Chapter 17
After Fossil Fuels

The shift from a Fossil-fuel-driven Economy to a Renewable-energy-driven Economy
(from Spending our Savings Account to Living within our Means)

Fossil fuels such as oil, natural gas, and coal now drive our global economy. It is almost the case that industrial society is made of oil and other fossil materials. These fuels are stored sun light: the sun produced them through the growing of biomass in previous geological eras. These energy sources can be viewed as humanity's savings account. Our daily income is the sun power that strikes our planet every day and the gravity-produced movements of wind and water.

We are using our savings account at an increasingly rapid rate. Fossil fuels will become a negligible energy source in the not too distant future. We are not developing our alternatives at a rate comparable with the loss of fossil fuels. And we are habitually, even scandalously wasteful in our uses of energy. Also our massive rate of fossil fuel usage is having destabilizing effects on the planet's atmosphere, climates, and sea currents. These are some of the basic overviews that make energy a very hot topic.

As any keeper of a family budget knows, we cannot live forever on limited savings, and the time of reckoning is shortened by wasteful spending. At some point a family has to cut back on spending or take adequate action to increase income or both. But with regard to energy for this planet's human societies, such elemental economics has become fogged by the propaganda of the status quo and the blindness of those who choose not to see the need for massive changes.

The Objective Facts

Oil, natural gas, and coal will have a role to play in human life for some time to come, but the rate of oil usage already exceeds the rate of discovery of new oil sources. The exact facts on these matters are hotly debated, but a strong case is being made that we are near the apex of cheap and plentiful oil. In other words, we may be near the half way point of the oil age. In the early decades of the oil age we have been able to discover new oil as fast as we expand our uses of oil. But in this coming second half of the oil age, we can anticipate that our increasing demand for oil will not be matched by an increasing supply; therefore, that supply will become increasingly expensive. This will manifest as regular increases in the price of all oil products and all transportation and manufacturing that depend upon oil uses. In the United States, where gasoline has long been cheaper than bottled water, drivers with be faced with gasoline prices of three dollars on up to five dollars per gallon. Some view this as catastrophic, and certainly some sectors of the economy will be faced with tough challenges. But overall such price increases will not collapse industrial civilization as we know it. It will simply necessitate a large corrective in our practices. As oil becomes more expensive, other options will be pursued more vigorously and conservation practices will be encouraged. This is exactly what needs to happen over the long haul.

These broadly stated "facts" are meant to indicate a general trend; the exact figures are debated and are actually unknown. Many factors go into the price of oil. There will be ups and downs in oil prices. But for the purpose of an overall ethics in the energy field, we only need to see the general picture. Oil is getting more expensive. And oil will eventually become a marginal fuel. Even if we slow down rather than grow our use of oil, it will be exhausted sometime in the coming century. Coal will last longer, but its costs in damage to the atmosphere (acid rain, smog, etc.) are daunting. Its extensive use will require careful "scrubbing" and governmental supervision, all adding to its cost. And even coal, if used at a rapidly increasing rate, will follow the descending curve we are beginning to experience with oil. Natural gas is a

cleaner fuel that coal, and it can take up some of the slack as oil runs out. But with extensive use, natural gas will also run out in the relative near term. The fossil fuel age is ending whatever we do or don't do. A responsible ethics needs to take this general state of affairs into consideration rather than continuing to deny it.

Fossil fuels are not only running out; our current rate of use of these fuels is creating air pollution, water pollution, soil pollution, and destabilizing the atmosphere and temperature of the planet. Burning vast amounts of oil, natural gas, and coal increases the greenhouse effects often called "global warming." Perhaps these effects could be better named "atmospheric overheating", "climactic destabilization" "polar cap melting." "ocean rising" and other more tragic sounding terms. The planet can absorb a moderate amount of carbon dioxide release, but an expanding energy system using mostly fossil fuels pushes the rate of carbon dioxide release toward increasingly problematical effects. We don't need more proof of the extent of these effects; we can act on the basis of what we don't know. We don't know if the oceans are going to rise 39 inches or whether this rise will be more or less. We don't know if weird weather patterns will hamper most or just some of our forest cover and food production. We don't know if rising temperatures are going to destroy all or just some of our corral reefs upon which millions of life forms depend for survival. It is not necessary to fully know what we don't know in order to know that our current course is ill advised.

Some social planners have dreamed of supplying human energy needs with nuclear energy. But ongoing safety issues and problems with waste disposal are so great that many sensible observers remain convinced that all nuclear power plants need to be located 90 million miles away from the surface of the Earth. Even if there are ways of improving the safety of operating this technology and storing its waste products, the costs of making these provisions are not something energy companies want to assume. So these costs are passed on to taxpayers. If all these subsidies plus the expensive building and ongoing operational costs are added up, nuclear power plants are not competitive when oil prices are low. As oil prices increase this condition changes. But the prospect of fully replacing oil with our current nuclear technology will exhaust nuclear fuels as well as greatly multiply the safety problems of mining nuclear fuels, operating thousands of plants, and disposing of massive and very dangerous wastes. Whatever nuclear propagandists say, these are challenges that have not yet been met and may never be met.

Others hope that human wizardry will find a controllable fusion process that we can live with on the surface of this planet. Our current nuclear plants use a fission process – energy derived from the break up large atoms. Fusion refers to the process of releasing energy through the joining of very small atoms of hydrogen into the larger helium atoms and other light elements. The sun and other star furnaces create their vast energy through fusion. They keep their fusion processes going through an enormous input-energy we call "gravity." We have on Earth a large supply of hydrogen that might be fused into helium and other light elements. But we have to input very strong forces to ignite this type of furnace. We have created these strong forces in our hydrogen bombs, but not in the controlled manner that a power plant requires. Even if we resolve the control issues, it may remain true that the cost of the energy it takes to ignite a controlled fusion reactor will remain greater than the cost of the output of fusion energy. At any rate, we do not have a feasible nuclear fusion energy source at this time, and we may never have one. Many are deeply reluctant to face this limit. The dream of unlimited energy still fuels the modern psyche. And such dreamers seldom if ever ask whether a boundless supply of energy would be good for us. Perhaps it would only accelerate other economic activities that are basically detrimental to the overall life of the planet.

So we are back to the context of carefully using our fossil-fuel savings account and learning to depend more on our daily supply of solar income plus various gravity based sources of energy. In principle these "renewable" sources of energy are vast, but it will take better

technologies to access this vastness. With a determined effort we can increase the economy of turning sunlight directly into electricity. We can easily expand the low-tech uses of the sun to heat our houses, our water, our barns, our gardens. Using wind to create electrical energy is already becoming a large part of our energy picture and has tremendous promise for the near future. The use of river dams has already been virtually exhausted. The use of ocean tides to generate electricity is being explored, but we do not yet know how to effectively tap the energy contained in these vast motions caused by the gravitational tug of the moon.

The renewable energy category can also include tapping the energy potential of the biomass on this planet. The sun, directly or indirectly, is powering the growth of all living beings. Burning plant oils or wood can substitute for fossil fuels but this also entails burning carbon and thus faces a certain limit in that regard. Also, we are currently using fossil fuels to sow and harvest most of the plants that we hope to turn into alternative fuels. This subtracts from the net gain in reduction of fossil fuel use.

In the short run developing all these alternative sources of energy will not be sufficient to replace our massive use of fossil fuels. Therefore, the development of a renewable-energy-driven economy will need to include energy conservation measures. In every industrial nation we have built a society that is extremely wasteful in its use of energy. We have built our current energy-use practices assuming the perpetual presence of cheap fossil fuels. We have embraced the false dream of an unlimited expansion of this mode of living. This wasteful pattern of living has created a situation with enormous potential for conservation solutions. If our private transportation vehicles got 64 miles per gallon of gasoline (or some equivalent fuel) instead of the 16 miles per gallon some of our vehicles now get, that would cut back to a whopping one fourth of the current energy use in that area. If we increase our use of rail systems that transport many people at once, we can transport each human being to work at a rate of expense comparable to 1000 miles per gallon.

I live in a house whose walls are three times as resistant to heat transfer as the typical house, and its windows are five times as resistant as a single pain of glass. This was achieved with easily available, cost-effective technologies. Buildings, private and public, are the largest users of energy. Green building is already a well advanced technology that can more than halve energy use. We are only at the beginning of technological innovations in energy efficiency. If the general economy encouraged rather than discouraged energy conservation, the positive results might shock even the most optimistic estimators.

All these factors adds up to a conclusion that many people do not want to face. We can and we must begin now to drastically reduce our use of both fossil fuel and nuclear energy sources. We can and we need to phase out a stupendously wasteful economy and build an economy that can live on our daily income of sun power and gravitation motion. These are the facts. All lesser goals amount to excuses.

The Spirit Challenge

So why are we not taking massive steps toward phasing out our current energy system and phasing in a renewable-energy-driven economy? Obsolete ideas, political will, and popular understanding is the short answer. Our current political policies allow energy corporations to set our energy agenda. Oil companies, car and truck manufacturers, trucking companies, shipping companies, power companies, heating oil companies, and other oil and coal dependent industries are not motivated to change. They are having a failure of imagination with regard to how they can creatively decline and/or transform themselves into something new. Instead of investing money and labor in the future, these forces in our society are choosing to "grow" their present mode of operation. They are valuing their income from current employment and stock

portfolios over the well-being of our grandchildren and the viability of human life on this planet. They are so insistent on choosing this narrow-minded direction that they are willing to buy politicians, destroy democracies, and lie to the public in order to remain comfortable in their current form of comfort.

The Spirit challenge is finding the means to awaken vast numbers of the population from their complacent snooze and to mobilize these citizens to construct democratic governments that have the independence to reign in these fossil-fuel-expansion forces in our current economies. Such popular-supported and vision-inspired governments also have to plan and subsidize some fast-track motion toward energy conservation and alternative energy production. Part of the Spirit challenge for many citizens is learning to trust democratic governance enough to make democratic governments more trustworthy. Our industrial-age populations have to stop passively blaming the powers that be (government and business) and realize the truth in this quotation:

"It is never the nation which is directly guilty for what is done by the nation. It is always the ruling group. But all individuals in a nation are responsible for the existence of the ruling group."[1]

This was said, speaking of Nazi Germany, by the theologian Paul Tillich in his book *Love, Power and Justice*. It applies no less to the United States and other nations today.

Industrial-age populations are currently going along with the fossil-fuel addiction and supporting governments that support it. Nevertheless, these same populations retain the power to oust such governments. Responding to such a calling brings another Spirit challenge into play – namely, giving up some deep habits of individualism, thoughtlessness, and sociological laziness and learning to work with groups of people who are willing to refuse to live under this subtle tyranny any longer.

Our home planet is confronting us with severe limits. Many of us deny or ignore these limits because we are stuck in our limited imaginations. We cling to incorrectly hopeful feelings that we humans are such technological wonder workers that limits no longer exist for us. These false hopes make our actual and unavoidable limits intolerable to us. "No limits" is a treasured illusion that resists the plain evidence of its silliness. Until we become a sober limit-facing people, there is no hope for our creating a viable future. The Spirit leadership of our time needs to take lessons from the Old Testament prophets who would surely characterize our denial of these obvious limits as a rebellion from God, not the God of our own making whom we falsely hope will rescue us from our doom, but the God whose sovereign power can be counted upon to confront us in the coming doom that is a clear consequence of the gross laxity in our service of realism.

The Needed Consensus

Once informed and persistent citizens take charge of our governing bodies and thereby of our overall energy policy, the rest is easier. Much basic research on these topics has already been done. The condition of political will to act on what we already know will expand what we know that we need to know to make this transition. In addition to restraining numerous corporations and encouraging other businesses, we citizens will need to build consensus about making changes in our personal lives. Rather than complaining about expensive gasoline for our cars and trucks, we will need to insist that our governments tax the price of gasoline to match the need to reduce its use. We can then direct such tax revenues toward the building of the renewable energy systems we need. In the long haul, our family budgets will be blessed with lighting, heating, and cooling costs that will be more congenial than the costs we are going

[1] Tillich, Paul: *Love, Power, and Justice* ( ) page

to have if we allow the oil company profiteers to set our energy polices.

The consensus that we must build goes deeper. We must make recycling every used product as automatic as breathing. We must make recycling as convenient as turning on the television and as mandatory for all citizens as stopping at a stop sign. We must make energy conservation in our houses and in our means of transportation as common as eating more vegetables and getting our exercise. We must learn to take joy in living in a less wasteful manner. And we must make our current patterns of wastefulness seem as immoral as child abuse. With these new creative life style changes we can also take joy that we are bankrupting those companies that have profited from our wastefulness.

We must commence a steady transformation of our legal systems toward firm and effective enforcement of all these conservation practices and energy production transitions. We must establish the educational services that assist everyone to join these alterations in an informed and eventually happy manner. I have only scratched the surface of the sorts of measures upon which we must build an ever enlarging practical consensus. I have no doubt that we can do these things. It remains to be seen if we will.