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THE SPECTOR OF JEVONS' PARADOX

It is an article of faith within the sustainability movement that resource efficiency improvement must be the main response to Peak Oil and Climate Change. The recurring mantra in our culture is that technological silver bullets will save the day. It is widely believed that increased resource efficiencies coupled with widely deployed renewable energy technologies will rescue the Earth from catastrophe, and salvage Western civilization from ecological and societal collapse. Furthermore, such a strategy will usher in a new relationship with nature that secures her for generations to come. As with most articles of faith, belief in them is a difficult thing to shake even in the face of compelling evidence to the contrary.

In the early 1980s, an old debate within economics resurfaced surrounding something called Jevons' Paradox, or the more descriptive term *rebound effect*. Many well-known minds, such as Amory Lovins, piped in on the new meaning of this old, obscure argument buried in 19th century classical economics. First coined by the economist W. Stanley Jevons in *The Coal Question* (1865), the paradox he noted was in regards to coal consumption and efficiency improvements in steam engines: "It is a confusion of ideas to suppose that economical use of fuel is equivalent to diminished consumption. The very contrary is the truth."

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In the 1980s, Jevons' observation was revisited by the economists Daniel Khazzoom and Leonard Brookes. In their analysis, they looked beyond the relationship between energy resources and the machines that convert them to useful work to consider the overall effect of technological improvements in resource efficiencies on the energy use of a society as a whole. They argued that increased efficiency paradoxically leads to increased *overall* energy consumption. In 1992, the economist Harry Saunders dubbed this hypothesis the Khazzoom-Brookes Postulate and showed that it was true under neo-classical growth theory over a wide range of assumptions. Since the appearance of the Khazzoom-Brookes Postulate, numerous studies have weighed in on the debate arguing a range of impacts of the rebound effect.

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In January 2008, Earthscan released *Jevons Paradox: The Myth of Resource Efficiency Improvements* as the latest and most comprehensive review of the paradox in economics literature. Prefaced by anthropologist Joseph Tainter (*The Collapse of Complex Societies*, 1988), the book reviews the history of the debate, current findings and includes the latest multi-disciplinary studies regarding the existence of the rebound effect. The book clearly supports the proposition that the rebound effect is present in the US, Europe and most other economies and that strategies to increase energy efficiency in themselves will do little to improve the energy situation or the ecological crisis. In fact, they may well worsen it as the historical impact of resource efficiency improvements shows that increasing the efficiency in the use of a resource in turn increases the consumption of that resource.

The devil is in the details.

The crux of the argument lies in the fact that when you save money through improvements in efficiencies, such as with gas mileage or heating costs, invariably that savings has two effects. First, it decreases demand for an energy resource, which reduces the price of the resource. This then reveals a new layer of demand that, in turn, increases consumption of that resource. Such behavior can be found most everywhere in the economy. In analyzing homes over the last 50 years we see energy efficiency improved dramatically but the square footage more than doubled and the number of occupants more than halved. Even though the heat load of today's homes may be less than that of 50 years ago, the total embodied energy and operational requirements per occupant is far greater due to size, composition, occupancy and lifestyle—all predicated on resource efficiency improvements.

Word processing is another example of the Paradox at work. Before the advent of personal computers, producing a professional typewritten document was quite arduous, time consuming and expensive. Once computers, printers and networks came onto the scene, there was widespread hype that we would no longer need paper and the "paperless office" was bandied about as one of the great resource conserving aspects of technology. Everyone knows what happened—paper consumption skyrocketed because the cost per word to print plummeted.

The same thing happens with highway improvements. Every increase and improvement made to the carrying capacity of highways invariably leads to an increase in traffic congestion, housing development and maintenance regimes. Efficiency improvements in battery storage technology and the energy efficiency of micro-circuits along with efficiency improvements in production and infrastructure have fueled the explosion in digital technologies, all of which increase demand for energy and resources. The paradox is everywhere.

The second effect resulting from efficiency improvements is that when you save money you usually spend it somewhere else in the system of production, and that translates into increased energy and resource consumption. The worst thing you could do is save it in the fractional reserve banking system where the multiplier effect can compound your savings to recycle it into the economy at 10 times what it would have been if you had just spent the money yourself.

Even those who argue for the "sackcloth and ashes" approach to sustainability through lower consumption, simplicity, and reduced reliance on fossil energy are haunted by Jevons' ghost. As the ecological economist Blake Alcott notes in *The Sufficiency Strategy: Would Rich-world Frugality Lower Environmental Impact?* given global markets and marginal consumers, one person's doing without enables another to "do with." In the near run the former consumption of a newly sufficient person can get fully replaced. And given the extent of poverty and the temptations of luxury and prestige consumption, this near run is likely to be longer than the time horizon required for a relevant strategy to stem climate disruptions and the loss of vital species and natural resources.

The claim of reducing material standards voluntarily as a means to reduce environmental impact may be sound at the local or regional level, but in the global marketplace such claims are demonstrably false. As countries like China and India work

their way through the late stages of primitive capital accumulation, they are stepping into the consumptive paradigm full force with over two billion consumers anxious to take up any slack. India's boast of the Tata, the world's cheapest automobile, and the prospect of a billion new cars on the road by the middle of the century haunt the Western world as the ghosts of Prometheus and Pandora reappear before our eyes.

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It is also thought that the impact of Peak Oil and rising fossil energy prices negates the Paradox as rising prices are largely seen to be in response to decreasing supply and increasing demand. It is assumed that whatever efficiency gains can be wrung out of the machinery will have little impact on the price of a depleting resource and therefore will negate the rebound effect. While that may be true in relationship between an energy source and the machines that convert it to useful work, it may not be true in relation to the overall economy and consumer behavior.

As energy costs rise, purchasing power is taken out of the economy as people have less discretionary income to spend on consumer goods and services. This is a serious concern for the economic and political order whose power is predicated on the concept of endless growth and unconstrained capital accumulation. If most everyone can barely afford fuel, food, shelter and to service their debts, we will have essentially returned to a utilitarian, subsistence economy based largely on debt peonage where the extraction and accumulation of huge amounts of surplus value will come to a grinding halt.

The vast bureaucracy of institutional, governmental and corporate paper pushers will become an unaffordable luxury. The risk of systemic collapse is very real for a complex social system predicated on abundant energy. In this light, the drive for improvements in resource efficiencies can be seen as a critical objective for state security and preservation of the system of production. In an economic system that requires the constant externalization of its true operating costs to sustain itself, every measurable increase in resource efficiency will serve to perpetuate this "desires-based" economy.

Prometheus Unbound

Apparently, few exits exist to the Jevons Paradox. The most reasonable and effective one is to negate the savings that are achieved through efficiency improvements so they cannot be recycled back into the economy as new sources of demand. The current political realities of such a policy in the US make it all but impossible. The steadfast refusal of the American political and economic elites to support the Kyoto Protocol (or any genuine progress toward reducing carbon emissions) is also rooted in the same realities. Within the discourse on ecological economics, the arguments for steady-state economies, carbon caps and other constraints on production terrify the existing economic order, as the basis for power is predicated on endless growth and unconstrained capital accumulation.

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Just recently, the coal lobby released a public relations campaign associating carbon caps with Paleolithic existence in an attempt to terrify suburbanites into believing constraints on capital accumulation mean clubbing each other to death over grubs and

cooking over a candle. The idea that there must be limits to production is today's heresy, but that is precisely the kind of thinking today's 6.8 billion humans must embrace if we are to transition to a post-industrial world.

Thinking that the paradox only applies to fossil energy is mistaken as well. The pursuit of strategies that embrace new technologies such as the transition from fossil energy to renewable energy is no better. While the elimination of emissions generated by fossil energy use would be the greatest benefit to the environment, the wide scale deployment of new, ecologically benign energy sources would once again serve to extend the biophysical constraints on production and consumption until such time as another environmental crisis would unfold.

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Without a complete restructuring of the patterns of daily life, these potential new technologies will do little more than fan the Promethean fires now consuming the world. This is largely why the specter of Jevons' Paradox needs to frame the discourse on sustainability if we are to act in such a way that we do not doom future generations to even worse conditions than we find ourselves in now. The economist Kenneth Boulding once noted in his *Utterly Dismal Theorem* that: "Any technical improvement can only relieve misery for a while, for as long as misery is the only check on the population, the improvement will enable the population to grow and will soon enable more people to live in misery than before. The final result in improvement therefore, is to increase the equilibrium population, which is to increase the sum total of human misery." (Boulding, 1959)

Up in smoke

Revealed in the paradox is an interesting ideological struggle central to the crisis. On one hand, the West has developed the technical prowess to repeatedly extend civilization's capacity to overstep the biophysical constraints of the environment, which has been the driving cause of the ecological crisis.

On the other hand, there is a rather large segment of humanity completely dissatisfied with the manner in which social life is organized. It is safe to say there exists, submerged, an intense, if not universal, desire to be liberated from the domination paradigm. We find such desires expressed in countless stories and myths that have endured for millennia as well as current statistics on substance abuse, suicide and mental health. The exploitation of all life for the sake of power is an intrinsically repulsive proposition to most rational people as it renders one's existence essentially down to that of an object. However, it is the essence of our social system, and the daily contradictions and contortions the average person must endure in order to survive take a tragic toll on the environment and the soul.

The capacity to manifest such an ancient desire is potent but unrealizable at this time since the cohesive force of our civic life has largely been shattered by what filmmaker Adam Curtis details in his four-hour BBC documentary *Century of the Self* (2002). Curtis chronicles the systematic transformation of a society by corporate America into a sea of "selves" and how our steadfast refusal to surrender illusions of freedom for the sake of collective survival and well-being are conditioning us to fail. It is clear that

we will have to unlearn a century of cultural indoctrination and abandon the central myths of our society if we are to have a reasonable chance at surviving the brewing storm.

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It is not without coincidence that the path out of Jevons' Paradox is also the same path out of the social and ecological crisis. F.G. Bailey, the esteemed if obscure anthropologist and student of power, has spent a life studying human collectivities, power and the way things get done in the world. Noted in his *Tactical Uses of Passion* (1983), and central to his analyses, is his contention that there are five aspects of the human persona that transcend culture (tactical, moral, silly, civic and divine) and that these are the aspects which govern the dynamics within social groupings. Of these aspects, two are anti-social, two social and one sort of hermaphroditic.

It is interesting to place into contemporary cultural context his analysis, since most everything promoted within the cultural mainstream as appropriate behavior to aspire to is predicated on the *anti-social aspects* of our personas. Such a correlation reveals to a large extent the nature of the social dysfunction in much of our society as well as the failure of efforts to organize new collectivities to challenge the existing ones.

Where we find the *social aspects* of our personas flourishing is in the institutions of power. In Bailey's analysis, any successful and dynamic community, organization or collective human endeavor must place the elements of the *civic* and the *divine* at the center of its social life, its reason to be. These are the social aspects of our personalities. The *civic* alludes to the set of rights, obligations and responsibilities that bind the collective to the individual and vice versa. The *divine* alludes to the notion of something greater than one's self and that the activities of the collective are significant in relation to the world.

The anti-social elements are the forces of disintegration constantly threatening the life of the collective by virtue of the fact that they are rooted in self-interest. The *tactical* is concerned with status, prestige, acquisition, power, and the *moral* is concerned with being right, superior, etc. These aspects are concerned only with the self. This is worth noting since the core ideological value promoted in our culture is "self-interest." It is claimed that this is a supreme virtue both in economic and social terms.

In thinking about the necessity of a planet-wide response to climate change and peak oil, one has to wonder to what degree we have lost the skills and abilities to create relationships based on Bailey's notions of the *civic* and the *divine*. For societies to reorganize themselves along new ideas of restraint and reflection, a radical restructuring of power relations will be necessary. And, unless we want the kind that comes through violence, then millions of intensely organized, determined people bound by a vision underpinned by rights, obligations and responsibilities will have to simply take matters into their own hands. The path out of the paradox is through a renewed civic and spiritual life where the central discourse is how to *be* in the world, and this is the basis of legitimacy for overturning the current reality. It happens to also be the same path out of the social and ecological catastrophe that lies beneath our feet.

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