The Economic Challenge of Sustainability

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The Problem with Sustainable Development

Most people in Ireland think sustainability is highly desirable and sprinkle the adjective "sustainable" about with abandon, but are confused about what the concept really means. Their confusion can be traced back to the term "sustainable development" which was introduced to the public by the Brundtland Report*, Our Common Future, in 1987*. The basic Brundtland definition is clear enough: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" but then the Report confuses the reader by attempting to make the principle less absolute:

> Meeting essential needs depends in part on achieving full growth potential, and sustainable development clearly requires economic growth in places where such needs are not being met. Elsewhere it can be consistent with economic growth provided the content of the growth reflects the broad principles of sustainability and non-exploitation of others.[i]

In other words, sustainable development is linked with growth, and since for many people,"development" and "growth" are synonyms, they think that "sustainable development" and "sustainable growth" are the same thing. And, of course,"sustainable growth" is not just a once-off increase in income levels that can reasonably be expected to be maintained indefinitely. It is a growth process that goes on increasing incomes reliably, year after year. In short, sustainability is linked in the public mind with something which is completely unsustainable.

Another flaw with the Brundtland Report is that it entirely ignores the possibility that limits to economic growth might exist and that humanity might have already exceeded them in some respects. Had Brundtland conceded this, the final sentence in the quotation above would have had to be changed radically because even if growth that 'reflects the broad principals of sustainability' can be achieved, it ought not to be generated by rich countries while they remain unsustainable in almost every respect. This is because their economic growth necessarily involves the use of natural resources and, if technologies can be found which enable, say, twice as much output to be produced for the same level of resource input that does not mean that the extra output should come on stream. It would be far better for a country to keep its production at the current level and to halve its resource use, as that would move it towards sustainability rather than merely maintaining its unsustainable *status quo*.

The Growth Imperative

Unfortunately, under our current debt-based monetary system, no country has the option of foregoing growth because, without growth, it will fall into serious economic decline. The main reason for this is that if there is no growth in any year, the investments made the previous year have produced no return. Firms find themselves with lower profits and unused capacity, and this discourages them investing further, at least in those sectors in which the increased capacity has not been taken up. Less investment means less new bank loans being taken out and thus less money entering into circulation to replace that being removed as previous years' loans are repaid to the banks which made them. And less money in circulation means that there is less available for consumers to spend.

In normal years in industrialised economies, somewhere between 16% (Sweden) and 31% (Estonia) of GNP is invested in projects that, it is hoped, will enable the economy to grow the following year. A similar proportion of the labour force is employed on these projects. Consequently, if the expected growth fails to materialise and all further investments are cancelled, a fifth or more of a country’s workers will find themselves without paid work. These newly-unemployed people will be forced to cut their spending sharply, which in turn will cost other workers their jobs. The economy will enter a downward spiral, with each round of job losses leading to more.

The prospect of investment falling and creating widespread unemployment terrifies governments so much that they work very closely with their business sectors to ensure that their economies continue to grow almost regardless of any social or environmental damage the growth process may be causing. In other words, the need for growth to maintain short-term economic sustainability gets in the way of attending to more fundamental types of sustainability such as halting social decline or climate change.

In the present system, the only way to ensure that enough borrowing takes place to maintain the money supply and maintain employment is to ensure that enough growth occurs year after year to ensure that investors keep on investing. Studies have shown that in Britain a minimum of around 3% growth is required to prevent unemployment increasing.

So although overall sustainability requires a long term view, our particular money creation system is like a pair of spectacles which give short term economic issues such prominence that they obscure our vision of the future. We concentrate on seeing that employees are paid at the end of the week, that interest is paid at the end of the half-year and that increased profits can be reported at year end. As a result, all too often, we fail to see that the natural environment is preserved, that capital equipment, buildings and infrastructure are kept up, that health is maintained, that knowledge and skills are preserved and passed on and that social structures such as families, friendships and neighbourhoods stay strong. These crucial concerns only get

our attention when they begin to affect this year's economic performance.

A society that puts economic sustainability ahead of environmental and social sustainability because of a bug in its money-creation system is putting the cart before the horse. The economy should be merely the tool by which society supports itself; and the money system should be simply part of that tool. To be sustainable, a society has to put fundamental environmental sustainability above all else. The Earth does not except the trade-offs so beloved of economists and politicians. Social sustainability comes a close second as even with environmental and resource security, no economy can survive for very long in conditions of chaos and strife created by gross inequality or unfair access to those resources. These laws are absolute.

The Economy as an Emergent System

Very few people understand that the workings of the economy are not ‘natural’ in the sense of obeying relatively immutable and consistent laws but are ‘contingent’ on the starting point and other factors. In other words, the rules which determine the results which an economy will deliver depend, amongst other things, on the economy's initial conditions, on the quantity and quality of the energy feeding it and on the medium used in interaction or exchange between the actors in the system. While the initial conditions were set in the past and cannot now be changed, the energy input and quality can. Moreover, the medium we use for interaction, money, is fully within our conscious design.

People thinking in systems-theory terms describe our current economy as an emergent structure arising from a complex reflexive system which oscilates between two basin attractors, one giving relatively slow steady growth and the other contraction and depression. Despite economists' best efforts, it is not possible to predict exactly when the switch from one basin attractor to the other will happen or how long the economy will stay in each basin, although patterns do repeat fairly regularly.

Recent advances in systems theory suggest that small adjustments in the amount or quality of the energy entering the system or changes in the algorithms of exchange or in the ‘stickiness’ of interaction could cause the system to cease its oscillations between the two basins and enter a different pattern – perhaps a more stable, sustainable one. Unfortunately, if the money system and the goal of preserving immediate, short-term economic sustainability are treated as sacrosanct, the world will be unable to escape the growth/depression cycle and find a type of economy which is much more sustainable in the very long term.

In Mesopotamia, in the Indus Valley and in the jungles of Mesoamerica, civilisations collapsed because they had undermined their environment. So did the Soviet and Roman empires. However, even though our system has so depleted the environmental resources it requires for long-term sustainability that it stands on the brink of collapse, we have greater scientific knowledge and political sophistication than the failures that went before us. Many

governments see the warning signs and are aware of the need for policies to address them.

But governments will not take the radical steps required unless pushed to do so by their electorates. Like the frog in the hot water, it is hard to get sufficient political momentum to make sharp, uncomfortable changes to counter the slow growing, high impact threats we are facing such as climate change, loss of fertile soil, dropping water tables, shrinking biodiversity and human population growth. But, thankfully, another kind of environmental threat to economic, social and environmental sustainability is forcing its way up the list of government priorities, and it is one which there is potentially considerable public will to tackle. It is the imminent peak in oil and gas production.

Peak Oil and Energy Scarcity

Oilmen have been saying with increasing frequency recently that world oil production is about to reach a peak and then decline. Initially, it was retired petro-geologists - people like Ireland's Dr. Colin Campbell – who attempted to point this out, but top oil company executives are now saying so too and one company, Chevron, has spent a lot of money advertising the fact in magazines like *The Economist*, *Time* and *Newsweek*.

The problem Chevron has been highlighting is that enough new oil production has to come on-line each year to cover both the growth in world demand of at least 2 million barrels a day and the decline in production from existing fields of over 4 million barrels a day. “That’s like a whole new Saudi Arabia [coming into production] every couple of years,” Sadad al-Husseini, the retired head of exploration and production at the Saudi national oil company, Aramco, said in August 2005. “It’s not sustainable.” Figure 1 illustrates the problem.

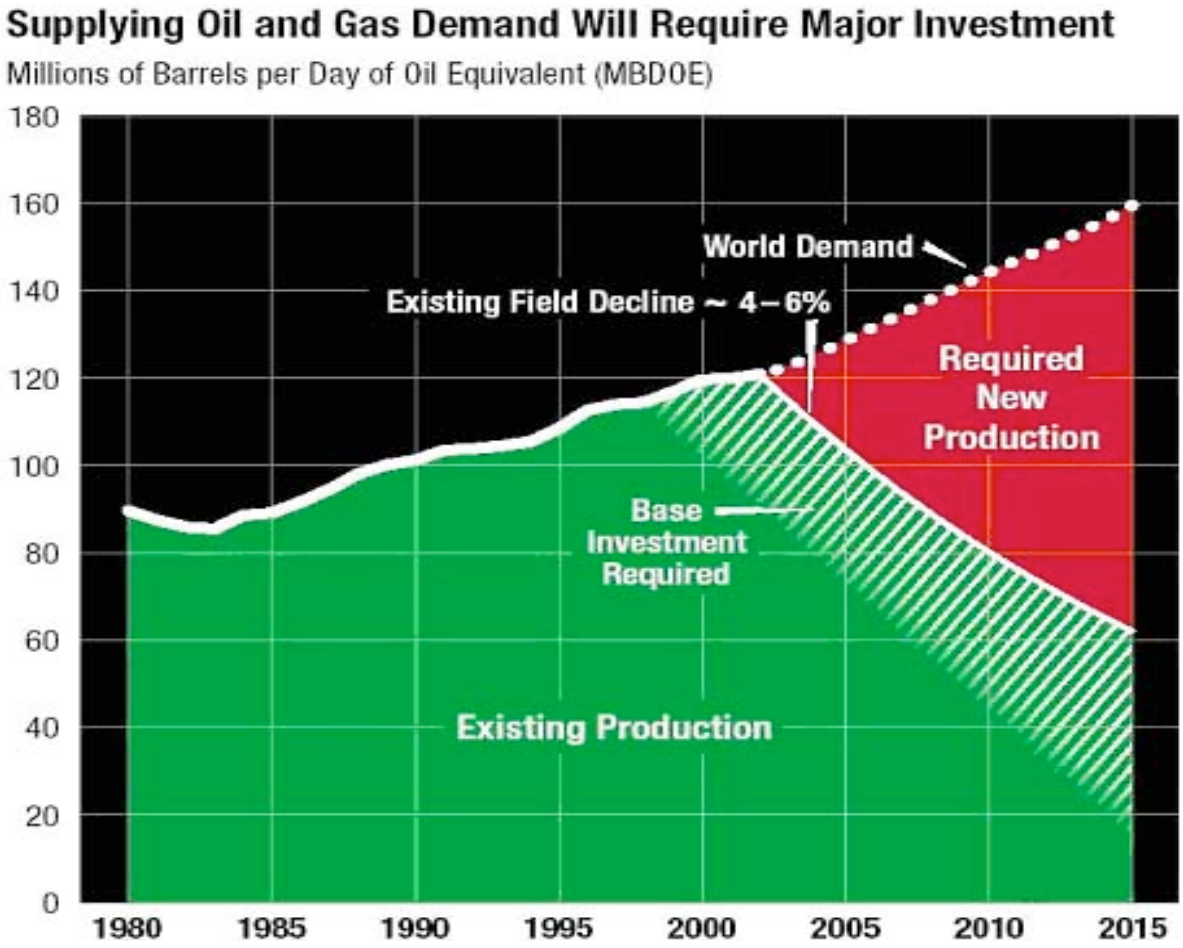

Figure 1: **Production from existing oil and gas fields is expected to decline at between 4% and 6% a year. Massive investments are required and, even then, supply may not be able to keep up with global demand. Source: Exxon-Mobil, 2004.**

Unfortunately the world's politicians have been let off the “we need-to-act-with-urgency” hook by economists, particularly those at the International Energy Agency, a branch of the OECD, whose duty is to advise governments on their energy policies. In common with most economists, those at the IEA regard oil as just another commodity and believe that its supply will increase if its price rises because the higher price means that more resources can be profitably devoted to its production. If sufficient investments (around $3 trillion) are made, the IEA says, world oil production will increase for at least another 25 years. Professor Kenneth Rogoff of Harvard and a former chief economist at the IMF concurs. “We might be running low on $20 oil, but for $60 we have adequate oil supplies for decades to come” he says. *The Economist,* which has consistently taken the IEA’s line, wrote in April 2006; “It is true that the big firms are struggling to replace reserves. But that does not mean the world is running out of oil, just that they do not have access to the vast deposits of cheap and easy oil left in Russia and members of OPEC”.

In fact, no one is saying that the world is running out of oil. What the oilmen worry about is whether supplies will be able to keep up with rising global

demand. There is still plenty of oil in the ground but, despite what the economists say, oil is not a commodity like any other. It is a source of energy and, if it takes more energy to extract and refine it than the oil itself delivers, that process will never be profitable, no matter how high the price rises. As increasingly difficult oil sources have to be tapped, the net energy gain, the energy return on energy invested (EROEI) ratio, declines. At some point, throwing more resources – that is to say, energy – into the effort to produce becomes pointless. When that happens, world oil output will cease to increase, stay on a plateau for a few years and then fall.

Note that both the oilmen and the economists are essentially saying the same thing – that oil will be scarce in future. The IEA economists believe that it will be possible to increase oil output at 1.6% a year for the next 25 years, which is much less than the rate at which global demand is likely to grow if the world economy continues to expand at the rate it did between 1993 and 2003, 3.6% per annum. The oilmen, however, say that production is likely to start falling at between 4% and 6% a year some time within the next five or ten years. If the economists are right, global growth will be severely checked. If the oilmen are, then the global economy will contract.

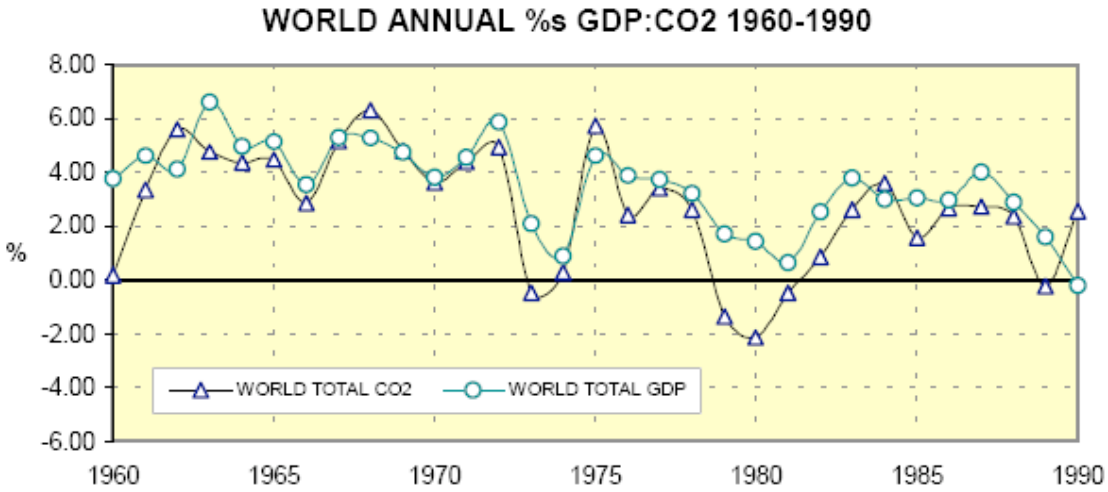

Figure 2: There has been a very close correlation between the world's total output and its use of fossil energy, as measured in terms of its carbon dioxide emissions. If less fossil energy is available, it is going to be very difficult if not impossible for the world economy to continue to grow each year. Source: Global Commons Institute, 1995.

Figure 2 shows the close link between global fossil fuel use, as represented by CO2 emissions, and the rise in global incomes. The close link means that we can be sure that growth under business as usual will be slow or negative and the world economy is in severe danger of tripping into the depression attractor basin characteristic of our current structure.

Energy Price Inflation

One of the factors which makes the descent into depression highly likely is

that the world's central banks don't understand that, as oil is getting scarcer, a fundamental shift is needed in the world economy to reflect this. When oil prices rise, the cost of all other forms of energy will rise too because, at least to some extent, one form of energy can be substituted for another. As a result, the prices of everything we buy will need to increase, but by differing amounts because of the differing amounts of energy required to make and deliver all the different goods and services we use. In other words, a new set of price relationships needs to be established to reflect the new cost structure. Inflation is the only relatively painless way that every price in the global economy can change by a different amount to reflect the new energy price level.

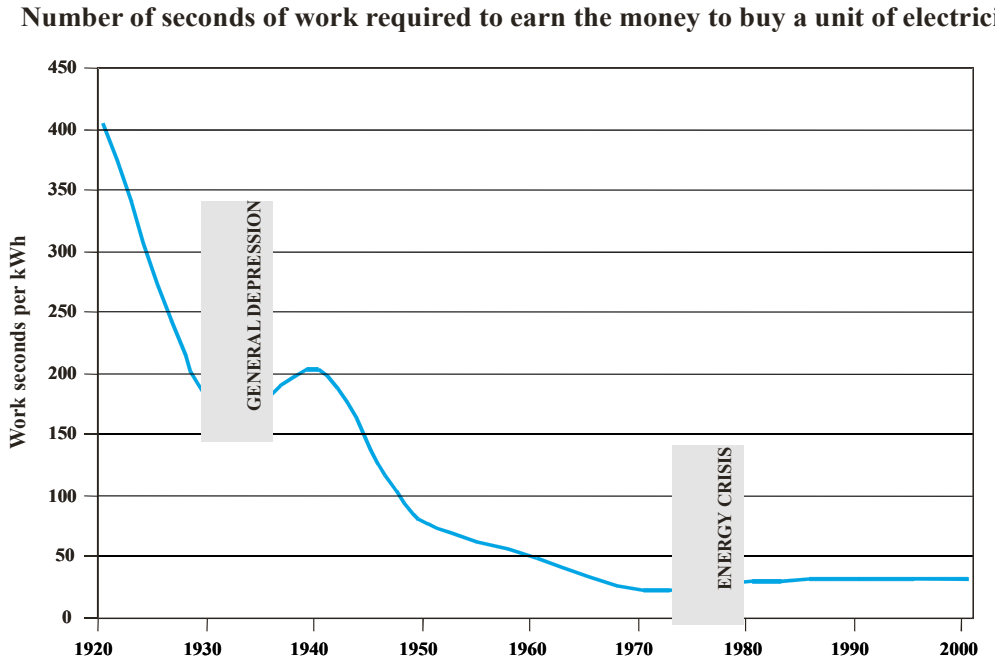

Figure 3: **The number of seconds someone in an OECD country had to work to earn the price of a unit of electricity had fallen to less than a tenth of its 1920 level by the 1970s. We must now expect the time required to rise again. Source: Folke Gunther, 2002.**

For the better off, the change will merely mean that they have less money to spend on luxuries. Holidays, dining out, prestige cars, savings and housing will be cut as they attempt to adjust to the new realities. But most people who are well-off now will still be able to live well.

It is the indirect effects of inflation that threaten them – and everyone else. The money system is not just a numeraire that keeps score in the economic system: it actively shapes the economy itself and gets shaped itself in turn. Inflation devalues money as a medium of exchange and as store of wealth and thus threatens the confidence with which it is held. Since money was decoupled from gold, a process that started at Bretton Woods after World War II and was finished by President Nixon in the early 70s, it is has become virtual, backed only by public confidence. Almost certainly, the US Federal

Bank and the European Central Bank Reserve will think it their duty to try to maintain this confidence by ensuring that the money people earn in wages and salaries will buy them almost as much as it did before oil prices began to rise.

To do this, they will continue increasing interest rates to damp down inflation. This is a dangerous strategy because raising the cost of borrowing money is itself inflationary since it raises the cost of running businesses. Only the exceptional firm manages without borrowed funds. Every business will react to the higher interest rates in the same way and attempt to put up its prices in an effort to preserve its profitability. This will cause more inflation, and the central banks will react with further interest rate rises. The cycle of price rises leading to interest rate increases leading to price rises could continue until most new projects became unviable and were scrapped because of the interest costs. This would cause demand to collapse and workers to be laid off. In the new climate, businesses reacting to the higher borrowing costs would find they could no longer pass them on to their customers. The resulting slowdown would cut property and share values far more effectively than allowing an inflation to proceed. It would also cause massive unemployment, thus cutting or eliminating the incomes of many people.

So while the decrease in oil production after the production peak will almost certainly cause the world economy to contract, that need not itself cause a recession. True, the purchasing power of people's incomes will decline, but the higher energy prices will create a lot of investment opportunities and there could be plenty of work about. Some sectors of the economy will do badly, others will rapidly expand. It will be the rise in interest rates to protect the money system that will cause any depression that comes along. An attempt to block inflation would be worse, far worse, than the disease. The US Federal Reserve and ECB should therefore adopt new inflation targets and allow relative prices to adjust so long as the inflation rate does not go too much above 8%. This is the rate at which inflation begins to impose costs on the economy because firms find that they have to waste resources on continually adjusting their prices.

Despite the strong correlation between abundant energy use and economic growth, high energy prices can be a benign factor in the economy. We need to distinguish between a restriction in supply of energy which will certainly impede economic growth and higher energy prices which may not. Higher energy prices tend to shift spending away from consumption to the production of goods for export (in order to pay the higher cost of energy imports) and to capital investment in energy-saving and energy-producing technologies. Moreover, the inflation the higher energy prices generate helps the world economy by lowering the effective interest rate and thus makes investments in the new technologies even more attractive.

Land Value Tax

Of course, a lower effective interest rate will also make it more attractive to invest in property and shares. A buoyant stock market is a good thing as it

would make it easier to finance the new energy companies. But a further increase in the price of property would be disastrous for first-time house buyers, most of whom already have to struggle to make their repayments. Anything disastrous for first-time buyers is eventually disastrous for the market as a whole, since it means that no-one is getting on to the bottom of the ladder to allow the rest of us to move up, sideways or down as our circumstances change The resulting property crash would be from an even greater price level than at present and would bring the entire economy down with it.

Central banks seem truly to be caught in a quandary.

The solution to this problem is not within the remit of the central banks but the government – a carefully designed tax. This tax must not discourage investment in energy-saving improvements to buildings, services and settlements but simply make property less attractive as an investment. Such a tax is an annual land value tax (LVT) – the least worst tax according to economist, Milton Friedman[ii]. This tax would be set at a percentage of the value of the land element only of property and should be adjusted annually to remove any increase in the market value of the property not due to improvements by the owner. [iii]

Its imposition would cause the value of property to fall to reflect the capitalised cost of the annual tax payment. But the construction industry would not collapse because the owners of land zoned for development would have to develop it or sell it on to a developer to avoid paying the tax year after year and seeing no return. As a result, the price of development land will fall and builders will soon have no trouble acquiring land at prices that allow them a respectable profit on the sale of houses at the lower price. The number of new houses built might slow but the level of construction activity would be augmented by an increase in (untaxed) building improvements i.e. the refurbishment and retrofitting of buildings to save energy that the high energy prices will spur.

Families who bought their houses at the height of the boom would not be burdened by the site tax at a time when they had lost purchasing power due to the higher energy prices and were facing high mortgage costs. This is because the LVT would be offset against their income tax until the property was sold or otherwise transferred.

Over time, the inflation would decrease the mortgage burden because, although people's incomes would lose purchasing power, they would nevertheless rise in money terms relative to the original loan. This way the construction sector could be kept working at near capacity until its efforts were switched to building the infrastructure required by a country that expects to have to manage without using any fossil energy at some time within the next fifty years.

Poverty and Famine

Just as the central bankers will be unable to preserve the purchasing power of money as energy prices rise, without causing an economic disaster, workers will be unable to preserve the purchasing power of their salaries and wages. Everything they buy will cost them more in terms of the number of minutes of work they have to do to earn the money to get it. As a result the world's poor will be very badly hit, especially the landless among them, as food will become increasingly scarce and expensive because of the large amount of energy required to produce it by industrialised methods. Moreover, huge areas of land are likely to be taken out of food production to produce energy crops.

Already the world's stocks of cereals are at the lowest level they have been since the early 1970s in terms of days of supply and they are being eroded further by the massive use of maize and wheat in the US for the production of bio-ethanol to add to petrol for cars.“Within four years, ethanol will be the nation's second-largest market for corn, running just behind feeding it to livestock” a spokesman for the National Corn Growers' Association, told the Wall Street Journal in December 2005. The newspaper also reported that 30,000 stoves and boilers specifically made to burn maize had been sold in 2005, twice the number sold the previous year.

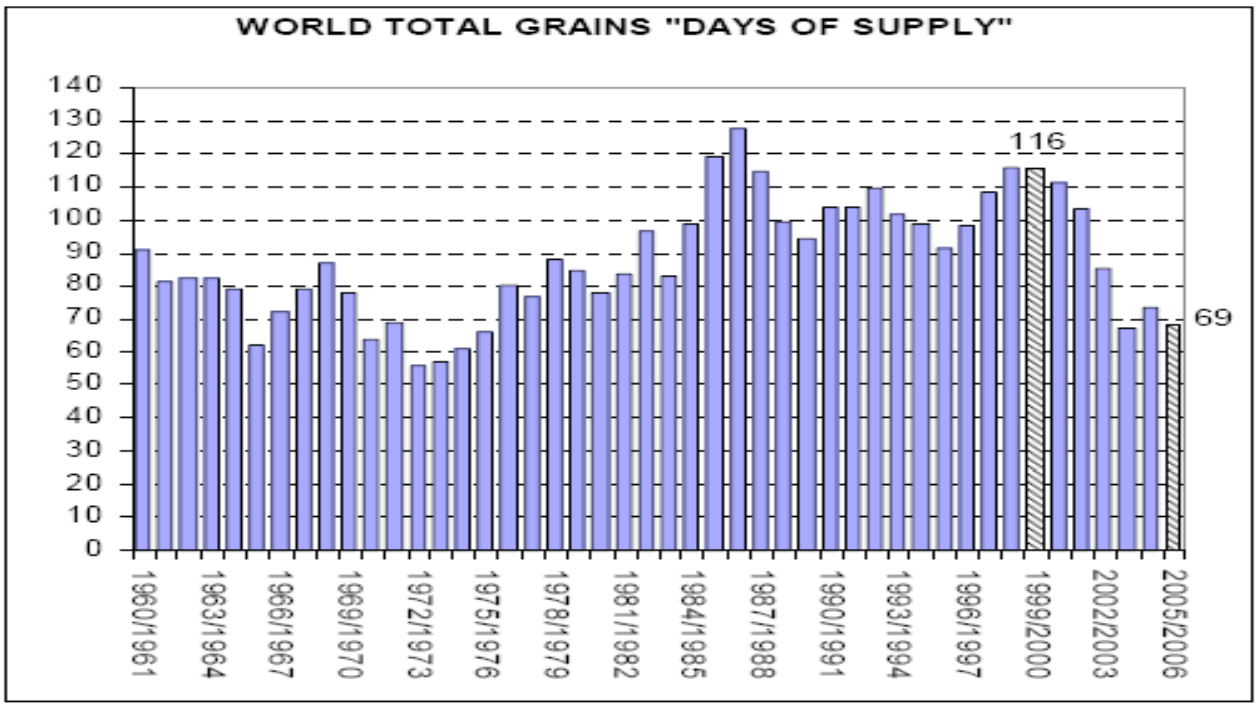

Figure 4: **The world's grain stocks per person are lower than they have been at any time in the past thirty years. They are down to 69 days' supply. Despite this, increasing quantities are being used for fuel. Source: National Farmers' Union of Canada, May, 2006**

The situation has therefore already arisen in which the rich are running their cars and heating their homes using fuels that could otherwise have gone to feed the poor. The situation will get worse as market prices deny the poor the

energy they need to make themselves more productive in their local economies. This poses serious problems for Irish and EU policies. The separation of energy and anti-poverty policies could be tolerated when energy costs were low but not when they are high and rising. A new paradigm for anti-poverty policies and structures requires new policy connections at the European level around energy, social cohesion and human rights.

The market economy we currently “enjoy” was once defined by the Australian writer Ted Trainer as "an ingenious device for ensuring that when things become scarce only the rich can get them". This will prove true about fossil energy as it becomes scarce unless we take action. The rich will have plenty of energy and use it, one way or another, to maintain their wealth and political power. But their enjoyment of it will be short lived as when a society collapses in the way the civilisations did that we listed before, the rich do not avoid the fate of their poorer neighbours, they simply take longer to die. The poor in the South and amongst us in the North will not go quietly into the night; globalised communication has closed that option forever. Even the wealthiest, most carefully-guarded elite will have to accept that social justice is fundamental to their own survival in the short and in the long term.

Citzen Carbon Quota

In wartime, even governments with impeccable right-wing credentials do not leave the distribution of scarce, vital commodities to the free market. Instead, they introduce rationing[iv]. If the poor are to be protected, a worldwide system of energy rationing is needed now, before attitudes harden as the scarcity grows more acute. Fortunately, a suitable rationing system is ready to hand, although it does need a little adapting.

The EU's Emissions Trading System is the cornerstone of the EU's effort to meet its Kyoto target. Its emission permits are as good a proxy for fossil fuel as you can invent. At present, these valuable rights to emit carbon dioxide into the atmosphere are being handed out free to some of the biggest users of fossil fuels in Europe[v]. If the recipient firms reduce their fossil fuel use and thus their emissions, they can sell their surplus permits on a new carbon market. Most companies in unregulated and captive markets such as that for electricity are charging the public for the permits they use in their production processes despite the fact that they get them free. This means that consumers are not only faced with higher energy costs because of the global scarcity, but that they are also paying for climate change measures which are failing to accomplish their goals.The EU's Lisbon strategy will expose more citizens to this form of legalised gouging as energy markets are steadily deregulated under it. The public, and most of their elected representatives, are totally ignorant about what is going on.

Given a little creativity and the courage to stand up to big business, the ETS could be redesigned to deliver on its climate targets and to protect the poor. It could thus ensure the social stability required to make the jump into a renewable energy future. Before anything can be traded, its ownership has to be established. Permits to emit greenhouse gases convey the right to use a

natural resource, the earth's atmosphere, as a dump for a limited period and, if the permits were sold, they would produce an income for the rights-owner. The key question is therefore: who is the rights-owner?. Is it the dump's current users, the state, or everyone on the planet? If each person's equal right to the use of the atmosphere was to be recognised, a new source of income would be created for everyone, as energy companies would have to buy the permits from the rights-holders, the general population.

Predistribution Versus Redistribution

Public policy on poverty in Ireland and Europe generally is still largely re-distributive, dispensing welfare benefits from tax revenues. New policy instruments like carbon trading open up new policy options. The current EU Emissions Trading System acts as a regressive tax with the revenue going to benefit businesses rather than the state or the people. However, carbon trading could be set up in such a way as to pre-distribute the limited rights to emit carbon/greenhouse gases to everyone, and then require businesses to buy those rights from the recipients. This would generate a citizens' income and compensate poor people for rising energy/carbon prices.

What if every adult EU resident got an equal share of whatever amount of emissions the EU as a whole had as its target under the Kyoto Treaty? This "carbon quota" could be sold at a bank or post office at the current market rate, exactly as if the permits were a foreign currency. The banks and post offices would then sell the permits on to companies importing fossil fuels into the EU and those producing them here. Importers would be required to hand over to Customs enough permits to cover the eventual emissions from the fuel in a shipment whenever one came in. Oil, gas and coal producers in the EU would be monitored by inspectors who would collect permits for the emissions that their output would produce when burned. All very simple and cheap to administer compared to the current ETS system.

Obviously, the costs of our food, fuel and everything we buy would go up under this system but, if we lived in an energy frugal way and used less energy than the average in the EU, the amount we would receive when we sold our permits would be greater than the increased energy cost. Essentially, this could be the beginning of an EU citizen's income to protect the poor.

A Grown-Up Economy

It is imperative that we use our remaining fossil fuels as capital rather than income, investing it in projects which rapidly increase our renewable energy capacity until we reach a level that is self sustaining. This process cannot be achieved in a deep global depression as, quite apart from anything else, that would reduce the price of fossil energy to levels that made the switch to renewables uneconomic again.

At the same time as investing in energy generating capacity, we have to gradually redesign our settllements, retrofit our buildings, transform our agriculture, and contain our population in order to substantially reduce total

energy demand. [vi]These objectives cannot be achieved in conditions of resource wars, famine and insecurity.

This paper has outlined three economic tools to help society make the adjustment to a renewable energy future – energy price inflation, a site value tax and a citizen's carbon quota. Other tools are required, too, including the replacement of the debt-based money system with one in which provides a stable money stock. This would be achieved[vii] by having a money which, rather than being lent into circulation by the banks, would be spent into circulation by the state and would remain in circulation until it was taxed out again. If such a money system was in place, the state would have no problem in picking up the slack if the economy was sliding into a recession by, for example, making grants to people wishing to get their houses up to a high energy standard – and thus, incidentally, keeping employment high in the building trade.

The adoption of just these four tools would set in train many of the necessary changes required for a more sustainable 'grown up' economy. We offer them to policymakers in the hope that they will use them to avoid a major economic collapse because we want our collective journey to sustainability to start from where we stand now, rather from a situation in which most people would feel desperate and helpless.

Peak oil leaves us with no option but to move to a more sustainable, renewable-energy-fuelled economy. Getting there requires taking a running jump over a yawning chasm. There are no stepping stones. The world on the other side will be very different. It has to be. Radical changes, such as the four we have suggested, are therefore required. In the present circumstances, timid incrementalism, the making of small improvements to a failing system rather than revamping it entirely, just will not work.

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[i] G.H. Brundtland, 1987, *Our Common Future,* Oxford University Press, 1987.

[ii] "In my opinion, the least bad tax is the property tax on the unimproved value of land, the Henry George argument of many, many years ago." Freidmand, Milton, (November 18, 1978) *Human Events*, p. 14; see also the *Fortune Encyclopedia of Economics*, New York: Warner Books, 1993.

[iii] For a more complete description of Land Value Tax in the Irish context see O'Siochru, Emer, (2004), "Land Value Tax: Unfinished Business", Healy,S and Reynolds,B (eds.) *A Fairer Tax system for a Fairer Ireland,* CORI Justice, pp.23-57. For a general overview see http://en.wikipedia.org/wiki/Land_Value_Tax

[iv] The case for using greenhouse emissions as the basis of a world system of energy rationing is made in *Energy Rationing and the Oil Price Crisis* (Feasta, Dublin, November 2005) Downloadable from http://www.feasta.org/energy.htm

[v] An analysis of the flaws in the EU Emissions Trading System and proposals for its reform along the lines suggested here can be found in *The Great Emissions Rights Give-Away* (Feasta, Dublin, March 2006). Downloadable from http://www.feasta.org/energy.htm.

[vi] For a more complete description of challenge and remedies re fossil fuel scarcity see Douthwaite, R,(ed.) (2003*) Before the Wells Run Dry: Ireland's Transition to Renewable Energy*, Dublin, Feasta in association with Green Books and Lilliput Press

[vii] Proposals for a complete reform of the world's money systems can be found in Douthwaite,

Richard, The Ecology of Money, Green Books, Totnes, Devon, 2006 (Revised edition). Downloadable from http://www.feasta.org/documents/moneyecology/index.htm