



The Best of The Oil Drum 2005-2010

Posted by [Nate Hagens](#) on November 22, 2010 - 9:00am

Topic: [Site news](#)

During the past 5 years we have had a continuing stream of energy-related content appear on these pages (Super G tells me 6,366 individual pieces). In the busiest of times, with a staff of over 20 volunteers, we were posting two articles or analyses per day. Oft times 50-60 hours of work (or more) on a post resulted in only 12 hours live on the main page. We thought it might be a good idea to have one archive of some of this content that has disappeared down the rabbit hole. Below is such a list, containing, in the opinion of each author, the 'best of The Oil Drum' from the past 5 years. It is a first pass at collating some of the insightful, relevant content highlighted over the years here exploring the details and implications of an early peak in global oil production. The meta-list is in alphabetical order, by author last name. Much if not most of this material is still highly relevant today. If you are interested in learning about energy and society, please consider bookmarking this archive as a resource. (Stories are still searchable by keyword/subject in the upper left).

Ugo Bardi

["Peak Civilization": The Fall of the Roman Empire](#)

A post attempting to apply system dynamics to the fall of the Roman Empire which - as far as I know - has not been done, so far.

[Cassandra's curse: how "The Limits to Growth" was demonized](#)

With its scenarios of civilization collapse, the book shocked the world perhaps more than Cassandra had shocked her fellow Trojan citizens when she had predicted the fall of their city to the Achaeans. Just as Cassandra was not believed, so it was for the "Limits to Growth" which, today, is still widely seen as a thoroughly flawed study, wrong all along.

[The Universal Mining Machine](#)

Why can't we build a universal mining machine here, on Earth, and stop worrying about running out of mineral resources?

[Mind-sized Hubbert](#)

What is it, exactly, that causes production peaks for oil and for other non renewable resources?

[The dark side of coal - some historical insights on energy and the economy](#)

In this post, I start to tell the story of coal in Italy and how the fortunes of the country went in parallel with those of coal well until mid 20th century.

[The church, the peak, and my old watch](#)

A post about leaving something that lasts a long time and that doesn't need precious resources that can't be replaced.

[The post-peak car](#)

A fantastic account of how a 1970s Fiat 500 has been retrofitted with batteries and an electric motor to create the Post Peak Car.

[How to Drive your Elephant - Dealing with Complex Problems](#)

How elephant driving may be seen as as a metaphor for controlling complex systems.

[Peak Minerals](#)

A post taken from a report co-authored with Marco Pagani which examines the world production of 57 minerals reported in the database of the United States Geological Survey (USGS) and makes the case for the peak and decline of many of these minerals in the near future.

[Peak Caviar](#)

"Peak Caviar" is another confirmation of how common the "Hubbert" behavior is. It doesn't matter if a resource is theoretically renewable, as sturgeons and whales are. If sturgeons or whales are killed much faster than they can reproduce, then they behave as a non renewable resource; just as crude oil.

[Read more posts by Ugo Bardi](#)

Arthur E. Berman

[Arthur Berman talks about Shale Gas](#)

[McMoRan Davy Jones Gas Discovery](#)

Co-written with Joshua H. Rosenfeld, this post looks at a significant discovery in the U.S. Gulf of Mexico by the McMoRan Exploration Company that may contain 2-6 trillion cubic feet (Tcf) of natural gas reserves.

[Shale Gas—Abundance or Mirage? Why The Marcellus Shale Will Disappoint Expectations](#)

Shale gas plays in the United States are commercial failures and shareholders in public exploration and production (E&P) companies are the losers. This conclusion falls out of a detailed evaluation of shale-dominated company financial statements and individual well decline curve analyses.

[BP Macondo Blowout - Static Top Kill vs. Bottom Kill: Weighing the Risks](#)

A post co-written with William Semple.

[Is the Drilling Moratorium Long Enough? No, Not Really](#)

The key issues around the drilling moratorium as I see them.

[What caused the Deepwater Horizon disaster?](#)

The blowout and oil spill on the Deepwater Horizon in the Gulf of Mexico was caused by a flawed well plan that did not include enough cement between the 7-inch production casing and the 9 7/8-inch protection casing. The presumed blowout preventer (BOP) failure is an important but secondary issue.

[ExxonMobil's Acquisition of XTO Energy: The Fallacy of the Manufacturing Model in Shale Plays](#)

Most analysts believe that the ExxonMobil acquisition of XTO Energy (XTO) represents a dramatic shift in strategy by the premier exploration and production (E&P) company, and a validation of shale plays. It is neither. The move represents a considered and deliberate choice that acknowledges diminished opportunities for the oil giant to add and replace reserves.

[Read more posts by Arthur Berman](#)

Jason Bradford

[The Thermodynamics of Local Foods](#)

I wrote this in response to a slew of media attention that argued against local foods. However, based on thermodynamics, only a predominantly local food system will be sustainable in the long run.

[Ecological Economics and the Food System](#)

This is a summary of energy use in the U.S. food system placed in the context of ecological economics. Our current food system is structured inappropriately for long-term viability, and the kinds of shifts required to make it more enduring are discussed.

[Save it for the Combine](#)

Few people understand how critical certain technologies are to their survival and way of life. The combine allows one person to harvest the food for hundreds, saving enormous labor while using liquid fuels. I argue that any rationing of liquid fuels or use of biofuels be prioritized for the combine.

[The Food System and Public Policy](#)

Many in the U.S. like to think we live in a free market economy. But when it comes to development of the food system public policy explains much of what we see.

[The Food System and Resilience](#)

Resilience is a concept from ecology that can be applied to any complex system. When the current food system is examined using a resilience framework it is found to be very fragile. The essay concludes by outlining the possible emergence of more resilient food systems given new economic and energetic realities.

[Energy Descent and Agricultural Population](#)

This article includes a graph that combines data on energy use and percent rural population, showing that more energy in a society lowers the proportion engaged in farming. Given the shape of this relationship, can we make some educated speculations about shifting labor demographics in highly industrialized nations during energy descent?

[Scenario 2020: The Future of Food in Mendocino County](#)

I believe there's the possibility of a near-term collapse of complex societies given a financial shock, perhaps precipitated or exacerbated by political and energy crises. This photo essay conveys this potential from an imagined future, with an emphasis on the food system.

I have an interest in economics, in the broad sense, of how and why people and societies chose to invest and consume, and what this means for resources and the environment. The following three essays share a common theme: resources are only constrained in a world with exponentially growing demand for more stuff. Reducing demand is more important than increasing supply, and ultimately we have no choice. However, conscientious curtailment comes up against both engrained psycho-social reward systems, which are largely explored in the first two essays, and the structure of our financial system, which is touched upon in the third.

[Finding Healthy Addictions](#)

[Dopamine Returned on Energy Invested \(DREI\)?](#)

[Advice to Pres. Obama\(#6\): Beware the Hungry Ghosts](#)

[Read more posts by Jason Bradford](#)

Joules Burn

[Khurais Me A River](#)

An early look at the development of the Khurais oilfield in Saudi Arabia using satellite imagery, reviewing past efforts to produce from the field.

[Ghawar Numerology: Drilling in Uthmaniyah](#)

An animated history of the drilling sequence in one part of the Ghawar oil field in Saudi Arabia.

[Saudi Arabia's Ghawar Isn't Sinking \(but has apparently moved\)](#)

A critical look at satellite imagery analysis which reached some faulty conclusions regarding the behavior of the Ghawar field upon depletion.

[Abqaiq and Eat It Too](#)

A look at recent developments in the giant Abqaiq field in Saudi Arabia using satellite imagery combined with published reports.

[Local Scientist Splits Water, Saves World, Gets On TV](#)

A skeptical look at recent claims of a breakthrough in water electrolysis to produce hydrogen.

[Five Easy Leases: Ghawar's Discovery Wells](#)

An in-depth look at the first wells drilled in the five operational areas for the Ghawar field, including their current status.

[Who Killed the Electric Gas Tank?](#)

A look at claims of a breakthrough in ultracapacitors for energy storage in electric vehicles.

[Saudi Aramco Loses Count, Drills Too Many Wells In Ghawar](#)

An satellite imagery analysis of Saudi drilling activity in the southern-most part of the Ghawar field, showing that more has been going on than publicly revealed.

[Lessons Left Unlearned From 2003 Gulf of Mexico Near-Spill](#)

A look in the US Materials Management Service datafiles revealing a number of accidents and near misses which preceded the massive BP spill in the Gulf of Mexico.

[Crude Confessions: Massive Saudi Oil Spill in 1993?](#)

A look at how Saudi oil is transported out of the country in the context of claims of a secret oil spill.

[Read more posts by Joules Burn](#)

François Cellier

[Ecological Footprint, Energy Consumption, and the Looming Collapse](#)

This article explores dynamic relations governing population growth, resource depletion, and world economics by means of a few simple modeling and simulation exercises.

[Is the 2000 Watt Society Sustainable in Switzerland?](#)

In this presentation, we discuss whether the 2000 Watt Society is at all sustainable, and if so, what it will take to keep energy supply at that level after the end of ample and cheap fossil fuels.

[The Slavery of Oil](#)

A review of a proposed methodology that would allow me to quantify the price level of crude oil at which our economies will stall.

[Read more posts by François Cellier](#)

David Clarke

[The Failure of Networked Systems: The Repercussions of Systematic Risk Revisited](#)

Cascading collapse and why the corporate drive towards increasing efficiencies could be driving our interacting networked systems towards this mode of collapse.

[The Networking of Resource Production: Do the Networks Give us Warnings when They are About to Fail?](#)

The flaw in the techno-cornucopian dream: Modeling why and how a networked resource-extraction system fails.

[Read more posts by David Clarke](#)

Samuel Foucher

[Analysis of Decline Rates](#)

This post offers a kind of reverse engineering of what numbers could be behind the long and detailed IEA decline analysis in their last report (2008 IEA WEO). A tentative decline structure for the post-peak Super-Giant and Giants oilfields is offered as well as a possible scenario for future production.

[Peak Demand or Peak Consumption? A Look at OECD Oil Demand](#)

In this post I show that the key driver behind the oil price increase since 2002 has been excess demand combined with unresponsive supply.

[Peak Oil Update - July 2009: Production Forecasts and EIA Oil Production Numbers](#)

An update on the latest production numbers from the EIA along with graphs/charts of different oil production forecasts.

[Estimating the World Production Decline Rates from the Megaproject Forecasts](#)

Having a good estimate of the decline rate of the resource base (most estimates are ranging between 2 and 6%/year) is fundamental for the precision of supply forecasts derived from megaproject database.

[Saudi Arabia: An Attempt to Link Oil Discoveries, Proven Reserves and Production Data](#)

This article is an attempt to apply the Hybrid Shock Model (HSM) on Saudi Arabia's oil production. In a nutshell, the HSM is trying to model the observed production profile from the discovery curve by simulating the different phases involved in the development of oilfields (initial discovery, planning, build, maturity).

[Why We \(Really\) May Have Entered an Oil Production Plateau](#)

We know that some countries (around 56) have seen their production peaked (also called type III depletion). The remaining group consists of 17 countries that have the potential to grow or

maintain their current production (the type II group). I propose to apply the HL technique only on the total production from the the type III group and try to assess the future production decline coming from that group.

[An Update on Mexico's Oil Production--The Rapid Collapse of Cantarell by the Numbers](#)

Last year, I expressed my concerns about the eventual impact of a rapid collapse of Cantarell on Mexico's oil production. The last production numbers from PEMEX seems to confirm the rapid decline of Cantarell as well as the inability of the Mexican to rapidly bring new production online.

[The Loglet Analysis](#)

Most peakoilers on this site have been introduced to the logistic curve through the famous prediction of King Hubbert on the Lower-48 production. Fewer maybe knows that curve fitting techniques have been extensively applied by people that we may qualify as cornucopians. Ironically, the logistic curve is also used as a prediction tool for market share and technology substitution.

[A Different Way to Perform the Hubbert Linearization](#)

A quick post about a different manipulation of the logistic differential equation. By using the first derivative, we get a new way to perform the Hubbert linearization. Some results are given on Norway and the US oil production.

[Norway and the Parabolic Fractal Law](#)

Norway can be considered as the poster child of the Hubbert curve modeling approach with a production profile that is remarkably close to the logistic curve.

[Read more posts by Samuel Foucher](#)

Nicole Foss

[Entropy and Empire](#) This article is a discussion of the rise and fall of empire (in thermodynamic terms) and the process of imperial succession.

[The Resurgence of Risk](#) Resurgence of Risk is a description of the developing credit crunch from its inception - an explanation of how we arrived at this financial crisis and where we are headed.

[Smart Metering and Smarter Metering](#) Electricity metering is a significant means of addressing excess demand, but the high-tech metering solutions being proposed miss many opportunities because they pay no attention to psychological drivers.

[A MacKenzie Valley Pipedream?](#) This piece assesses the prospects for the construction of a MacKenzie Valley pipeline through the Canadian north.

[Anaerobic Digestion in Ontario - A Regulatory Obstacle Course](#) Renewable energy technologies wishing to connect to the grid face significant regulatory obstacles that add so much to project costs that project viability is threatened.

Big Gav

[Concentrating On The Important Things - Solar Thermal Power](#)

While we spend a lot of time talking about traditional energy sources based on depleting resources that are extracted from the ground, I think its important to remember that the fastest growing sources of energy are solar and wind, and that these will never run out.

[Tapping The Source: The Power Of The Oceans](#)

A post examining the use of artificial islands to collect wind, wave, ocean current and solar power in the tropics, along with a more unusual energy source - harnessing the difference in water temperatures between the warm surface and the cold depths using a technique called OTEC (Ocean Thermal Energy Conversion).

[Geothermal Energy: Geothermia](#)

Crossposted from my blog Peak Energy as the subject of geothermal power has cropped up in the comments a few times lately.

[Floating Offshore Wind Power](#)

An update on a post I did last year on the potential for floating offshore wind power, which looked at a number of different prototypes at various stages of development.

[The Limits To Scenario Planning](#)

A review of some common misconceptions about the Limits to Growth book.

[Iraq's Oil: The Greatest Prize Of All](#)

In this post I'll outline why I believe that Iraq probably has the world's largest oil reserves - or, as Daniel Yergin once said of the middle east, it is "the greatest single prize in all history".

[Natural Gas In Australia - How Long Will It Last?](#)

In this post I have a look at how much gas Australia has and how long it will last under a variety of scenarios.

[Coal Seam Gas In Australia](#)

In this post I look at recent events in the gas industry and what they mean for Australian gas production in future.

[The Hydrogen Economy and Peak Platinum](#)

A comprehensive review of the issues involved in the "hydrogen economy".

[Hubbert: King Of The Technocrats](#)

In this post I explore the Technocracy movement and Hubbert's role in it.

[Locabucks: Are local currencies a way to escape the liquidity trap?](#)

I look at the concept of local currencies (or "locabucks" as I'm now dubbing them), an idea which has its roots in the Great Depression as a mechanism for escaping the liquidity trap - and thus might be relevant again in the not-too distant future if present trends continue.

[Terra Preta: Biochar and the MEGO Effect](#)

In this post I have a look at modern day techniques to produce terra preta (often called biochar or agrichar) which have the potential to increase soil fertility, generate energy and sequester carbon all at the same time.

[Buckminster Fuller's Critical Path](#)

A review of Buckminster Fuller's last work, Critical Path.

[Is It Time For a 4 Day Working Week?](#)

In this post I look at various proposals to reduce the amount of time we spend at work, as a way of addressing energy, environmental and other issues facing us.

[Peak Oil And The Tea Party Movement](#)

In this post I have a look at the boost this (peak oil) is likely to give to populist politics and some of the possibilities for addressing this.

[Read more posts by Big Gav](#)

Nate Hagens

[The Psychological and Evolutionary Roots of Resource Consumption](#) Just so.

[A Net Energy Parable: Why is EROEI Important?](#) A story about how energy return on investment impacts an imaginary society of Sasquatches - highlighting the importance of biophysical metrics for a civilization.

[Peak Oil: A View from Planet Talos](#) An alien perspective on the resource depletion/human nature intersection.

[Living for the Moment While Devaluing the Future](#) An examination of why we have evolved mechanisms to steeply favor the present over the future and why this is relevant to questions of resource depletion and environmental problems.

[Peak Oil - Whom to Believe CERAIously-Part 1](#) Highlights of the main differences between the energy cornucopians and those predicting a near term peak in oil production.

[Peak Oil - Why Smart Folks Disagree Part 2](#) More detail on the above post on supply side differences between energy optimists and realists.

[Peak Oil - Believe it or Not - Part 3](#) An overview of human cognitive biases that contribute to disagreement on resource depletion/climate change.

[Can We Be Happy Using Less Energy? Uhh Yes!](#) An look at decreasing returns to more consumption.

[Old Sunlight vs Ancient Sunlight - An Analysis of Home Heating and Wood](#) Measuring the scale of US standing forest relative to US fossil fuel use for heat.

[".....Dammit - We Wasted a Day of Sunlight"](#)

[Peak Oil, IHS Data and The Broken Clock](#)

[Peak Oil and Reflexivity and Peak Oil](#) Soros theory of reflexivity, in light of oil depletion.

[Hedge Funds, Hurricanes and Energy Markets](#) An overview of volatility and the small size of energy markets relative to financial capital.

[The 2008 IEA WEO Review \(#1 in a Series\)](#) The first in a series examining the claims of the IEA annual energy report.

[Advice to Obama \(#2\) Yes We Can But Will We?](#) A letter to the new President, outlining biophysical (supply) and evolutionary (demand) type thinking.

Campfire

[What Do We Tell Our Children](#) A letter I wrote to an 8 year old boy who asked about oil running out.

[I Don't Know](#) A short piece looking at why we are so confident, even when we know very little.

[I Dream of GINI - Wealth Inequality During Resource Depletion](#)

[Peak Oil, Peak Credit and Investments - So What the Hell Does One Do?](#) An initial pass at rewriting the Capital Asset Pricing Model assumptions

[Whither The Oil Drum?](#) An introspection on the purpose of sites like this, when the meme of peak oil has been generally accepted.

[Enter the Elephant](#) A look at why facts matter very little in changing peoples behavior.

[2010: The Year for Making Contact](#) New Years resolutions for myself, in light of current conditions.

[Dear Candidate-What Will You Do if Growth is Over?](#)

[Read more posts by Nate Hagens](#)

Phil Hart

[Meet Trev: A two-seater renewable energy vehicle](#)

I believe there is instead a bright future for a spectrum of 'micro' electric vehicles, from battery powered bicycles up to compact size cars, including this new concept car named Trev (Two-seater Renewable Energy Vehicle).

[International Energy Agency calls 'Peak' on OECD Oil Demand](#)

In World Energy Outlook 2009, the International Energy Agency seems to have dropped a bombshell that has been quietly (and politely) ignored.

[The Economics of Volatile Oil Prices](#)

Considering the fundamental nature of oil supply and demand provides a coherent explanation not just for the rapid rise in oil prices, but also the dramatic fall.

[The 2008 IEA WEO - Oil Reserves and Resources](#)

Despite significant changes, the 2008 IEA report still relies on inflated estimates of reserves from OPEC countries, overplays the contribution of reserves growth due to technology and predicts the reversal of a decades long trend of declining oil discoveries.

[Oil, House Prices, Credit? Three parts of the same story](#)

The long forgotten 'oil crisis' of just a few months ago has been replaced by a full blown 'credit crisis' - related events that represent the unravelling of half a century of unsustainable trends in oil consumption and debt.

[High-Tech Hitchhiking](#)

Could a hitchhiking scheme for the iPhone era work in practice and change attitudes to hitching a ride?

[How Technology Increases Oil Production](#)

How can you double something and still have ten times less than you started with? The answer to

this question will help us reassess claims that advances in oil field technology will postpone the peak in global oil production.

[Oil Reserves: Where Ghawar goes, the rest of OPEC follows](#)

In May 2007, the work of Stuart Staniford and Euan Mearns culminated in a new and unprecedented assessment of oil reserves in Ghawar, the world's largest oil field. This article combines their assessment with additional information sources, to produce a revised estimate of reserves in Saudi Arabia and the other OPEC countries.

[Read more posts by Phil Hart](#)

Rembrandt Koppelaar

[Carbon Capture and Storage: Economic Costs Revisited](#)

The effects on coal power plant economics of CO2 emissions capture.

[Carbon Capture and Storage: Energy Costs Revisited](#)

The effects on coal power plant economics of CO2 emissions capture.

[A primer on reserve growth part 1](#)

What is reserve growth and why it is so difficult to measure?

[A primer on reserve growth part 2](#)

A summary of various reserve growth studies.

[A primer on reserve growth part 3](#)

A discussion on the reserve growth figures in the USGS World Petroleum Assessment 2000.

[Are Reserves of the Largest US Coal Field Overstated by 50%?](#)

A summary of the USGS 2009 reserve assessment of the largest U.S. coal field, Gillette in Wyoming.

[Read more posts by Rembrandt Koppelaar](#)

Rune Likvern

[Europe and Natural Gas - Are Tough Choices Ahead?](#)

In this post, I present some graphs showing European historical natural gas consumption and supply, along with my estimates of future consumption and supply.

[Trends in World Oil Supply/Consumption and Net Exports/Imports](#)

In this post I briefly present the results from my analysis of absolute and relative trends in world oil (all liquids) supply, consumption, net exports and net imports between 1980 and 2009.

[Has OECD oil consumption peaked?](#)

I examine similarities and differences in oil consumption patterns of OECD and Non-OECD countries and offer my view as to what the future may hold.

[IEA WEO 2008 - NGLs to the Rescue?](#)

In this post, I will document that there is good reason to believe that the IEA WEO 2008 projections in the reference scenario overshoots the likely world production of NGLs by as much as 35 - 50 % by 2030.

[Has Fossil Fuel Consumption Within EU Peaked?](#)

As this post will show the likelihood that the EU's fossil fuel consumption has peaked, back in 1979, is now very real. It will also compare the degree of net fossil fuel self-sufficiency between the EU and the USA as of 2007.

[Why UK Natural Gas Prices Will Move North of 100p/Therm This Winter](#)

This post presents the development of the energy mix for the UK, and how the UK in less than a decade went from being a substantial energy exporter to a substantial net energy importer.

[Read more posts by Rune Likvern](#)

Euan Mearns

[Lies, Damned Lies and Government Oil Production Forecasts?](#)

Back in 2005 the Norwegian Petroleum Directorate (NPD) forecast 2.84 mbpd oil production in Norway during 2009. I pointed out their forecast was rather optimistic. 2.3 mbpd was what actually came to pass. The NPD were 23% too high.

[The architecture of UK offshore oil production in relation to future production models](#)

This post, written in November 2006 provided a forecast for UK oil production employing bottom up and top down methodology. My forecast for UK oil production in 2009 was 1.53 mbpd. 1.45 mbpd was what actually came to pass. I was 6% too high.

[Flesh on the bones of Mexican oil production](#)

With Cantarell in free fall, this post tried to take a more holistic view of Mexican oil production, pointing out that nitrogen once destined for Cantarell would now be diverted and injected into neighboring Ku-Maloob-Zaap complex.

[Saudi production laid bare](#)

This post was written to counter Stuart Staniford who claimed "Oil production peaked in Saudi Arabia in 2005. Recent sharp declines in production are involuntary and Saudi Arabia has switched from swing producer to supply constrained producer."

[GHAWAR: an estimate of remaining oil reserves and production decline \(Part 1 - background and methodology\)](#)

[GHAWAR: an estimate of remaining oil reserves and production decline \(Part 2 - results\)](#)

[Ghawar reserves update and revisions \(1\)](#)

Estimates of the remaining reserves and future production in Ghawar, the worlds largest oil field, based on data gleaned from the internet by a host of eager bloggers.

[Crisis, what energy crisis?](#)

An overview of the best posts from the 12 months preceding July 2007.

[UK Energy Security](#)

A look at possible impacts of UK oil and gas production decline together with a range of appropriate energy policy responses.

[Saudi Arabia - production forecasts and reserves estimates](#)

An oil production forecast for Saudi Arabia using both bottom up and top down (Hubbert linearisation) techniques. Peak was forecast to be 2011.

[The European Gas Market](#)

A comprehensive look at where Europe gets its natural gas from (34 charts and maps) including forecasts that incorporate peak Norwegian gas production and decline of the supergiant gas field at Groningen in Holland.

[Daddy, will the lights be on at Christmas?](#)

A follow up to the European Gas market incorporating a forecast for Norwegian gas production produced by Rune Likvern.

[Why oil costs over \\$120 per barrel](#)

An examination of some of the fundamental causes of the run in oil prices that took place in 2008.

[Why oil costs over \\$130 per barrel: the decline of North Sea Oil](#)

An overview of North Sea oil production decline and its role in the oil price run of 2008.

[A State of Emergency](#)

An examination of the plunge in UK oil and gas production and its impact on the UK economy ahead of the 2008 crash.

[The Global Energy Crisis and its Role in the Pending Collapse of the Global Economy](#)

The slides I presented at a talk to the Royal Society of Chemists in Aberdeen, November 2008.

[The energy efficiency of energy procurement systems](#)

An overview of the energy return on a number of energy procurement systems together with a look at contradictory policies being pursued by OECD governments.

[The energy efficiency of cars](#)

A simple look at the energy efficiency of various vehicle propulsion systems including all electric, internal combustion, fuel cells and bio fuel.

[The financial return on energy invested](#)

An experimental examination of links between energy production, consumption, prices and GDP.

[The Chinese Coal Monster](#)

An examination of the phenomenal growth in Chinese coal production and consumption. How long can this go on?

[Read more posts by Euan Mearns](#)

David Murphy

[EROI, Insidious Feedbacks, and the End of Economic Growth](#)

In this post I attempt to answer the following question: Is a return to long term economic growth possible?

[The True Value of Energy is the Net Energy](#)

"The true value of energy to society is the net energy, which is that after the energy costs of getting and concentrating that energy are subtracted." - H.T. Odum (1973)

[Energy Transitions and the Next Paradigmatic Image of the World](#)

The most important question is "what is the next paradigmatic image of the world?"

[The Net Hubbert Curve, what does it mean?](#)

Cutler Cleveland of Boston University has reported that the EROI of oil and gas extraction in the

U.S. has decreased from 100:1 in the 1930's to 30:1 in the 1970's to roughly 11:1 as of 2000. What does this mean?

[Further Evidence of the Influence of Energy on the US economy](#)

Gail, Jeff Rubin, and now James Hamilton of the University of California – San Diego have produced literature correlating either this financial collapse or recessions more generally with peak oil and oil prices. The take-away message of their work is that oil prices played a fundamental role in causing the current recession and many previous recessions.

[Read more posts by David Murphy](#)

Jérôme à Paris

[Ukraine vs Russia: Tales of pipelines and dependence](#)

I wrote the text below in late December 2005, i.e. just before the Russian-Ukrainian gas conflict, which had been simmering for a few weeks, blew open into the consciousness of the West.

[New Iraqi oil law: some facts on PSAs](#)

A post refuting some assertions about the new Iraqi oil law, which will allow foreign companies to invest in the oil sector via PSAs (production sharing agreements).

[A review of the underlying fundamentals of nuclear energy](#)

A review of the pros and cons of the nuclear industry.

[How To Get A Pipeline Built](#)

A primer on why and how pipelines get built - which essentially means how they get financed.

[Countdown to \\$200 oil meets Anglo Disease](#)

Oil has played a fascinating side role in my Anglo Disease series, allowing the debt bubble to go on for much longer than expected. But now, instead, it is accelerating the crash. Let me take you through the whole cycle.

[Fierce pride - yes it works! \(or, first ever bank-financed offshore wind farm inaugurated!\)](#)

A post about the windfarm which I helped finance two years ago which is now up and running.

[Countdown to \\$200 oil: \\$140 oil and speculation](#)

There are A LOT of good reasons why oil prices are going up. Let me show you just a few.

[The cost of wind, the price of wind, the value of wind](#)

In this post I try to clear some of the confusion that surrounds the economics of wind power, as this is an issue that is often used by the opponents of wind to dismiss it.

[Read more posts by Jérôme à Paris](#)

Engineer-Poet

[Sustainability, Energy Independence and Agricultural Policy.](#)

If we are going to use biofuels, we need to re-think everything involved with them; the results may not look like anything we've ever seen.

[One engineer's advice for energy policy.](#)

An open letter to Obama on the path the country should take.

[H2CAR: Another blind alley](#)

We can make enough biofuel to replace oil, but at a price we cannot pay; this is NOT a solution.

[The Cogeneration Stopgap](#)

Generating electricity along with heat can stretch fuel supplies and bridge to the future.

[Energetics of cultivation: draft animals vs. combustion engines and the Haber process](#)

Tractors are more efficient than horses, and we don't have to breed or train them.

[Analysis of the Hon. John Dingell's carbon-tax proposal](#)

Talking back to a Washington insider who kept Detroit in the gas-guzzler business, who I voted against when my city became part of his district, yet who is making some sense.

[EPA economy ratings vs. the GM Volt: A square peg in a round hole](#)

Ruminations on why MPG loses its relevance in a world of watt-hours per mile.

[Photovoltaics: From Waste to Energy-maker](#)

How the dumps of phosphate mining can yield the material to power much of the world.

[Weathering the storm: making it through a natural-gas crisis.](#)

Lifestyle changes which may slash fuel demand by changing habits.

[Read more posts by Engineer-Poet](#)

Robert Rapier

[We Won't Stop Global Warming](#)

I lay out the case that there isn't really much we will do to stop the accumulation of CO₂ in the atmosphere.

[Does the Hubbert Linearization Ever Work?](#)

Debunking the use of the Hubbert Linearization as a tool for the prediction of peak oil.

[Peak Oil Interview: Misconceptions, Replacing Oil, and False Solutions](#)

An interview I did at that 2010 Global Footprint Network conference that discusses peak oil.

[What If Gas Cost \\$100 a Gallon?](#)

A thought experiment to see what people might really do in cases of extreme gasoline constraints.

[A Critical Examination of Matt Simmons' Claims on the Deepwater Spill](#)

Debunking hyperbolic comments related to the deepwater spill.

[The Switch to Winter Gasoline and a Primer on Gasoline Blends](#)

Every year in late summer, you will start hearing references in the media about the conversion to winter gasoline. So what does this mean, and why does it make gasoline less expensive?

[The Price of Energy](#)

Just looking at the cost per BTU of many different energy sources. Sparking some interesting discussion.

[The Case for Higher Gas Taxes \(and Lower Income Taxes\)](#)

I make my case for why it would make sense to shift taxes from income to consumption of fossil

fuels.

[Ethanol Blend E85 Case Study: Iowa](#)

Examines the question of why Iowa should use their own ethanol instead of exporting it.

[The Next Five Years: Peak Lite and the Current Oil Picture](#)

Seeking to explain why I think peak oil consequences would start to happen before peak oil.

[Refining 201: The Assay Essay](#)

Explaining what products are produced from crude oil, and how that relates to the assay of the crude.

[Why Not Nuclear Power?](#)

Exploring the case for expanded nuclear power.

[The Future is Solar](#)

Why I think solar power has to play a more important role in the future.

[Cellulosic Ethanol vs. Biomass Gasification](#)

Just explaining the difference in the two technologies that have seen the borderlines between them blurred.

[German Military Study Warns of Potential Energy Crisis](#)

A translation of major points from the Bundeswehr report.

[Read more posts by Robert Rapier](#)

Kyle Saunders

[A Pretty Stunning Graph of World Cement Production \(and China is Certainly Using It\)](#)

This post updates Stuart's post about this two years ago (and yes, it's still a graph that will blow you away!) with two more years of USGS cement data, 2006 and 2007.

[From the Editor's Desk: Peak Oil, Heretical Thought, Complexity, and the Future of The Oil Drum](#)

Lately, I have been thinking a lot about the direction of The Oil Drum. Much of my thinking on this set of ideas has been brought about by some soul-searching, trying to understand the problems we face as a community, and then figuring out how to "positively push the future."

[Peak Oil, Persuasion, and the World Meme](#)

What insights can we claim from psychology to get those we care about, and even those we don't, to dig deeper to get to an understanding of the pillars of the problems we face, instead of trying to buy aluminum siding for a house slowly falling in on itself?

[Will Canada Fuel Fortress America?](#)

Will Canada complacently allow the US to pillage her resources as energy supplies become more scarce?

[Why the US Political System Is Unable to React to Peak Oil: Institutions](#)

I thought I would bring some pieces of the political puzzle together into a post on why I believe the US, at least at the federal level, will be overly slow to react to the problems of peak oil in both the short and long term.

[Was That Really Five Years?](#)

A summary and some thoughts about the fifth year of the Oil Drum's existence.

[The Oil Drum Celebrates Its First Year Today](#)

[Read more posts by Kyle Saunders \(Professor Goose\)](#)

Luis de Sousa

[World Oil Exports: A Comprehensive Projection](#)

This article is a first simplistic (but comprehensive) assessment of World Oil Exports, here defined as the total amount of liquid hydrocarbons that are surpluses in producing countries.

[World Oil Exports \[00\] Introduction](#)

A 2008 update on the original 2006 assessment.

[World Oil Exports \[01\] Angola](#)

The next post in the series focussing specifically on Angola's oil reserves.

[World Oil Exports \[02\] Libya](#)

Same as above except Libya this time.

[A New Energy Policy for Europe](#)

Wednesday the European Commission released a series of Communications proposing a new revolutionary Energy Policy attempting to address EU's energy challenges for the XXI century. This is a set of first comments to such proposals.

[Dialoguing with Dr. Peter Jackson of CERA: Is the Future of Oil Resources Secure?](#)

Some reflections follow regarding Dr. Jackson's arguments and understanding of the Hubbert's Peak.

[From sweet on the table to fuel in the tank: the millenary history of Sugar Cane](#)

A dive into the fascinating history of a plant that shaped the World.

[Marchetti's Curves](#)

This is a brief account of the Energy Substitution Model developed by Cesare Marchetti in the 1970s at IIASA.

[A few more thoughts on Saudi and HL](#)

There has been some discussion about how to apply the Hubbert Linearization (HL) to Saudi historical production in recent weeks at TOD. Trying not to fall into redundancy, let me have some loose thoughts on these models.

[Olduvai revisited 2008](#)

This work tries to assess how the decline of Conventional Fossil Fuels may unfold and how can Mankind avoid the Road that may take us back to the Olduvai Gorge.

[IEA WEO 2008 - Fossil Fuel Ultimates and CO2 Emissions Scenarios](#)

An assessment of the WEO climate change statistics, co-authored with Euan Mearns.

[Energy Policy: SER-2](#)

This log entry is the first of a series that will try to build a critical but constructive review of this crucial element of future Energy Policy in Europe.

[SER-2 \[02\] Memo on the Security and Solidarity Action Plan](#)

In the second installment of this series analysing the Second Strategic Energy Review (SER-2) by the European Commission, the focus is on to the Memo entitled "EU Energy Security and Solidarity Action Plan".

[SER-2 \[03\] Communication of the Security and Solidarity Action Plan](#)

This post tries to highlight important aspects that aren't referenced in the Memo and presents the implementation steps proposed by the Commission to put the Plan into practice.

[Planning for Europe's Energy Future: My Submission to the Commission's 2010 Consultation on Energy](#)

This document is a response to the Energy Consultation launched by the European Commission in the first half of 2010. This consultation is part of a process that shall take the Commission to a new Energy Policy Programme a few years from now.

[Interview with Jean Laherrère](#)

Some comments on the general Fossil Fuels depletion picture and our future beyond them.

[Read more posts by Luis de Sousa](#)

Stuart Staniford

[4%, 11%, Who the Hell Cares?](#) A very early piece pointing out that the post-peak decline rate is really the critical variable in assessing the seriousness of peak oil - much more important than the date or height of peak, or the degree of warning of peak. This piece still seems pretty good to me.

[Hubbert Theory says Peak is Slow Squeeze](#). The first piece I wrote looking at the evidence that the post peak decline rate will probably be slow, rather than rapid.

[The Auto Efficiency Wedge](#) A piece looking at the fact that at slow decline rates, it's reasonably foreseeable that peak oil can be handled by ongoing efficiency improvements (not painlessly, but without complete disaster)

[Depletion Levels in Ghawar](#) A major forensic analysis of the state of oil depletion in the Ghawar field of Saudi Arabia, suggesting that Saudi official oil reserve figures are over-optimistic.

[US Peak Oil Adaptation: Prognosis in a Credit Crunch](#) Rather prescient piece from 2007 discussing the possibility that the credit crunch could collapse oil prices and slow adaptation to peak oil. This turned out to be pretty much what happened.

[Fermenting the Food Supply](#) An argument against continued growth in biofuel consumption as an alternative to oil, on the grounds that the implications for food prices are likely to be very problematic.

[The Fallacy of Reversibility](#) This piece argued that there is no evidence for the idea that peak oil will lead to a revival of local non-industrial agriculture. The reverse seems more likely - that industrial agriculture is being and will be strengthened by high oil prices.

[Powering Civilization to 2050](#) The first of three posts laying out a scenario for how we could get to a fairly close to carbon neutral civilization by 2050, without major collapse or disaster (if I was in charge in of the world). This post looked at energy, and argued that extrapolating the learning curve of solar power, it was possible to see energy becoming cheap again by 2050, based

primarily on solar.

[Four Billion Cars in 2050?](#) Second of the "2050" series: Guesstimates on how many cars there might be by 2050, and how they might be powered.

[Food to 2050](#) The third in the "2050" series: Whether there are likely to be limitations on feeding the world's population to 2050 in a cautiously optimistic scenario.

Gail Tverberg

[Racing against Time: Racing against Finite Petroleum Supply - Challenges and Opportunities - Oct. 6, 2010](#)

Post written in response to Honda's "Race against Time" challenge. Post talks about the challenges and opportunities facing the world in the years ahead in the automotive sector – including automotive fuels, electric cars, design changes, and natural gas vehicles.

[Systemic Risk Arising from a Financial System that Requires Growth in a World with Limited Oil Supply](#)

Essay I submitted to an actuarial group in a call for essays relating to the financial crisis and systemic risk. The essay points out that the financial system requires economic growth, but oil supply seems to be flat or even declining in the near future. Lack of growth in oil supply is likely to cause lack of economic growth, and with it debt defaults and problems similar to the 2008 financial crisis.

[The US Electric Grid: Will it be Our Undoing? – Revisited](#)

Post originally written in 2008, on why the US electrical transmission system has so many challenges, and the many obstacles to improving it.

[Social Security and Medicare Funding Issues: Even Worse when One Considers Resource Constraint](#)

Why Social Security and Medicare funding issues are even worse, when Peak Oil is considered.

[Delusions of Finance: Where We are Headed](#)

Explanation of why my financial forecasts at the beginning of 2008 turned out to be correct. Write up of talk for 2009 Biophysical Economics Conference.

[What Can We Learn from Gift Economies?](#)

Most non-monetary economies function not on barter, but on a very different mechanism, where individuals gain status not by what they have, but by what they give away. Goods and services are given away, without any expectation of return—in many primitive societies, and in some organizations today, such as Wikipedia and The Oil Drum.

[There is plenty of oil but ...](#)

There is a huge amount of oil that theoretically can be extracted, but the question is whether the cost will be cheap enough for us to be able to afford to extract it. If the oil is too expensive to extract, the shortage of oil seems to cause a recession, similar to what we are having now.

[Scientific American's Path to Sustainability: Let's Think about the Details](#)

Scientific American presents "A Path to Sustainable Energy by 2030" in its November issue. In many ways, it sounds good. But let's think about the details: What would the end result look like? Would it really be sustainable? What would the costs really be? Is there any way we could afford to do what is proposed?

[Some Cautionary Thoughts about Wind](#)

Offers ten reasons why wind is not as an attractive an option as many think it is. Includes reasons why EROI calculations for wind are likely overstated.

[Where we are headed: Peak oil and the financial crisis](#)

Post pulling together some of the pieces showing that the financial crisis is a direct result of peak oil.

[What does Sustainability Mean for Energy?](#)

Looks at criteria needed for sustainability, and gives each fuel a grade on a “sustainability grid” rating system. The criteria used for rating are (1) Low Carbon, (2) Low Water, (3) Sufficient Fuel, (4) Low tech; low imports, (5) New Capacity Inexpensive. With this grading system, wood comes out best (although the quantity is low).

[A Visit to Chevron's Kern River Heavy Oil Facility](#)

A discussion about heavy oil extraction at Chevron’s Kern River facility.

[The Expected Economic Impact of an Energy Downturn](#)

This is a talk given for an audience in the health care field, explaining that the lack of growth is likely to result in major debt defaults, causing the world to change greatly in the next 20 or 30 years.

[Peak Oil and the Financial Markets: A Forecast for 2008](#)

Financial forecast for 2008 based on underlying principles that, in retrospect, has proved very accurate. Forecast that Fannie Mae and Freddie Mac would need government assistance, monoline bond insurers would have financial difficulty, failures of large banks and insurance companies, recession that deepens as the year wears on, etc.

[Our World Is Finite: Is This a Problem?](#)

Post written before I became an Oil Drum staff member that lays out many of the major issues that I continue to write about. We live in a finite world, and growth in all directions cannot continue. Technology only moves problems from one area to another.

[Read more posts by Gail Tverberg](#)

Jeff Vail

[Theory of Geopolitical Disruptions to Oil Supply](#)

Discusses several non-geological feedback loops that may have a dramatic impact on the course of resource depletion.

[Mexico, A Nation-State Dissolves](#)

Addresses the geopolitical instability in Mexico as a potential bellwether for the Nation-State structure generally, and its potential impact on oil production and exports.

[The Problem of Growth](#)

How the fundamental structure of our civilization demands perpetual growth and is therefore inherently unsustainable, as well as potential structural solutions.

[Oil Demand Destruction and Brittle Systems](#)

Argues that demand destruction tends to make remaining demand less elastic, and therefore makes systems more brittle and vulnerable to future supply shocks.

[Predator-Prey Dynamics in Oil Prices](#)

Argues that oil demand, supply, and prices can be modeled similar to predator-prey systems in nature.

A series of posts on the potential for suburbia post-peak.

[A Resilient Suburbia? 1: Sunk Cost & Credit Markets](#)

[A Resilient Suburbia? 2: Cost of Commuting](#)

[A Resilient Suburbia? 3: Weighing the Potential for Self-Sufficiency](#)

[A Resilient Suburbia 4: Accounting for the Value of Decentralization](#)

[The Renewables Gap](#)

Discussion of the challenges of a societal transition to renewable sources of energy, and especially the "gap" between the beginning of massive investment and the beginning of significant levels of renewable energy generation.

[Read more posts by Jeff Vail](#)

Chris Vernon

[Will Wartime Mobilisation Address Peak Oil?](#)

A look at Lester Brown's call for wartime mobilisation.

[Nuclear Britain](#)

Reviews the history and future of civilian nuclear power in Britain.

[Climate Change – an alternative approach](#)

Rather than attempting to reduce emissions by reducing demand, can the same be achieved by limiting fossil fuel production?

[Jonathon Porritt: Peak Oil and Climate Change](#)

Prominent environmentalist brings together these two issues.

[Goodbye Helium, Goodbye Brainscans](#)

Non-Renewable resource scarcity, the case of Helium.

[Read more posts by Chris Vernon](#)

Some Notable Guest Posts

[Cutler Cleveland - Energy Transitions Past and Future](#)

[Herman Daly: Towards a Steady State Economy](#)

[Herman Daly on the Credit Crisis, Financial Assets, and Real Wealth](#)

[Jay Hanson: America 2.0](#)

[Walter Youngquist: Unique Times -- and the Future](#)

[Christopher Smith: Aviation and Oil Depletion](#)

[Nick Rouse: Will Nuclear Fusion Fill the Gap Left by Peak Oil?](#)

[Dave Pollard: It's Our Turn to Eat: How Politics Works and Why Activism is So Important](#)

[Lester R. Brown: The Oil Intensity of Food](#)

[Alan Drake: Multiple Birds – One Silver BB: A synergistic set of solutions to multiple issues focused on Electrified Railroads](#)

[Debbie Cook: How Will Local Governments Respond to Large Increases in Energy Bills?](#)

[Aaron Newton: The Four Day Work Week: Sixteen Reasons Why This Might Be an Idea Whose Time Has Come](#)

[Glenn Morton: Holding Daniel Yergin and CERA Accountable](#)

[Michael Vickerman: A federal energy policy: can it happen here?](#)

[Brad Lancaster - Eight Principles of Successful Rainwater Harvesting](#)

[Dave Rutledge: The Coal Question and Climate Change](#)

[Jeffrey J. Brown: The ELP Plan: Economize; Localize & Produce](#)

[Jean Laherrère: Arctic Oil and Gas Ultimates](#)

[Jean Laherrère: Hydrates updated](#)

[Jean Laherrère: Forecasts on Saudi Arabia liquids production](#)

[Jean Laherrère: Update on US GOM from MMS, EIA and Scout Data](#)

[Sterling Smith: Energy Vision 2050](#)

This list isn't exhaustive nor final but what the authors sent in (and we are still missing a few authors).



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