

RENEWABLE ENERGY: NOT ONLY A QUESTION OF WHEN BUT OF HOW! *

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This paper is about a particular friend of mine, the solar collector located right behind me, on the roof terrace of a little house in Spain, on the Costa Blanca. She (the solar collector is so generous in bringing forth what nature has to offer that I assume it must be a she) arrived three years ago, has been standing there ever since, and the following little story is about her glorious present, mingled with my worries about her future. It is organized in ten points - with an epilogue.

(1) The basic fact is, of course, that the solar collector delivers the goods: hot water for washing floors and dishes and bodies, and - led through a serpentine cemented into the floor of one room - for heating a room. The water comes out at about 60° C. A normal shower is replaced with 15 minutes sunshine. After three successive days of clouds - it happens also here, in winter-time - one collector does not suffice to do both the hot water and the heated floor jobs; one has to choose between one or the other (one can heat the floor, though, and then switch on to heating water while the floor keeps the heat for some time; but the problem is that floor heating is needed at night when there is no sun). As is well known, even when cloudy, the sun manages

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to heat the water in a good collector, but, as the dealer said, apologetically: moonlight does not help. As water heating was a major part of the electricity bill, it is not strange that the bill was cut by about two-thirds after she arrived. The cost: about SF1,500, guaranteed for 10 years, and it is paying for itself already. One more collector and we would have an abundance of energy, but this is enough.

(2) All of this, of course, is the usual story, so let me now try to explore less obvious aspects of our relations with the collector. And the first one is simply this: there is almost no relation at all! She is so quiet and patient, just standing there, soaking in the abundant and highly renewable energy flowing from Mother Sun through her thick, protective glass-cover, into the black surface and the pipes, the tank hovering over it, adding to this by reflecting some extra sunshine. Not a sound. From electric installations, once in a while, there is a certain humming - not from her. All that is needed is a little dedusting every so often, perhaps washing her down once a month to permit maximum absorption. Not a part to change, possibly because of very little that is moving and very solid materials. Also, this is a part of Europe with no frost during winters - that helps (but if there is frost, the heater can, of course, be installed in the roof so as to receive some heating from below; but that probably has to be built into the house from the construction; otherwise, costs may become prohibitive).

(3) But this does not mean that the solar collector has no soul; only that the soul relates to the sun rather than to us directly, thereby bringing us closer to nature. Obviously, the daily and the annual solar rhythms are reflected in the solar collector. Concretely, this means that a high number of showers should be taken while the sun can still replenish, so that there is enough hot water for late evening and early morning purposes. It also means different practices at different times of the year, as indicated above. There is no problem in this unless one is hooked up on the idea of absolutely invariant supply of energy. And there is a great advantage: somehow one gets more sensitive to nature again, particularly at wintertime, peeping out of the window to see what kind of energy practice is needed, translating that into action, almost unconsciously.

(4) So, there is a concept of LIMITS. The energy is renewable at the solar collector level but not limitless. Of course there is also a concept of limits in ordinary household electric supply: plug in too many things and the fuses protest (or things burning). Man becomes accountable to THINGS, to TECHNOLOGY. In the relation to the solar collector, we become accountable to the sun, to NATURE. We make use of nature without depleting or destroying (provided the collectors are made in an appropriate way); but the condition for this is a certain willingness to subordinate ourselves to nature's own rhythm. And we get an extra benefit:

there is, in addition to very little depletion, no pollution: no poisonous, noxious fumes, no rusty things lying around, no expended batteries, no broken bulbs, and so on. Not bad.

(5) At this point there has been so much praise that an element of criticism has to be added: she is rather ungainly. Much of the alternative energy movement has been devoid of any excessive concern with aesthetics, or so it seems. The point has been to show that it works, and finishing, designs that are pleasant to the eye have probably been seen more as the marketing tricks of (trans)national corporations than as something also important, as can be seen in the way tools and art used to go hand in hand in human society before the artificial division of labor between "work" and "art" came about. As soon as possible, this should be corrected for, not by bringing in the kind of finish designed to conceal construction errors or to mystify by making the precise working of the tool less immediately comprehensible. So, there is room for progress - the aesthetic phase should have been reached by now, bringing in popular, not only bourgeois art.

(6) In short, the enthusiastic report of a happy Northerner in a Southern (to us) Mediterranean country. And this raises the interesting question: what about Norwegians in Norway, and what about Spaniards in Spain; why should this report come from a Norwegian in Spain? The answer is obvious, or so it seems: there

is a very different attitude to the sun. Spaniards complain already from 10 a.m. onwards about the summer sun; Norwegians love it, sit outside, go to the beach, seek the sun, the sun goddess, that is. Spaniards seem to come out around 9 p.m., when somebody reports it is cool outside; by that time, the Norwegians are likely to be indoors, counting the hours to next day's basking in the sun, in spite of a burning skin, an overheated body. So of course we love the idea of seeking the sun, even in the form of packing her lovingly into a solar collector; the Spaniards seem to see the sun more as something one wants to keep at the distance, lest one gets hurt (compare the shade-side versus the sun-side prices at a corrida). That the sun could solve so much of the energy problem would seem odd: the sun is so abundant, so fierce, also so rural, something the lower classes have to be close to because of their outdoor work. It is not something for the educated, the rich, the urban, the modern, although this is changing: to have a tan in the cities, particularly in winter time, now has considerable snob appeal. But for most people in Spain and in the third world there is something old-fashioned about the sun, something not up-to-date. Electricity out of a socket is up-to-date, hence preferable. However, the rising prices of the latter and the subsidies for the former, not to mention the tendency to imitate countries more to the North, will change all of this and bring the solar energy into a country that has so much of it, perhaps even before Norway comes much further in using alternative sources, more difficult in a country of clouds and frost.

(7) And yet this is not the problem I see for the future. I am not the slightest worried that this fabulous type of renewable energy will not be made use of - or all the others for that matter. My concern is with how they will be used. Energy converted into a form that can be used to satisfy human needs is a product, and like all products it can be produced with various amounts of nature, capital, labour, research and organization. As we are talking here of renewable energy let us assume that the production does not require much in terms of this factor (although this is by no means obvious - if the hardware built around it is highly depleting all that has happened would be that the depletion has been transferred from, say, oil, to, say, some metal). The basic choice is between the two by now classical profiles:^{1/}

"Modern": capital, research, organization high, labour low

"Traditional": capital, research, organization low, labour high

I think the basic problem about the solar collector can be described very simply: it works, and yet it is not modern, it is not according to the structure preferred by big capital, big research and big organization, meaning bureaucracy. If it had not worked so well there would have been no problem: the Big Three could have come to the rescue, in the form of a transnational corporation, or a national one for that matter, governmental and/or private. Energy being so crucial, a satisfier lying under neath so much of our needs-satisfaction, there is small wonder that the Big Three

^{1/}The author's study for UNCTAD/UNEP, Development, Environment Technology, Geneva, UNCTAD, 1979 is a relatively detailed exploration of this type of theme. It should be noted that some left-wing intellectuals would have a tendency to see it in terms of "capital-intensive" vs. "labour-intensive" only, thereby becoming blind to the workings of big research and big organization, e.g. in the state or government.

would like to exercise a monopoly on it, to have it under their control. They all want to be seen as the providers, and as indispensable. But this solar collector can be produced very locally (although it does require good workmanship), can be "consumed" locally, is very simple to make and understand, and does not require any administration to speak of. It simply works. So, the question is: why should the Big Three not leave it at that, why should they want to change such a state of affairs? And, equally significantly: how can they go about it, what would be their strategies, their arguments? Let us try to look at them, and from a worst case analysis.

(8) To start with capital, meaning the energy corporations: they obviously have a stake in this. Sooner or later this becomes competitive for sufficiently many, particularly if people remain unconvinced that nuclear energy is neither dangerous, nor depleting, nor polluting. The tremendous investment they have made in other sources of energy are thereby threatened: they may render unacceptable returns by being decreasingly competitive. The answer, of course, would be to make money on the alternative forms of energy, but only after having amortized the old equipment and gotten out of it as much return as possible. Hence, the rate of growth of the alternative has to be subjected to two important constraints: relative to amortization of the old equipment, and it should not be permitted to grow into a pattern of local self-reliance, convincingly competitive with more centralized forms. It has to be stamped out as "unrealistic", "romantic", etc., till the form has been found that can be brought on a normal form, i.e. centralized, controlled by the Big Three. Then it will become "realistic".

To achieve this capital can do at least three things: control the source of the energy, control the transformer and/or control the energy flow. The former is difficult but not as much a piece of science fiction as it may sound: ideally the energy (former oil) corporations might like to buy up the sun, "in order to develop it and harness these forces in the service of mankind", and then charge everybody who in one way or the other makes use of solar energy, meaning the whole planet. This is what they did earlier this century with the oil fields in the Gulf area, so both the mentality and the pattern are there. But there is the difficulty of preventing others from using sunshine. In the Gulf area this was done through more or less colonial arrangements, meaning through monopolistic control (through the colonization of space) and allegedly better than solar energy: some kind of micro-wave approach. So, this approach may be just around the corner.

Next in line, then, is the idea of monopoly on the solar collectors through the usual approach of outcompeting all small producers till a point has come where the big solar corporations can set the price they want, and justify it by some additional frills built onto or into the gadget, unasked for by the consumer. Another version would be a tax on them so as to make them less competitive in a transition period, after a sufficient number of people have been lured into buying them through a policy of subsidization.

Then, finally, there is the control of the flow itself by having a meter and payment as a monotone function of the consumption, not necessarily linear but so as to benefit the big consumers who have more "need" (meaning demand). In this connexion it is not so important whether the end consumer metered is a village, a block, a household or even the individual (few families would get that far with their family members, it seems); the point is the meter inserted between producer (meaning transformer) and consumer. For that to be possible the producer has to be away from the consumer, and the logical pattern would be the centralized energy transformation supplying to a network branching out to a set of consumers - like the electric grid model. The latter is rather natural if the source is a big waterfall, thermo- or nuclear-electric plant; considerably less justifiable for countries with many and small waterfalls (Switzerland), not at all justifiable for countries with many and small windmills (operating 12V systems sufficient for lighting purposes and easy to operate by amateurs, among other reasons because the energy can be stored in conventional accumulators, car batteries). Unfortunately, big waterfall hydro-electric plants have set a highly centralizing pattern that has stimulated the growth of structures now grasping for reinforcement.

It should be pointed out that these three approaches do not exclude each other. The corporations may also have a rent-a-collector system (as they have a rent-a-car system) and then install a meter on it, although time use may be more practical. The basic point in all these cases, however, would be to find the form that does not threaten the current structure, including the current structure and process of capital accumulation.

(9) The interest of research is in the same general direction: not to become dispensable, superfluous. For that reason the solar collector must not be too simple. And there are enough problems to wrestle with, such as imitating sunflowers in trying to make them always face the sun for maximum absorption and other problems of maximization/optimization. It should be noted that all such solutions in the spirit of generalizing, universal science are at the same time formulas for general, standardized production and hence precisely what is needed by corporations wanting to out-compete the local and artisanal, and quite ready to make losses in some districts in order to gain world market control. But above all research would be at the disposal of those who want to find adequate answers to how to make this system centralized and hierarchical, and that would certainly require research inputs far beyond what can be commanded at local, even national levels.

(10) The interest of organization, bureaucracy, government is complex, but there are certain obvious aspects. Thus, there would be no denial of the need for governmental steering in order to have a coordinated national policy, steering energy and economic surplus from the more to the less advantaged districts - including across national borders. One governmental argument (and also an argument of private large corporations in the energy field) would be that saving from alternative energy sources deprives the corporations of income and hence of surplus that could be used to bring energy to periphery districts. The argument gains in strength because

solar energy probably starts with resourceful people in center districts - but a counter-argument could be that what is good for the center is also good for the periphery - why should not they also have solar energy based on local self-reliance?

The government argument goes further, however. There is the wish to be l'état providence. But providence is often revengeful: a government in control of the energy switch centrally may also switch it off - and use this as a weapon not only against foreign invaders, but also against their internal enemies, e.g. a district with high level of subversive activity (as defined by the government). And then there is the obvious consequence of having (near) monopoly on a fundamental good with almost inelastic demand: the producer can decide the price, and put the prices up. The government will not see this as a search for profit, it will be referred to as taxation if it goes beyond covering expenditure, and there will be economists available to tell that this fiscal measure is necessary to steer the economy as a whole. The consumer has the poor choice between paying the price or live without energy available for the many purposes of modern life. Thus, the gasoline price structure should be seen as a refined collusion between producer countries, energy corporations and governments in consumer countries in using this monopoly skillfully - the governments actually accounting, in general, for the highest percentage of the price composition.

Obviously this works only as long as the consumer has no alternative. A government bent on preserving its monopoly for the purposes mentioned above will therefore easily be tempted to try to destroy alternatives for the consumer. In the case of the solar collector there are many obvious methods that can be used:

- put taxes on the solar collector so that they are priced outside the competitive range
- try to define them as dangerous so that they have to be outlawed after the inevitable accident occurs (such accidents can also be arranged). Make installation very costly to comply with "standards"

Needless to say, in all of this the government can cooperate with big energy corporations. Even a socialist or social democratic government may do so, even if it is sceptical of the profit motive of the energy corporation, for two very simple reasons: those who operate from a position of bigness - state, capital or research - tend to believe in bigness in general; centralization, even in the hands of private corporations, gives more power to central government, particularly if that government has a mandate to have the upper-hand over business (which is exactly the reason why socialist and social democratic régimes may be even more accommodating to the wishes of big business); and governments will tend to prefer to deal with a limited number of producers (of energy) and not with an unrely association of very loosely coordinated small scale, local energy converters. And on top of this, then, comes the basic

argument common to all states: they are not primarily organizations for the satisfaction of basic human needs or any such thing. They are organizations out to build strong countries rather than strong states - and they see energy demand in terms of competitive industry and military machines. And for many such purposes the alternative approaches are not (yet) adequate - they are closer to basic human needs.

Epilogue

So, there we stand. To repeat: we are far beyond the problem of arguing in favour of renewable as opposed to non-renewable sources of energy. That battle has been won^a long time ago - the arguments are more than good enough. The problem is how, and the argument above is that this is a question of power. Power (in the energetic sense) is Power (in the political sense). Big capital (corporations), big research and big organization (government) know this very well; the small scale experimenter in the rich or poor countries may be less aware of it. He may be confused by the ambivalence of the establishment to his alternative sources: on the one hand, curiosity, even support (subsidies); on the other hand, a flow of reports saying it is unrealistic, romantic, etc. Much of that argumentation is easily refuted:

- the argument that solar energy does not satisfy all energy needs is like rejecting medical science because it does not cure cancer. It may later (the first airplane has already crossed the Channel powered by solar energy); besides it is only one part of a very comprehensive energy package with renewable sources.

- the argument that solar collectors will have to be this or that big to cover the demands is totally fallacious: this presupposes that the demand is constant and something not to be criticized; the vision of an enormous surface covered by solar cells presupposes the central solar park rather than small individual producers, essentially for own consumption.

Better is the argument that this fragmentation of energy production may become irrational: too much energy is produced (too much water heated) and there is no way of channeling the surplus to the places of deficit in a fragmented system. This, however, can often best be solved at the local level with equalizers between neighbouring houses, blocks, villages (which would presuppose either metering or a high level of collective spirit of sharing - both of them problematic).

However, the argument is not necessarily in terms of centralized versus decentralized modes of energy conversion - it could also be both-and. But this both-and presupposes that the centralized mode does not try to wipe out the decentralized mode of energy conversion. As stated above this is a question of power, or more precisely of countervailing power, and I am not too optimistic for the majority of the countries of the world. The Big Three are greedy, and they have power and are paid attention too.

But there are some modes of countervailing power that can be used and will be used.

First, simply to understand what is going on. When an oil corporation encourages a government to put very heavy taxes on a stove designed to burn turf it is rather obvious what is going on. When transnational and intergovernmental research focuses on optimal solar converters that can be mass produced by rich industrialized countries (in search of new export products) it may be less obvious what is going on. Hence, the whole issue should be studied with great attentiveness.

Second, to go quickly ahead with alternative energy sources such as solar collectors to build up popular pressure to keep this option also at the local level. If the government wants to tax them out of existence it is easier to say no when one is many than when one is few. Compare Gandhi and the Salt Tax in India!

Third, to establish, as some kind of human right the right to be self-reliant, including the local level, and including the right to be self-sufficient in a field so important as energy. A certain protection is needed to go ahead experimenting, and the Big Three were not the ones to launch the alternative sources. That came from the corners of society, from alternative people with alternative ideas - bringing the idea far enough for researchers

to work out details - without denying that academic researchers also often make great innovations. The problem is how to make them work side by side if one has all the power and money and the other has mainly enthusiasm and idealism and intuition because it attracts people who are more sensitive, have longer antennae into the future - although they certainly also may go wrong. But if they go wrong it is less dangerous: small-scale technology leads to small-scale errors and disasters in most cases (slash-and-burn cultivation being an example to the contrary).

Back to the solar collector on the terrace - will she survive? When will the first counter-attacks come? According to the ideas developed above: when the Big Three are ready, when they have a form that can make it possible to incorporate renewable energy on their terms. At that point studies will be presented showing how the small is in the way of the big. If they can be declared dangerous so much the better: it becomes like the little basement distillery for home-made liquor, rather popular with Norwegians but not with the Norwegian State wine monopoly that, of course, has managed to stamp it out as illegal, thereby making the sale of highly taxed liquor (again with a rather inelastic demand) highly profitable to the government. Today it is difficult to imagine how the solar collector can be declared dangerous - she looks rather peaceful - but I am afraid that only betrays lack of imagination on my side.

But let us promote and enjoy as long as we can. It is not only good to nature, it brings us closer to nature. It is undeniably economical and effective. It is a... To chart

it is already a realistic option because it is realistic for people even if certain types of big organizations have difficulties. So, if it is unrealistic to them, may be this is because there is something wrong with them and not necessarily with renewable sources of energy in general and solar collectors in particular? We shall see - the energy field will continue being a very revealing part of politics still for a very long time to come.