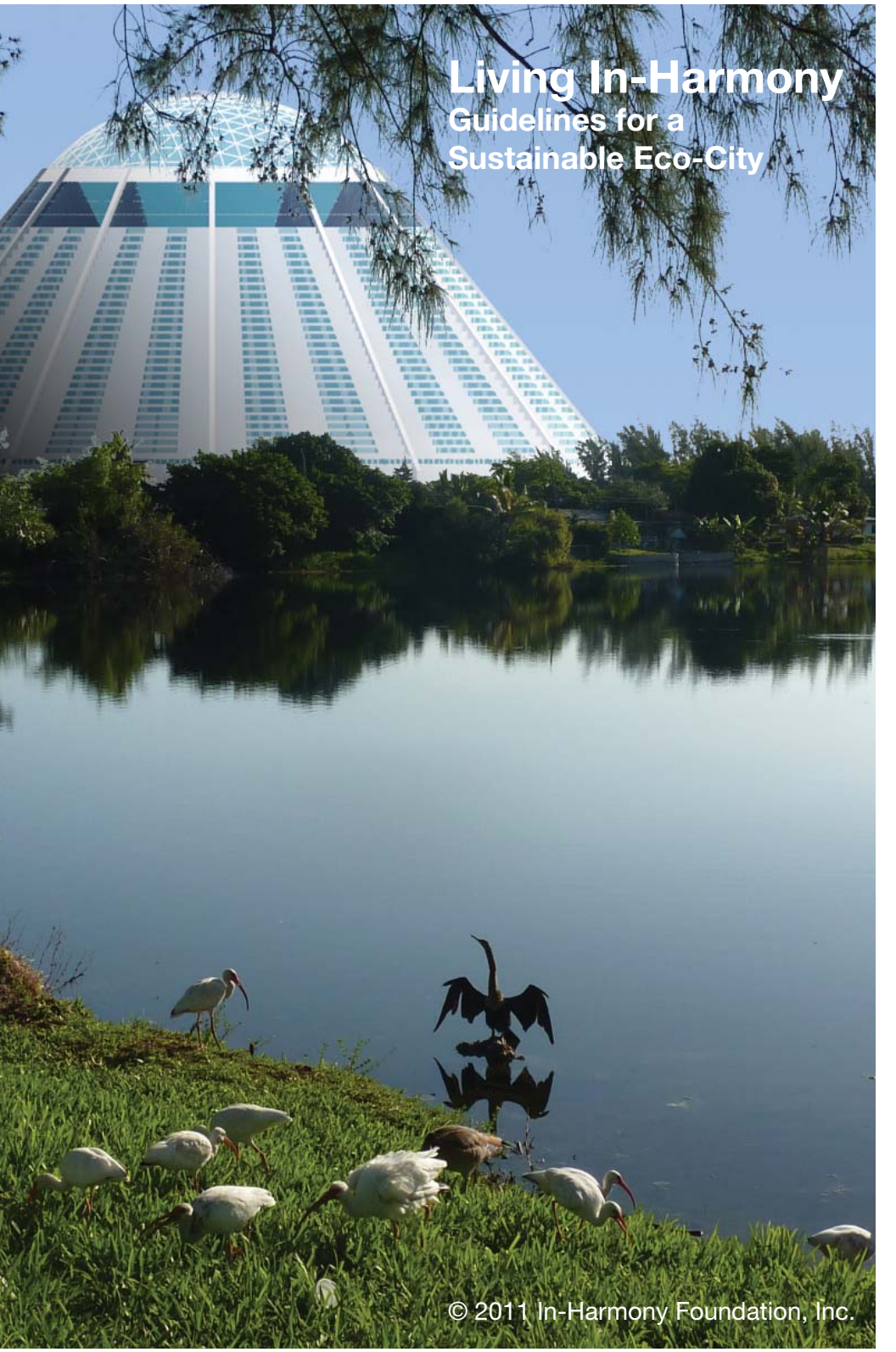

Living In-Harmony

Guidelines for a Sustainable Eco-City

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Guidelines for a Sustainable Eco-City

by Robert Daniels, Exec. Dir.
In-Harmony Foundation, Inc.™

INTRODUCTION:

A BOMB IS TICKING DOWN! When it explodes, life as we know it will never be the same. It is an environmental bomb of resource depletion, pollution and a worldwide population pushed to the limit of stress and frustration.

Now is the critical time to start building Sustainable ARC Cities™. Living in a Sustainable City that follows the Guidelines of the In-Harmony System℠ will create safety and security in times of resource depletion, food shortages, power failures and social turmoil! In addition, they will be fun and convenient to live in.

This unique new system changes the age old patterns of humans living in one or two story building connected by roads. Populations have increased to billions with consumption patterns in our modern cities going beyond the limits of natural replenishment. Humans are draining the Earth of its Life Force!

We are at a critical time in human history where continuation of our present consumption patterns will cause worldwide collapse for more than thirty different reasons. We need to re-organize our lifestyle to manage these precious resources with an exploding population. The Sustainable City approach, described herein, is the most comprehensive solution yet conceived to solve humanity's current and future problems.

Even though we haven't yet expereienced these shortages, they are rapidly approaching (see Appendix - Section VI). Many of these Resources will be disappearing within 15-25 years. Before they are gone, prices will inflate radically to reflect their scarcity. It is very important that we must start now to find alternate ways to run our civilization!

I. WHAT IS SUSTAINABILITY?

There is tremendous confusion, distraction and deviation about what is Sustainability and Sustainable Development. Before we talk about what is a Sustainable City, we need to understand what these words mean.

WHAT IS SUSTAINABILITY?

A. Defined- "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs". (UN-Brundtland Commission 1987)

B. Sustain – to continue, to maintain, to nourish

C. Sustainability - to sustain in continuity

D. Sustainable Development – To create or meet human levels of need that does not disturb the environment's ability to naturally regenerate and its ability to naturally assimilate materials back into the eco-system. All Sustainable development must improve the overall status of the near and far environment

E. Sustainable Cities –
   1. It must balance these actions: Social, Economic, and Environmental.
   2. It must be able to guarantee the continuation of life within its ecological boundaries for all its citizens.
   3. Must unite its citizens to work together to survive in a changing world.

II. PROVIDING THE BASIC NEEDS

A. Safety – City is designed to eliminate almost all unsafe conditions

1. Prevention of accidents from trip and fall
2. Entrances monitored for infectious disease
3. Air Safety
   a. Air flow exchange rates correct
   b. Fresh air ventilation when possible
   c. Smoke Free environment
   d. Filtration and Purification of air-borne germs
   e. Temp & humidity control of interior
4. Water Safety
   a. Drinking and bathing water is purified
   b. Wash sink water is disinfected
   c. Kitchen water is purified and filtered
   d. Laundry water is filtered and re-used
   e. Industrial Water shall be processed separately in its own recycling system
5. Sanitation
   a. All waste will be recycled on-site into mulch for plants and soil
   b. All areas of the building and outside will be kept free of trash and waste
   c. Keep soils naturally healthy to eliminate e- coli, staphylococcus and streptococcus
6. Fire Safety
   a. Max. occupancy throughout the building
   b. Proper fire exits and signage
   c. Built with 4 hour rated fire protection
   d. Smoke evacuation ventilation systems
   e. Fire alarms with central monitoring
   f. Fire extinguishers in proper locations
   g. Training of fire crews and inspectors
   h. Fire drills periodically conducted
7. All mechanical & electrical equipment shall meet ASHRAE codes
8. All chemicals in the city are bio-degradable

B. Safe and Strong New Living Environment

1. Live in a new Mega-Structure building
   a. Structurally designed to resist earthquakes, hurricanes & tornados
   b. It is designed to last hundreds of years
   c. The City is adaptable with moveable interior walls
2. Live unaffected by inclement weather

C. Security

1. People have the "Right to Security"
2. Security is the degree of protection against danger, damage, loss, and criminal activity provided by the community
3. Children are secure from Predators and Gangs
4. Security cameras notice all activities in common areas
5. Law and order maintained by militia and police
6. Perimeter walls for protection from intruders

D. Food Supply

1. Guaranteed availability from inside our site.
2. Food grown in permanent bed soil
3. Drip irrigation water system for plants
4. Nutritious food, no herbicides or pesticides
5. Buffered plant environment in greenhouses (heated and lighted, as needed)

E. Food and Health - Food promoting healthy diets by:

1. Healthy and nutritious food choices are available
2. International cuisine and foods from all around the world
3. Non-allergenic nutrient-balanced soy milk for children
4. Elimination of a "double burden" of disease facing people
   a. Malnutrition- People do not receive proper vitamins and minerals due to factory food only being concerned with N-P-K. The cells and tissue of their body do not function properly due to the absence of these healthy molecules from their diet.
   b. Obesity- Caused by imbalanced diets that too high in sugars, fats and cholesterol while not maintaining enough exercise to utilize the quantities of these foods.
5. Elimination of chemical additives in foods

II. PROVIDING THE BASIC NEEDS (CONT.)

F. Guaranteed Water Supply –

1. Rainwater collected & filtered – over 120 gal./person/day
   a. Underground storage of 4 months supply
   b. Low water-use appliances
   c. Grey water recycling system
   d. Storm water collection
   e. Sustainable water management plan

G. Balanced Energy System**

2. Multiple energy sources to supply each City
   a. Renewable energy- wind, solar, PV
   b. Constant renewable energy – geothermal and ocean current can provide uniform energy 24x7 but have limited location availability
2. Nuclear Energy System - 25Mw Thorium LFTR reactor, with modular sealed power units located anywhere in the world (World's Future Energy source for the next 600 years)
3. Energy Storage – for variable power demands
   a. Used for peak demand & emergencies
   b. Types of energy storage
      i. Hydrogen Fuel Cells and Large scale energy storage
      ii. Molten Salt heat storage
   c. Used with heat stabilizers, water desalinization, medical research and hydrogen fuel cells

***Concept developed by Neopanora Institute - Network of Energy Technologies, Vienna, Austria*

H. Re-Cycling Materials

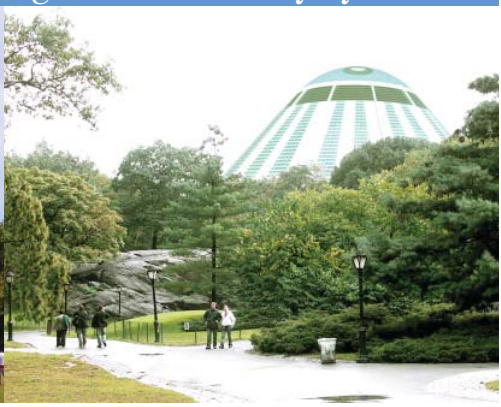
1. Materials for the new sustainable cities will be made from the materials of the old ones

I. Bio-Mimicry Technologies

1. Researching a million other species to discover their evolutionary secrets
2. Using these discoveries to replace exhausted Non-Renewable supplies

III. TRUE SUSTAINABLE DEVELOPMENT

Integrating Humans & Nature using the In-Harmony System℠



A. Contraction of Human Presence- concentrated in center with concentric dissipation to perimeter of human activity

B. Population Growth Limited

1. Family Size limited to 2 children as part of maximum building occupancy
2. City size limited to 25,000 as part of maximum building occupancy

C. Reduced Per Capita Consumption

D. Heat Island elimination

1. Elimination of roads, buildings and parking space
2. Aerodynamic structures allow air flow
3. Radiating canals allow air flow to the City

E. Toxin Free – Soil restoration of toxins and new waste recycling system that detoxifies industrial waste

F. Ecological Footprint- The amount of area it takes to support the needs of a city or country in terms of food, water, energy and waste pollutants

1. Most cities have an eco-footprint of 10.0 to 16.0
2. Sustainable cities will be under 0.6. This is 20 times more ecologically stable

IV. ENERGY EFFICIENT COMPONENTS

A. **Overall System Efficiency reduction of 80-85% below average US cities**
B. **Building Shell- Minimal Conductivity through walls**
   1. Heat loss & gain stabilized by thick concrete walls with few windows
   2. Building shape & size reduces exterior surface to interior volume
C. **Earth Sheltering –** lower 30% of building is buried into the ground for temperature stabilization
D. **Geo-Thermal Pump to Subterranean Water/Heat Storage**
   1. Summer cooling of intake air from geo-thermal
   2. Winter warming of intake air from geo-thermal
E. **Day lighting**- Residential Balconies, Bermed Canopy and main level façade perimeter area.
F. **Lighting –** use of LED, electro-luminescent, cold-cathode fluorescent, Fluorescent & HID
G. **HVAC –**
   1. Heating/cooling- radiant system built in floors
   2. A/C & Dehumidification–Located every other floor with ducting moving in overhead plenum
   3. Forced-air natural ventilation & power-assisted
   4. Windows are double or tripled paned and have UV and solar reflective film coatings
   5. Entire building is computer monitored for energy management and consumption
H. **Food Production**-
   1. Elimination of large machine, replaced with power assisted small units
   2. Elimination of energy based chemical additives
   3. Elimination of long distance shipping of food
   4. Elimination of food packaging
I. **Transportation –** movement of people and goods
   1. Elimination of cars and trucks
   2. Horizontal locomotion of people by walking
   3. Vertical movement by counter-weighted energy efficient elevators
   4. Supplies moved by cart, human & powered
   5. Mass transit to other cities by electric trains and electric pod-cars
   6. Long distance people movement by bullet trains and airplanes
   7. Long distance material movement by nuclear powered ships

OF IN-HARMONY SYSTEM℠

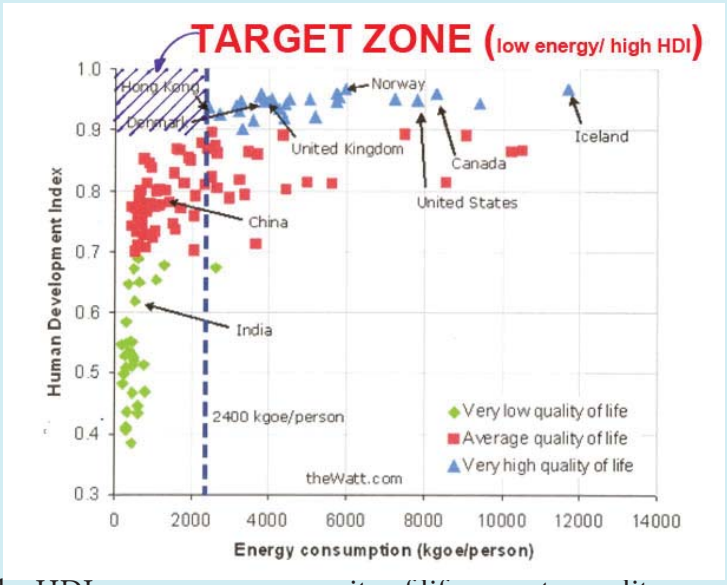
J. Water System

1. Water Collection- greenhouse roofs, covered pathways in parks and building storm runoff
2. Storage- Sealed cisterns below ground to eliminate evaporation
3. Hot Water- solar water heating and cogeneration heat exchange

K. Waste Processing

1. Solid Waste –98% packaging eliminated by community kitchens and 2% reusable containers.
2. Liquid Waste- Gravity feed to Natural Processing plants at property corners using hydroponic "living machines"
3. Recycling of waste into the ground increases efficiency of human activity

L. Human Development Index



1. The HDI measures a composite of life expectancy, literacy, education and standards of living for countries worldwide
2. Energy Consumption is a composite of the efficiency of the environmental system and the energy to produce the material level of affluence
3. Our sustainable city will have HDI over 9.0 and the energy consumption under 2,000 kgoe (see chart above)

V. RESILIENCE

Preparedness for Natural Emergencies and Continuity

A. Emergency Supply of Basic Needs

1. Food Storage for 4 months
2. Water storage for 6 months
3. Energy Storage for 1 week as an Uninterrupted Power System (UPS)
    a. Power supply in an underground vault, buffered from earthquakes or intruders, with two year supply
    b. It is connected to a "Supra-Grid" system

B. Structural Damage to Building, Greenhouses, Canals and Transportation

1. Building is designed to resist wind storms, cyclones and earthquake events
2. Greenhouses can resist most events
3. Canals and lakes will suffer no wind damage
4. Transportation should withstand all damage

C. Heuristics - Organized Emergency Plans to deal with the unknown

1. Accident Avoidance
2. Survival
3. Recovery from Disruption

D. Capacity of the System - design to absorb perturbation

E. Diversity of the types of perturbation - based on location

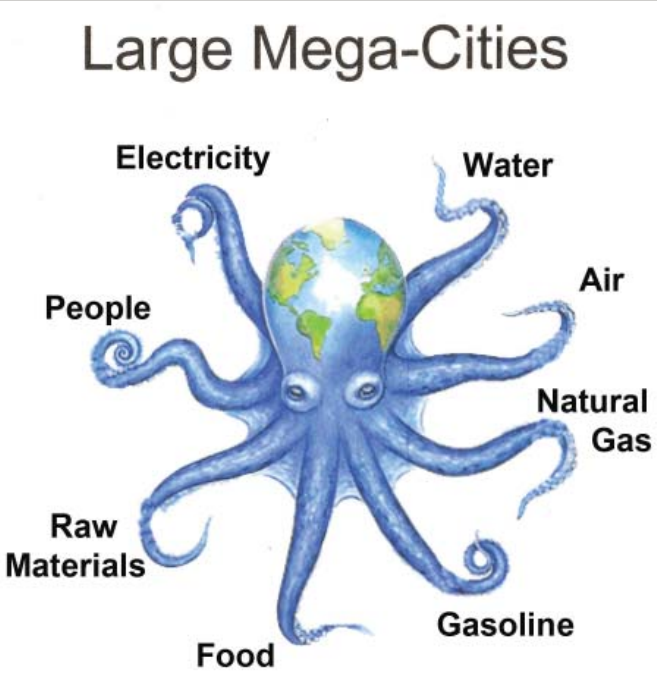
F. Magnitude of the perturbation - based on location

G. Plan for Human reaction and repair of system operation

VI. INVESTMENTS

Now before it is too late!

Civilizations are moving towards larger and larger cities called Mega-Cities (multi-million inhabitants). They sprawl long distances requiring cars and trucks for transport. All life-support comes from vulnerable supply-line tentacles reaching thousands of miles. Most require transportation fueled by oil-based energy. There is no guarantee of these life-support items reaching all the citizens. The tentacles are controlled in a profit-oriented system. When cut-off for days; the loss of food, water or energy; can spell death to the inhabitants.



Our continuously expansive economy is starting to fail, with jumpstarts not lasting long. Population increases in the next 40 years will create demands 50% higher, while consumption makes that number increase to 200%. Food Productivity is lowering due to soil exhaustion and contamination causing lower yields. Bio-fuels are feeding our cars instead of people. Freshwater is running out in many parts of the world, including the Western US. Oil supplies are past their peak output with only the Middle East lasting more than 30 years. There is no viable mobile-energy solution to keep these Mega-Cities operating. Economic failure seems inevitable. Failure means death to many and loss of investments to others. It is time to invest in a new and better system!

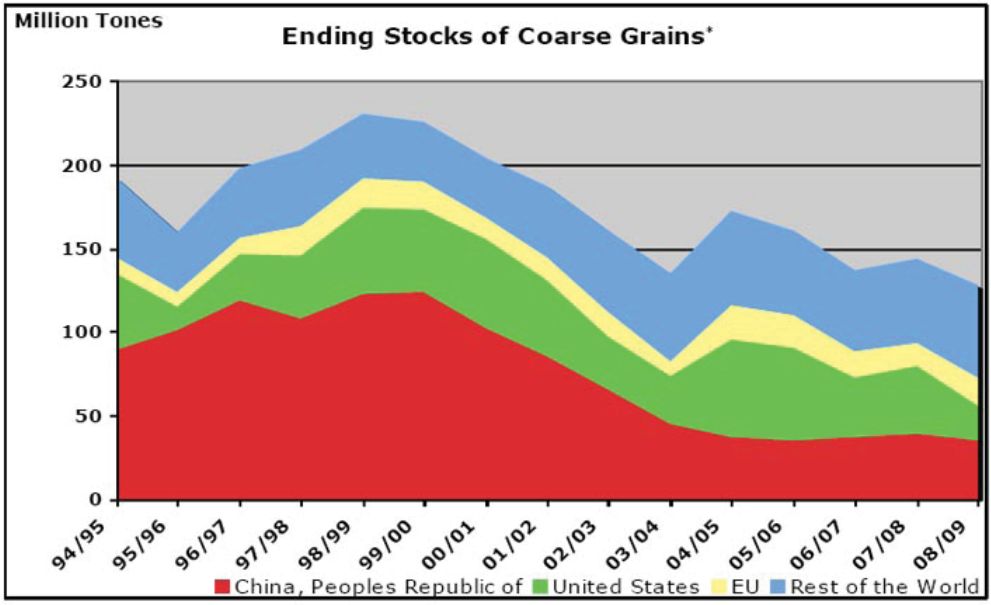
I. **Increased Demands from ever increasing population (increasing exponentially)**

II. **Increased Demands for ever increasing per capita levels of consumption**

III. **Civilization is directed to consume more energy and products with little change in Human Development (quality of life). Quality is not from consumption, but organizing lifestyles for mutual support.**

IV. **Rapid Loss or Price Increase of Energy Supplies will cause immediate collapse of societies that consume over 3,000-4,000 kgoe/person=US, Canada, Australia (see chart Section 5.K)**

V. **Depleted Availability of Renewable Supplies**



1. **Food Supply Reduction**
   a. Yields reducing from soil contamination & degradation
   b. Yields reducing from increased insect penetration
   c. Yields reducing from weather anomalies
   d. Diversion of plant food to feed larger meat demands
   e. Diversion of plant food for bio-fuel production

Unsustainable Practices of Resource Management

2. **Water Supply Reduction**
   a. Underground Aquifer reduction of finite ancient water reserves.
   b. Aquifer contamination from waste infiltration destroys usefulness
   c. Wasting quality water for cleaning & watering lawns because cities supply only one water line
   d. Excessive usage from commercial farming wastes during irrigation
   e. Changing weather patterns causing desertification from lack of rain
   f. The result people turn on the faucet and nothing comes out, water rationing begins for rich and poor

3. **Trees Supply Reduction**
   a. Wasting trees to make paper and wood-framed houses
   b. Burning trees for firewood
   c. Not replanting forests to replace cut trees
   d. Not recycling paper
   e. Deforestation for farming and cities

4. **Fish Supply Reduction**
   a. Over fishing – taking too many fish, especially young
   b. Selective Fishing- taking certain species to upset balance
   c. Polluting ocean with chemical runoff and acid rain
   d. Soon there will be no wild fish, only farmed fish in polluted water

VI. Depleted Availability of Non-Renewable Supplies

1. **Farm Land**
   a. The best farm land is buried under buildings and roads
   b. Increasing population will make land prices skyrocket over the next 25 years
2. **Oil** – Used for transportation & chemical supply is running out in 25 years
3. **Natural Gas** – Used for heating & electrical generation is gone in 35 years
4. **Coal** – Our first energy source, used for heating & electric, gone 85 years
5. **Uranium** – Non Carbon polluting- electricity, gone in 80 years
6. **Thorium** – Non Carbon polluting – electricity, lasts over 400 years
7. **Copper** – Electric wire and car radiators – 15 years
8. **Lead** – Car batteries - 12 years

VII. Waste Disposal Polluting Nature

1. Industrial Aerosols with SO2 & CFCs damage ozone & tropopause increasing UVc penetration
2. Aerosols mix with rain to cause acid rain acidifying soils, lakes and oceans
3. Chemical waste, human/animal waste & nitrogen fertilizer are poisoning soils, lakes, rivers and oceans
4. Solid waste (trash) creates landfill problems and floats in oceans making islands of plastic trash eaten by birds and fish

Unsustainable Practices of Resource Management

VIII. Fragile Long Distance Supply of Materials

1. Breakdown of shipments from business infrastructure
2. Shipments susceptible to robbery on highways and in cities
3. Shipments susceptible to robbery or destruction from terrorism
4. Energy cost of shipping increasing creating higher prices

IX. Cities are no longer economically viable

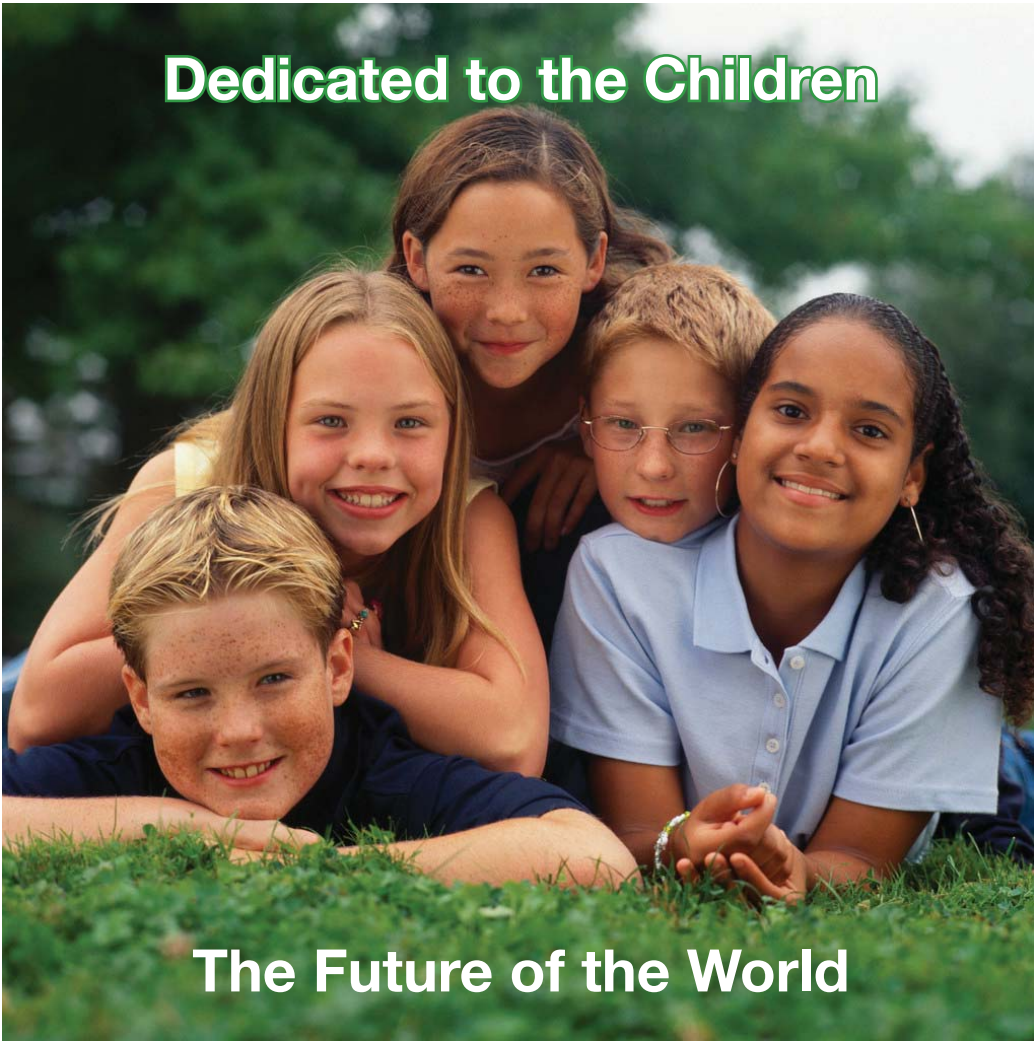
1. Expensive urban structure makes workforce non-competitive to other countries with less expensive infra-structure
2. Investments yield little or no return, so products stop flowing
3. City infrastructure is failing, repair costs increasing, sometimes not being repaired (roads, bridges, sewers, water lines telephone
4. Manufacturing in US no longer profitable due to high internal costs including antiquated machinery and inefficient material flow
5. Commuting with cars & trucks is inefficient for time, money and energy
6. City environment is toxic with pollution and causes higher illness rate

X. Weather Anomalies- temperature & rainfall destabilization disrupting predictable business patterns that cause losses or higher prices

About the Author

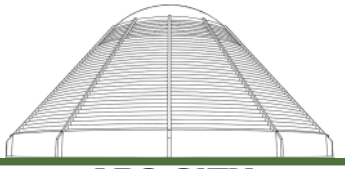
Robert Daniels, age 61,is the Exec. Dir. of the In-Harmony Foundation and creator of the ARC City/In-Harmony System. His multi-disciplined background includes: BS Agronomy (Magna Cum Laude & Phi Kappa Phi), university studies in Urban Planning, Economics, History & Educational Psychology; field-developed skills in Structural Building Design, Aerospace Manufacturing, Holistic Health, Arch. Lighting Design, System Design Analysis and recently 3years of studies in Deep Ecology. His entire life experience has resulted in these creative ecological concepts of "Re-Inventing Civilization."

His research is based on a passion to harmonize human activity with Nature. He believes that utopian perfection is achievable if people can learn to live life in moderation and enjoy the Life that God has created around them.



Re-Inventing Civilization©

The ARC City℠



IN-HARMONY FOUNDATION, INC.™

t. 305-751-7200 email: info@in-harmony.net