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Ecosocialism

# Foundations of an ecosocialist strategy

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**The following article was written especially for the latest issue of the Montréal-based journal *Nouveaux Cahiers du Socialisme* (NCS), which features a number of articles on the ecological crisis. The French text of this article as published by NCS was translated by Richard Fidler and published on his [blog](#).**

Contrary to the false but extremely popular Easter Island metaphor advanced by Jared Diamond, [1] the environmental deterioration we are now observing is not at all comparable to the damage that may have occurred in previous historical periods. The differences are not only quantitative (the seriousness and global scale of ecological problems) but also and above all qualitative. While all the environmental crises of the past stemmed from social tendencies to chronic under-production, hence the fear of shortages, the current problems originate in the converse tendency to over-production and over-consumption, which is specific to generalised commodity production.

Consequently, the expression “ecological crisis” is inappropriate. It is not nature that is in crisis, but the historically determined relationship between humanity and its environment. This crisis is not due to the intrinsic characteristics of the human species but to the mode of production that became dominant about two centuries ago “capitalism” and the modes of consumption and mobility that it entails. The serious damages to ecosystems (climate change, chemical pollution, swift decline in biodiversity, soil degradation, destruction of the tropical forest, etc.) constitute one dimension of the global systemic crisis. Together, they express the incompatibility between capitalism and respect for natural limits.

## Productivism without limits

The fundamental reason for this incompatibility is straightforward. Under the whip of competition, every owner of capital is permanently seeking to replace living labour by dead labour, that is, to replace workers with more productive machines, since the latter procure surplus profit in addition to the average profit. Needless to say, this operation would be meaningless for the capitalist if it were not accompanied by an attempt to eliminate his weaker competitors through the increase in the mass of commodities placed on the market at low prices. The innovation, in this mode of production, lies not in the reduction in the volume of labour but in the never-ending accumulation of capital.

Accordingly, the capitalist’s constant search for new fields of added value leads him to produce a never-ending quantity of useless and harmful commodities which, to produce surplus value, must constantly create increasingly artificial outlets and needs. “Productivism” “producing in order to produce” necessarily implies “consuming in order to consume” and is part of the genetic code of this mode of production, just like commodity fetishism. Capitalism, said Schumpeter, “not only never is but never can be stationary.” [2] Indeed, if capitalism were to be stationary, it would be necessary to abolish competition between the numerous capitals that make up Capital, which is obviously absurd.

But, it may be objected, if efficiency in the use of resources were to increase more rapidly than the mass of commodities produced, the expanded reproduction of capital would not be accompanied by an increased depletion of natural resources. Capitalism would then be ecologically sustainable. Indeed. That is the thesis of the decoupling between GDP growth and the ecological footprint. It is illustrated by the so-called Kuznets bell curve, according to which the environmental impact of a given society will increase to a peak, then decline with the increase in its wealth and therefore the development of its productive forces.

True, of all the modes of production that have existed in history, capitalism is the one that has most spectacularly increased the productivity of labour and thus efficiency in the use of resources. That is because the quest for surplus profit that prompts mechanisation simultaneously favours increased savings in the use of natural resources. However, this observation does not challenge the ecocidal nature of the system, and the Kuznets curve is false. On the one hand, the increase in efficiency is necessarily asymptotic, not a linear function of the increase in fixed capital – otherwise one would have to conclude that perpetual movement is possible since, if carried to an extreme, labour could be performed without loss of energy. (This glaring error was committed by the experts who assessed the share of European electricity consumption that could be covered by the Desertec solar power project in the Sahara. [3])

On the other hand, empirical observation shows that increasing the volume of production does more than offset the increase in efficiency, which is only relative. A striking example is the case of the automobile: the efficiency of the engines increases, but the global needs for hydrocarbon fuels and the greenhouse gas emissions explode as a result of the never-ending increase in the number of vehicles. Growth-obsessed capitalism inevitably implies a growing consumption of resources, which is irreconcilable with their finite nature and their rates of renewal.

The alarming increase in serious ecological problems poses the question of the theoretical limits to capitalist growth and consequently capitalist degradation of the environment. To answer this, we must clearly grasp that capital is not a thing, it is a social relation of exploitation, the development of which was historically made possible by the prior appropriation of natural resources (land, water, forests, etc.) by the ruling classes on behalf of profit. This appropriation then entailed that of the labour force, transformed into a waged commodity. The pillage of resources and exploitation of labor – when it is considered from the social standpoint – are therefore the two sides of the same coin.

However, leaving aside its social component (cooperation and its forms), human labour power can also be considered from the thermodynamic angle, as one among other natural resources (the human body is a converter of energy). In this case, pillage and exploitation are in fact but one and the same process of destruction, and surplus labour can be described as a quantity of energy monopolised by the employer.

Once this is recognised, it is possible to answer the question about the theoretical limits of capital. On the one hand, the expropriation of the direct producers, their alienation from the nourishing earth, has created a social class whose only means of subsistence is the sale of its labour power in return for a wage.

On the other hand, the worker who is hired as an employee finds ready-made, placed at his or her disposal by the employer, the necessary ingredients for his or her productive activity – tools, buildings and energy – that are directly or indirectly derived from resources taken from nature through labour or transformed by it.

In this context, and taking into account the fact that the increase in efficiency is only relative, it goes without saying that the incessant quest for surplus profits through capitalist productivism weighs on both the variable and constant fractions of capital, so that it must inevitably consume an ever-greater absolute quantity of labour power and natural resources even though it favours their relative economy. Seen in this light, Marx's enigmatic formula that capital has no limit other than capital itself simply means that this mode of production will stop on its own terms only after it has exhausted the only two sources of "all wealth: the land and the labourer." [4]

This conclusion leaves so little room for optimism that some people desperately cling to the idea that some endogenous mechanism not yet identified might block the system before it has reached this theoretical limit. However, we must resign ourselves to noting that there is nothing of the kind, nor can there be. The reason, once again, is straightforward and has to do with the fundamental laws of capitalism: this mode based exclusively on the law of labour value has as its sole purpose the production of exchange values, not use values. Since value is determined by the labour time socially necessary for production, it is obvious that capital does not have any means

that would enable it to account spontaneously for the resources that nature gratuitously puts at the disposal of humanity. The money form — the symbol and essence of value — by its very abstraction and the complete reversal of perspective that it engenders (money seems to give value to commodities, although it is commodities that give money its value) creates the illusion that unlimited material accumulation is possible.

It should be explained that capital, although it counts and measures everything, is incapable of taking natural resources into account both qualitatively and quantitatively, as is shown by the irresponsible insouciance with which it irreversibly destroys the stocks of numerous resources despite warnings of all kinds. This madness has even found its theoreticians in the person of ultraliberals who — in the face of all the evidence — defend the absurd thesis of the complete substitutability of natural resources by products of human activity.

## A political answer?

Of course, SOME capital is invested massively in the green sector of the economy, for the profits there are attractive, thanks especially to public subsidies. But “green capitalism” as such is an oxymoron. The only meaningful issue is to what degree the ecological blindness of the commodity mode of production might be offset by policy measures exogenous to the strictly economic sphere. In view of what was said earlier, the answer is obvious: the efficiency of ecological policies depends entirely on the determination with which those who advocate them dare to challenge the freedom of capital, and to construct the necessary relationship of forces to impose them (which in turn involves linking the solution of the ecological question to the struggles of the exploited: the fight against unemployment, poverty, social inequality, discrimination and deterioration of working conditions).

And this is where the shoe pinches. Tim Jackson, for example, is probably one of the non-Marxist authors who best understands the productivist logic of capitalism as the fundamental cause of environmental degradation. In *Prosperity Without Growth*, rejecting superficial explanations, he writes perceptively that “the throw-away society is not so much a consequence of consumer greed as a structural prerequisite for survival,” for the system needs to “sell more goods, to innovate continually.” [5] But Jackson sidesteps the conclusion to be drawn from his own analysis: instead of challenging the mode of production, he veers toward questioning a “desire for novelty and consumption” that in his view is part of human nature. As a result, the mountain gives forth a mouse:

[Translation]

On the ecological side, *Prosperity Without Growth* pleads for government to set harsh limits on the use of resources subject only to environmental constraints. And that is what should be done.... However, one cannot pretend to ignore, as Jackson does, that the business class successfully opposes all drastic environmental regulation, even in those cases where the need for it is questioned the least;

On the social side, Jackson has the merit of arguing for a reduction in labour time, but he subordinates this measure to the maintenance of corporate competitiveness, so no figure is assigned to it. In his view, the reduction in labour time is in fact a form of flexibility, not an immediate collective response to unemployment or a tool for redistributing the wealth produced (without reduction in wages). He envisages it only as a last resort, whenever the conversion of economists to a new “macro-economic model” would not suffice to simply displace the focal point of economic activity from the value producing sector to dematerialised services. [6]

Generally, all of the proposals advanced to politically remedy the ecosuicidal nature of capital trip over the same obstacles: the logic of profit and the class nature of the institutions. [7]

# Mirage of internalisation

Einstein is reputed to have said “We can’t solve problems by using the same kind of thinking we used when we created them.” This theorem is perfectly applicable to the idea that capitalism could embark on the path of sustainability if some political authorities assigned a price to natural resources. Since the ecological crisis is a consequence of generalised commodity production, the destruction of the environment cannot be stopped by “commodifying” water, air, carbon, genes or any other natural resource. Not only does this “internalisation of externalities” not bring us any closer to a solution, it takes us in the opposite direction. Needless to say, the transformation of natural resources into commodities implies their appropriation by capital. Accordingly, the matter is settled because capital, by subjecting them to the law of labour-value, thereby tends to remove them from any governing principle other than profit.

In any case, independently of these considerations, and even more fundamentally, attempts to assign a price to natural resources come up against an insurmountable theoretical difficulty: how to evaluate in monetary terms properties whose production is not measurable in hours of labour, and which therefore have no value, and whose destruction is, moreover, deferred in time? Liberal economists attempting to answer this puzzle squabble over the current conversion rate and question to what degree consumers are willing to pay for the environment or to accept its degradation. The price of natural resources varies, then, according to whether the persons who are questioned are wealthy or poverty-stricken. Pushed to the limit, this method clearly reveals its absurdity: what commodity value should be given to sunlight, knowing that life on Earth depends on it?

The impasse of commodity calculation appears clearly in the proposal for a carbon tax to make fossil energies more expensive than renewables and consequently reduce carbon gas emissions. As we know, to have a reasonable chance of not overly exceeding a 2°C increase in temperature from the pre-industrial era, these emissions must decrease by 80 to 95% by 2050 in the developed capitalist countries, and by 50 to 85% world-wide, with the inflection point being reached by no later than 2015. [8] These ranges “mean abandoning fossil fuels within two generations, although these energy sources account for 80% of our present energy needs (and petroleum is the raw material of the petrochemical industry).

In fact, the scope of the reductions to be achieved, given the urgency and the size of the difference in cost between fossils and renewables, is such that even a tax of \$600 a ton would not suffice (it would simply allow a reduction in global emissions by one-half by 2050, according to the International Energy Agency. [9] Then, armed with this ecological concept (before the term existed), he returned to the issue of soils in order to advance a radical programmatic perspective: abolition of the separation between town and country, the indispensable complement in his view to the gradual disappearance of the separation between manual and intellectual labour.

It must be stressed here that the expression “rational” management should not give rise to confusion. Nature, for Marx, is “the inorganic body of man.” The correct metabolism of the whole is not achieved by a bureaucracy of green technocrats but by the suppression of social classes. Indeed, the division of society renders impossible any conscious and organised mastery of exchange of matter with the environment. Not only because the drive for profit impels the bosses to pillage natural resources but also because their capitalist appropriation means that the resources are arrayed against the exploited as hostile forces from which the latter are alienated. Added to that is the competition between workers and the fear of unemployment, which encourages each, individually, to desire the profitable operation of “his” or “her” company, and thus to collaborate involuntarily in productivism. Finally, based on a certain level of development of capital, commodity consumption gives the workers a certain number of meagre compensations for their alienation from production.

None of these mechanisms can be broken except by the development of class solidarity on an ever-broader scale. That is why, for Marx, the rational regulation of the social metabolism can be realised only by the “associated

producers.” And Marx explained that it is this alone that provides “the only possible freedom.”

Although Lenin referred to it in some positions he took on the agrarian question, [10]

and Bukharin made an intelligent presentation of it in his handbook on Historical Materialism, [11] the Marxist concept of rational regulation of material exchanges subsequently sank into oblivion.

No Marxist thinker assigned it the importance it deserves, and in fact none of them saw its relevance when the ecological question became a social issue in the 1960s. This is not the place to inquire into the reasons for this discontinuity in revolutionary Marxism. [12]

Suffice it to warn the reader against simplistic interpretations: Stalinism is not the sole culprit, although in this field as well it did signify a terrible theoretical regression. [13] Rather, we will emphasise the fact that there is an urgent need to assign “Marx’s ecology” a central place in the theoretical thinking and programmatic development of the Marxists. [14]

The problem of global warming illustrates this need. The saturation of the atmosphere in CO<sub>2</sub>, mainly due to the combustion of fossil fuels “that is, a short-circuit in the long cycle of carbon” is a flagrant case of irrational management of material exchanges, and this irrationality confronts humanity with a terrible dilemma:

– On the one hand, three billion people live in disgraceful conditions. Their legitimate needs can only be met by increasing material production, and thus processing resources removed from the environment. This means consuming energy, 80% of which is of fossil origin today, a source of greenhouse gas;

– On the other hand, the climate system is on the verge of a heart attack. If we are to avoid irreversible catastrophes (the major victims of which will be among the three billion people aspiring to a dignified existence), greenhouse gas emissions must be radically reduced. This means reducing the consumption of the fossil energies now needed for the processing of the resources taken from the environment, and reducing material production.

Within the short period of 40 years now left to us, according to the IPCC “and absent an extraordinary scientific revolution in energy” there is simply no acceptable capitalist solution to these simultaneous equations. A system based on competition for profit is quite simply incapable of satisfying non-solvable human needs on a mass scale while sustainably reducing the consumption of energy and material production. Attaining either of these objectives separately is already incompatible with the logic of capital, so how can they be achieved in conjunction? That this is not possible is clear from an examination of the climate scenarios proposed by governments and international institutions.

The Blue Map scenario of the International Energy Agency, for example, aims at a reduction in global emissions of 50% by 2050. [15] It is more than probable that this objective is insufficient; in any case, it could be achieved only by massive recourse to nuclear energy, agrofuels and so-called “clean coal” (not to mention shale gas and oil sands). Blue Map would involve the construction each year, for more than forty years, of 32 nuclear power plants with a 1,000 MW capacity, and 45 new “clean” coal-fueled plants with a 500 MW capacity. There is no point in going further: the terrible catastrophe of Fukushima, Japan, is enough to show the aberration in such projects.

The strategic choice is therefore the following:

– either we leave capitalism behind by radically restricting the sphere and volume of capitalist production and

transportation, and it is possible to limit to the maximum the damages of global warming while guaranteeing a quality human development based exclusively on renewable energies within the perspective of a society based on some other economy of time;

– or we remain within the capitalist accumulation logic, and climate deregulation radically limits the right to existence of hundreds of millions of human beings, while future generations are condemned to cope with the problems originating in the project creep of some dangerous technologies.

Obviously, we will opt for the first solution, but it must be emphasised that strict environmental constraints will subject the transition to socialism to some previously unforeseen conditions. There is no over-estimating the scope of the challenge. In the European Union, for example, reducing emissions by 60% (they should be reduced by 95%!) without resort to nuclear power would necessitate a reduction of about 40% in final energy demand. [16] It is not easy to gauge the cascading implications on material production and transportation, but it seems obvious that the objective will not be achieved simply by eliminating unnecessary and harmful production (weapons, advertising, luxury yachts and private planes, etc.), fighting the planned obsolescence of products, or reducing the ostentatious consumption of the wealthiest layers of the ruling class. More radical measures will be needed, and these will have some effects on the population as a whole, at least in the developed capitalist countries. In other words, the transition to socialism must be made in conditions very different from those of the 20th century.

One indication is provided by the estimate of the share of agribusiness in total greenhouse gas emissions. According to the campaign “Ne mange pas le monde,” from 44 to 57% of greenhouse gas emissions are due to the present model of production, distribution and consumption of farm and forest products. This figure is obtained by adding together emissions due to strictly agricultural activities (11 to 15%), deforestation (15 to 18%), and the handling, transportation and storing of foods (15 to 20%) and organic residues (3 to 4%). [17]

The fight for the optimum possible climate stabilisation cannot be limited, therefore, to the expropriation of the expropriators-polluters-squanderers. The change in property relations is only the necessary “but not sufficient” condition for an extremely profound social change involving a substantial modification in social modes of consumption and mobility. These modifications “travel otherwise, eat less meat and consume seasonal vegetables, for example” must be placed in perspective now, for they are urgently needed and they have immediate implications. This is possible, for they apply cultural and ideological mechanisms that have a certain autonomy in relation to the productive base of society. Although they themselves do not involve any structural change, they must be considered an integral part of the anticapitalist alternative. To the degree that they lead to collective practices, they can promote increased consciousness and organisation.

## A new period

The Transitional Program written by Leon Trotsky in 1938 begins with the statement that “The economic prerequisite for the proletarian revolution has already in general achieved the highest point of fruition that can be reached under capitalism.” It concludes that “The objective prerequisites... have not only “ripened”; they have begun to get somewhat rotten. Without a socialist revolution, in the next historical period at that, a catastrophe threatens the whole culture of mankind.”

The founder of the Red Army refers firstly, of course, to the historical context: the victory of fascism and Nazism, the crushing of the Spanish revolution, and the imminent world war. His judgment on the putrefaction of the objective conditions, however, seems to have broader historical implications. This theme reappears, moreover, in Ernest Mandel’s writing: “Growing productive forces with growing commodity-money relationships can in fact move a society

farther from the socialist goal instead of bringing it closer.” [18] A remarkable quotation, the strategic implications of which deserve to be explored.

For this is, in fact, the unprecedented situation with which we are confronted: in the developed countries, capitalism has gone too far in the growth of the material productive forces, such that a worthy socialist alternative implies no longer an advance, but a form of retreat. (We are speaking of the material forces, and not questioning the need for developing knowledge and cooperation among producers, of course.) It is this new historical conjuncture that is expressed in the pressing need to produce and transport less, in order to consume much less energy and totally eliminate fossil CO2 emissions by the end of this century.

The fact that the development of the material productive forces has begun to move us objectively further from a socialist alternative is the major fact on which the new concept of ecosocialism is founded and justified. Far from being only a new label on the bottle, this concept introduces at least five novel aspects, which I have outlined in my book *L'impossible capitalisme vert*, and which I will briefly recall here: [19]

1. The notion of “human mastery of nature” must be abandoned. The complexity, the unknowns and the evolving nature of the biosphere involve an irreducible degree of uncertainty. The systemic social and environmental interrelationship must be conceived as a process in constant movement, as a production of nature.
2. The classic definition of socialism must be completed. The only possible socialism now is one that satisfies actual human needs (freed from commodity alienation), democratically determined by the interested parties themselves within the limits of the resources and by carefully questioning the environmental impact of these needs and the way in which they are satisfied.
3. It is necessary to go beyond the compartmentalised, utilitarian and linear vision of nature as the physical platform on which humanity operates, as the store from which it draws the necessary resources in the production of its social existence, and as the dump in which it unloads its garbage. Nature is at once the platform, the store, the waste receptacle and the set of living processes which, thanks to the contribution of solar energy, circulate material between these poles while constantly reorganising it. Wastes and their mode of deposit must therefore be compatible in quantity and quality with the capacities and rhythms of recycling by the ecosystems. In other words, the proper functioning of the whole depends on biodiversity, which must be protected.
4. Energy sources and the methods of conversion that are used are not socially neutral. Socialism, consequently, cannot be defined, as Lenin did, as “soviets plus electricity.” The capitalist energy system is centralised, anarchic, wasteful, inefficient, dead-labour intensive, based on non-renewable sources and oriented toward accumulation. A socialist transformation worthy of the name necessitates its gradual replacement by a decentralised, planned, thrifty, efficient, living-labour intensive system, based exclusively on renewable sources and oriented toward the production of durable, recyclable and reusable use-values. This concerns not only the production of energy in the narrow sense but the entire industrial apparatus, agriculture, transportation, recreation, and land development and planning. This extremely profound transformation can only be achieved on a world scale.
5. Going beyond the threshold from which the growth in the material forces of production complicates the passage to socialism involves a critical attitude toward increasing the productivity of labour. In a number of fields the implementation of an anticapitalist alternative respectful of ecological balances necessitates the replacement of dead labour by living labour. This is clearly the case in agriculture, where the ultra-mechanised agribusiness system, a huge consumer of inputs and fossil energy, will have to give way to another mode of operation that is more intensive in human labour. This applies as well to the energy sector, for decentralised production based on renewables will necessitate a lot of work, particularly in maintenance.



Generally speaking, the quantity of living labour must increase radically in all fields directly linked to the environment. A parallel can be drawn with personal care, education and other sectors in which the left considers the development of public employment as a given: human intelligence and emotion, combined in a culture of “care-taking,” are in fact necessary in matters directly pertaining to interaction with the biosphere.

Some dogmatic minds will fear that these thoughts open the door to a revision of revolutionary Marxism in the form of concessions to the austerity offensive against the working class in the developed countries. There is no truth to this. It is not a question of yielding the least parcel of terrain to the guilt-tripping discourses that use the ecological crisis to try to disarm the labour movement and its representatives.

One line of demarcation between ecosocialism, on the one hand, and the political ecology of degrowth, on the other, is the attitude toward the class struggle. We remain firmly convinced that the exploited learn through the experience of collective struggles, which begin with the defense of wages, jobs, and working conditions. Every struggle of the workers, even the most immediate, must be supported and considered as an opportunity to increase consciousness and orient it toward a socialist perspective.

Within this strategic framework, the observation that the socialist transition must now operate under environmental constraint does not weaken anticapitalist convictions; on the contrary, it reinforces them. However, only the truth is revolutionary. We cannot hide the fact that the socialist transformation will very probably involve renouncing certain goods, services and habits that profoundly influence the daily life of broad layers of the population, at least in the developed capitalist countries.

The task, then, is to advocate objectives capable of compensating this loss by a substantial advance in the quality of life. In our view, the priority should be given to the pursuit of two such objectives: (1) gratuity of basic goods (water, energy, mobility) up to an average social volume (which implies the extension of the public sector); (2) a radical reduction (50%) in working time, without loss of salary, with proportional hiring and a decrease in the pace of work.

In the last instance, said Marx, all economics comes down to economy of time. To affirm the necessity of producing and consuming less is to demand the time to live, and to live better. It is to open a fundamental debate on the mastery of social time, on what is necessary and to whom, why, and in what quantities. It is to awaken the collective desire for a world without wars, in which we work less and otherwise, in which we pollute less, in which we develop social relations, in which we substantially improve welfare, public health, education and democratic participation. A world in which the associated producers re-learn how to “dialogue” collectively with nature. That world will not be less rich than the present world (as the Right says), nor “as rich for the great majority of the population” (as a certain Left says). It will be infinitely less futile, less stressed, less hurried — in a word, richer.

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[1] Jared Diamond, *Collapse: How Societies Choose to Fail or Survive* (London: Penguin Books, 2005). Among the criticisms of Diamond's thesis, see Benny Peiser, “From ecocide to genocide: The rape of Rapa Nui,” *Energy and Environment*, Vol. 16, No. 3-4 (2005); Terry L. Hunt, “Rethinking Easter Island's ecological catastrophe,” *Journal of Archaeological Science*, No. 34, pp. 485-502 (2007); and Daniel Tanuro, “Catastrophes écologiques d'hier et d'aujourd'hui: la fausse métaphore de l'Île de Pâques,” *Critique Communiste*, No. 185 (December 2007)

[2] Joseph Schumpeter, *Capitalism, Socialism and Democracy*, 3rd ed. (Harper Perennial Modern Classics, 2008).

[3] L. Possoz and H. Jeanmart, “Comments on the electricity demand scenario in two studies from the DLR: MED-CSP & TRANS-CSP,” ORMEE & MITEC engineering consultancy, Belgium, on-line at <http://tinyurl.com/65fzvqs>.

[4] Karl Marx, *Capital*, vol. I, section 10.

[5] Tim Jackson, *Prosperity without Growth: Economics for a Finite Planet* (Earthscan, 2009)

[6] Daniel Tanuro, "Prospérité sans croissance": un ouvrage sous tension".

[7] This applies, in particular, to the proposal for alternative or complementary indicators of GDP. Clearly, GDP does not measure the quality of the environment; that is not its purpose, nor the purpose of capitalism. GDP measures the accumulation of capital. It is therefore perfectly adapted to capitalism. To claim that altering the measurement tool would suffice to change the logic of the system is evidence of naïveté if not intellectual fraud

[8] [Intergovernmental Panel on Climate ...](#).

[9] [IEA, Energy Technology Perspectives...](#)] Since the combustion of a thousand litres of fuel oil produces 2.7 tons of CO<sub>2</sub>, it is understandable that such a measure would be socially inapplicable in reality: employers could accept this only if it were wholly transferred to the ultimate consumers, while the majority of the population, infuriated by the austerity that has prevailed for 30 years, will obviously oppose any such deterioration in its conditions of existence.

That is why, in practice, and notwithstanding all the sophisticated theories of ecological economics, the policy proposals for internalisation of the costs of pollution are both ecologically insufficient and socially unsustainable. Supposing that the theoretical and practical obstacles can be lifted, the effectiveness of internalisation would remain unpredictable because price is a purely quantitative indicator, incapable of capturing the qualitative differences between tons of CO<sub>2</sub> avoided by methods as different as the insulation of a home, installation of photovoltaic panels, a tree plantation, or the suppression of a Formula One Grand Prix. Quantitatively, there is nothing to distinguish one ton of CO<sub>2</sub> from another. But the qualitative differences are decisive in developing adequate ecological strategies in which the means implemented are consistent with the end — the passage without social destruction to an energy sparing and decentralised system based solely on renewable sources.

## Rational management of the metabolism and class struggle

The ecosuicidal nature of capital has been a reality since the beginning of this mode of production. In the 19th century the founder of soil chemistry, Liebig, was already sounding the alarm: as a result of capitalist urbanisation, human excrements no longer returned to the field, and this break in the nutrient cycle threatened to cause serious impoverishment of the soil. In the course of his work, Marx raised the issue to the conceptual plane by posing the general need "to govern the human metabolism with nature in a rational way." [Marx, *Capital*, Vol. 3 (New York: Vintage, 1981), p. 959.

[10] V.I. Lenin, *The Agrarian Question and the "Critics of Marx"*, chapter IV.

[11] Nicholae Bukharin, *Historical Materialism, A System of Sociology* (New York, 1965)

[12] Daniel Tanuro, "Marxism, energy and ecology: The moment of truth", *Capitalism Nature Socialism*, December 2010, pp. 89-101.

[13] Daniel Tanuro, "Le lourd héritage de Léon Trotsky"

[14] See J.B. Foster, *Marx's Ecology: Materialism and Nature* (New York, 2000).

[15] IEA, op. cit.

[16] Wolfram Krevitt, Uwe Klann, Stefan Kronshage, *Energy Revolution. A Sustainable Pathway to a Clean Energy Future for Europe* (Stuttgart: Institute of Technical Thermodynamics & Greenpeace, September 2005).

[17] Reported by Esther Vivas, "«Ne mange pas le monde»: Une autre agriculture pour un autre climat," French translation of an article published in the Catalan daily *Publico*.

[18] Ernest Mandel, "[Ten Theses on the Social and Econom...](#)

[19] Daniel Tanuro, L'impossible capitalisme vert (Paris: La Découverte, 2010)