

Energy, the environment, and future shock

We live in a crucial and unique period of our technological civilization: a period where we are fast approaching a cusp, one which leads on, not to greater glory, but to a diminishing standard of living and increasing societal unrest and even chaos. Modern prosperity depends on cheap, handy energy, threatened not only by the rise in world population and heightened expectations fed by television and the world-wide web, but also as we pass the peak of global oil supply, the Hubbert peak, after which global production will begin to irremediably decline.

Recent studies indicate that the cusp will arrive in 10 years or less. They also suggest that some large Persian oil fields may have a remaining life of only two or three years! Energy prices have risen strongly in the last year for various reasons, and although we may see short-term fluctuations, the prognosis is for continuing large cost increases. They are unlikely to be appreciably reduced in the short and medium term by the development of wind, photoelectric, and nuclear power sources, ones that will, however, become more competitive as the costs of oil and natural gas continue to increase for the foreseeable future.

There is no shortage of energy, only of useful energy and power. The sun deposits 120,000 terawatts (1.2×10^{17} watts!) of radiation power on the surface of the earth, and the world currently consumes only an average of 13 terawatts of power. As oil imports inevitably decrease, we will need to meet more and more of our power needs from coal, shale, and biomaterials. For portable energy, increasingly costly gasoline will begin to be displaced by

batteries, fuel cells, and stored hydrogen. But there are major energy costs in producing such materials, so the net energy gain may be less than expected, and possibly even negative for hydrogen. Instead of pushing plans for moon colonies, manned trips to Mars, and seemingly endless foreign wars, our government should be greatly increasing its support of energy research and development.

Increased use of coal and other non-solar energy sources will contribute to increased carbon dioxide emissions and consequent further global warming. The ostrich-like attitude of the government on global warming has insured that we have done far less than necessary to control and reduce such emissions, and it is already too late to avoid further warming. The tragedy of the commons is in full flower, and continued lack of action by the largest polluter, us, and by large developing countries, such as China and India, will have incalculably deleterious consequences over the next 50 to 100 years.

Most of us at Carolina Meadows, however, are here only for the short term! Nevertheless, there are some things we can do to help: Make your next car not a SUV but a hybrid, and save electricity and heating oil wherever possible. I walk around the campus every day and often see outside garage lights left on all night. Take a look at the compact spiral fluorescent lights in the ceiling of the club center store. Such long-life lights are available in both 14 and 27 watt sizes and produce light equivalent to 60 and 100 watt incandescent bulbs, respectively. I have replaced all of the non-dimmable 65-watt recessed flood lights in my villa by such fluorescents, ones that also produce light closer to sunlight than do incandescents. They cost \$6.75 each

from CM maintenance, and to get more light you should also replace the surrounds in the recessed fixtures by ones with a reflective coating.

Another way to reduce energy costs in villas is to add infra-red-rejecting coating to the inside of windows. I have done so for my villa. Such coating also stops the transmission of ultra-violet light and allows the transmission of most visible light. Although coatings are particularly valuable for windows that face morning or afternoon sun, they save energy in both summer and winter, day and night. Finally, insulation of water pipes and your water heater will also save energy. If you replace your washer or dryer, the new ones are far more energy efficient than older ones.

Long term: Several years ago, before the roofs of phase-1 villas were replaced, I suggested to Rob Boening that they should be white or at least much lighter than current ones. Remember the difference in the summer between the heat in a white car and a black one, both with closed windows in the sun. White roofs reduce both heating and cooling energy use and could reduce such cost to villa residents by hundreds of dollars a year per villa, and much more in the future. In the past, we have valued beauty over efficiency, but I predict that eventually efficiency must dominate.

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