

- International Business

Understanding Peak Oil

by *Peter Pogany*

Orthodox academe's incapacity to do so - a caricature in the lighthearted spirit and general good will of the Christmas season.

Dear Santa, Bring more oil! Substitutes too! Urgent!

Never mind temporary respites and unreasonable spikes; disregard daily oscillations and monthly vacillations! If you string a line through annual data you will see that the upward barreling price trend defies all odds of being random and suggests the presence of secular causative forces. We need your old “supply and demand magic” this Christmas more than ever before. You know that spirit-raising, table-turning abracadabra that goes like “As oil supplies become short, the world price of oil rises. Then, exploiting nonconventional sites and drawing on renewable energy sources and substitutes for materials derived from oil (uneconomical before price rises) become profitable, alternative technologies develop, and -- bingo! We have artificial gasoline (recycled carbon dioxide), hydrogen, corn-based ethanol, dymethyl ether (DME, obtained from biomass and coal), benzol (coal gas extract), bio-butanol, and coal-tar-derived naphthalene to run the increasing number of cars, most of which will be reduced-weight hybrids -- so efficient, so incredibly efficient (I get goose bumps every time I connect the infinite wisdom of the marketplace with the limitless ingenuity of integrated technologies); electrical cars propelled ultimately by solar, wind, geothermal, and hydro energy -- sewage and manure turned into voltage. We'll have plant-based materials to replace plastic derived from oil and natural gas. We'll have everything, everything...”

You have already brought these things during Christmases past, but we need more, much more to reduce our dependence on easily accessible oil while creating a world where there are only the wealthy and the wealthier. We have a long way to go but our enthusiasm is intact. You should hear my car salesman friend exclaim when he looks at the world atlas: “Wow! Billions and billions of people without cars! What a market!” The Chinese adopted Dinah Shore's almost forgotten Chevy song. Loudspeakers holler it across the Middle Kingdom: “See our old Hu-Pei in a new Rong Wei, car dealer comrades telling you to call...”

In just two decades or so, the worldwide number of automobiles will rise from roughly 900 million to 1.2 billion.

We have been good. The virtuous circle is on. Rising prices led to reserve appreciation and increased valuation in the books of oil companies. Although private initiative could use more tax breaks and subsidies to catalyze substitution, the government's dead hand, always ready to suffocate the creative genius of market forces, has been restricted to an extent politically possible. Yet, investment into nonconventional oil production is not forthcoming as much as one would expect. Renewable energy generation and agro-based material production are not gaining weight. As a slice of the world economy, these activities together grow just enough to keep pace with the growth of the entire pie.

Despite your generous gifts of scientific, technological, and commercial successes, we are depleting our known reserves fast and need to start exploiting new ones. I know that they are practically everywhere. Leading universities with generous endowments say that there are trillions and trillions of barrels of oil in tar sand and shale (also under the Rocky Mountains); that there are untold riches at the North Pole (in your general neighborhood), in the Gulf of Mexico, the South China Sea, and off the shores of Africa and South America. With and through your help of bounty-producing insight, we can, we must, tap into these reserves. And soon, very soon! Or else, projections for spreading the joy of happy motoring and for exponential growth in the array of uncountable super-modern consumer goodies will go sour and we will be the laughingstock of doomsayers. You know the type that's keep talking about "peak oil," disparages substitutes for fossil fuels ("They use up more energy than they provide"), and considers bio-fuels a health hazard. While some of these individuals simply do not have enough faith in you, others are becoming outright sarcastic and say things like "It may be true that Santa's sleeves hide his hands but we can see quite clearly how big his stomach is and how thick that shiny belt is."

Don't worry! We snap at them with our towels bearing your haloed monogram (**SC – Smithian Competition**). Whenever they come with their charts and analyses to show big trouble ahead with oil we respond with references to the sun that will shine brightly upon us for billions of years and high-five loudly over "Just get prices right." We expose their ignorance by telling them about things that have not even been discovered or simply hum that evergreen Viennese economic melody "Everything is Equal on the Margin." Thanks to you, peak oil -- if there is such a thing at all (a great allowance that we make in the name of academic freedom to doubters of permanently expanding limits to growth) -- then it is not only beyond the horizon of our children's children but whenever it is reached, in a hundred years, it will be an unnoticed milestone on the ever widening turnpike of eternal economic expansion.

Here I must pause and confess something that I would not discuss in public or mention even to my colleagues, particularly not to my superiors at the Institute. I begin to feel fear. Such terribly steep increases in oil prices without an end in sight to their fundamental cause -- swelling global excess demand -- appears to be locking our system into "lose-lose," self-destructive choices. We want as much free competition as possible but if private capital is forced to absorb oil price-hikes, almost all consolidations and mergers would have to be authorized to avoid bankruptcies and layoffs. We would be

forced to reduce the potency of market forces -- the very source of our expected salvation. Joint curtailment of competition and purchasing power in the wake of general, oil-triggered cost-push inflation would mean that we are stuck on high seas -- sails in tatters, no wind. Not only would macropolicies be unhelpful, they might even be harmful. Both fiscal and monetary measures traditionally used to stimulate economic growth are turning sour. Further monetary easing (i.e., increasing the mass of dollars now sloshing around in threateningly convulsive, toxic financial waters) or deficit spending (either by government programs or tax cuts) would only aggravate conditions, imperiling the dynamic stability the world economy currently enjoys. (Those nasty heterodox economists call the current situation "stable disequilibrium." Don't even think about going down their chimneys!)

It bothers me (and this should also remain between us) that my academic superiors at the Institute (where daring skiers sliding down rugged slopes of the Austrian Alps decorate walls), so knowledgeable about the game-theoretical implications of optimal design mechanisms and double auctions as they reflect the incentive compatibility of choice from among multiple equilibria in non-contradiction to the allocative superiority of Smithian Competition, seem unable to grasp the possibility of serious negative developments because of "peak oil." They make inappropriate historical comparisons; beat up the weakest arguments about the unfolding global crisis, and erroneously single out and isolate the U.S. economy to show how little oil price increases matter.

It seems to me that the current galloping industrialization in much of the developing world against the backdrop of accelerating depletion of conventional oil reserves is a new situation. Using more and more of what we have less and less of cannot be talked away by references to earlier points or stages of this process without self-deception.

Much research talent and effort is being consumed to prove that disruption in global oil supplies on the scale recorded during the closing three decades of the 20th century would not, by itself, necessarily cause a recession in the U.S. economy. Is this really the point that requires ever more sophisticated and detailed elaboration? Is this the right framework to analyze the planet's mounting energy problem?

Citing the American economy as an example of increasing invulnerability to oil market developments would be innocently parochial were the proponents of such arguments not among the most fervent believers of globalization-brought interdependencies. Much of the oil the United States no longer needs directly for its predominantly service-oriented economy is used up indirectly in the form of imported manufactures, e.g. from China where oil demand rose by roughly 45 percent since 2001. Do my esteemed academic superiors forget that oil trade is mainly dollar-denominated, allowing the primary source of international liquidity to cover its foreign oil purchases without earning someone else's currency? (If the U.S. economy had to maintain a large export sector in order to pay its import bills, it would need much more oil than it currently does.) How can anyone overlook the obvious fact that the developing world -- four-fifths of the planet's population -- cannot leap-frog around massive (heavily oil-dependent) industrialization to raise its level of living to that enjoyed in "little share of oil expenditure in the GDP,"

post-industrial, knowledge economies? How could the United States, sinking into ever deeper financial debt to the rest of the world, while playing unique and pivotal roles on the stage of world history, be used as an imitable example, representing generally reachable conditions? And given the high and growing level of interdependence that globalization brought, how can anyone imagine that the consequences of aggregate excess demand for oil reaching a critical point would not engulf the U.S. economy?

Yes, using transformation in highly developed economies toward services and high-tech activities as their trump argument, economists at the Institute insist that the world is headed toward growing invulnerability to oil supply problems. Contrary reasoning shall be prosecuted to the full extent of econometric know-how. (Some disagreeable heterodox economists say that econometrics has an unconstrained ability to deconstruct causality-based macroeconomic arguments. They call “big issue” econometrics a dangerous toy that should be recalled. They characterize us at the Institute as autistic, inorganic intellectuals, heirs to Professor Pangloss who damage the creative faculties of Candides captured in their classrooms while boring them to death. They call us neoclassically programmed philosophical zombies. Come Christmas morning, they deserve to find their stockings empty.)

Still (pst, just between the two of us), it irks me that my august scholarly community labels recent increases in oil prices “speculative.” A rise in oil prices as a result of dollar depreciation is “speculative;” the supply (and related price) policies of state oil companies (like those of Russia, Venezuela and sinister Iran) are “speculative;” and regional tensions with supply-disruptive potential are also “speculative.” It seems to me that dollar depreciation is symptomatic of global monetary-financial troubles: Diversifying strategic supplier behavior, away from the cooperative and responsible conduct of petro-monarchies, and intensifying strong-arm struggle for oil revenues follow as directly and logically from diminishing-reserve-given clout as night follows day.

I fear that unless the world soon increases the supply of oil and substitutes on a scale that addresses the central problem of growing asymmetry between global (i.e., not only U.S. or OECD) oil demand and supply, something big, unexpected, and ugly will happen. Looking at our current options, I still come to the conclusion that only you can help, dear S.C., begetter of wondrous things.

We address ourselves not to humanity but to you. Without any complaint or even a mention of our dire needs, we just simply want to remind private entrepreneurship of its lucrative opportunities and remove all obstacles from its creative genius and unstoppable driving force.

Thank you.

Your fervent believer,

Johnny von Schonzeit

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PS. Please do not bring oil from the Arctic Circle. Intentions to get the stuff from up there are already at fever pitch. As a matter of fact, a bunch of rough and ready skaters are circling each other with hockey sticks raised menacingly high, each claiming the privilege to bring the bounty to market.

My dear son,

Your mother (whom everyone calls Mother Nature these days) and I have been postponing the day when we had to tell you that there is no Santa Claus. Or better to say, there is one -- myself, hardly an almighty quasi-saint. You have passed 40 now and you ought to know that I have been receiving your letters all these years and dressing up for the part to bring you joy. Your mother and I could satisfy all your requests until now, but your last letter changed everything. I simply cannot bring you all the substitutes you need. They demand so much conventional oil that we are talking about substituting conventional oil by a different name for the same. (Excuse the hyperbole -- I just wanted to drive home the overwhelming, but still largely unrecognized general difficulty of substitution -- its insatiable demand for oil.) And, while we are on the subject of driving, your mother informs me that if all those cars you mention in your letter are made, the expression "car bomb" will have a new and even more ominous meaning than the one we know from CNN. The only thing worse than fulfilling plans for worldwide automobile production -- your mother insists -- is to drill a hole to the center of the Earth, put down explosives and light the fuse.

Try to move to the next level, son!

Hard core Institute members (with whom you evidently have a love-hate relationship) cannot appreciate the magnitude of the problem the world faces until they stop equating fundamentals in economics with axioms of Euclidean geometry. Somehow you all must get it through your heads that behavior and expectations tied to the guiding principle ("pre-analytic vision") of "satisfying infinite needs" are approaching -- if they are not already in full collision with -- nonexpendable material and ecological limits. Infinite expansion in a materially closed space is physically impossible. The terrestrial sphere contains a lump sum of free energy enclosed in matter and, for all economic intents and purposes, the inventory of atoms constituting this matter is fixed. Thinking that free (accessible) energy can be maintained by increasing human knowledge is tantamount to the claim of having discovered a perpetual motion machine -- the source of boisterous merriment in patent offices around the world. Cultural evolution centering on economic growth is strictly a one-way process and "oil" is shaping up as humanity's first (and hopefully conclusive) lesson about this unchangeable reality of its existence.

I see, of course, the source of your error. Given the practically unlimited availability of solar radiation and Einstein's famous discovery concerning the equivalence of mass (matter) and energy, resources appear to be unlimited. It seems that eternal progress in science and technology, i.e., accumulated information, can support economic expansion on this planet *ad infinitum*. "Ay, there's the rub." Theoretical equivalence between matter and energy hides an important asymmetry. While we can produce energy from matter, we

lack the technology to do the reverse in economically significant quantities. Moreover, transforming energy requires matter -- solar *panels*, hydroelectric and wind *turbines*, geothermal *stations*, etc. Thus, energy cannot pick up the tab for accessing or regaining useful material structures without further degrading matter. Energy enclosed in terrestrial substances is capable of performing a fixed amount of work and this represents a binding external constraint for human expansiveness. Once we ingurgitate easily accessible free energy contained in fossilized plants and animal bones we will need increasing amounts of useful matter to access energy enclosed in other structures. Your colleagues ought to be worried about the damage their light-hearted view about “peak oil” inflicts on the human prospect. *Leger de main* treatment of this issue is even less acceptable now, when new energy-swallowing black holes have opened up where China and India (home for about one-third of humanity) used to be.

Please try to understand that an irreconcilable double demand exists for global oil. While micro-incentives at the private corporate, business firm level simply cannot do without continued increases in oil consumption, transition into a significantly less oil dependent world wants to take oil away from this process. And government can neither override existing market incentives nor can it safeguard them, arranging for smooth transition while children sleep peacefully, smiling in their dreams. To put it crudely, it might look like a simple task to chew bubble gum and walk at the same time but a person either without legs or teeth cannot do it. The situation at hand is, of course, quite a bit more subtle and deceptive. The world has legs and teeth but its motor coordination has not evolved to measure up to the task. (You see, we are talking about evolution, not just minor repair work or curing some impairment.)

The solution to any economic problem is possible only if macro-policies and micro-incentives can be synthesized fruitfully. Although macro-policies and micro-incentives do form a certain union when it comes to reducing dependence on oil, it is a barren one. These two key factors are currently only flirting and patting. You are now old enough to know that this is wholly insufficient. The two parties will need to interpenetrate each other in significant and coordinated ways to conceive a solution. (You must, of course, continue to believe in miracles -- it is good for your mental health and moral composure.) Ground-level material reality is that the “greening” of global industrial infrastructure without serious and extended birth pangs appears to be impossible. Calamities will either be forced on society by public authority or they will occur spontaneously as a result of the world economy’s run-in with the guard rail. This second scenario is more likely because neither the public at large nor private business is inclined to mutilate its immediate interests voluntarily. Therefore, we must prepare for a collision between economic ambitions and their physical limits. I hope that it will be benign, just enough to sober the world -- not less and not more. (Indeed, what the world needs now is a collision of optimal inelasticity with the first roadblock of its material constraints.)

You may not see now why your problem cannot be solved using only my “Invisible Hand,” as you call it. To comprehend the situation conclusively and enduringly -- among many other, now unimaginable developments -- you will have to see gas stations boarded up; the mind-boggling variety of plastic toothbrush holders, bobble-head dolls, hula

dancing figurines, hand-crafted dog paw stamps, tomato car-shaped teapots (made just for you with so much love and care by the Barrack-24 Production Brigade of Nan-king Knick-Knacks Unlimited, and shipped to a store near you by turning untold amounts of refined oil products into poisonous fumes and bubbling hemlock) will have to disappear from the shelves. Deep and common understanding of the global oil predicament will have to wait until poor countries no longer sell new watches at prices way below what it would cost to repair them in the rich ones; until the poor, yet frantically industrializing world no longer sells bed comforters cheaper than what it costs to dry-clean them in Paris, New York, and Tokyo. And believe me, we, here on the sunny side of the great development divide are not the only ones slated for a rude awakening. One of these days, the export bootstrap some developing countries use to pull themselves up will remain in their hands. All these seemingly unrelated symptoms -- headaches, dizziness, and shortness of breath -- may be explained by the global economy finding itself on that stark and dangerous temporal plateau called "peak oil."

The current global economic order (decentralized market incentives cum weak multilateralism as realized through the United Nations and its charter organizations) cannot guide the world to a predominantly renewable resource-based economy without undermining its own stability.

Remember that old Jim Steinman song?

*I would do anything for love
Anything you've been dreaming of
But I just won't do that*

If our global order could sing, its lyrics would convey the following message:

*I would do anything for profit
Anything you've been dreaming of
But I just won't do transition to a renewable resource base*

It could very well add "I won't because I don't go voluntarily to my death." Transition is conditioned on the stagnation if not on the contraction of our luxury-oriented market civilization. And drastic structural shifts implicit in the required transition cannot be smooth. The current system simply cannot coordinate shutdowns of nonrenewable resource-based activities with the activation of new, renewable resource-based capacities. Already economic-growth-preserving substitution of nonconventional for conventional oil is faltering on narrow business incentives and resource nationalism. And this is not even the bulk of humanity's historic task of transforming its resource base.

Was that highly gifted and spirited New York Times European correspondent, Karl Marx, ever wrong! He thought that capitalism would come to an end because it limits growth. Just the opposite seems to be the case. The greatest danger to free market economy is that it must continue to grow at breakneck speed to survive. And as it grows, it becomes physically more dependent on oil.

This deepening contingency in the context of our many-faceted and continually differentiating global interconnectedness has a novelty-producing, symmetry-breaking quality. The past remains prologue, of course, but it is no longer the usual, half-way reliable guide to the future. Not only does the passage of time make the world increasingly vulnerable to insane terror acts aimed at economic disruption, but it also elevates risks entailed by the interplay of unfavorable developments. Global society's voracious appetite for physically unsustainable expansion, its increasingly brazen use of sharp elbows to secure access to scarcer resources (particularly oil), and growing precariousness in its single-currency-based (mono-polar) monetary-financial order *together* have heightened "sensitive dependence on initial conditions" -- the touch-and-go proclivity of a system to magnify relatively small, totally unpredictable events into big trouble for all of us. I have butterflies in my stomach.

Orthodox economism (with its ecology-indifference, narrow, market-historical focus, and institutional naïveté) has become irrelevant to analyzing the world's energy crisis. The belief of leading academic authorities that a secular rise in the dearness of oil might just cause a U.S. recession is as charmingly ingenuous as expecting a six month suspension of one's library card as punishment for bank robbery. Hiding the ominous significance of rising global oil throughput (from depleting sources into chockfull environmental sinks) behind single-digit shares of oil among aggregate expenditures in highly developed economies qualifies as self-hypnosis. Why the sharpest intellects (on this side of the French Revolution's guillotine) fail to recognize that such numbers are low because they turned physical reality on its head is a phenomenon that ought to be analyzed by social psychologists, psycho-linguists, or political scientists with a bent to cultural anthropology. Anyway, if you define heterodoxy as being open to new ideas in dealing with never-before-seen situations, I must confess to you . . .

But enough! The days of traditional rejoicing are upon us. Why upset you even more? You will be profoundly challenged -- no doubt -- but you will come out ahead. Hope over dread, old boy! So, just like in those past times of your lengthy childhood:

Merry Christmas, ho, ho, ho!