NEGATIVE POPULATION GROWTH

THE NPG FORUM

Europe In The Energy Transition:
the Case for a Smaller Population

by Lindsey Grant

Lindsey Grant is a writer on population/resource/environment issues and a retired Foreign Service Officer. During his Foreign Service career, he was a China specialist, a National Security Council staffer, a member of the Department of State's Policy Planning Staff, and Deputy Assistant Secretary of State for Environment and Population Affairs.

When one has gotten used to anything, the prospect of change can be unsettling. West Europe's population has been growing, probably, since the end of the Black Plague, and some writers are disturbed at the prospect that the trend may be reversing.

The concern may be misplaced.

The Demographic Facts and Projections

Europe is crowded. The sub-region of Western Europe (see Note at close for definitions) has a population of about 155 million — nearly two-thirds that of the United States — in an area about one tenth as large. Despite the surge of third world populations, it is the most densely populated sub-region of the world except Japan. In the Northern Europe sub-region, the United Kingdom is even more densely populated. The population of the two sub-regions grew by almost one-quarter following World War II and has stabilized since 1980 at just under 240 million.

Perhaps the best indicator of coming demographic trends is the total fertility rate (TFR), a measure of how many children a group of women may be expected to bear. In modern societies, "replacement level TFR" is just above 2.0 - i.e. two children per woman, plus a small allowance for mortality and for the tendency to bear more boys than girls. At that level, a population will eventually stabilize; below it, the population will eventually decline, unless immigration makes up the difference.

In the so-called developed world, Poland, Romania and the USSR are slightly above replacement level. All the non-communist developed countries (except Ireland) are now below it. Japan and the United States have TFRs of 1.8, Canada 1.7. (By contrast, the third world — excluding China — has a TFR of 4.8 and a current population doubling time of 33 years.)

The lowest rates of all are in non-communist Europe. West Germany is at 1.3; Denmark, Italy and Luxembourg at 1.4; Austria, Belgium, the Netherlands and Switzerland at 1.5. It is these figures that lead to the concern about depopulation.

Why do I believe that the concern may be misplaced?

First, there is the matter of perspective: these processes take a long time. For the next generation, European populations are on a plateau, not in rapid decline. The United Nations' 1984 projections illustrate this point and also remind us of the uncertainty of predicting future TFRs. There are three projections. If fertility should stay roughly at its present levels, West Europe's population in 2025 will have declined by only one per cent. Even the low variant, with fertility well below current levels for most of the period, yields a projection of 90 per cent of the present population — a little higher than the population in 1960, when West Europe was hardly underpopulated. The "high variant" assumes a return to 1960s fertility and yields a population *increase* of 9 per cent. Europe has time to think about its demographic future.

Second, and more important: Europe may be wise to aim for lower population densities. Europe exported a sizeable fraction of its population growth during its demographic transition and is probably better off for having done so. Now, a rollback of population growth may benefit them.

Some day, the societies of West Europe must decide how to bring fertility back to replacement levels if they are not to die out or be supplanted by immigrants — and European governments are not very receptive to immigration. Before that, however, they would do well to decide what population densities would best serve their interests as they look into the next century.

Along with the rest of us, Europe faces an imminent energy transition away from petroleum-based economies. At the same time, it faces an environmental transition. Its own economic success has brought it face to face with resource and environmental constraints that will limit its future options. These issues are interconnected, and it will take foresight to deal with them both. My contention is that they can be better addressed with a smaller population.

The Energy Transition

World petroleum production will probably peak and begin to decline some time in the next generation — the exact timing probably more dependent upon demand, prices and technology than upon the discovery of new fields. For Europe, the International Energy Agency (IEA) thinks the transition has already come.

In varying degree since the industrial revolution, West European countries have been paying for net imports of food, natural fibers and energy through their possession of colonial

empires, foreign investments and technological superiority. Their overall energy dependence intensified as petroleum supplanted coal. By 1973, non-Communist Europe was only 38 per cent self-sufficient in primary energy.

Discovery of the North Sea fields gave Europe (and particularly the United Kingdom) a temporary boost, and non-Communist Europe reached 64 per cent of self-sufficiency in 1985. That boost is winding down, however, and the IEA anticipates a 28 per cent decline in European petroleum production during the 1990s. The United Kingdom expects to become a net importer again sometime in the mid-'90s. That may not be a happy time to be entering the market. The monopoly position of OPEC as the residual supplier will become increasingly strong, particularly if U.S. imports continue to rise.

The Environmental Transition

West Europe is struggling — like the United States but in a much tighter space — with urbanization and its byproducts, with multiple byproducts of industrialization such as toxic substances, and with the pollution generated by fossil fuels and nuclear energy.

The energy-related problems are perhaps the most pressing ones: world climate change; and acid precipitation. World sea levels are rising, posing particular threats to eastern England and the low countries. The effects of climate change upon European agriculture are still unpredictable. Acid precipitation, still little understood, is damaging the continent's forests and may affect its agriculture.

Europe must change its practices to preserve its environment if it is to preserve its livability.

It starts these energy and environmental transitions with some penalties. The colonies are gone, and technology has fled to multi-national corporations seeking cheap labor. Europe has adjusted to changes with considerable resiliency, but at the cost of an extremely intensive development of a small and crowded region.

In agriculture, Europe has hedged its bets — at considerable economic cost — to avoid relying on imports. The deliberate pursuit of self-sufficiency has almost succeeded. The European Community has reached self-sufficiency in major foodstuffs. Non-Communist Europe as a whole runs a $20 billion annual deficit on its overall agricultural account, but this is a modest figure in $3 trillion economies, and the import gap has been declining.

This has been achieved by subsidizing very high-yield, high-cost agriculture. In the European Community, direct subsidies constitute about 45 per cent of the value of agricultural production. On top of that, consumers pay a premium of about 76 per cent over world prices for agricultural products. Moreover, the system has a built-in conflict. In the European Community (EC), only Denmark, France and the Netherlands are net agricultural exporters, and they are subsidized by Germany and the UK, the principal importers.

The high yields come at the cost of very high inputs. In most of West Europe, cereal yields exceed five tons per hectare (well above the United States), but fertilizer inputs per hectare are more than double those in the U.S. France alone uses almost as many tons of insecticides and fungicides as the U.S., on one-tenth as much cropland. Italy uses more. From the scattered data available (e.g. river-borne nitrates and phosphates) Europe's agricultural pollution problems are correspondingly serious.

Consider the intensity of energy use. West Germans use 15 per cent as much energy as Americans, in less than 3 per cent of the U.S. land area. They drive 13 per cent as many vehicle miles in that same crowded area. Individually, they don't use as much energy or drive as much, but the atmosphere has no way of knowing that.

As a result of such disparities, the zone of extremely acid precipitation (below pH 4.7) covers substantially all of West Europe, but less than one-fifth of the United States. No wonder the Germans find half their forests damaged.

One could go on with such examples. The U.S. lost about 18 per cent of its wetlands between 1950-1980. West Germany and the Netherlands each lost more than 50 per cent. There may be policy differences, but the driving engine is the pressure to use the land.

The point is that the energy transition will be a much more complex process than simply finding substitutes for oil. The Europeans must find environmentally benign ways of running their energy economies. They must arrest the environmental attrition generated by industry and agriculture — and all this at costs they can afford.

The Alternatives to Oil

West Europe faces a tougher transition than does the U.S. Its fossil fuel resources are very limited, even if it can find ways to mitigate the environmental costs of using them.

West Germany and the United Kingdom, the traditional *coal* suppliers, have remaining resources totalling perhaps 20 to 40 per cent of U.S. resources, and they are substantially less accessible. (Fuel resource estimates are notoriously tricky.) The new Cool Water integrated coal gasification combined cycle (IGCC) technology may make it possible to exploit these reserves and still ameliorate acid precipitation, though it offers less comfort concerning carbon dioxide.

Most of the dwindling *natural gas* reserves are in Norway and the United Kingdom.

Biomass is the first and natural alternative to fossil fuels. Before the advent of coal, biomass was already the principal non-animal energy source. Ideally, if it is harvested on a sustained yield basis, it can be neutral with respect to carbon dioxide, since it recycles the carbon dioxide between plants and the atmosphere rather than releasing it from fossil fuels. Unfortunately, here again the Europeans are the victims of their own intense use of the environment. Where does one find the land to grow the biomass? Some 78 per cent of West Germany is already in cropland, pastureland and forest, and 84 per cent of France. Every hectare given to biomass production will involve trade-offs against food or forestry production — and the forests are already in trouble. The European climate will not grow crops like bagasse and corn that yield high tonnages of potential fuel. There is only limited opportunity here.

Nuclear Energy once seemed the answer, but one need hardly belabor the concerns that it has generated. France, West Germany, the United Kingdom and Sweden are the only major West European countries to go heavily into nuclear power. In Sweden, even before Chernobyl, the voters had voted to phase out of nuclear energy by 2010. The programs in Germany and the UK are in trouble, and only in France is there a major continuing commitment to the nuclear route. Already, 80 per cent of its electric power production is nuclear.

As a result, France already has over one-half as many cubic meters of spent fuel and radioactive wastes to be stored or reprocessed as does the United States — in a country with one-quarter our population and only 6 per cent of our land area.

Nuclear energy itself is only a transitional fuel, unless one goes to the breeder reactor, which is proving very expensive and which poses dangers of operating safety and plutonium diversion to weapons. Nobody can yet say whether fusion-based energy is possible — it is not easy to harness a 50 million C. explosion — and we cannot yet assess the radioactivity problems

or the environmental implications of using such a vast new source of energy.

Hydropower. Europe already uses 59 per cent of the theoretical potential — more than any other continent — but hydropower meets only 7 per cent of non-Communist Europe's energy needs. The potential is marginal, and the social and economic cost of developing new sites is high.

Europe is the least favorably situated inhabited continent for direct *solar* energy. Almost all of Europe north of the Alps averages more than fifty percent cloud cover, and much of it is 70 percent cloudy or more, and the northerly location means the days are very short when the energy is most needed.

Wind. Think of windmills and one thinks of Holland. The potential is there (a NASA study once concluded that it is technically feasible to meet the United States' energy needs with wind power.) Since the potential energy varies with the cube of the wind speed, the cost rises exponentially where average wind speeds are low. There are some opportunities as rising fuel costs justify the investment, but West Europe with its relatively placid climate is not particularly well situated.

The Demographic Connection

Daunting as this brief survey is, Europeans are educated and resilient. They will experiment and come up with some presently unpredictable mix of sources — perhaps including other exotics such as wave power and ocean thermal gradients. There will be an incentive to develop more efficient engines such as the fuel cell, and to intensify energy conservation. Back to bicycles?

However, demography is fundamental to the size of the problem. At any given levels of per capita consumption, technology and conservation, *the scale of the problem is proportional to the size of the population to be served.* A reduction of — let us say — 20 per cent in population would mitigate the pressure for high agricultural yields, in turn reducing the pollution problems, the high cost of food — savings that could be invested in the energy transition — and the political tensions within the European Community. Agriculture itself would require less energy, and land would be freed for possible biomass production for energy.

A population reduction would generate comparable benefits from reduced requirements for new energy sources, or from reduced costs in managing urban wastes and toxic substances. And so on. The benefits are not necessarily linear because the connections are complex. Europe might, for instance, choose to maintain food output to generate exports to pay for energy imports. However, the direction in which population reduction would act upon the management of the energy transition is unmistakable, and it is favorable.

The classic rebuttal is that "labor creates wealth — the more people the more wealth." Not so. A mental model for a less crowded world may not fit a crowded one. In the current technological revolution, a better model would be "capital creates wealth, with a bit of intelligent direction." It is worth noting that the Leontief-Carter UN world model tied production in the industrial societies to investment rather than to work force size. In the real world, Europe's present problem is unemployment, not labor shortages.

The Cannon Fodder Argument

The most popular argument for a large population is that it is needed for military security. This "musket mentality" finds resonances in European countries that have been fighting each other and their neighbors for millenia.

The first answer to that argument is that it ain't necessarily so. It is momentarily beguiling but unsupported by systematic historical research. A quick mental scan of the histories of Europe, the Americas and Asia suggests that at least half of all wars have been won by the smaller adversary.

The second answer is to define the potential adversaries. Wars have been getting more costly and destructive. If one assumes a continuation of Europe's historical fratricidal behavior, it is probably foolish to waste much time speculating how they will accomplish their mutual self-destruction. The European Community is, however, the testament to a driving desire to break the historical cycle, and it seems to be succeeding.

The USSR is more often perceived as the threat, and again the question is "how do you define the adversaries?" At present, the total forces of NATO countries are 34 per cent larger that those of the Warsaw Pact, but for both sides, questions of cohesiveness and will are more important than crude numbers.

At the other extreme, a single European country such as West Germany is already completely outnumbered by the USSR, and a change of 20 or 30 per cent either way would not substantially alter the equation.

If the Apocalypse should come, the present assumption is that it would be nuclear exchange and that manpower would be of limited relevance. Even assuming that the Soviets would entertain the risk of a mutual and perhaps worldwide holocaust — and even assuming that they would wish to take on the management of West Europe — the enticement to attempt limited moves against West Europe depends upon the opportunities, and a stable Europe adjusting successfully to the energy and environmental transitions is less likely to offer opportunities than a Europe riven by economic and resource problems — and I have already argued that a smaller population makes a successful transition more likely. Competitive fertility justified on military grounds may be self-defeating.

The containment of the threat of war depends upon the unity and determination of the two alliances, and the problems are not all ours. With memories of the disaffection of their own Ukraine in World War II, the Soviets can hardly be confident of the support of their East European allies in some future engagement.

The "cannon fodder" argument rests in part upon the awareness that the population of the USSR is still growing. However, most of that growth is occurring among the Soviets' restive Asian minorities. Wars, as the Soviets know, regularly lead to results far different from the expectations of those who start them. The Soviets would be well advised not to put the loyalties of those minorities to an extreme test.

Moreover, in an increasingly interdependent world, autarky may be very unattractive to both sides. The USSR is now a major importer of Western grains, which it pays for in some part with energy exports, including natural gas to West Europe.

In short, the Soviets' relations with Europe are now shaped by forces far different from the simplistic confrontation out of which NATO and the Warsaw Pact emerged, and strategic thinking must adjust to the change.

The Problems of Transition

There are problems of adjustment as population stabilizes, and they are more severe if there is a roll-back, particularly if it happens quickly. How does one run a prosperous "steady state economy" without the stimulus of population growth? How do you maintain innovation and creativity?

How does one manage a changing age structure? It is regularly pointed out that there will be more old people to support. It is less frequently mentioned that there will be fewer young to raise and educate, and better job opportunities for them when they enter the work force.

These issues have to be faced. Population growth cannot con-

tinue indefinitely in a finite world. You cannot avoid the energy transition or the environmental issues by ignoring them. The problems will face us all. West Europe (and Japan) have simply gotten there first.

Conclusion

If a sustainable society is judged by its success in living comfortably within its resources — in preserving the environmental and resource base that supports it — then Europe like the rest of the world has not yet achieved it. Fossil energy has made possible a period of very high productivity while its byproducts have been sowing the seeds of destruction of the economies it has supported. The energy transition may be a blessing if it lessens that threat and forces us all toward sustainable energy policies.

It is ironic that when West Europe has just succeeded in
- stabilizing population growth,
- controlling a potentially dangerous dependency on imported food,
- adjusting to the transition from the colonial era, and
- positioning itself to deal with the energy transition,

there are those who are fearful of that very success.

There is no magic about "population stability," nor is it even attainable in the real world. When growth ends, there will be fluctuations, not a constant.

Europe, apparently, has entered that period, and the present demographic patterns help to meet the problems that they face. Bravo. We should be studying their experience and their solutions.

Notes: I follow the UN usage: Western Europe includes Austria, Belgium, France, West Germany, Luxembourg, the Netherlands and Switzerland. Northern Europe consists of Denmark, Finland, Iceland, Ireland, Norway, Sweden, and the United Kingdom. For convenience, I describe these two sub-regions as "West Europe." Some of the generalizations are made for all of non-Communist Europe, since OECD and some other sources present their data on that basis.

The data for this article were taken from the **UN Statistical Yearbook 1986; World Population Prospects: Estimates and Projections as Assessed in 1984**, Population Studies No. 98 (New York: UN Dept. of International Economic and Social Affairs, 1986); 1986 and 1987 **World Population Data Sheets** (Washington: Population Reference Bureau); UN Food and Agriculture Organization 1985 **Production** and **Trade Yearbooks** and **1984 Fertilizer Yearbook**, and **1951 FAO Yearbook: Production; Statistical Abstract of the U.S.; Energy Policies and Programmes of IEA Countries** (Paris: Organization for Economic Cooperation and Development (OECD), 1987); **OECD Environmental Data Compendium 1987; Coal Information 1987** (Paris: OECD, 1987); Luther J. Carter, **Nuclear Imperatives and Public Trust** (Washington: Resources for the Future, 1987); International Institute for Environment and Development and World Resources Institute, **World Resources 1987** (New York: Basic Books, 1987); **The Global 2000 Report to the President, Vol. Two**; WAES, **Energy: Global Prospects 1985-2000** (New York: McGraw-Hill, 1977); Paul R. Ehrlich et al, **Ecoscience** (San Francisco: W.H. Freeman, 1977); New York Times, p.E3 September 27, 1987; J. Goldemberg et al, **Energy for a Sustainable World** (Washington: World Resources Institute, 1987.)

NPG COMMENTS

NPG, Inc., publishes from time to time in the NPG Forum articles of exceptional merit in the population/resource/environment field. Our own views on the subject of Mr. Grant's excellent paper are summarized as follows:

NPG heartily concurs with Mr. Grant's judgment that Europe would benefit from a reduction in population. He correctly points out that neither Europe nor the rest of the world have yet achieved a sustainable society, by definition one that preserves the environmental and resource base that supports it.

The traditional man from Mars, surveying our present astronomical numbers, the state of the world's environment and the scope of our industrial activity, might reasonably conclude that mankind's overriding objective was to achieve, not a sustainable society, but the total destruction of our environment and resource base in the shortest possible time.

Mr. Grant's statements that demography is fundamental to the size of the environment/resource problem, and that the scale of the problem is proportional to the size of the population to be served, seem both obvious and irrefutable. Yet those fundamental and supremely important facts are ignored by almost all policy makers and national governments. Even the scientific community, distressingly, seldom draws the link between environmental destruction and population size.

Many years ago, famed European scientist Sir Julian Huxley wrote that the recognition of an optimum population size was the indispensable first step towards the planned control of population size. The concept of optimum population size as a goal toward which we should direct our efforts has too long been ignored, with disastrous consequences.

One of our top national priorities should be to enlist the world's best scientific minds in a study to determine optimum population size for the world, and for Europe and other regions as well. We at NPG believe that optimum population size for Europe and the world, is in the range of 30-40 per cent of present numbers. That would mean a world population of 1.5 to 2 billion.

In view of our present world population of over five billion, and projections that it will grow to 10-14 billion in the next 100 years or so, an optimum population size of not over two billion for the world may sound extreme. We invite those who believe so to try and make a convincing case for the argument that any greater numbers are compatible with the goal of achieving a sustainable society.

Negative Population Growth, Inc.
16 East 42nd Street, Suite 1042, New York, N.Y. 10017
Telephone: (212) 599-2020

Membership: NPG, Inc., is a nonprofit organization founded in 1972. Annual dues are $25, and are tax-deductible to the extent the law allows.