

Living Earth Workshop with Richard Heinberg January 21st Friends Meeting House Portland

Welcome & Introductions

Background Information on Peak Oil

Richard wrote an earlier book about human social change since the Industrial Revolution that examined underlying causes for growth in population and social complexity.

Looking back he realized that book did not mention “energy” “coal” or “oil”. He noted:

- Human population has grown from about 1 to 6.5 billion in only 200+ years.
- Per capita consumption of resources has also grown, so a modern human controls the equivalent of about 300 slaves worth of energy.
- Today’s rate of extraction of energy and resources equals 40% of biosphere’s capacity.
- Energy use is not uniform for all humans, there is wide variation and poverty.
- Economic inequality has increased greatly during this time: 500 people have as much as the poorest half of humanity.

What has driven these trends? Growth in use of fossil fuels more so than colonialism, capitalism, technology and invention and other social forces—these follow energy availability.

Energy and fossil fuels have enabled society to become more complex, which humans perceive as cultural evolution, that is, they see energy-driven social evolution with a sense of superiority.

Cultural relativism says every society is shaped by its environmental conditions; you must understand the culture’s environment to understand how it created itself and avoid making judgments based on your own society. Cultural relativism is a balance to social Darwinism.

Marvin Harris in *The Rise of Anthropological Theory* developed Cultural Materialism (perhaps cultural ecology would be more accurate), which describes culture as based on ecological necessity.

During the migration of humans out of Africa, humans sought water and megafauna to hunt. Social organization was first driven by need for language and ability to plan and carry out hunts. Humans appear to have hunted megafauna to extinction around 10,000 years ago, except in Africa. So they had to adapt to smaller game, domesticating animals and planting food, which lead to settlements and organizing to manage food production. Food production also drives culture (today we can see that getting food in a supermarkets creates separation).

Cultural Materialism uses the concepts of Structure, Infrastructure and Superstructure.

- Superstructure is how we define culture through things like institutions, power structures, roles, and rituals.

- Infrastructure describes how we get our food and materials. Social change can happen at each level but infrastructure is primary—if you know how a society gets its food, you know how it is organized and what kind of superstructure it has. For example, animal herders are patriarchal and have a high god.
- Structure is how we organize society and food, through government, regulating and so on.

In terms of Cultural Materialism (or Cultural Ecology), the discovery of fossil fuels, coal and oil, drove very fast and large-scale changes in society, especially compared with any previously known rate of change. For example, the Industrial Revolution lasted only about 250 years but the changes in human society were enormous.

As the fossil fuel era closes there will be similar large-scale cultural changes as we adapt to much less energy, also over a short time period. This raises a question--Can the shift we call “Peak Oil” be organized and guided?

Q: How do we know how much oil there is? What are some information resources? Reserves and depletion rates can be hard to determine accurately--for example, yesterday a news story said that Kuwait has dropped its “proven” reserve estimate by half. OPEC’s stated reserves before they were altered in the mid-80s are probably reasonably accurate. Numbers used by peak oil analysts are usually provided by experienced oil geologists and executives, like Colin Campbell, Ken Deffeyes or Matt Simmons. One good source is ASPO, Association for Study of Peak Oil and Gas.

Present discovery trends show a 40 year decline in discoveries, and probably almost all oil fields are known and explored. However, even if published numbers are wrong it only postpones peak oil and change for a short time. Also, we will have CO2 and climate change to deal with for long time to come. So it makes sense to focus on social change and human behavior to adapt to peak oil, even if it should prove we started early. The alternative, waiting until the last minute, may lead to social and economic disaster.

VIDEO: “Arithmetic, Population and Energy” with Al Bartlett
(Available at www.globalpublicmedia.com/lectures/461)

Thesis: the greatest problem facing humans is their inability to understand the exponential function, that is, the consequences of growth at a steady fixed rate over time (such as “5% per year”).

A handy rule of thumb: divide 70 by the growth rate to calculate the time it takes to double an original amount. For example, something that grows at 7% doubles in 10 years ($70 / 7 = 10$).

Steady growth can produce very large results. For example, only 10 doubling times produces a 1,000 x increase from original value. This is illustrated by a story about grains on a chess board. Starting with a single grain of wheat and doubling 64 times, the last

doubling roughly equals 400 times the worldwide harvest of wheat in 1990. Note that each doubling is more than the total of all the previous increases added together.

70 years, or one human lifetime of 5% growth rate equals a 32 x increase. For example the Boulder City Council described 5% annual growth as a good thing without realizing the cumulative effect. At a 2.58% growth rate, Boulder's population in 70 years would equal a city the size of Boston. Boulder civic boosters regard a 7% rate of growth as desirable, but in 70 years Boulder would be the size of Los Angeles, "growth capital USA". We send family planning aid to countries with lower growth rates!

At its current growth rate of 1.3 %, the world's human population would double in 53 years. This doubling cannot continue, whether we like it or not. Zero Population Growth will happen, whether humans manage it or not. Growth will stop; only question is how.

What options are there to address the growth of population? Social "goods" lower the death rate and increase population—science, medicines, adequate food, speed limits, police, clean air—all help population to grow. Social "bads"—abstinence, abortion, disease, war, murder, famine, or smoking—help reduce population. Nature will choose from the "bads" list—for example, the AIDS epidemic. Can humans choose our own "bads" to reduce population growth?

Misunderstanding of exponential growth is widespread: example of letter from controlled growth advocate "I don't believe exponential growth is valid at the local level".

To understand how steady rates of changes accelerate growth, consider the example of bacteria growth in a culture where they double every minute for one hour, from 11AM to noon. When 1 initial bacterium doubles every minute, the bottle is only half full at 11:59 AM. Or, the bottle is only 5% full at a few minutes before noon. This idea is central to understanding growth: Boulder Valley has 15 x as much space as it needs—this is equivalent in bacteria example to the situation at 4 minutes to noon. Suppose the bacteria could stretch to find 4x more culture, or Boulder could find 4x more land area? Then at 12:02 PM, all 4 bottles (or all the land) are totally full and there are no more resources.

A common statistic from government reports and the media in the early 1970s was that coal reserves would last 500 years at current levels of production and use. But from 1971 to 1991 coal use experienced a 2.38 % rate of growth, which means not 500 years but only 72 years to exhaustion. To make coal last 500 years we would have to have 0% growth AND use all possible coal available. Yet educated leaders, like the Oakridge National Laboratories director, would say there are 300 to 1000 years of coal supply, and journalists would parrot the mistake as news: Newsweek said coal supplies would last "666.5 years", Time said there is enough coal to "power needs for centuries". This is what David Brower referred to as "Strength through exhaustion".

In 1994 the US imported more oil than it produced for first time, and oil consumption has increased every year. M. King Hubbert found that a bell-shaped curve describes the pattern of oil extraction—after annual increases to a peak, it's all downhill. Therefore the

area under the bell curve going up predicts the amount under the decline side of the curve. One can look at the Hubbert curve to see how much oil will need to be discovered.

In the geology literature the total oil available is about 2000 billion barrels, plus or minus 40%. At 2000 BBL + 40%, peak oil will occur between 2004 and 2019.

Nevertheless an MIT professor of economics stated that the “world will never than run out of oil, not in 10,000 years”.

But what about new discoveries? Example: the Gulf of Mexico field was estimated at 700 million barrels—or the equivalent of 42 Days of US consumption. The Hibernia field might be a billion barrels, or 56 days (not 50 years as in a headline).

Ethanol from corn could produce 43 million barrels per year. That would be 1% of current amount of oil used for transportation and would require more corn land than there is available.

The lesson: Don't let “experts” do our thinking for us.

World oil consumption is about 1.7 liters per person a day, so if we use more than 1.7 L that is more than our share--yet Americans use 8 liters per day.

Peak oil is a major turning point in all of human history. We have a culture based on exponential growth. We worship growth, so what shall we do? Churchill said, “Sometimes we have to do what is required”. We must educate people to recognize exponential growth is not sustainable. Saying something is sustainable means accepting that growth cannot be sustained. Stopping population growth is a necessary condition of sustainability.

Examine the assertions of technological optimists carefully. William E. Simon, Secretary of the Treasury, said “copper can be made out of other metals”. This reflects fundamental ignorance, yet he was a national policy advisor. Jack Kemp, Secretary of HUD, said “Nonsense. People are not a drain on the resources of the planet”.

Isaac Asimov made the point that democracy cannot survive overpopulation because the more people there are, the less each one matters. For example, in Boulder 9 council members once represented 20,000 people. When the city grew to 100,000, 5 times more people were represented by same number of councilors. It's the same in the US Congress.

Why don't we talk about population growth? Smart growth or dumb growth, both destroy the environment. Smart growth is like saying a smart person planning to travel on the Titanic would go first class.

People have to do the arithmetic. Please check his (AI's) math. If you don't find errors then start making changes!

Eric Severeid once said, the chief source of problems is solutions. For example, “improving” the Nile river to reduce flooding and make electricity by building the Aswan High Dam. After the dam was built, the ancient floods stopped as did the yearly deposit of silt on farm lands. That forced farmers to start using chemical fertilizer, which has ruined soil. The fishery in the Mediterranean that depended on the silt has collapsed. The solution has turned out to be worse than the problem.

The Oil Depletion Protocol

The protocol is Colin Campbell and ASPO’s idea. It is essentially simple:

- Oil importing nations would agree to reduce their imports by an agreed-upon yearly percentage (the World Oil Depletion Rate)
- Oil exporting countries would agree to reduce their rate of exports by their national Depletion Rate.

Adopting the protocol would lead to about 2.7% per year decline in consumption (or a reverse exponential growth). Could we reduce oil use by 2.7% per year in our own lives? In our city?

The alternative is to let events cause extreme price volatility and economic chaos and increasing conflicts over oil.

It makes sense for countries to reduce voluntarily, as have Sweden, Iceland and Cuba. Ultimately oil is going away, why wait for chaos instead of embracing a constructive process?

We should start replacing oil sooner than later to postpone the peak and stabilize prices, avoid conflict, and leave some oil in the ground for future generations.

Q&A—

Our national policy does not acknowledge peak oil, how can we change it?

--More public education, grass roots strategies.

How can we get people to be unselfish for the good of whole?

--Examine the psychic roots of cooperation to replace competitive behavior. Emphasize cooperative aspects of social history. Americans did sacrifice for the greater good during WWII, when everyone recycled, rationed, grew Victory gardens, and gave up personal goods for overall goals of war.

The American idea of individual competition and Darwinism is wrong. In ecosystems, lots of cooperation goes on, for example in our own bodies. Think of each human as a “cell” in a larger whole.

What about social equity? How can we reduce US consumption while the third world is raising its living standard, meaning using more oil?

--The protocol rate is same for every country. However, change will be very difficult in our country, for example just look at our dependence on cars. And an annual 2.7% rate of decrease will get harder over time.

How does relocalization fit into a global solution like depletion protocol? Globally won't privileged people keep using oil at the expense of the poor?

-- Unless we have a global protocol, local efforts will be overwhelmed.

Localization is the opposite of globalization, or corporate dominance of world economy which really got going during colonial times.

Maximum carrying capacity is determined by the availability of essential needs, so the lack of a single variable can limit growth. This is stated in "Liebig's Law of Minimums" about soils. Suppose Region A has excess minerals but a lack of good topsoil while Region B has soil, but lacks minerals. They can exchange needed materials and both increase overall total carrying capacity. In other words, $CC_{A+B} > CC_A + CC_B$.

Human society increases carrying capacity through trade. At first humans only traded with strangers, while the family and village was more a gift economy (i.e., we don't charge our children for dinner). Today most other people are strangers, our familiar group is shrinking. Corporations want interchangeable labor units, where work is exchanged for money. We have created a sort of "phantom" carrying capacity, for example using petrodollars and cheap oil-based transportation. With the end of cheap oil there will be a loss of human carrying capacity unless we plan otherwise.

How to minimize suffering during the change? Figure out how can people live where they are with less resources--that's one idea of "localization".

For example, Permaculture or locally grown food and distribution was developed by Bill Mollison and David Holmgren in the 1970s. Ecology Action and John Jevons developed bio-intensive eco-agriculture or how to grow intensive gardens in different soil types and climates. These concepts need replication. Everyone should study permaculture—not only for food, but how to reorganize spaces like yards, human relationships and collaboration.

How can we get leaders on board? Through a process of change that can include everyone.

Population must be reduced humanely.

Q: What about migration? What about despair and withdrawal from political involvement? Isn't a civil order necessary for localization to succeed?

--The national government is corrupt, but would be worse without political engagement. Why surrender? This is about survival of human values.

Discussion: Egalitarian exchange works better than dominant exchange or theft. Food, water and energy are the big three to provide locally.

How much population reduction is needed? Probably to pre-industrial levels, plus whatever permaculture can add, around a billion people.

Read ecologist H. T. Odum, “Environment Power and Society” and “The Prosperous Way Down”.

FILM: How Cuba Survived Peak Oil

Cuba was in economic free-fall after Russia (formerly USSR) cut off oil in 1989, an artificial example of peak oil impact. How did Cuba survive? Peak oil is a first for humans and we need examples or labs where we can see how to reduce—Cuba is a lab.

At first it was necessary to grow vegetables wherever you could, and new food animals like rabbits, chickens and guinea pigs. Electric power went out, so there was no refrigeration. Food scarcity caused an average 20 pound weight loss, malnutrition, pregnant women with anemia, underweight babies. People had to haul water up to top floors of bldgs, take cold showers.

The Cuban government imported 1.2 million bicycles from China to restore transportation.

US cut Cuba out of world economy so there were few imports, and Cuban money had no value. The economy was based on barter and exchange.

The government guaranteed everyone food and started a ration system to ensure 3-4 weeks supply at UN minimum human survival levels.

Services like health care were sent out to rural areas so people would not have to travel into the city.

After the initial crisis, Cuba expanded education and universities. Three universities became 50. They also trained a surplus of doctors, which became an “export”—Cuba exchanges doctors with Venezuela for oil.

Land reform reorganized large state farms into small local farms, Regulations were reduced. Land is held in “usufruct”, that is, a tenant can use the land and pay no rent as long the land is in productive use, otherwise, it would revert to the government and be reassigned.

Private farmers increased production, and people moved from cities to take up farming to support families. Small scale organic farming saw a 5 yr drop, until soil recovered, now organic farming has made Cuba self-sufficient—the old system required importing food. Urban gardens were part of survival agriculture. Every vacant lot became an orchard. No one had special knowledge, and had to learn by doing. Vacant urban land was converted to farming. Australian gardeners came in 1993, started rooftop gardens, train the trainer programs. For example they showed how to grow grapes for wine, shade, cooling,

screening. Farming is now highest-paid profession. Rabbits, chickens and guinea pigs are raised on rooftops of buildings.

Fat consumption dropped, while vegetables increased. Fresh food and vegetables are now available at hundreds of stands in neighborhoods.

Sustainable practices started being studied in 1980s. One challenge was to restore soil after damage from commercial farming. It took 3 to 5 years to restore most sites, open up compacted soil, add nutrients to restore micro flora and fauna life. Cuba uses a variety of methods,--green manure, compost, land cycling, intercropping. All kitchen wastes go into compost. Today, 21 times less pesticide is being imported.

Started using draft animals which don't require fuel and don't compact soil as machinery did. Older farmers trained trainers in how to teach oxen.

Energy solutions

Solar water heating is popular to provide hot water and reduce energy needed for cooking.

About 30% of national electricity is generated by burning bagasse from sugar mills. Small scale wind and solar systems have been built for rural schools and health care facilities not on the grid. Rechargeable lamps, refrigerators, and TVs. Renewable TV results in more social living—everyone gathers round the only set!.

Auto fuel is saved by reducing number of cars, switching to mass transit. One example is “the camel” a 300 person passenger trailer hauled by a semi-tractor.

Government cars must pick up anyone needing a ride. Horse carts are used.

Cuba started making bicycles. Walking and cycling improved health. Bikes are more healthy and non-polluting.

Building design and construction pays attention to bio-climatic design, renewable energy, energy budgeting. Cement production has been reduced.

Houses are small and simple but 85% ownership. People like rural houses for space to garden grow animals.

Cuba has, and needs more, friendship and love.

People are learning to be happy with less.

More solidarity and sharing makes a better world.

www.communitysolution.org

Discussion:

Cuba already had organic knowledge that could be disseminated quickly—but so does US. We have many structural advantages.

Cuba's primary national goals: education, health care, food production.

Permaculture equals independence.

Does fewer people mean less chaos?

How much initiative came from people and how much from government? Government did help, but part of solution was to decentralize. By setting protective policies, that

everyone would eat and have a place to sleep, the government reduced panic. Also they did regulate some things like truckers to prevent price gouging.

We need asset or resource mapping at local level, like the table-top city model in film, to find out what we have and what we will need. GIS mapping could help.

Cubans were kicked out before the shock for advocating ideas like organics that the socialist government disapproved. We in US may have to get a kickstart from oil shocks. Cuban health care was already more localized.

Strategies

Do an energy inventory for your personal and household life.

Look at Kinsale, Ireland Rob Collins “Energy Descent” plan adopted by town council.

Also Oakland California proposal to get 30% of food from within city.

Reach local, county, metro and state officials.

Educate people re peak oil.

Support actions re specific things.

- Stop Sunrise freeway, don't expand I-205.

- Designate some roads transit and bike only.

- Plan for local food supply, ask people what they value and need.

- Conserve water resources, support graywater, composting toilets.

- Establish a food guarantee: everyone will eat no matter what.

- Save something of value to use instead of petrodollars.

- Improve river and train transport capacity.

- Support incentives to bike and avoid car.

- Replace front yard w garden: Food Not Lawn.

- Support community gardens.

- Consumption tax on fossil fuels

- Gas tax for transit and infrastructure

- Address 3 things—

 - Create a knowledgeable “eco-corps”

 - Understanding ecology

 - Bind them together

- Talk to everyone including the suburbs about peak oil.

- Use renewable energy locally.

- Develop transparent accounting for resources like energy and water.

- Make sure libraries have info on basic skills in local collection.

- Start respecting and loving everyone you know to create culture of caring.

- Change zoning to allow more than one family, group living.

- Fear of loss—know some good examples of replacements.

Understand how addictions can be changed—starts with becoming aware of need to make a change, contemplation of change, preparation for change, making change or action, relapse and restoration.

Where is the best place to live? Maybe stay where you are and look for commonality, how to live within your present community. Ultimately, deep communication across society will help people shift paradigms and then behavior. Use myth or other ways of

achieving “in your gut” understanding of the new ways of living. For example, in “Don’t Think of an Elephant” George Lakoff describes how to frame ideas and use language that resonates with moral and spiritual beliefs.

We idolize money and it is a false god. Boomers are not going to retire comfortably, the post-peak economy can’t deliver the dollars that were promised. This is another problem that needs addressing.

Progress toward new lifestyle to provide examples that work, so people can pick up on them when they are ready. What binds people? Gives them common vision? Think of symbols and movement that people can sign up for and enjoy the change. Gives them fire!

During the 19th century, Populists set up alternative solutions like co-ops but also created 40,000 speakers to go everywhere and mobilize people. Get movie stars to join in with change agents to draw interest as in Czechoslovakia.

Barbara Dudley is working to establish “fusion voting” which allows more than one party to nominate the same candidate, and a Working Families Party.

Isolate words into smallest pieces you can, like “survival”.

Honesty, respect, compassion are three very important strategies.

Be inclusionary—change can from bottom up, from diverse population, also broaden number of solutions and possibilities, increases buy-in.

What qualities does each of us want to bring to this work? What do we want it to feel like? What is our vision, which our small steps will take us toward? What will our lives be like? What are we looking toward? Humans will always have capability for love, compassion celebration—how do we make this transition?

Small Group Discussion

Want future to have less anxiety, more fun.

Fences should be taken down for pasture and food.

Future will be healthier, more outside activity, bicycling, walking.

We will still have technology like computers and phones.

What do we want use the rest of the oil for? Attack Iran or make solar panels?

Discussion re permaculture, can it provide for so many people?

We will be more like Cuba, more with less, more human and animal power.

We will go through phases, each leading to next.

Farming will be a high-value profession, as will other work that is connected to the earth—probably other trades will come back like smithing.

Or clothes making.

People don’t even know everything already happening here in Portland.

Our money should not be debt-based. Maybe more local currencies would be better than a national one that can be exploited. National currency may collapse.

Local banks support local exchange. Read Catherine Austin Fitts.

Buy local--whatever you buy is a way to start.

Get involved in BF Schumacher Society (www.smallisbeautiful.org)—local currency, complementary currency.

Corvallis and Hood River working on local currency.

In *he Party's Over*, p. 91 argues against interest-based or debt-based money.

What works is a village—let's make neighborhoods into villages. Associations.

Learn from disasters, where people did learn to collaborate.

Repair the biosphere.

Gain awareness of peak oil and also one another, so we trust and love each other.

Honor diversity and everyone's input and ideas.

Define a value set (honesty, compassion etc.)

Figure out how to distribute resources.

Communications equals sustainability. How can we choose whom to talk to and how?

Need to rethink class, so homeless can talk to baby boomers.

Incorporate more social life into houses like in Cuba.

Make gathering places.

Help people deal with their fears, open up, confront our own fears first.

Develop close relationships w neighbors, intention of connection and caring.

Share skills and abilities.

Make sure everyone has enough.

Sense of slower time, seasons.

Enhanced sense of sacred.

More music and art.

Balance of feminine and masculine.

Balance between self-interest and earth-interest.

Is peak oil the last activist campaign?

Richard—Peak Oil is different from earlier campaigns because we have to make a deep structural change. We have knowledge and so we have responsibility to share. Rather than feel powerless, recognize we have the power of a vision for future and how it can be.

We don't need to wait for experts. Keep the conversation alive.