

Whatcom County/Bellingham Solutions from a Peak Oil Task Force

Peak Oil – Introduction and Definition

“The peaking of world oil production presents the U.S. and the world with an unprecedented risk management problem. As peaking is approached, liquid fuel prices and price volatility will increase dramatically, and, without timely mitigation, the economic, social, and political costs will be unprecedented.”ⁱ

So begins the Executive Summary of a 2005 risk management report commissioned by the U.S. Dept. of Energy. Recognizing that oil is a finite natural resource, subject to depletion, the term "Peak oil" refers to the point in time when the maximum rate of global petroleum production is reached, after which the rate of production enters its terminal decline.ⁱⁱ Following a few years of flat production rates, decline in production rates will reach 3-5% per yearⁱⁱⁱ and the decline will continue indefinitely until virtually no oil will be available by 2100. This situation means that in the coming years, with unpredictable timing and severity, oil and related fuels will be more expensive and less readily accessible, resulting in dramatic impacts on what we consider normal daily activities.

The concept of Peak Oil dates to the 1950s when M. King Hubbert determined the approximate year when half of the world's supply of oil would have been extracted. His predictive model gained credibility when he correctly estimated the peak of oil production in the U.S. to occur in 1970-71.^{iv} Although energy experts disagree on the exact year that global oil production will peak, many, including oil industry CEOs^v, have declared publicly the peak will occur before 2020, and some believe we are at or near peak now.^{vi} Global production rates have been flat from 2005-present, and it appears increasingly likely that permanent decline could begin by 2010-2012. Energy experts also predict natural gas will peak sometime between 2018 and 2030.

A proactive approach to preparing for diminished energy supplies will position Whatcom County to better adjust to this inevitable situation with minimal disruption to our economy and social structure.

Our Local Problem and the Consequences^{vii}

Fifty years from now, the peak of global oil production will be a distant memory. Despite the apparent breadth of current projections, even the most optimistic forecasts offer little time to adapt given the very long lead times required to change such things as transportation and building infrastructure.

Of all the impacts from rising oil prices, the clearest are those on **transportation**, which will experience profound pressure to shift toward more efficient modes of travel. For personal travel, this means transit, carpooling, walking, bicycling and highly efficient vehicles. Transportation of freight will become more costly and either decline or shift modes from air and truck to rail and boat. Population may shift to city centers, and density and mixed-use buildings will increase.

American **food production and distribution** have become highly dependent on fossil fuels, accounting for 17 percent of U.S. energy consumption. Because of this, higher oil and natural gas prices are expected to lead to a decline in the amount and variety of food produced and available locally, even with Whatcom County's supply of prime agricultural lands. Food prices will rise, further straining the ability of low-income households to put food on the table.

Like agriculture, **the economy** as a whole is expected to experience significant disruption and volatility. Impacts will vary widely by industry and firm. Bellingham and Whatcom County are likely to see increased demand in the development of a clean energy sector. Nevertheless, many of Bellingham and Whatcom County's industries are dependent on national and global markets, and business start-ups and failures are likely to increase.

Unemployment could increase. This is of particular concern, since **social services** are already stretched to their limits. Vulnerable and marginalized populations are likely to grow and will be the first and hardest hit by rising oil prices. Increasing costs and decreasing incomes will reduce health coverage and further stress the health care system, which is already in crisis. Heating, maintenance, and monthly housing costs will consume a larger share of household budgets and push people toward lower-quality housing choices at the same time that auto transportation costs increase dramatically. First responders, especially police, are likely to be further taxed as social service agencies struggle to meet demand.

The U.S. Department of Energy's risk management consultants stated in 2005 that, *"The problems associated with world oil production peaking will not be temporary, and past 'energy crisis' experience will provide relatively little guidance. The challenge of oil peaking deserves immediate, serious attention, if risks are to be fully understood and mitigation begun on a timely basis"*^{viii}

Implications in the United States

Oil production in the U.S. peaked nearly forty years ago; however, a crisis was averted by importing sufficient oil from international sources to meet the shortage between U.S. demand for oil and its oil production. Now we face the same problem on a worldwide scale.

Discovery of new oil peaked worldwide in the mid 1960s,^{ix} and now new oil discoveries are replacing only a modest fraction of the oil shortfall even though the industry has researched and drilled on every continent and in the deepest oceans. Furthermore, we cannot import our way out of this situation, since the shortfall is worldwide. Worldwide conventional oil production has not increased since 2005.^x

With increasing demand and lower production capacity, due to depleted oil fields, an oil shortage has begun to occur which is already causing oil prices to skyrocket above historic levels - rising from \$20/barrel in 2002 to \$115/barrel as of April 16, 2008.

Although the U.S. holds just 5% of the world's population, it consumes 25% of the world's energy. The U.S. currently imports 60% of its oil supply, and much of that supply is from countries that have passed their own peak of production and are in decline. As U.S. production continues to decline, the desire for imports will increase. However, the oil exporting countries experiencing production declines, are also experiencing their own increases in demand for internal consumption, and therefore the net amount of oil available for export has begun to shrink. The only export availability projection to date^{xi} indicates that the U.S. could face zero imports around 2030, which would mean that U.S. oil consumption could decline to 20% of today's level. In Whatcom County, with most of its supply from Alaska, the corresponding figure would be around 35% of today's consumption (all supply from Alaska, no imports). However, these projections assume world economic stability and no change in the system of distributing oil around the world and should be considered optimistic.

We also need to plan for natural gas decline. Natural gas has several uses: electricity production, space and water heating, food preparation, industrial process heat, and fertilizer production. North American natural gas production rates have been in decline for a few years, and there is a high likelihood that the decline will become quite steep within 5-10 years. Comparable amounts of Pacific Northwest (PNW) gas come from Canada (in decline) and the U.S. Rockies (flat). The precipitous decline of natural gas in the PNW will likely lag that of the rest of the U.S. by a decade or so, unless new pipelines connecting the West with the Midwest begin to divert a significant fraction of Western gas supplies.

Energy Alternatives

Due to the uniquely high energy density of oil as well as the low energy cost for production, sufficient supplies of fossil fuel substitutes to meet the global energy demand are unlikely to be available in the immediate future.^{xii} Alternative sources of transport fuels from tar sands, coal, or oil shale require high energy inputs and increase total carbon dioxide emissions and provide inherently low production rates. Further, the potential for biomass fuels to replace petroleum is limited due to competition with food crops and the need to maintain biological diversity. The world-wide rush to biofuels has already caused prices of all grains to more than double during the past two years.

There are no existing liquid fuel alternatives that can meet more than a fraction of our current needs. If all U.S. cropland were put into ethanol production, it would provide only half of our liquid fuel needs and obviously no food.

The study sponsored by the U.S. Department of Energy^{xiii} demonstrated that a ten to twenty year lead time is required to effectively transition from economic dependence on petroleum. However, current measures supported by the federal government will replace only 3 weeks worth of gasoline consumption when fully implemented by 2012.^{xiv} In addition, these subsidies for ethanol and other biofuels come at a very high cost to our food supply.

Implications for Bellingham and Whatcom County

The governments, citizens and businesses of Whatcom County depend on oil and natural gas for their economic welfare and their most critical activities, including transportation, food supply, water delivery, health care and electricity. Yet many Whatcom County residents and businesses are not currently aware of the full implications of an impending decline. Residents and businesses will benefit from a community-based task force focused on evaluating the effects and developing a response strategy to the peak energy crisis.

Whatcom County and the City of Bellingham have recently adopted programs to reduce energy use and to mitigate for greenhouse gas emissions. They can now take a leadership role in an important economic and societal issue during the next half-century.

Because it is almost certain that oil prices will increase even further as the oil shortage worsens, and because the availability of this energy source may be erratic, it is vital that citizens know what to expect and what they can do to organize and prepare themselves and their community for increased energy scarcity. Around the world, citizens are prompting their local governments to prepare for the peak oil situation by taking steps to “relocalize” their economies and ensure their ability to function with limited supplies of oil and natural gas.

What will we do here in Whatcom County? Will the land use policies, infrastructure decisions, and transportation improvements we are currently investing in help alleviate or exacerbate these problems? Will we make different decisions with peak oil in mind?

Proactive communities will find answers to these and additional questions as we adjust to a new paradigm less dependent on imported energy supplies. The time to start answering these types of questions is now, and that is the work this task force will begin.

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- ⁱ Robert L. Hirsch, R. Bezdek, R. Wendling, "Peaking of World Oil Production: Impacts, Mitigation, & Risk Management," report prepared for and sponsored by U.S. Dept. of Energy, February 2005
http://www.netl.doe.gov/publications/others/pdf/Oil_Peaking_NETL.pdf
- ⁱⁱ http://en.wikipedia.org/wiki/Peak_oil
- ⁱⁱⁱ Dick Cheney, speech at the London Institute of Petroleum, Autumn 1999
http://www.peakoil.net/Publications/Cheney_PeakOil_FCD.pdf; Maxwell, Charles T., "The Gathering Storm," Barron's, Nov. 14, 2004. <http://www.energybulletin.net/3161.html>
- ^{iv} Brown, J.J. & Khebab, "M. King Hubbert's Lower 48 Prediction Revisited," March 6, 2006
<http://graphoilogy.blogspot.com/2006/03/m-king-hubberts-lower-48-prediction.html>
- ^v Van der Veer, J. (Shell CEO), "Two Energy Futures"
http://www.shell.com/home/content/aboutshell-en/our_strategy/shell_global_scenarios/two_energy_futures/two_energy_futures_25012008.html; Thierry Desmarest (Total CEO), Le Monde, Oct. 31, 2006 <http://www.eurotrib.com/story/2006/11/6/4357/22826>; Dr Jim Buckee (Talisman Energy CEO, retired), audio interview ABC Local Radio: "It is the underlying decline of the world's major fields that is the dominant driving factor here." <http://www.abc.net.au/pm/content/2008/s2149330.htm>
- ^{vi} Wikipedia, Timing of Peak Oil: http://en.wikipedia.org/wiki/Peak_oil#Timing_of_peak_oil ; Simmons, M. "The Peaking Of Fossil Fuels And The Transformation Of The National Security Environment, Pentagon Briefing," Feb. 2008.
<http://www.simmonsco-intl.com/files/Pentagon%20Briefing.pdf>
Energy Watch Group, "The Oil Supply Outlook," October 2007
http://www.energywatchgroup.org/fileadmin/global/pdf/EWG_Oilreport_Summary_10-2007.pdf
- ^{vii} "Descending the Oil Peak: Navigating the Transition from Oil and Natural Gas, the Portland Peak Oil Task Force Final Report," March 7, 2007. <http://www.portlandonline.com/osd/index.cfm?c=ecije>
- ^{viii} Hirsch, et al. http://www.netl.doe.gov/publications/others/pdf/Oil_Peaking_NETL.pdf
- ^{ix} Campbell, CJ (2000-12). Peak Oil Presentation at the Technical University of Claustha.
<http://energycrisis.org/de/lecture.html>
- ^x According to the EIA's daily average of world oil production: 72,512 mmb/d in 2004; 73,807 mmb/d in 2005; 73,539 mmb/d in 2006; 73,274 mmb/d in 2007.
<http://www.simmonsco-intl.com/files/NYC%20SCI%20Investor%20Lunch.pdf>
- ^{xi} Brown, Jeffrey J., and Foucher, Samuel, "A Quantitative Assessment of Future Net Oil Exports by the Top Five Net Oil Exporters." <http://www.energybulletin.net/38948.html>
- ^{xii} Hirsch et al.
- ^{xiii} Hirsch et al.
- ^{xiv} EIA Renewable Energy Sources: A Consumer's Guide.
www.eia.doe.gov/neic/brochure/renew05/renewable.html

2007 EPA Renewable Fuel Standard Program: “The Renewable Fuel Standard program will increase the volume of renewable fuel required to be blended into gasoline to 7.5 billion gallons by 2012.” (3 weeks of U.S. gasoline supply.) <http://www.epa.gov/orcdizux/renewablefuels/index.htm>

^{xiv} “Local Government Responses to Peak Oil, Post Carbon Cities.” Lists all known sub-federal government actions in the U.S. and Canada made specifically in response to peak oil.
<http://postcarboncities.net/peakoilactions>

General Reference Material

The Energy Bulletin Peak Oil Primer: <http://energybulletin.net/primer.php>

Sustainable Bellingham's "Peak Oil Primers" page:
<http://sustainablebellingham.org/wiki/wikka.php?wakka=WhatIsPeakOil>

U.S. General Accounting Office (GAO), “**Crude Oil: Uncertainty about Future Oil Supply Makes It Important to Develop a Strategy for Addressing a Peak and Decline in Oil Production**” - Report to Congressional Requesters, February 2007
<http://bartlett.house.gov/uploadedfiles/GAOCrudeOil.pdf>

Post Carbon Cities: A website to help prepare local governments for energy and climate uncertainty. A valuable set of resources on energy and climate change, designed specifically for the people who work with and for local governments.
<http://postcarboncities.net/>

Portland Peak Oil Task Force: 86 Page Final Report - "Descending the Oil Peak: Navigating the Transition from Oil and Natural Gas"
<http://www.portlandonline.com/shared/cfm/image.cfm?id=145732>

Portland POTF: Download the 6 page Executive Summary
<http://www.portlandonline.com/shared/cfm/image.cfm?id=150016>

Portland Peak Oil Task Force Briefing Book
<http://www.portlandonline.com/shared/cfm/image.cfm?id=126582>

White Paper: Future Oil Supply Uncertainty and Metro
<http://www.metro-region.org/article.cfm?articleid=18951>

A Tank of Gas, A World of Trouble, by Pulitzer Prize winning journalist Paul Salopek.
Comprehensive coverage from The Chicago Tribune. <http://www.chicagotribune.com/chi-oilsafari2-htmlstory.0,5759205.special>

Recommended Books

Kenneth S. Deffeyes (2001), *Hubbert's Peak: The Impending World Oil Shortage*
Richard Heinberg (2003), *The Party's Over: Oil, War and the Fate of Industrial Societies*
Richard Heinberg (2004), *Powerdown: Options and Actions for a Post-Carbon World*
Julian Darley (2004), *High Noon for Natural Gas: The New Energy Crisis*
William R. Catton, Jr. (1982), *Overshoot: The Ecological Basis of Revolutionary Change*
Kenneth S. Deffeyes (2005), *Beyond Oil; the View from Hubbert's Peak*.
John G. Howe, 2003/2005, *The End of Fossil Energy, and the Last Chance for Sustainability*.
David Strahan (2007), *The Last Oil Shock: A Survival Guide to the Imminent Extinction of Petroleum Man*
Dale Allen Pfeiffer (2006), *Eating Fossil Fuels: Oil, Food and the Coming Crisis in Agriculture*.
Simon Dresner (2002), *The Principles of Sustainability*.
Andres R. Edwards, *The Sustainability Revolution: Portrait of a Paradigm Shift*.
James Howard Kunstler (2005), *The Long Emergency: Surviving the Converging Catastrophes of the Twenty-first Century*.
Matthew R. Simmons (2006), *Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy*.
Richard Heinberg (2007), *Peak Everything: Waking Up to the Century of Declines*.
Daniel Lerch (2007), *Post Carbon Cities: Planning for Energy and Climate Uncertainty*
A guidebook on Peak Oil and Global Warming for Local Governments.

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