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COMMENTARY/COMMENTAIRE

Are We Running out of Natural Resources?

By Brian Lee Crowley, Managing Director, MLI

This commentary is based on a presentation made by Brian Lee Crowley, the Managing Director of the Macdonald-Laurier Institute, at a panel convened as part of a Queen's University program on "Clean Energy Superpower and Environmental Assessment: Canada's Ambitions and Choices". The conference was held in Kingston, Ontario on April 14-15, 2011.

Introduction

It is naturally impossible for me to do justice to all the questions that have been put to this panel, so I have had to be selective. At the outset I wanted to concentrate more on the argument that globalization and the growing scale of many projects (such as the oil sands) mean that provincial jurisdiction is now too narrow to be able to capture most or all of the spill-over effects of such projects. Given that the effects of these projects inevitably spill over provincial and even international boundaries, and given that in federations part of the purpose of national governments is to prevent local jurisdictions from passing the costs of their policies on to their neighbours, Ottawa needs to be far more aggressive about asserting its perfectly legitimate jurisdiction and become the regulator of all aspects of economic activity that spill over provincial boundaries to any significant degree. This will not eliminate provincial jurisdiction and some overlap will still be necessary, but Ottawa has been too timid and the quality of environmental policy has suffered as a result.

All this stuff about Canada being a land of compromise and negotiation is not totally without merit, but at the same time the Fathers of Confederation created one new thing in 1867: a national government and a national parliament in which all Canadians would be represented and which could therefore act in the national interest. Ottawa does not need the permission of the provinces. It should seize the lead and not apologise for doing so.

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But that's pretty much the whole argument you'll get from me on that point, because I became far more interested in this question that was addressed to the panel:

Fossil fuel resources are finite: how do we prepare for the day when these resources dwindle and disappear?

Is it True that Non-Renewable Resources are Finite?

Let me begin by saying that I believe the premise of this question is mistaken. It is quite incorrect to think that fossil fuel resources are finite. It may be true that there is a finite quantity of such resources in the earth's crust, but that does not mean that we will ever run out. Indeed I would be willing to place a bet with anyone in this room that human beings will cease using fossil fuels long before we have exhausted the available resource and that this is completely independent of any policy designed to speed up the invention and distribution of alternative "green" sources of energy.

Why? Because human intelligence and ingenuity have consistently and repeatedly unlocked technological and scientific advances that have raised the standard of living of each generation compared to its predecessor, while increasing the ability of human society to support larger numbers of people and increasing the carrying capacity of the planet.

Thomas Malthus earned economics the nickname of the dismal science in the 18th century by observing that the population was growing faster than the food supply. He predicted mass starvation.

In the 1970s, the Club of Rome predicted massive shortages of natural resources due to overconsumption and overpopulation, with disastrous effects on human health and material well-being.

In 1980, the Global 2000 Report to the President, wrote: "If present trends continue, the world in 2000 will be more crowded, more polluted, less stable ecologically, and more vulnerable to disruption than the world we live in now. … Despite greater material output, the world's people will be poorer in many ways than they are today."

The reason why the ecosystem hasn't collapsed, why we haven't run out of oil, why we are still successful in feeding ourselves, why incomes are rising and health status improving around the globe is that the doomsayers have completely misunderstood the way the world works.

Of all their misunderstandings, two stand out. They don't understand what natural resources are. And they don't understand that the greatest natural resource of all is the human mind.

It may be popular, but it is quite incorrect to think of natural resources as not only exhaustible, but on the verge of being exhausted. If, for example, natural resources were actually getting scarcer, then the price would go up. That's part of what prices are for, to signal shortages and availability and to trigger exploration and innovation where required.

But the price of natural resources has been steady or else in decline for centuries, although the recent entry of developing countries like China into the marketplace may have moved natural resources prices temporarily to a higher level, not because of shortages, but because of China's fondness for old-fashioned and highly inefficient mercantilism.

Remember the famous bet between ecologist Paul Ehrlich and economist Julian Simon. Simon bet Ehrlich that the prices of any five natural resources Ehrlich chose would drop over a 10 year period, whereas Ehrlich, inspired by the Club of Rome, was convinced that we were on the cusp of huge shortages driven by overconsumption and population growth. Ehrlich paid up in 1990.

Ehrlich, like his many forerunners and successors, forgot that shortages and rising prices are an opportunity. Malthus didn't foresee that farmers could become hugely more productive in response to rising demand for food, eventually unleashing the last century's Green Revolution. Aquaculture, hydroponics, genetic modification and other technologies will allow us to keep feeding the world's population, probably at a declining real cost in the long haul.[1]

What Happens When You Mix Ideas and Natural Resources

Thus, because of human ingenuity, the "carrying capacity" of the planet is not a fixed quantity, but a hugely variable one, depending on how much of our intelligence we mix with the natural world. Put another way we could say that the availability of natural resources is not determined merely by the quantity of such resources in the earth, but by the interaction between such resources and our ability to squeeze more value out of them.

We now require less and less land to feed each human being. We need less and less steel for each car and copper for each telephone connection and gasoline for each mile travelled than we ever did before. Those resources are valuable, and it makes no sense to use more than the minimum necessary in each instance. And that minimum is fall-

1 And note that we in the West do not feed ourselves at the expense of people in the Third World. On the contrary, it is western innovation that has largely made it possible for the burgeoning populations of the world to be fed. And we are nowhere near the limit of what such innovation and inventiveness can accomplish. It has been estimated that if the very best technology were made available throughout the world, and property rights attached to agricultural land were sound everywhere, we could easily feed a billion more people than we do today.

ing all the time, because it pays to make it fall. When things get in short supply, human ingenuity comes up with cheaper alternatives, or invests time and intelligence in increasing the supply, both of which ease the shortage.

Just one example: the telephone. Look at pictures of cities early in the last century; you'll see a forest of utility poles carrying hundreds of copper wires to connect telephones to each other. Copper is a non-renewable natural resource. If we had had to run that many wires to connect every person, it is perhaps possible that it would have been beyond the limit of our planet's copper resources.

So of course now that billions of people are connected to the telephone, the price of copper has skyrocketed and the extension of telephone service to the billion plus people who have never made a telephone call has now stopped, right?

Wrong. In fact the long term price of copper[2] has been stable or falling for years, overhead wires are rapidly disappearing, and those cables that do connect us are usually fibre-optics, made of cheap and plentiful materials like sand, and those materials carry literally millions more bits of data per second than the old copper wires.

Moreover, we have developed a whole wireless technology that is not connected to the network by any physical object at all, and satellites carry many of the signals between cities and countries. We are vastly extending the reach of the telephone with fewer and fewer resources consumed because the price mechanism allows us very successfully to balance supply and demand over the long term, regardless of the short term gyrations we may experience.

Human Creativity's Influence on "Finite" Resources

Now I intentionally used a non-energy example, but I'd like now to talk about oil and gas, because that is the focus of our conversation today. Remember that the doomsayers of the 1970s that I quoted earlier thought we would have run out of oil by today because they compared knowledge about the state of supply then with then current rates of consumption and concluded that those available supplies would be exhausted in very short order. But the fact of the matter is that we have consumed 40 more years worth of oil and yet find ourselves with more reserves than we believed we had in 1970.

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2 While the price of copper appears to be very high currently in terms of US$/tonne, in real terms the current price is not quite as exceptional as it first appears in nominal terms. Since the purchasing power of the US dollar was higher 20 or 30 years ago than now, in order to analyse the copper price trend in real terms, historic prices have to be adjusted by a general measure of cost changes, such as the GDP deflator for the US economy. After applying this inflation adjustment to the nominal US$ copper price, it is clear that the rise in copper prices during 2005 was not actually that exceptional in real terms. The spike in copper prices experienced in 2006 was exceptionally high, but there were times in the 1960s when price levels in real terms were not far away from the 2006 average price. http://www.icf.at/en/5756/trends_in_copper.html

How is that possible? Because the supply of oil isn't a function of the amount in the earth's crust. It is a function of capital investment, which simply symbolises the application of human intelligence to the problem of finding the oil we need.

You might believe that the extra reserves that now exist are due chiefly to new discoveries of oil deposits, but you would be mistaken. The majority of new supply has come and will continue to come, from wringing more supply from already known reserves through various kinds of enhanced recovery techniques.

The oil sands are a classic example. A few short decades ago people knew that the oil sands existed, but the oil they contained was not accessible from a technological point of view, or the technology was too expensive to use when compared to more conventional sources of oil. But as the result of the application of human ingenuity and financial capital, we have shifted the oil sands from theoretical but non-recoverable reserves into recoverable ones. And my understanding is that at current prices and technology, we can only recover 10% of the oil in the oil sands. Yet that 10% is enough to make Canada's brand new reserves the second largest in the world. All we have to do is to increase the recovery rate from 10% to 20%, and we vastly increase again the supply of oil available to humanity, with no increase in the quantity of oil in the earth's crust[3].

The price mechanism does quite a good job of smoothing consumption out over time while matching supply and demand today. And part of the assumptions behind oil prices include reasoned views about the future state of oil supplies. If there was genuine evidence of looming and irremediable oil shortages, prices would rise to allow us to shift oil consumption into the future, where those future shortages would make it more valuable. But generally speaking these are not necessary, in large part because of the well-established and well-functioning system that we have for increasing the available supply of oil over time, a system I have been describing here. Thus the notion that the oil price somehow ignores an alleged future oil shortage is quite mistaken. One of the factors that oil prices most definitely reflect is all available knowledge about future supplies.

Prices, hydrocarbons and climate change

What about the idea that the burning of fossil fuels generates harmful side effects in the form of CO2 and other greenhouse gases that may be causing climate change, and that the oil price therefore does not reflect the true costs created by the consumption of such fuels?

3 It might be worth observing in passing that there would be a lot more oil available if governments didn't so often act in ways that unnecessarily reduce the amount of recoverable oil. Mexico is a good example. Through an unwillingness either to invest enough of its oil revenues or to allow private investment in its oil fields, Mexico's oil production capacity is declining faster than should be the case. Political unrest or policy induced supply restrictions such as sanctions in places such as Iraq, Venezuela, Libya and Iran reduce the amount of oil available for reasons that have nothing to do with the available supply of oil in nature.

I regard this proposition as quite reasonable. If we did make people pay the full cost of fossil fuel use (including environmental damage) then that would establish a better balance between the benefits of oil consumption (such as a rising standard of living) and the costs, which include environmental degradation.

But people have a tendency vastly to overstate what we actually know about unaccounted-for social and environmental costs of hydrocarbon consumption. According to one well-known economist specialising in the economics of climate change[4]:

A considerable amount of work has gone into estimating potential economic consequences of global warming induced by greenhouse gas emissions. The following points emerge from this analysis.

• The Stern Review was not, as many media sources claimed, a novel undertaking. It was number 211 in chronological sequence.

• The Stern Review's estimate of the marginal social costs of greenhouse gas emissions is far outside the mainstream view. It is even an outlier compared to non-peer reviewed studies that use low discount rates. It has been subject to extensive criticism by a large number of economists.

• Average estimates of the marginal social cost of greenhouse gas emissions have declined over time.[5]

• The median estimate among peer-reviewed studies that use a 3% discount rate (pure rate of time preference) is $20 per tonne of carbon. The mean is $23 per tonne."

This is not in any way a negligible amount and is a matter worthy of the attention of policy makers. On the other hand, it is not such a large amount that it is likely to result in huge changes in the pattern of consumption of oil and gas.

But that tells us something important. Most of the alternatives to oil and gas are more expensive today, per unit of energy output, than fossil fuels, even ones bearing the full cost of the environmental damage they cause. So a policy of force-feeding the growth of these expensive technologies is a policy of declining human prosperity, because we end up paying more for energy than we need to, and the decline in our standard of living is greater than the benefit that we derive through environmental improvement.

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4 Professor Ross McKitrick, University of Guelph, in testimony before the United States House of Representatives Subcommittee on Energy and Air Quality Hearings, June 26 2008. http://rossmckitrick.weebly.com/uploads/4/8/0/8/4808045/mckitrick-hearings.pdf

5 According to McKitrick (pp. 2-3), "Estimates published prior to IPCC (1995) were larger than those published between IPCC (1995) and IPCC (2001). These, in turn, were larger than estimates published between IPCC (2001) and IPCC (2007). Hence the IPCC's claim that more recent estimates of the cost of climate change are increasing is unsupported by the data."

Economic Growth: Problem or Solution?

By almost any measure of human well-being, the state of humanity has improved over the course of the last two hundred years, and, generally speaking, it has improved more in those two centuries than in the whole of the rest of human history, and this in spite of the fact that humanity's numbers have grown hugely. And that improvement is almost all down to economic growth.

Since 1800, the global population has increased about 6-fold. Manufacturing output, on the other hand, has increased 75 times in value. Total global economic product has risen more than 50-fold. And this increase in human wealth has improved the state of humanity throughout the world:

The average person's life expectancy at birth has doubled, infant mortality is less than a third of what it used to be, and real income has grown 7-fold. Children are less likely to go to bed hungry and women are far less likely to die in childbirth.

Longevity in developing countries is higher today than it was in the world's wealthiest economy, Britain, 100 years ago. People live longer in the developed world, but the developing world is improving faster.

Children are likelier to be at school than at work. People are more educated and freer to choose their rulers and express their views, as measured by a number of human progress indexes. Work is less physically demanding and people work fewer hours.

We generate far fewer pollutants per unit of GDP, and in fact the richer countries become, the cleaner their environment. [6] [7]

So economic growth is the key factor allowing us to reduce most of the problems facing humanity.[8] [9]

6 It is not the rich First World countries that are the source of most pollutants today, because they have moved into post-modern service-based economies that are clean, and have achieved levels of prosperity that allow them to devote major resources to cleaning up their environment. In most major US cities in the 70s, air quality was unhealthy for 100-300 days per year. That has fallen to less than 10 days a year, except for LA, where it is 80 days a year, but even that is a 50% improvement. And remember that this has been achieved in the face of population and economic growth of sizeable proportions.

7 In fact, the correlation between wealth and environmental cleanliness is universal. A country which is poor cannot afford to bother about the environment at all. Condemning them to current levels of economic development is to condemn them to filth, disease and environmental poisoning. To open to them the possibility of participating in institutions that permit and reward the creation of new wealth opens up the possibility of a cleaner and healthier environment. In fact, there is a fairly precise turning point in environmental cleanliness. At a GDP per capita of around $8,000US, people feel able to devote more resources to cleaning up the environment.

8 Where hunger continues to be a problem, for example, it is due chiefly to two factors. One is politics and poor quality institutions that prevent investment in land, and the second is standards of living too low to allow access to the very latest in modern technology.

9 Global inequality is declining, and that decline is accelerating. If we look only at the richest and poorest tenths of the population, inequality is growing, but if you look at the far more representative top and bottom fifths or thirds of the world's population, and control for purchasing power of different currencies, the prosperity gap is closing. The gini co-efficient for the entire world declined from .6 in 1968 to .52 in 1997, a reduction of more than 10%.

Conclusion

Now let's put together a couple of the ideas I have been developing in this little talk: Natural resources are not getting scarcer but rather more plentiful. And because of cumulative economic growth, human beings are consistently better off with time.[10]

So trying to fix the world's problems by restricting economic growth will produce the opposite result, and will result in a regressive transfer of wealth from the less well-off (today's population) to the better off (future generations).

Such proposals to "progress" by reducing our standard of living are based on the notion that human prosperity and well-being are an illusion, subtracted from the productive capital of the Earth. But this is wrong. Human beings add something crucial to the world. They add their intelligence to it.

It is not that we do not face problems and challenges. Of course we do. But we cannot stop with the identification of problems, we must also look at the mechanism we have successfully used to solve every one of the significant challenges that humanity has faced since the dawn of time: the human mind.

The wealth of humanity comes from mixing natural, human and financial capital in differing proportions, and as natural capital becomes scarce in one context or another, we invent ways to sustain it, supplement it or replace it. Thomas Malthus and his ilk are not wrong in having identified challenges facing the human race at specific moments in our history – they have simply misunderstood how the right human institutions, such as private property, the rule of law, contract, incentives and human intelligence all work together reliably to solve those problems, even when we cannot foresee with precision what the solution will look like.

If shortages in the future do occur, they will trigger price increases in the supply of oil and gas, which in turn will provide huge incentives to find alternatives that are cheaper than the rising price of oil and gas. But that is a substantially different set of circumstances than today's where the alternatives are generally more expensive, even when environmental factors are included.

10 In the industrialized West, national wealth grows on average between 1 and 3 percent annually above and beyond inflation. Moreover, that understates the degree to which we are becoming better off over time, since it does not capture the extent to which the real price of many things is falling over time, nor does it count our increased life expectancy, cleaner environment and a host of other measurable ways in which we are increasingly well off. This overall improvement is also observable in the Third World. For a quick overview, see e.g. Johan Norberg, In Defence of Global Capitalism, Timbro, Stockholm, 2001 and Ronald Bailey (ed.), The True State of the Planet, Competitive Enterprise Institute, Washington, DC, 1995.

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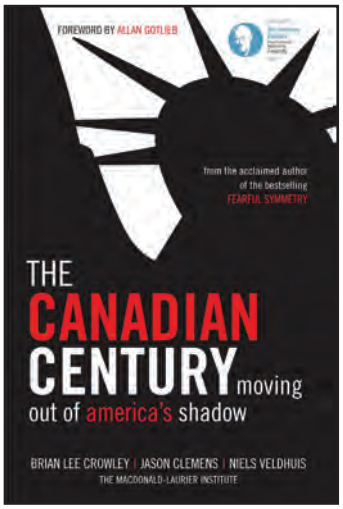

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