Petro-market civilization. (20 November, 2012)

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Abstract
Prologue: The Rule of Threes

Lending weight to the popular saying that bad things always come in threes, three events in April of 2010 underscored the level of capitalist civilization's addiction to carbon energy. On the 3rd of April off the coast of north eastern Australia, the Shen Neng 1, a Chinese owned coal tanker hauling 68,000 tons of coal collided into the Great Barrier Reef – a UNESCO World Heritage Site – at full speed. The impact ripped the ship's haul, leaked three to four tons of the worst quality fuel oil into one of the world's most fragile ecosystems and tore a two mile hole into the coral while shedding toxic bottom paint before the ship was re-floated and taken ashore.[1] According to an independent investigation, the chief mate in charge of the ship's positioning made an error due to fatigue.[2] The coal hauler was leaving from Gladstone where the crew picked up the Aussie coal used to power China's emerging market civilization that longs to outdo the West at its own historical profligacy. But to continue its modernization project, let alone outshine the West, China will have to import evermore fossil fuels in the coming decades. Queen Victoria used to be China's biggest drug pusher, financing the Empire's operations in India by battering down Chinese walls with opium.[3] Today, the Milton Friedman inspired Communist Party and its energy firms have given China a wholly new addiction: fossil fuels and the promise of high energy intensive lifestyles for its 1.3 billion aspiring moderns.

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Over a week after the Chinese vessel’s foray into the Great Barrier Reef — on April 15th — volcanic ash from Iceland grounded flights across Europe for days. Upwards of a million people travelling for business and pleasure were inconvenienced as airlines scrambled to adjust to daily losses of US$ 250 million and alternative methods of transport were found for some travelers. But some green groups celebrated the grounding of most of Europe’s air fleet. The inability to fly its kerosene powered planes over much of Europe reduced European carbon emissions. While one geologist has estimated that the eruption of the Eyjafjallajokull volcano emitted 150,000 tons of carbon a day into the atmosphere, this pales in comparison to the daily dose of climate change inducing gases emitted by the airline industry across Europe. According to the European Environmental Agency, normal flight traffic across 32 European countries emits 510,000 tons of carbon into the atmosphere every single day of the calendar year.[4] But the grounding of planes not only underscored Europe’s addiction to oil-derived kerosene and its contribution to global warming, it also revealed some of the international linkages that support the social reproduction of Europe’s own market civilization. Without a fully developed internal market of its own to absorb the products of fossil fuel dependent industrial agriculture, scores of food bound for Europe on refrigerated cargo planes rotted in Kenya as the ash cloud hovered over Europe. According to the CEO of Fresh Produce Exporters Association of Kenya:

Two million pounds of fresh produce is normally shipped out of Kenya every night. Eighty-two percent of that goes to Europe, and more than a third goes solely to Britain, whose airports have been among those shut down by the volcano’s eruption. Five thousand Kenyan field hands have been laid off in the past few days, and others may be jobless soon. The only way to alleviate this would be to restore the air bridge to Europe, which would necessitate the equivalent of 10 Boeing 747s of cargo space — per night.[5]

In other words, not only is Kenya’s capitalist agriculture and the livelihood of its farm workers dependent on markets thousands of fossil fuel propelled air miles away, but Europe’s own diet largely relies on the delivery of foreign produce soaked in oil at every step of the supply chain. Connections like these make it a bit easier to understand that the modern food system uses 10 calories of oil energy for every one calorie of food we produce.[6] One can only imagine how many other producers in the Global South experienced similar hardships.
Completing the carbon hat trick, five days later on April 20, another volcano exploded. This time, however, the eruption was man-made and occurred ultra-deep — a mile below the surface of the Gulf of Mexico. The Deepwater Horizon, an offshore drilling rig exploded into flames and collapsed into the Gulf — a location already dotted with over 500 mechanical straws working daily to suck out the viscous lifeblood needed to keep modern lifestyles from going into anaphylactic shock. Initially called an ‘oil spill’, the vomiting of thousands of barrels of crude into the Gulf was closer to a volcanic eruption than anything resembling the carefully crafted public relations effort to label it a ‘spill’. Working without the technology to stop the high pressured bleeding of decayed organic matter into the Gulf, many argued that this disaster was the worst environmental catastrophe in US history. It is estimated that five million barrels of oil spewed into the sea. Despite this, the Obama administration cautiously vowed to allow the publically listed drug dealers to continue their search for more fossil fuel energy along publically owned US coastal waters – albeit, after a six month moratorium to assess the safety practices of the oil and gas industry.

While the blame game among British Petroleum (BP), Transocean and the Halliburton Axis of Energy Evil continue, a final report by regulators and the US Coast Guard suggests that BP and its partners in crime did everything they could to cut costs and skirt safety regulations at every opportunity. The fact that the regulator in charge of the industry – the Minerals Management Service of the Interior Department – was turned into a frat house for energy industry insiders did not help matters much either.[7]

The evidence suggests that in order to push its commodity on the world and make a reasonable rate of return, BP ignored multiple early warning signs that should have led the company to halt its drilling: “the failures included a dead battery in the blowout preventer, suggestions of a breach in the well casing, and failure in the shear ram, a device of last resort that was supposed to cut through and seal the drill pipe in the event of a blowout.”[8]

Moreover, a series of additional choices were made by BP ‘company men’ that likely contributed to the blowout of the Deepwater Horizon and the death and injury of some of its crew members: 1) a cheaper and less proven cement casing used to cap the well was selected, 2) heavy drilling mud used to stop oil and gas from coming up the drill pipe was removed before a final cement plug was placed on the well and 3) a team tasked with testing the well cementing work was sent home without performing a required inspection.[9]

This is perhaps hardly surprising given BP’s history of criminal fraud, routine safety violations and its recent campaign — joined by other petro-capitals — to quash new rules proposed by the beleaguered Minerals and Management Service of the Interior Department.[10] Such rules would require oil producers to undergo an audit of their safety program every three years — a regulation deemed too strenuous and costly to follow for the firm’s profit algorithms.[11] And to put the ironic cherry on top of a mountain of greed-informed decision-making, BP was one of three finalists nominated for an award offered by the Obama administration celebrating offshore oil companies that have demonstrated “outstanding safety and
So, a series of events throughout April of 2010 underscored global market civilization’s dangerous and environmentally ruinous reliance on fossil fuels. But it is worthwhile to explore this dependency in considerably more detail, to go down the rabbit hole just a bit further.

Introduction: Petro-Market Civilization

First: a confession. In the academic world I consider myself a critical international political economist. By ‘critical’ I mean at least three things: 1) an intellectual and moral stance whereby historical structures are not taken as self-evident but as phenomena that have to be explained historically, 2) that we should question power structures as a matter of course and subject them to tests of legitimacy. If these chains of command and authority do not serve a legitimate purpose, then they should be opposed and abolished, and 3) that where possible we should seek opportunities for greater freedom, emancipation and democratic practice in all forms of social organization.

With this in mind, what I have noticed about my field of study is its almost complete ignorance of energy in the origins, evolution and general development of the global political economy. Virtually nowhere in the great works of political economy can we find a central preoccupation with energy and the social relations and practices founded thereupon.[13] To my mind this is deeply problematic for conceptualizations of where we are in history and where we are likely heading. The most my discipline has to say about the history of the global political economy is that it can be understood as a series of hegemonic transitions. The logic is relatively straightforward: one political community rules for a time until another overtakes it during a period of ‘systemic chaos’. A new and different world order is then created by the leading state that out-innovates its competitors. This logic is generally believed to be ongoing – hence debates on whether China will overtake the United States to become the next global hegemon.[14] This history of the global political economy largely begins in the Italian city states of the 14th century, transitions to the United Provinces by the 17th, moves through to the United Kingdom by the early 19th where the hegemonic torch gets passed to the United States at the tail end of World War Two. This hego-centric reading of the global political economy is not entirely unconvincing.

However, since it does not take energy seriously, Arrighi and others who speak of hegemonic transitions miss the fact that the Italian city-states were essentially powered by wind and sail, the Dutch by wind, sail and peat (an inferior fossil fuel), the British Empire by coal and imported oil and the informal empire of the United States by coal and a rich supply of domestic oil and natural gas. So we could proffer an historical formulation: since energy is defined as the capacity to do work, those states with cheap access to more energy can simply do more work, innovate and produce more than their counterparts. This process, however, is subject to the profit motive under capitalism, not serviceability to the community as a going concern.[15] But my point in this introduction is not to offer a new narrative of hegemonic transitions that takes energy seriously – though we might be well served by one. My point is rather to illustrate how the energy base of our social relations and cultural practices is overlooked by most if not all of my discipline on International Political Economy (IPE). So, what would it mean to take energy seriously?
I have argued in the past and will continue to argue here that our civilizational order can be characterized as a transitory petro-market civilization or a civilizational order with non-renewable fossil fuels as the dominant energy base.[16] Since fossil fuels are non-renewable, so is the civilizational order founded upon them. What this means is that current patterns of social reproduction are historically unique in that they are decisively dependent on carbon energy – particularly oil. What I mean by social reproduction is the way in which any given society produces, consumes, and reproduces its lives and lifestyles, how it conceptualizes these actions and how it defends them both discursively and materially – for example in war. In saying this I fully recognize the unevenness of carbon energy consumption across the world. But given the prominence of international trade and geographically distant, yet integrated supply chains, not to mention a carbon dependent global agribusiness system, a high dependence on fossil fuels in one place is likely to have direct or indirect consequences for low energy economies as the case of Europe and Kenya above illustrates rather nicely. Thus to argue that we can characterize our civilizational order as a transient petro-market civilization is also a way of periodizing human history into three major eras: 1) the Age of Inertia, 2) the Age of Fossil Fuels, and 3) the Post-Carbon Age.

My second argument is that with the peak of global fossil fuels we will not simply be witness to ‘peak globalization’, ‘peak trade’ or the end of economic growth but what I call a general crisis of social reproduction.[17] What I mean by a general crisis of social reproduction is a situation whereby our current patterns of energy-intensive production, consumption and reproduction can no longer be sustained. There are a number of incredibly important dimensions to this crisis that I will explore briefly towards the end of this article.

To illustrate these arguments, I will move to a discussion on the magnitude of global society’s reliance on fossil fuel energy, consider who controls carbon energy and how their business landscape changed over time. I will then survey whether there are any easy alternatives to the concentrated energy provided by fossil fuels and evaluate whether we are really moving towards a global green new deal and a clean and green capitalism as some business leaders and politicians suggest. And, in a world where virtually everyone projects higher prices for energy in the 21st century, I will evaluate what the prospects are for the future of social reproduction.

The Magnitude of the Dependence

We can start by recognizing the magnitude of our dependence on fossil fuels. Though the use of carbon energy is highly uneven from both a global and local perspective, we live in the age of fossil fuels. What is often overlooked or underemphasized is how the extension and deepening of capitalist power,
commodity culture and the world market largely coincided with the more intensive use of coal, petroleum and much later, natural gas. This is not to suggest that capitalism or the world market originated with the discovery of fossil fuels. Rather, it is to recognize that the current rate and scale of what has been called ‘globalization’ would be impossible without burning these resources.[18]

To give some indication of this it is best to bear in mind some hard facts. First, as of 2010 (when we have the latest figures from the International Energy Agency), the world’s total primary energy supply – meaning where we get our energy from – is wholly dominated by fossil fuels at 81.1%.[19] The remaining 18.9% comes from nuclear, hydro, combustible renewables and waste and marginal sources such as wind and solar. From 1973 to 2010 world total final consumption of energy almost doubled from 4672 Mtoe to 8677 Mtoe.[20] Of this, oil makes up the largest share of total final consumption in both 1973 and in 2010 at 48.1% and 41.2% respectively. If we consider fossil fuels as a whole, however, we find that 66.2% of the world’s total final energy consumption comes from oil, natural gas and coal/peat.[21] In other words, from 1973 to 2010, total final consumption of fossil fuels has increased from 3540 Mtoe to 5744 Mtoe. If we consider the OECD, recognized as the club of most ‘developed’ nations, we find that 71.4% of total final energy consumption comes from oil (47.9%), natural gas (20%) and coal/peat (3.5%).

Now, if we consider consumption by sector in relation to each individual fossil fuel we find that oil is primarily used for transport with 61.5% of all oil consumed used to power machine driven mobility. This figure from 2010 is up from 45.4% in 1973. In other words the transport sector has become increasingly more, not less, reliant on oil as a primary energy feedstock. In relation to coal and peat, the IEA notes that in 2010, 79.5% of this decayed organic matter is consumed by industry, up from 57.5% in 1973. Once a major fuel source for industry, the majority of natural gas is now consumed by the agricultural sector, commercial and public services as well as private residences at 46.4%. This figure is up slightly from 1973 when 39.7% of all natural gas was consumed by the same sector. These hard facts paint a very clear picture of the centrality of fossil fuels to world order.

Given the level of dependency, the sources of supply, the cost of future procurement and the well known fact that burning fossil fuels for energy is the major contributor to global climate change, political parties and their corporate paymasters have embarked upon a scrambled campaign to promote an alternative source of energy addiction. The two major alternatives currently promoted are nuclear and biofuels. This is in spite of the disaster at Fukushima and the fact that biofuel production requires fossil fuels to produce and remove arable land from food production.
generating about 13.5% of the world’s electricity as of 2012. Sixty are currently being constructed around the world and a further 160 are planned in the next ten years with most of this construction occurring in Asia and countries with existing nuclear reactors like Finland.[22] The attempt to introduce an increasing dependency on nuclear energy via its ‘revival’ poses a serious problem given that supplies of uranium, like fossil fuels, are also non-renewable. As one leading report that studied the viability of nuclear energy has summarized:

The analysis of data on uranium resources leads to the assessment that discovered reserves are not sufficient to guarantee the uranium supply for more than thirty years. Eleven countries have already exhausted their uranium reserves. In total, about 2.3 Mt of uranium have already been produced. At present only one country (Canada) is left having uranium deposits containing uranium with an ore grade of more than 1%, most of the remaining reserves in other countries have ore grades below 0.1% and two thirds of reserves have ore grades below 0.06%. This is important as the energy requirement for uranium mining is at best indirectly proportional to the ore concentration and with concentrations below 0.01-0.02% the energy needed for uranium processing – over the whole fuel cycle – increases substantially.[23]

Thus, even if we were to ignore the environmental problems of storing spent nuclear fuel rods and the probability of an accident such as occurred at Chernobyl, Three Mile Island, or Fukushima, we would still have to recognize that a new nuclear dependence would do little to solve long-term energy requirements if current patterns of development continue to depend on evermore amounts of energy.

A similar story can be told about the green gold rush to convert land into feedstock for the production of biofuels that many believe should power modern automobility. Spurred on by ‘ambitious biofuel support policies’ in the United States, the European Union and elsewhere, the biofuel industry has experienced a high rate of growth with a 15 percent yearly increase in global production from 2000 to 2006.[24] Both the promise and the potential of biofuels have, however, come under intense scrutiny. Some studies have demonstrated that producing such fuels provides little to no net energy since fossil fuel energy is required to produce and process the crops in the first place. Thus, the rush to replace oil with a ‘green’ substitute faces significant challenges. In other words, the energy returned on the energy invested is rather meager for most producers with the exception of perhaps Brazil due largely to climate conditions and the quality of its sugarcane. Second, converting arable land away from food production has already contributed to increasing food prices around the world and has the potential to destroy biodiversity as rainforests and other habitats are destroyed to produce the cash crops for fuel guzzling cars.[25]

The Suppliers

We’ll start by first examining the single most important element of our business, or, for that matter, any business. It’s also the reason I’m so optimistic about our future. That element is the demand for what we produce and sell.[26]

Understanding modern petro-market civilization’s reliance on carbon energy requires us to consider those who control fossil fuels, particularly oil and gas. In this case, the suppliers are those entities that have a
direct financial incentive to shape and reshape the terrain of social reproduction towards a future heavily dependent on fossil fuels. They derive their income streams from the creation of this dependence as they did in the early 20th century by sabotaging the electric car and eventually a little later on, public tramlines.[27] It is worth taking a moment to recall that crude oil was originally refined into kerosene as a substitute for whale oil which was used for light. Gasoline was a waste product of this process and was typically dumped into rivers, lakes and streams. But the harnessing of electricity for light would have killed off the nascent oil industry by replacing, albeit over time, the need for kerosene. The internal combustion engine and the promotion of automobility and its related suburban landscapes saved the oil industry.

But before we consider who the suppliers are, a methodological precaution: it would be a mistake to assume that modern civilization’s dependence on fossil fuels and the shaping of the world’s carbon created and maintained built environments somehow happened naturally or spontaneously. In other words, in no way should the emergence of this hydrocarbon intensive pattern of capitalist sociality be conceived of as a natural or inevitable development. Rather, the world’s reliance on fossil fuels was created by powerful corporate forces that gained ownership and control over these resources and had a direct interest in commodifying them for profit. This is not to suggest that the owners of carbon energy did not come up against resistance – far from it. But the degree to which modern life and lifestyles are dependent on carbon power – evidenced in the statistics above – suggests how successful this industry and the others it has enabled were at shaping the global field of social reproduction for private accumulation. What is commonly understood as ‘progress’, ‘development’ and ‘modernity’ has been propelled by fossil fuels. And despite calls for alternatives to fossil fuels as early as the 1970s, at every step of the way, the suppliers and their advertisers have done their best to keep the world heavily dependent on the commodity they sell.

The global controllers of fossil fuels can be divided into two major camps that are sometimes at odds with one another but whose general interest is to maintain the world’s dependency on fossil fuels at ‘reasonable’ rates of return. First, there are the publically listed oil, gas and coal/peat mining corporations such as Exxon Mobil and British Petroleum whose shares trade on the stock markets of the world. According to the Financial Times Global 500 2012, which ranks the world’s largest firms by capitalization (the value of one share times outstanding number of shares), oil and gas producers as a sector have the second largest capitalization at $3.3 trillion. The only sector that surpasses oil and gas is banks at a market value of $3.8 trillion.[28] But what does this mean?

From the point of view of capitalization, it means that investors regard this sector of the economy as one of the most powerful, decisive and effective at accumulating social power in the form of money.[29] It also means that investors have confidence that oil and gas producing firms will be able to shape and reshape the terrain of social reproduction towards a carbon intensive future since the capitalized assets that generate their income streams come from carbon in one form or another. And for all the talk about the transition to a green and clean economy, the FT Global 500 is revealing. There is not one single green firm, let alone an alternative energy sector of the global economy listed in its 2012 survey.[30] Since the level of capitalization is a key indicator of corporate power and the expectations of investors, what this suggests is that investors currently have little confidence in the power of alternative energy firms to shape the future relative to the suppliers of carbon based energy. This does not mean it cannot happen, but if this transition was to take place, it would undoubtedly be written in the annals of capitalization in the years or decades to come.[31] The even bigger problem would be trying to out-earn the fossil fuel industry, a feat unlikely to be accomplished in the near future.
But there is a second and far more important supplier. Given its direct control over the world’s major oil and gas deposits, state run oil and gas companies such as Saudi Aramco and Pemex now control the overwhelming share of the world’s oil and gas. Collectively they “control 75% of all crude oil production” whereas the international oil companies such as Exxon Mobil and BP collectively control only 10% of oil and gas production and about 6% of reserves. For the most part, these giant entities are unlisted on the exchanges of the world and most of them are members of the Organization for Petroleum Exporting Countries (OPEC). Until recently, it was difficult to assess the financial value of these state operated firms — if only for the reason that they are not capitalized by private investors. However, the Financial Times hired the consulting agency McKinsey to carry out a study with the express aim of valuing the top 150 non-public companies as if they had a market value. What they found is that the largest companies in the world in terms of market value are the state run oil and gas firms. As of December 2005, state owned oil and gas producers were said to have an estimated market value of $3.2 trillion. Adjusted to dollars in 2012, that is about $3.8 trillion. We could add this to the $3.3 trillion in market capitalization among the publically listed firms to arrive at a total market valuation of $7.1 trillion for oil and gas producers. What this means is that the oil and gas industry is by far and away the largest sector of the global economy — period.

In sum, whether they are publically listed or state run, both suppliers of carbon energy have a financial incentive to lock global society into hydrocarbon reliant patterns of social reproduction since their income streams — capitalized by investors or not — are wholly dependent on exploring for, finding and/or producing fossil fuel based commodities for sale on the global market.
Searching for the Last Barrel

At the dawn of the modern oil age, the Anglo-American Seven Sisters (Standard Oil of New Jersey, Royal Dutch Shell, Anglo Persian Oil Company, Standard Oil of New York, Standard Oil of California, Gulf Oil and Texaco), controlled the vast majority of the world’s oil and gas.[36] However, a series of domino public expropriations in oil and gas producing regions following on from Mexico’s 1938 nationalization of the Mexican Eagle Oil Company stripped Western companies of their most financially valuable income streams.

These events forced the international majors to develop two main survival strategies. The first strategy was for energy firms to merge with or acquire their peers. As Juhasz has noted in her careful study of the oil industry, from 1990 to 2004 there have been more than 2,600 mergers in the US petroleum industry with more on the horizon.[37] While strategic goals like ‘synergy’ and ‘cost cutting’ are said to be fulfilled by mergers and acquisitions, there are other possible reasons for this corporate cannibalism.[38]

First, mergers or acquisitions can act to reduce competition in the industry and as a result, increase the political and economic power of giants like Exxon Mobil and BP. But while mergers may increase the power of these firms to shape political and economic possibilities, the Federal Trade Commission approved of these large mergers based on the fact that this would not give the new firms significant market power. This argument is based on the fact that ‘the investor-owned international oil companies own just six percent of the world’s oil reserves’ – not enough, presumably, to dictate prices.[39] Second, the process of merging with or acquiring another firm allows the new company to report greater reserves on the asset side of its balance sheet. This has been absolutely crucial for the publically owned companies since their capitalization largely depends on their ability to book new reserves. The problem, however, is that there are only so many merger targets. Eventually, booking reserves will actually mean finding new reservoirs rather than acquiring barrels through merger.

Even before the great merger boom, however, there was a second strategy. After national governments expropriated the original expropriators, the goal became to find new fields to escape to and develop reserve production capacity – often in politically riskier, environmentally sensitive, and technologically challenging regions of the world. So in order to replenish their reserves and maintain investor
confidence, the publically listed carbon dealers have had to continue the transnationalization of their operations and fight for the right to develop newly discovered fields. The problem of finding and accessing new fields, however, is compounded by the fact that oil and gas field discoveries peaked in the 1960s and 1970s. What this suggests is that the largest and most easily exploitable fields have — more than likely — already been discovered. The fact that the more easily recoverable lion's share of the world's remaining oil and gas resources are state owned and controlled suggests that Big Oil has reached a critical turning point where its future reserves will have to be accumulated from resources “buried far offshore or deep underground; oil scattered in small, hard-to-find reservoirs” or “oil that must be obtained from unfriendly, politically dangerous, or hazardous places.”[40]

Shell’s current operation plans provide a glaring example of this fact. The multinational is currently poking holes in Camden Bay in the Beaufort Sea and the Chukchi Sea to test for the presence of economically exploitable oil and gas. It operates “one of the world’s largest integrated oil and gas projects” 15 kilometers off the Sakhalin Island in Russia’s far east — an area “prone to earthquakes” and extreme cold weather conditions that make it difficult for laborers to work long shifts outside. Not to be outdone by its competitors, Shell also has three deep water operations in the Gulf of Mexico, Malaysia and Brazil. The operation off the coast of Brazil — called Parque das Conchas — is perhaps the most ambitious since the well is in ultra-deep water over two kilometers from the surface in freezing temperatures, high pressure and features an unpredictable sea swell.[41] And as the company’s propaganda reminds investors: “as long-term energy demand soars, accessing hard-to-reach resources such as those at Parque das Conchas will be increasingly vital.”[42] It should be clear that accessing energy resources in riskier places is absolutely vital for the future profitability of the newly merged incarnations of the former Seven Sisters. In order for their large capital investments to make sense, higher oil prices above 60 dollars a barrel will have to become the new norm.[43] And indeed, despite a dip during the global financial crisis, oil prices (depending on the supply source) hovers around $100 a barrel (West Texas Intermediate) or surpasses this benchmark (Brent Crude).

The environmental devastation in the Gulf of Mexico, however, has served as a catalyst for debate on one of the remaining sources of unconventional oil and gas: coastal and deep sea waters. Fearing for their future profitability, the major publically listed firms banded together to stave off critical remarks from environmentalists and concerned citizens regarding oil and gas production in US coastal waters. No doubt the propaganda campaign will continue for some time. Given its degree of dependence on oil and gas, the capital investment already sunk into ongoing and planned projects and the generous donations lavished on US politicians at virtually every level of government, it is highly unlikely that an outright ban on offshore drilling will ever be countenanced. Doing so would effectively wipe billions of dollars in capitalization off the balance sheets of the publically listed petroleum titans, weaken the pension portfolios of workers and other investors and undermine the official national goal of becoming more energy independent. But being able to drill offshore is not just about corporate profits. As the IEA Executive Director Nobuo Tanaka rushed to declare, “the future potential [for oil supply] is offshore in deeper water and in the Arctic, so if offshore investment is going to be slowed down, that is a concern… We need a good supply from offshore in the future.”[44]
‘We’ need a good supply from offshore sources in the future because of a dirty little secret that more and more people are waking up to, but few are willing to fully come to terms with because the consequences are almost unthinkable: the production of the world’s conventional oil supply may have already peaked, with the peak production of conventional gas and coal to follow quickly on its heels. The last barrel will come from increasingly more costly, less abundant and less accessible wells.

Peak Oil, Gas and the Return of King Coal?

For those who have cared to reflect on the nature of non-renewable natural resources, peak oil is not a theory but a fact. The enduring debate, despite occasional interventions by oil/energy optimists like Cambridge Energy Research Associates (CERA) – is not if the production of oil will peak, but when it will do so.[45] Peak oil is associated with the work of the late Shell geoscientist M. King Hubbert. Working primarily in the United States – the original Saudi Arabia of oil — Hubbert predicted that the production of oil would reach a maximum rate and thereafter decline. Despite worries about oil supplies at the dawn of the oil age in the US, Hubbert’s original ‘theory’ was ridiculed by his colleagues. Ridicule, however, did not stop oil from peaking in the US in the early 1970s. Ten years later with oil production declining in the US and the experience of two orchestrated oil price shocks in 1973 and 1979, the most overt statement on the US economy’s reliance on Middle Eastern oil was issued in the Carter Doctrine.[46] The doctrine authorized the use of any means necessary to protect oil supplies in the Persian Gulf.

But Hubbert also applied his understanding of peak oil in the US to the world as whole. If the production of crude would peak in the US, it would only be a matter of time before global production reached its tragic climax before the dénouement. Hubbert’s model has been highly influential and his interlocutors have applied and adapted his model to other non-renewable resources such as natural gas and coal. But while estimates of peak fossil fuels are easy to come by, it should be admitted that even if we recognize the verity of peak oil as a general model for understanding the production and depletion of non-renewable resources, no one knows exactly when the peak of production will be reached.
Out of all the estimates on peak oil, it is worthwhile to consider the work of the German based Energy Watch Group (EWG). This is so for at least three reasons. First, it was initiated by Hans-Josef Fell, a member of the German Parliament, to provide independent analysis free of special interest groups and their finance. Second, the EWG is staffed by independent scientists. Third, the group considers data that is either disregarded or underplayed by more optimistic assessments of world fossil fuel supply. According to their 2008 report on crude oil supply, the EWG suggests that the peak of oil production came in 2006 at 81 million barrels per day. By 2030, the group estimates that combined oil production for the world will be less than half that at 39 million barrels per day. To put this in context consider that the US, European Union and China alone consumed a total of 41,439,000 barrels of oil per day in 2011. These pessimistic accounts can be compared with the IEA’s rosy assessment that crude production could reach 116 Mb/d by 2030. Still, the IEA did succumb to reality in its 2008 World Energy Outlook admitting that “global trends in energy supply and consumption are patently unsustainable – environmentally, economically, socially.”

The narrative of natural gas appears to be following the same plot line of oil resource depletion. There is about 6250 trillion cubic feet of global proven reserves of natural gas. However, like the case of petroleum, the discovery of giant natural gas fields peaked in the 1970s and 80s. New discoveries and faith in fracking may add to these reserves but given current and expected rates of consumption, as more natural gas infrastructure comes online, production will reach an inevitable decline. According to one study written by a team of petroleum engineers, the peak of natural gas production may occur as early as 2019. Again, it should be reinforced that this is only an estimate. The peak of production could come much later on given technological advances and new discoveries. But it could also come much sooner. The immediate result will be higher prices for natural gas. And higher prices for natural gas will not only lead to higher prices for household heating and cooking but also for agricultural goods since natural gas is currently essential for the production of fertilizers used in industrial farming.

Given this bleak energy future and calls for greater energy security in the US and Europe, hope is again springing eternal for King Coal. For years, the industry has embarked upon a sustained campaign to convince Americans and the world that where oil and natural gas will fail, burning coal can provide the energy needed to power the social reproduction of the world’s petro-market civilization. The illegitimate child of the coal majors and their vested interests, The World Coal Institute (WCI), boasts that there is enough black rock to burn for 122 years. If these special interests have their way, the twenty-first century will not be the century of green and clean energy but a look back to an early period of industrial development in the West and perhaps modern China and India in the present. Still, investment gurus are predicting a “new era of coal” with “fortunes to be made” off the toxic carbon believed to be the “fuel of the future.” Indeed, according to the industry standard BP Statistical Review, coal was the fastest growing fuel source in 2008 and the only fossil fuel whose consumption was not curtailed during the economic downturn in 2009.

The debate about the potential of large-scale carbon capture and storage aside, the WCI’s generous assessment of the world’s coal supply may prove overly optimistic. Noting that coal reserve data – much like oil reserve data – is of rather poor quality, the production profiles calculated by the Energy Watch...
Group put the global peak of coal production at 2025. This projection does not take into account the possibility of more stringent environmental regulations that would lessen the demand for coal by keeping it in the ground.[56]

Drill Baby Kill!

The fiery collapse of the Deepwater Horizon 80 kilometers off the Louisiana coast line along with the historical memory of the Exxon Valdez smashing into Price William Sound's Bligh Reef reveals the stark idiocy of Sarah Palin's incantation to 'Drill, Baby, Drill!' The ecological destruction generated by the greed inspired recklessness of BP's 'company men' and its bumbling former CEO Tony Hayward is yet to be fully tabulated given that there are both short-term and long-term consequences of the spill. And while episodes like these pierce a tiny hole in the fetishism of commodities armor in the United States by showing some of the social relations and environmental consequences behind oil production; mainstream reporting has largely ignored the global role international oil companies and their partners have played in wreaking devastation on peoples and ecosystems throughout their profitable careers. From the 1970s to the 1990s alone there were “more than a dozen spills larger than the Exxon Valdez, pouring oil into the waters off Trinidad, Uzbekistan, Iran, Angola, South Africa, France, Italy, Greece, Spain, Portugal, Turkey, Ireland, Scotland, Wales, Mozambique, Chile, and Sweden.”[57]

Despite accidents, short-sightedness and just plain ineptitude, this devastation has been part of the cost of fueling modern market civilization. Most of the costs have been externalized and this too undergirds the capitalization of the oil companies, not to mention the estimated market value of their state owned counterparts. If all the costs of producing oil, gas and coal were internalized at the level of the firm, it is highly likely that the industry would disintegrate. For example, the National Academy of Sciences reported that burning fossil fuels costs the United States $120 billion in health care costs every year due to pollution and premature deaths.[58] In another comprehensive, though preliminary report on the true costs of business damage to the environment financed by the United Nations, it was found that the oil, gas and coal industries externalize roughly $128 billion in costs.[59] These costs, of course, are not born by the producers of fossil fuels, but by society at large.

In many spaces of the globe, Big Oil has been able to produce carbon energy by pushing the costs and dangers of production on to local communities while effectively destroying their livelihoods. As powerful global corporations, the oil firms have acted with relative impunity. Where they have not been able to escape the rule of law, they can afford to hire the world's leading litigators to stall or lessen compensatory settlements that could potentially damage the price of their shares. For example, after
dumping an estimated 10.8 million gallons of oil into Prince William Sound, killing wildlife, poisoning the ecology and ruining livelihoods, Exxon's team of lawyers spent the next two decades attempting to overturn an initial judgment that roughly 33,000 claimants were entitled to a share of $5 billion in punitive damages. Subsequent appeals later, Exxon's lawyers managed to get this reduced to $2.5 billion and then to $500 million when its friends on the US Supreme Court finally heard the case almost two decades after the incident. When interviewed about what compensation Louisianaans could expect from BP based on his two decades of experience dealing with Exxon's legal gymnastics regarding compensating the victims of the Exxon Valdez, Brian O'Neill offered some candid legal advice: “If you were affected in Louisiana, to use a legal term, you are just f—ked.”

The communities of the Niger Delta have been 'just f—ked' as well. One of the key differences between this petroleum soaked region and the Gulf of Mexico gusher is that local communities have experienced the equivalent of one Exxon Valdez oil spill every year for the last 50 years. According to a study done in 2006 based on available data, anywhere from 9 to 13 million barrels of oil have been dumped on and offshore since the Shell Petroleum Development Company commenced its operations in partnership with other IOCs and the state owned Nigerian National Petroleum Corporation. The company blames many of these spills on the sabotage and vandalism of the indigenous population who see little to no benefit of having the oil companies despoil the environment that once sustained their communities. There is of course little doubt that some residents have tried to disrupt the flow of oil — sometimes to extract ransom or to siphon off oil to sell in the market as a survival strategy. However, equally important is the company’s own admission that spills have been caused by the failure to invest in new equipment with over 50% of spills caused by corrosive pipeline networks and infrastructure before 1995. The agency responsible for oil spill detection and responses has listed about 2000 sites that are in need of clean up operations. Today, the communities of the Niger Delta must contend with polluted water, contaminated fish, physical ailments such as skin lesions and breathing problems, high infant mortality, a declining life expectancy and illegal gas flaring that is clearly visible from space. The social reproduction of energy intensive and fossil fuel dependent ways of life has meant the destruction of life energy, primarily in food, for many local communities.

Similar stories of community and ecosystem devastation can be told virtually everywhere modernity's leading drugs are drilled, pumped or dug out of the ground: Alberta's tar sands, the oil fields of Sudan, the Ecuadorian Amazon, or the coal mine death traps of China and West Virginia.

But some believe the worst is yet to come. For roughly two centuries, industrialized and industrializing countries have dumped thousands of tons of carbon into the atmosphere by burning fossil fuels. A scientific consensus has long existed that the concentration of these gases in the atmosphere is warming the planet which will lead to more volatile weather patterns. The Kyoto Agreement was a public relations sideshow. So was the Copenhagen Accord. It has to be stressed that there is no serious global plan to tackle climate change. Both the demand for fossil fuels and global emission are set to increase substantially over the next two decades. Though each region of the globe will be affected in different ways, scientists warn that the consequences of global warming will be severe. For instance, the Intergovernmental Panel on Climate Change (IPCC) argues with varying degrees of confidence that many
parts of the world will suffer flooding, drought, the loss of biodiversity, coastal erosion, wildfires, the spread of new diseases and a potential reduction in crop productivity in many regions.[67] The Pentagon and other defense agencies also anticipate that climate change will lead to strife and armed conflict for survival.[68] For its part, the United Nations Development Program (UNDP) has argued that many of these calamities are already ongoing in the poorest countries of the planet.[69]

What makes matters worse is that some scientists believe that the current climate models may miscalculate the impact of greenhouse gases due to global dimming. Global dimming is the name given to the process whereby pollution particles in the atmosphere gather excess water and reflect some of the sun’s rays back into outer space. For example, the contrails of airplanes help cause global dimming.[70] There is, then, a far more complicated and complex dynamic going on in the earth’s atmosphere: the planet is simultaneously being warmed and cooled. The worry, however, is that as new technologies and regulations are put in place to clean up the environment, less of the sun’s rays will be reflected back into space due to diminishing pollution. What this suggests is that the rise in global temperatures may actually be higher than anticipated in current models. On the back of this awareness, a chorus of global green economy enthusiasts has been growing.

The Global Green Economy

There is little doubt that the leaders of net fossil-fuel importing economies are aware of their level of reliance on carbon energy and the environmental and security risks associated with their dependence. Whether the scale and pace of the transition that needs to take place is fully appreciated, transitioning to a post-carbon or green economy has become the new mantra of some of the world’s leading politicians, parties and investors. From all the rhetoric, not to mention corporate advertising, it would appear that global hydrocarbon based sociality is being radically overtaken by a new green and clean form of social reproduction. For example, President Obama noted in his State of the Union address that “we know the country that harnesses the power of clean, renewable energy will lead the 21st Century.”[71] The call for this transition has gotten louder on the heels of a still developing global financial crisis and how the fiscal injections of taxpayer funds were to be allocated. Calling their campaign the “Global Green New Deal”, the UNEP was a leading voice arguing for a “significant portion” of the economic stimulus packages to be spent on greening the global economy. The agency argued that financing a green economy will help reduce carbon dependency, address issues of poverty and generate ‘decent’ employment opportunities while restoring natural ecosystems and introducing patterns of sustainable consumption. They proposed that spending should help build more sustainable transit systems, contribute to renewable energy initiatives and increase standards of energy efficiency among other things.[72] And indeed, a small portion of the stimulus funds of countries such as China, France, Germany, Mexico, The Republic of Korea, South Africa and the United States of America have found their way into alternative energy
projects. Much of this spending is believed to have lifted alternative energy stocks out of the battering they received during the market crash of 2008.

Even the killing industry wants to appear green. For example, British Aerospace is currently investing in “ecologically sound weaponry” such as “explosives that eventually turn into manure” thereby helping to “regenerate the environment that they had initially destroyed.” Research and development is also working on lead free bullets that promise not to pollute the environment for future generations. The absurdity of producing ‘sh-t bombs’ and similar ‘green’ weapons to destroy populations was not lost on BAE’s director of corporate social responsibility who noted that “it is very ironic and very contradictory, but I do think, surely, if all the weapons were made in this manner it would be a good thing.” It may not, however, be such ‘a good thing’ for those on the receiving end of BAE’s so-called ‘ecofriendly’ but human deadly weapons.

The world’s largest military enterprise also dreams of becoming more ecofriendly in light of its costly and voracious appetite for finite fossil fuels. With no irony intended, the Navy showcased its ‘Green Hornet’ — an F/A-18 that runs on a ‘50/50 blend of conventional jet fuel and a biofuel’ — to celebrate Earth Day on April 22, 2010. After the successful launch of its lean green killing machine, Secretary of the Navy Ray Mabus intoned that:

>>The alternative fuels test program is a significant milestone in the certification and ultimate operational use of biofuels by the Navy and Marine Corps...It’s important to emphasize, especially on Earth Day, the Navy’s commitment to reducing dependence on foreign oil as well as safeguarding our environment. Our Navy, alongside industry, the other services and federal agency partners, will continue to be an early adopter of alternative energy sources.<<

The Navy also boasts a hybrid-electric ship which the Fox News Network never tires of highlighting in one of its paid commercials celebrating the technology of US imperialism.

Outside of the military realm, businesses and investors are also waking up to the challenges posed by future energy costs and the risks posed by global climate change. In 2005 at the United Nations, Al Gore, Ted Turner and Kofi Annan urged 400 institutional investors to consider how “willing a business is to prepare for climate change” as a key factor in their investment decisions. One group of investors responsible for US$ 3.2 trillion – the Investor Network on Climate Risk – has also sought to encourage companies to disclose the amount of carbon they release into the atmosphere, how climate change will affect their balance sheets, and what plans they have to mitigate climate risk.

Given its level of exposure and appetite for profits, the global insurance industry is also playing a heavy role in shaping new costs and conceptualizations of risk, not to mention helping to set the agenda of debate concerning the future of energy, business profits and climate change. Many insurers have started to reevaluate their risk-assessment models to “reflect future climate-change scenarios instead of past weather patterns.” Because the insurance industry underwrites individual and business decisions, its leading corporations have considerable power to incentivize its clientele towards a greener future. Already a number of firms offer discounts for owners of hybrid cars and green buildings. Furthermore, a recent
study of emerging risks in the energy market financed by Lloyd’s—a leading insurance specialist—concluded that “traditional fossil fuel resources face serious supply constraints and an oil supply crunch is likely in the short-to-medium term with profound consequences for the way in which business functions today.” Drawing this conclusion, the study argues that businesses have to take seriously that “energy security is now inseparable from the transition to a low-carbon economy and business plans should prepare for this new reality.”[79] Becoming aware that one must prepare for the transition to a low-carbon economy is one thing, accepting this assessment and then investing and building the future based on a new energy paradigm is quite another. Admitting that a new energy paradigm may indeed grow out of the womb of the old, the evidence for an emerging green economy is not incredibly convincing at present.

One way to distinguish reality from the green economy hype is to consider the renewable energy industry. The first thing to notice is that virtually all of the raw materials currently used in new energy technologies involve rare earth metals. According to Mark A. Smith, the CEO of Molycorp Minerals, LLC, “rare earths are a group of 17 elements (atomic numbers 57-71 along with Sc and Y) whose unique properties make them indispensible in a wide variety of advanced technologies.”[80] For example, hybrid cars use samarium, wind turbines use neodymium, solar cells use silicon and gallium and cobalt and tantalum are used in rechargeable batteries.[81] Currently, there are only three sites where “a sufficiently high concentration of rare earths exists: Baotou, China; Mountain Pass, California, and Mt. Weld, Australia.” China currently produces about 95 percent of the world’s supply of rare earths. [82] In its latest five year plan (2010-2015), however, China announced that it will continue to curtail its exports of rare earths with talk of halting the export of specific metals altogether.[83] Since rare earths appear to be indispensible to new energy technologies security of supply is a major issue for alternative energy firms. Experts such as Jack Lifton also believe that the production of these metals will become increasingly expensive in the decades to come as demand increases and new mines fail to come online fast enough. Another massive concern, however, is that no one knows just how much rare earths can be mined economically. What the dependence on rare earths suggests, then, is just how limited alternative energy capability may be given the scarcity or costliness of its essential components.

The second thing to consider is the level of investment in renewable energy. There are indeed some positive signs. Worldwide investment in renewables increased from $20 billion in 2004 to $257 billion in 2011. Moreover, renewable energy capacity has grown substantially over the last two decades. Global wind power has increased from about 10 gigawatts (GW) in 1996 to 238 GW in 2011, with countries such as South Korea and the United States planning future wind power projects. The existing world capacity of grid-connected solar photovoltaic energy has also increased from virtually zero in 1996 to 70 GW in 2011. Other fuels classified as renewable such as biomass power generation, geothermal power capacity, hydropower and the production of ethanol and biodiesel also expanded. If we exclude large hydropower projects, then renewable power capacity expanded by 390 GW in 2011 – up 143% percent from the 160 GW added in 2004.[84] A further sign that bodes well for the green global economy is that

![Image of renewable energy plants]
the number of publicly listed renewable energy companies expanded from 60 in 2005 to 160 in 2008. Before the collapse of capitalization during the market crash of 2008, the renewable sector of the global economy was capitalized at $280 billion. [85] Investors, it appeared, were making speculative moves into green stocks.

Upon first glance, the expansion of renewable energy capacity and the growth of renewable energy firms appear to signal at least the beginning of a transition away from dirty fossil fuels and what some have called the development of a ‘new’ industrial revolution centered on clean technology and green energy. And while there is no doubt that the alternative energy sector of the global economy is growing, it is worthwhile to put this development in context. First, of the total primary energy supply in 2010, geothermal, solar, heat, wind and hydro make up a dismal 3.2% of the world’s energy production – with 2.3% of that figure coming from hydro. If we are very generous and include biofuels and waste the amount of non-fossil fuel generated energy jumps to 13.2%. But it is interesting to note how little progress was made since 1973. In that year, the same energy categories made up 12.4% of the world’s total energy production. In other words, over a 39 year time span, the amount of energy derived from geothermal, solar, heat, wind, hydro, biofuels and waste hardly budged. Now, if we consider these same sources of energy as a proportion of the world’s total final consumption we arrive at the figure of 16.1% in 2010. This is only a slight increase over the period from 1973 when the same sources of energy made up 14.8% of total final consumption. [86]

This is perhaps hardly surprising since more nuclear power came online during this period and fossil fuels were relatively abundant and affordable. These figures not only suggest how little progress was made during an era when there was knowledge of peak oil production, but they also suggest how small a share alternative energy sources play in the production and consumption of energy. Of course given the promise of global green economy and continued government support for renewables this may change in the decades to come but renewables have a long way to go before they even come close to overtaking fossil fuels as the primary energy source of production and consumption. In its most optimistic reference scenario for 2030, the IEA for instance, notes that alternatives will make up only 19.5% of the world’s total primary energy supply. Fossil fuels, it estimates, will still make up the major share of global energy supply at 67.1%. [87]

Another way of scrutinizing green hype can be provided by comparing the capitalization of the oil and gas industry at $3.3 trillion with the capitalization of its competitors at $280 billion. Put another way, investors currently have roughly 11 times more confidence that publically listed oil and gas firms will continue to be an effective vehicle of accumulation going forward – if only for the reason that energy demand is high and oil prices are in their historical stratosphere. So long as the net income of the oil and gas industry continues apace so too, we can expect, will its capitalization. But to put the icing on the cake and for those who believe we can just ‘switch’ to a green fuel future once fossil fuels become increasingly less abundant and affordable, it is worth contextualizing the magnitude of the world’s dependence by noting what we would have to do in order to ‘switch’ to a different primary energy source:

…in order to produce enough energy over the next 25 years to replace most of what is supplied by fossil fuels, the world would need to build 200 square meters of solar photovoltaic panels every second plus 100 square meters of solar thermal every second plus 24 3-megawatt wind turbines every hour nonstop for the next 25 years. [88]
As the distinguished historian of energy and technology has tried to underscore in his many roles as
educator and adviser – energy transitions are protracted events that span decades rather than months or
years. In other words, since there is currently no energy equivalent to oil, natural gas and coal, there is
no easy ‘switch’. And if the past is prologue in that over the last 24 years very little was done to
advance a new form of social reproduction based on alternative fuels, then the future of our petro-market
civilization looks very grim indeed. As a recent study convincingly argues, renewable energy cannot
sustain a consumer society of the type we have today.

There Will be (More) Blood

Future wars will be fought over the issue of survival rather than religion, ideology or national
honor.

The dream of a clean and green capitalism where techno-fixes and engineering feats allow progress to
continue along similar energy intensive lines is one way to think about the future. But more sober (and
perhaps more somber) analysts proffer a pessimistic view of the future. The historical bloodshed in the
struggle for fossil fuel energy is substantial and many analysts predict that we can look forward to more
bloodletting as net energy importers struggle to obtain the energy they need to fuel their addiction and
the social reproduction of their energy intensive patterns of development. The irony is that new wars for
energy resources will largely be fought with fossil fuel dependent machinery. In other words, the US-led
wars in Afghanistan and Iraq, whose soldiers are estimated to consume 1.3 billion gallons of oil a year or
3.5 million gallons a day, may be the opening salvo for resource wars to come.[92]

Of course in liberal theology, wars may be avoided by shared values and institutions such as free trade and a belief in the efficient operation of markets. There is no reason for the powerful to coercively expropriate another population’s resources if they can purchase these resources on the world market. However while there is no direct harm believing in the Flying Spaghetti Monster, the world outside of faith is a bit more complicated than the harmony of interests thesis promulgated by the high priests of liberal capitalism.

The possibility of future violent conflicts is well rehearsed in the literature on the importance of fossil fuels to modern economies. As such, there is no need to elaborate on them here. Some see conflict as the result of new territories opening up for exploration due to melting sea ice in the Arctic, others see conflict between Russia and the rest of Europe over the supply of natural gas, some see the potential bombing of Iran as a result of its attempt to denominate oil in a basket of currencies, others see conflict between the US and Mexico as more Mexicans try to escape to the north as Mexican oil fields dry up, and some see increasing conflict from the international migration that is expected to coincide with the massive fluctuations in global weather patterns due to global warming.[93]

Even a role playing game organized by business interests called Oil Shock Wave imagined what the world might look like if the price of oil escalated out of control due to supply disruptions or regional political conflict. According to its organizers, the war game was intended to bring attention to the United States’ dangerous dependence on foreign oil. Some players remarked that it was virtually impossible to avert a major crisis if the price of oil shot above $150 per barrel.[94] War, not to mention martial law, could not be ruled out. But what these views almost all have in common is their state-centric understanding of what future energy conflicts may look like.

Should the rate and scale of changing and adapting to a post-carbon form of social reproduction continue at the present pace, the likelihood of conflict between states may not only increase but conflict within them as well. What analysts should be concerned with is not only whether one state will try to violently expropriate the energy resources of another in a last ditch struggle to feed their own addiction. Rather, what analysts should be concerned with is a general crisis of social reproduction that could lead to multiple levels of armed conflict and the widespread breakdown of industrialized capitalist sociality. To reiterate: by a general crisis of social reproduction I mean a situation whereby the ways in which modern societies produce, consume and reproduce their lives and lifestyles can no longer be sustained. It can also be read as a situation where conceptualizations of individual and social purpose along with the prospects for future development will be radically altered. Even if social and economic adjustments to higher prices can be made in the short to medium term, as long as patterns of development continue to be based on the fantasy prospect that more fossil fuels can be found going forward, it only prolongs painful adjustments for future generations.
It is worth keeping in mind that before the widespread use of carbon energy, transnational market forces did not mediate or arbitrate the everyday lives and lifestyles of the majority of the world’s population. The transition to the current global social order where the allocation of goods, services and life chances are mediated and arbitrated by transnational market forces and mechanisms has only been a few centuries in the making. Modern forms of social reproduction and survival are now wholly dependent upon having access to goods and services for purchase on the market. One glaring indication of this transition has been the demographic shift away from a world society where the majority of the population was primarily rural to one that is increasingly urban, suburban and for over one billion people, living in slums. By one estimate, 79% of the global population will live in cities by 2050.[95] With little to no access to land and the means of production outside of wage relationships, the vast majority of city dwellers are completely dependent on markets – whether they are used to gain employment or purchase food. Furthermore, the logistics of global supply chains have expanded so far geographically that whole populations are virtually 100% reliant on the vast networks of supertankers, cargo planes and diesel trucks moving not just computers and toys but essentials like food, fertilizer and medical equipment. In other words, only a small fraction of the global population could be considered even remotely self-sufficient in terms of fulfilling their basic needs like a proper diet.

So what, then, happens to a globalized market civilization reliant on fossil fuels for its social reproduction when the supply of energy is no longer abundant and affordable and alternatives cannot provide plentiful cheap energy on the scale needed even to reproduce current patterns of production and consumption let alone expand them? What happens, for example, if oil hits $300 a barrel in five to ten years time as some commodity traders anticipate? Previous price spikes may give some indication of how people will react. Typically, they look for alternative methods of transport, attempt to conserve energy and cut back drastically on consumption as more of their disposable income is spent on fuel. In fact, Jeff Rubin and Peter Buchanan of CIBC World Markets Inc., have argued that the current global ‘great recession’ has not been caused by the housing market crash as conventionally thought. According to the authors, the crash is a symptom of a much greater cause — the massive jump in the price of oil from roughly $30 dollars a barrel in 2001 to $147 dollars a barrel by 2008.[96] It is worthwhile to note that this spike in prices was over twice the amount of the previous major price spikes in 1973 and 1979 which also plunged economies into recession but did not lead to any momentous transition to a new energy paradigm.

These shocks have been temporary and the price of oil has come down precipitating new periods of growth and the end of recessionary conditions. But what happens when triple digit prices become permanent? There are no crystal balls of course, but some reasonable consequences can be hypothesized. Though I present them in a stylized way below, they all interact and feedback on one another in complex ways that cannot be entirely deciphered here.
The Great Redistribution

...as we move into the 21st century we are headed toward a massive transfer of the world's resources — hundreds of billions ranging toward trillions of dollars — into this volatile region [Caspian Basin and Persian Gulf]. Those funds will support much governmental and private activity that is not in the U.S. interest, to put it mildly.[97]

...the coming oil windfall will dwarf anything we have seen yet. At an oil price of $70 per barrel, new research by the McKinsey Global Institute finds that Gulf oil export revenues will add up to $6.2 trillion over the next 14 years — more than triple the amount they earned over the past 14 years. At $100 oil, this will rise to almost $9 trillion.[98]

First, since 90% of conventional reserves are owned by states, there will be a massive and unprecedented transfer of wealth from net energy importers to net exporters. Consider, for instance, that from 2001 to 2011 the price of oil increased by 464% on average and redistributed an astronomical income of just over US$ 25 trillion dollars to oil exporters, oil companies and their global investors.[99] This figure, of course, is not pure profit for the oil interests, but the amount spent on global oil consumption. In the two previous decades, the transfer was five times less – about US$ 5 trillion in each decade. The table below considers how much might possibly transferred in the decades to come.
Given the staggering amount of this transfer, the big question is what the state owned companies and their associated sovereign wealth funds do with the enormous windfall of petrodollars they are bound to accumulate as the price of oil and gas escalates in the coming decades. Western intelligence communities and central bankers are concerned and indeed, do their best to monitor petrodollar recycling. Of the windfalls already received during the period from 2002 to 2006 — when prices escalated threefold — the Federal Reserve Bank of New York estimates that the redistribution of global income to oil producing economies was almost equally used to purchase net foreign financial assets and goods and services from abroad.[100] Much of this finance has permitted the West – particularly the US – to consume at higher rates than would otherwise be possible. There is, however, no reason to believe that this relationship will continue into the indefinite future. Nor is there any reason to believe that the price of crude oil will continue to be largely denominated in US dollars. In the coming decades, then, global financial balances will be virtually unavoidable, currency values will likely fluctuate far more widely and the geography of trade and finance will undergo dramatic shifts.

### Peak Food

Second, the production, distribution, storage and consumption of food will change radically. The price of food will skyrocket, variety will plummet and there will be consistent shortages. What many do not realize is that westernized diets are saturated in fossil fuels at every step of the supply chain. By one estimate "the modern food system consumes roughly ten calories of fossil fuel energy for every calorie of food energy produced."[101] Indeed, not only is oil necessary to run the industrial equipment and farm...
machinery used to produce modern diets, but the fertilizers, herbicides and pesticides made necessary by the corporate transition to industrial farming are all produced with oil and/or natural gas. In addition to this, most of the world’s food travels thousands of miles and is transported by a global fleet of diesel burning trucks and turbine spinning refrigerated cargo jets. While it may sound far-fetched for the millions who can purchase their diets from grocery stores, in the future, these same people may struggle to find enough food for a nutritious diet.

**Peak Health, Peak Science**

A third, though underexplored, consequence of constant high prices for energy will be felt in the medical field. Most of the equipment used in modern medicine, from clinical disposals like syringes and plastic gloves to MRI and CT scanners is fossil fuel dependent. Furthermore, the transport and energy infrastructure of modern hospitals are also heavily reliant on cheap gasoline since many modern hospitals are hardly in walking distance from suburban McMansions. Thus, how health care will be both performed and delivered and at what cost in the future is just one more challenge that signals a general crisis of social reproduction.[102] What can also be noted is that many of our scientific advancements are due to the energy and products provided by oil, natural gas and coal. It could very well be that with increasing costs and declining energy availability, our scientific advancements start to dwindle.

**Peak Mobility**

Fourth, forms of social reproduction founded on gasoline fired car culture and suburbanization will be radically altered. As the cost of overcoming distance mounts, long commutes to work not to mention international business travel and transporting goods over long distances will look increasingly unaffordable for many. Companies capitalized on the basis of selling petroleum powered mobility such as the recreational vehicle, aviation and automobile industry will watch their markets, work force and market capitalization shrink. Though it is impossible to foresee, suburban home values may also start to collapse as car dependent suburban lifestyles appeal to fewer and fewer people.

**Peak Employment**

Fifth, rising energy costs will likely translate into higher prices for many goods and services, lower growth and mass unemployment. Cheap energy has supported an internationalized and extensive division and specialization of labor. As demand suffocates under higher energy prices and growth slows, unemployment will increase, further depressing consumer demand. It will be difficult for economies to alleviate this vicious cycle as the previous bout of stagflation in the 1970s and early 1980s – brought on by oil price spikes — was not, as is commonly believed, alleviated by Volcker like shocks, but by a dramatic decline in the cost of oil. Marx once noted that the “production of too many useful things produces too large a useless population.”[103] In one sense, this hypothesis is tested daily in the hierarchical and racialized labor markets of the world. With sustained triple digit energy prices, it is about to be tested on a grander scale. In the coming decades, what gets produced, how, where and by who is an open question. It is highly likely that the forms of knowledge considered valuable will also change.
Peak Capitalization

Sixth, while skyrocketing energy costs may stuff the coffers of the international oil and gas companies, King Coal and their state run counterparts during the opening phases of global society’s climb down Hubbert’s peak, other sectors of the economy will likely watch their capitalization implode. Though it is difficult to calculate with any precision, it is worth noting that the capitalization of every sector of the economy is interlinked and ultimately undergirded by cheap energy. For example, the ‘mobility industry’ could be said to be made up of four major sectors, 1) automobiles and parts, 2) aerospace and defense, 3) industrial transportation, and 4) travel and leisure. Their total capitalization as of March 2010 was approximately US$ 1.6 trillion.[104] If we consider the market value of each sector, they are ranked 17th, 24th, 27th and 30th out of 37 sectors of the global economy. Since capitalization is a measure of the expectations investors have about the future, all we need to do is imagine a scenario where energy costs rise so high as to challenge the profit expectations of investors. In such a context, a run on these sectors of the economy is likely. We already have evidence for this using the FT Global 500. The market value of what I have called the mobility industry was $1.5 trillion in 2007, up from $1.3 trillion in 2006. But by 2009, the capitalization of this industry was almost halved to $ 816 billion. With government bailouts of car firms and the reduction in the price of oil from its US$ 147 a barrel high in 2008, the capitalization of these four sectors has recovered by 2010 to US$ 1.6 trillion in market value. But what of the capitalization of the leading 500 companies of the global economy during the record breaking period of high oil prices of 2008? Within a year, global capitalization collapsed by 42% from about US$27 trillion to US$16 trillion by May of 2009.[105]

The collapse of capitalization is conventionally blamed on the subprime mortgage crisis and its aftershocks. But as former CIBC economist Jeff Rubin has argued, this explanation of the crisis fails to account for the severity and widespread nature of the collapse in capitalization and the fact that recessionary conditions hit Japan and Europe before Wall Street imploded. According to Rubin, this suggests another culprit – the high price of oil as the key driver that enables or disables other sectors of the economy to meet the expectations of investors. And as he points out, there has been a strong historical correlation between high oil prices and the onset of recessionary conditions. Perhaps we will never know what the ‘true’ cause of the global financial crisis was and we should be highly skeptical of explanations that single out one cause. However, given affordable energy’s importance to every sector of the global economy, the high price of oil would seem a likely driver pushing global demand and profit expectations down.
The Five Stages of Grief

These are just some of the potential consequences of a general crisis of social reproduction. Many more situations could certainly be countenanced. While there are undoubtedly small spaces of green hope, community action and the potential for greater human solidarity during periods of crisis, the level of our market civilization’s dependence on fossil fuels cannot be underestimated. Currently, we do not have alternatives that can be scaled up at a fast enough pace to replace fossil fuel energy, let alone the massive political will needed to transition to a peaceful post-carbon social order.

As privileges disappear and future expectations become frustrated for many, spaces of desperation, violence and general social unrest cannot be ruled out. If my reading of the current conjuncture seems like an overly pessimistic assessment, so be it, there are enough cheerleaders out there who dream of a Jetson-like future. But pretending our addiction to carbon energy does not exist does little to motivate possible futures beyond carbon capitalism. We must move beyond denial, anger, bargaining and depression to a general acceptance that, to paraphrase Gramsci, the old is dying out and the new has yet to be born. In the decades to come, we might expect many morbid symptoms.

End notes:


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[20] Mtoe stands for Million Tons of Oil Equivalent. It is a unit of energy that accounts for the energy given by burning one ton of crude oil.

[21] This is down from 75.7% in 1973 largely due to more nuclear power coming online.


[30] There have, however, been alternative energy companies listed on the Global FT 500 in the past.


[33] The FT Non-Public 150 can be found here: http://www.ft.com/cms/s/2/5de6ef96-8b95-11db-a61f-0000779e2340.html

[34] To adjust the price I used an inflation calculator: http://www.usinflationcalculator.com/ (31 October 2012).

[35] Banks are secondary and this is telling since we could make the argument that the money creation system – which is premised on loans/debt and fractional reserve banking is propped up by our energy resources.

[36] The Seven Sisters was the name given to these seven corporations at the dawn of the modern oil age by Enrico Mattei, the initiator of the Italian energy group, Eni.


[41] For a list of Shell’s projects see,  
http://www.shell.com/home/content/aboutshell/our_strategy/major_projects_2/ (30 October 2012).


[52] This theme has been explored in an excellent article by Mike Davis, ‘Who Will Build the Ark?’ New Left Review, Vol. 61, January and February, 2010, pp. 34-34. I update some of the evidence provided for King Coal’s return and add the issue of depletion to the discussion.


[61] Sam Stein, ‘Exxon Valdez Lawyer: Louisianans, “To Use A Legal Term,”Are “Just F—ked”,’ The Huffington Post, June 8, 2010. But the disaster and outcry may have been too much: BP established a US$ 20 billion dollar trust to compensate victims of their negligence. So far only US$ 6.7 billion of that fund has been dispersed to the community and government agencies with the largest share going to the individuals and business affected. http://www.bp.com/sectiongenericarticle800.do?categoryId=9036584&contentId=7067605 (25 October 2012).


However whether these taxpayer financed projects will lead to a new economy paradigm is still highly questionable.


[91] Quoted from a Pentagon study on the future of warfare. Mark Townsend and Paul Harris, ‘Now the


[99] To make this calculation I added total world oil consumption in barrels consumed per day from 2001 with the latest figures from 2009/10 and divided by two. I use this figure as a rough proxy for total world oil consumption per day from 2001-2011. I then multiply this figure by 365 to get total barrels consumed per year (28,915,431,400). I then multiply this figure by the average price for a barrel of oil from November 2001 to October 2011 (US$ 86.67) for all three oil spot markets to arrive at US$ 2,506,100,439,438. It should be noted here that I use the short scale for orders of magnitude throughout this article. So 1 trillion = 1,000,000,000,000. It should also be noted that some small portion of this US$ 25 trillion goes to taxes on barrels of oil. For example, the US charges 8 cents per barrel in tax.


[104] I use 2010 because in the last two FT Global 500 reports the sectors are disaggregated.

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Thank you Tim for this much needed essay

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