Abstract:

In one view, the destruction of old energy technology and its replacement could become the basis for a new round of capitalist growth. In another analysis, the changes necessary to halt global warming cannot be contained within capitalism. It will be argued that the technological changes required are so very major as to imply a drastic reduction in material production and consumption. The consequences of doing nothing are equally drastic. One possible outcome is world revolution, despite the absence of a strong anti-capitalist movement today. Another option is that the capitalist class will agree to a new dispensation and direct much productive capacity to saving the planet. The capitalist class would be behaving more like a redistributive chieftainship; extracting surplus value and redistributing it. Or these problems could be resolved coercively in a technocratic feudalism. A likely outcome is a last days flurry of grand projects and expensive wars, followed by a collapse in food production and population. So whatever is done to resolve the environmental crisis, we are not going to end up with a capitalist society. For environmental activists, putting environmental outcomes first is just as likely to bring down capitalism as a campaign to end capitalist society. Doing nothing at all is very likely to have the same effect.

Keywords: Global Warming; Capitalism; Collapse; Energy Technologies.
Checkmate: Why Capitalism Cannot Survive Global Warming

Thinking about environmental catastrophe requires us to imagine future society, and think about what might be likely and what could be possible (Coates & Leahy 2006; Curran 2007; George 2007; Leahy 2004; Trainer 1985; 1995). I will argue the changes necessary to halt global warming cannot be contained within capitalism. The consequences of doing nothing are equally drastic for capitalism. So what might happen and what are the implications for environmental activists?

**Business optimism**

A group who are best referred to by a new title on account of their diversity are “business optimists”. A core belief of business optimists is that “a capitalist or rather market-based system of production and consumption does not necessarily contradict significant environmental improvements and reforms in any fundamental way” (Mol & Spaargaren 2000: 36). Related to this is a second important view:

More production and consumption in economic terms (GNP, purchase power, employment) do not have to imply more environmental devastation (pollution, energy use, loss of biodiversity). (Mol & Spaargaren 2000: 36).

While these statements come from key theorists in the “ecological modernization” school, it is clear that such views are shared with many in the environmentalist movement. A much read book is “Natural Capitalism” (Hawken, Lovins & Lovins 1999), which is subtitled “The Next Industrial Revolution”. For this book and for many business optimists, environmental protection is seen “as a potential source of future growth” (Langhelle 2000: 306). Within early formulations of “ecological modernization” by Huber this potential growth is related to
a Schumpeterian analysis. Environmentalist modernization is seen as an instance of the way new phases of expansion of the capitalist economy are tied to new technologies (Mol & Spaargaren 2000). From the point of view of a marxist economic analysis it can be argued that massive investment in new energy infrastructure will solve an “accumulation crisis” for capitalism (Shutt 1998). A crisis in which there is a massive surplus of productivity and nothing profitable to invest it in. In this vision, the destruction of old energy technology and its replacement will become the basis for a new round of capitalist growth.

While more recent ecological modernization theory has backed off from the technological determinism suggested by earlier versions, the confidence in the linking of environmental reform to growth remains – and is also very much a viewpoint within business optimism as presented by public intellectuals such as George Monbiot, John Dee, founder of Planet Ark or Paul Gilding, a former Greenpeace leader. Even organizations such as Friends of the Earth are arguing that environmental restructuring to deal with climate change can enhance economic growth and start a new version of capitalist affluence (Spratt & Sutton 2008).

In popular debate, environmentalist radicals are ideologically driven extremists who seek drastic reductions in material production and consumption. Business optimists want to preserve affluence through the path of material re-tooling.

Posing the alternatives in this way makes a lot of assumptions about the likely costs and consequences of the material re-tooling necessary. What if the material re-tooling required is so very expensive and major as to imply a drastic reduction in material production and
consumption (Trainer 1995; 2007; Heinberg 2003)? What if there are actual physical limits that prevent the re-tooling that might be necessary to sustain a healthy capitalist economy?

The reader should be warned that the conclusion to this argument is not the most obvious one – that we need an anti-capitalist revolution to solve our problems. It is a mistake to think of this paper as an example of an old debate between revolutionary and reformist strategies. It is not the strategy of business optimists that is the focus of this critique; the key question is whether the business optimist model can be realized as intended by its proponents, what is the long term prognosis of this strategy – even if it gains consent and is implemented within the institutional constraints of the capitalist global system today and even if it secures its key environmental goals. At the same time it is also necessary to consider what other strategies and outcomes are possible.

The technological problems

Carbon sequestration is untried except on a very small scale; it is hard to estimate the cost for coal-fired plants. It would be decades before it could be installed in new plants. Total energy costs could go up by 40% and total plant generation costs double. Only particular geological formations could keep the pressurized gas underground. We would quickly use up all suitable sites, even those under the oceans. It would only sequester carbon dioxide from power stations – not other uses of carbon fuels.

Nuclear power seems cheap; roughly equating to the current costs of wind-power at the point of production. But there are other problems. If present electricity demand were to be met...
with nuclear reactors, high-grade uranium ores would be used in three years. If we expanded nuclear power to meet energy demands in 2070, we would have to bury 4,000 old reactors every year. Current optimistic estimates of the costs of nuclear power do not include the costs of storing the nuclear waste in the long term. The costs would be huge if we were to supply a large part of our energy with nuclear power and constantly produce this waste. There are also safety problems associated with a nuclear economy. We would have tonnes of plutonium zipping about the globe. Each reactor today produces 200 kg of plutonium per year and a bomb could be made from 10 kg. (Trainer 2007: 120, 123).

Wind is the cheapest renewable energy but there is no cheap way of storing or transporting the energy produced by wind. If we think of using excess wind power to create hydrogen as storage, the costs would go through the roof – the capital cost could be about 11 times that of a coal-fired power plant plus fuel (Trainer 2007: 34). We do not even have enough good wind sites. For example, if Australia was to supply half its energy from wind via a hydrogen system that used 4 units of electricity to store one unit for later, we would need 200 times the area we have in NSW and Victoria with wind speeds sufficient to drive the turbines (Trainer 2007: 35).

Solar thermal energy is the cheapest solar power. Short-term storage of heat energy in molten salt is the most probable means of dealing with nighttime use and occasional cloudy days. Looking at a reasonably good site – outback Australia – we can estimate how much capacity we would need to install to equate to a coal-fired plant. As a result of factors such as winter sun angles, nights, cloudy days, costs of storage, costs in winter to supply an equivalent amount of power to one coal powered station could easily be more than 15 times the costs of
the coal-fired plant (Trainer 2007: 47). Solar thermal systems are not much use in the northern regions where population is concentrated.

Biomass is a sad joke to replace oil and gas. To meet current demand in the United States we would have to harvest biomass from 1,162 million hectares - nine times all US cropland and 8 times all presently forested land in the US (Trainer 2007: 87). Hydrogen is not a practicable alternative - the difficulties in storing hydrogen add massively to the weight necessary to transport it.

There are all sorts of reasons why these costs cannot come down. For example, the costs of steel for framework, and glass for solar mirrors are in themselves the cost constraint on solar plants. Economies of scale are not going to make a big difference. A transition away from fossil fuels of the magnitude required would quickly go past energy conservation and into the very expensive territory of alternative energy provision. Additional to the daily running costs of all these alternatives is the sudden and very expensive conversion of our existing energy, transport and agricultural systems within decades.

**How drastic do we have to get?**

Current emissions from fossil fuel burning are 6 Gt/y. Four hundred parts per million is a very generous estimate of the concentration of carbon dioxide which we would have to aim at to avoid catastrophic effects such as the blocking of the Gulf Stream and the consequent freezing of Europe and the US, or the release of methane from the ocean floor and the permafrost, creating a warming feedback loop – 320 ppm seems like a much more sensible
figure to aim at (Spratt & Sutton 2008). Sticking with the larger figure for argument’s sake – as being the outside of what seems politically possible at present – 400 ppm is pretty close to the current 380 ppm – up from 280 ppm over at least the last 750,000 years. To maintain 400 ppm we would have to cut emissions to 0.5 Gt/y by 2040 and then in subsequent years extract carbon from the atmosphere. This is a reduction of 92% from present emissions. This is extreme enough. In per capita terms the situation is even more drastic. If this target of fuel emissions were shared equally between 9 billion people (in 2050) it would be about 1-2 % of present rich world per capita use. So even if we kept use of fossil fuels below 2% of our current per capita use in developing countries, we would have to reduce our own use to the same level (Trainer 2007: 2). As shown above, this fossil fuel energy cannot be readily replaced by any feasible alternative technology (Trainer 1995; 2007). The consequence of this energy-scarce regime would be a drastic reduction in material consumption. Whether this would necessarily be experienced as impoverishing is debatable. It may be considered that a rosy view of the costs of alternatives is often promoted to persuade the political allies of capitalism to get moving and do something.

The global economy

Backing up a simple assessment are two further factors. One is that a capitalist economy expands continuously. Competitive private ownership produces continuous growth (McLaughlin 1993). Growth also stabilizes capitalism politically, promising increased consumption to dampen current discontent and preventing unemployment levels from escalating (Leahy 2003). At a continuing world growth rate of 3% per annum we will have four times the output of products by 2050 and eight times by 2075. With a 4% growth rate
that would be 16 times (Trainer 2007: 115, 128). To realize the business optimist vision we
would have to replace almost all our current energy use with renewables, and also provide
between 7 and 15 times as much again for a healthy capitalist economy.

The second factor is the expansion of consumption in developing countries. At the very least,
India and China will continue to expand at up to eight per cent per annum. So, we will have
to persuade them that it is in their interest to switch to material re-tooling while they are
catching up with our level of affluence (not just our level today but that which we will be
reaching as our growth continues). It is hard to see us doing this coercively without a global
war. To persuade them, we must prove we ourselves are quite affluent and comfortable
without pumping CO2 into the atmosphere. This considerably ups the stakes. The most
likely way forward would be to demonstrate that we are fine ourselves in going ahead with an
energy consumption regime of the kind we would like them to adopt.

Drawing these points together. There is no way forward without a drastic reduction in
consumption and production. As far as energy is concerned, the reduction has to be
maintained indefinitely – we cannot expand the area of cropland to produce more bio-fuels
and so on. The implication is zero or negative growth. Within the ownership regime of
capitalism this implies a political restraint on the owners of capital that fundamentally alters
the mode of production.

What’s new about this crisis?
A comparison between this context and other crises of accumulation in capitalism is quite misleading. A common factor in resolving other accumulation crises is the development of new strategies that provided services at a fraction of their former cost, or provided services never available before – for example the railways, automobiles, and electricity. Consider the accumulation crisis of the seventies. Most people in the rich countries had a car, refrigerator, television, and the like. An overproduction crisis. How did globalization solve this? Economies of scale – niche products for affluent consumers across the globe. Computer assisted manufacturing to reduce costs. Relocating factories to poor countries. Containerization. Casualising work. Reducing waste in production. Branding to expand markets. Outsourcing production to cheap supplier companies. The common thread was that the same tasks could be done much more cheaply. (Castells 1997; Hoogvelt 2001; Martin & Shumann 1997; Shutt 1998). Even the boom following the second world war follows this pattern. The immense destruction preceded a re-tooling to a higher level of productivity.

There is nothing about the switch to green energy that remotely resembles this. It is all about substituting cheap ways of producing useful energy with more expensive ways of producing the same energy. It is re-tooling to a lower level of productivity and to a permanent cap on energy production. It is this simple fact that explains why the capitalist class is dragging its heels on this issue in a way that threatens our future survival.

Another issue is the consumers who must be targeted. Globalization targeted consumers with a lot of disposable income for niche products – this is what made these new tools of production a profitable investment (Castells 1997; Hoogvelt 2001). Yet new forms of energy must be targeted to all those who use energy around the globe – including all of the poor of
developing nations who are just starting to acquire motor bikes and get electric power laid on. To open this market to renewables we could either coerce them into compliance, which seems politically unlikely, produce renewables more cheaply than fossil fuels, also unlikely, or subsidize their energy use by taxing the rich countries. The latter is the most likely approach to work but it is hardly capitalism.

The end of capitalism - scenarios

When faced with this kind of critique, business optimists usually conclude that the capitalist mode of production will continue, even if somewhat drastic measures have to be taken. After all, where is your revolutionary proletariat? Most people are still hoping for a future of affluence and growth. There is little political support even for the Green Parties (Gow & Leahy 2005).

Yet capitalism could come to a sticky end despite this. A growth economy is impossible to reconcile with a finite environment. As well as global warming we are also faced with the coming oil shortage, the exhaustion of mineral deposits, the destruction of soils and the depletion of world fisheries, just to get started. (McLaughlin 1993; Trainer 1995). The environmental crisis and measures to fix it will put a major strain on the comfortable lifestyles of the rich countries. In developing countries, the hope of future affluence will evaporate. Can capitalism survive these political tensions? Revolution or social collapse is quite possible.
These are the most obvious points. A less obvious one is to wonder what would actually happen if the business optimist vision was to be successful. In other words, what if it were to be successful as a political project, given the technological constraints I have outlined? We can envisage two broad possibilities.

In one, the capitalist class would agree to a new dispensation and direct much productive capacity to saving the planet. To appease the working class of the rich countries, they would have to redistribute at least some wealth so people’s effective incomes did not fall too far with reduced production and consumption - as energy prices went up. With zero or negative growth, unemployment would increase year by year after an initial period of restructuring. If reduced hours of work were shared around to prevent social tensions, people’s experience of leisure would undermine the authority of bosses at work. To prevent developing countries from using old fossil fuel energy technologies, governments would have to tax the rich countries and supply energy re-tooling. Or individual capitalists could donate their wealth for this purpose. Is this still capitalism? I think not. The capitalist class would be behaving more like a Trobriands Islands chieftainship; extracting surplus value and redistributing it. Even the subordinate class of the rich countries would be implicated, as their own affluence fell and developing countries were bestowed with new technologies. All this redistribution would be quite outside the norms of the market economy, which would become something of a sideline. It would be like the end of Feudalism in England. Then, kings and queens reigned, lords and ladies kept their titles and even their land. But year-by-year, the economy and political realm functioned less and less like Feudalism. The ecological reform of today’s economy could mean a similar fate for capitalism.
In many ways this is the most optimistic scenario. Capitalism does not end through a violent uprising or through a catastrophic collapse of living standards. There is a negotiated change to a new mode of production in which people have much more control over their lives at work, in which there are far fewer hours of necessary productive work, in which the most important goods and services are allocated on the basis of need, in which developing countries and rich countries end up at a similar level of affluence, in which we look after the planet and other species. This is all very attractive but it is not capitalism, everything that made a capitalist economy work has been abolished by degrees.

Or in the second broad possibility, these problems could be resolved coercively. New fascist parties would preserve the affluence of the rich and the poverty of the developing countries. There would be increasing unemployment in the rich countries and the dole would be minimalist. To maintain environmental goals, the armies of the rich world might attack coal-fired power plants in India and China - with nuclear weapons if necessary. Assassination squads could terminate timber barons cutting forests. Growth for the great majority would be stalled and party hacks would take over the running of companies. Is this capitalism? I doubt it. This is a form of technocratic feudalism, which would be unable to solve environmental problems in the long term and would suffer the same kind of technological stagnation as the Soviet Union (George 1999; Plumwood 2002). It would be a way station on the road to Somalia.

In fact, there is no path out of the present crisis, which leaves the capitalist mode of production intact. A successful reformist approach of the kind envisaged by business optimists is just another path to end capitalism. Of course a quite likely outcome is that
envisaged by Jared Diamond (2005). We will end up like civilisations in the past that have undermined their environment. A last days flurry of grand projects and expensive wars. The inevitable collapse in food production. A corresponding collapse in population. Finally, the ruling class is massacred by an ungrateful populace (Diamond 2005).

**Implications for activists**

What are the implications for activists in taking these ideas on board? Of course one kind of response is to say that what we need to do is to recognize that capitalism cannot solve environmental problems and to work now to develop a broad coalition of popular support for a new kind of economy. But the environmentalist movement includes many strands of opinion and activism. A common response is to say that if we have to overthrow capitalism first, the whole enterprise is too hard. Also, how could we possibly have the time to build such a change in opinion? It is hard enough to get people to put in a water tank in their backyard!

We cannot really say now which of the scenarios painted above are the most likely. What I am saying is that *whatever* we do to resolve the environmental crisis we are not going to end up with a capitalist society. Putting environmental outcomes first and working towards them in any way that is effective is just as likely to bring down capitalism as mounting a campaign to end capitalist society. And doing nothing at all is very likely to have the same effect – perhaps in the longer term!
With that in mind, working on angles that have some chance of success is probably most rewarding. Both negation and more positive strategies can work. No, we will not have a new power station. No, we will not allow more coal exports. Yes, we will support a cap and trading scheme as better than nothing at all. Yes, we will begin to set up alternative localized economies.

The main benefit of having a clear understanding of why capitalism cannot solve the environmental crisis is that you are not surprised and discouraged by the resistance you encounter. With the business optimist outlook it is hard to understand why people are hanging on to ways of life that are plainly doomed. If it is really easy to reform capitalism and bring about a new cycle of growth why is it so hard to get the political will to do this? The real answer is that what is at stake is as major as the fall of the Roman Empire. No wonder there is such a mismatch between the rhetoric of environmental reform coming from government and business and the inadequacy of real action.

References:


Diamond, J. (2005), Collapse: How Societies Choose to Fail or Survive. Penguin, Camberwell, Victoria


