

The Energy Equation

Understanding our Thinking — it really matters

Dr John Price — 11 April 2001

“Profit is the difference between two very large numbers, total earnings less total costs, so any reductions in costs (whatever the balance sheet item) can significantly contribute to profit, and shareholder value.”

“Not everything that can be counted counts, and
not everything that counts can be counted”

Albert Einstein

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Part 1— Our Evolutionary *Cul de sac*?

The signs are there that if we continue to progress in traditional ways we are headed at speed to a dead end, an “evolutionary *cul de sac*”.

In the Age newspaper on Saturday, Feb 10, 2001 (News Extra section) Tim Colebatch, wrote in “Brace for a bumpy landing”:

“... A hard economic landing will have serious implications for the longevity of the Howard government... All the signs are that Australia is entering a similar economic cycle to the US.”

And

“... the history of the past 50 years is that, by and large, the Australian and the US economies move in sync. Three of the last four times the US has gone into recession— in 1974, 1982 and 1990 — Australia has dived into recession with it. Will it be the same in 2001?”

Each of these dates was preceded within a year by an OPEC¹ induced Oil price ‘spike’. It was not just the Australian and US economies that were in sync in 1974, 1982, and 1990. The recessions were global in scope (excepting those of the major oil producing countries who did rather well until the price fell again).

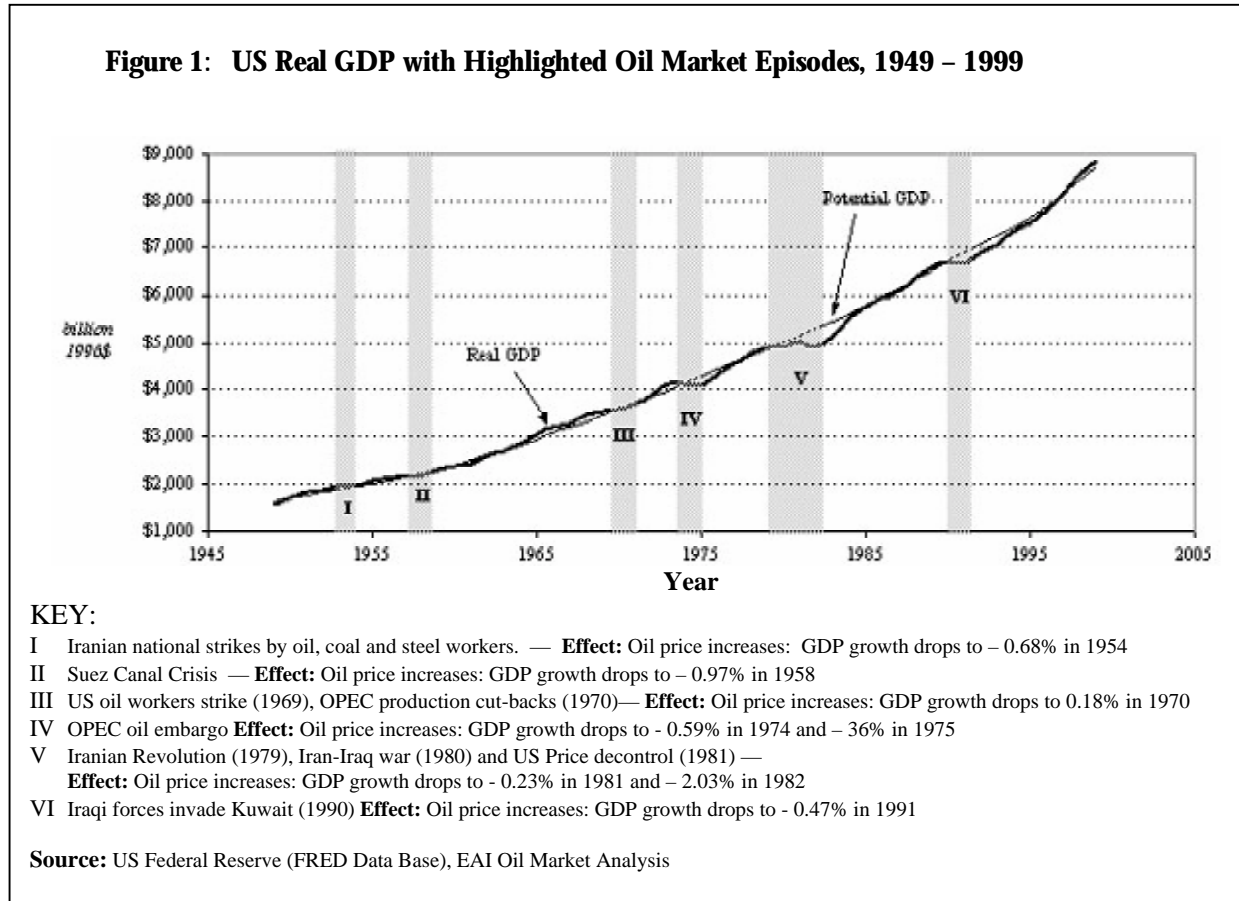
A recent (April 10, 2001) Report² of an Independent Task Force, “Strategic Energy Policy Challenges for the 21st Century” reports that “...*(t)he fact that oil’s input into Gross Domestic Product (GDP) has been nearly cut in half during the last fifty years does not*

¹ [The Organisation of the Petroleum Exporting Countries](#) (OPEC) formed in 1960. There are currently 11 member countries— Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates and Venezuela.

² “Strategic Energy Policy Challenges for the 21st Century”, Report of an Independent Task Force sponsored by the James A. Baker III Institute for Public Policy of Rice University and the Council on Foreign Relations, April 12, 2001
http://www.cfr.org/public/pubs/Energy_TaskForce.html - 4

mean that output can expand with no increase in energy. Nor does it break the link evident in the fact that virtually every U.S. recession since the late 1940s has been preceded by sharp rise in the price of oil. The economic reversal now looming will, if it develops into a full-fledged recession, be no exception.”

The Report includes Figure 1 (taken from Appendix A) to illustrate this linkage between sharp oil price increases and subsequent US recessions:



This linkage is highly significant and, when it manifests, quite disconcerting to politicians and others who think that it is in their power to manage our economies. Just when they think they’ve got it right (eg President Clinton or Prime Minister Howard), some unexpected geopolitical (or other) event (a ‘Shock’), disrupts the supply of oil, leading the crude oil price to rise in the market — and to recessions.

However, the true significance of price variations of one commodity, oil, is hidden from the view of many Economists. Generally they treat commodities as interchangeable units through the workings of the market system. If the price of one energy source rises, for example, then they believe that the market will simply substitute for this change by moving to another source.

The experience of the 1974 recession seems to confirm this view. As Gregg Easterbrook³ observed in prescient piece written in 1998 — when the oil price was low and OPEC was generally regarded as a spent force:

“The short version of the 1970s energy “crisis” is that it was caused not by any underlying lack of supply but by Middle East politics and regulatory rules that impeded market forces. Once President Jimmy Carter decontrolled oil and natural-gas prices, the “crisis” ended. By the mid-1980s, reduced demand, led mainly by energy-efficiency and auto miles-per-gallon improvements in the U.S., caused the bottom to fall out of oil prices, and OPEC to disintegrate as a monopoly.”

But in a classic case of learning the lesson of the last war, most observers now seem determined to believe that since the last energy SOS was phoney, all future alarms must be phoney, too. News organisations that looked silly in the 1970s by squealing about the end of energy now overcompensate by treating energy supply as old news, when the genuine news on this subject is yet to come. Economists, clear winners of the 1970s energy disputes, now place too much faith in their own rhetoric, asserting that higher prices endlessly will refill petroleum reserves by granting increased incentives to produce. This was true in the 1970s, when price controls discouraged production; it may not be true after 2010, when feasible reserves begin to decline ‘Market forces are wonderful, but they cannot increase the amount of oil that exists to be discovered.’⁴”

When the price of oil increases (as in 1974, 1981, 1990 and in 1999) this increases the costs of production, which results in reduced earnings and/or increased prices. Either way it has a dampening effect on growth.⁵

The U.S. Secretary of Energy, Spencer Abraham presented a wide-ranging speech to U.S. Chamber of Commerce National Energy Summit on March 19, 2001 entitled “[America faces a major energy supply crisis over the next two decades](#)”

Mr Abraham observed that:

“...This nation's last three recessions have all been tied to rising energy prices – and there is strong evidence that the latest crisis is already having a negative effect.

The National Association of Manufacturers estimates that soaring fuel prices between 1999 and 2000 cost the U.S. economy more than \$115 billion -- shaving a full percentage point off our Gross Domestic Product. A January survey of its 5,500 members reveals that nearly one quarter were forced to curtail operations...”

This flow on effect applies to any input to production (eg the wages and salaries costs of people employed, or copper or steel). Our economies are most sensitive to changes in energy prices, however, because energy dependent processes require particular energy sources, We cannot use electricity to run the internal combustion engines in our cars, nor can we run a computer with petrol. The use of petroleum products throughout our economies is ubiquitous so an oil price rise induces the reported system wide reduction in earnings, and the virtually across the board drop in the value of shares.

³ Easterbrook “The Coming Oil crisis — Really.” The (US) Office of Transportation, 1998
http://www.ott.doe.gov/la_oil_crisis.html

See also. Matthew R Simmons, “The Oil World: 1973 Compared to 2000”, May 2000
<http://www.simmonsco-intl.com/web/downloads/whitepaper.pdf>

⁴ ibid, Easterbrook, quoting Craig Hatfield, a professor of geology at the University of Toledo

⁵ “America faces a major energy crisis over the next two decades, U.S. Secretary of Energy, Spencer Abraham, Speech to the U.S. Chamber of Commerce National Energy Summit (March 19, 2001)
http://www.energy.gov/HQDocs/speeches/2001/marss/energy_speech.html

The converse is also true. Falling oil prices come through as reductions in the production costs, and show up as increases in earnings, which are misleadingly taken as indicating increased productivity. Significantly, the oil price fell in the period following the ‘Shock’ induced recessions. These were the good times we like to think of as normal, characterised as they were by high and stable ‘growth’ and bull markets.

To see how an oil price rise can have this apparently significant stifling effect on the state of the global economy, company balance sheets would need to have an *energy costs* item which could be further broken down into oil based products, electricity and gas⁶. The oil based product item would include costs of running the transport system.

Through sensitive hip pockets, people experience the effects of a rise in energy costs, most acutely at the pumps, every few days. Similarly, all companies experience increases in the energy cost item of the ledger. In the competitive market place most companies lack the power of those in the oil industry to pass on the costs, with any speed, as raised prices. So earnings fall, almost across the board— though the impact will be greater in some industries than others. Declining earnings in the so-called Old Economy spin through into reduced demand for the information technology based products of the New Economy and, again to declining share values. No sector of the economy is fully immune.

The reverberations of oil price ‘Shocks’ provide Economists with a myriad of money based measures on which to base their analyses — whilst the root causes remain hidden from their view. The value of oil *as the primary energy source enabling the physical economy to function* cannot be embraced by the price paid per barrel.

OK, so oil price rises have a dampening effect on economies. But we’ve been through Shocks before. Why won’t market forces deliver us from this one?

I think that they will... but only if we look outside the box and see that it is the flow of tangible goods and services (not the money we pay for them) that delivers our standard of living, our wealth and ultimately our wellness.

The problem with our current dependence on oil is that the demand world wide for oil is rising and the productive capacity to supply that demand is in question⁷.

This current Oil Shock is different from those in 1974, 1981 and 1990. This Shock has been precipitated by decisions by OPEC countries to cut production to stimulate the price increase needed (by them) to counteract the adverse effects⁸ of the Asian economic crisis, a resulting sharp decrease in demand for oil, and a fall in the oil price to record low levels.

The others were preceded by real, if temporary, reductions in production as a result of war. This one was not. It was by agreement⁹.

⁶ “USA’s Triple Energy Whammy in Electric Power, Natural Gas & Oil”, Jan 2001
<http://www.oilcrisis.com/news/article.asp?id=1565>

⁷ “The Geopolitics of Energy into the 21st Century: Report”, CSIS Strategic Energy Initiative Feb, 2001. <http://www.csis.org/sei/geopoliticsexecsum.pdf>

⁸ Eg. “VENEZUELA: Crash of Oil Prices Freezes Economy, Heats Up Unrest”, June 1998
http://www.oneworld.org/ips2/june98/00_01_001.html

⁹ “OPEC’s Basket Case —OPEC was dysfunctional in 1998, and is now controlling markets. Why?”
September 2000. <http://www.oilandgasinvestor.com/reports/upstream/opec.htm>

The then prevailing view was that the self-interest of individual OPEC countries would prevent their agreeing to a cut back in production¹⁰. Or if agreement were reached, self-interest would soon lead to subversion of production quotas, and falling prices again.

The current agreement was made, against the perceived prevailing wisdom — and has so far held up, again against the prevailing wisdom. The crude oil price is fairly steady at about US\$27¹¹ against about US\$10 per barrel in February 1999.

OPEC member countries are aware of the symbiotic relationship between producing and consuming countries and have no desire to kill off the golden goose. They have set the goal of maintaining the price of crude oil in a band ranging from US\$22 - \$28 a barrel, a price they believe reasonable to both suppliers and consumers.¹²

OPEC is demonstrating its newly found capacity to tweak production rates to match variations in demand and maintain price stability.

The reason for the newfound resilience of the agreement is that most of the OPEC countries are actually producing at near to capacity. Fewer members have to maintain the discipline required previously for quotas to hold⁹.

This ‘Shock’ is new. The price is staying up.

Geo-political factors¹³ in the volatile Middle East could easily intrude again, however, and compound the present Shock. Our economies remain highly vulnerable to unpleasant surprise.

As if this was not enough, there is a common view that we are rapidly approaching the peak of oil production, some say within the next ten years — a point at which oil production begins an inexorable decline to half its present levels within thirty or forty years. Faced with projections of still increasing demand, most notably in developing countries, including China, this view has us all rapidly heading for a catastrophic crunch with the height of oil price being anyone’s guess in a seller’s market.¹⁴ According to this view, like it or not, we

“OPEC’s Basket Case— OPEC was dysfunctional in 1998, and is now controlling markets. Why?”

“...(The crude oil) price level is most strongly influenced by the market’s level of confidence in OPEC’s ongoing ability to keep supply on the snug side of demand. For reasons described below, we (and apparently traders) see OPEC in an unusually strong position as compared with times past, one that should allow it to control prices at a higher level than during the 1990s.

- OPEC discipline is more achievable with little spare non-Saudi capacity. OPEC spare capacity outside of Saudi Arabia is probably 1.0- to 1.5 million barrels per day. This limited surplus makes cartel discipline far less difficult than in times past. Fifteen years ago, when prices collapsed, non-Saudi OPEC spare capacity was 7- to 8 million barrels per day.
- (And non-OPEC member) Mexico, at least for downside price-support purposes, has effectively become an OPEC member. It curtails production along with OPEC when times are tough, and expands production along with OPEC to curb pricing excess. This was a very important outcome of OPEC’s 1998-99 “collapse-recovery” cycle, and it has received very little notice...
- We are still at an early point in the “fear” stage of the inevitable greed-fear cycle. Chronic OPEC cheaters tend to cheat less at this point in the cycle, simply because of still recent memories of the pain of \$10 oil prices. Perhaps this point is slightly redundant in light of the limited spare production capacity of OPEC’s cheating-prone members.

From an “[Oil and Gas Investor](#)” Special Report⁹

¹⁰ For a summary (1998) of the argument see “OPEC Ascendant? — Another Case of Crying Wolf”, The Washington Institute for Near East Policy. <http://www.washingtoninstitute.org/pubs/pp20exec.htm>

¹¹ By meaningful coincidence, the US dollar has increased in value against almost all other currencies. Thus the US pays relatively much less for crude oil imports than other oil importing countries. Such are the vagaries of the market.

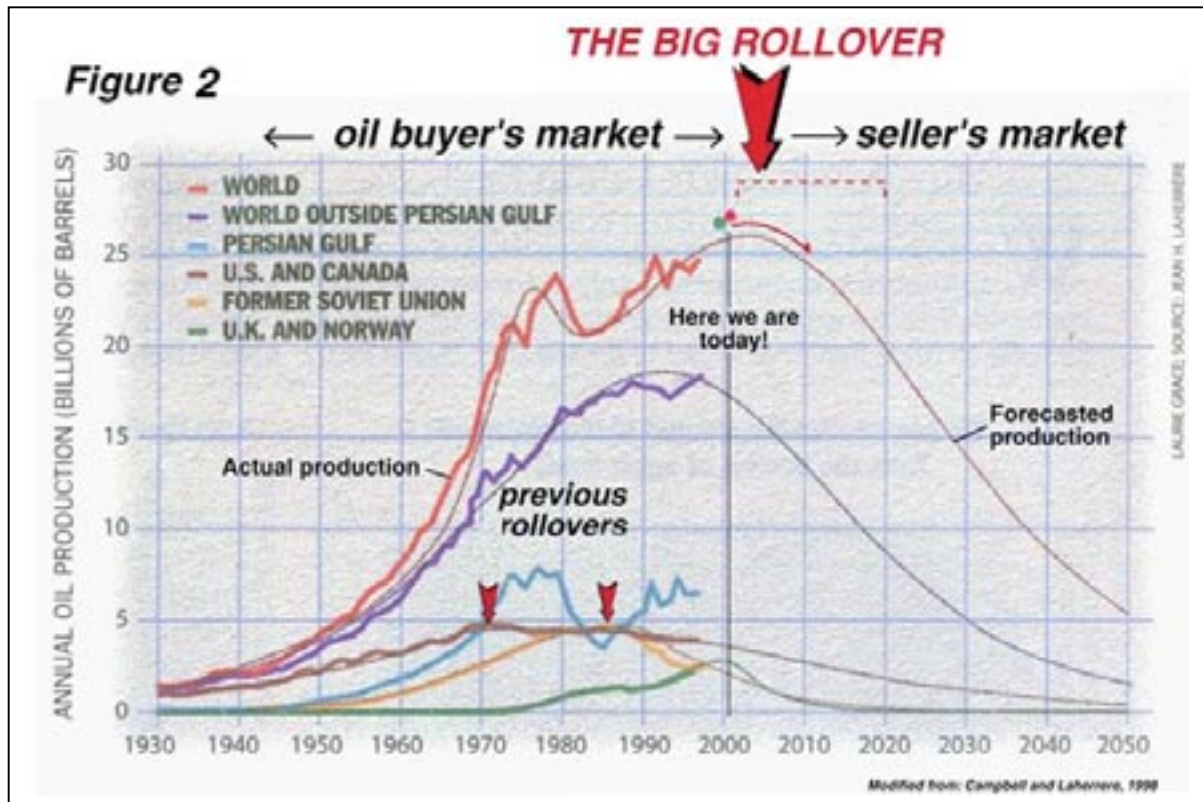
¹² “Cut to the Chase”, February 2001, Gulf Business Online, <http://www.gulfbusiness.com/cgi-local/index.cgi?article=1&ID=589&ww=on&pg=1>

¹³ “Energy in the 21st Century: The Return of Geopolitics?”, Highlight of the OECD Information Base, No. 17, May 1999; <http://www.oecd.org/sge/au/highlight17.html>

¹⁴ L B Magoon, “Are We Running out of Oil”, USGS, November 2000 <http://www.oilcrisis.com/magoon/>

are headed to a rapid reduction in supply and a consequential drop in demand to match it. And this time, OPEC will not be in any sense to blame. Proponents of this view see the Oil Shocks so far as minor tremors, harbingers of the devastating quake soon to come.

Figure 2 shows the plot of actual and forecast production and graphically portrays the production peak, here described as “the big rollover”, the point at which oil production begins its inexorable decline.



Les Magoon¹⁴ of the U.S. Geological Survey, in a poster entitled “Are we running out of oil?” (from which this figure is copied) says that “*just like preparing for the Y2K bug... talk about it. And talk about it. You can’t solve a problem until you know you have one.*”

“Technology is great, but it can’t find what’s not there. In the past five years we (the US) has consumed 27 billion barrels of oil, but the oil industry discovered only 3 billion barrels a year... So, only 1 barrel was replaced for every 9 we used.”

This poster could well be placed in the Board Rooms of all our corporations and in the offices of our all politicians— and perhaps more importantly, schoolrooms.

Another view has technological advancement¹⁵ capable of increasing extractable oil reserves. However, the more gloomy observers, ‘doomsayers’, are pointing out that all this can do, at best, is to insignificantly postpone the day of reckoning. Yet this view is being grasped like a passing log in the raging torrent by the political and industrial mainstream as they struggle to maintain competitive advantage.

See also

Brian Fehey, “Oil Supply — The Crunch has Arrived!!!”, March 2000

<http://www.oilcrisis.com/fleay/crunch.htm>

¹⁵ Jonathon Rauch, “The New Old Economy, Oil, Computers and Reinvention of the Earth”, Atlantic Monthly Online, January 2001 <http://www.theatlantic.com/issues/2001/01/rauch.htm> and a counter view from Jean Laherrère <http://www.oilcrisis.com/laherrere/onRauch.htm>

Figure 3 displays the formidable challenge facing technology if it is to deliver US oil production to match the projected increase in demand.

The consumption peaks correspond to the Oil Shocks in 1973-4, 1979-81 and 1989. From 1991 when the oil price dropped the gap filled by imports has been increasing steadily to the point that the US is now importing about 58% of its oil requirements.

“Following his four predecessors, President Bush has identified dependence on imported oil as an urgent energy, economic, and national security concern...

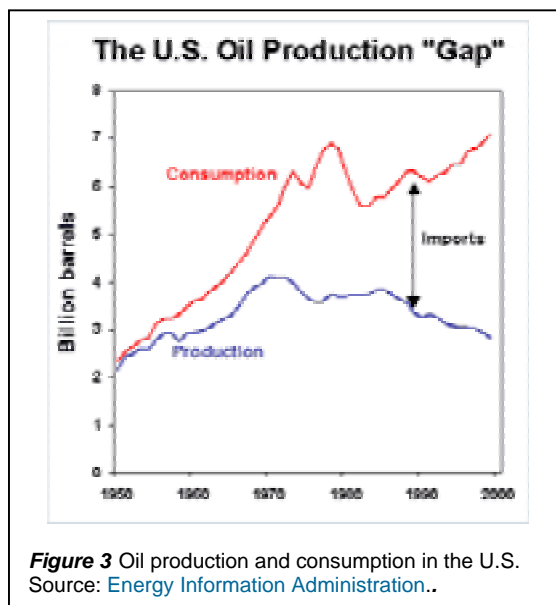


Figure 3 Oil production and consumption in the U.S.
Source: Energy Information Administration..

To close the ‘oil supply gap’ the President will promote the development of domestic resources of oil and natural gas. The argument goes that increased domestic production will reduce dependence on imported oil and reduce the ability of OPEC to control the supply of oil, and hence the price of oil as well. This would reduce the chance of oil shocks disrupting the economy, and maintain the price of gasoline and home heating oil at reasonable levels. The President, his energy and environmental advisors, and the oil and gas industry maintain that this scenario is plausible, and that it can be realized in an environmentally responsible manner.”¹⁶

Yet

“...because domestic oil sources are more costly to produce than overseas alternatives, tax relief and other incentives to encourage exploration and development will hurt the economy in the same way they did 20 years ago when the oil prices shocks produced record rates of drilling. Between 1973 and 1980, the total footage of wells drilled increased three fold and the fraction of new capital investment in the US economy going to the oil industry increased from 2 to 7 percent. What did the nation get in return? During this same period, US production declined 7 percent and the oil industry’s share of GDP declined from 4 to 2 percent. The gap between investment and production totalled more than 100 billion dollars from 1975 to 1987. Common sense economics clearly indicates that the huge diversion of income would have produced greater economic benefits had it been invested elsewhere in the economy. The reason for the poor performance of the US oil industry is simple: the domestic oil resource base is depleted to the point that large investments in drilling cannot generate a commensurate increase in oil supply.”

It is early days yet, but the signs are already there that history is repeating itself. In the allied area of gas exploration and production, “North American natural gas production is flat despite a 10-year-high drilling boom”, as reported by El Paso Corp Chairman and Chief Executive, William Wise¹⁷, the top executive of the world's biggest natural gas company.

¹⁶ “Why the Bush Oil (Energy) Policy Will Fail”, Jan 2001, Cutler J. Cleveland and Robert K. Kaufmann
<http://www.oilanalytics.org/neten4.html>

¹⁷ “N. Amer gas production flat, despite drilling boom”, William Wise, 20 March 2001,
http://biz.yahoo.com/rf/010326/n26642413_2.html

“Our field services are in all of the basins where all of the drilling in the United States is taking place and we are not seeing a production response. We're just kind of treading water, holding our own.”

Denise A. Bode, Vice Chairman of the Oklahoma Corporation Commission draws on a quote from *Through the Looking Glass* (The Red Queen to Alice):

“Now here, you see, it takes all the running you can do, to stay in the same place. If you want to get somewhere else, you've got to run twice as fast.”

and goes on:

“The above quote rings in my mind as I view the latest numbers on oil and gas production here in Oklahoma. In spite of the fact that the number of rigs has nearly doubled from a year ago, oil and gas production is actually down since May (2000). Such is the state of affairs America faces as it tries to keep vehicles running, electricity flowing and furnaces lit.

The policies (or lack of same) of the past and present force us to run as fast as we can to stay in the same place. Meantime the time bomb that is the Middle East continues to tick, and the threat of a disruption of the OPEC oil we've come to depend on grows even greater. With a 17 year old son I'm watching that situation coming unravelled with great trepidation.”¹⁸

Despite the increased profits being enjoyed by the oil and gas sector, the world's economies continue to experience a serious downturn with falling earnings, increasing reportage of insolvencies, and layoffs everywhere.

It has been said that “when the American economy catches a cold, Australia's contracts pneumonia”. Australia's prognosis is discouraging.

The immediate issue is how we in Australia (as elsewhere) are going to respond to our current downturn. Colebatch puts the view of market economists such as Saul Eastlake of the ANZ Bank. *“The downturn is essentially cyclical, not structural, and exports will ensure that it is reasonably shallow.... But even that slowdown means higher unemployment.”*, and Dr John Edwards of the HSBC, *“with firms still focusing on rising productivity, that means unemployment.”*

The obvious and traditional way to increase productivity is to reduce the cost of people in the productive process. But labour is only one of the factors of production. Productivity is more than the value of productive output per unit of labour input. Turning the sights on people could now be counterproductive. Historically, raised levels of unemployment have followed Oil Shocks. Despite subsequent returns to 'normal' levels of growth, unemployment has never returned to pre-Shock levels.

Already, (Colebatch quotes Eastlake) *“The half of the economy that depends on private spending is particularly weak, but the other half is doing exceptionally well.”* Unemployment means reduced income to, and spending by, people (private spending) further weakening the weak half. People are more than well aware that the price of petrol has gone up, and indices are exhibiting low levels of consumer and business confidence. And where will this process end if and when we are faced with more oil price Shocks, and if the link holds up, economic recessions?

¹⁸ Denise A. Boyd, “Energy Shortages in Energy Rich America. Why?”, Energy Houston, Vol 3 No 2
<http://www.worldenergysource.com/>

If not this coming election, then some time soon, the Australian Prime Minister will be in no position to respond to a disgruntled electorate's quite reasonable needs, wants, hopes and expectations. We are already seeing evidence of the electorate's disenchantment with political alternatives— politics being so much the captive of conventional Economics. Hugh McKay¹⁹ sees the Australian electorate as uninterested in politics, “*Not wavering, droning*” and in acute need of a galvanising vision of the future.

“...The next election will amount to little more than Economics Revisited: interest rates, blah, inflation, blah, foreign debt, blah, misleading employment figures, blah, deregulation, blah, floats and tranches of this and that, blah, competition, blah, globalisation, blah....

This is not to deny that any of the items is important — vital even, to the economic health of Australia — but only to acknowledge that the electorate keeps hoping for so much, much more from its political leaders.”

¹⁹ The Age (News Extra). February 10, 2001

Part 2 — Our Evolutionary *Cul de sac* — Ways Out

“The significant problems we face can not be solved with the same level of thinking we were at when we created them.”

Albert Einstein

Stimulated by the 1974 Oil Shock, Paul Hawken, Amory Lovins and L. Hunter Lovins have been working for more than twenty years on the practicalities of a sustainable, low energy, low pollution, high quality economy that treats the natural environment including people as though they matter. They have recently published “Natural Capitalism — Creating the Next Industrial Revolution”.²⁰

In Amory Lovins’ view²¹:

“Today we have a temporary aberration called “industrial capitalism” which is inadvertently liquidating its two most important sources of capital — the natural world and properly functioning societies. No sensible capitalist would do that. The textbooks say that capitalism reinvests its profits to enhance its stock of productive capital. Yet through accidents of history, we’ve ended up counting on the books some forms of capital and not others. What we are counting is very much smaller than what we are not counting.”

Even though it is impossible to place a value on “natural services”,

“We can behave as if we were properly valuing them; and we can thereby make money, even now when they’re valued at zero, by following the four practical principles of natural capitalism.”

The first and most obvious principle:

“is to use resources with radically greater productivity; to get ten to one hundred times as much work out of them through better technologies that provide the same or better services with more brains and less money. This substitution can dramatically reduce the half trillion ton a year flow of resources, from depletion to pollution, that is at the root of the degradation of natural systems.”

Resources to be used more productively include

“...energy, water, materials, top-soil and so on. New methods and designs often enable you to tunnel “through the cost barrier” and make very large resource savings. It is less costly, therefore more profitable, than small or no savings. Resource productivity can often achieve not diminishing but expanding returns. That’s a surprise. But it’s now well demonstrated in a wide range of technical systems and economic sectors.”

²⁰ Paul Hawken, Amory Lovins and L Hunter Lovins, “Natural Capitalism, “Creating the Next Industrial Revolution” 1999, Earthscan Publications, London (<http://www.natcap.org/>)

See also “A Road Map for Natural Capitalism”, Amory B. Lovins, L. Hunter Lovins and Paul Hawken, *Harvard Business Review*, May-June 1999 <http://www.natcap.org/images/other/HBR-RMINatCap.pdf>

²¹ Taken from an interview of Amory Lovins by Satish Kumar, Resurgence, #198 <http://www.gn.apc.org/resurgence/issues/lovins198.htm>

The Industrial Revolution made people a hundred times more productive than before. Contrasting the situation that led to the mechanisation of production characteristic of the first Industrial Revolution, Lovins writes:

“Economics teaches that you should economise on your scarcest resource because that’s what limits progress. In those days, some 230 years ago, the relative scarcity of people was limiting progress in exploiting seemingly boundless nature. Today we have the opposite pattern of scarcity: we have abundant people and scarce nature. So it now makes sense to substitute abundant people for scarce nature — not the reverse, as we still seem prone to doing.”

The second principle:

“...is to redesign production on biological grounds with closed loops, no waste and no toxicity. It is to design out anything that shouldn’t be there, anything that isn’t benign and valuable, any unsaleable production. This will yield better products at lower cost. It will transform everything that we produce into either a natural nutrient that goes to compost or a “technical nutrient” that goes back to re manufacturing.”

The third principle:

“...is to change the business model by switching from selling goods to delivering a continuous flow of service and value. And this should be done in a relationship that rewards both the provider and the customer for resource-saving and loop-closing. It’s one of those radically simple ideas that, once you see it, makes a great deal of sense.”

The fourth and last principle:

“...is reinvesting in restoring, sustaining and expanding the stock of natural capital, as any prudent capitalist would do. That’s the easiest step because God does the production; we just need to get out of the way and allow life to flourish wherever it can. As more people choose fewer resources, this creates increasing business value.”

In “Natural Capitalism — The Next Industrial Revolution” (‘the book’), the authors, Hawken and the Lovins, give numerous examples from diverse industrial settings to demonstrate that many companies are profiting by following these principles. They argue that market forces will deliver solutions to *dis-solve* most of the environmental, economic and social challenges inflicted as a by-product of Industrial capitalism.

The problem of excessive and increasing dependence on increasingly scarce oil and petroleum products is just one of the challenges that Lovins sees as being *dis-solved* with the emergence of Natural Capitalism.

“The existing and emerging competitors for the end-uses now served by petroleum products are so diverse and robust that oil will probably become uncompetitive even at low prices before it becomes unavailable even at high prices. The most intelligent major oil companies already understand that they are in the coal-and-oil endgame; the only internal dilemma is whether to say so, as Arco’s Chairman did in February 1999.”²²

Hence Lovins’ confident assertion (lion’s roar) “*that the Stone Age did not end for lack of stones, nor will the oil age end for lack of oil*”.

²² “Energy Surprises for the 21st Century”, Amory Lovins and Chris Lotspeich, <http://www.rmi.org/images/other/E-EnergySurprises.pdf>

But to realise the full breadth of Lovins' vision, the ways we envision the future, and how we might go about getting there, has to change almost universally, and quickly. The future cannot be left to market forces alone. There are political and ethical issues and dimensions here. Passively letting the future come, in blind faith that the market will lead us through, is the easy option, the default, but who knows where we'll end up.

Examples in the book convey possibilities through the successes of early "believers". However, their ways of thinking are yet to make the transition into the mainstream political or business thinking, dominated as it is by Industrial Economics. We can as individuals help by reading the book, talking about it, passing on what we find useful, always trying to influence the influential.

To "create the Next Industrial Revolution", in time to meet the deadlines set by the doomsayers, much more than this is needed.

But we've got to start somewhere, acting locally but thinking globally.

So whose vision of the future is right?

That of the doomsayers which says that sometime in the next ten years, maybe tomorrow, we will face disastrous economic consequences when the global supply of oil becomes irreversibly insufficient to meet growing demand.

Or

The Natural Capitalism view that the Next Industrial Revolution or, more modestly, the driving force in the commonly expected cyclical upturn, will be based on profits to be made through system wide (global) elimination of waste and adoption of the Natural Capitalism Principles.

The doomsayer view — our evolutionary *cul de sac*— will turn out to be right if projections on the oil supply and demand front transpire (an all-other-things-being-equal proposition). But everything self evidently is changing all the time. But in what ways — and how fast?

It was widely thought that the growth of the so-called New Economy would prevent the economic and social repercussions of Oil Shocks. Yet with this Shock the repercussions are there again, arguably softened little by the growth of the New Economy. It reminds again how much our economies are oil dependent.

And just how far has yet to be travelled to get the thinking right in the mainstream.

There is, however, considerable Political significance in the Natural Capitalism way of thinking because:

- elimination of system wide wasteful productive practices is highly profitable, and therefore,
- relevant to our Economics dominated *real politic*.

What's more, frugality in the use of resources is a value deeply ingrained in our cultural psyche, particularly when times are hard. (The 1980's mantra, "Greed is good" still evokes culturally based discomfort today.)

Right now, we are faced with a global, system wide decline in corporate earnings and the prospect of *unemployment on the rise* at least until the anticipated cyclical upturn. That is, if

corporations, and business generally, continues to focus predominantly on reducing labour costs as supposed by the Market Economists cited in Colebatch's article.

But:

- **Profit is the difference between two very large numbers, total earnings less total costs, so any reductions in costs (whatever the balance sheet item) can significantly contribute to profit, and to shareholder value.**

Thoroughly addressing and eliminating system-wide wasteful practices, through application of the four Natural Capitalism principles, delivers reduced costs across many such items—including energy costs — and contributes 'significantly to profit and to shareholder value'.

This issue of *waste* opens a great opportunity for Political leadership.

- **Far from people being asked to do more with less, business and people could be urged and inspired — led — to share in the common purpose of systemically eliminating waste — profitably for both.**

The scope for corporate profit through the elimination of waste is huge. As Lovins observes:

"... (Y)ou can make a good case that probably half the GDP is pure waste, spent either to pay for or to remedy the effects of waste that shouldn't have occurred in the first place. Economists' attempts to estimate net welfare suggest that Americans are little if any better off now than they were around the early seventies. Their GDP growth went largely to subsidies and remedial costs. That's why so many people have the sense that they're running harder to stay in the same place."

In other words, in the US at least, depending on how clever we are, up to "probably half the GDP" is waiting to be turned into profit.

The field for growth of the Natural Capitalist economy's growth is vast²³. — limited only by lack of will, vision and ingenuity. (By contrast, the field for growth of Industrial Capitalist economies is in question — limited by lack of oil.)

The Natural Capitalism focus on eliminating waste — breaking the cycle of resource depletion to pollution — *is* a practical, attractive way out of the doomsayers' *cul de sac*.

Hawken, Lovins and Lovins cover a wide canvas with examples of what is possible through the applications of integrated design principles utilising current and emerging processes, technologies and materials.

Take two examples:

- Use of "super-windows" in office blocks can in fact now reduce building construction costs, eliminating the need for heavy-duty air conditioning plants and the recurrent costs of energy required to drive them. Existing buildings can be

²³ To take an example outside the energy area, a Victorian State 'branch' of an Australian national Freight Transport company estimated that their trucks were on the road for about 2 days a week to pay the costs associated with workplace injury (insurance, replacement of injured workers, training etc etc.).

Twelve months ago, the company engaged the assistance of an Occupational Rehabilitation Provider to set up an early intervention program to assist their injured workers to speedily and safely return to work. Now, twelve months later, the net effect of this intervention has been a reduction in the order of \$AU 1 million (about 50%) in the company's workers compensation insurance premium — at a cost of about \$AU 100 thousand. A good return on investment, particularly at a time of increasing costs of diesel to run their trucks. And the injured workers are pleased to have got back to normal productive life. The company cares, and is profiting by doing so!

retrofitted with these “super-windows” greatly reducing the demand for energy, with payback times that have proven to be attractively short. The scope for reducing demand for energy — and making money— is highest in the office towers that are so much a feature of our urban landscapes.

[Office towers can be transformed from energy ‘sinks’ into energy sources converting solar energy into electricity for internal use, sale to the grid and or conversion into hydrogen for use in envisaged transport vehicles]

- The Hypercar™²⁴ concept combines the use of ultralight materials and on-board direct hydrogen fuel cell technologies to substantially obviate the need for petroleum products in light and heavy vehicles.

As the authors say, Detroit is equivalent to a huge oil field to be tapped through replacing

- the century old design principles that deliver inefficient, polluting vehicles that won’t work to meet our individual and corporate needs for mobility without the supply of petroleum products;

By

- modern, integrated design principles that deliver many times more efficient, environmentally benign vehicles that satisfy mobility needs at greatly reduced cost (and without the vulnerability that currently attends dependence on ‘foreign’ oil supplies).

With the exception of the occasional feature article, the mainstream media does not cover developments covered in “Natural Capitalism”. Similarly, there is little coverage of the implications of continuing dependence on oil — though there *is* massive coverage of increased prices at the pump as though it is within the power of government to somehow bring them down. Coverage of politics, business and the state of the economy seem to be treated as though they were sporting events, with headline and body copy analysis based primarily on the score-line.

Media people and politicians with an interest in what is evolving know that our standard of living depends on *what* we produce and *how* we produce it. Money based measures (the score-line) may tell us how our corporations are doing in the ‘game’ but they convey nothing about how the game is changing and what needs to be learned and practised.

The much-vaunted promise of Information Technology and the so-called New Economy has led to weekly feature sections in newspapers (eg IT in The Age newspaper of Victoria, Australia).

What about some coverage of the new directions reported and foreshadowed by “Natural Capitalism — Creating the next Industrial Revolution”, and of businesses adopting its principles to profit through waste’s systemic elimination? How about coverage of issues, ideas and initiatives advancing the goal of a sustainable future?

²⁴ Trade marked by the [Rocky Mountains Institute](#), publishers of “[Natural Capitalism](#)”.

For more information:

— The Hypercar™ concept and development — <http://www.rmi.org/sitepages/pid386.asp>

— “A Strategy for the Hydrogen Transition”— <http://www.rmi.org/images/other/HC-StrategyHCTrans.pdf>

— “Advanced Composites: The Car Is at the Crossroads”
<http://www.rmi.org/images/other/HC-Crossroads.pdf>

The media did not create our present problems, nor are they solely responsible for engaging in new thinking and activities that will lead to viable alternative futures.

How many of the following seem to be unreasonable suggestions as modest proposals to help us all to envision new futures?

- ❑ What about a real '*War*' on waste on the part of business commencing with our captains of industry offering real evidence of increasing shareholder value through operational innovations that deliver value also to the communities their shareholders and their families live in?
- ❑ What about company balance sheets and National accounts being required to report on the usage — and wastage — of natural resources?
- ❑ What about Funds Managers routinely and systematically reviewing the earnings potential of Natural Capital projects and developing a dedicated portfolio category specifically to provide their investors access to informed choices with Natural Capitalism investments?
- ❑ What about Universities, think tanks and Research & Development Organisations, such as the CSIRO and similar consultancy organisations, having their Charters amended to include provision for investing in Natural Capitalism projects?
- ❑ What about some inspirational leadership from our politicians to reveal pathways to sustainable futures through policies and initiatives which focus and resource the abundant and creative potential of our greatest assets - Nature and People?
- ❑ What about a Governmental review of tax relief and other incentive structures to revise any found to be distorting the market and encouraging wasteful practice by restructuring them to penalise wasteful practices and promote increasing resources productivity?
- ❑ What about a review of standards (eg in the energy, construction, automotive and manufacturing industries) with a view to establishing integrated design principles utilising current and emerging technologies and materials as the norm, and resource productivity the goal?
- ❑ What about a clearing house on Natural Capitalism issues and project information to establish and maintain the focus?

Oil, the energy driver of the Industrial Revolution is now a factor of the economics of scarcity. Human ingenuity, the energy driver of the Information Revolution is a factor of the economics of abundance.

No one knows how the future will unfold.

What does seem certain is that we will get the future we dream of and plan for.

Investments in human ingenuity in tackling waste are what are required in the world of abundance. Rearranging ‘current industrial processes’ — ‘deck chairs’ — is a just more of the same, investment into the world of scarcity; and at best staving off the inevitable.

To borrow from the wisdom of one of Albert Einstein’s dictums,

“The significant problems we face can not be solved with the same level of thinking we were at when we created them.”

I am pretty confident about the thinking that got us to where we are now, and the different type of thinking needed to overcome our present challenges.

Faced with the evolutionary *cul de sac* we have created — our “significant problems” — which “level of thinking” are you committing to for our futures —

Industrial or Natural Capitalism?

*

Further Reading

- “A Road Map for Natural Capitalism”, Amory B. Lovins, L. Hunter Lovins and Paul Hawken, *Harvard Business Review*, May-June 1999, <http://www.natcap.org/images/other/HBR-RMINatCap.pdf>
- “Natural Capitalism, “Creating the Next Industrial Revolution”, Paul Hawken, Amory Lovins and L Hunter Lovins, Earthscan Publications, London, 1999 <http://www.natcap.org/>
- “A Strategy for the Hydrogen Transition” Amory B. Lovins and Brett D. Williams <http://www.rmi.org/images/other/HC-StrategyHCTrans.pdf>
- And, resources available at the Rocky Mountains Institute website, <http://www.rmi.org/>

The links from the footnotes are all worth exploring.
