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Chapter 4: Emerging Alternatives

In the preceding chapter, I discussed doctrinal debates between economists and the growing trend towards rejecting economic dogma when it gets in the way of understanding reality. In this chapter, I will consider alternatives to the prevailing economic dogma that take contemporary social reality and new ways of thinking and acting as their starting point. I will identify four strands of thought, each of which is related to new practices. In each of these trends, we can see economics beginning to merge with governance, thus setting the stage for the issues that I will consider shortly.

The four strands are: the economics of well-being; economics for a responsible, plural, and united world; the economics of reducing materials and energy dependence; and the intersection between economics and territorial ecology.

1. From an Accumulative Economy to an Economy of Happiness

What kind of wealth do we produce? According to what logic? And for what purpose?

Since the seventies, many studies have called attention to how poorly gross national product reflects the degree of development a society has reached. Studies seeking to measure "gross happiness" have flourished. The success of Patrick Viveret's book, *Reconsidering Wealth (Reconsidérer la richesse),* indicates the extent of contemporary interest in the topic. Let us not

forget that the U.S. Declaration of Independence claims that the "pursuit of happiness" is a right shared by all.

In the twentieth century, the efforts of communist regimes to impose happiness on their citizens "from above" inhibited for a long time all serious reflection about the social conditions of well-being. Today, the desire for material possessions, far from being, as it was for fifteenth-century moralists, the least dangerous of passions, is fast becoming humanity's most dangerous need. Hence the vigorous new thinking on well-being, which the degradation of natural and cultural capital makes all the more understandable. Economics measures profits, but forgets to measure losses.

In their essay Gary Gardner and Erik Assadourian say the following about well-being (drawing in particular on Canadian examples): "In shorthand form, the term essentially denotes a high quality of life in which daily activities unfold more deliberately and with less stress. Societies focused on well-being involve more interaction with family, friends, and neighbors, a more direct experience of nature, and more attention to finding fulfillment and creative expression than in accumulating goods. They emphasize lifestyles that avoid abusing your own health, other people, or the natural world. In short, they yield a deeper sense of satisfaction with life than many people report experiencing today."[1] They add: "The disconnection between money and happiness in wealthy countries is perhaps most clearly illustrated when growth in income in industrial countries is plotted against levels of happiness. In the United States, for example, the average person's income more than doubled between 1957 and 2002, yet the share of people reporting themselves to be 'very happy' over that period remained static."[2] This point of view obviously needs to be nuanced, as they readily admit: "Not surprisingly, the relationship

[1] Gary Gardner and Erik Assadourian, "Rethinking the Good Life," in *State of the World 2004: A Worldwatch Institute Report on Progress Toward a Sustainable Society* (New York: W. W. Norton, 2004), 165.
[2] Ibid., 165-166.

between wealth and life satisfaction is different in poor countries. There, income and well-being are indeed coupled, probably because more of a poor person's income is used to meet basic needs […]. Findings from the World Values Survey, a set of surveys of life satisfaction in more than 65 countries conducted between 1990 and 2000, indicate that income and happiness track well until about $13,000 of annual income per person (in 1995 purchasing power parity). After that, additional income appears to yield only modest additions in self-reported happiness."[3]

In the United Kingdom, this way of thinking was popularized by the "Well-being Manifesto" published by the New Economic Foundation, an independent think tank founded in 1986, which has taken an active role in proposing new economic paradigms.[4] The manifesto's starting point is an observation about the United States very similar to Gardner's and Assadourian's. Studies prove that satisfaction with life stagnated for thirty years, between 1973 and 2002, even as gross national product practically doubled. We now have many comparative studies on well-being. The manifesto states: "For most of human history, trying to understand what led to well-being was the stuff of philosophy or poetry. Recently, however, some psychologists and sociologists have finally turned away from studying illness and dysfunctionality and begun to study well-being, happiness, and flourishing. The results have profound implications for individuals and for government." The manifesto seeks to answer the following question: "what would politics look like if promoting people's well-being was one of government's main aims?" In developed countries, the conventional answer to this question relied heavily on economic growth: "The logic to this is that by increasing national and individual incomes, people have more choices about how they should lead their lives. Psychologists, however, have thrown a large spanner in the works. The relationship between

[3] Ibid., 166.
[4] The New Economics Foundation, 2004. http://www.neweconomics.org/gen.

economic prosperity and both individual and social well-being in developed countries seems to have broken down." Later, they note: "US research [Lykken,1999 and Schkade, 2003] suggests that there are three main influences." They distinguish three types of factors: a "predisposition to happiness," resulting both from genetics and education, which accounts for 50% of the results; "life circumstances," which includes factors ranging from weather to income, and which accounts for a mere 10% of our well-being; and, finally, "intentional activities," which, as I see it, could be described as the compatibility between what we do and what we believe; it includes sociability and the pleasures we take in life. This latter factor accounts for about 40% of the results. We could debate the way these measures were taken, as well as the culturally relative character of such studies. But the trends they identify are so overwhelming that they can scarcely be challenged. They have the great merit of reminding us that economics and the production of material resources must not be self-referential. The ends of these activities lie beyond them.

Below is a stunning chart from 2003 by Veen Hoven (from the NEF's manifesto). It is based on the world happiness database. The X axis shows per capita income in each country. The Y axis indicates a happiness index (I am not sure on what it is based).

[Chart]

The results are quite remarkable. They qualify and complete Gardner's and Assadourian's observations on the relationship between income and wealth in developing countries. Two axes are apparent: the first consists of countries where per capital GNP and happiness are correlated; the second ranks the vast number of poorer countries according to the happiness index. For comparable income levels, Moldova and the Ukraine are the least happy,

while Colombia (despite its civil wars), Costa Rica, and Guinea are the most. These results, in any event, provide serious food for economic thought.

2. Towards a Responsible, Plural, and United Economy

I will now turn to the work of an international network that was born in the late nineties as an offshoot of the Alliance for a Responsible, Plural, and United World,[5] and which has been supported by the Charles Léopold Mayer Foundation for Human Progress. This network, which consists of several hundred activists and academics, became in 2008 the Alliance for a Responsible, Plural, and United Economy (or ALOE, according to its French acronym). Its name indicates its purpose: the network seeks not so much to advance economics as a discipline as to promote, in the realms of production, exchange, and consumption, new practices based on the principles of responsibility and solidarity. The effects of our actions as producers, businessmen, or consumers on our neighbors, on our communities, on people located at the other end of a production chain (who may be thousands of miles away), and on our immediate environment matter to us. We must not trust the market's "invisible hand" to ensure that actions driven by our selfish needs alone will miraculously bring about the happiness of all.

The ALOE does not advocate replacing the existing production and exchange system or the market economy with a comprehensive alternative. Rather, it pleads for a plural economy, in which the traditional economy coexists with a social and solidarity economy, based on different principles and resting on different organizational structures. Thanks to this attitude, the ALOE, known until 2007 as the Alliance's "Workgroup on Solidarity Socio-Economy,"[6] played a

[5] See www.alliance21.org.
[6] See www.socioeco.org/fr

significant role in connecting different movements promoting a "social and solidarity economy" but that tended to focus on their own pet projects: microcredit, the social responsibility of economic actors, social money, local exchange systems, fair trade, responsible tourism, or women's role in the economy. These networks, moreover, are tied to what in France is known as *l'économie solidaire* (solidarity economy), the principle theorist of which is Jean-Louis Laville, who studies the various economic activities and services that are based on the principles of self-organization and reciprocity.[7]

In this way, following a trend similar to one seen in Latin America, the ALOE makes no distinction between the nineteenth-century idea of "social economy" and that of "solidarity economy," which, though of more recent vintage, seeks to revive "social economy's" founding principles.

My intention is not to justify the ALOE's work, but rather to identify those elements of its thought that could contribute to a renewal of economic thought. It is worth noting, incidentally, that this movement speaks of "socio-economics" rather than "economics," in order to emphasize that economic behavior is not a separate realm of social life.

Social economy arose out of the major nineteenth-century cooperative and mutualist movements. These movements gave birth not only to productive cooperatives, but more importantly to mutual companies in the realms of banking, insurance, and health care.

In France, Europe, and even the world, the role played by the social economy, which creates economic institutions owned by their beneficiaries (like mutual health insurance companies) or by their employees (like production cooperatives), is by no means marginal. In

[7] In *Le Dictionnaire de l'autre économie*, edited by Jean-Louis Laville and Antonio David Cattani (Desclée de Brouwer, 2005), one finds a thorough overview of this movement's key ideas.

Europe, according to the Center for Young Leaders and Actors of the Social Economy (*Centre des jeunes dirigeants et acteurs de l'économie sociale* [CJDES]), it employs 8-10% of the workforce. Far from receding, it is on the rise, as a result of the increasing role played by associations in banking, insurance, and retail. Production cooperatives, after declining, are now experiencing modest growth.

Examples of social economy, moreover, can be found throughout the world, especially in health and agriculture. It is spreading to banking and insurance. In the European Union (to use figures from when there will still fifteen members, as current ones are lacking), 260 million people were affected by the social economy, notably through their insurance policies often without realizing it. The fact that people do not realize it is significant. A consequence of social economy's success is that its ties to the ideology and activism that created it have weakened, particularly in the larger mutual companies. When we choose a mutual company to insure our car, we do not consciously endorse the idea of solidarity or opt to participate in the company's management. In service industries like banking, major mutual companies compete with other banks. Competition has more bearing on the quality of the services they offer than ideology. Even in Quebec, where the Desjardins saving banks are a genuine social phenomenon, central both to Quebec's identity and to the quiet revolution of the sixties, former president Claude Beland concedes that it is difficult to preserve the activist spirit, which is rooted in social Christianity, both among employees, whose primary goal is to participate in the consumerism made possible by Quebec's prosperity, and among clients. The same difficulties are found in French agricultural cooperatives. They are the offspring of a venerable cooperative tradition; yet these days, their livelihood depends on selling fertilizer and phytosanitary products. Over the years, they have at times become one of agribusiness's staunchest allies. This is a lesson we must

retain as we begin to think about the institutional frameworks of the future: the broader context in which actors operate is more decisive than their juridical status. Even so, we are clearly witnessing a desire to renew, in the early twenty-first century, a movement whose time seemed to have come and gone.

In November 2004, after seven years' existence, the workgroup's members met in the Paris suburbs to take stock of what they had learned over the years and to consider future prospects. They noted, in the first place, that the goals of solidarity economics and the critique of classical economics (discussed in the previous chapter) overlapped considerably. Solidarity economics rejects the tendency of economic activity and thought to become self-referential. An appreciation of solidarity economics cannot restrict itself to how many jobs it creates and how much wealth it produces. The economy, from solidarity economics' perspective, must simultaneously pursue several goals. The cost or quality of a good or service are only two factors among others in determining their success. Others include social relations occurring as a result of the exchange, the recognition of other fundamental needs besides strictly material ones, and the personal development of both producers and clients. One of solidarity economics' most notable traits is that it often eliminates the barrier between producers and clients.

Take the example of microcredit. Since winning the Nobel Prize, Muhammed Yunus of the Grameen Bank has become an international star. Several years ago, the World Bank organized a "microcredit summit." The broader public, in short, has recently discovered him. Institutions that first heard of him only a few years ago see him as a brilliant mind that has found a miraculous solution to the problem of poverty. We all love fairy tales, and Yunus' story seems to be one. Why financial institutions find his story appealing is no mystery: microcredit draws

the poor into market relations. In this way, the free market and classical economics can prove that they are capable of promoting social cohesion.

Yet it is not hard to see that this fairy tale has little to do with reality. First, Muhammed Yunus, whom I have known and admired for twenty years, did not invent microcredit; rather, he brilliantly theorized an important movement with deep historical roots. Furthermore, there is no miracle cure. When I had to evaluate European cooperation in the program in 1998-1999, I found African villages where several enthusiastic organizations (one must always beware of beginners' zeal) were offering the inhabitants competing microcredit schemes to develop economic activities for which there was no market. Microcredit's impact on job creation is far more modest than is commonly acknowledged. It is often the result of nearly intolerable social pressure. The workgroup thus organized an international committee that brought together the major microcredit banks to help them establish a set of socially responsible performance criteria which they called "solidarity finance," as an alternative to traditional evaluation methods that focus on strictly financial criteria such as repayment rates. It has become apparent that microcredit's most positive effect is to build social capital, to establish networks between its beneficiaries, and to give them self-confidence. Social capital and self-confidence, as we know, are essential preconditions for genuine economic development. Bonds are more important than goods: this principle is essential to solidarity economics, in which actors produce and distribute goods while also pursuing socially-oriented goals such as communal bonds, integration, and cohesion. That said, to hark back to what Philippe de Woot said about companies, the proponents of social economy reject the way that classical economics has traditionally inverted ends and means, with consumption as society's primary goal and production companies' sole *raison d'être*. Instead, they believe that human development should be economic activity's primary purpose. They

refuse to cut off economic thinking from other social sciences, whose lessons they are eager to learn. They are particularly close to the thinking of the New Economic Foundation and other groups that are finding new relevance in the old saying that money isn't everything and which distinguish between well-being and degrees of material progress.

The ability to conceive of actors capable of pursuing several goals simultaneously is as essential to oeconomics as to governance. I doubt if solidarity economics can at present offer enduring and comprehensive solutions to these problems, but it at least has the merit of recognizing their importance. Today's corporations know that the most significant production factor is the ability of their employees to pool their knowledge and know-how together to achieve shared goals. They find themselves in exactly the opposite position of old production-oriented corporations, which achieved economies of scale through the rationalization of material production processes. This is why these new companies are often called "post-Fordist." They only have a distant relationship with the world portrayed by Charlie Chaplin of *Modern Times.* They way they act and talk about themselves is not dramatically different from the proponents of solidarity economics: they emphasize the multiple functionalities of production and work activities, which must also engender relationships and pleasure; the de-compartmentalization of tasks; the division of responsibilities; and the reconciliation of professional and familial roles.

It is said that Google, a symbol of this new style of company, receives millions of unsolicited job applications. This entrepreneurial attitude is consistent with the socio-cultural trends we have been discussing.[8] High-tech companies and the promoters of solidarity economics rarely develop in the same sector. Even so, several common denominators can be identified, and similar institutional arrangements are emerging as classical economics is subject to critique and technological change forces companies to rethink their structure. Rapprochement

[8] Voir, par exemple, les travaux d'Alain de Vulpian, fondateur de la Cofremca.

will take time, and it may be that neither side wants it. Clearly, proponents of solidarity economics are more likely to speak of shared goals, while high-tech companies are more willing to acknowledge the primacy of their economic goals, even if they are perfectly willing acknowledge the importance of other goals, whether out of ethical obligation or enlightened self-interest. In any case, multi-purpose institutional arrangements are now on the cutting edge of economics.

For the time being, solidarity economics has yet to prove that it can propose a full-fledged economic alternative. It sees itself, rather, as the dominant model's outspoken fellow-traveler. Still, by criticizing the assumptions of classical economics and by proving by example that other approaches are possible, it suggests several fruitful paths. The development of local currencies makes it possible to challenge the way in which the moneys system operates. Fair trade raises the issue of product traceability and forces us to consider chains of added value (why, how, and under what conditions can the term "fair trade" be applied to a product?). We are thus reminded that buying is a social activity, rather than the unproblematic acquisition of an anonymous product.

Solidarity economics forces us to consider how we measure economic activity's impact on society's well-being, social capital, and the environment. There can be no accountability without measures.

It is also highlights the variety of ways in which the economy can be regulated. Everything cannot be reduced to norms decreed and monitored by the state—witness the emergence of fair trade labels, organic agriculture, sustainable usage of forests, and responsible fishing.

More generally, solidarity economics rests on governance's most important principles: legitimacy; the coordination of scales of production and exchange; partnership; and the primacy of territorial approaches. Thank to solidarity economics, new ideas have begun to take root.

3. When Economics Becomes Frugal

I remember a conversation that as a child I once had with my mother. She was a widow, and not particularly rich, but she saved her money and prepared for the future. She made a small investment for my sister and me. She explained that she bought us bonds from (if I remember correctly) what was then called the Energy Fund (the Caisse de l'énergie), which was an investment fund for developing energy production. I can still hear her say: "It is a safe investment since the more society develops, the more people need energy." This statement is a perfectly reflection of the economic mindset of the fifties: society's development was closely linked to the growth of consumption and energy, and, more broadly, to the growth in consumption of raw materials. Don't forget that this was the era when the Northern countries were still dominant and when we still associated Japan with cheap but poorly-made products.

As I recall, we had little consciousness of the implications of the consequence of increasing well-being and rising material consumption for the environment and access to energy resources.

A major shift occurred in the early 1970s. At almost exactly the same moment, the first international conference met in Stockholm in 1972, while the Rome Club published its famous report, "Limits to Growth" (which was mistranslated into French as *Halte à la croissance,* or "Growth Must Stop"), written by a group of experts under the direction of professor Dennis

Meadows. The Stockholm conference addressed the impact of human activities on the biosphere's metabolism. The Meadows Report addressed the limits of raw material resources. It also clearly declared that, if human societies are to continue to develop, it is absolutely essential that the rate at which we consume natural resources must be decreased.

The two oil crises of 1974 and 1980 proceeded to vindicate the Meadows Report. The oil producing countries, which had gradually organized themselves into the OPEC cartel in order to strengthen their negotiating position, demonstrated their power in relation to industrialized countries by brutally raising prices. The times when the United States could overthrow Mossadegh's government in Iran because he dared challenge the major oil companies seem like long ago…

The oil crises of 1974 and 1980 did not, in absolute terms, represent a significant increase in energy prices, as they had been constantly falling for forty years. The day when Rockefeller's Standard Oil delivered barrels of oil to the Allies during the First World War had come and gone. Oil has become our economy's lifeblood. The pipeline has replaced the gold galleon, shipped in from New Spain to spur inflation during the European Renaissance. Pipeline saboteurs (as seen in the Tintin book *The Land of Black Gold*) have replaced the pirates of old. The Western world became conscious not of energy's scarcity—it still seemed inexhaustible from a human standpoint—but of the strategic implications of the concentration of fossil fuels in a limited number of world regions. The oil crises and the sudden increase in gas prices were also upheavals in the global economy: oil producing countries were awash in petrodollars, with which banks made often risky investments in developing countries. The debt crisis later ensued.

Whether because of the scarcity of raw materials, or because of the West's growing dependence on a small number of OPEC countries, the question of the relationship between

economic growth in developed countries and the consumption of energy and raw materials has become firmly lodged in our conscience. This is the time period when the efforts of "decoupling" were made—that is, the need of separating the growth in well-being from greater consumption of raw materials and fossil fuels. This led in France, for instance, to the creations of organizations like the French Agency for Energy Control (l'Agence française pour la maîtrise de l'énergie, AFME) and to the first teams of technical specialists with expertise on these matters (which, for us, are still new). As a local engineer for the French Equipment ministry, I participated in the implementation, during the seventies, of the first systematic policies aimed at improving residential heating efficiency. This led, notably, to a reconsideration of residential heating contracts: until then, operators were paid based on their profits—in other words, on energy consumption. These contracts thus promoted "criminal activity"! The more energy (fossil fuel, in this case) is consumed, the more these business owners profited.

I mention these details because they illustrate the kind of economic changes that must occur: the creation of new actors and institutions; the development of new forms of expertise; new contractual connections between actors made possible by the idea of institutional arrangements; and the reform of public policies, notably the elimination of subsidies that artificially reduce energy costs.[9]

Except during the interludes of the two oil crises, the predicted price increase in prices of raw materials did not occur in the seventies and the early eighties. The modernization of industrial production processes and the first serious efforts in recycling made western industries more efficient in their use of raw materials. During this time, for instance, electric steel mills

[9] Matthieu Calame's book *La tourmente alimentaire* ("Food Turmoil") (Éd. Charles Léopold Mayer, 2008) offers excellent examples of the impact on agriculture of artificial reductions in the cost of production factors.

were built that could recycle the steel of old cars and discarded industrial equipment. For the first time, raw material consumption became decoupled from GNP growth.

By the early eighties, the problem associated with raw material consumption was no longer depletion (since raw materials became neither more scarce nor more expensive), but environmental danger. Ecological associations publicized the problem of the ozone hole, reflecting the cumulative impact of human activities in the outer atmosphere. Its symbolic value was indeed very great: it demonstrated that ordinary human actions like having a refrigerator or using aerosol cans, each harmless in itself, could affect the outer atmosphere's chemical composition, particularly in the North and South poles—that is, in practically the only places on the planet where there is almost no human activity.

The fifties—the era of the Cold War—were dominated by the prospect of a nuclear war between the West and the East bloc. People were haunted by the threat of a "nuclear winter," a sudden modification of the earth's climate following a series of atomic explosions. Humanity thus became conscious of its ability to destroy itself. In the eighties, however, people became conscious of humanity's capacity for self-destruction not through a suicidal war, but through the pursuit, from year to year, of economic development, which had been presumed to be socially beneficial. This was a massive shock to humanity's self-conception, though it had been anticipated a decade earlier by the first manned satellites, which showed the Earth to be a "little blue planet." We rediscovered the fragility of mother earth, the Pachamama of Andean religions, humanity's matrix, which we were busy killing off without even realizing it.

This was the psychological atmosphere in which the greenhouse effect, i.e., the consequences of human activity of climatic balances, became a major social and political question, even though it had (like the ozone hole) been known about (if only as a scientific

curiosity) for some time. In 1989, the American magazine *Time* made the Earth its "Man of the Year." Meanwhile, the Bruntland report, "Our Common Future," introduced the concept of "sustainable development," which, after the 1992 Earth Summit, became, if not the basis of new economic policies, part of the obligatory rhetoric of corporations and governments.

It has now been over twenty years since the Bruntland report was published. Real progress towards sustainable development has been desperately slow, like a little skiff rowing upstream. The gulf between economic thought and dynamics, on the one hand, and new frameworks premised on sustainability, on the other, remains vast. A few visionaries, like Georgescu Roegen (mentioned above) have tried to lay out the theoretical basis for an economy in which achieving equilibrium between human activity and the biosphere would be the primary concern. Others have developed theories of reversing growth. They remain marginal.

There are two trends, however, which are more practical than theoretical, which have begun to enter the mainstream: energy efficiency and the economics of material flows. Let us consider them in turn.

The first trend, energy efficiency, is well represented in France by a movement of researchers and activists named Global Chance, led by Benjamin Dessus. Global Chance is obviously a pun, referring to "global change," i.e., "climate change." But the pun is used to make another simple point: the problem of fossil fuel and climate change, far from being a catastrophe that signs the death warrant of our development model, represents an historical opportunity (a "chance") to re-conceive human activities, particularly production, exchange, and consumption, on a more intelligent basis.

For a long time, energy-related problems were primarily the concern of the energy industry and energy service providers. The major concerns were the development of new

technologies, particularly nuclear technology, and financing the heavy infrastructure needed for energy extraction and distribution. There was less glory and money in the more modest task of making energy more efficient.

The Dalai-Lama once said that we must learn to "make an epic of peace," as it is war that is always seen as glorious and sophisticated. A similar insight could be applied to energy.

Even today, in France, expertise on energy issues generally belongs to energy producers and distributors. From the standpoint of new economic paradigms, the fact that only one actor—the energy industry—has the know-how is very significant. Bernard Laponche, who worked for EDF (France's state electricity company) for many years, has pointed out that very often energy companies, because of their size and need for technological competence, are virtually the only employer in a position to hire specialists. Consequently, the very idea of an "independent expert" must be viewed with caution. Someone who specializes in this area has no career opportunities if he or she does not work for the producers—and producers can remember. There is thus an enormous dissymmetry between the information and means available to suppliers and the information and means available to those working to reduce consumption and increase efficiency. As we shall see, this is a problem that is critical to developing new institutional arrangements: in today's world, in which social cohesion depends on economic growth, the apostles of efficiency and frugality often preach in the desert.

Despite these obstacles, sensitivity to energy efficiency grows with each passing year, a point that is illustrated by a great deal of statistical data.

First, "energy efficiency" is not a meaningless term. Decoupling a nation's development (economic or otherwise) from its energy consumption is perfectly possible. Available comparative statistics demonstrate that at equivalent levels of human development, countries

cover a wide spectrum in terms of energy consumption. Among rich countries, there is an obvious contrast between “American” development, which consumes a large amount of energy, and “European” development, which is considerably more restrained. The countries of the former Soviet Union stand out by their appalling performances, in which there was little well-being combined at the same time that there was considerable energy consumption. Communist regimes lacked both regulating mechanisms and countervailing powers capable of resisting their brutally productivist outlook. Poor energy efficiency resulted.

The numbers reveal what is at stake in the choosing a development model for countries whose economies are just taking off, like China and India. They suggest the importance of offering them, while there is still time, efficient technologies and alternative development models. China understands this well: because it currently uses twice as much energy as Western industry for any given product, it must improve its energy efficiency quickly if it wants to postpone as long as possible the inevitable showdown with the United States and Europe for control of the world’s energy reserves in the Middle East, Africa, and Central Asia.

Changing patterns of energy consumption in any given country confirm that the relationships between economic development and energy consumption are flexible. While for a long time they were closed related, these two growth curves have diverged since 1970. This shows that even within our economic system, political and technological choice can be decisive in decoupling development and material consumption.

The increasing importance of energy efficiency has made it possible to fine-tune our understanding of the problem. Fossil fuel consumption breaks down into three categories of comparable if not identical size: industrial production, human and commercial transportation, and residential activities, including housing (such as heating and air conditioning) and offices.

The most notable progress has occurred in the realm of industrial production. It is easier to negotiate with producers with the financial and technological means to react than with ordinary citizens, whom it can be politically costly to constrain through regulations.

The time has come to focus our efforts on the two other realms: transportation and residential activities.

Energy policies are based on different timeframes, ranging from the short to the long term.

Let us begin by considering time. How much time is needed to bring about significant change in the way we produce, consume, and live, and to ensure the same degree of well-being with considerably less energy consumption?

First, there are changes that might be described as behavioral. Some can be made quickly, such as turning off the lights when one leaves a room, not using one's car for walkable trips, lifting one's foot on the accelerator, and carpooling.

Other changes can only occur in the long term, as they depend less on individual behavior than on collective investments: where one lives, how one uses one's free time, how one travels from home to work, etc. These examples call attention to the importance of what one might call mixed goods or decisions: changes that, to be fully effective, require a combination of public and private decisions. A good example is the renewal of interest in Europe in bicycles as a form of urban transportation. I have bicycled for over forty years, but fifteen years ago, I felt like the last cyclist in Paris. The city's residents and municipal officials needed their consciousness raised to create new bicycle paths. The public's enthusiasm for this new use of space encouraged the city to pursue its efforts, and to confront the objections of business-owners and car-drivers when they arose. The success of Vélib' (a system of publicly available bicycles) in Paris in 2007, following

Lyons' example, testifies to the achievements that are possible thanks to changing outlooks and political courage.

In the medium term, one can also include the adaptation of particular industrial products to greater energy efficiency standards, such as washing machines, dishwashers, boilers, and individual vehicles. In this realm, change requires about five to ten years: the time to conceive, to finance, and to develop products that are likely to provide an equivalent service with a far greater expenditure of energy.

But for such investments to occur, industrialists must have the government's ear. Consider the example of hybrid and electric motors for individual vehicles. In assembly line industries requiring heavy investments, such as the automobile industry, developing radically new practices and technologies entails a real risk, however powerful the companies in question might be. Risks like these are only taken if costs are cut in order to reduce uncertainty. Such decreases require partnership between consumers, government, and corporations. Whoever has been involved in this kind of work in government knows that it is politically very difficult, when considering new regulations, to get ahead of public opinion and the capacity of corporations to adapt to change. On the other hand, to creative incentives for innovators, it is just as important to ensure, given the costs of innovation and the supplementary production costs of new vehicles, that regulations and matching public funds are approved in a timely fashion. In other words, each party must innovate, yet without being too far ahead of everyone else. Because consumers tend to be influenced by fads, it is also important that new products be tied to consumption practices or lifestyles practiced by the upper middle classes, as it is they who create and publicize fads. If new products, however promising they might be, become associated with poverty, they will have a much more difficult time becoming mainstream. The bicycle, once again, provides an excellent

example. Forty years ago, it was associated with the working class. Today, it tends to be associated with the "bohemian bourgeois" (or "bobos").

Modified behavior over the short term and changes in the supply of goods and services over the medium term are likely to significantly improve energy efficiency. But they are not sufficient. The most important changes must occur over the long term. Transportation- and home-related energy consumption, the two most important factors, are tied to our conceptions of cities, neighborhoods, and spatial organization.

Studies show that urban residence and population density are the most decisive factors in the choice of transportation. Studies by the Laboratory of Transportation Economics in Lyons demonstrate that the average number of kilometers travelled has increased (all forms of transportation included) by 3% each year for the past two hundred years. 3% a year! However quickly the energy efficiency of a form of transportation has increased, a growth rate of this size is not sustainable over the long run. Yet it is tempting to regard these long term patterns as laws of nature or as expressions of human nature as such. Urban structures only evolve over centuries. In France, moreover, suburbanization accelerated thanks to the decentralization of the eighties, which reinforced municipal autonomy without fiscal compensation and without establishing political authority in major population or employment centers. Commerce and industry have followed the major roadways. To reverse this trend would be painful. Everyone knew this, everyone still knows it, yet it continues. Millions of households are dependent on, even enslaved to their cars. This illustrates the long-term consequences of demagogic and short-sighted politics. It raises the question of what sanction or reward they should receive. We know how to prosecute war criminals fifty years after the event. We do not know how to challenge economic and political authorities who are still in place.

The housing stock, for its part, renews itself on average at the rate of 1% a year in a country like France. Energy efficiency depends on the transformation of the old stock, which requires partnerships between various actors: industrialists, who must develop suitable technologies; building professionals, who must integrate efficiency standards into all their calculations; local government, which must change regulations in order to favor insulation; the state, which must develop an appropriate tax structure; and banks, which must create suitable financial products.

We must connect the problem of time to that of space. First comes the question of situating human activities in space. The transportation and information revolution played major roles (as we have seen) in internationalizing the economy by thinning out space. Will greater consciousness of energy's scarcity contribute to a re-localization or re-territorialization of the economy, production activities, and exchange? These mechanisms are more complex: distance and the energy cost of transportation are far from being proportional. Small loads transported over short distances can be just as costly in terms of energy as mass transportations over long distances. Furthermore, the cost of distributing information remains very modest. This is why I speculated about mixed economical organizations combining international chains and territorially-based production.

The quest for energy efficiency requires the identification of different timeframes, but also of different spatial levels. The organization of space at both a macro and a micro level are equally important. At a very local level, this might involve setting up the basic elements of an ecological home, such as light, exposure, incline, air circulation (which, in hot countries, makes air conditioning avoidable), thermal isolation, independent decontamination, etc. The next level involves making neighborhood energy use efficient, by organizing public services, making space

multi-functional, and relying on local sources of renewable energy. Successively higher levels are those of the city, the metropolitan area, the region, the continent, and the world. It would be fastidious to explain how each of these levels shapes human activities and, consequently, energy production and consumption. The key point is that energy management makes action necessary at each spatial level.

To organize these spaces, however, one must also be aware of the production and exchange flows occurring at each level. Classical economics posits two fungible principles: time, and goods and services. Interest rates and discount rates make it possible to treat the future as though it were the present, on the grounds that decisions are made in the present and that difficult choices are unavoidable. Traditional financial products demonstrate this fact when they allow interest rates to vary according to a loan's duration. Modern investment schemes require head-spinning choice between the short and the long term and between liquidity and risk. Similarly, the idea of a single currency rests on the tacit hypothesis that every good and service we buy can be measured according to a single standard, since we make choices about what to buy and what not to buy. These assumptions must be called into question, as the example of energy reveals in relation to the question of time. We must consider each temporal level independently of all others. Certain long strategies must be undertaken immediately if we are to avoid catastrophe.

The second school of thought on decoupling development and material and energy consumption is what I call the "German school," as it is best represented by two German institutes, the Wuppertal Institut and the Öko Institut. Both seek to connect abstract philosophical and political considerations (i.e., the relationship between human activity and the biosphere) with detailed technical recommendations. This is worth mentioning in light of the ideas we have been considering. Considering society as a bio-socio-technical system allows one to see the

ecosystem, the economy, society, politics, and technological change as parts of a whole. Methodologies are still prone to emphasize one of these sub-systems at the expense of the others. But to change the relationship between human activity and the biosphere, we must be prepared to get our hands dirty. If we are interested in technological systems, new modes of production, and less wasteful products, then we have to consider how they can be achieved. Contrarily, when considering economic issues, the question of which technological systems are best suited to achieving one's goals is immediately raised.

The central concept in the thinking of both institutes is that of material flows. It is a concept that connects the environment, economics, and social and political systems. If one is interested in society's metabolism, just as one might be interested in the metabolism of a living being or an ecosystem, then it is essential to be able to measure it. Describing the metabolism of a living being or a society requires measurements. Since nothing can be managed if it cannot be measured, the Wuppertal Institut has attempted to describe economic systems by a synthetic standard called MIPS ("Material Input Per Service Unit"). It measures, as its name suggests, the amount of matter that is used for every unit of a service rendered. This measurement, conceived by Friedrich Schmidt-Bleek, has the enormous merit of defining the ultimate goal to be achieved through a generalization of the principle of energy efficiency: we must reduce the amount of matter consumed for any given outcome. It is also worth noting that this outcome is denominated not in terms of goods, but in terms of service rendered. The goal, according to the Wuppertal Institut, is to divide the number of MIPS, at least in industry, by ten between now and 2050. Dividing MIPS by ten would assuredly require the creation of modes of production, distribution, and consumption that are radically different from those existing at present.

The study of material flows has also led to a new way of measuring flow inputs and outputs, known as material flow accounting. It is astonishing that not until the twentieth century was it recognize that accounts of material flows are indispensable to company management, even though double-entry bookkeeping, introduced by the Italians during the Middle Ages, has long been deemed essential to business. The use of money to extend commercial exchanges across the world has paradoxically cast a veil of ignorance over our society's physical operations.

Various Wuppertal Institut documents provide a useful introduction to an economy founded on balancing human interests with those of the biosphere. Material flow analysis requires paying attention to matter circulation, including input and output, both in any given geographical area and different geographical levels. It is no small matter that these institutes are themselves located in specific places. The Wuppertal Institut, for example, is dependent on the state of North Rhineland-Westphalia.

Flows operate according to one of two related modalities: along industry chains or within territories. Chains and territories are the two related systems of a "bitmap" approach to social management, with chains organizing "vertical flows,' while territories organize "horizontal" ones, i.e., those between humans and a given space.

In 2007, confronted with France's troubling trade deficit with China, President Sarkozy mentioned the possibility of taxing the "carbon content" of Chinese imports. Though the idea itself was politically unacceptable at the time, given that proposals for a domestic "carbon tax' had recently been abandoned, it nonetheless rightly emphasizes the importance of knowing the quantity of energy that is mobilized at each stage in the production and use of goods and services.

What matters is not the size of the final product so much as the amount of material and energy needed to produce these goods. The classic example is silicon chips, whose weight is negligible, but which require a large amount of materials to be produced. Mathis Wackernagel popularized a way of measuring our lifestyle's environmental impact: the "ecological footprint."[10] It consists of evaluating the number of hectares of agricultural land required to sustain a particular way of living. One can quibble over its accuracy, but the measurement is bold and provides a useful tool for comparing different lifestyles. It is in this way that the Wuppertal Insitut, when analyzing the materials that are mustered to produce imported goods, can affirm that Germany depends on a territory that is the equivalent of 125% of its own area to support its current lifestyle—a new form of *Lebensraum.* Measures like this have made it possible to claim that providing everyone on earth with a Western lifestyle would require four planets like our own.

While useful for raising awareness, such measures can never replace calculations of the materials used by consumed goods and services or balance sheets of materials used by entire chains of production and consumption. Well-informed industrials are getting used to tracing their products from "cradle to grave," up to and including the disposal of waste. Putting a material balance sheet on a product's package is no more difficult than listing what it is made of—and it is just as informative.

An example is the so-called "Environmental Round-Table," a somewhat hastily arranged series of negotiations between the state and companies, consumers, environmental associations, and other, which took place in France in 2007. The question of renewing the car stock was obviously considered: to pollute less, why don't we replace all the old polluters and gas-guzzlers with new technological jewels? Naturally carmakers, while they are opposed to a carbon tax,

[10] www.fr/s_informer/calculer_votre_empreinte_ecologique

approved and suddenly became the environment's best defenders. Question: who knows what the energy and material cost is of a new car? How much energy must be saved over how many kilometers to amortize this cost? I, for one, don't know. To my knowledge, this question has yet to be put forth.

4. Towards a Territorial Ecology and a Functional Economy

The other current that has emerged from reflection on material flows is industrial ecology. In the Francophone world, it is represented and promoted by Suren Erkman.[11] Industrial ecology began to emerge in the nineties, in the wake of an article by Robert Frosch and Nicholas Galopulos entitled "Strategies for Manufacturing" published in the *Scientific American* in September 1989. It begins with the observation that one can no longer consider the industrial system (i.e., human activities) as separate from the biosphere. One must, to the contrary, consider industrial activities as an ecosystem, with the same measurement tools and the same analytic concepts. Until recently, the relationship between human activities and the environment was thought of primarily in terms of environmental damage and pollution. To deal with pollution, the first reflex was to eliminate, at the point when they are about to be released into the atmosphere, water, or soil, the sub-products of the production process that lack any economic value: smoke, polluted war, industrial waste, and so on. Pollution was dealt with at "the end of the pipe." The goal was to keep perturbations of the biosphere by such waste at an acceptable level. Such an approach is localized, narrow, and costly, but it averted a broader reconsideration of the production process

[11] Suren Erkman, *Vers une écologie industrielle*, Éd. Charles Léopold Mayer, 2nd édition, 2004.

itself. Instead of rethinking the system in its entirety, the inconveniences of the current system were simply limited.

We have become gradually aware of the costs and limited efficiency of this kind of approach, and efforts are now made to deal with the problem "upstream," aiming at prevention rather than reparation. Such efforts are similar to those made some fifty years ago in the realm of quality. ISO quality norms were not simply aimed at controlling quality at the end of the production process, but were based on the awareness that a product's ultimate quality depended on each stage of the production process.

But the search for clean production processes remains attached to a narrow conception of human activity, in which each process is closed on itself. Industrial ecology proposes seeing things on a different scale, considering human activities not in isolation, but as a whole.

Returning to ecology's classic concepts, Suren Erkman has described industrial ecology as "accelerating the maturation of ecosystems." What does he mean? An immature ecosystem is one in which a small number of agents have very great natural resources and operate in "open" cycles, in which they take from the environment before throwing their waste back into it. As the system becomes more mature, it becomes qualitatively richer, and its cycles become "closed." Because of the complementarity between the system's agents (micro-organisms, plants, animals, human activities, and so on), most flows occur within the system, thanks to a large number of feedback loops. The system takes as few resources from outside as possible, while throwing as little waste away as it can.

Applied to human activity, the principle of ecosystem maturation is achieved by making activities more complementary, with the waste products of one activity becoming the resources of another; by closing the gaps in material cycles; by reducing squandered energies to a

minimum; by de-materializing production and services; and, finally, by de-carbonizing energy. In this way, one moves from concentrating on isolated activities to considering the relationships between activities.

Industrial ecology shows how important it is to build stable relationship configurations. A mindset in which an economic agent's stable internal relationships (such as those of a company) contrast with its atomized transactions with the outside world must be replaced by a more complex kind of institutional arrangement based on networks of relationships.

How can one help the ecosystem in which human activity is included to "mature"? How can the cycles be closed? Two paths flow from this new approach: the search on a local level for complementarity between human activities, and the development of what Suren Erkman calls the "functional economy." The latter involves "dematerializing the economy," i.e., replacing, whenever possible, the production of new goods (with all the energy and material expenditures they imply) with offering services.

"Industrial symbiosis" refers to the search for complementarity between production activities in a given territory. Its classic model is Kalundborg, a small town on the Danish coast about a hundred kilometers west of Copenhagen. Beginning in the fifties, it began to develop economically, thanks to the building of power station and an oil refinery. "Over the years, Kalundborg's main companies began to trade 'waste': vapor, water (of differing temperatures and purity levels), and various sub-products. At the end of the eighties, those in charge of local development realized that they had advanced and had created a system, which they spontaneously baptized 'industrial symbiosis.'" (Suren Erkman, p. 28). This symbiosis is the result of complementarity between five major partners: a power station, an oil refinery, a producer of industrial enzymes, a construction panel factory, and the town of Kalundborg itself.

Among these five entities, water, gas, sulfur, gypsum, and heat circulate. The reasoning used in Kalundborg has frequently been borrowed. The shift in outlook that it reflects perfectly illustrates what I have called the "bitmap" approach and institutional arrangements: whereas from the perspective of vertical chains (such as the automobile chain), the reduction of transportation costs facilitates the distribution across the globe of various segments of the chain, the material flows approach and efforts to bring the industrial system to maturation offer incentives to promote territorially-based complementarities between various companies. The vertical and horizontal approaches thus begin to complete one another.

The transition from a goods-based to a service-based economy promises still further change. For years ecologists have been denouncing our economy's wastefulness—its tendency to produce new goods that quickly become physically, technologically, and socially obsolete. In a society of the spectacle, in which the diversity of the supply stimulates demand even when difference between products is minimal and even superficial innovations pass for progress, rapid obsolescence is essential to social equilibrium. Unfortunately, equilibrium of this kind is becoming suicidal. By making the transition from material abundance to a richness of functions, we can turn away from the real reasons for consumption, and search for alternative means to ensure necessary services while minimizing the amount of materials used.

Just as Kelundborg has become the symbol of industrial symbiosis, the photocopier-maker Rank Xerox has become a hero of the "functional economy." To quote Suren Erkman's new book (on p. 157): "Xerox gave up producing 'new' photocopiers in favor of a strategy of 'remanufacturing,' which emphasizes selling a service (high-quality photocopies) rather than producing photocopying machines." In practice, Ran Xerox offers its clients working photocopiers that meet their current needs and guarantees them regular maintenance and the

replacement or repair of spare parts. By pooling the stock of machines with which it provides its clients, Xerox, thanks to a modular conception of its machines, ensures speedy replacement of spare parts. This allows it to guarantee that is machines will always be in working order and will always be adapted to the clients' evolving needs, at the same time that spare parts are recycled to the maximum. What it offers is not so much a product as a service that the client needs. The goal is thus to provide the service with as few resources as possible per functioning unit.

Four pillars, as Suren Erkman calls them, characterize the functional economy: prevention, which consists in conceiving products that will last from the outset (the exact rejoinder to the principle of planned obsolescence) and according to a modular and standardized structure; maintenance, which prolongs their lifespan; "cascading" usage, meaning that goods are reused for less demanding purposes; and resale services, which allow companies that want to get rid of equipment to ensure that it will be either reused "in cascade" or dismantled (Erkman, pp. 161,162).

A particularly valuable concept when considering territorial economies is that of "cascading usage," which consists in making maximum use and exhausting all the potentialities of everything that is present in a territory. The modular approach emphasizes the interchangeability of parts on a territorial scale. There is no compelling reason to limit one's thinking to the scale of a single company, other than for the profits one might hope to extract from the situation. It is easy to imagine compatibility norms for most of the parts of that an industry uses. Companies are encouraged, at an internal level, to make all the parts on any give product line compatible. This creates economies of scale. It means, for instance, that the same gearbox can be used for an entire line of cares, making it possible to pool research and development expenditures as well as (and just as importantly) learning and adjustment costs. But

it is entirely possible to conceive of modular cars in which the spare parts, or specifically the connections between the different parts, would be fully normalized. This is already the case for computers and freeware. The subcontracting by computer makers of most parts had led them to be normalized, thus allowing for considerable redistribution of the power to negotiate at various stages of the chain. For this reason, the companies that historically made computers, whose added value consisted of conceptualizing new products and managing their assembly—companies like IBM, Compaq, Hewlett-Packard, and so on—began to face stiff competition from companies that simply assemble normalized parts, like Dell, which assembles them on demand at an intense rate, with great success.

Habit alone that make us see the current structure of companies as untouchable and leads us to think in terms of the false alternative between management (i.e., internal organization) and competition (that is, relations with others actors). The modular approach that is inherent to the "functioning economy" makes it possible to imagine other institutional arrangements in which local, inter-company assembly and maintenance units would combine on demand various normalized parts hailing from different origins. Following Volvo's "flexible workshops," which was a departure from breakdown of tasks along the assembly line, this approach would be a new stage in the post-Fordist era.[12]

The transition from a production economy to a functioning economy depends on normalization, which ensures the interchangeability of parts. Normalization is a public good of new kind. It not necessarily achieved through the public sector. The lack of an automatic correlation between the public and the public sector is, once again, characteristic of governance of a new kind: one learns to distinguish between the service rendered (in this, the normalization

[12] Note from December 2008: In response to the crisis in the car industry, Fiat's president proposed this idea and specifically invoked the precedent set by the computer industry.

and interchangeability of parts) and the status of the individual who renders it. Here, too, the internet blazed the trail. True, the internet was born because, during the Cold War, the U.S. Defense Department needed to eliminate one of its primary weaknesses: the centralization of its command structures. If just one missile landed in the right place, the military's entire coordinating system would be destroyed. But this system was quickly borrowed by American universities to develop inter-university exchanges. The creation of the World Wide Web continued its stunning development. The Web is founded precisely on a normalization of exchanges between servers. This normalization was established and managed by a consortium of (at first) four universities, the World Web Consortium. These norms have become so publicly valuable that the organization that provides domain names on the web was at the center of major diplomatic maneuvering between states during the World Summit on the Information Society (SMSI).

Normalization and the interchangeability of the material and immaterial components of human activity thus count today as some of the most important contemporary public goods. This is only an extension of the long historical process that began in the eighteenth century with the normalization of screws and which continued, during the twentieth, both at the state and the international level, with the establishment of normalization agencies. The transition from a goods-based economy to a functional one marks a turning point in the relationship between materials and labor and between capital and labor. To speak in general terms, one might say that the first industrial revolution replaced human energy with fossil fuel and human labor with material capital (consisting of buildings and machines). Today, our problem is almost exactly the opposite: the consumption of matter must be replaced by human labor and immaterial capital (intelligence, a capacity for collective organization, and technology). But service activities, such

as the kind of maintenance and parts-replacement that Rank-Xerox does, is localized by definition, in contrast to the production of goods, which could be easily delocalized. The shift from one to the other leads to a relocalization of an increasing share of economic activity.

Taken a step further, this reasoning explodes the distinction between private and public capital. What is more lasting than a city, especially a European city—a totality of material and symbolic investments organized among themselves, whose "spare parts" (the buildings, roads, networks, etc.) are constantly being renewed? Studies in urban morphology have shown the extent to which ancient ways of dividing up space contributed to creating modern cities by shaping roadways and modern urban space. These original divisions have been constantly readjusted (through subdivisions or regroupings), but nonetheless a stable pattern was created. The most beautiful cities are based on very simple rules, such as building alignment, fixed ratios between building height and roadways width, and rules of architectural coherence, within which individual architects can display their own individual talents.

The rate at which good usage evolves can vary considerably. Replacements—of a photocopier's spare parts or even of an entire business in particular commercial line-up—often occur quickly. More profound changes, such as a neighborhood's structure, may only occur once a century, or even less often. Cities are able to preserve their traditional quality through such basic elements as roadways and building alignments because each of these elements can be used in multiple ways. The tragedy of the urban projects of the 1960s was that they were conceived in such exclusively functional terms that their only future prospects were their own obsolescence, just as a device that has only one purpose will eventually wear out. By analogy, service offerings could depend on the creation, at the level of each territory, of stable infrastructure (from the transportation system all the way through, say, to the photocopying system), within the

framework of which service providers would, at a more or less rapid rate, reuse collective material capital ("infrastructure" in the broadest sense of the term) to offer a variety of services. Rather than a juxtaposition of public and private material capital, one would thus have investments in essentially collective material capital, comprised of both public and private investments, which would then be coupled with various forms of immaterial capital, such as socialized knowledge and localized labor. The whole would be shaped by the material and energy flows needed to make the system work and to ensure its gradual development.

Notes :

* P. 128 : « La Constitution américaine ne garantit d'ailleurs pas aux citoyens américains le droit de s'enrichir mais le droit de chercher le bonheur. »

Il y là deux erreurs :

- C'est la Déclaration d'indépendance, non la Constitution

- Celle-ci ne garantit pas les citoyens le « droit de s'enrichir » (même si un brouillon avait parlé d'un droit à la propriété). Les trois vérités « évidentes » dont elle fait mention sont : « life, liberty, and the pursuit of happiness. » J'ai corrigé donc la traduction ; peut-être faut-il faire autant pour le texte français ?

* J'ai trouvé et cité le texte original du « Well-Being Manifesto » du NEF.

* Pp. 155-56 portent sur la traduction en français de l'expression « *industrial ecology*. » Puisqu'en anglais c'est assez redondant, je l'ai supprimé.

Signes (avec blancs) 78,636