

Planning for Energy Descent

Back to Democracy

**Trumansburg, NY
26 October 2007**

Energy descent

Starting some time in the next 20 years, most of us will begin to live a completely different kind of life.

- Much less energy
- Much less material wealth
- Much closer to home

Living with decreasing energy is called ***energy descent***.

This presentation is about why energy descent is unavoidable and how to start planning for it.

A sure thing

Energy descent is unavoidable, for two reasons:

- Global warming
- Peak oil

Global warming is why we ***should*** radically reduce our use of energy.

Peak oil is why we ***will be forced to*** radically reduce our use of energy.

Greenhouse gases

Most climate experts agree that global warming is caused to a large extent by increasing levels of atmospheric carbon dioxide resulting from human consumption of fossil fuels.

We should substantially reduce our consumption of fossil fuels to prevent climate change from being even worse than it's going to be anyway.

But most people aren't clear on the everyday implications of such a reduction....

Reducing greenhouse gases

To reduce the amount of CO₂ in the atmosphere, humanity will have to reduce its production of GHGs

about 80 percent

over the next several decades.

Increasing efficiency won't reduce GHGs even enough to keep up with population growth.

Most of the necessary GHG reduction will have to be accomplished simply by ***making do with a lot less energy than we're used to.***

Maybe energy descent isn't such a good idea after all!

But it turns out that we have no choice....

Peak oil

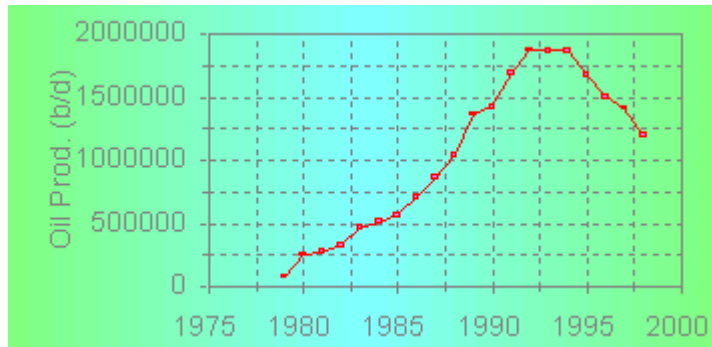
“Peak oil” refers to the point in time when global oil production reaches an all-time peak and begins to decline.

- This is how all oil extraction behaves – for individual oil fields, for countries, and over whole regions
- There is no real controversy over whether global oil production will peak; the question is when
- Credible estimates range from 2005 (already here) to 2030, with the majority predicting the peak of production to arrive by 2020
See our leaflet of selected mainstream expert assessments.
- As production declines while demand continues to increase, fuel prices will rise inexorably
- Rising prices will force ***a radical reduction in our use of energy***

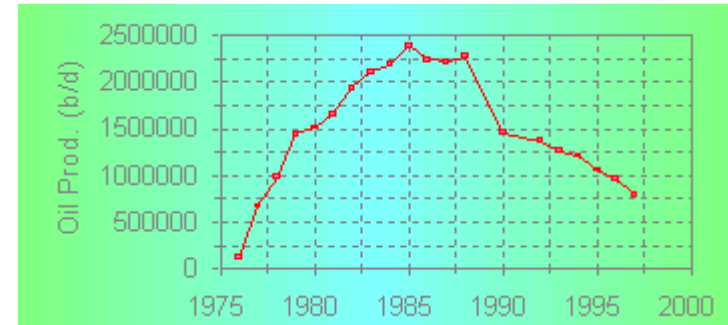
Let's take a closer look at this....

How oil extraction behaves

Norwegian North Sea oil production

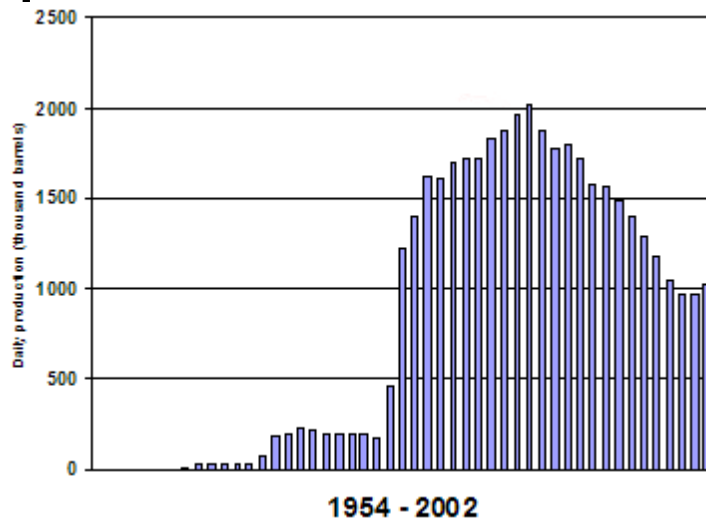


UK North Sea oil production



Blanchard, NKU

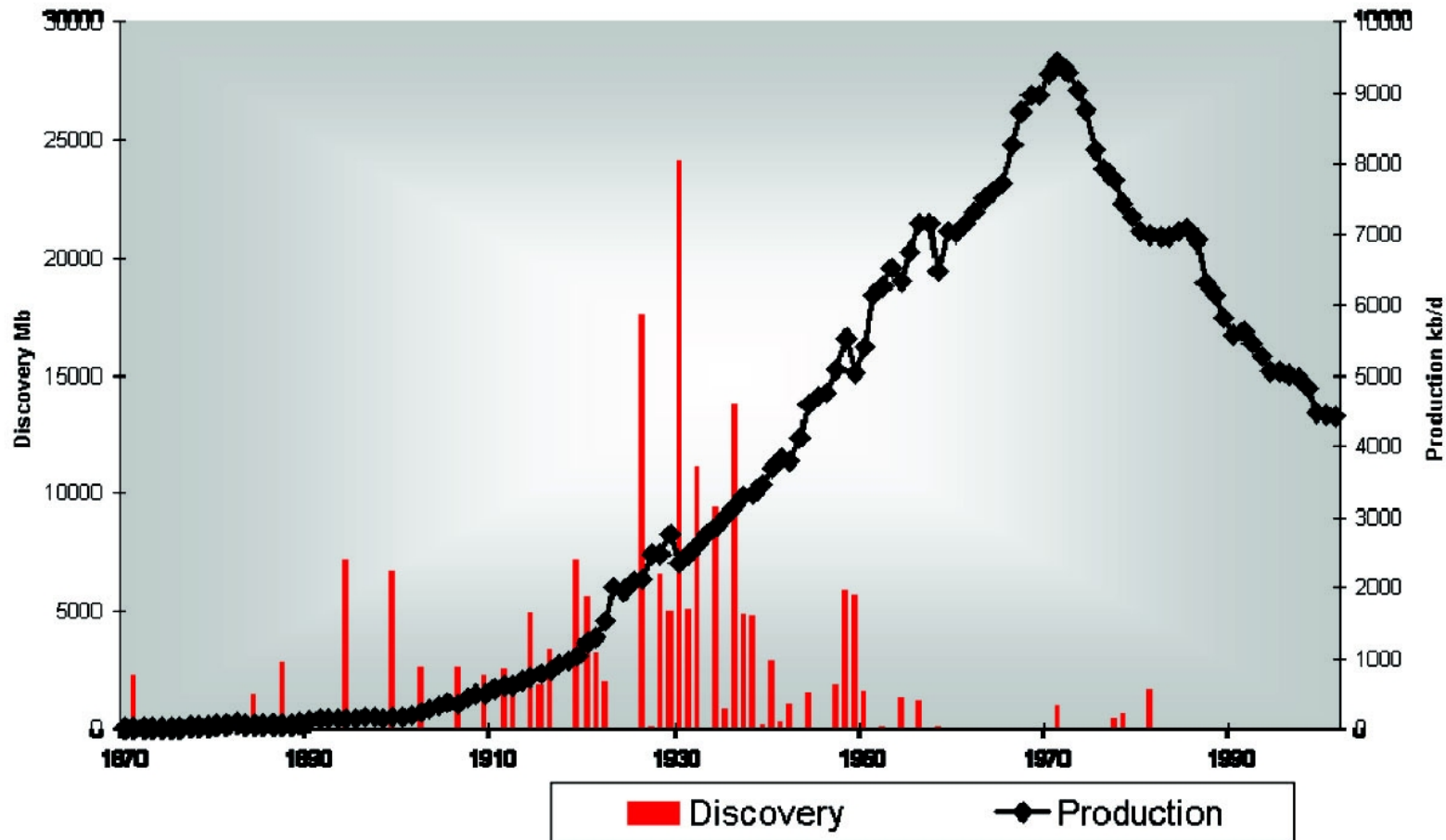
Alaskan oil production



In the typical case, oil extraction in a given area eventually reaches a peak and then enters an era of irreversible decline.

Production echoes discovery

US Conventional Oil in the Lower 48 states

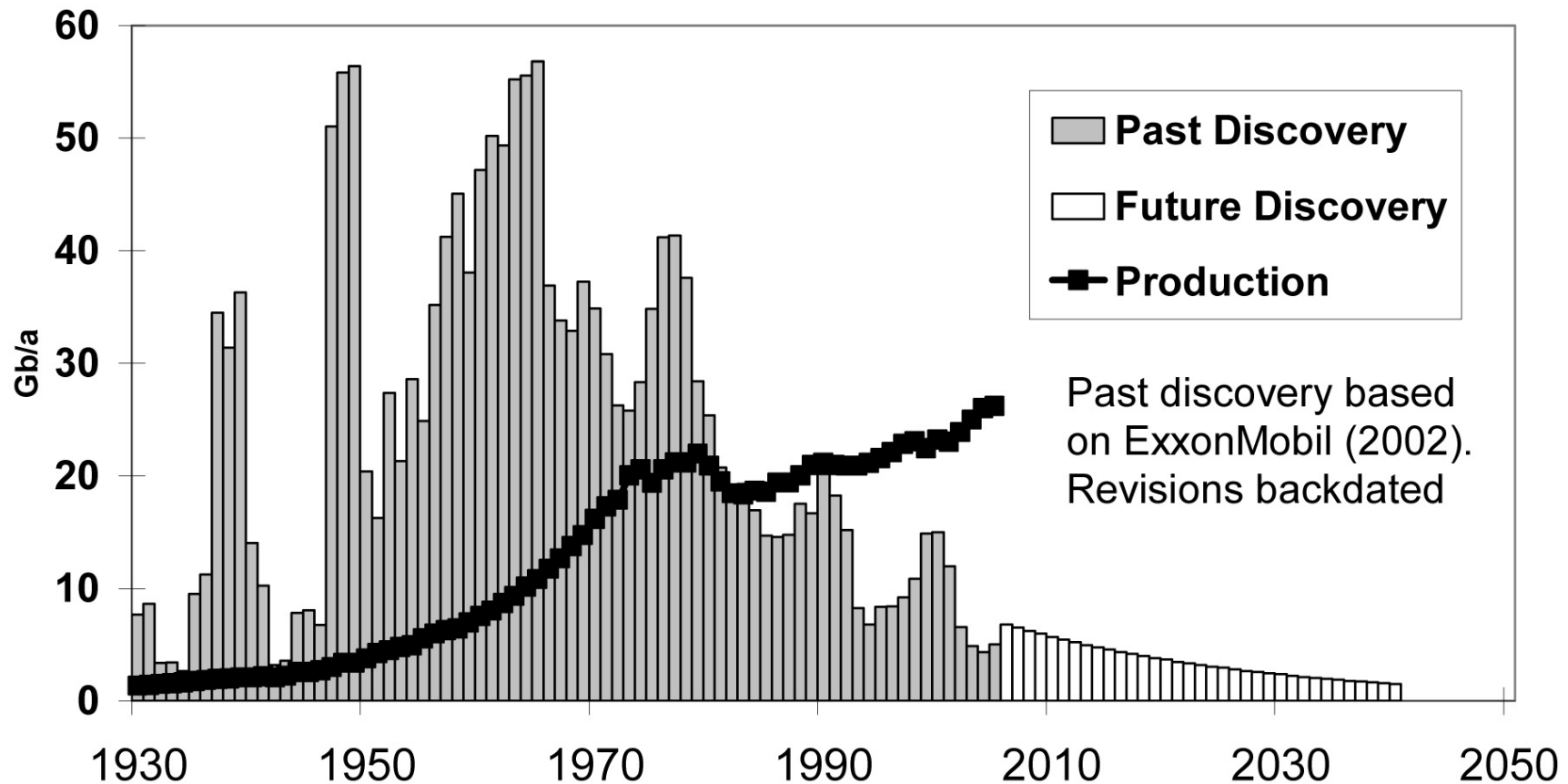


Source: Campbell/PostCarbon Institute

Averaged over a large area, the peak of discovery is followed many years later by the peak of production.

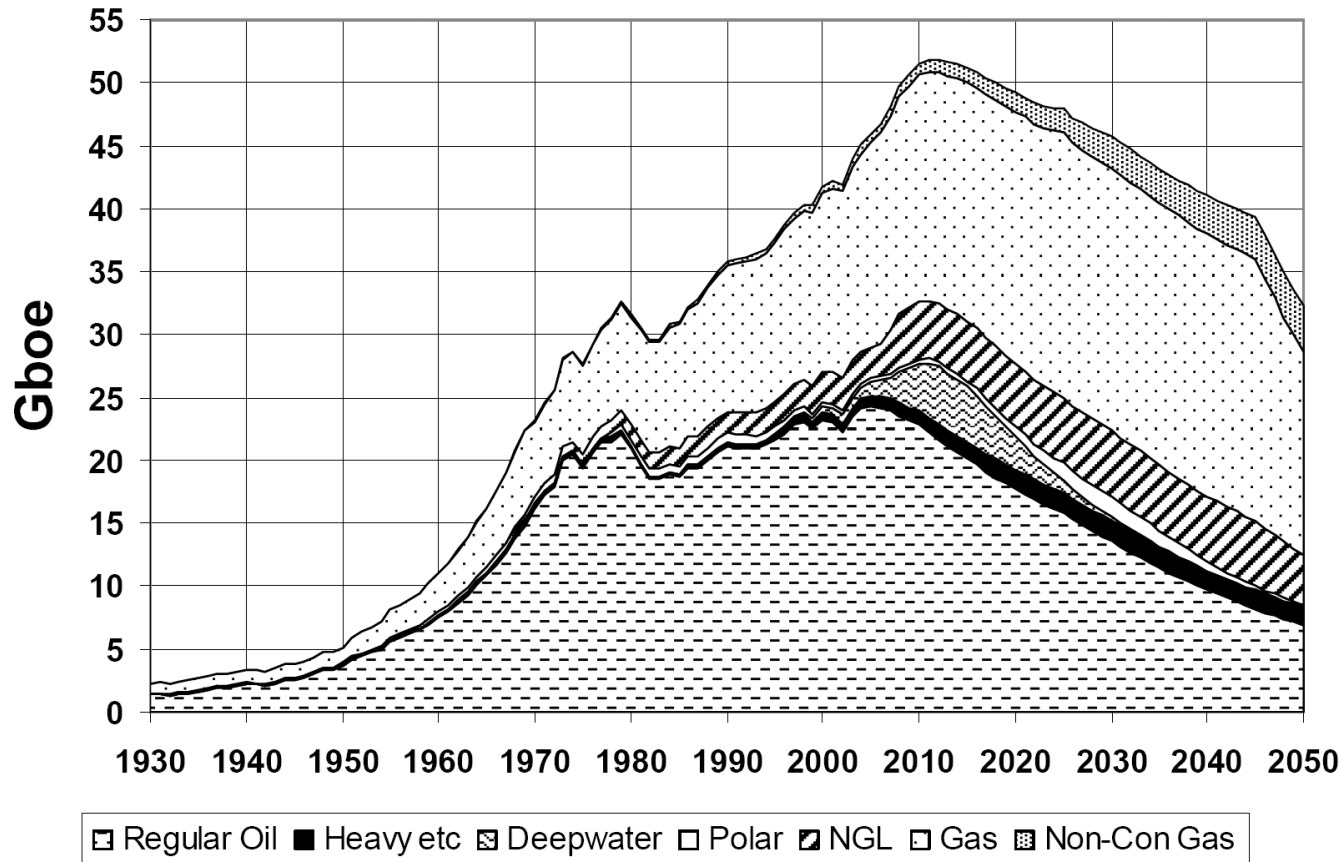
Global discovery and production

Global oil discovery peaked 40 years ago. The last year we discovered more than we used was 1981. Today we use five barrels of oil for every one barrel of oil we discover.



Source: ASPO

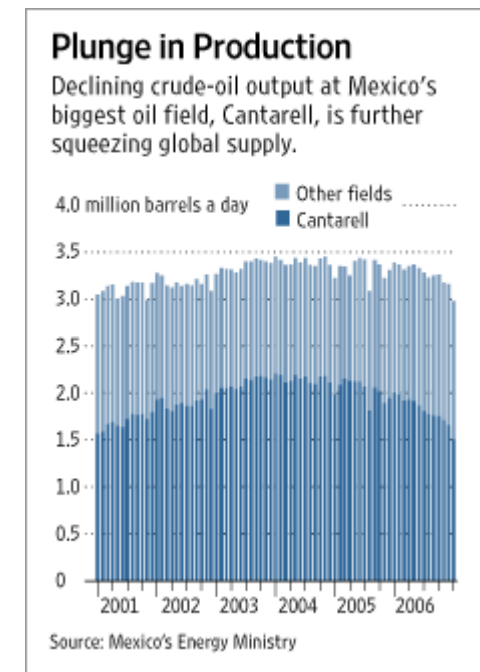
ASPO forecast



The best independent source of expert analysis appears to be a group of industry insiders and retired oil geologists called the Association for the Study of Peak Oil (ASPO). They project the peak of global oil and natural gas production to occur around 2011.

ASPO curve caveats

- Many experts believe that last-ditch efforts to maintain output will result in a plateau rather than a peak (though this will make the eventual decline more rapid)
- We appear to have reached the plateau about a year ago (mid 2006)
- It's possible that global production peaked when Mexico's giant Cantarell field peaked
- Market-driven demand destruction cycles will probably make this an "undulating plateau," obscuring the underlying trend
- "Export withholding" caused by increasing local demand in OPEC countries may create a market crisis much earlier than the geology would dictate



Wall Street Journal

Availability vs. price

- Oil and natural gas will ***always*** be available
- But several things will make them ***much more expensive*** after the peak of production
 - Gap between supply and demand
 - Increasing cost of extraction
 - Decreasing quality of product
- First sector to be affected by price will be transportation (both people and goods)
- But rising costs of oil and natural gas will eventually increase the price of practically everything

Prices and food production

- Over the last 70 years, we have increased the carrying capacity of the earth from about 1.5 billion people to about 6.5 billion people by increasing agricultural productivity
- This “green revolution” is based on
 - Mechanized farming (*input: diesel fuel*)
 - Long-distance transportation (*input: diesel fuel*)
 - Ammonia fertilizer (*input: natural gas*)
 - Pesticides and herbicides (*input: oil*)
 - Refrigeration (*input: various energy sources*)
 - Irrigation (*input: various energy sources*)
- As prices of oil and natural gas increase, food prices will rise dramatically
- “Peak food” is coming anyway due to soil and water depletion

Energy descent is inevitable

Peak oil means that within the next 20 years we will begin to use ***much less energy.***

- Alternative energy (including biofuels) can in the best case supply only about 4 percent of our energy needs by 2015 (U.S. DOE)
- Nuclear capacity is too expensive and energy-intensive to build out quickly
- And no alternative energy source (including hydrogen) can replace liquid fuels for our system of transportation as currently structured
- North American natural gas production peaked four years ago
- Coal will not save us (though it can certainly damage us)
 - U.S. coal production in terms of volume will peak 2020-2030, but *U.S. coal already peaked in energy terms five years ago due to ever-lower quality of the remaining coal*
 - Global coal production is estimated (best case) to peak around 2025 at about 30 percent above present production

Summing up peak oil

Over the next several decades, beginning probably by 2020:

- **Food** will become much more expensive, and food that travels any distance may become prohibitively expensive
- **Individual mobility** will be substantially reduced
- **Financial and investment crises** will develop as reduced growth erases current premiums on equities and real estate
- **Unemployment** will become widespread as decreased buying power reduces consumption
- This will look like an economic problem, *but there will be no purely economic solution*

Several other possible developments (war, runaway climate change, economic collapse due to other factors) could delay arrival of the peak for decades, *but they would all result in energy descent*

Implications of energy descent

Key understanding: In an industrial society,

energy = wealth

- Every manufactured object in the world results from an investment of energy
- Decreasing consumption of energy = decreasing levels of material wealth
- “Wealth” includes food, shelter, and mobility
- In a market economy, decreasing wealth is manifested as reduced buying power caused by inflation, lower wages, and unemployment
- The permanent end of continuing physical growth calls into question the economics of most instruments of financial growth as well

Implications for business

- Increasing costs of transportation will shorten supply chains and increase the competitive standing of locally produced goods
 - Local agriculture will out-compete distant factory farming, making local farming an attractive vocation again
 - Local manufacturing will out-compete distant durable goods production, particularly for heavy items
- “Big-box” and “just-in-time” models of sales and distribution may experience disruption and even collapse, resulting in unemployment but also presenting opportunities to rebuild local retailing
- We have to start planning how to *take advantage* of these opportunities
- And we have to stop basing development plans on long-term continuing use of the automobile — it’s just not in the cards

A sense of perspective

Tompkins County will likely be one of the best places in America to live in an era of energy descent. Our advantages include:

- Cold climate
 - less disease
 - more climate-change headroom
- Water
 - for drinking
 - for agriculture
 - for local hydropower
- Relative isolation combined with
 - good access to rail transportation
 - excellent access to water transportation
- Tolerant and highly educated work force
- Substantial agricultural assets



The silver lining

A life less dependent on cheap energy isn't such a bad thing.

- Community
- Family
- Self-reliance
- Spirituality
- Simplicity
- Ecological health

An indefinitely sustainable version of Tompkins County might look something like the way it did in 1900. We didn't used to think that was so bad.

The trick is to land there without getting hurt.

Preparation considered helpful

We cannot escape energy descent. Our choice is whether to prepare for it or just let it happen to us.

- Just about everything we should be doing for greenhouse gas reduction is what oil depletion will force us to do in a couple of decades anyway, so we might as well get started
- Economic harm, like climate change, is inevitable, but like climate change, it will be worse the longer we delay
- Dealing with climate change through reduced consumption helps to delay peak oil
- It also makes us less dependent on Middle Eastern oil
- As well as benefitting the environment

Our goal: A Prosperous Way Down (H. Odum)

Planned relocation

The best way to cope with energy descent is *relocalization*: a return to local production of essential goods and services.

- Food production and distribution
- Water
- Heating
- Transportation
- Emergency services
- Health care
- Education
- Manufacturing

TCLocal is a group of area citizens who believe that it's time to start planning for a more local future in Tompkins County.

TCLocal objectives

- Inform the community
- Build a database of local information (maps, statistics, climatological data, etc.)
- Create a relocation plan for Tompkins County
 - Identify key resources, people, and organizations
 - Front-load the first couple of years of planning
 - Identify the major challenges for our area
 - Take responsibility for our local future
- Create a template for use by other counties
- Create a practical solution by getting down into the *local details*

TCLocal research strategy

- The TCLocal Project Outline (on our web site) sets forth the questions that need to be answered for each research area
- At this point, all we have are questions, no answers
- The project will first accumulate data in a publicly visible repository and then attempt to answer the questions
- The current plan is to publish our findings as a series of white papers
- Please see our web site at <http://tclocal.org> for details
- The slides at the end of this presentation show some of the questions we're trying to answer

What County government can do

- Start with items that can be implemented at little cost to local government
- Look for synergies with greenhouse gas reduction
- Rebuild local production by buying local products and services
- Encourage alternative energy production in every way possible
- Figure energy descent into land use planning
- Promote household self-sufficiency, especially food production
- Develop a comprehensive energy descent plan
 - Example: Portland, OR
 - Example: Hamilton, ON
- Commission studies resulting in proposals for specific policy recommendations (tclocal is currently tasked with this)

What individuals can do

- Buy local products and services
- Increase your self-sufficiency
 - Compost waste and grow your own food
 - Get out of debt
 - Work closer to home
- Get to know your neighbors
- Invest what you can in your infrastructure
 - Insulation
 - Alternative energy
 - Roofing, plumbing, maintenance, water collection
- Encourage friends, family, neighbors, and co-workers to learn more about relocalization
- Prepare for volatility in food and energy prices

Recommended reading

ONLINE

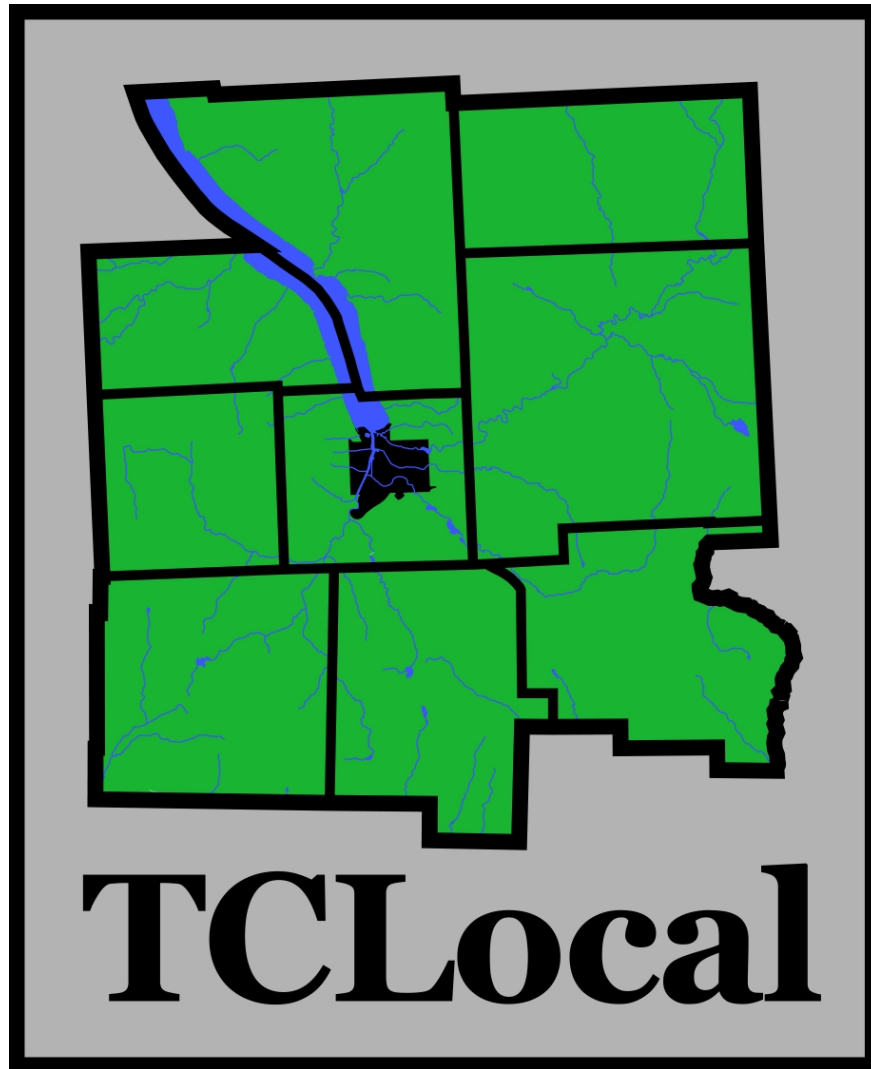
- **The Hirsch Report** (*Peaking Of World Oil Production: Impacts, Mitigation, & Risk Management, 2005*)
- **Descending the Oil Peak** (*Report of the City of Portland Peak Oil Task Force, 2007*)
- **GAO Peak Oil Report** (*CRUDE OIL: Uncertainty about Future Oil Supply Makes It Important to Develop a Strategy for Addressing a Peak and Decline in Oil Production, 2007*)

BOOKS (PEAK OIL)

- *The Party's Over and Powerdown* — Richard Heinberg
- *The Long Emergency* — James Howard Kunstler
- *Twilight in the Desert* — Matthew Simmons

BOOKS (LARGER PICTURE)

- *A Prosperous Way Down* — Howard Odum
- *Overshoot* — William Catton



Sample TCLocal Research Questions

Transportation

Gasoline prices will force us to travel more efficiently; this ultimately means public transportation.

Questions

- What's the actual advantage of buses over fully occupied cars? Should we be thinking about carpooling instead?
- Are bicycles a realistic mode of transportation in this climate?
- Who will need an expanded TCAT? Where should it be expanded? How will we pay for the expanded service? Who will need subsidies?
- Can our school bus system also be used to get people to work?
- Is increased housing density a realistic solution?
- How do we maintain roads and bridges?

Food

Rising prices will force much food production to be local.

Questions

- What is the carrying capacity of the county's current agricultural base? How can we return as much land to production as possible? How can we substitute for increasingly expensive synthetic fertilizers and insecticides?
- What is the most productive use of our agricultural land?
- How can City of Ithaca residents raise food and poultry? What changes need to be made in zoning laws?
- What mix of local crops is required to maintain health? How do we make sure people have access to enough of them?
- How can we process and distribute limited supplies fairly?
- How can we preserve foods over the winter?

Water

Summer droughts and the cost of pumping will threaten our water supply.

Questions

- What are the energy dependencies of our current system? What is its age and life expectancy?
- How will we supply rural customers when wells run dry?
- How can water catchment systems be adapted to our climate? Are greywater systems more practical than catchment systems?
- Do we have the local resources to treat water contamination and prevent a repeat of the 1903 Ithaca typhoid epidemic?
- What would a water rationing system look like?

Health care

Decreasing individual mobility will make it difficult to access centralized health services.

Questions

- Which is more efficient — providing public transportation to central facilities or establishing a system of local clinics?
- Should we petition the state to allow some common medical procedures to be shifted from physicians (MDs) to nurse practitioners (NPs)?
- Should we return to the pre-WW2 system of home health care delivered by County Public Health?
- How do we define “essential medical services”?
- How do we cope with the aging baby boomers?

Education

In addition to the school transportation problem, there is the issue of what we should be training people to do.

Questions

- Should we continue to maintain a separate parallel system of transportation just for school children?
- Is it more efficient to bus students to centralized facilities, or is it better to return to the school system we had a century ago?
- What kinds of jobs will be available, and how can we provide training for them?
- Can we revive the apprenticeship system for skilled trades?
- How do we direct people into trades best suited to their aptitudes and the needs of the county?

Heating and shelter

Heating will be a critical problem for our area as fuel prices rise.

Questions

- What are the most cost-effective ways to insulate existing housing at a level that will make heating affordable?
- How much will it cost to insulate older homes in the county? What state programs are available to help with this?
- How many homes heat with wood? How many should?
- What is the county's sustainable yield of firewood? How does this change if more land is returned to food production? What about grass pellets, etc.?
- How many people can be temporarily housed in county facilities in a heating emergency?

Alternative energy

As much energy as possible must be produced locally.

Questions

- How can the county aid residents in taking advantage of state subsidies for alternative energy?
- What are the sites best suited for the return of hydropower and how does zoning need to change to make use of them? What percentage of local energy could come from hydropower?
- Should the county fund solar, hydro, and wind power developments through bonds or other indebtedness?
- How can we ensure that local natural gas deposits are used to meet local needs?
- Does it make sense to encourage local biofuel production?

Agriculture as a local industry

Agriculture is the largest single land use in the Cayuga Lake watershed and probably our county's largest potential source of jobs and income.

Questions

- What are the most profitable uses of our agricultural land?
- How do we ensure adequate pollination?
- How can we train (and in some cases retrain) people for agricultural jobs?
- Should the county sponsor loan programs to encourage the establishment of local farms? What about the tax structure?
- How can we persuade our agricultural research center to determine the most productive and sustainable farming regimen for this particular area?

Manufacturing as a local industry

Local manufacturing will increase in importance as transportation becomes more expensive.

Questions

- What kinds of manufactures should we target (historically clocks, guns, airplanes, typewriters, gears, chains,...)?
- How do we train people for those jobs?
- Should the county subsidize the establishment of target industries with loans and tax breaks?
- How can we restore the small-business infrastructure (warehousing, distribution, sales) needed to support local production?