

Rethinking energy at the end of the era of cheap energy is crucial and is not optional – the laws of Thermodynamics cannot be repealed and Mother Nature has a way of settling such issues for those who choose to ignore them. – **David Hughes**

Peak Oil, Energy Descent, and the Fate of Consumerism

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1. INTRODUCTION

Western-style consumer lifestyles are highly resource and energy intensive. This paper examines the energy intensity of these consumer lifestyles and considers whether such lifestyles could be sustained in a future with declining energy supplies and much higher energy prices. The rise of consumer societies since the industrial revolution has only been possible due to the abundant supply of cheap fossil fuels – most notably, oil – and the persistence of consumer societies depend upon continued supply, for reasons that will be explained. But recently there has been growing concern that the world is reaching, or has already reached, its peak in oil production, despite demand for oil still expected to grow considerably. Put more directly, many analysts believe that demand for oil is very soon expected to outstrip supply, with a recent study by the US military reporting that, globally, spare productive capacity could entirely dry up by 2012 and by 2015 demand for oil could outstrip supply by almost 10 million barrels per day.¹ What this means – even allowing for some uncertainty in timing and extent – is that the world is soon to face a situation where economic and geopolitical competition escalates over access to increasingly scarce oil supplies. One consequence of this (a consequence already playing out) is that oil will get more expensive. Since oil is the ultimate foundation of industrial economies, when it gets more expensive, all commodities get more expensive, and this dynamic will have pervasive implications on the globalised economy and the high consumption lifestyles that fully depend on that economy.

This paper reviews the current energy supply situation and considers the fate of consumer lifestyles in the context of an imminent stagnation and eventual decline in oil supplies. The primary purpose of this paper is to outline why the global consumer class should at once begin preparing itself for a significant downscaling of the highly energy and resource intensive lifestyles that are widely celebrated today. Such downscaling is desirable for environmental and social justice reasons, but the present focus will be on how oil supply may soon *enforce* such downscaling, whether it is desirable or not. While this externally imposed downscaling of lifestyles will be a great and unpleasant cultural shock for all those who do not anticipate it, this paper concludes by considering whether members of the global consumer class could actually benefit from voluntarily embracing a ‘simpler life’ of reduced energy and resource consumption.² Although energy supply issues have the very real potential to cause unprecedented human suffering, it will be argued that, if handled wisely, the forced transition away from energy-intensive consumer lifestyles (whether due to peak oil, climate change, or broader resource

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¹ United States Joint Forces Command, ‘Joint Operating Environment’ (2010) 29, available at http://www.jfcom.mil/newslink/storyarchive/2010/IOE_2010_o.pdf [accessed 22 December 2011].

² See generally, Samuel Alexander, ‘The Voluntary Simplicity Movement: Reimagining the Good Life beyond Consumer Culture’ 7(3) *International Journal of Environmental, Cultural, Economic, and Social Sustainability* (2011) 133.

constraints) could actually lead humanity down a more meaningful, just, and sustainable path, such that we should want to *choose* this path even if it were not to be forced upon us in coming decades. But it is important to understand that we must leave consumer lifestyles before they leave us, for if we wait for them to be taken from us by force of circumstances, the transition beyond them will not be a blessing but a curse.

2. THE ENERGY INTENSITY OF CONSUMER LIFESTYLES

For almost all of human history, the sources of energy for human activity were very limited. Food was the primary energy source for human labour, as well as animal labour, and wood was used to fuel fires for cooking and warmth. As basic technologies developed, there was also limited use of hydro energy, through waterwheels, and wind energy, through boats and later windmills.³ Early in the 18th century, however, humankind's relationship to energy changed fundamentally, primarily due to the invention of the steam engine. This invention allowed human beings for the first time to harness, on a large scale, the truly immense energies stored in the fossil fuels – coal, at first, and later natural gas and oil. This technological and energy advance ignited an explosion of mechanized economic activity that we now refer to as the industrial revolution, and that explosion has yet to subside. These two centuries of economic growth produced an exponential rise in material standards of living, primarily in Western societies but increasingly elsewhere, and the emergence of these high material standards of living was dependent on the cheap and abundant supply of energy concentrated in fossil fuels.⁴ Before examining exactly how energy intensive modern consumer lifestyles are, those lifestyles will be described in some more detail and contrasted briefly with what had preceded them, for it is hard to overstate the magnitude of this transition and yet it is easily taken for granted.

2.1. *Industrialisation and the Rise of Consumer Societies*

The great economist, John Maynard Keynes, once noted that for the four thousand years preceding the industrial revolution, the average material standard of living for human beings globally changed very little, at most doubling over those four millennia.⁵ During this period of negligible economic growth, human productive activity was such that most people lived at material standards of living that most Westerners today would probably describe as extreme poverty. Food supplies were generally meagre and often insecure, and it would have been normal for people to have only one or perhaps two sets of clothing. Preventable diseases were common due to sanitation systems and medical knowledge being crude or non-existent. Housing was generally cramped and very basic, and people's material possessions were minimal – some bowls and cups, perhaps, and some basic kitchen and farming tools, but little else. Obviously there were many significant variations in material circumstances, both globally and temporally, but in terms of absolute material standards of living, it can be fairly stated that prior to industrialization most people lived at a material standard of living that was undesirably low.⁶ The point here is not to celebrate the present, but to caution against romanticising the past.

³ See Vaclav Smil, 'World History and Energy' in C. Cleveland (ed), *Encyclopaedia of Energy*, Vol. 6 (2004) 549.

⁴ See, e.g., David Stern and Astrid Kander, 'The Role of Energy in the Industrial Revolution and Modern Economic Growth' (2011, CAMA Working Paper) available at <http://econpapers.repec.org/paper/acbcamaaa/2011-01.htm> [accessed 22 December 2011].

⁵ John Maynard Keynes, *Essays in Persuasion* (1963) 260.

⁶ See Angus Maddison, *The World Economy: Historical Statistics* (2006); Peter Stearns, *Consumerism in World History* (2006).

Over the last few centuries, however, and especially the last 50 years, the material standard of living in the developed world has undergone a revolution of exponential proportions. It has been estimated by a Berkeley economist that from 1500 to 1750, world GDP grew by a very modest 0.4% annually, with total wealth created in this 250-year period being \$21 trillion.⁷ Due to industrialization and the large-scale use of fossil fuels, the period from 1750 to 1950 generated a considerable increase in world GDP, with \$139 trillion being created during the period 1900 to 1950 alone. From 1950 to 2000, however, the increase in world GDP was simply astonishing, marking a growth explosion the kind of which humankind had never experienced before. As another analyst notes, 'Total wealth created in this 50-year period was \$847 trillion, more than three times that created in the preceding 10,000 years.'⁸

Within the most developed regions of the world, these recent decades of unprecedented economic growth have all but solved the economic problem of how to secure the necessities of life and, indeed, have resulted in most people living lives of relative luxury and comfort. Although a small residue of abject poverty remains in these regions, on the whole ordinary people are materially wealthy when considered in the context of all known history or when compared with the multitudes around the world who still struggle for a bare subsistence. As economist, Clive Hamilton, puts it, 'Most Westerners today are prosperous beyond the dreams of their grandparents'⁹ – a point that should be moderated in light of the global financial crisis but which remains valid as a general statement. The houses of typical families are bigger than ever, sprawling across expanding suburbs, and these houses are each filled with untold numbers of consumer products, such as multiple TVs, stereos, computers, mobile phones, racks of unused clothes, washing machines, fridges, dishwashers, dryers, vacuum cleaners, kitchen gadgets, etc. These products often overflow into garages or hired storage rooms to create spaces full of accumulated 'stuff.' Houses are often centrally heated and air-conditioned, with spare rooms, and two or more cars parked outside. Average wages are well above subsistence levels, meaning that almost everyone has spare income to spend on comforts and luxuries such as meat, alcohol, take-away food, going to the movies, non-essential clothes or furniture, books, taking holidays, etc. People generally have access to a variety of public services, including free primary and secondary education. On top of all this, democratic political systems (however imperfect) seem firmly established, the water is clean, and almost nobody goes hungry.

These consumer lifestyles are indicative of unprecedented material wealth, which it will not be suggested is a bad thing, necessarily. But it is a form of socio-economic development that has been, and continues to be, extremely energy intensive. It takes vast amounts of energy to construct our homes and high-rise buildings; to grow and transport our food; to build and fuel the one billion vehicles that move people and things around the world; to light our homes and power our appliances; to produce countless commodities that provide us with our technologically sophisticated goods, services, and entertainment, etc. In short, it takes vast amounts of energy to support high-consumption lifestyles, and it is worth spending some time getting a clearer grasp on exactly how energy intensive – how oil intensive, in particular – these consumer lifestyles are.

⁷ J. Bradford Delong, 'World GDP, One Million B.C. – Present' (1998) available at http://www.jbradford-delong.net/TCEH/1998_Draft/World_GDP/Estimating_World_GDP.html [accessed 20 December 2011]. See also, Angus Maddison, *The World Economy: Historical Statistics* (2006).

⁸ Geoffrey Glasby, 'Beyond Growth: The Environment Key to Survival in the 21st Century' (2008) 16 *Pacific Ecologist* 15, 17.

⁹ Clive Hamilton, *Growth Fetish* (2003) xi.

2.2. Energy Slaves as the Invisible Foundation of Consumer Lifestyles

We could begin by noting, rather bluntly, that the world currently consumes around 89 million barrels of oil per day.¹⁰ This mind-boggling figure, which aggregates conventional and non-conventional oil, becomes all the more astonishing when we bear in mind the incredible energy density of oil. David Hughes, one of Canada's premier energy analysts, has recently done the math.¹¹ He concludes that there is approximately six gigajoules (six billion joules) in one barrel of oil, or about 1,700 kilowatts of energy. Multiple that by today's oil consumption of 89 million barrels per day and this represents the consumption throughout equivalent of about 14,000 years of fossilised sunshine *every day*.¹² These figures may not mean very much to those readers unfamiliar to thinking in terms of energy, so it can be helpful to convert them into terms of human labour, which can prove more comprehensible. Hughes has done this calculation also,¹³ and concludes that a healthy human being peddling quickly on a bicycle can produce enough energy to light a 100-watt bulb (or 360,000 joules an hour). If this person works eight hours a day, five days a week, Hughes calculates that it would take roughly *8.6 years of human labour to produce the energy stored in one barrel of oil*. Let us pause for a moment and reflect on this astounding conclusion. One barrel of oil is the equivalent of 8.6 years of human labour, and the world today consumers 89 million barrels of oil, *everyday*.

This type of analysis gave rise to the notion of 'energy slaves,' a term coined by American energy philosopher, Buckminster Fuller, in 1944.¹⁴ The purpose behind the 'energy slave' concept is to understand how much human labour would be required, hypothetically, to sustain a certain action, lifestyle, or culture in the absence of the highly concentrated fossil-fuel energies available today. For example, it would take 11 energy slaves peddling madly simply to power an ordinary toaster. When this concept is applied to modern consumer societies as a whole, the results are eye opening, to say the least. Given that the average North American currently consumes over 24 barrels of oil per year, the average inhabitant in that region of the world would require at least 204 'energy slaves' to sustain their lifestyles.¹⁵ The average Australia would require 130 energy slaves; the average Western European around 110 energy slaves. As if these figures were not confronting enough, in the absence of oil the global economy in its entirety would need approximately 66 billion 'energy slaves' to sustain itself in its current form.

Whatever way one looks at this analysis, these are astonishing figures, representing a spectacular amount of energy that obviously far exceeds what was at the disposal of Monarchs, aristocrats, and slave owners in previous eras. When we also bear in mind how *cheap* oil has been in the past, this analysis gets more remarkable still. Even at today's price of around \$100 per barrel, which historically is extremely high, this is really a very cheap form of energy. One only needs to imagine offering someone \$100 for 8.6 years of labour to realise that even today's so-called 'expensive' oil is still amazingly cheap. Western-style consumer lifestyles, it can be seen, being so energy intensive, are utterly dependent on a cheap and abundant supply of energy, and in ways that are not always obvious. We often fail to see how central energy is to our lives

¹⁰ International Energy Agency, 'World Energy Outlook' (2011) available at <http://www.iea.org/weo/> [accessed 22 December 2011].

¹¹ See Andrew Nikiforik, 'You and Your Slaves' *The Tye* (5 May 2011) available at <http://thetyee.ca/Opinion/2011/05/05/EnergySlaves/> [accessed 22 December 2011].

¹² David Hughes, 'Peak Energy and its Implications for the City of Edmonton' (2010) available at http://www.edmonton.ca/city_government/documents/Discussion_Paper_5a_Hughes_Peak_Energy.pdf [accessed 22 December 2011].

¹³ See above n 11.

¹⁴ See Nicola Armaroli and Vincenzo, *Energy for a Sustainable World* (2011) Ch 3.

¹⁵ See above n 11.

because it is invisible, only its consequences are visible. As we will see in the next section, however, evidence is mounting that the age of cheap energy – the age of cheap oil, in particular – seems to be over, and the purpose of this paper is to draw out some of the lifestyle implications of this historic turning point in the human story.

3. PEAK OIL AND THE PROSPECTS OF ENERGY DESCENT

Although human beings have used oil for millennia – for such things as lamp fuel, paints, lubricants, medicine, and waterproofing – the modern era of oil production began in 1859 when the first oil well was drilled in Western Pennsylvania. This well produced between 15-25 barrels of oil per day, which at the time constituted the world's entire production. Before long the oil trade exploded onto the national and international scene, and a century and a half later, as has already been noted, the world extracts and consumes around 89 million barrels per day (or 32 billion barrels per year). When we conceptualise this flow of oil in terms of 'energy slaves,' it becomes perfectly clear why the age of cheap oil changed the world in fundamental ways. But the world's dependency on cheap energy raises the following questions: What would happen to our economies, or our societies more generally, if the global supply of oil stopped increasing and began to decline? Is there a chance of oil supply stagnating or decreasing and, if so, when? And what would the consequences of much higher oil prices be? These are some of the central questions of the peak oil debate, and some of the issues will now be considered in a little more depth.

3.1. Understanding Peak Oil

Crude oil – or petroleum – is a finite, non-renewable resource. Sometimes called 'ancient sunshine,' it was created over tens of millions of years when organic matter was placed under immense heat and pressure beneath the earth's surface. This process converts the organic matter into energy-dense hydrocarbons, such as oil and natural gas.¹⁶ Given the vast time frame we are talking about here, it follows that there is only a finite amount of these substances in the ground.

For geological reasons, the extraction of oil from the ground roughly follows a bell-shaped curve, with extraction increasing at first, then reaching a plateau, and then declining. That is, oil is not extracted from a well at the same rate until the last drop of oil is consumed. Rather, over time, extracting the oil first gets easier, and then gets harder, and ultimately the extraction process slows down until it stops. Oil generally stops flowing from oil wells not because the well becomes empty, but because continued extraction becomes uneconomic, in the sense that the financial or energy costs of continued extraction become greater than the financial or energy returns, a point to which we will return.

This basic 'bell curve' of extraction flow has been shown to occur in every oil well ever drilled, and the same pattern also applies to nations as a whole. For example, in the United States oil production began in 1859, increased rapidly for several decades, peaked around 1970, and has been on a corrugated downward trend ever since. That is, the US never produced as much oil per year as it did in 1970; and this is not a phenomenon limited to the US, of course, because everywhere oil is a finite resource. A 2005 study by the Royal Swedish Academy (which bestows the Nobel Prizes in chemistry and physics) reported that 54 of the world's 65 largest oil-producing countries have already reached maximum oil extraction or were in decline,¹⁷ and all other nations that produce oil are destined to follow the same path.

¹⁶ See Kenneth Deffeyes, *Beyond Oil: The View from Hubbert's Peak* (2005) Ch 2.

¹⁷ Royal Swedish Academy of Sciences, 'Statements on Oil by the Energy Committee' (KVA, 14 October 2005) available at:

It should be clear, then, that there will come a time when the *global* supply of oil will peak, and in fact, a consensus is forming that the supply of crude oil peaked around 2005-8. This consensus, however, is quite a recent phenomenon. As recently as 2005, the Executive Director of the International Energy Agency (IEA) mocked people who suggested that oil might peak, referring to peak oil theorists as 'doomsayers.'¹⁸ However, in a remarkably abrupt turn around, the IEA's *World Energy Outlook 2010* announced that crude oil, in fact, has already peaked, back in 2006.¹⁹ It is worth noting here that the IEA is a conservative, mainstream institution, for this shows that peak oil is no longer the domain of fringe theorists or doomsayers, but has become a generally accepted fact by those who have examined the data seriously. As noted in the introduction, the US military – another conservative institution – has also recently published a report that concluded that 'By 2012, surplus oil production capacity could entirely disappear, and as early as 2015, the shortfall in output could reach nearly 10 MBD [million barrels per day].'²⁰ A similar conclusion was published in 2010 by the UK Industry Task Force on Peak Oil and Energy Security, which expressed the view that the decline in world oil production is likely to occur in the next five years or sooner.²¹ Even the biggest oil companies are beginning to acknowledge this state of affairs. For example, Christophe de Margerie, the CEO of Total, has recently stated that he expects demand will outstrip supply as soon as 2014 or 2015.²² And the evidence continues to mount.²³

The peaking of oil production should not really surprise us, of course. Before we can extract oil we have to discover it, and world oil discovery peaked around 1965. Since that time, the trend has been to discover less oil each year, even though exploration has been more intensive and more technologically sophisticated than ever. A useful analogy here is picking fruit from a tree. People pick the low hanging fruit first since that is the easiest to acquire. But once the easy stuff is gone, as time goes on it gets harder to find and pick the same amount of fruit. The world has picked the low hanging fruit, and the drilling in the Gulf of Mexico is a practice that essentially proves this. No oil company would go to the expense and danger of drilling in several thousand feet of water if there were more accessible oil on land. The fact is that the easy-to-find oil is gone, which means that from now on oil will get harder to find, more difficult to extract (requiring more energy and time), and therefore will be more expensive.

The Gulf of Mexico oil spill is also testament to the world's *addiction* to oil, because it suggests that the world would sooner go out on the thin branches of the tree in search for more 'fruit,' and risk great injury, than rethink consumption. But the review of oil supply above indicates that the world has no option but to rethink consumption, since we are fast depleting a non-renewable resource. Today the world consumes

http://www.kva.se/Documents/Vetenskap_samhallet/Energi/Utskottet/uttalande_energi_olja_eng_2005.pdf

¹⁸ International Energy Agency, *Resources to Reserves: Oil and Gas Technologies for the Energy Markets of the Future* (2005) 3.

¹⁹ International Energy Agency, 'World Energy Outlook' (2010) available at <http://www.iea.org/weo/> [accessed 22 December 2011]. Crude oil has been on an undulating plateau since then, with any increases being insignificant in terms of global demand.

²⁰ See above n 1.

²¹ Industry Task Force on Peak Oil and Energy Security, 'The Oil Crunch: A Wake Up Call for the UK Economy' (2010, Second Report) 6 available at http://peakoiltaskforce.net/wp-content/uploads/2010/02/final-report-uk-itpoes_report_the-oil-crunch_feb20101.pdf [accessed 22 December 2011].

²² See <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aTv00Tc4yhSA> [accessed 22 December 2011].

²³ For a helpful list of important resources, see <http://odac-info.org/reports-resources> [accessed 22 December 2011]. See also, Steve Sorrell et al, 'Shaping the Global Peak: A Review of the Evidence on Field Sizes, Reserve Growth, Decline Rates, and Depletion Rates' *Energy* (2011, in press) 1.

approximately three barrels of oil for each barrel it discovers,²⁴ a ratio that is plainly unsustainable. Furthermore, in the *World Energy Outlook 2008*, the IEA notes that the reserves in existing oil wells are declining at 6.7% per year, which is roughly twice the rate it had previously assumed.²⁵ In real terms what this means, as noted by the IEA's chief economist, Fatih Birol, is that over the next two decades the world will need to find and develop four more Saudi Arabias just to keep oil production at current levels, or find and develop six more to meet expected demand.²⁶ In recent decades, however, despite intensive exploration, the world's oil companies have been finding fewer and fewer significant oil fields, and almost all the significant fields that have been found historically have been intensively exploited for many decades. All this adds further support to the argument that crude oil supply will never again increase and, after its current undulating plateau, enter terminal decline in the foreseeable future.

3.3. Further Concerns about Oil Supply

There are at least four more reasons to be concerned about maintaining current oil supply. First, it is not clear exactly how much recoverable oil the world has left, and this makes it difficult to predict the exact timing of the decline in global oil production. Western oil companies are required to publish their reserves publicly, but some of the world's largest oil producers – the state-owned enterprises in the Middle East, for example – deem oil reserves to be a 'state secret' and do not allow external audits. This means that analysts have to rely on what those producers say they have, but there are many grounds for thinking that their figures are highly inflated. In the 1980s, for example, when OPEC introduced its quota system, nations doubled or even tripled their stated reserves, essentially over night.²⁷ They obviously had an economic incentive to do so, since increasing their reserves meant they could produce and sell more oil, but it casts considerable doubt on the legitimacy of their claimed reserves, and it is fair to think that their stated oil reserves are considerably higher than what is actually recoverable. Furthermore, despite decades of extremely intensive oil production, the stated reserves today have barely changed or even increased since the mid-1980s, which provides further grounds for doubting stated reserves. What makes this scepticism all the more compelling is the fact that a Wikileaks cable was released in 2011 that indicates that the US Embassy has concerns, based on the views of the former head of exploration of Saudi-Aramco, that Saudi Arabian oil reserves could be inflated by as much as 40%.²⁸

Secondly, even if the reserves are there, it is not just about reserves, but about getting timely supply of those reserves.²⁹ It is often noted that there are vast oil resources in the tar sands of Canada and Venezuela, and this is true. But the productive process of refining the tar sands oil is slow, meaning that even though there is much recoverable oil left in the tar sands, bringing it to the market in a timely fashion in order to meet the decline in currently existing supplies is at best a form of mitigation, not a solution, to the inevitable decline in oil supplies.³⁰ Furthermore, since the tar sands are an expensive

²⁴ Robert Hirsch et al, *The Impending World Energy Mess* (2010) 11.

²⁵ See International Energy Agency, 'World Energy Outlook' (2008) 43 available at <http://www.iea.org/textbase/nppdf/free/2008/weo2008.pdf> [accessed 22 December 2011].

²⁶ See <http://www.bbc.co.uk/programmes/p009hq8g> [accessed 22 December 2011].

²⁷ For a helpful discussion of this issue, see David Strahan, *The Last Oil Shock* (2009), esp. Ch. 7.

²⁸ See John Vidal, 'Wikileaks Cables: Saudi Arabia cannot pump enough oil to keep a lid on prices' *The Guardian* (8 February, 2011) available at:

<http://www.guardian.co.uk/business/2011/feb/08/saudi-oil-reserves-overstated-wikileaks> [accessed 22 December 2011].

²⁹ See generally, Paul Stevens, *The Coming Oil Supply Crunch* (Chatham House Report, August 7, 2008).

³⁰ See Hirsch et al, above n 24.

way to produce oil – as are other non-conventional oils – it is only ‘economic’ to produce them when oil prices are high. Since oil prices have been quite volatile over recent years – and in an age when carbon taxes threaten to change the profit margins of oil, especially carbon-intensive oil from the tar sands – this puts questions into the minds of investors who have proven hesitant to commit many billions of dollars into developing the tar sands in an era when the price of oil seems so uncertain. For example, when oil dropped to under \$40 a barrel after the economic crash of late 2008, many development projects were deferred indefinitely or cancelled, and this has delayed some production of oil from the tar sands and other resources.³¹ The temporary moratorium on any drilling in the Gulf of Mexico after the disastrous spill of April 2010 may also interfere with future supply.³²

A third concern about oil supply, and perhaps the most important, is the fact that global *demand* for oil is expected to keep growing. Much of this demand is coming from places like China and India, where energy intensive industrialisation is escalating at extraordinary rates, and where cheap cars are opening the door for hundreds of millions of new drivers who will need fuel. Naturally this increase in demand is putting further pressure on the stagnating supply of oil around the world. What is less widely appreciated, however, is the fact that huge increases in consumption are occurring within oil *exporting* nations too (e.g. such as Russia and the nations in OPEC).³³ This rise in consumption is making it more difficult for those nations to maintain existing exports, for obvious reasons. As consumption grows within oil exporting nations, and as production stagnates, there will be a great incentive for those exporting nations to keep more oil for themselves, which means that the OECD nations, for example, should not assume that they are going to get the same proportion of global oil production as they do presently. Since internal supplies of importers are also declining, this presents the situation of both importers and exporters wanting more oil, while both facing decreasing supplies. This is the ‘oil crunch’ that is likely to define the 21st century.

This leads to the fourth concern about oil supply, which is driven not so much by *geology* as *geopolitics*.³⁴ What will the United States do, for example, if the OPEC nations decide that they want to reduce their exports to the US and keep more oil for themselves? Or, what would happen if a military dispute arose in the Middle East and disrupted the immense flow of oil from this region? Finally, what would happen if a terrorist group successfully bombed Ghawar – the largest conventional oil field in the world – or some other critical oil supply line or refinery? None of these scenarios are by any means beyond the realm of possibility, and let us not forget that the last two oil shocks (of 1973 and 1979) were caused by geopolitical events, not geological shortages.³⁵ Accordingly, even if people reject entirely the prospect of oil supply stagnating or declining for geological reasons, the very real threat of geopolitical

³¹ See International Energy Agency, ‘Impact of the Financial Crisis on Global Energy Investment’ (2009) 3 available at http://www.iea.org/papers/2009/G8_investment_ExecSum.pdf [accessed 22 December 2011].

³² Industry Task Force on Peak Oil and Energy Security, ‘Peak Oil: Implications of the Gulf of Mexico Oil Spill’ (Nov., 2010) available at http://peakoiltaskforce.net/wp-content/uploads/2010/11/itpoes_deepwater-briefing-note_nov20103.pdf [accessed 22 December 2011].

³³ See Jeff Rubin and Peter Buchanan, ‘OPEC’s Growing Call On Itself’ (CIBIC, Occasional Report 62, 2007) available at http://research.cibcwm.com/economic_public/download/occrept62.pdf [accessed 22 December 2011].

³⁴ See, e.g., Frederic Leder and Judith Shapiro, ‘This Time It’s Different’ 36 *Energy Policy* (2011) 2850; Roger Howard, ‘Peak Oil and Strategic Resource Wars’ *The Futurist* (Sept./ Oct, 2009) 18.

³⁵ It is also worth noting that when the supply of Libyan oil was cut off due to geopolitical unrest in 2011, Saudi Arabia – which was generally considered the only place that could increase production significantly – seemed unable to replace the lost supply of Libyan oil. This forced the International Energy Agency to release some stored capacity to avoid any spikes in oil price.

disruption gives all oil dependent nations a very large incentive to move quickly toward becoming more resilient to oil shocks. This is especially so, as noted by the IEA, given that in coming years the world will come to rely increasingly on a relatively small number of producers, mainly in the Middle East and Northern African regions, where oil is shipped along 'vulnerable supply routes.'³⁶

For all the reasons outlined above, nations around the world should be preparing themselves for a stagnation and decline in oil supplies in the near future (whether for economic, geological, and/or geopolitical issues). Indeed, Fatih Birol has recently stated in an interview that the world should have started preparing at least 10 years ago.³⁷ This view is supported by the 2005 study by Robert Hirsch and colleagues, who rigorously demonstrate that a mitigation strategy for dealing with peak oil should begin 20 years in advance of peak oil, or 10 years in advance if a nation is 'mobilised' in the manner of war preparation.³⁸ Politicians, however, are either ignorant of peak oil or seem to think that discussing it publicly would be political suicide, and so little or no preparatory action is occurring at the governmental level.³⁹

If global production of all liquid fuels has peaked, or will peak in the next few of years, then oil importing nations have already left things too late for a smooth transition to a post-petroleum society. Of course, there are some alternative liquid fuels and alternative energies that are available to help mitigate the worst impacts of this turning point in history – coal-to-liquids, gas-to-liquids, hydrogen, biofuels, etc.⁴⁰ But no alternative fuels or energies will be able to replace the *uniquely* cheap, portable, and energy-dense crude oil that has been the foundation of economic growth historically.⁴¹ While this raises a vast array of social, economic, ecological, and political issues, this paper will focus on the implications of energy descent on consumer lifestyles in the developed world, and that is the question to which the analysis now turns, which requires an engagement with economics.

4. THE ECONOMICS OF PEAK OIL

Although the intricacies of peak oil economics can get very complex quite quickly, the basic dynamics can be easily grasped and conveyed. The first point to note is that there has always been a very close correlation between energy supply and economic growth,⁴² which should really come as no surprise. Quite simply, productive activity takes energy, and many studies and events have demonstrated that when energy supply has not met demand, economies suffer, often to the point of recession.⁴³ What is surprising, however, is that dominant macro-economic theories do not include energy in their economic models, which means that if we use those models to think about the world, there is no reason to think that a stagnation or decline in energy supply need affect economic

³⁶ See IEA, above n 10, 3.

³⁷ See Fatih Birol, interview, available at <http://www.youtube.com/watch?v=iKkISqOCnVA> [accessed 22 December 2011].

³⁸ Hirsch et al, above n 24.

³⁹ One reason for this may be because the development of non-conventional oil to offset the decline in conventional oil is going to be both expensive and carbon intensive. For a discussion of the relationship between peak oil and climate change, see Pushker Kharecha and James Hansen, 'Implications of "Peak Oil" for Atmospheric Carbon Dioxide and Climate' (2008) available at <http://arxiv.org/abs/0704.2782> [accessed 22 December 2011].

⁴⁰ Ibid.

⁴¹ Ibid.

⁴² See, e.g., David Stern and Astrid Kander, 'The Role of Energy in the Industrial Revolution and Modern Economic Growth' (2011, CAMA Working Paper) available at <http://econpapers.repec.org/paper/acbcamaaa/2011-01.htm> [accessed 22 December 2011].

⁴³ See, e.g., James Hamilton, 'Historical Oil Shocks' (2010) available at http://dss.ucsd.edu/~jhamilto/oil_history.pdf at 7 October 2011.

growth.⁴⁴ The reason mainstream economists have been able to get away with not taking energy into account in their macro-economic models is because, historically, energy has been so cheap, and its supply so readily available, that ignoring its role in economic growth has not interfered significantly with the model's ability to make (at least at times) reasonably accurate macro-economic predictions. But if we are facing a future of stagnating supply and high oil prices, then energy is going to play a larger and larger role in the costs of production, the implications of which are only now being fleshed out theoretically. Recently, several economists have started placing energy at the centre of macro-economic models, and these models provide grounds for thinking that the end of the age of cheap oil may very well signify the twilight of economic growth.⁴⁵ As prominent energy-economists, Murphy and Hall, argue:

when energy prices increase, expenditures are re-allocated from areas that had previously added to GDP, mainly discretionary consumption, towards simply paying for the more expensive energy. In this way, higher energy prices lead to recessions by diverting money from the economy towards energy only. The data show that recessions occur when petroleum expenditures as a percent of GDP climb above a threshold of roughly 5.5%.⁴⁶

If economic growth is indeed dependent on energy prices in this way, then we are truly approaching a momentous turning point in the human history. For two centuries the dominant narrative of human progress has been based on economic growth,⁴⁷ but if it turns out that the world cannot significantly decouple growth from energy use, then any stagnation in the supply of energy may very well represent the 'end of growth.'⁴⁸ This is something that is going to change the world so fundamentally that its foreseeable arrival ought to be taken very seriously indeed. Unfortunately, most people, including the world's leaders, remain firmly entrenched in a macro-economic paradigm that seeks growth without limit.

A further economic point to consider in this context is that the trillions of dollars of debt that many nations have taken on in recent decades was predicated on the assumption that future growth would be similar to the growth experienced over the last few decades. But if it is the case that we have entered the twilight of economic growth, those debts may very well become bad debts, and sooner than anyone might like to think. The effects of this will destabilise the highly interconnected global economy, with implications that no one can really foresee with any precision. Suffice it to say that it will not be good news, which is to say, it will be bad news. Exactly how to transition away from a debt-based and growth-based monetary system, and what to replace it with, are questions far beyond the scope of this paper; but these are questions that ought to be taken very seriously.⁴⁹

⁴⁴ See, e.g., Robert Solow, 'A Contribution to the Theory of Economic Growth' 70 *Quart. J. of Economics* 65.

⁴⁵ See, e.g., David Murphy and Charles Hall, 'Adjusting the Economy to the New Energy Realities of the Second Half of the Age of Oil' 223 *Ecological Modelling* (2011) 67; David Stern, 'The Role of Energy in Economic Growth' (CCEP Working Paper, 2011) available at <http://econpapers.repec.org/paper/eenccepwp/0310.htm> [accessed 22 December 2011]; Robert Ayres and Benjamin Warr, *The Economic Growth Engine: How Energy and Work Drive Material Prosperity* (2009).

⁴⁶ Murphy and Hall, above n [] 70.

⁴⁷ See Stephen Purdey, *Economic Growth, the Environment and International Relations: The Growth Paradigm* (2010).

⁴⁸ See Richard Heinberg, *The End of Growth* (2011).

⁴⁹ See, e.g., Richard Douthwaite and Gillian Fallon, *Fleeing Vesuvius* (2011); Tim Jackson, *Prosperity without Growth: Economics for a Finite Planet* (2009); Peter Victor, *Managing without*

For present purposes, the most important economic dynamics of peak oil can be expressed as follows. We saw, in the previous section, that conventional oil peaked around 2005/6, and that the unexpectedly high decline rates in existing wells means that the supply of non-conventional oil has been struggling to offset those declines. As more nations pass their peak production in coming years, and as existing wells continue to decline, a stagnation and eventual decline in overall oil supplies is inevitable. When we realise that *demand* for oil is still expected to grow significantly, despite this stagnation and decline in supply, the economic implications of peak oil become clear. The most basic economic principles tell us that as the supply of a commodity decreases and demand increases, the price of that commodity will increase, perhaps exponentially. That is what the world can expect in the future, and in fact today's high oil prices are undoubtedly a result of these dynamics of supply and demand already beginning to operate in the global oil market. And here we are touching on what is arguably the most important implication of the peak oil phenomenon. The issue is not that the world will ever run out of oil, a point that should not be forgotten. The issue is that we have reached the end of the age of *cheap* oil. These supply and demand dynamics described above are exacerbated by the fact that alternatives to conventional oil – such as the non-conventional oil derived from the tar sands or deep-sea drilling – are always more expensive to produce, due primarily to their lower energy returns on investment.⁵⁰

Over the last few years we have seen how fragile and delicate the global economic system is – owing in a large part to its oil dependency. More specifically, we saw the price of oil increase steadily as the peak of conventional oil was approached, and as the supply of conventional oil stagnated while demand continued to increase, we saw the price of oil spike at \$147 in July 2008. Although mainstream media attributed the global economic crash in 2008 to the sub-prime fiasco that originated on Wall Street and materialised in Cleveland – and while there is at least some truth to that account – the untold story is the role that oil prices played, and continues to play, in the global financial crisis. Economist, James Hamilton, has shown in a recent paper that 10 out of the 11 economic recessions experienced by the US post-WII were preceded by high oil prices,⁵¹ and many others have drawn the connection between economic growth and energy supply.⁵² Given how dependent the global economy is on cheap oil, it is rather surprising that so few people have made the link between the economic crash and the spike in oil prices.

Unfortunately, however, this is a probably lesson that is going to be taught and retaught in coming years and decades.⁵³ The global economy simply cannot withstand the economic impacts of high oil prices – primarily because so much trade is now international and therefore dependent on oil for the transportation of goods. But when oil prices get so high that the economy cannot function – which is what happened in 2008 – the economy struggles to grow, and this reduction in economic activity means a reduction in oil demand, and this reduced demand makes the price of oil crash also. This is what happened after the crash in 2008, and it is what happens whenever the demand for oil is reduced because of economic recession. Low oil prices, however, then aid economic recovery, but as economies recover from recession and begin to grow again,

Growth: Slower by Design, not Disaster (2008); Samuel Alexander, 'Planned Economic Contraction: The Emerging Case for Degrowth' *Environmental Politics* (2012, forthcoming).

⁵⁰ See David Murphy and Charles Hall, 'Energy Return on Investment, Peak Oil, and the End of Economic Growth' *Annals of the New York Academy of Sciences* (2011) 52.

⁵¹ James Hamilton, 'Historical Oil Shocks' (2010) available at http://dss.ucsd.edu/~jhamilto/oil_history.pdf [accessed at 7 October 2011].

⁵² See, e.g., Stern and Kander, above n 4; Benjamin Warr and Robert Ayres, 'Evidence of Causality between the Quantity and Quality of Energy Consumption and Economic Growth' 35 *Energy* (2010) 1688.

⁵³ See generally, Gail Tverberg, 'Oil Supply Limits and the Continuing Financial Crisis' *Energy* (2011, in press) 1-8.

this puts more demand pressure on stagnating oil supplies, and the cycle repeats itself. In short, oil prices increase till economic breaking point, economies crash, which leads to a crash in oil prices; the low oil prices then facilitate economic recovery, which puts more demand pressure on oil, leading prices to rise till economic breaking point, and so and so forth. This increasingly severe cycle of bust-recovery-bust is what we should expect in coming years and decades, and as oil supplies decline, economic contraction is what we should expect and prepare for. The world is unlikely to escape this unhappy cycle until it transitions beyond a growth-based economy and breaks its addiction to oil.

This final point about breaking our addiction to oil deserves some brief elaboration, because it raises the spectre of what Tom Murphy has called the 'energy trap.'⁵⁴ In order to break the addiction to oil, economies dependent on oil will need to invest huge amounts of money and energy in building new social and economic infrastructures that are not so heavily dependent on oil (e.g. efficient public transport systems to incentivise people to drive less). But since this transition has not yet seriously begun, the necessary investment of money and energy is going to be required at a time when money and energy are scarcer than they have been in recent decades. This places us in the 'energy trap.' Politicians are going to have a short-term incentive *not* to invest extra money and energy in new infrastructure, since people will already be feeling the pinch of high oil prices. This means that there will be very little or no surplus money and energy to direct towards the necessary infrastructure projects. But while this will provide some short-term relief for people and politicians, it only delays the inevitable need for that new infrastructure. But a delay only exacerbates the problem, since the necessary investment will then need to come later, at a time when energy and money are scarcer still.

5. THE FATE OF CONSUMERISM IN AN ENERGY DESCENT CONTEXT

With the prospect of energy descent and much higher oil prices being very real indeed, the question to consider now is how this eventuality is likely to affect the high consumption, energy-intensive lifestyles that so many people in the developed world take for granted today. It may be useful to begin with the issue of food production, since this is an area that is both heavily dependent on cheap and abundant energy and most likely to be the cause of great suffering if the arrival of expensive oil is not prepared for with due diligence.⁵⁵

To state the obvious, we all need to eat, but equally obvious is that almost nobody in Western-style consumer societies could last for very long if they were expected to provide food for themselves. Instead, other people generally grow our food, or most of it, and make it available for purchase through lines of transportation that are often extremely long. In Australia, for example, a basket of food typically travels 70,000 kilometres from producer to consumer (if the distance each item travels is aggregated).⁵⁶ How secure is this system of food supply? An anecdote from a website

⁵⁴ See <http://physics.ucsd.edu/do-the-math/2011/10/the-energy-trap/> [accessed 22 December 2011].

⁵⁵ See Roni Neff et al, 'Peak Oil, Food Systems, and Public Health' 101(9) *Am. Journal of Public Health* (2011) 1587. See also, Norman Church, 'Why Our Food is so Dependent on Oil' (2005) available at: <http://www.powerswitch.org.uk/portal/index.php?option=content&task=view&id=563> [accessed 22 December 2011].

⁵⁶ See <http://www.abc.net.au/science/articles/2007/11/28/2103395.htm> [accessed 22 December 2011]. Another study by Sustain has the figure at 241,000 kilometres. See Sustain, 'Eating Oil: Food Supply in a Changing Climate' www.sustainweb.org [accessed 22 December 2011].

raises this question quite vividly.⁵⁷ The author recounts a time when the power went out in his local supermarket. He reports that after 20 minutes of unease people started getting agitated, and when the shopkeeper advised people that he could not trade because the system was down, people started yelling: 'What will I do if I have nothing to eat?' Just when despair was about to escalate into a riot, the lights came back on and normality returned, and all thoughts of food insecurity were immediately forgotten. People were able to purchase some pre-cooked meals and return home to 'provide' for themselves and their families. This anecdote proves nothing of course; it merely raises the question of food security. A second insight, on a much larger scale, however, can be gleaned from the trucker's strike that took place in the UK in 2000. The nation realised very quickly how dependent it was on the globalised food system, because when the truckers were not trucking, food was not getting to the supermarkets. Before long supermarket officials were calling members of parliament advising them that without the lines of transport open to restock the shelves, supermarkets had about three days of food. In the words of one commentator, the nation was only 'nine meals from anarchy.'⁵⁸

The point of recounting these events is not to suggest apocalyptically that tomorrow there might not be food in the supermarket. The point is to expose how dependent people in consumer societies are on the globalised food trade and the systems of transportation and production that this entails. Since the global food economy is so dependent on cheap oil,⁵⁹ we ought to be considering whether it can really be sustained in an era of higher oil prices. Agri-business, after all, is extremely energy intensive. First of all there is the energy needed for commercial fertilisers, which are derivatives of natural gas, and secondly commercial pesticides are derivatives of oil. Thirdly, all the irrigation, plastic packaging, and marketing done behind the scenes are also highly energy intensive. But once the food is grown and packed, it still has to be trucked, flown, and/or shipped around the country or around the world, and given how cheap oil has been in recent decades, the costs of global trade have not been prohibitive. This means that today the typical meal in consumer societies has typically travelled vast distances to get to our plates – rice from China; corn from the United States; an orange from Australia; cheese from Denmark, etc. If, however, as can be expected, oil gets much more expensive in coming years, then quickly this mode of food production and distribution will become uneconomic.⁶⁰ High oil prices will add crippling costs to the globalised food trade, and this will unleash powerful economic forces that are likely to result in systems of food production and distribution that are much more localised and which use considerably less fertilisers, pesticides, and packaging.

The same economic forces will eventually apply to all commodities in the globalised market that are dependent on oil, and it is worth unpacking this point a little to make it clear.⁶¹ When the price of oil goes up, oil-dependent things like plastics, pharmaceuticals, and pesticides, are going to be much more expensive and thus decreasingly accessible or affordable in the same quantities we often take for granted today. The key point, however, again concerns transport. Since almost all the goods we purchase are no longer locally made, this means that they are all dependent on oil due to

⁵⁷ See http://www.survivalblog.com/2011/10/letter_re_a_shopping_trip_glim.html [accessed 22 December 2011].

⁵⁸ See Andrew Simms, 'Nine Meals from Anarchy: Oil Dependence, Climate Change, and the Transition to Resilience' (2008) available at <http://www.scribd.com/doc/51097356/Nine-Meals-From-Anarchy> [accessed 22 December 2011].

⁵⁹ See Sustain, above n 56.

⁶⁰ See Richard Heinberg, 'How Oil Prices Affect the Price of Food' (2011) available at <http://oilprice.com/Energy/Oil-Prices/How-Oil-Prices-Affect-the-Price-of-Food.html> [accessed 22 December 2011].

⁶¹ For a comprehensive discussion, see Jeff Rubin, *Why Your World is About to Get a Whole Lot Smaller: Oil and the End of Globalization* (2008). See also, Fred Curtis, 'Peak Globalization: Climate Change, Oil Depletion, and Global Trade' 69 *Ecological Economics* (2009) 427.

the fact that they have to be driven, shipped, and/or flown to our localities. When the price of oil goes up, however, this highly transport intensive economic practice will become much less common.

Take steel, for example, although essentially any commodity could make the same point. The United States used to produce most of its own steel, but as the economy was globalised over the course of the 20th century, producers of steel realised that wages were very cheap in the developing world, especially China, and so they moved their factories there. Furthermore, cheap oil might have meant that the Chinese acquired their iron ore from some other nation around the world, such as Brazil or Australia. In recent decades, most steel used in the US has been produced in China, primarily for these economic reasons, and then shipped back to US where it is used in construction. However, this method of production and exchange is very quickly going to come to end when oil gets more expensive, because basic economics will so dictate. As soon as the extra costs of shipping the steel begin to outweigh savings flowing from the cheap labour, steel will once again be produced in the US and perhaps less of it will be used. Relocalisation, therefore, may well come about, not because of any top down initiative, nor from a critical mass of people convincing the mainstream of the environmental or social benefits of localisation. Rather, relocalisation of economies will arise because the costs of globalised trade simply become uneconomic.⁶²

It is not just economic relocalisation, however, that will flow from expensive oil. There is also going to be a significant reduction in the *amount* of things people can afford to consume, since the extra costs of production (due to high oil prices) will mean that less can be produced and/or what is produced costs more. Consider, for example, a typical family living in the suburbs: the parents both work in the city and drive separately to work. When oil gets more expensive, this commute is going to get more expensive, and so the family immediately has less discretionary income and thus is forced to consume less. However, the impacts on the family's consumption habits are more direct, for reasons outlined above. Since almost all commodities (especially food) have some oil embedded in their production, all commodities will get more expensive, meaning that a given income will purchase fewer things. It can be fairly assumed that with less disposable income, people will fly less, drive less, transition to more local work, use less heating and air-conditioning, eat in season to avoid food miles, etc.

The conclusion that this brief analysis leads to, of course, is that several years after oil prices have these economic impacts – which is likely to occur over the next decade or two, owing to the supply issues described earlier – it is not at all clear whether anything like consumer culture as we know it today will still exist. Today, in fact, we may be living in the age of 'peak consumerism.' If anything like consumer culture does persist into the second half of this century, it will be lived and experienced by far fewer people or at a much downscaled level. A more likely future is one where food production is largely relocalised over the next two or three decades; plastic packaging almost disappears; car culture enters terminal decline; and industrial production and consumption of all commodities drops significantly due to the embedded costs of expensive oil. This will be the age of deindustrial civilisation, the dawn of which seems to be almost upon us.

6. LIVING SIMPLY AT THE DAWN OF DEINDUSTRIAL CIVILISATION

This paper is advancing the thesis that the best way to prepare, personally and socially, for the imminent impacts of peak oil is to voluntarily embrace 'simpler lifestyles' of

⁶² This actually occurred when oil was \$147 in 2008. It became cheaper to make steel in the US, since the price of oil added \$90 ton to steel production, making Chinese imports less economic than local production. See Rubin, above n 61, 150. See also, Peter North, 'Eco-localisation as a Progressive Response to Peak Oil and Climate Change – A Sympathetic Critique' 42 *Geoforum* (2010) 585.

reduced and restrained consumption in advance of their external imposition. Not only will this make people and communities more resilient when the oil crunch intensifies, a case can be made that embracing lifestyles of voluntary simplicity would be in our interests even in the absence of the oil crunch. In this final section these points will be unpacked in a little more detail.⁶³

Assuming that governments do not prepare adequately for peak oil, which is by far the most likely scenario, the first way the oil crunch may impact on ordinary members of the global consumer class is through unemployment. If peak oil production does indeed signify the twilight of economic growth globally, it is likely that today's growth-based economies will not function properly (which may be what we are seeing already in many places around the world today). Increased unemployment is almost certainly going to be one consequence of this malfunction. This might mean two-income families become one-income families, or it might mean that people lose their jobs and struggle for long periods to find new ones or similar paying ones. This provides a great incentive to develop the art of living with less income, and one way to do this is to begin living well below one's means today.⁶⁴ It also provides an incentive to get out of debt as soon as possible, because debt is the last thing one needs when facing the risk or reality of unemployment. This post-consumerist living strategy obviously contrasts starkly with the approach in consumer societies today, where people typically spend every dollar they earn and even place themselves deeply in debt to satisfy their seemingly insatiable consumer desires. But the virtue of frugality, it could be argued, is soon to make a renaissance. And if it turns out people embrace frugality and are fortunate enough to remain employed, then nothing is lost, except the chains of one's debt. Living simply, therefore, seems like a good bet.

A second way high oil prices are likely to impact on consumer lifestyles is on car culture. Currently oil prices make it economically feasible for many individuals to drive long distances to work (usually with only one person in the car) or to take many short trips around one's locality for shopping or other errands. As oil prices increase, these practices are likely to disappear or be greatly reduced. Public transport, so far it is available, will become much more widely used, and there will be huge upsurge in people walking and cycling places, primary for economic reasons. The environmental and health benefits of walking and cycling will be a welcome and much-needed bonus. People will also travel much less – locally, nationally, and internationally.⁶⁵

A third lifestyle impact of high oil prices will be the flow on effects on the price of food, especially meat from grain-fed animals. Producing food and transporting it around the world will get much more expensive, for reasons noted above, and this extra cost will be quickly passed onto consumers. This will provide economic incentives for consumers to grow as much of their own food themselves, as well as provide economic incentives for businesses to relocalise food production in order to reduce transport costs. Meat consumption is likely to decline. We may see food production in consumer societies begin to resemble the highly localised production in Cuba, which has already experienced its own (geopolitically imposed) oil crunch.⁶⁶ Westerners, especially those living in the suburbs, will dig up their lawns and relearn the joys of home gardening, and

⁶³ Obviously, just 'living more simply' is not a sufficient response to peak oil. Significant changes will also need to be made to political, economic, and social structures – locally, nationally, and internationally. But this paper must limit its focus to the lifestyle implications of peak oil in the developed world. See Ted Trainer, *The Transition to a Sustainable and Just World* (2010).

⁶⁴ Joe Dominguez and Vicki Robin, *Your Money or Your Life: Transforming your Relationship with Money and Achieving Financial Independence* (New Ed., 1999).

⁶⁵ See Patrick Moriarty and Damon Honnery, 'Low-Mobility: The Future of Transport' 40 *Futures* (2008) 865.

⁶⁶ See E. Percy et al, 'Planning for Peak Oil: Learning from Cuba's "Special Period"' *Urban Design and Planning* (2010) 169; Jorg Friedrichs, 'Global Energy Crunch: How Different Parts of the World Would React to a Peak Oil Scenario' 38 (2010) 4562.

supplement their home food production from local farmers markets. Supermarkets as we know them today will need to evolve or risk becoming redundant.

The forth impact of high oil prices will be the flow on price effects more generally. As noted above, when oil gets expensive, all commodities dependent on oil for production, packaging, marketing or transportation get more expensive too. This includes almost all commodities, to varying degrees, meaning that a given income will be able to purchase fewer things. This will *enforce* frugality and moderation in consumption on most people, as well as provide a great incentive to reduce waste, and recycle and reuse wherever possible. Most importantly, perhaps, it will provide a great incentive to simply *reduce* the amount of household consumption. At every opportunity, people will find that it is in their immediate and long-term interest to provide for themselves in ways that do not rely on the formal economy. For example, more people will mend or make their clothes rather than buy them new; people will find ways to entertain themselves that do not involve monetary exchange or high energy consumption; and people will lend when asked and borrow when necessary. In short, the potential for sustained and even considerably higher oil prices that are increasingly going to price consumer lifestyles out of the market.

6.1. Embracing Lifestyles of Voluntary Simplicity

The interesting thing about the lifestyle changes being described above is that the so-called Voluntary Simplicity Movement (hereafter, the 'Simplicity Movement') has been exploring and embracing many of these lifestyle changes and attitudes *by choice*. This diverse social movement is made up of people who are resisting high consumption lifestyles and who are seeking, in various ways, a lower consumption but higher quality of life alternative.⁶⁷ Participants in this movement generally seek to 'downshift' the level and impacts of their material and energy consumption, while at the same time aiming to create for themselves an alternative conception of 'the good life' in opposition to the Western-style consumerist ideal. And it seems that they are succeeding to some extent, with a recent study showing that for almost everyone in the movement, living simply is a path to increased happiness.⁶⁸ This ratifies the vast body of sociological and psychological research indicating that once basic material needs for food, clothing, shelter, etc. are satisfied, the pursuit of wealth and possessions quickly distracts people from more fulfilling endeavours, and thus contributes little to overall wellbeing.⁶⁹ In high consumption societies, therefore, this opens up space for people to 'consume less and live more,' which is a large part of what living simply is all about.

This post-consumerist living strategy typically involves transferring progressively more of one's time and energy away from materialistic sources of satisfaction (e.g. money, assets, possessions, etc.) toward non-materialistic or post-consumerist sources of satisfaction (e.g. social relations, community engagement, creative activity, home-based production, self-development, spiritual exploration, relaxation, etc.). Because this lifestyle implies the privilege of choosing one's standard of living, the Simplicity Movement arises, by in large, within the highly developed, affluent nations where such a choice is most widely available, and those are the broad geographic locations to which the analysis in this paper has been primarily directed. The suggestion is that this

⁶⁷ See generally, Samuel Alexander (ed), *Voluntary Simplicity: The Poetic Alternative to Consumer Culture* (2009).

⁶⁸ See Samuel Alexander and Simon Ussher, 'The Voluntary Simplicity Movement: A Multi-National Survey Analysis in Theoretical Context' (Simplicity Institute Report, 2011a) available at www.simplicityinstitute.org/publications [accessed 22 December 2011].

⁶⁹ I have reviewed some of this evidence in Samuel Alexander, 'Planned Economic Contraction,' above n 49.

lifestyle may be exactly what is required when the impacts of peak oil get more severe, although the point is also that by then it will be 'involuntary' simplicity.

While the practice and values of voluntary simplicity take many forms, and are always context-dependent and evolving, prominent simplicity theorist, David Shi, has suggested that some of the primary attributes of the Simplicity Movement include: thoughtful frugality; minimizing expenditure on consumer goods and services; a reverence and respect for nature (and its limits); a desire for self-sufficiency; a commitment to conscientious rather than conspicuous consumption; a privileging of creativity and contemplation over possessions; an aesthetic preference for minimalism and functionality; and a sense of responsibility for the just uses of the world's resources.⁷⁰ More concisely, Shi defines voluntary simplicity as 'enlightened material restraint.'⁷¹

Variouly defended by its advocates and practitioners on personal, communitarian, humanitarian, and ecological grounds, the Simplicity Movement seems to be predicated on the assumption that human beings can live meaningful, free, happy, and infinitely diverse lives, while consuming no more than an equitable share of the world's resources. That, at least, is the challenging ideal that seems to motivate and guide many of its advocates and practitioners. It is difficult to establish precisely the size of this movement, however the largest empirical study in this area has presented a case that as many as 200 million people in the developed world could be embracing lifestyles of voluntary simplicity.⁷² The study does acknowledge, however, that there will be a wide diversity of lifestyles within this large group, with some participants taking relatively minor steps to downshift and others taking more radical steps. It may well be that when the oil crunch hits, more radical expressions of simplicity will be what is required to deal with the economic impacts.⁷³

The central point this paper seeks to make is that for many people the transition to a simpler life of reduced and restrained energy and resource consumption, in the manner anticipated above, will actually be in their *immediate self-interest*, as well as being an ecological imperative and eventually an economic imperative. The personal benefits of living simply depend, however, on one's state of mind, for the same transition voluntarily embraced will seem very different to the person upon whom simple living is imposed by force of circumstances. Fortunately, our attitudes are largely within our control. To paraphrase the great American psychologist, William James, change your attitude of mind, and you can change your world.

7. CONCLUSION

This paper has offered cursory and introductory remarks on an incredibly complex subject, leaving a great deal unsaid. The reality is that there is no '12-point Plan' that can explain how we should prepare for the forthcoming personal, social, economic, and political impacts of peak oil. The transition away from consumer lifestyles toward some form of post-consumerist lifestyle will be a truly fundamental shift in how the global consumer class lives, involving a significant reduction in material standards of living and a necessary reconceptualisation of what 'the good life' entails. Living more simply, in terms of energy and resource consumption, has both an external and an internal dimension, and both these dimensions require much more consideration than space

⁷⁰ David Shi, *The Simple Life: Plain Living and High Thinking in American Culture* (2nd ed, 2007) 3.

⁷¹ Ibid 131.

⁷² See Samuel Alexander and Simon Ussher, 'The Voluntary Simplicity Movement: A Multi-National Survey Analysis in Theoretical Context' (Simplicity Institute Report, 2011a) available at www.simplicityinstitute.org/publications [accessed 22 December 2011].

⁷³ See Ted Trainer, above n 63; David Holgrem, *Permaculture: Principles and Pathways beyond Sustainability* (2002).

presently permitted. Furthermore, the transition beyond consumerism, wherever it may lead, will always be context-dependent and relative to one's unique situation, abilities, and responsibilities. So ultimately, we must think for ourselves about these critical issues. Nevertheless, it is hoped that the analysis above provokes some thought about how the peaking of oil production may come to impact on Western-style consumer lifestyles and how voluntarily living simply arguably provides a coherent and desirable response to this great turning point in history.

To sum up: This paper has argued that consumer lifestyles have a time limit and that time is running out. We may even be living in the age of 'peak consumerism,' which can be understood as the point at which the energy and resource intensive consumer lifestyles widely celebrated today begin their inexorable and terminal decline. Consumerism is a social experiment that has failed for various reasons, but arguably the most pressing failure is its fatal reliance on a depleting non-renewable resource. As oil supplies stagnate and eventually decline in coming years, oil prices will rise, and perhaps spike, placing an unsupportable burden on the global economy leading to recession, as we saw in 2008. Given how much oil the world consumes, economies suffer when oil and oil-dependent things get more expensive, and this dynamic will be what inevitably leads to consumerism's demise. It is only a question of timing. Almost all market commodities will get more expensive relative to a given income, and this will mark the end of superfluous consumption. Even those optimists who do not think we are going to reach a peak in total oil production for ten or fifteen years or longer must nevertheless accept that oil is going to continue getting more expensive. The cheap, easy-to-find oil is gone – period. This marks the dawn of a new age, an age in which 'simpler lives' of reduced energy and resource consumption will eventually be imposed upon us by force of geological, environmental, economic, and perhaps even geopolitical forces. It would be wise, therefore, to prepare ourselves for this future – psychologically, socially, economically, and politically. The worst way to respond to this looming reality, but which is the dominant response today, is to pretend that our inheritance of oil is never going to deplete despite sustained consumption and increased demand. A much better way to respond, at the personal and social level, at least, is to embrace lifestyles of voluntary simplicity at once, not out of necessity, as such, but because doing so will improve our own lives and the lives of others as we begin the uncharted transition to a deindustrial civilization. With consumerism on its deathbed, it is time to dream a new dream – a post-consumerist, post-petroleum dream – and we should recognise that we are now under considerable time pressure to realise this new, simpler form of life.