to consistently parallel longevity – regardless of income level, race, ethnicity or nationality – was the level of education.

"You have to be willing to do something that is not pleasant now, and you have to stay with it and think about the future."

People with less education seem less able to think ahead, where education may somehow teach people to delay gratification. In sustainability, by the time the supermarket no longer has any fish, or by the time oxygen levels drop too low to support healthy living, conditions may be irreversible. While it seems unfair to target demographic groups with greater levels of education, the people most likely to be buyers of a new concept in sustainable living will be those with more education.

Seeking geographies in which the education levels are higher – or university campuses that have sufficient land for agricultural research – may make more sense.

At this point, you have a sense of an hypothesis that seems to make sense for providing a living environment that is both sustainable and enriching. Here is where the research began to go off the “deep end” – though still relevant to sustainability.

From physicist Dr. Ervin Laszlo’s *“The Chaos Point,”* he sees current civilization – the industrial civilization – coming to a close and evolving either into a new level of civilization, or ... to a breakdown of society. For instance ...

The Window of Decision, 2005 – 2012, is the third phase in what appears to be a regular evolution that mankind has gone through, from era to era. In his words ...

“The dominant social order is stressed by radically changing conditions that place in question established values, worldviews, ethics and aspirations. Society enters a period of ferment. Now the flexibility and creativity of the people create that subtle but all-important ‘fluctuation’ that decides which of the available paths of development society will hereafter take.”

The Chaos Point, 2012, is the fourth and final phase ...

“The processes initiated at the dawn of the nineteenth century and accelerating since the 1960s build inevitably toward a decision-window and then toward a critical threshold of no return: the Chaos Point. Now a simple rule holds: We cannot stand still; we cannot go back; we must keep moving. There are alternative ways we can keep moving forward. There is a path to breakdown, as well as a path to a new world.”

Adding to that pattern ...

“The central bankers know that the alternative to a gradual if painful adjustment is the radical step of switching to another reserve currency. If they do, the U.S. would no longer be able to finance its deficit in dollars, and the American economy would face a shock similar to that which led to the collapse of the Argentine economy. This would have worldwide repercussions.” (Complementary currency seems needed.)

And ...

“The IMF’s 2005 ‘Economic Outlook’ noted that it is no longer a question of whether the world economy will adjust, only how it will adjust. If

measures required for a gradual adjustment are delayed, the adjustment will be 'abrupt.' It will be a part, or perhaps a trigger, of the Chaos Point faced by the entire world economy."

Then Laszlo looks at what's needed in the way of a transformation ...

"Einstein was right: the problems created by the prevalent way of thinking cannot be solved by the same way of thinking. This is a crucial insight. Without renewing our culture and consciousness we will be unable to transform today's dominant civilization and overcome the problems generated by its shortsighted mechanistic and manipulative thinking.

"We know that a viable new civilization must evolve a culture and consciousness very different from the mindset that characterized most of the twentieth century.

- *"Extensive growth moves along a horizontal plane on the surface of the planet: It conquers ever more territories, colonizes ever more people, and imposes the will of the dominant layers on ever more layers of the population.*
- *"Intensive growth, on the other hand, centers on the development of individuals, and of the communities and ecologies in which they live.*

"Extensive growth generates unsustainability: it drives the world toward chaos. Intensive growth could produce sustainability: it could drive contemporary societies toward a new mode of functioning – a new civilization.

"The paramount end of extensive growth can be encapsulated in three "C's" ...

"conquest, colonization, and consumption".

"In intensive growth, the end is very different. It can be grasped under three other "C's":

"connection, communication, and consciousness."

"Evolution focused on the growth of connection, communication, and consciousness could create a fundamental shift in the civilization that dominates life on this planet. It could drive the next transformation in a positive direction, from Logos to Holos."

The factors that have evolved in considering a community that can live sustainably – but live well – seem consistent with Laszlo's views. All the more reason that such a development needs to be attempted. And the time to act – or not act – is at hand.

“We can also make clear that abiding by a universal morality does not entail undue sacrifice. Living in a way that enables all others to live as well does not mean being self-denying.

“We can continue to strive for excellence and beauty, personal growth and enjoyment, even for comfort and luxury. But when we are guided by universal moral principles, we define the pleasures and achievements of life in relation to the quality of enjoyment and level of satisfaction they provide, rather than in terms of the amount of money they cost and the quantity of materials and energy their production and use call for.

“In 1968, when Robert Kennedy was running for the presidential nomination, he said ...

*‘Some men see things as they are and say, why;
I dream things that never were and say, why not.’*

“To dream the world as you wish to see it is never just to indulge an idle fancy. Today, living in a window in time that decides our future, it has more relevance than ever.

“Margaret Mead said ...

‘Never doubt the power of a small group of people to change the world. When you evolve your consciousness, you have the power to change the world. Nothing else ever has.’

“Mahatma Gandhi was even more insistent ...:

‘Be the change you want to see in the world.’

“They were right.

“Why is consciousness so potent? The explanation is at hand: In a decision-window, even small “fluctuations” can change the destiny of the system. A fluctuation in the form of a more evolved consciousness is particularly powerful. A more evolved consciousness means new thinking, and is the key to a new civilization. A new civilization, in turn, is the key to well-being, and even the survival of humankind.”

While the initial motivation behind this second sustainable housing venture was physiological sustainability – food, clothing and shelter – the research involved in developing the idea has carried the initial thinking way beyond its original intentions. And, somehow, all this thinking fits astonishing well with the kind of thinking embodied in Laszlo's work – unusual for a physicist using wave theory. But ...

The need seems unquestionably there, and strikingly immediate ...

“At a decision-window, individuals can consciously create the small but potentially powerful fluctuations that could ‘blow up’ and decide the evolutionary path their society will adopt. They can tip the system toward the evolution that is in line with their hopes and expectations. Thus, the Chaos Point need not be the harbinger of global breakdown. It could be the herald of a leap to a new civilization.”

If “evolved consciousness” is essential in this coming evolution, how, specifically, do we turn that ideal into a reality? And ...

What is “evolved consciousness,” anyway?

Addressing a joint session of the U.S. Congress in February of 1991, Vaclav Havel, then the president of Czechoslovakia, said ...

“Without a global revolution in the sphere of human consciousness, nothing will change for the better ... and the catastrophe towards which this world is headed – the ecological, social, demographic, or general breakdown of civilization – will be unavoidable.”

This scenario can be avoided. Human consciousness is already evolving. Adapted from *The Chaos Point* are ten benchmarks of an “evolved consciousness” ...

1. Live in ways that enable all other people to live as well, satisfying your needs without detracting from the chances of other people to satisfy theirs.
2. Live in ways that respect the lives of others and that respect the right to the economic and cultural development of all people, wherever they live and whatever their ethnic origin, sex, citizenship, station in life, and belief system.
3. Live in ways that safeguard the intrinsic right to living and to an environment supportive of life for all the things that live and grow on Earth.
4. Pursue happiness, freedom, and personal fulfillment in harmony with the integrity of nature and with consideration for the similar pursuits of others in society.

5. Require that your government relate to other nations and peoples peacefully and in a spirit of cooperation, recognizing the legitimate aspirations for a better life and a healthy environment of all the people in the human family.
6. Require business enterprises to accept responsibility for all their stakeholders as well as for the sustainability of their environment, demanding that they produce goods and offer services that satisfy legitimate demand without impairing nature and reducing the opportunities of smaller and less privileged entrants to compete in the same marketplace.
7. Require public media to provide a constant stream of reliable information on basic trends and crucial processes to enable you and other citizens and consumers to reach informed decisions on issues that affect your and their life and well-being.
8. Make room in your life to help those less privileged than you to live a life of dignity, free from the struggles and humiliations of abject poverty.
9. Encourage young people and open-minded people of all ages to evolve the spirit that could empower them to make ethical decisions of their own on issues that decide their future and the future of their children. And ...
10. Work with like-minded people to preserve or restore the essential balances of the environment, with attention to your neighborhood, your country or region, and the whole of the biosphere.

Some of these ten benchmarks are likely qualities that will emerge from the kind of sustainable community being envisioned. Some – such as controlling a larger government, businesses or the media – are clearly beyond the purview of a small community ... though residents can certainly be advocates and attempt to influence. Even so, an “evolved consciousness” seems a difficult trait to measure ...

“Are we evolved yet?”

Dr. Anne Adams’ research provides additional guidelines for helping people develop an “*evolved consciousness*,” beginning with a definition provided by Allan Combs ...

“The ability to enter into cooperative exchanges with others while retaining a complete and developed awareness of one’s own individuality.”

Both individual and collective goals need to be acknowledged and honored. More specifically, here are four “domains” of consciousness; each one needs to evolve:

1. Consciousness in the Physical Domain.

This aspect of consciousness is discernible in the relationship a person has with his/her own body. There is a relationship – a depth of knowing, feeling and appreciation; a partnership. There is “communication” occurring throughout the body; one “listens” to the body’s cues and requirements and respects its messages. Physical awareness is a dynamic, direct and interactive relationship with life – not only a conceptual “knowing about.”

2. Consciousness in the Emotional Domain.

Consciousness as awareness, attentiveness, knowledge, understanding and “presence” shows up in the emotional domain as deep connection – an individual with himself or herself; with his/her family, community, peers, friends, teachers, etc. Being known, loved, listened to, respected, and self-expressed, etc. allows a human being to be present and engaged in his/her life. Being “emotionally conscious” ...

... also manifests in the ability to demonstrate plasticity and “dance” with many different kinds of people and anticipate situations and their possible consequences.

3. Consciousness in the Mental Domain.

Consciousness as awareness, attentiveness, knowledge, understanding and “presence” makes itself known in the mental domain as a natural expression of being human. When human beings are given the opportunity to discover their own relationship with learning, through their own unique ...

Passion
Choices
Curiosity
Expression
Experiences
And embodiment ...

... their consciousness expands as a result of their “presence” throughout the learning process. Consciousness is seen in mental intelligence as a high level of flexibility and ease of engagement exhibited in the way ideas are interconnected. Awareness expresses itself through contextual thinking; how individuals discriminate, interpret, draw conclusions and communicate; their ability to see larger patterns and grasp the “whole picture” and honor the interconnectedness of all life.

4. Consciousness in the Spiritual Domain.

Consciousness as awareness, attentiveness, knowledge, understanding and “presence” appears in the spiritual domain in the quality of meaning, purpose and values an individual creates for his/her life. A spiritually aware person embodies the interconnectedness of all life and sees himself or herself in relation to a larger world, connected with themselves, others, and nature.

Educating for an evolved consciousness would provide experiences in each of the spheres of intelligence that are interwoven from the beginning of life.

Most of Laszlo's ten qualities for an evolved consciousness can be readily supported with the concepts built into this new sustainable community. Achieving an "evolved consciousness" in these other four ways may still be a matter of question.

Dr. Laszlo, a physicist, evolved many of his projections and conclusions based on wave theory. As variations from a norm occur, pressure increases for a return to what was normal ... stasis. However, if a variation goes far enough "out" ... a whole new system begins ... which is precisely what Laszlo sees happening in 2012.

Another source, which reinforces Laszlo's work, comes from Lawrence Joseph's "Apocalypse 2012." Joseph's approach involved identifying totally independent sources that project the same 2012 time for the beginning of the next era for mankind. In fact, the specific date, 12/21/12, surfaces from many disparate sources ...

From the Mayan calendar ...

"The year 2012 is a seam in time, the juncture of two different ages. Death, possibly a great deal of it, will be part of that transition."

"The change will be gradual, more like the deepening of twilight than the flick of a switch."

"The First Sun began approximately 20,000 years ago, was dominated by female energy and related to the fire element. The Second Sun was characterized by male energy and related to the earth element. The third Sun was characterized by female energy and related to the air element. The Fourth Sun that we are just now completing has been dominated by male energy and related to the water element. On 12/21/12 we will enter the Fifth Sun, in which the energy is balanced between female and male. Related to the ether element, the Fifth Sun brings with it a subtler wisdom."

From Juan Manuel Mendosa, a Mayan spiritual leader ...

"2012 is very important because it is a time when the elders from the past will return to make a communication between the heart of humanity and the heart of the Earth. It's the beginning of a new era of peace, harmony, love, and union. But at the same time there exists the possibility for manipulation. Evil enters where there is space for it to squeeze in. In order to defend against evil, we have to do a lot of ceremonies to determine the right path."

From South African psychic, Anne Stander ...

“... a rise in seismic and volcanic activity, particularly along the western edge of the Pacific rim, from Alaska on down through California and Mexico. The peak will come in 2011, a reminder that 2012, though clearly the target date, will not pop out of the void but rather will culminate a range of cataclysmic processes. I have said before that we need to worry about 2011, because all the signs will be there to let us know what 2012 has in store for us. The number 2011 brings a bigger danger of pain than 2012.”

I said previously that the research started going “far out.” When this happened, I searched for additional sources, looking to either support or verify or further explain – or contradict – these unexpected “sustainability” dimensions.

From Michael Drosnin’s “Bible Code” ... an unusual decoding of the Bible that has listed names of legendary people who came centuries after the Bible was written ...

“... comets are expected to pound the Earth in 2010 and also 2012 at which point the ‘Earth annihilated’ prediction comes into play. ... analysis also unearthed the phrases ‘It will be crumbled, driven out, I will tear it to pieces’ near the 2012 comet, though that could be a mixed blessing, causing the Earth to suffer multiple major impacts, potentially more damaging than one big blast.”

What changes are forecast as a result of the 2012 – or 12/21/12 – events?

From clairvoyant Edgar Cayce, reading 3976-15, January 19, 1934 ...

“As to the changes physical again: The Earth will be broken up in the western portion of America. The greater portion of Japan must go into the sea. The upper portion of Europe will be changed in the twinkling of an eye. Land will appear off the east coast of America. There will be upheavals in the Arctic and in the Antarctic that will make for eruptions of volcanoes in the torrid areas, and there will be shifting then of the poles – so that where there has been those of a frigid or the semitropical will become the more tropical, and moss and fern will grow.”

From Joseph Michael Levry, a Kabbalah scholar ...

“The old world will be laid low in order to make way for the building of the new world of spiritual, collective consciousness with universal love at its core. The political map will be altered. There may even be a change in the geophysical stability of the world. All will come to understand that the new age that emerges, along with the devastation that

came before it, was a necessary purging so that humanity could transform.”

From V. I. Vernadsky, a Russian planetary ecologist ...

The noosphere is the mental layer that encases the planet, the sum of all our thoughts and memories as they continue today. Developed with Pierre Teilhard de Chardin, the French paleontologist and philosopher of cosmic consciousness, the noosphere is considered the product, the wellspring, or both, of all the minds on the planet. Psychic communication can be understood as navigating the noosphere.

And from the Mayans ...

“The elders say we need to be returned from machines to humans. We must transform our curiosity into real purpose, of serving each other and Mother Earth.

“Humanity is still in its infancy in its ability to empathize with the feelings of people far away. Nonetheless ...

“... such empathy is crucial for the survival and transcendence of the species, which is why this skill is part of the coming reckoning.”

Change is coming

In fact, change is already happening.

The question is: Where do we, as a nation or world, want to go?

From “*Chaos Point*,” “*Apocalypse 2012*” and other readings, major change forecasts seem consistent and immanent. Whether from volcanic activity, tsunamis, earthquakes, comets or finances ... major problems seem in the offing. The good news:

Virtually every source sees the trauma signaling the end of one era of humanity, followed by the beginning of a new – and very positive – age of evolution of our species.

These likely major and immanent upheavals and changes do beg the question ...

Does this “sustainable development” have any meaning, really?

Seen in the broader perspective that’s evolved in the course of this research – well beyond heating, cooling, electricity, water, air quality and other physiological factors – I sense the answer is ...

“Yes.”

This community may help people evolve in ways that are appropriate to what is unquestionably coming, and what seems to be a whole new era for our human evolution. The question, from a development perspective, is ...

*“In the context of likely upheavals,
how can this sustainable development succeed?”*

Creating smaller, more affordable homes may have special sales and financing advantages. The entire community, including the utility systems, may need to be created in “pay as you go” phases, which diminishes indebtedness. Smaller units may be able to be purchased with no mortgage whatever. Pre-sales provides development capital, reduces or eliminates indebtedness, and ensures more sales for the first phase. Once the farm, inn, and initial homes exist, the rest can grow incrementally, to control risk exposure.

(We’re a long way from light bulbs and power budgets, now!)

Following the guidelines surfaced in the course of this research, living in this community should help residents achieve the transition that seems essential to our ability to sustain. The community can also serve as a model ...

... an idea from which to learn, and that can be copied and modified by others, so that sustainable living can evolve and grow.

One final thought ...

We’re in a time of major change. Old systems – and leaders of those systems – no matter how dysfunctional they’ve become, don’t die without a fight. And – it’s all we know. It’s what we depend on. Change brings with it high levels of uncertainty. And uncertainty and anxiety can give rise to ...

FEAR!

Roosevelt was right: The only thing to fear is fear itself. We need to see the coming changes as ...

A magnificent opportunity!

We need to follow all the logic that says, sustainable living is truly what we need. And we need to see this evolution as much more than ways to provide food, clothing and shelter. We really need to have the courage to “go with the flow” that seems to be unquestionably happening, and to realize a ...

**Better quality of living
than we could have ever imagined!**

Neil Armstrong's famous words, upon stepping down onto the moon's surface for the first time, "*One small step for man; one giant leap for mankind,*" symbolized a great moment for our entire planet. Learning to live sustainably, in the full sense that's evolved and has been described here, seems to be a truly new frontier, and might be seen as an even more momentous leap for our entire human civilization.

And that's "Sustainability."