Nuclear Power: Our Best Option

By Mike Oliver and John Hospers

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With monotonous regularity over the last generation, the American people have had the following statements so constantly drummed into them by the media that most Americans, it seems, have come to believe them:

1. Fossil fuels, such as coal and oil, are dangerous pollutants, and anyway we are running out of them.

2. Nuclear power is so dangerous that it cannot safely be used; indeed, the nuclear facilities already in existence represent such a mortal danger that they should be shut down.

3. But there is one hope: power derived from the sun and winds. These are infinite in quantity, or at least indefinitely great; and they are also safe and clean. All we need is a few years in which to develop this kind of power, and our energy needs will be taken care of.

Only the first of these three statements is true, with some qualifications. The second and third statements are utterly false, although it is popular to believe that they are true.

Fossil Fuels

Thus far, most of our energy needs have been met by fossil fuels: coal, oil, and natural gas.

Almost half the coal in the world lies under the United States. For more than a century American locomotives were fueled by coal, and even today coal is a major source of energy. Fortunately it is one commodity that America does not have to import.

But coal lies underground, and digging for it is dirty and dangerous. We can all remember reading of accidents in coal mines, with miners trapped far below the earth till they died of starvation or thirst, or were asphyxiated by lethal gases. And even after it is above ground, coal is a dirty fuel. Since 1907, 88,000 miners have died in accidents and from effects involved in American coal mining. The 1952 London fog that killed 3,900 people was the combined result of innumerable coal fires.

Oil is somewhat less dangerous to extract from the earth than coal is, but it is far more dangerous to transport and store. Oil storage tanks often catch fire. The city of New York was endangered several times by such fires, and loss of life was prevented by rain and change of wind direction. Large trucks filled with oil sometimes are involved in accidents

on highways, killing not only the people who have volunteered for the dangerous job of transport, but passengers in other vehicles who happened to be in the vicinity of the burning oil trucks.

Are we running out of oil? Gradually, not very rapidly. In 1930 it was widely publicized that there was only enough oil for American cars for another ten years. Now it is 1995, and the world is still awash with oil. Oil continues to be discovered at numerous places around the world. Tremendous amounts of oil and natural gas were discovered near Prudhoe Bay in Alaska, but the wells were capped and the discoveries were stopped, in line with the general policy of the Carter administration to place most of Alaska off limits to development. (The dramatic story of the discovery of this oil and gas, and the decision not to use it, is told in Lindsey Williams' book, *The Energy Non-crisis*.)

In spite of its prevalence around the world, we can't keep on using oil and gas forever; we are using it up about a million times faster than it takes nature to form it. Perhaps it is wise to husband our resources and use the foreign oil first. But this does not appear to have been the thought in the minds of the U. S. government regulators who descended on the Alaska pipeline as it was being built and interfered with its construction endlessly, officially to protect the environment, but actually to prevent the completion of the pipeline. (This story is also well told in Williams' book.) A few examples will suffice: All work on the pipeline was stopped when birds were nesting nearby. All waste materials had to be bagged and shipped to Anchorage, where nobody wanted them, instead of remaining on the tundra, where they would have been harmless or even beneficial. “Caribou passages” were mandated, to enable the animals to pass the pipes without touching them, although, as it turned out, the animals preferred the warm spaces around the pipes and experienced no difficulty when they did have to jump over them. A thousand and one legal obstructions were erected to bankrupt the companies building the pipeline before its completion; it was all done in the name of the environment, though the obstructions in no way helped the environment, and in fact the enforcers constantly violated the very rules that they forced upon those who were building the pipeline: no workman could kill a native animal, but the regulators did so all the time. All this, of course, added considerably to the cost of the oil (from the pipeline) that was consumed by Americans.

Even more expensive in its consequences for Americans is our reliance on foreign oil supplies. In 1979 the Shah of Iran abandoned his throne at the urging of the American government. With this major source of oil cut off, there was an oil shortage in the United States, and millions of Americans stood in line at gasoline pumps. The price of oil increased from $15 to $32 a barrel—a major factor in the increased cost of living. And even today we still protect with our servicemen's lives the foreign oil supplies that are controlled by hostile sheiks and ayatollahs. If we did not rely so heavily on this oil, we could thumb our noses at such monarchs. Meanwhile, our energy use is constantly increasing, and it is more important than ever to stop relying on foreign energy sources if we don't want a far worse replay of 1979.

Besides all this, fossil fuels are detrimental to our atmosphere. The more of them we use, the more we help to destroy any chance of a clean non-toxic environment. It is, indeed, imperative that we find some alternative to the fossil fuels we have always used in the past.

Solar Power

Americans have been told to believe that since fossil fuels are a non-renewable resource, and dangerous to handle and to obtain, the search for other energy sources is imperative. Thus far they are correct. But as to the kind of energy source we should try to develop, the popular belief is that nuclear energy is too dangerous for us to develop further, and that the real answer lies in “natural” energy sources (as if they were not all natural!) such as sun and wind, as well as geo-thermal sources such as hot springs, and fossilized fertilizers such as guana. But this last belief is the exact opposite of the truth: the solar and other “natural” sources can never be more than a tiny portion of our total energy source, and the nuclear can not only be a principal source, but by far the least dangerous one.

The idea of cultivating the sun and wind as sources of human energy is aesthetically appealing. It appeals to our impulse to “return to nature.” Sun and wind are clean, aren't they? They don't make a mess, they don't pollute, and they certainly don't appear to be dangerous. Isn't it just a matter of waiting a few years until we develop the required degree of solar and geothermal technology?

It is a thankless job to dispel an appealing and popular delusion. It's not as if this were a new idea, which is only now dawning on the human race. Wind power, in the form of windmills, has been used for many centuries. People have used hot springs as a heat source when it was available, which isn't in very many places in the world. All these so-called “alternate energy sources” together fill less than one half of one per cent of our energy needs. If we relied on them, the lights of civilization would go out. They play almost no role in providing power for the cities of the world, or even for farms and villages.

This is not for any lack of attempts. It is because of basic facts of nature which every physicist knows but which people don't want to believe because the idea of solar power is so appealing. It's not our technology that is the source of the problem; if it were, *that* could be developed in time. The problem is not with technology but with the laws of physics themselves, which as far as we know never change. The simple fact is that solar power comes to the earth at the very dilute rate of 1 kilowatt per square meter, at best. The amount of energy emanating from the sun to the earth, and the facts about its dispersal, have been known for many years; they are constant from year to year, century to century. Nothing that human beings can do can change this.

Nor is this the end of the problem. Consider what would have to be done to make actual use of the sun's energy to create electric power. To heat one sizable swimming pool with solar power, you need a set of heat-collectors spread out over your roof or lawn. The area required to provide this heat is truly staggering. A 1,000-million-watt power plant, whether nuclear or fossil-fueled, needs about 25 acres for the plant plus storage facilities. But “a solar plant producing that same amount of power (with 10 percent efficiency and 50 percent spacing between the collectors) would need *50 square miles*.”[1] To provide sufficient electric power for New York City, at its present rate of use, would require collectors spread out over 300 square miles—a considerable part of Long Island (and what would the present inhabitants of Long Island do, and where would they go, if they were about to be replaced by such collectors?).

But the situation is worse than this. The sun's rays are not strong during cloudy days, and aren't received at all at night; so any solar plant would have to be designed for a

much higher capacity than has just been described. (Anyone who depends on solar heat for his swimming pool knows this at first hand.)

The same is true of the wind: it doesn't blow all the time, and when it doesn't, ordinary windmills are useless. Wind systems would have to have unimaginable large and expensive storage systems. The upkeep alone on these systems would be prohibitive, as well as the hazards to health and environment from the use of the chemicals required to keep the collectors clean and functioning. And as for wind power, covering the United States with 40,000,000 windmills (or thousands of miles of solar equipment), plus the extraction and processing of the enormous quantities of materials needed for such systems (we might soon run out of them), would precipitate an ecological disaster of unparalleled proportions. Those who have been “out in the field” with these “alternative energy sources” know the result well enough: officials in California complained that the windmills produced superb tax shelters for “alternate energy” suppliers, but very little electricity.

It is time that this hoax was laid to rest. Proponents of solar, wind, and geothermal energy have yet to produce a single shred of real evidence that solar energy would ever be feasible on the scale required to provide power for the inhabitants of a planet whose very existence depends on the use of energy. It is not too much to say that 95 percent of America's population would perish without the availability of modern energy to operate our farms, hospitals, factories, schools, and other facilities. Perhaps this would please some ecologists, but are they willing to sacrifice themselves on this altar, or do they claim that there are too many of “you others”?

Nuclear Power

Our best energy option for the indefinite future is nuclear power. It is already in use without mishap in other nations: about 70 percent of France's energy source is nuclear (France has almost no oil or coal, so there wasn't much choice—go nuclear or go without energy). But there have been no nuclear mishaps in France.

About 25 years ago, newscaster Edwin Newman told the American people in an NBC broadcast that our rivers would boil within a decade because of the thermal pollution from nuclear power plants. Jack Anderson once claimed that a white nuclear cloud was descending on Denver. The *Las Vegas Sun* converted a one-millirem leak near Beatty, Nevada, into a full-blown nuclear cloud, which was descending on the community about five miles away. By the time it reached Beatty the millirem was distributed through about 500 cubic miles of air. We get about fifty times that much radiation from a simple X-ray distributed over the puny volume of a single human being.

In the face of such concerted propaganda, it is no wonder that Americans are fearful of nuclear power. They are not told the facts of the case, nor even of places where nuclear power is successfully and safely used. It is fortunate that the facts are as they are, rather than as they have been painted to the American people, for if they were as painted, we would soon have to go without most of our light, heat, and electric power. The energy source that has been advertised to us (sun and wind) is a delusion; if we had to depend on that we would be doomed. But the energy source that we have been told is fraught with mortal danger is, fortunately, and contrary to popular opinion, cheap, clean, and comparatively safe. In it lies our best hope for the future.

Meanwhile, the “alternate energy” advocates are urging us to dismantle our nuclear power stations, to stop exploration for domestic oil, to curtail construction of coal-fired plants, and to start basing our existence on their “tomorrow we will do it” promises. Jane Fonda and Tom Hayden succeeded in shutting down the Rancho Seco nuclear power station near Sacramento. Some of their disciples went house to house telling mothers that their children would glow in the dark unless that plant was dismantled. And yet the population of Sacramento is growing at an explosive pace, and so is their need for electricity.

How is it possible, in the span of a brief article, to prove the comparative safety of nuclear power? Here are a few examples of how nuclear power works and what its effects are on consumers of that power. For an excellent longer treatment, see Petr Beckmann's incomparable book *The Health Hazards of Not Going Nuclear*.

1. *How safe are our nuclear reactors?* Very safe indeed, compared with any other kind of power. Every nuclear reactor is built on the principle of *defense in depth*. In October 1966 a metal plate broke loose in a reactor, partially blocking the flow of coolant, overheating two of 100 fuel assemblies and melting some of their fuel. The reactor was promptly shut down, and all precautions worked as planned. As Beckmann says, “If the reactor had lost its coolant, it would have been automatically replaced. And if it hadn't, the containment building would have contained the radioactivity. And if it hadn't (though it is hard to see why not), it would have disperse into the atmosphere without doing any harm. And if it hadn't, because a temperature inversion kept it near the ground, a slight wind in an unfortunate direction would have had to blow it 30 miles to Detroit before a Detroit fly got hurt.” (Beckmann, p. 50) And yet this incident was the subject of a book, *We Almost Lost Detroit*, which scared many readers half to death with a flagrantly unscientific account of what occurred.

2. *What about radioactivity?* The International Commission on Radiological Protection has set 500 millirems as the maximum permissible annual dose that an individual should receive. “A single chest X-ray will expose the patient to some 50 mrems; a coast-to-coast jet flight will expose the passengers to some 5 additional mrems; watching color television will deliver an average of 1 mrem per year. Yet all of these doses together are smaller than the dose the average U.S. resident obtains from Mother Nature: 130 mrems per year. Most of this comes from cosmic rays, the ground, and from building materials.” (Beckmann, p. 56) For example, Grand Central Station in New York has so much radiation emanating from its granite blocks that it violates all permissible standards for nuclear plants. Now, “how much do all the U.S. nuclear plants add to the dose of 250 mrem per year that the average U.S. citizen receives already? About 0.003 mrems per year. Yes, that is what the nuclear critics are protesting: 0.003 mrems on top of the 250 mrems that they get anyway.” (p. 58)

In thirty years of operation, not one death, not one injury has resulted in the U.S. from nuclear plants or radioactivity. The Three Mile Island accident did not cause a single casualty, and the extra radiation the residents in that area received during that event was less than half the dose each airline traveler gets by flying from Boston to Seattle. Radon gas gives millions of American home-owners hundreds of times more radiation than they receive from all of our nuclear plants combined. And even this is not nearly the problem it was previously deemed. Moving up one floor in an apartment house gives tenants more extra radiation than all the nuclear plants do.

“But nuclear reactors *are* clearly unsafe. Consider what happened at the Chernobyl plant in the Soviet Union in 1987.” Very well, let us consider it. The main differences between the Chernobyl plant and ours are these: Ours were designed to give maximum safety to their neighbors; theirs was not. Heat increases in our reactors cause their reactivity to go down, but reactivity in Chernobyl models increases with heat and therefore self-accelerated the Soviet unit to destruction. Ours are surrounded by containment buildings; theirs was not. Our plants had multiple defenses in depth; theirs did not. These were among the facts given in a report by a team of U.S. experts, led by former National Academy of Science president Dr. Frederick Seitz and Nobel Laureate Dr. Hans Bethe—both of them members of Scientists and Engineers for Secure Energy.

The Chernobyl accident killed 31 people from radioactivity; an unknown number are still dying of cancer. Yet if, a month after the Chernobyl accident, one were to drink 60,000 gallons of “Chernobyl contaminated water,” he would have received the same amount of extra radiation as from a simple thyroid check. Many “radioactive deer” in Finland and Scandinavia were slaughtered, but the killing stopped when some people, including scientists in those countries, offered to buy and eat the meat. Since the beginning of time each of us had thousands of times more radioactivity in our bodies than the extra amount found in these deer.

3. *What of nuclear wastes?* Here as elsewhere, one has to unlearn what one has been told. When the uranium in a nuclear fuel rod has been spent, it remains radioactive, and is immersed in pools of cooling water for a few months to allow the short-lived radioactivity to go down. The spent rods are shipped in sealed casks to fuel reprocessing facilities, which separate out the uranium and plutonium. There is no physical problem with all this—a reprocessing center can handle many tons of fuel per day. The problem in the United States has been not physical but political. The Carter administration was filled with people who wanted us to perform miracles and go solar immediately. They hindered offshore oil drilling and, to vanquish nuclear power, prohibited further recycling of nuclear residues. As a result, these residues—which today constitute a 300-year source for our nation's electricity needs—started to accumulate at power plants. The anti-nuclear lobby, which caused this accumulation in the first place, now claims that these “wastes” are a main reason why we should shut the plants down. When sealed and packaged to U.S. specifications, this material is not dangerous—it is far safer than open wastes from oil or coal.

Nuclear power plants provide the safest, cleanest form of energy the world has ever known. Yet “alternative energy” advocates attack it as unsafe, and propose instead something far less safe, which in any case cannot be put into operation on a large scale. Instead of facts, they give us scare stories, which find a receptive audience because that which is new is always, or can easily be made, very frightening. The fact is that safe and inexpensive nuclear power is now available and can easily be developed further to provide clean energy for vehicles now run on oil.

The anti-nuclear lobby is not strong enough to turn off our lights and factories completely; they are not (yet) demanding that we deactivated our fossil-fired electricity plants. Yet they have already done considerable damage. (1) They have stopped us from building new nuclear power stations. (2) They have prevented the operation of fully or nearly completed nuclear power plants, which are required to fill the burgeoning energy needs of New York and other cities. (3) They have blocked the reprocessing of nuclear residues, and thus denied our country access to an enormously large,

environmentally clean energy source. And (4) they have thus far prohibited the burial of the same nuclear residues at any site.

Let me propose something which is very unusual, but which is needed to dramatize to the American people that the alleged hazards posed by nuclear residues is a sham. Let us build, privately, a 50- to 100-room hotel on top of the site under which the U.S. government buries these “wastes” in sealed containers. The authorities will probably oppose the building of such a hotel, but we may get experts to testify in court that we would be safer there than in over-insulated radon-infested homes.

Let such a project be used as a vacation resort, where some of us, including scientists, and their families, will occupy a room for an average of seven days per year. The one week per year idea is not inspired by radiation fears, but by the belief that no one should have to spend more vacation time in a specified place to prove that the nuclear waste issue is a hoax.

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1. Petr Beckmann, *The Health Hazards of Not Going Nuclear*, p. 125.

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