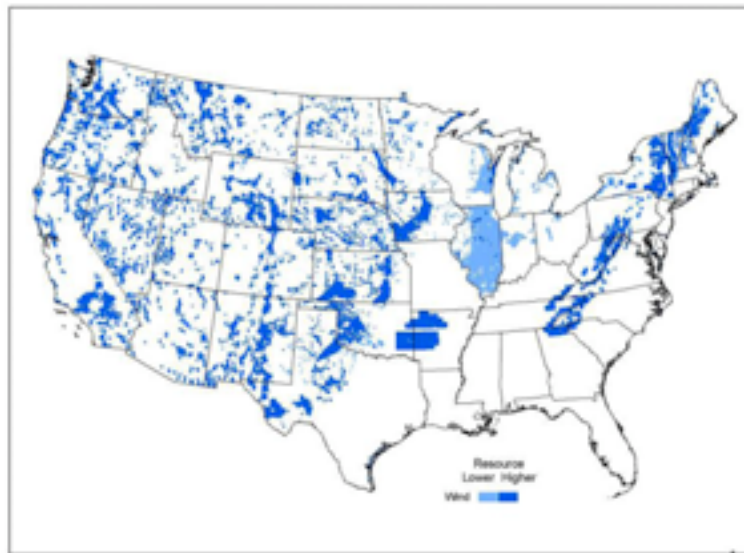
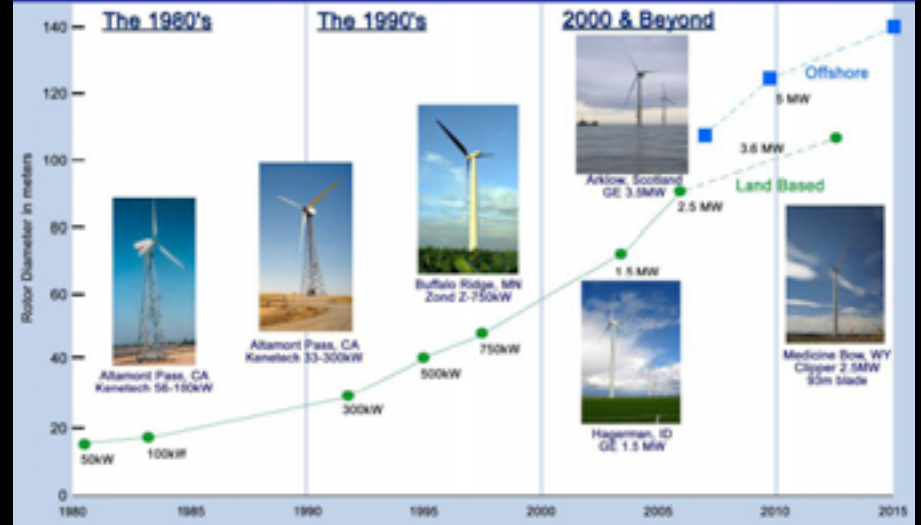


Wind Hopes

U.S. Wind Resource



Evolution of U.S. Commercial Wind Technology



Wind Savings

- 20% grid energy, 245,000 MW
- 3 to 7¢/kWh

Savings: 181 MtC/yr



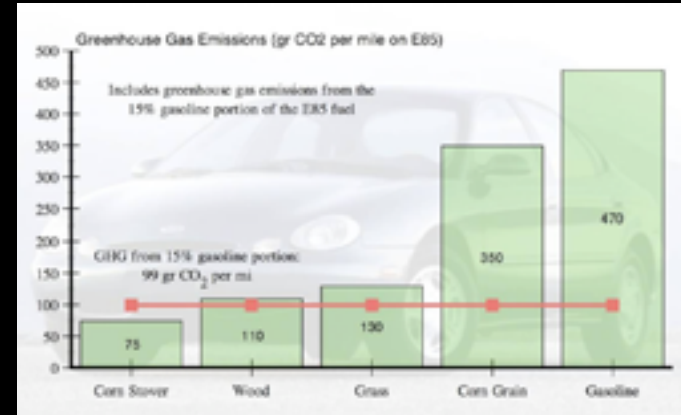
Biomess to Biomass...

Biomass Power Savings

- Wood residues and municipal discards
- 45,000 MW
- 5 to 8¢/kWh



Savings: 75 MtCl/yr



Biomass and Biofuels



Geothermal



Geothermal

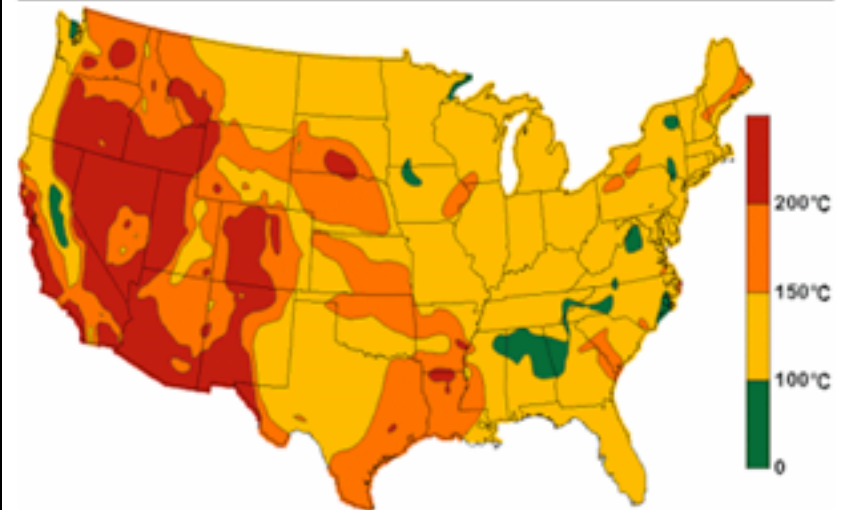
Geothermal Power Savings

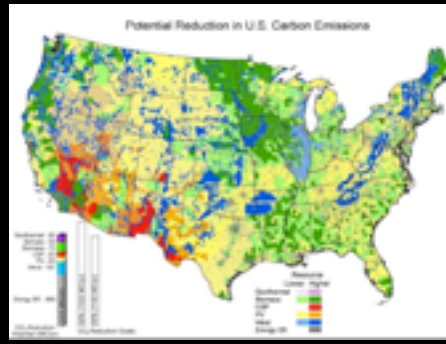
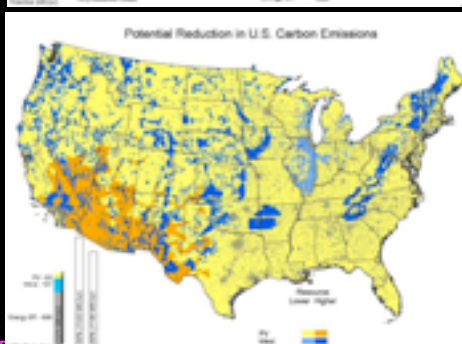
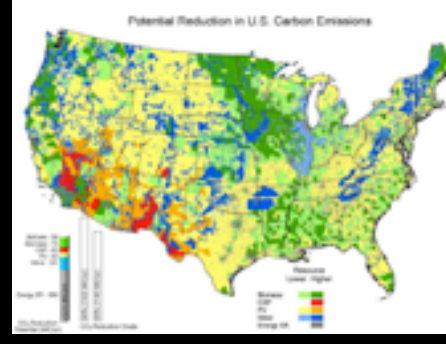
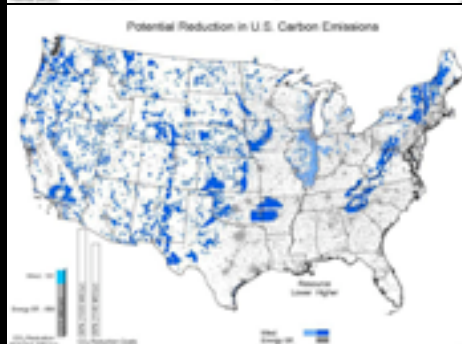
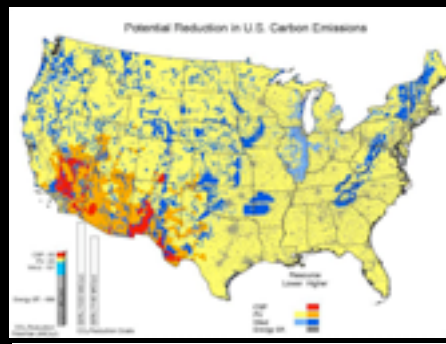
- 50,000 MW, 90% capacity factor
- 25% existing resources, 25% expanded, 50% from oil & gas wells
- 5 to 10 ¢/kWh



Savings: 83 MtC/yr

Temperatures at 6 km Depth



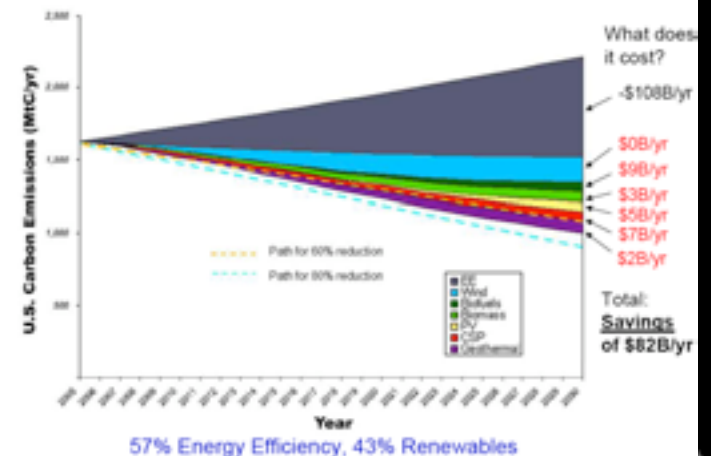


Putting It All Together



Summary: ASES

U.S. Carbon Emissions Displacement Potential from Energy Efficiency and Renewable Energy by 2030



But Back to the Bigger Picture....

Relocalisation

Urban case studies, trends and local government role



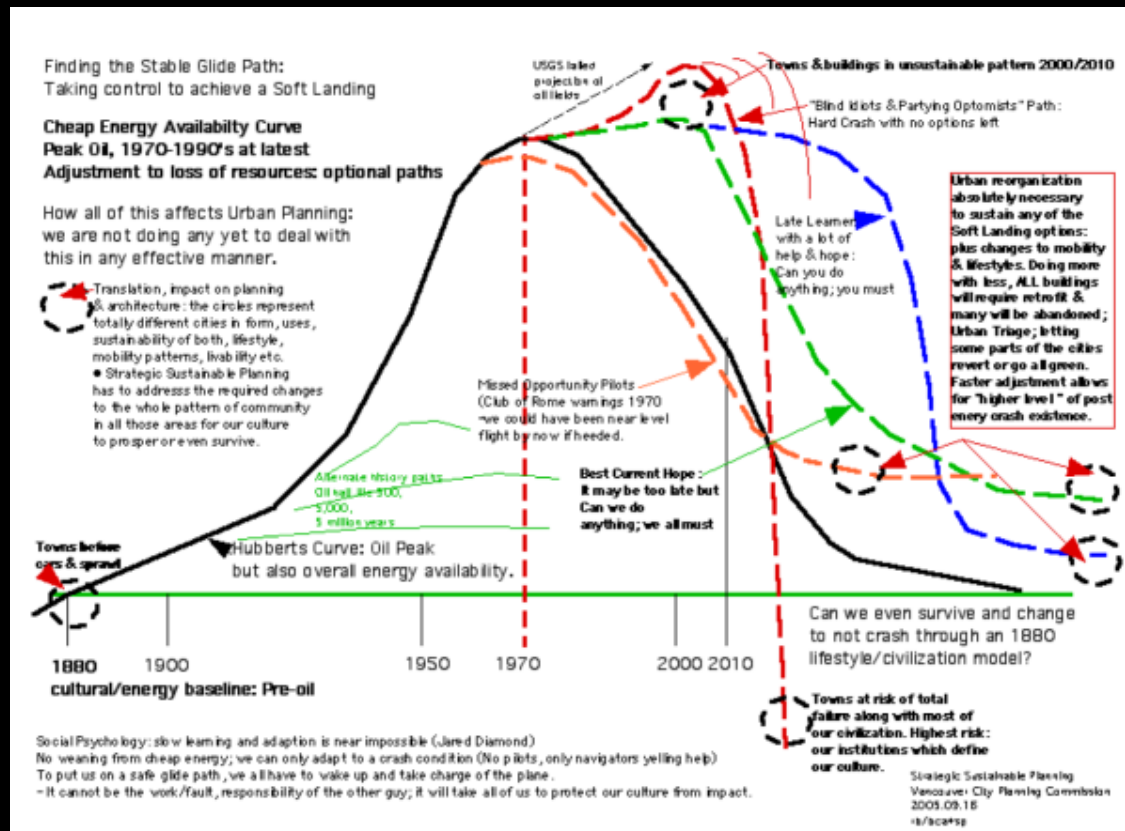
What new patterns for sustainability?

- Loss of large unsustainable city centers which cannot be fed
- Marbelization in the suburbs- reclaiming from mistakes
- new villages rail oriented - and eco-basin managed
- new northern tier of towns/new rail systems (US & Canada)
- new energy harvesting without adding net heat to the earth
- multiple pathways for maximizing food production
- new industries recycling, reusing, co-operative self help models.

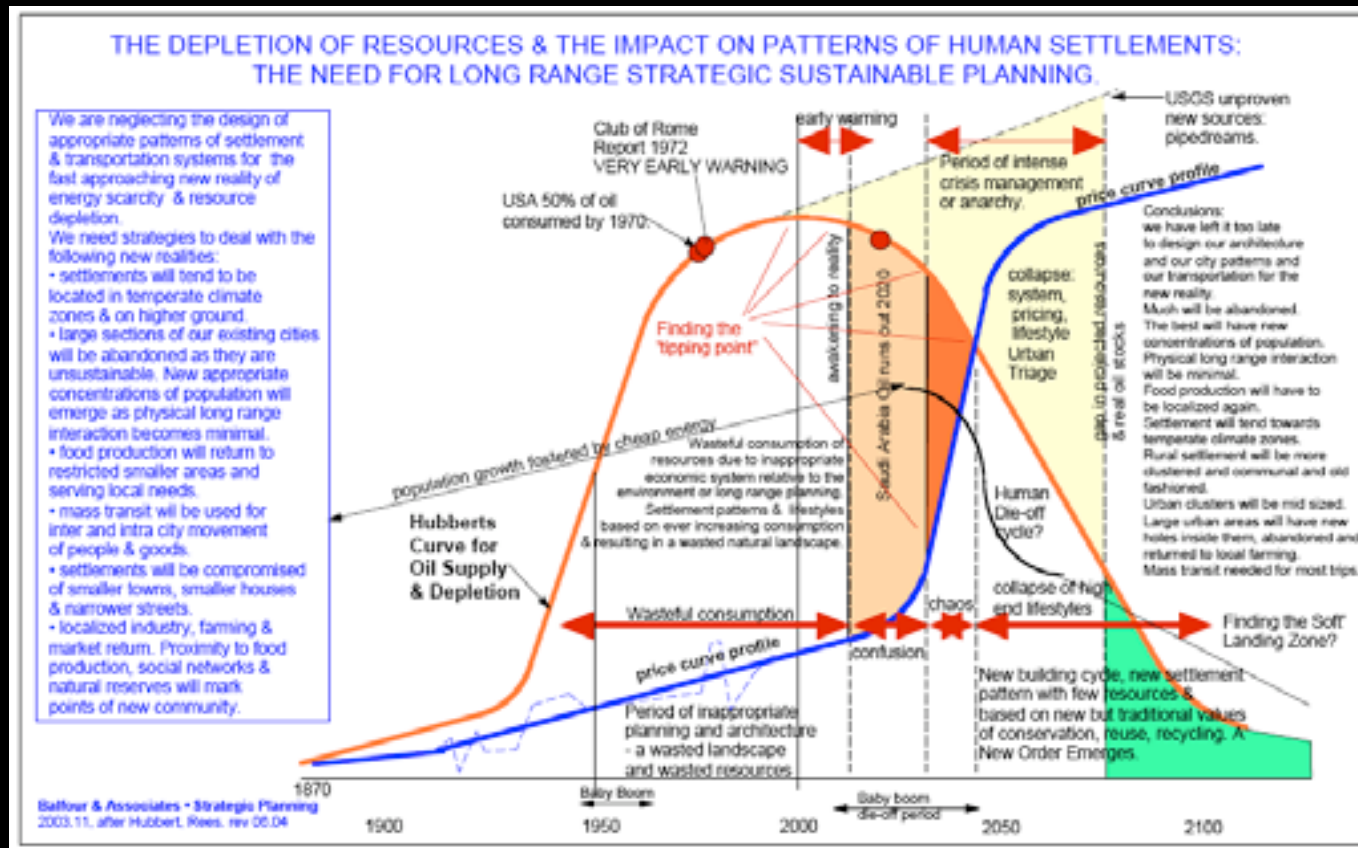
...Global Impacts: Quantum Social Change.



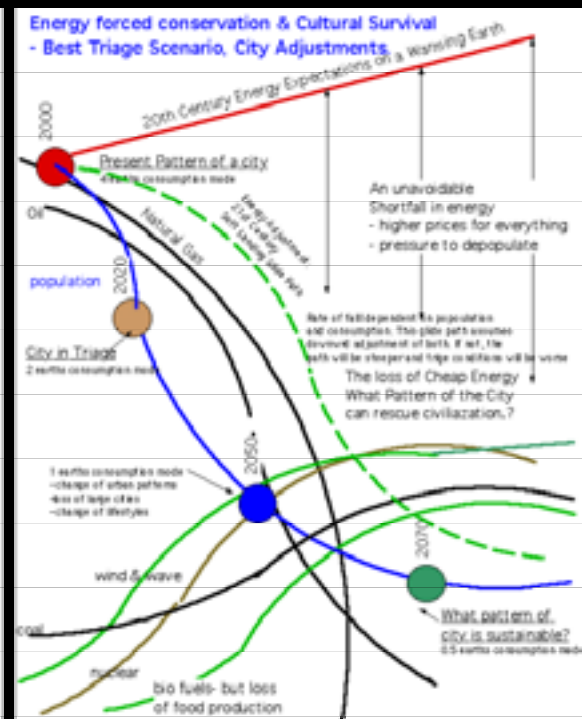
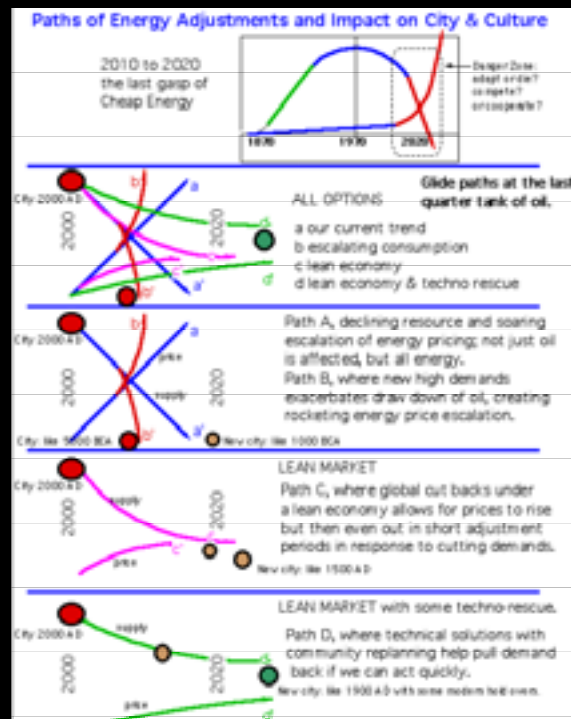
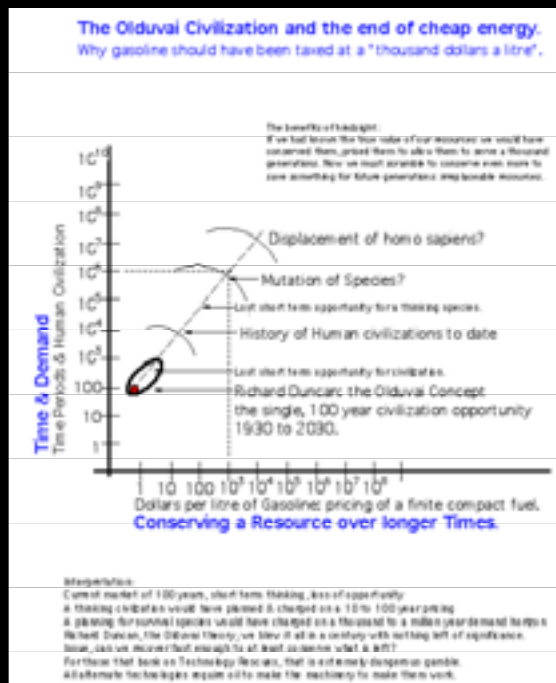
City, culture and energy curve.



Out of time & energy.



3 views of tipping points



Rising Oceans Impacts



PEAKING OF WORLD OIL PRODUCTION: IMPACTS, MITIGATION, & RISK MANAGEMENT

Robert L. Hirsch, SAIC, Project Leader
Roger Bezdek, MSSI
Robert Wendling, MSSI

February 2005

Chapter 2. Rapid Changes in Glaciers and Ice Sheets and their Impacts on Sea Level

Lead Author: Konrad Steffen,* CIRES, University of Colorado, Boulder, CO



Article from Scientific American Feb. 08

Too Much Water, Not Enough...



Deserts, rising oceans, moving farmbelts

Humans, beings of mostly water

Water on earth available for drinking: less than 1%
On the other hand: Rising Oceans, too much water...
Hydrological cycles go erratic with global warming....

Food production with less water, plummets....

Deserts grow,

but polar climates do not allow trade off for farming...

Poor soils areas need enhancement and water....

Cities in unsustainable places wither and die....

The carrying capacity of the planet is decimated..
Just what is avoidable now for human populations?

Do
The
Math



Mass Migration Impacts



Migrating for Hope



Climate Change Exodus

Map of Migrations: SSP Manual 2007



Food Security Defense

Any society with a 3 day or 2 week supply chain, where empty stores with no back up local supply, is at risk of starvation.

No oil: no transport: no food.

Local food production can be oil independent, diversified, locally processed and locally controlled for assured local security.

This risk to you and your family is just too great and will only get worse as post oil adjustments take effect, as climate shifts, water and many key resources become scarce and prices rise.

Where is your soft landing spot?



North America & Changes

Human Induced Climate Change .

- Our over-use of resources has created a supply shortage: of all things we take for granted.

All of these now has induced more change:

- rising Oceans and
- mass migration.





Extreme Weather Risk



Erratic Weather means new use of now marginal lands will give smaller yields.

The combination of factors means population declines are inevitable.

Higher dependent areas will suffer larger losses of population.

Perceived new Edens will be inundated with migrants.

The overwhelming of new Edens will cause a collapse of their own.

The notion of cities of high rises around the Arctic is not sustainable.



Abrupt Climate Change

2008:

Climate Change Report, USA

Admission of the worst case IPCC forecasts.

We cannot stop global warming at 2° C

Growth of deserts in mid latitudes

Loss of irrigation water & farmlands

Rising oceans: by 60m in a century

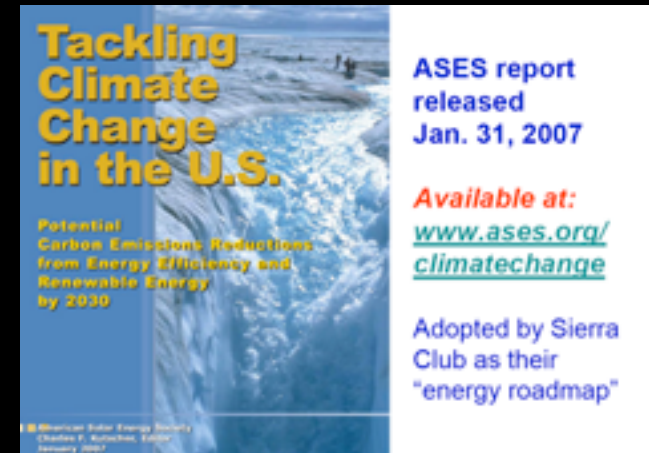
Technical fixes are not viable

There are few positive trade offs

Population crashes are unavoidable

- and meanwhile-

The end of cheap energy and
the loss of key resources
creates an industrial society collapse.



Final Report, Synthesis and Assessment Product 3.4
U.S. Climate Change Science Program

And the Subcommittee on Global Change Research

- U. S. Geological Survey
- National Oceanic and Atmospheric Administration
- National Science Foundation

USGS-CCSP Abrupt Climate Change Federal Advisory Committee

Patrick J. Bartlein, University of Oregon

Edward Brook, Oregon State University

Peter U. Clark, Oregon State University

Edward R. Cook, Columbia University

Thomas L. Delworth, NOAA

Shawn Marshall, University of Calgary

Carrie Morrill, University of Colorado

Richard Seager, Columbia University

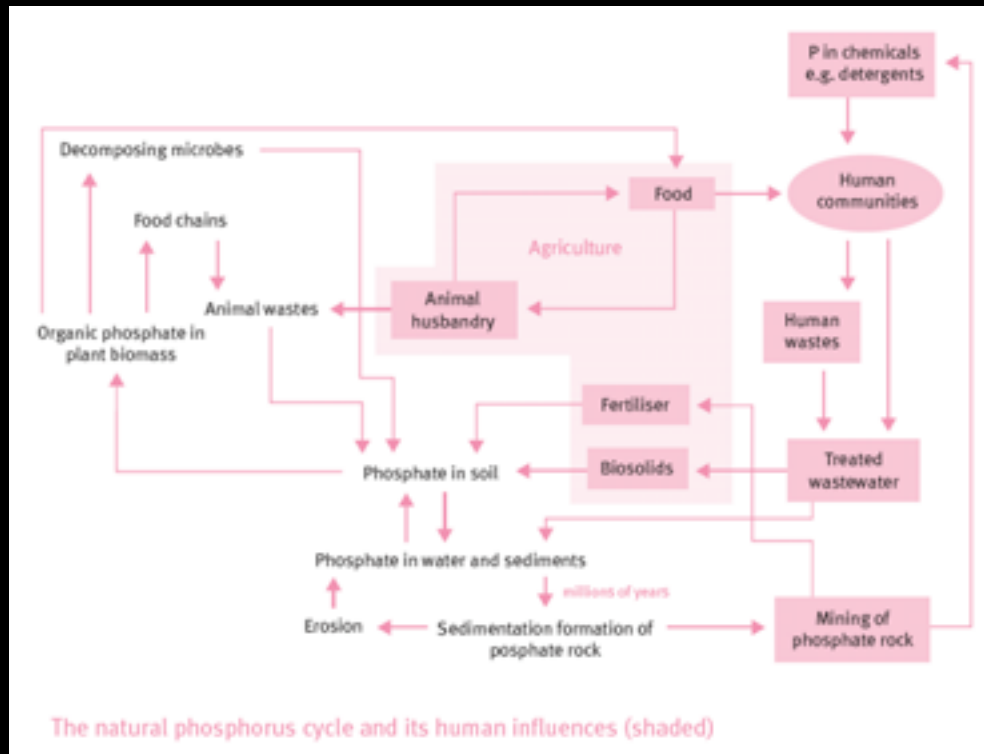
Konrad Steffen, University of Colorado

Andrew J. Weaver, University

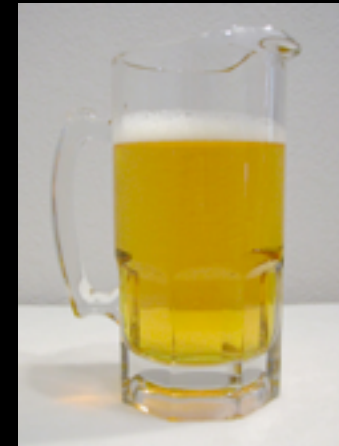
Robert S. Webb, NOAA



Phosphorus: a Snapshot Example



Source: The Nutrient Cycle: UK Report



Unavoidable Solution:
Curbside pickup of urine
for food cycle replenishment....

We have only a 40 year supply left due to our separation of food and waste streams. Scientific American May 2009.



Your Discussion Sections

- Try to get a grasp of the big picture Quantum Shifts by looking at the following sub areas of your lifestyle and community..... take a hard look at your pattern of community to see which parts of it can be sustained given any or all of the impending Global Impacts of Peak Oil, Climate Change, Mass Migration and or Rising Oceans.
- What can you learn from our history to now apply, or from the Third World which has not taken the same route up to now?

For lists of Socratic Questions for SSP sessions, go to www.plancanada.com, to SSPI Report, for seminar or round table session planning.



Localization Opportunity

- Marbelization: a short form description of a new pattern of community of limiting urban settlement to town and village scales with green fingers of sustainability; local self sufficiency is essential.
- A shift from road to rail, from oil to hydro & renewable is now not just a good idea, but essentially unavoidable.
- However, the sheer volume of travel, goods movement and overall energy waste has to be cut to 10% at least from 2009, by 2050.
- Lifestyle options of the future are modest but need not be uncomfortable: human expectations have to change the most.....



Railway Adaption Ability

- Lexington is a hub in the hills and farmlands, new rail lines will be needed to move new high intensity food crops to remaining and new towns and cities attempting to survive as dependent towns.
- Vancouver and BC will move to rail and steamship and sail, but city relocation from ocean rising, plus major agro-engineering of interior farmlands will require a concerted building plan and high social cost.
- As Lexington is smaller and closer to a sustainable scale in itself, it is leagues ahead in the capability to adapt to a post oil economy.
- As Vancouver is into the scale of large unsustainable Metro areas, changes to the pattern of community must be made.



Alternate Energy Resources

- New priority planning of energy use will shift how we all use energy to use it more wisely.
- Town and village community energy utilities for capture and use of renewable energy are economic necessities. (Geothermal, wind, solar, inter-building energy transfers....) High energy costs will do it.
- Re-scaling of all production in agriculture and relocation of industries will reduce energy needs, reduce consumption and increase reuse and recycling.
- The Economic Return on Investment escalation will force localization.

... but hope on Technical Rescue it very bad insurance...



Business As Usual -Just NOT Possible.

- Plan A: BAU, Delayed adaption to a post oil, climate change economy will make the cost and pain to the community worse, but also make it worse for the rest of society and the planet. A 4° C warming occurs
- Plan B: A lean economy with some technical help may also be too little, too late. Look at this as a new business opportunity as well as a protection of your greatest investment: your children. 3° C warming.
- Plan C: adapting for a crash due to failure of plans A & B, means most severe climate change, and severe social economic disruption. An overshoot into 5° warming means civilization collapse. 6° warming means planetary ecosystems collapse.

IPCC, Lovelock, Brown, Abrupt CC Report.....



Adaptive Lifestyle Choices

- How much of anything does anyone really need?
- Increased nominal wealth in the last century has not increased personal happiness.
- Can we find a way to work together to live with less and be happier too?
- What choice do we have?
- Less talk, more action, and fast.....

.... Solutions!



Food

- Food now raised in industrial scale monocultures are at risk of crash due to loss of water, oil for tractors, fertilizers and pesticides
- Long range transport plus competing demands quickly shuts off daily food goods at great distances
- The high energy cost of transport escalating means local food production is inevitable: what grows where you live?
- Reconfigure your community to make food production a priority.

Strategic, Sustainable Products & Essential Services are your own responsibility in the end: can you maintain a community so you are not acting alone?



Shelter

- Shelter based on long commutes will not be possible unless by rail.
- Large homes and wasted spaces will be abandoned in poor locale
- But doubling up, using space more efficiently will save time, energy
- A new sense of community is likely to follow, if cooperation rules.
- Oil age built forms will be adapted to new efficiencies.
- Multi-purpose use of space will be rediscovered by necessity.

Cooperation & Community are Essential to continuity of shelter.-
Where are your friends and community?



Community

- The pattern of change: Marbelization at all scales - to restore balance
- Death of suburbs could also mean new villages with farm belts.
- Small scale community patterns could revive direct democracy
- A redesign of governance is a natural option to build upon
- We had better make local community work, as large scale systems are at greatest risk of full or partial collapse. (High energy, high maintenance.)



Finance & Soft Landings

- “End of empire” stages are often accelerated by monetary inflation
- More money chasing less oil will inflate the price of essential items
- A devaluation of non-essential to life, deflation of oil age assets will occur.
- If we can avoid the false economy of inflation, we will manage transition much easier and avoid the worst of a crash of social networks and support systems.
- No country is immune, and the Third World could be safer, given a dependence on big systems was avoided.

Reference: see Shock Doctrine.



Mobility Changes

- If you travel a lot now to accomplish very little, this will change.
- Frequency and length of trips will factor down by quantum steps.
- Efficiency of transport and shift from oil to electricity means public rail and gondola networks must be ramped up now.
- Air travel will be scaled down drastically, so trips will be fewer but longer to compensate.
- Alternate technical solutions do not really fill the gap nor do they change the use of energy in the right direction to cut global warming.



Education & Culture

- Value for cost will become more a critical factor.
- Shortening school years and accelerating learning plus doubling up in use of facilities will be necessary to cut energy and monetary costs in these areas.
- Rediscovery of local culture and talent will occur, out of necessity.
- Efforts to hold on to the low cost high tech wizardry will be a goal in the face of a loss of support systems and irregular electrical service over at least an adjustment period as the economy shifts to another mode of operation.



Industrial Economy

- Escalating energy costs plus the loss of key materials in production processes will create a reversal in global trade. (Re-localization).
- Local production and local repair become the norm again.
- We all need to relearn lost skills and trades. (Lost arts, offshore?)
- We all need to add real value in our work in order to get paid.
- The rediscovery of old patterns of town, farm and industry, even in new locations, will alter the pattern of all communities as we seek a more stable and conserving lifestyle and economy.



Localization vs. Globalization....

Bear Market: Post Oil

- cars, trucks
- planes, oil freighters
- suburbs
- cities that are too big
- urban land in general
- industrial 'parks'



Bull Market: Post Oil

- horses, bikes, trains.
- blimps & Sail driven ships
- rural eco villages, urban villages
- cities that are patterned 'right'
- farm & commons
- industrial small scale, in-town.



SSP The Global Cities Project 2009 Strategic Sustainable Planning & Quantum Changes

A Two-City Region cross cultural comparative impact analysis. One size does not fit all, but also what can we learn from any one locale to apply to another: the SSP Global Cities Review.

Vancouver, BC, Canada

Differential impacts on Global Cities
Location, Climate, History, Social Makeup,
Culture, Differentials of Climate Change,
Post Oil Resilience in Community Patterns,
Ability to accept Refugees or to become
Refugees yourselves, impact of oil, water
and food crisis and then the Rising Oceans
triggering another wave of adjustments by 2050.

Lexington, Kentucky, USA

'Appalachian
Crossroads'

- Human Growth and cumulative impact on all other factors.
- Oil Age Planning Errors to fix- and now mass migrations
- Global Warming Accelerated impacts- and refugees seeking shelter & food
- Rising Oceans Impact on Coastal Cities- moves in all directions
- Food Crisis from loss of farmlands, loss of oil based fertilizer, transport...
- Mass migration differentials from combined systems failures
- Urban & Travel Systems collapse: all affecting population overshoot & corrections.



World Timeline: Human Overshoot, Tipping Points to Quantum Change, Changing the Pattern of Community and Human Society in Rapid Response Mode for Cultural Survival.

Balfour & Associates • Strategic Planning 2009
Vancouver Peak Oil Executive: New City Institute
MVTC/Trailers Cities Metro Vancouver Task Force

Continuing SSP Work

- Vancouver Peak Oil Executive
- New City Institute
- Metro Vancouver Planning Coalition
- Post Carbon Institute
- Metro Vancouver Resilient City Task Force
- UBC/SCARP: Dr. Bill Rees (Ecological Footprint)

Planning
for

Quantum

Change

Post Oil Reconfiguration of the Pattern of Community.

Compassion
Outrage
Wisdom
Contented Stewardship
Truth
Tolerance

