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SOCIAL PATHOLOGIES AND ENERGY USE IN OVERDEVELOPED SOCIETIES

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1. INTRODUCTION

In this paper we will explore the relationship between two seemingly unrelated trends in overdeveloped societies,[1] namely the growth rates of energy use and the energence of various social pathologies (mental illness, cancer, heart disease, suicide, alcoholism, drug abuse, crime, automobile accidents)[2] in the industrialized part of the world. We will discuss the similarity in growth rates during the last decades, the doubling time being 10-15 years for many "civilizational diseases" as well as for primary energy use and the somewhat confusing picture during more recent years, where growth rates for energy use and many social pathologies have declined or even turned negative in some cases.

This may not necessarily imply causalities, but in some cases, such causality is evident: The rise of automobility has increased energy used for transportation dramatically, at the same time as the private car is responsible for violent deaths and chronic diseases, for instance in the respiratory system. The use of lead as an anti-knock agent has impaired the mental development of especially children in large cities.[3] At the same time, the use of the car has lead to less exercise, thus promoting chances of heart ailment from both eating too much and the wrong kind of foods.[4]

But whether such causality may be "proven" or not may be of less interest than the fact that energy policies may be used consciously in an effort to develop less overdeveloped societies in the future i.e. societies in ecological balance, with more participation, less alienation, more decentralized living and small-scale production, more fulfilling work (as opposed to jobs), less exploitation of nature and man intra- and internationally, and better chances for future generations to take part in development; transcending overdevelopment as experienced by the present generations in the industrialized world.

Obviously, the relationship between energy use and social pathologies is not so simple that we may claim that the abandonement of the use of polluting energy technologies necessary will lead to a "good society" for all. There are relationships which have to do with quality of energy used, but also of quantity.

If the quality of energy is adapted to end-use needs (using solar energy to heat houses instead of electricity produced by thermal plants), negative health consequences of energy conversion would be cut dramatically. In most cases, a better matching of energy quality and end-use needs also would mean using less energy. Using a smaller quantity of any source of energy, provided that the task at hand could be performed equally well (which is the case with more energy-efficient cars or electric appliances), would always yield a net health benefit to society. At the same time, the spread of energy supplies on some few units will mean something different for elite control and alienation than if they are spread on many places. And "soft" energy sources may be turned "hard" - eliminating pollution, but even increasing alienation: burning coal in domestic burners may be very polluting but not very alienating, while large, centralized solar farms may involve complicated and alienating technology without much environmental impact. And the use of non-polluting energy technologies is not enough to assure us the emergence of human and social development. To put one example in perspective: It does not really matter for someone who is run over by a car whether that car was powered by gasoline or solar cells - the structure of which the car is an integral part is still the wrong kind of structure.

The present paper should not be understood as an attempt at pointing at factors of overdevelopment which cause social pathologies. But we do claim that a high level of energy use invariably will contribute to the development of social pathologies in any society, regardless of the structure and culture encountered. A low energy use, based on renewable resources is not in itself a sufficient condition for assuring human and social development in a given society, even if it meets all material needs. A ceiling on energy use may be necessary if we are to avoid many negative consequences of development, even if the energy use is non-polluting and non-depleting. A high level of energy use may reinforce an antihuman social structure one place, while ever increasing levels of energy use another place may induce undesirable structures. The extent to which a given society will be prone to overusing energy as well as other natural resources, however, will be determined by structural and cultural factors which are beyond this paper's intent to study [5].

2. ENERGY AS A DEVELOPMENT INDICATOR

The question has been raised why energy should be seen as a more relevant indicator of development than for instance GNP per capita, or what energy use may tell us about a particular society.

We have rejected GNP/capita as a measure of development, because it is manipulable, subject to random fluctuations in size when currencies fluctuate in the international monetary markets, because it contains both desirable and undesirable elements of human production, and because the reason for one country's higher GNP may just be due to more meticulous accounting procedures. In other words, the GNP concept is something relatively theoretical, both the size and significance of which is subject to large disagreements, depending upon one's political outlook or value system. Therefore, it should be obvious that countries with high GNP/capita figures may not be able to satisfy the population's needs any better than countries with low per capita GNP.

While GNP is just a numerical expression of a given social structure, energy serves as a basic carrier of the system itself. To the extent that statistics are kept with some accuracy, it is possible to calculate how much oil, gas, coal, hydro-electricity, or whatever other source of energy there is in use. Very seldomly will there be substantial disagreement of how much a given country is disposing of in terms of primary energy, as there is little disagreement on the thermal energy content (heat value) of for instance one ton of oil. Such matters are decided by physical laws and physical laws of nature are not currently in great dispute.

There is no disagreement that any society cannot function without the use of energy in some form or other. Any society needs energy for transportation, for providing heat, or to make useful products. There is no disagreement about that. Neither is there any large disagreement about how much energy is needed for a given task, if theoretical conditions were obtained. Anybody with some insight into energy questions would agree that the industrialized world

could function very well with less energy. However, this is also where disagreement sets in: How much energy should be used, and for what tasks? While the theoretical energy efficiency of a private car is not much in dispute,[6] the disagreement on the extent to which private cars should be used for transportation purposes is hotly debated.

The energy variable also has another advantage over GNP/capita: There is a conception of a limit to energy use, at least to the currently imaginable ways of using energy. The agreements is focussing on physical limits to energy use, i.e. that there is a limit to how much energy may be used if life shall be maintained on the planet, and there is a limit to how much energy is available in the universe over time. There are global limits to thermal pollution, as well as limits to how much CO_2 - or other pollutants from energy conversion processes - may be spewed into the atmosphere. As for the global GNP, however, few Western people seem to be able to visualized any definit upper limit. Also, it is theoretically more difficult to discern and specify such limits, because there are no natural laws governing the shaping of GNP.

But then a crucial question: Is a country more developed if the per capita energy use is very high, or what does energy use in a given country tell us in terms of its level of development? This is where normative considerations come in, and I would take the following stand: Because we know that any conversion and use of energy is associated with negative impacts on the environment and the human race, a low use of energy should be more desirable than a high use of energy, all other factors remaining constant. In other words, if two countries' inhabitants have the same distribution and level of satisfaction of needs, the country wich is using the least amount of energy will be a more developed one. It does matter, of course, whether the level of energy use is based on renewable or non-renewable sources, or whether the use is polluting the environment or not. Accordingly, the most advanced country would be the one which was able to satisfy all the population's needs with the lowest use of non-polluting, renewable energy sources.

Again, physical laws may tell us something about how well we are performing different tasks. Energy efficiency is something calculable, something to which people with opposing value systems may agree. And here lies the basic strength of an energy approach to development as opposed to focussing on GNP, at least when it comes to means indicators. But as we shall discuss in the following, Western man does not design energy systems on basis of consideration of human needs. In the West, the natural thing is for energy use to grow indefinitely - the definition of a "crisis" being one where energy use, for some reason or other, stops growing.

3. RATE OF CHANGE IN ENERGY USE

On a world scale, the use of energy has increased dramatically during this centure. Since 1900, world energy conversion rates have increased over tenfold, while primary energy use during the 50 years from 1924 to 1974 incrased 5 times. For the last 50 years, this amounts to a yearly growth rate of 3.5%, giving a doubling rate of energy use of about 20 years.[7] This is almost identical to the "Historical growth rate" in the U.S. of 3.4% during the 1950-70 period, but somewhat lower than the 1965-73 growth rate of 4.5% per annum.[8] In other industrialized countries, growth rates in energy used during the post-war decades have been comparable or slightly higher than in U.S., reflecting the fact that they started from a much lower base than the U.S. after 1945.[9]

However, after the so-called energy crisis of 1973, the rate of change of energy use has taken a significantly different course. Compared to the growth rates experienced in the period 1968-73, total primary energy use in the 18 IEA countries fell, on the average, 14.3% below projections for 1975.[10] Consequently, government policies in the energy field have become less ambitious when it comes to fulfilling past growth rates, but more so when it comes to conservation and rational use of existing and alternative sources of energy. This process has been gradual, and the tendency is quite clear: Every new

official energy study relased after 1973 shows a lower projected energy use for 1985 and beyond than past studies.[11] And not only do prospects for nuclear power look dimmer by the day, but the prospects for solar energy are continuously revised upwards, so that it today is no longer considered completely utopian to speak of all-solar economies some time after 2000.[12]

At the same time as government officials have been forced to admit that solar energy is viable, at least for the future, they also have had to admit that the relationship between growth in GNP and growth in the use of energy is not a 1-to-1 relationship. In fact, the 1977 OECD energy projection for 1985 and beyond assumes that the average GDP growth rate in the member countries will fall from the 1960-74 rate of 4.6% per year in 1974-85, while the relationship between energy growth and economic growth will drop from 0.99 to 0.84 for the two periods compared.[13] Later projections put the ratio at 0.6, meaning that a one percent growth in GNP only will entail a 0.6% growth in energy use.[14]

For some countries, such as the U.S. and Canada, one may even talk about zero growth while maintaining economic growth at approximately the same level. Although no official energy forecasts are willing to go that far, some countries already have started to plan for a zero energy growth-oriented future.[15] And, no doubt, as the elites now have begun the process of doubting their own beliefs, more countries will gradually convert to the no-growth school, at least when it comes to the use of non-renewable resources.[16] But that this conversion has not come about as a result of fundamentally changed values, but rather as a consequence of physical limitations involved in supplying the projected energy supplies, is shown quite clearly in that all scenarios still imply a continued growth in GNP.

This, therefore, will have to be the next myth to overcome; namely that a continued growth in the production and use of things in the already-overdeveloped countries is necessary to ensure further development. Industrialized nations will undoubtedly be able to cope with the worst polluting aspects of present energy sources by converting to cleaner sources of

energy. However, the non-physical factors negatively associated with high levels of energy use will still be with us and further aggravate official statistics on social pathologies. Ivan Illich is undoubtedly correct when he argues that "beyond a certain-median per capita energy level, the political system and cultural context of any society must decay".[17] The problem, however, is one of deciding where that level lies, and whether it matters what kind of energy is used for what purposes and by whom.[4,18] Preliminary research indicates that the production of basic material needs may be fulfilled with a per capita energy use of around 1-3 tons of coal equivalent used inefficiently,[19] but with substantially less, if energy quality is matched to end-use and used at near-theoretical efficiency.[20] In other words, present world energy use per capita should suffice to give everybody a sufficient material standard of living[21] at a level comparable to the living-standard found in many industrialized countries today. The task that lies ahead of us in the energy field, therefore, should not be seen as being one of incrasing per capita use of energy to present OECD-countries' level, but rather to equalize all world citizens' use of energy towards present average levels, at the same time as non-renewable and "hard" technologies are replaced by "soft" energy technologies.[22]

But before we start discussing how energy policies may be designed as part of a strategy to eliminate underlying, contributing factors to social pathologies, we shall look more closely at how fast many such ills have changed during the last few decades in several industrialized countries.[23]

4. RATE OF CHANGE OF SOCIAL PATHOLOGIES

Several papers written as part of a joint project between the GPID Project of the United Nations University and Society for International Development have dealt with the emergence of many social pathologies in the industrialized world.[24] Although these papers also have been dealing with positive developments, it seems clear, to paraphrase Johan Galtung and Monica Wemegah, that "something has gone wrong, somewhere", in the most affluent

part of the world.[25] We shall, however, explore somewhat further their finding that the typical range of growth rates for many social pathologies lies in the vicinity of 4-9% per year, indicating a doubling rate of 8-18 years. This is substantially higher than either the doubling rate of real GNP or of energy use per capita, something which could indicate that for some of the social pathologies, saturation points are still ahead of us. Saturation points for how much a society may tolerate of a given social pathology, or the society's social outer limit, seems to be more difficult to determine than market saturation for material goods.[26] It is also our view, however, that some recent positive development in the field of social pathologies indicate that society's limits may have been reached in some instances, i.e. that negative effects have become strong enough to initiate preventive actions. Interestingly enough, as we shall see, the slowing down of some trends coincide with the coming of energy conservation and new energy techonologies. This does not necessarily indicate causality, but it may be that the decline in the growth of material processing and the resistance against "hard" technologies signalize the coming of a new era of development amongst the overdeveloped.

We shall keep the four needs categories so far used in the World Indicators Program [27] and which in essence have been kept in the GPID project as a useful way of categorizing needs. The four groups and the indicators which may be seen to negate the fulfillment of such needs are taken to be the following:

Table 1 Indicators of negation of needs

Needs category:	Indicators
Survival	Crime rates: homicides and violent assaults. Accidents from transportation, in the workplace, etc. (Political) terrorism, internal revolt, police brutality.
Welfare	Frequency of heart disease and stroke, cancer, diabetes, tooth decay, overweight, chronic diseases (allergies, migraine, rheumatism etc). Unemployment and underemployment. Alienating or meanlingless work. Lack of exercise.

Identity	Pathological addiction to alcohol, drugs, narcotics, cigarettes, sugar, coffe or tea. Suicide rates. Mental illnesses (neuroses, psychoses, schizophrenia) Societal changes (disappearance of physical surroundings, lack of "roots", dissolving partnerships, etc.). Juvenile delinquency.
Freedom	Large choice of material goods/bads, small choice in choice of occupation, place to live, clean air, no noise, unpolluted food etc. Various symptoms of breakdown caused by "over-choice", for instance of sexual partners: venerial diseases.

The mentioned indicators should not be seen as more than suggestions - surely there are other indicators in additions,[28] and some of the indicaters may not be indicating very much in terms of systems breakdown in the overdeveloped world. But as a basis for discussion, we shall look at some of the trends in the development of several of the mentioned indicators.

4.1. Survival

Trends in murder, manslaughter and infanticide in England and Wales show a strong upward trend from 1967 to 1974, i.e. on the average about 7% per year. However, after 1974, the figures are significantly lower, almost 20% lower in 1977.[29] Homicide rates in Norway have increased 100% during 20 years, or about 3.5% per year in relative numbers as a yearly average, but somewhat higher in absolute numbers (from 11 to 32 homicides per year from 1951-55 to 1976-79).[30] Annual incrase of violent crimes in the U.S. 1960-70 were about 9%, but declined to 6% during 1970-74.[31] Property-related crimes increased 1% less in both periods, according to the same source. Violent deaths in Italy do not seem to have followed the regular trends experienced in many industrialized countries: "Italian society has always been characterized by outbursts of violence", and "for every 100.000 inhabitants, there are from 60 to 40 deaths due to violent causes" each year from 1881.[32]

Furthermore, the more recent outburst of political violence, it seems, substitutes, rather than adds to, common violence. In Poland, homicides and willful injuries actually declined by 60% per million population from 1960 to 1972. Accidents, poisoning and injuries, however, took a much larger death toll in Poland in 1975 than in 1960, the death rate per million increased from 430 to 700, or about 4% per year in frequency.[33] Edward Goldsmith reports that crime rates in Sweden have jumped 90% in a decade, i.e. a compounded growth rate of above 6% per annum. But he warns us that "all crimes are not reported to the police, indeed it would appear that in the U.S. less than half are".[34] Notwithstanding lacking data on crime, however, it seems that violent crimes in several countries are on the decline, and that growth rates have not parallelled GNP or energy growth rates, except during certain periods (notably during the 1960's).

Statistics on deaths from accidents, particularly deaths from traffic accidents, seem to be leveling out or even decreasing in many of the most industrialized countries. In Norway, the death rate from accidents (all kinds) increased only slightly more than 13% during 20 years untill 1975;[35] in the U.S. relative death rates from accidents are now well below the 1970 level;[36] Swiss data show a marked drop in traffic death tolls after 1970, but also in other violent deaths since that year ("other" violent deaths in Switzerland were more than twice as frequent in 1900 than in 1976).[37] The same pattern is found in England and Wales, where 1965 figures for "all accidents" and in "Transport" (deaths) are well above the 1975 level.[38] The notable exception, as we noted above, was Poland, where automobility still may be on the rise, as opposed to the near-saturated private car-markets of the U.S., Switzerland, Norway and others.

4.2. Welfare

As we know, there may be too much of a good thing, and too much comfort and rich foods are important factors in explaining the exploding statistics on the so-called diseases of civilization. After World War 2, mortality rates from heart disease jumped upwards in many industrialized countries, often surpassing the GNP growth rates. Heart disease represent the major cause of

death in these countries, in some cases being responsible for about 50% of all deaths. However, during the recent years, the rate of increase in mortality has slowed down considerably, and some countries are now actually experiencing negative growth rates. In Norway, for instance, deaths from cardiovascular diseases per 100.000 population almost doubled from 1946-50 to 1971-75.[39] However, the relative increase for each 5-year period after 1945 has become smaller and smaller. Although almost 50% of all deaths in Norway i 1978 (40 682 deaths in total) were attributed to this category, a slight increase from 1977, mortality trends during the previous eight years pointed downwards, indicating that a ceiling has been reached.[40] The same tendency is found in other industrialized countries, such as the U.S. (where the death rate from heart disease and stroke fell by about 20% from 1968 to 1976, i.e. 180.000 less deaths per year[41]), Belgium Finland and Switzerland.[42] Other countries, such as Poland and Italy, still show large increases during the recent decade, but in such cases, the death rates from heart diseases are still well below those of the most overdeveloped countries.[43]

The increase in death rates from cancer, however, does not seem to follow the pattern indicated for heart conditions. First, the growth rates seem to have been much lower, around 1 to 2% per year in number of deaths from malignent tumors, and, second, the growth seems to continue at an unabated pace into the future.[44] A recent study done for the Norwegian Ministry of Social Affairs predicts an annual growth rate of new cancer cases of about 3%,[45] half of which represents an increased risk of cancer in the general population, the other half of which may be ascribed to the relative increase in old people in the total population, combined with population growth. The same report also gives the total number of cancer cases per year, showing a 75% increase from 1951/55 to 1971/75, but with an increasing rate of change for each quintile for the total period.[46]

We do not have any available statistics showing the growth rates in diseases such as diabetes or in the number of obese people during the last few decades. Estimates published in Der Spiegel[47] indicate a 10-fold rise in the frequency of diabetes among the population in industrialized countries, from a few per mill to

several percent, thus closely parallelling the growth rate in energy use. This also is parallelled by remarkable growth in per capita sugar consumption, one of the main contributing factors to diabetes, from a world average of 1-1.5 kg to more than 20 kg.[48] At the same time, the reduction of dental health has been staggering: In the United Kingdom, 1968 estimates revealed that more than 1/3 of the population had no teeth at all;[49] in Oslo more than 25% had none or few teeth of their own in 1975, while the 50-66 year-olds had 57% in this category and the 67+ surpassed 80% toothless persons;[50] in the U.S., estimates are that half of all people over 55 have no teeth.[51] In short, the dental health of the population in the so-called developed world is no less than catastrophic, and it is hard to call a country "developed" when nearly 100% of the population is afflicted with a disease of which the etiology is well known, and when may so-called primitive people are almost completely unaffected by the same disease.[52]

The particular form of human energy which is consumed in white sugar is detrimental to the human metabolism and contributes to a great many diseases, not because it is too caloric, but because of the inferior quality as a food.[53] Together with the high fat-intake, too low levels of exercise and a general overuse of non-fibreous foods, the overnutrition in the western world has perhaps been the most significant factor in boosting health budgets. In the U.S., the potential savings in nutrition related costs are estimated at $ 40 billion, not including cancer, kidney diseases and consequences of maternal malnutrition.[54] Altogether, improved nutrition might cut the U.S. health bill by one-third, closely parallelling benefits perceived in the well-documented West German Ernährungsbericht 1976, which estimated that nutrition-related diseases cost the Germans as much as DM 7 billion per year, or 2% and GNP.[55] Available statistics on per capita sugar consumption in several countries show that there is a limit to how much sugar can be consumed, and it seems safe to predict that for the already-overfed, consumption will not get much higher. Also, since suger is so cheap, consumption may be influenced by simply increasing prices, something which again will significantly improve not only dental health, but the general health of the population as well.

In Norway, for instance, the 1960-72 per capita sugar consumption of more than 40 kg was reduced to about 33 kg during 1973-77, something which must have contributed significantly to the recent marked drop in dental decay rates in the population.[56] Rate of change in the future in this field, therefore, may not be expected to parallell historic per capita growth rates in energy use, and may in fact take a steep dive from the 40-55 kg/capita sugar consumption experienced in many industrialized countries until recently.[57] This, in turn, will affect the frequency of diabetes, obesety, gout, heart disease, arthritis and other social pathologies found to increase at an alarming rate during the last decades in the West.[58]

4.3. Identity

Let us then look at indicators of a possible identity crisis in the overdeveloped world. While energy policies and nutrition reform may remove many ailments suffered by the populations of these countries, what may be done about alienation, of feelings of loneliness, of lacking participation or other signs of an identity crisis spreading throughout the industrialized world? Leaving this question for now, let us look at some of the trends which have been reported in the statistics. But first a word of warning: Different cultures seem to have different ways of coping with alienation and stress situations - in some countries, people may resort to suicide, while the population in another country may become heavy drinkers or turn to narcotics or "popping"pills. In other words, there may be a trade-off between several social pathologies, so that a decrease in one factor may be offset by an increase in another. Also, the statistics may be very inaccurate because of problems in recording. But some tendencies may be observed: As for suicide, The World Health Organization a few years ago released a report with statistical data from 24 countries.[59] For the period observed (1961-69), results were mixed: Of the 7 countries with the highest rates for males in 1961 (Hungary, Finland, Austria, Czechoslovakia, Switzerland, Sweden and West Germany), 5 had even higher rates in 1969 (Austria and Switzerland being the exceptions). The increase in frequency per 100 000 population varied between 10

and 33%, or from about 1 to 4% per year. The rates for females were only 1/2 to 1/3 of those for males, but showing similar developments. On the other hand, many countries with low rates in 1961 did not experience any increase by 1969, or even a slight decrease (Scotland, Italy, Greece, among others, for males, and Italy, Greece and Ireland for females).[60]

Suicide statistics from Switzerland show that the rates were significantly lower in 1960 and 1970 than the previous several decades, but that the 1976-figures again start approaching the 1960-level.[61] As for Norway, the number of suicides has been increasing steadily after World War 2, but from a much lower base than for Switzerland (less than half the rates) - the growth rates during the last 10 years being around 3% p.a.[62] For the U.S., the figures (rates per 100 000) are rather stable since 1950, with virtually no change since 1965.[63] 1964-76 statistics on suicide for England and Wales reveal a sharp downturn in numbers, from more than 5.500 per year to below 4.000.[64] Similarily, Polish suicide rates since 1970 show no increase, while the 1960 rate was 20% lower than 1975.[65]

There seems to be "a positive connection between alcohol and drug addiction on the one hand and suicide on the other", according to WHO.[66] Therefore, an upsurge in alcoholism and/or drug addiction may be followed by more suicide in the future, even if the statistics have not been able to capture them yet. The figures on alcohol consumption are not very encouraging: According to another WHO study,[67] the yearly percentage increase in alcohol consumption per capita in nine countries varied from an average of 1.5-5% to 8-10% with one case above 20% per year (Finland), for the period around 1960-1971. More recent data from two of the included countries, Finland and Poland, show even larger consumption levels in 1975 than indicated by WHO.[68] At the same time as alcohol consumption is increasing, we also find increasing death rates from cirrhosis of the liver, although for instance in the U.S., the growth rates have stagnated.[69]

Drug addiction, alcoholism and suicides all have something to do with mental health. With identity feelings dissolving, one would expect mental illness to become more serious. Som stati-

stics show us that mental illness is on the rise, and the close link with alcohol and drugs is revealed when number of admissions to mental hospitals and units for illness related to alcohol and drug use for England show an increase of almost 130% during 1964-74.[70] Indications are that problems related to suicide,[71] alcoholism and drug dependence include younger and younger people.[72]

Also, the use of dangerous drugs represents a special problem in several countries, even if the population afflicted is not larger than a few percent. Trends in the use of heroin in the U.S. are reasonably well known.[73] In 1965, an epidemic of heroin use began in the U.S., with new use increasing ten times in less than 7 years, originating in the large metropolitan areas on both the coasts. Narcotic related hepatitis cases grew from around 4.000 in 1966 to 35.000 in 1971-72, for then to decline somewhat the following two years. According to the "Drug Abuse" paper, "A number of cities which showed a decline in heroin use in 1972-73 are now reporting an increase in prevalence based on rising numbers of heroin-related emergency room visits and heroin-related overdose deaths. These cities are also experiencing rising heroin purity. All these factors indicate a deteriorating situation".[74] Various other drugs, such as barbiturates, tranquilizers and amphetamines also seem to be in more frequent use, although statistics on use and sources of such drugs are not as reliable as for heroin. An estimate of the 1975 use in the U.S. of such drugs puts the figure at 5 percent of the adult population, or 7 to 8 million U.S. citizens,[75] while heroin users are counted in per mill of the population.

4.4 Freedom

As to the freedom dimension, we have more difficulties in finding good indicators of too much freedom. One important issue has been raised by Alvin Toffler in his famous Future Shock,[75] where he discusses the psychological and social implications of having too much choice and having available too many bits of information for the human mind to master. If we have

the freedom to choose from too many things (events, possibilities), we may suffer from "information overload".[76] The same may be said about someone who has to make decisions incessantly, i.e. where the structure loads too many choices on people and call it "freedom of choice", in fact leading to mental illness instead of happy-go-lucky consumers. Growth rates on consumer choices have certainly been impressive during the last decades, probably by far surpassing energy or GNP growth rates, although we do not have any statistics available.

Another indicator of too much freedom may possibly be indicated by the explosive figures on venerial disease in countries such as the U.S. Reported cases of gonorrhea, for instance, rose from slightly above 200 000 in the late 1950's to around 1 million in 1976.[77] Of course, the frequent occurance of many sexually transmitted diseases may not necessarity mean that there is too much sexual freedom in the West, it may on the contrary mean that there is too little openness about such issues, or too little information on how to avoid venerial disease (V.D.). As Donald D. Shroeder says: "Public embarrassment and hush-hush attitudes about sexually transmitted diseases... have made them a "silent epidemic" that many don't even know exists. Yet the startling fact is, these diseases, as a group, are by far the No. 1 communicable disease problem in most of our modern nations. Only flue and colds, which are not officially reported, occur more frequently".[78] Obviously, a disease that could cause brain damage, heart trouble, paralysis, sterility or a host of other problems, including death (for which syphilis is most well known), deserves a lot more attention than the moral finger pointed at young people by religious people, whose alternative to possibly contracting a V.D. is to live in complete abstinence.[79]

Indicators of too little freedom may be easier to visualize, but, again, trends are hard to interpret from available data. An excellent passage on freedom by Irvine & Miles[80] discusses the fact that many freedoms in higly industrialized countries may not be enjoyed because of the inherent class structure. When it takes money to enjoy freedom, a certain educational background or training from a particular mileu to gain full benefits of available opportunities on the job market, to make political or

market choices, inequalities in such qualities will mean that freedom in practice is restricted for many. Indications are that although opportunities for many people have multiplied, relative poverty exists. In the United Kingdom, the richest 10% of the population still hold 62% of all marketable assets, 58% of all liquid assets and 51% of all cash assets, according to estimates.[80] Although there have been recent gains in womens' rights,[81] role-expectation and social pressure force a great many women into behavior which is not of their voluntary choice. And political controls, emprisonments and subtle and not-so subtle mechanisms to exclude people with certain political views from the job-marked may be becoming more important. At the same time, the present economic recession in the West has left unemployment in the OECD area at more than 20 million with small chances of significant improvements in the years to come.[82]

In conclusion, however, it is hard to come up with any growth rates of social anomalies in the freedom category - we can only indicate that in spite of a greatly enchanced possibility to choose among many less important things in the overdeveloped world, more fundamental choices are probably no more free to be had today than they were before.

5. SOCIAL PATHOLOGIES AND ENERGY POLICIES

There are many ways of trying to combat human suffering and unnecessary deaths, for instance through laws and regulations, the use of policing mechanisms, through public information, etc. In the following, however, we shall look at how energy policies may be related to several of the most important negative aspects of industrialized life, and how energy policies overlap or have common grounds with such things as nutritional policies, transportation, agriculture, industry and consumer interests. First, let us recapitulate the major causes of death by using three highly industrialized countries as examples, comparing these with the death rates in one of them in 1900:

Table 2: Major causes of death - 1900 and 1970's compared

		Percentage of deaths caused by:				
Country	Year	Cardio-vascular diseases	Cancer	Respira-tory diseases	Accidents Injuries	All other causes
U.S.A.	1900	14.2*	3.7	23.1	4.2	54.8
U.S.A.	1975	49.6**	19.3	2.9	5.4	22.8
Switzerland	1976	43.2	20.1	5.6	5.2	25.9
Norway	1978	49.4	20.7	8.7	4.7	15.3

Sources: Samuel S. Epstein (1978) p. 16; Monica and Bärfuss (1978) p. 29-30; and Central Bureau of Statistics, Oslo 1979.
*includes diseases of the heart and cerebral hemorrhage (stroke)
**diseases of the heart, stroke and arteriosclerosis

In the U.S. in 1900, the most common causes of death were influenza, pheumonia, gastroenteritis and heart diseases, while cancer only figured as number eight on the list. Today, cardiovascular diseases and cancer account for about 2/3 of all causes of death in industrialized countries. Also, note that sudden death from heart failure, f.inst. in Norway, occupied 5th place in the death statistics with 3.3% of total deaths in 1978, while suicides accounted for 1.2%; about half the Swiss rate. [83] Curiously enough, almost nobody in Norway dies simply from being old and tired of life. In the statistics, at least, only 0.9% died from senility in 1978, less deaths than reported from suicide. This has something to do with the way statistics are made up: death is always considered to be caused by one factor, even if there may be very many contributing factors. But how we die also tells us something about how we have lived our lives; in this case, less than ideal lives.

When it comes to the major "civilization" disease, i.e. dying from some kind of heart disease, there is obviously no one cause which we may look for, find, and then eliminate. In fact, the literature lists some 40 factors associated with coronary risk, several of which are directly linked with energy use, such as lack of physical exercise, the intake of fat, sugar and heavy meals (promoted by the "junk food" industry), and income levels [84]. We also know that cancer to a large extent is caused by man-made carcinogens, diets and probably also enhanced by

stress.[85] Such factors, again, are related to industrial pollution, carcinogenic substances found in combustion gases from power plants, cars and heating systems, from automobiles, break linings (asbestos), from replacing natural materials with synthetics,[86] from cigarette smoking and even from fluoride added to the drinking water or accidentially released in the environment.[87] Diseases in the respiratory system, of course, have something to do with whether or not people breathe clean air.[88] Air pollution from heavy use of fossil fuels, as witnessed by the extremely high rate of diseases of the respiratory system in coal-burning Poland,[89] contributes strongly to the third cause of death, while road accidents take their heavy tolls because so much energy is devoted to transportation in private cars. Although it may be argued that many industrialized countries now experience zero growth in deaths from motor vehicle accidents, the rates are already unacceptably high. In addition to deaths from motor vehicle accidents, injuries run some 20 times higher, and many people are crippled or incapacitated for life.[90]

It is impossible to estimate how many people develop addiction to alcohol, narcotics, nicotine, or become mentally ill as a consequence of loss of dear family or friends, of having to take care of someone chronically ill or of becoming crippled or ill oneself as a consequence of accidents or environmentally-induced cancer. But the secondary effects of heedless energy use are definitely important as a contributing factor in explaining mental disease, suicides or other social pathologies. Also, we have seen how vulnerable central energy production systems are in the recent "black- and brown-outs" on the U.S. East Coast, not only causing unecessary suffering (like people suffocating in elevators or freezing in their unheated homes), but also giving rise to social upheavals and letting loose suppressed criminal behavior in central cities.[91]

The discussion above, therefore, contains arguments for changing the overdeveloped countries' use of energy in several ways: First, by cutting down on the total use of energy by eliminating waste and limiting energy use in for instance food processing, transportation, industry and agriculture. Second, by replacing polluting energy sources with renewable, non-polluting sources

of energy, such as the sun, the wind and the tides, biogas and biomass. Thirdly, by making sure that energy conversion and use takes place decentralized and with simple technology, so as to strengthen local self-reliance in the field of energy.

In other words, we feel that energy policies should be linked with the following important areas, where we know that changing policies may reduce the prevalence of social pathologies in our time.

5.1. Nutrition and agriculture

Even if food production is not considered to be very energy intensive, the most industrialized countries in the world use enormous amounts of energy in their food system. In the U.S., for instance, more than 12% of all fuel is consumed by the food system, and food processing uses almost twice as much as does farming [92]. Because of the high total energy use, this means that the U.S. food production system uses more than 2/3 as much energy per capita as the world average for all uses, clearly an unobtainable goal for humankind. If a limit is put on how much energy may be used on food processing, i.e. often turning nutritious food into "junk" food (potatoes made into salty 40%-fat chips), large benefits in terms of improved diets may take place [93]. At the same time, a conversion to more organic farming, including the use of natural instead of artificial fertilizers, will have a significant effect on raising employment and reducing negative health effects from biocides and chemical fertilizers. [94] At the same time, cutting down on energy use in agriculture will increase the demand for labor input, thus getting more people out of unemployment and into meaningful and mostly healthy work. [95]

5.2. Transportation

A limit to energy used for transportation will obviously have large effects on society: First, products will have to be produced nearer the point of consumption, enabling industries and other activities to become more decentralized. Second, some

products may not be considered important enough to be transported from very far away (like massive amounts of sugar or bauxite, for instance). Thirdly, with a much smaller volume of transporation, accidents will drop, and fuel combustion will cause less air pollution.

People will pick up walking and bicycling to a much larger extent, something which will mean better protection against heart diseases [96]; i.e. being healthy for the body; and use collective means of transportation, which may be good for the mind (preventing loneliness?).

5.3. Industry

Coupled with the decentralization of industry due to limits put on energy use in transportation, industry should take advantage of technological advances to promote small-scale production. In fact, recent research has shown that much of the theory behind large-scale production and decreasing unit costs is simply not true, i.e. that smaller production units in fact may produce goods just as rationally and often better than large factories [97]. What the small producers lack is market power, something which may be compensated for by cooperative ventures with many small units combining their insights instead of competing for market shares. Coupled with more labor-intensiveness, more artisan and craft-type of work, more use of natural as opposed to synthetic or artifical raw materials, scaling down to human size will be a boon to both body and mind.

5.4. Housing

One of the easiest areas to convert to low-energy, renewable sources of energy is the housing sector of the economy. Instead of providing more energy in centralized power stations to heat poorly insulated houses, money may be put into insulation, heat pumps, heat exchangers, solar heating systems and district heating from local industry. The potential reduction in the use

of fuels and electricity in buildings in OECD countries has been estimated to represent 50-80% depending on existing standards.[98] In other words, employment and resources may be used decentralized, not only saving new supply system construction, but also cutting down on energy now wasted. It is important to note that the housing area may be the main area where low-cost "soft" energy technologies based on renewable energy flows may be put to use, at the same time as new heating alternatives will open a large scope for local community-type options.[99]

6. CONCLUSION

In this paper we have explored some of the areas where energy policies may have an impact in reducing social pathologies in the industrialized part of the world. When looking at specific growth rates, we find a much more diverse picture than expected. Although the frequence of some social pathologies still seem to be on the rise, others are actually declining. The somewhat disconcerting thing about improvements in the populations' general health, however, is that they are not evenly distributed among the population: Well-educated and economically above-average groups are reaping the major benefits of increased knowledge of environmental sources of disease. An example of this may be given with a few figures from the so-called Oslo-check-up of 18 000 men, where it was found that the total number of risk factors for heart disease was twice as large for people with the lowest education and income, compared with the highest status group.[100] Similarly, in the lowest status group, almost 2/3 were daily smokers, while higher status group showed a diminishing smoking frequence, being as low as 18% in the highest group. In other words, what is about to happen is that a new class division in highly complex societies is about to crystallize itself, this time not only along educational and economic lines, but also health dimensions. This is not a new phenomenon, but it seems that the polarization of classes of health has become larger since the 1950's and the 1960's, indicating a suspicion long held by some people [101] that equality of opportunity in modern democracies not necessarily implies equality in results. This paper suggests that energy policies may be used consciously to

reduce existing inequalities in health; for example, by using the renewable solar energy instead of burning dirty coal, the soot and pollution that previously mostly hurt poor people, would be eliminated. Also, by merging energy policies with nutritional interests and an analysis of basic needs, combining in a strategy for increased self-reliance, we may increase equality in health as well in participation in shaping one's own future. In this way, there will be a basis for increased equality in material wealth, and not only of opportunity.

In the first part of this paper, we looked at some of the evidence that energy policies indeed are changing in the West. The major reason for this modification of energy policies can be found in the concern for gaining independence from OPEC and to secure long-term supplies of cheap fuel, so that the Western growth model can be maintained. However, in pursuing such goals, these countries have been confronted with studies made by analysts who have made their values more explicit, thus forcing policy makers to think beyond the merely political and military-strategic views. Also, the growing opposition to nuclear power all over the Western world,[102] combined with the current economic recession, have proven so strong that demands from solar energy lobbyists and Alternative Ways of Life movements have managed to force OECD countries into tentative conservation efforts and to take their first steps, although reluctantly so, on the solar energy path.[103] At the same time, small indications here and there tell us that the ruling energy czars in the overdeveloped world now have begun to doubt their own supremacy, and several leading bureaucrats and policy makers have resigned from their jobs in frustration.[104] It is therefore no longer totally utopian to imagine that the transition period we now have entered may not lead us back to the old growth road, but is actually the start of a new era, where social pathologies and energy growth rates again converge - but this time with a negative prefix.

7. Notes:

*The present paper was first presented to the Third Network Meeting of the Goals, Processes and Indicators of Development Project of the UN University, held in Geneva during October 2 - 9, 1978. In the revision and updating of this paper, the inspiration and help from network members, in particular Johan Galtung, has been most helpful. The responsibility for data and conclusions drawn are, however, entirely my own. During the period of March 1978 to December 1980 the author has been financially supported by The Norwegian Council for Science and the Humanities.

1) The concept of overdevelopment has been discussed by the author several places (JPR 1977, June 1977), also with Galtung and Wemegah (May 1979).

2) Trends in the development of social pathologies are discussed in Poleszynski (June 1980), Wemegah and Bärfuss (April and October, 1978), Siciński (April 1978), Irvine and Miles (April 1978), Bonani (April 1978).

3) This discussion is further taken up in Poleszynski (December 1980), where toxic effects of environmental pollutants are discussed in relationship with food.

4) An acceptable range of per capita energy use would probably set a floor at about 1 kW and a ceiling at maximum 3-4 kW. This compares with an energy availability of less than 0.5 kW per capita per year for poor countries in Africa and Asia today, while U.S. figures show 10-11 kW and European countries about 4-6 kW. See Bach et al (1980), p. 713, 734 and 882. Krause et al (1980), p. 168, indicate that an attainable goal for 2030, given present BRD material comfort level would be a range of 1.7-2.5 for all world regions.

5) The "hidden assumptions" of the Western social cosmology have been discussed in seminars, lectures and in numerous papers by Johan Galtung, an issue which is extensively commented and referred to in Poleszynski (December 1980) and in Galtung, Poleszynski and Rudeng (1980).

6) According to the American Institute of Physics (1975), p. 112, 1971-73 automobiles in the U.S. had a secon-law efficiency of about 0.09.

7) See "Production of Energy in the 20th Century,""p. 8-11 in The Oak Ridge National Laboratory (1974) report.

8) Energy Policy Project of the Ford Foundation (October 1974), page 19.

9) OECD (January 1977), page 27. The average energy growth rate in the OECD area during 1960-73 was 5.1% per year, giving a doubling period of less than 14 years.

10) The drop in energy use relative to projections varied from around 20% (Netherlands, Japan, Belgium) to below 10% (Sweden, Norway, Turkey), according to OECD (September 1976), page 14.

11) The 1975 OECD report, Energy Prospects to 1985, forecast a total energy requirement of 6,302 Mtoe (Million tons of oil equivalent; base case) and 5,603 Mtoe respectively ($9 per barrel of oil case), while the 1977 review put the Reference Case at 5,218 Mtoe. See page 31, reference 9 above.

12) See Johansson and Steen (December 1977) for the Swedish case, which is described as completely solar by 2015. For a comment on this study, see Gordon Taylor (24 August 1978). For Norway's solar prospects, see Atterkvist and Johansson (1980). A summary of solar studies is given by U.S. Department of Energy (June 1978), referring to 17 different studies on U.S. solar prospects for 1985, 2000 and 2020. The highest estimate is given by Amory Lovins, who elsewhere (1977) has argued for a gradual transistion to an all-soft solar energy economy for the U.S. by 2025. Also see John Steinhart et. al. (1979) for a U.S. energy scenario involving 50% solar by 2050 and total energy shrinkage by more than half.

13) See OECD (January 1977), p. 27. Also see reference 8 above, the Zero Growth alternative, where total energy use by 2000 is expected to rise by 1/3 relative to 1975, while total private consumption is projected to be 125% higher than 1975 levels (the Historical Growth case puts consumption by 2000 140% above 1975 levels).

14) This target was set at the IEA Ministerial Meeting in July 1980. Targets for energy growth until 2000, however, mean almost a 10-fold rise in nuclear capacity and a tripling of coal consumption within the IEA compared with present levels.

15) Although Sweden has planned a 2% yearly energy growth rate until 1990 and zero growth thereafter, 1973-78 energy statistics show that zero growth already has been achieved.

16) One example in how forecasts of energy use in the U.S. have shifted are shown by Amory Lovins, who has made the following Table* (reproduced in Steinhart et. al., page 4):

Year of forecast	Beyond the pale	Heresy	Conventional wisdom	Superstition
1972	125 (Lovins)	140 (Sierra)	160 (AEC)	190 (FPC)
1974	100 (Ford ZEG)	124 (Ford TF)	140 (ERDA)	160 (EEI)
1976	75 (Lovins)	89-95 (VonHippel)	124 (ERDA)	140 (EEI)
1977-78	33 (Steinhart)	67-77 (NAS I II)	96-101 (NAS III, AW)	124 (Lapp)

*All figures in Quads per year (quadrillion Btu), the 1979 rate being about 75 Quads, estimating energy demand by the year 2000. For explanations of abbreviations, see reference. Note the diagonals, showing the shift downwards.

17) Ivan Illich (1975), p. 18-19.

18) As discussed by Lovins (1977), there are several questions we must ask in order not to talk nonsense about future energy needs, namely: 1) Who is going to require the energy? 2) How much energy? 3) What kind of energy? 4) For what purpose? 5) For how long? (Questions originally by H. Daly, "On thinking about future energy requirements," Baton Rouge, Department of Economics, Louisiana State University, 1976).

19) The energy requirements for fulfilling basic material needs may vary according to infrastructure, geography, climate and cultural factors. A discussion of this point is taken up by the author (JPR 1977) and in Krause/Bossel/Müller-Reissman (1980).

20) According to American Institute of Physics (1975), p.9, U.S. "energy resources are being consumed with an overall second-law efficiency of only 10 to 15 percent. This is not only wasteful, but inelegant. There is much room for improvement, for designing our machines to be technically excellent and to reflect the powerful insights of modern science and technology." In theory, this would mean that the U.S. economy could function with a per capita energy use of only 1 - 1.5 kW per year, even without reducing the production of unnecessary luxury products.

21) Excluding wood, wastes and other non-commercial energy sources, world-wide per capita energy use in 1973 has been estimated at approximately 2.1 tce (tons of coal equivalents), according to the Oak Ridge Survey (1974). Mid-1970s' estimates put the figure only slightly higher at about 2.1 kW per capita/year.

22) Such a strategy has been forcefully argued by Lovins (1977). Also see Denis Hayes: "Solar Possibilities," in Bach et. al. (1980). Note that not all renewable energy sources automatically represent "soft" technologies, as vested interests often coopt simple technologies and make them "hard." See Poleszynski (March 1975).

23) The selection of countries is not done in any systematic way, but the sample should be large enough that we may draw some general conclusions concerning trends in western countries in general.

24) A number of the papers listed in the references (all dating back to the April 1978 meeting in Cartigny), plus several papers from later SID/GPID meetings withing the sub-project Alternative Ways of Life (AWL) are now being combined for publication by Pergamon Press some time during 1981 (edited by Miles/Irvine, assisted by Galtung, Poleszynski and Wemegah).

25) See introduction to paper collection edited by Galtung, Poleszynski and Wemegah (May 1979).

26) Market saturation for most common consumer items is already a fact in most industrialized western countries today. See a study undertaken by the author commented upon in Galtung, Poleszynski and Rudeng (1980).

27) The World Indicators Program (WIP) was undertaken at the University of Oslo, Chair in Conflict and Peace Research, under the leadership of Johan Galtung during the period of 1974-77. The present paper represents the last paper in the series of papers emanating from this program but at the same time greatly influenced by the GPID Project.

28) A number of questions relating to indicator formation were discussed at the GPID Indicators Meeting I in Oslo, September 17 - 19, 1980. Papers from this meeting may be obtained from the GPID Geneva Coordinating Unit, Palais des Nations, 1211 Genève 10, Switzerland.

29) Irvine and Miles (1978), page 11.

30) Dag Poleszynski (June 1980), page 8.

31) Arnold and Goulet, Table II B in "The"Abundant Society" and World Order: Dominant and Alternative Life Styles in the U.S.," printed in Galtung, Poleszynski and Wemegah (May 1979).

32) Bonani (1978), page 16.

33) Siciński (1978), page 16.

34) Edward Goldsmith (June 1977), page 184.

35) Death rates per million population declined by 8 per cent during the 1976-78 period compared with 1971-75. See Poleszynski (June 1980), page 6.

36) From Table II B in Arnold and Goulet, see note 31.

37) Wemegah and Bärfuss (October 1978), page 3.

38) Irvine and Miles (1978), page 11, Table 2.

39) Poleszynski (June 1980), page 18.

40) This phenomenon is discussed by Galtung, Poleszynski and Rudeng (1980), page 128,129.

41) This is discussed by the Deutsche Gesellschaft für Ernährung (June 1980), page 10: "1976 rund 180 000 Amerikaner weniger am Herzinfarkt starben als 8 Jahre zuvor." In Western Germany, the situation at least has stabilized, according to the same source. For the U.S., factors such as a 25% reduction in tobacco consumption among adult men, a better diagnosis and treatment of high blood pressure and a reduction in the cholesterol level have been found to correlate with the decreased mortality.

42) The situation with respect to Norway, Belgium, the U.S. and Finland are commented upon by Professor Knut Aas in Fuggeli (1979), page 5, while Swiss trends are discussed by Wemegah and Bärfuss (October 1978), page 29-30.

43) Bonani (1978), page 14, and Siciński (1978), page 17.

44) Compare figures given by Wemegah and Bärfuss (1978), page 29 and 31, and Siciński (1978), page 17, and Poleszynski (June 1980), page 19.

45) Sosialdepartementet (1978), page 102.

46) Same source as above, page 29.

47) Der Spiegel (1976). Also see chapter on "Zuckerkrankheit" in Deutsche Gesellschaft für Ernährung (1976), page 119-122, and also the discussion in the 1980 edition, which shows a decrease in the mortality from diabetes in West Germany after 1975 (see page 12).

48) Yudkin (1973), page 39, refers to the last 150 years. Also see references in Poleszynski (December 1980) for futher data.

49) Irvine and Miles (1978), page 31.

50) Central Bureau of Statistics (July 1977), page 141.

51) United States Senate (December 1977), page 73.

52) According to Yiamouyiannis and Matchan (1978),..."in primitive societies whose drinking water contains low amounts of fluoride, such as the Otomi Indians in Mexico, the Bedouins in Israel, and the Ibos in Nigeria, 80% to 90% of these people go through life without one decayed toth." (page 22). Also note that "In nations of the Far East, where sugar intake per person per year ranged (at the time) from 12 to 32 pounds, the national averages for decayed, missing or filled teeth in adults 20 to 24 years old ran from 0.9 to 5. By contrast, in South American nations, where sugar intake was high (44 to 88 pounds per person annually) the averages....ran from 8.4 to 12.6. As for the United States today, it has been estimated that 98 percent of American children have some tooth decay"... See US Senate (December 1977), page 31-32.

53) This issue is extensively discussed and annotated in Poleszynski (November 1980).

54) US Senate (December 1977), page 2.

55) See page 105 in the mentioned report.

56) Other factors having contributed are: Increased consumption of fresh fruits and vegetables, improved hygiene, an increased availability of unsweetened medicines and chewing-gums etc. Note that the gradual reduction in the caries rate in Norway after 1971 continued in 1978 and 1979 in spite of drastic reductions in the sale of fluoride tablets in both years, indicating that the pre-1978 sales increase in such tablets may not have been such a boon to the 6-17 year old children as assumed. See Norges Medisinaldepot (1980), page 23-26.

57) Figures for 7 countries' per capita sugar consumption are given in Ministry of Agriculture (1975), page 103.

58) A more complete list of diseases believed to be aggravated by overweight is given the 1980 Deutsche Gesellschaft report, page 2, and in the 1976 report, page 114.

59) See WHO (1974) on suicide.

60) See page 75-80 in the mentioned report, note 59.

61) Wemegah and Bärfuss (October 1978), page 40.

62) The period referred to is 1961/65 to 1971/75, averaged for the two five-year periods. 1976-78 figures show a further increase to 117 suicides per million population, compared with 92 during 1971/75. See Poleszynski (june 1980), page 25.

63) Arnold and Goulet, Table II C, see note 31.

64) Irvine and Miles (1978), page 37.

65) Siciński (1978), page 18.

66) See WHO (1974), suicide report, page 87.

67) Joy Moser (1974), page 28. Also see WHO (report 551, 1974).

68) Roos and Roos (1978), page 15, and Siciński, page 8.

69) Arnold and Goulet, Table II C.

70) Irvine and Miles, page 40. Alcoholic psychosis, alcoholism and drug dependence for men increased from 4479 to 9084 and for women from 1426 to 3269 (reported cases) during the period, i.e. a yearly average growth of 13%.

71) According to Irvine and Miles (page 27), suicide is the third major cause of death for people aged 15-34 in England and Wales. Also see Gibbens (1961) for a discussion of aspects of juvenile identity problems and deviant behavior.

72) Both alcohol and nicotine are included in the concept of drugs, both extensively used by more and more young people in industrialized countries. The Domestic Council Drug Abuse Task Force (1975) shows that in the age-group 12-17, as many as 55-60% had ever used alcohol and tobacco, while more than 20 percent had ever used marihuana. More than 35% of the 12-17 year olds were found to have used alcohol "last month," while 20-25% had used tobacco and about 15% had used marihuana. In the Secretary of Health, Education and Welfare (1977) report on "Marihuana and health," figures have already risen substantially: Cannabis use (ever) for white males 12-17 was up to 33 percent, for females 23 percent. An inquiery of high-school seniors in 1977 showed that regular use (past month) of marihuana and cigarettes was comparable, 35-40% (most for cigarettes), while alcohol usage rates were significantly higher (above 70%). See p. 10 in mentioned report.

73) See Task Force (1975) report, page 14.

74) Same as above, page 20.

75) Same as above, page 21. The HEW (1977) report gives the following figures for 1977 high-school seniors (ever tried): Heroin 1.8%, other opiates 10%, cocaine 11%, inhalants 11%, hallucinogens 14%, sedatives 17%, tranquillizers 18%, stimulants 23%, marihuana 56%, cigarettes 76% and alcohol 93%. (see p. 10).

76) See the chapter on "Information overload," page 350-355.

77) Schroeder (1977).

78) See page 10-11 in source above, where Schroeder advocates several standard medical advice, including constancy in relations with one partner, discretion in choice of partners, prophylactics (use of condoms), hygiene, periodic examinations and treatment of sex partners.

79) Research on sexual behavioral patterns in various Norwegian youth groups performed by sexologist Berthold Grünfeldt shows, however, that the moral finger does not work too well: all groups, regardless of religious view, show about the same frequency of sexual intercourse and also about the same debut age.

80) See Table 45 in Irvine and Miles (1978), page 51.

81) The most significant gains from this point of view being the liberalizations in abortion laws and laws against sexual discrimination on the job market. In Norway, as well in other industrial countries, however, the achievments in terms of increased educational opportunities for women have not yet materialized in equal pay and job opportunities, and quotas for the job market etc. have been suggested to alleviate this problem.

82) Ragnhild May (Aftenposten, Sept.22, 1980) also reports that the estimated unemployment figure in the poor part of the world now is set at 400 million.

83) CBS (Oslo 1979) and Wemegah and Bärfuss (October 1978), page 40 and Poleszynski (June 1980), page 25.

84) Strasser (1975) lists four major and relatively uncontroversial risk factors involed in heart disease: Diet and blood lipids, blood pressure, smoking and inactivity.

85) For a discussion of the politics of cancer, see Epstein (1978), who puts main emphasis on occupational-related cancer from chemicals used and produced by industry.

86) See "The New Era of Petrochemical Carcinogens" in Epstein (1978), page 27-34.

87) About 50 industries pollute the air (and partly also the water) with fluoride compounds. Such industries are often highly energy-intensive (production of primary metals, chemical fertilizers, petrochemicals), thus being responsible for a major part of all industry-related pollution due to energy use. For an overview of global fluoride-pollution problems, see Schöhl (1975) and Waldbott (1978), and for the link between cancer and water fluoridation, also see House of Representatives (1977).

88) "Air pollution not only promotes chronic diseases; it also boosts the frequency with which people, especially children, contract short-term respiratory ailments," according to Eckholm (1977), p. 143. Also see Waldbott (1978) on this issue.

89) A 1967-68 representative survey of chronic diseases revealed that, per 1000 people, as many as 611 males and 571 females in towns suffered from diseases of the respiratory system, while the figures for rural areas was 264 and 210, respectively. See Siciński, page 17.

90) Nordic statistics show a small absolute decline in the number of persons killed or injured in road traffic accidents during recent years. However, the total in 1978 still amounted to almost 65,000 killed or injured, almost 40,000 of which involved drivers and passengers of motorcars. See NU A 1979:26, page 216-17.

91) The effects of the 9 November 1965 "brownout" on the North American East Coast was among others that 600,000 people were trapped in the New York subway system. New failures of the centralized electricity system occurred both in 1969 and in 1970, and again in July 1977. This last time, a 16-hour "black-out" lead to 13,000 burglaries and assaults, to food decaying in the stores, to people helplessly being left in skyscrapers without elevators working and total chaos on the roads. For a vivid description of these events, see Ingar Roggen (1977) and his comments on Vacca's The Coming of Dark Age (1971).

92) See Denis Hayes (1976), who splits up the energy used in the U.S. food system as follows (percentage of total use in parenthesis): Food processing (33), Households (30), Agriculture (18), Wholesale & Retail Trade (16), and Transportation (3).

93) United States Senate (1977), page 73-74, estimate the potential reductions from improved diets in some common diseases as follows: Heart and vasculatory diseases, 25% reduction; respiratory and infectious diseases, 20%; mental health, 10% fewer disabilities; dental health, 50% reduction in incidence, severity and expenditure; obesity (afflicting 60-70% of people over 40), 80% reduction in frequency; alcoholism, 33% down. The recommended dietary changes include avoiding processed food, reducing salt intakes and the use of artificial food additives, cutting sugar consumption in half, reducing the fat component in diets, etc. Note that "Perhaps the kind of basic prudent dietary recommendations made in this report will help to provide not only a framework for reducing dietary risk but also for more prudent use of energy." (Preface, page WWII).

94) Comparisons between "organic" and "conventional" farms in the U.S. have shown the former to use only 1/3 as much energy as the latter, with comparable yields, basically due to non-use of artificial fertilizers, but also of less use of chemicals. See Barry Commoner et. al. (July 1975). For an evaluation of the effect of nitrogen-fertilizers role in depleting the ozone layer, causing increased incidence of skin cancer, see Miller (September 1975), where estimates of ozone reduction from use of nitrogen fertilizer is put at 15%.

95) See Hayes (1976), page 40, on how energy has substituted for labor on U.S. farms from 1920 to 1970. Curves shown indicate a 90% reduction in labor input and more than five times increase in total energy use for the period.

96) Strasser (1978), page 5-8. Also see quotations by Ingvar Hjermann and Knut Aas in Fugelli (1979) concerning the significance of exercise in preventing heart disease.

97) Haugland et. al. (1978).

98) See Hayes (1976), page 34. Also see Dag Poleszynski (April 1978 and February 1980) for a discussion of potential savings in energy use in households.

99) Sweden has now started to build residential areas with neighborhood-sized solar heating systems, thus greatly enhancing energy self-reliance at the local level. See Taylor (1978).

100) Ingvar Hjermann, one of the main researchers taking part in this study, is quoted on this topic in Fugelli (1979). The point about a class division in the area of health is also well taken care of by Irvine and Miles and by Eckholm (1977).

101) See Hernes and Knudsen (1976) and Galtung, Beck and Jaastad (1974), all of them probably inspired by Ivan Illich's many essays on this topic.

102) See Lutz Mez (1979), Nash (1979) and Lovins (1977).

103) Council on Environmental Quality (1979) probably represents one of the most optimistic conservation/solar reports from official bodies within the OECD during recent years.

104) In Norway, a large number of top-level experts within The Norwegian Resources and Electricity Board have resigned during recent years; the General Director resigned in 1975 because of anti-nuclear power sentiments, the head of the Thermal Power Group has been replaced twice recently, and several engineers have found new employment. Also note that John O'Leary, Deputy Secretary of the U.S. Department of Energy, in February 1978 remarked that "nuclear power, which ten years ago was the hope of all energy planners, is now a "has-been."" Quote from Worldwatch Institute senior researcher Colin Norman.

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