

THE ACADEMY OF ELECTRICAL CONTRACTING

Paper presented by

Frank H. Bertke, Fellow

Energy and the American Dream
April, 1980

ENERGY AND THE AMERICAN DREAM

When Jamestown, Virginia, was settled in 1607 to become the first permanent English settlement in the new world, the American Dream was more like the American Nightmare. For the first few years, it was the scene of disease, extreme hardship, starvation, and death. In 1609 there was a population of nearly 500 Colonist, but, by the spring of 1610, only 60 were left.

Those early Colonist were dependent on England for supplies and on the Indians for food. "Survival" was the "American Dream"--and survive they did.

They fought the wilderness and claimed the land with the only sources of energy they had--physical human and animal muscle power, with such help as they could extract from wind, water, and fire. Survival was getting up before dawn and working till after dusk, and then starting over again the next day. "Survival" was the "American Dream".

By the time 1776 rolled around, the American Dream had grown past just survival of life, and had blossomed into the expectation of freedom. In Boston they dumped the tea into the bay, and in Philadelphia the Declaration of Independence sent the message loud and clear that the Colonies felt they were no longer dependent on England for supplies or anything else for that matter.

The sources of energy available were still primarily human and animal effort, with some help from wind, water, and fire. The major source of energy was still the energy of human hands, and a substantial portion of this energy was derived from slaves.

Oxen pulled plows to till the soil, water wheels turned the grist mill to grind the wheat, and windmills pumped water; but, human hands were still the number one producers of the energy that got things done.

Mankind still had an inordinate struggle to produce food and shelter from his own energy, and this had one giant size environmental impact a very short average life span. Most people died before they reached 40 years old. There had to be a better way for the American Dream--there had to be a more efficient conversion of energy to productive effort than water wheels, windmills, and short life spans.

Enter the steam engine. An Englishman, named Thomas Savery, patented, what is believed to be, the first practical steam engine in 1698. The wastage of fuel in Savery's steam engine was enormous compared to the work it accomplished, but it did pump water from mines, drive water wheels, and raise water for houses and towns.

In 1763, James Watt added great improvements and efficiency to the steam engine, but technology didn't move nearly as fast as it does today. It took over 100 years for the development of the steam engine to get to the point where it was making a meaningful contribution to the effective utilization of energy.

In 1807, Robert Fulton chugged his steamboat, "Clermont", up the Hudson River.

Steam locomotives started making their appearance for hauling, pumping water, grinding grain, powering looms, and driving all sorts of machinery to produce for man the things he needed and desired.

A new era, the "Industrial Revolution", was upon us, a fantastic transformation in the methods of production, transportation, and communication. Mechanical manufacture substituted for hand labor was made possible by the harnessing of the energy available in nature.

The late 1800's saw power machinery producing quantities of products quickly and cheaply.

The American Dream of abundance, for all who were willing to try for it, began to become a reality. Immigrants from the entire world came to America seeking freedom and fortune. Our free enterprize economic system gave them a good chance at fulfilling their dreams, but, the available energy resources and the technological genius of how to use them almost insured success.

From the beginning of time, human beings have sought to minimize their labors through the use of tools and with the countless inventions of machinery to convert energy to productive effort.

Coal fired steam engines had helped man capture the energy of nature, and reduce his labor burden substantially, but even broader expansions of the American Dream were yet to come.

In September of 1859, at Titusville, Pennsylvania, from a depth of 69 feet, oil was successfully pumped from the ground for the first time by the "Pennsylvania Rock Oil Company". This had almost an immediate environmental impact on the whale population of the world it saved their sweet little old blubber from extinction. Whale oil lamps were the most efficient source of illumination up till the time that the enterprizing band of Pennsylvanians received the chemical report on their "Seneca Oil". The report read that it "furnished as much light as any substance that had ever been tested; it burned more economically; it did not turn gummy or rancid, and it was a very valuable product. In 1867, Kerosene outsold whale oil, and the whales were pretty happy about that.

The Pennsylvania Rock Oil Company didn't know then that the future potential of their product was doomed but, at the same time, just embarking on a new horizon that would kick the American Dream into high gear.

The electric light bulb relegated kerosene to Coleman lantern duty on camping trips, but the internal combustion engine thrived on the apparently useless substance called gasoline. The American Dream hitched its energy wagon to petroleum, and we "merry oldsmobiled" our way into the twentieth century.

The second half of the nineteenth century had been marked by the emergence of the fossil fuel energy society in America. In 1850, about two thirds of all horsepower produced came from the work of animals--about half of that from horses, and one eighth from humans.

Two thirds of all mechanical work in terms of horsepower was done by windmills and falling water.

Fifty years later saw America taking the first few steps that would set the pace for the life style of the high energy civilization. In 1900 we were ready to start rolling. The "Technological Age" was born.

Four thousand two hundred automobiles had been built in the United States by 1900, most of which were still steam driven and some powered by electricity, only 25% were internal combustion powered. However, the emerging petroleum industry had provided both the fuels and the lubricants that made the gasoline powered automobile fast, light, maneuverable, and competitive in cost. Oldsmobile switched from steam to gas and, in 1903, Henry Ford introduced his segment of the American Dream powered by the internal combustion engine and cranked out by mass production techniques that irrevocably tied us to the gasoline driven car.

Meanwhile, back at Edison's Laboratory, electricity had really come into its own. Edison had invented the electric light in 1879. In 1882, he developed the world's first electrical power generating station and distribution system in the heart of New York's Downtown Pearl Street Financial District. The generating station served an area of about one half square mile. Four boilers were on the ground floor of the building, and six two hundred horsepower dynamos, or generators, capable of lighting twelve hundred lamps each, were on the second floor. Electricity was here to stay.

Electricity has enhanced the American Dream, as has few other technological developments. Electricity, which can be generated by a great variety of energy sources, made it possible to deliver the work potential of those energy sources to every home, business, and industry in America.

Electricity provided man with the mechanical servants to further reduce his burden of work and improve his standard of living at the same time. Early 1900 catalogs listed primitive electric toasters, roasters, hot plates, ovens, and so on to the most treasured of all domestic electric equipment, the electric flat iron--my grandmother loved it.

Agriculture became increasingly mechanized and productivity jumped as it did so. In 1880, it took 20 manhours to harvest an acre of wheat; by 1916, this was reduced to 12.7 manhours; by 1921, with the advent of full mechanization, this was cut to 10.7 hours; and by 1936 to 6.1 manhours. The American Dreamers not only provided food for this country, but for the world as well.

Building design and technology changed and adapted to the availability of energy. Skyscrapers were now possible with the use of cheap steel, the elevator, and mechanically driven fans.

From 1900 to World War I, energy use jumped dramatically. Coal production nearly doubled, petroleum more than quadrupled, natural gas doubled, and the amount of electricity produced by hydro stations doubled. The "American Dream" soared. Gross national product increased by 50%, manufacturing production by 58%, and steel by 125%. Power equipment used in manufacturing almost quintupled from 9.8 million horsepower to 48.5 million horsepower.

Electric power generation increased at an astronomical pace after 1900. From 1902 to 1907, it increased almost two and a half times, and by 1917 it was seven times more than it had been at the turn of the century.

Coal was king in the American Energy Dream till World War I and for many years after, but the war saw the start of a long slide in coal's share of the total fuels market. In 1918, coal's share of energy consumption was six times that of petroleum products, by 1925 it was only three times higher, and by 1930 it was down to two to one. Petroleum finally overtook coal just after World War II.

By 1965, oil accounted for 40% of the energy used in the American Dream; natural gas 30%; coal 23%; hydro electric power 4%, and liquid natural gas 3%.

We enjoyed one "black gold" find after another, as huge oil fields kept opening up to fuel our energy needs.

In the days of yesteryear, the United States had sufficient refinery output not only for all domestic consumption but there was surplus petroleum for export. Since those heady days, we have had to import crude oil in increasing amounts. As a matter

of interest, we imported crude oil to the tune of 385 million barrels in 1971, and even the crisis of 1973 didn't slow us down--we are importing more than ever in 1980. Oil is now supplying us with something in the order of 43% of all of our energy needs. It powers about 100 million automobiles and trucks, thousands of diesel trains, most ships and riverboats, and all of the airplanes, and it provides the fuel for 12% of our electricity.

The National Petroleum Council has estimated that the demand for oil would range from 20 to 30 million barrels per day by 1985. Depending upon how successful we are in developing alternatives and conserving, we will have to import approximately 4 to 20 million barrels per day to satisfy that demand.

In 1980, the American Dream is clearly hooked on petroleum--we are "energy junkies" dependent upon the Shahs, Shiiks, and Kings of OPEC Countries for a fix. If the American Colonist of 1607 depended upon the English for supplies in order to survive, we, just as surely, depend upon OPEC oil to survive today.

If the American Dream back then was a nightmare in order to survive, imagine the nightmare we would have if tomorrow morning at 9:00 A.M. the OPEC Cartel would cut off all of the petroleum that they ship to this country. A huge percentage of everything we do that depends on energy would eventually grind to a halt.

The American Dream would face economic collapse, as our ability to produce would die an energy starved death. Closed factories, abandoned automobiles, and idle farm machinery would become the American Nightmare. Our country today is as much a hostage to foreign petroleum as the fifty Americans held in Iran. This is a situation and set of circumstances that we cannot live with or tolerate, if we are to survive.

What then are our energy options or alternatives for the 1980's version of the American Dream? How can we best insure our independence and continuing freedom? What can we do to maintain our standard of living and improve it? What are the alternatives open to us?

One option is we could go to war. We could attack all of the OPEC Nations and, assuming we could conquer them, we would gain access to their petroleum reserves, thereby extending our energy life. Not a very good alternative with pretty grim consequences. Russia and the rest of the world would probably take a dim view of us doing that. The prospect of World War III is the least desirable solution to our problem.

Another alternative we can examine is essentially what we have been doing and that is "nothing". We can just continue to fiddle while the American Dream burns to the ground.

The 1973 oil embargo should have galvanized our entire national sense of self-preservation into action to seek ways and means of reducing our dependence on foreign petroleum. It hardly made a ripple. Six months after the embargo was lifted, the American public looked upon the gas lines at the corner station as a temporary inconvenience and, a year later, we had all but forgotten about them.

Our politicians continue to meddle and impede energy independence, as they author legislation that considers only environmental impact with little or no thought given to energy impact.

Hollywood queens star in movies, while Rock and Roll Artists give free concerts to convince the American public that nuclear power is synonymous with catastrophe. The environmentalists have plastered their bumpers with "No Nukes" stickers all the while OPEC has been securing their stranglehold on the American Dream.

The third option open to us is the one that finally seems to be taking root in the American awareness, and that is to develop alternatives to foreign oil. At long last, we are getting common sense government reports that advise us coal and nuclear will be the chief sources of electric power generation for the next thirty years. The National Research Council spent four years developing a 783 page report entitled "Energy in Transition 1985-2010". It's a good first step to reality.

A first-year apprentice electrician, who sat down and really thought about it, would have come to the same conclusion in an hour, but his report wouldn't have the same impact on the American public. It is important that, for the first time since that October day in 1973 when the embargo hit, Americans are realizing how very important it is that they maintain their energy independence. Americans in increasing numbers are coming to understand that, what we have is not an "Energy Crisis", but a "utilization of Energy Crisis".

We have the energy we need in alternative sources, but we must dispel the fear and uncertainty that exist in our fellow countrymen's minds. We must make intelligent evaluations of our alternatives and put our efforts to using them.

Some of our options are far out and exotic, with a long time span before they will be able to make a meaningful contribution to our energy needs, but they are there for us to develop.

Let's look at what's happening and see what the American Dream might anticipate between 1980 and 2010.

TIDAL POWER --

The use of the tides for energy is nothing new and has fascinated man for centuries. The tides were used for grinding spices in 1734 at Slades Mill in Chelsea, Massachusetts.

Electricity is being generated today by the tides in France and Russia. The Canadian Government has recently invested in a \$45 million experimental project to produce power by harnessing the 50' tides of the Bay of Fundy in Nova Scotia.

Passamaquoddy Bay is the only spot in the United States that has tides sufficient to generate electricity.

Tidal power limitations are obvious in that there are only fifteen locations in the world with suitable tides, and when the tide turns, there is a need for a back up source of generation.

BIOMASS --

Mankind's first source of energy, other than muscle power, was burning wood. All vegetation from the scrubbiest weed to the tallest tree contains energy. Kelp plants in the ocean and the garbage in every town's incinerator are a source of energy.

Among the more successful biomass energy extractions to date has been ethyl alcohol brewed from corn and mixed with gasoline to make gasohol.

Among the least successful has been Baltimore's Pyrolysis Plant, which was built three or four years ago, and has yet to convert garbage to steam for more than a month. Their technical problem seems to be big klinkers that jam the machinery.

Biomass technology is still in its embryonic stages, in spite of the fact that men have denuded forest for thousands of years to have trees to burn. The greatest problem with the development of these fuels is the huge amounts of land required, unless it is grown in the ocean.

WIND --

There are still remnants of wind power, and the American Dream to be found on farms from coast to coast. Most of these windmills stopped turning during the 1930's when rural electrification crisscrossed the prairies with power lines. The revived interest in wind today is in the form of directly generating electricity.

The largest windmill in the world with blades longer than the wings of a Boeing 747, is high atop a windy hill in the Blue Ridge Mountains of North Carolina, and is capable of generating 2,000 KW to power 500 nearby homes.

In early February of 1980, a six million dollar contract was awarded by the Water & Power Resources Service (WPRS) for the first of fifty large wind turbines to be located about five miles south of Medicine Bow, Wyoming. Each of these turbine generators will stand on a 262' tower and have a 255' long, two bladed, fiberglass rotor, and is expected to be ready for testing by late 1981. This project is intended for blending the four megawatts produced with existing generating and distribution systems.

Somehow I can't envision the environmentalists not screaming about all these towers whirring away, even though they seemingly will pollute nothing but the scenery.

Wind generated electricity is still three times more expensive than oil and, like flying a kite when the wind stops, you're in trouble.

GEOTHERMAL --

Geothermal energy is the legacy of the earth's fiery beginning. Much of the heat generated then is still trapped inside.

Commercial geothermal development in the United States has been primarily in the geyser area of Northern California, where the Pacific Gas and Electric Company operates the world's largest Geothermal Power Plant capable of generating several thousand megawatts of electric power at a very competitive price.

There are several other areas in the country starting to receive some attention for commercial drilling and exploration for geothermal energy, but none have the natural advantages of the "geysers".

Geothermal heat, sufficient for electric generating, usually lies at a depth of 9 Kilometers, or almost 30,000 feet, which is just about the limits of present day drilling technology.

In addition to the necessity of improving our drilling techniques, it will be necessary to remove very high levels of salts and suspended minerals before geothermal development can take place on a large scale.

Rotten egg odor or hydrogen sulfide and other noxious gases will also have to be controlled before geothermal power will be able to make any real contribution to our energy needs; but, as the technology is developed, it will give us access to the energy equivalent of 21 billion tons of coal, and that's a heap of energy.

NATURAL GAS --

Natural gas is one of the most environmentally clean sources of energy. The availability of natural gas appears to be on the upswing now that the Supreme Court's imposed system of pricing has been lifted. The artificially low prices had destroyed incentive for the producers since 1954, but now the gas is flowing at increased prices without a Windfall Profits Tax, and still at a more competitive price than oil.

The United States has a potential of 920 trillion cubic feet of natural gas reserves, and that is enough for 40 to 50 years at present rates of consumption.

COAL --

When I was a little boy "coal was king". I can still remember shoveling tons of it into the coal chute in the fall, and carrying clinkers and ashes out all winter, not quite the clinkers that Baltimore has, but clinkers none the less.

It would appear that coal is on its way back to royalty, if not as "King" at least as "Crown Prince".

We have 425 billion tons of coal reserves that are easily available, and that means about 800 years supply. The U. S. Geological Survey places our identifiable reserve at 1.7 trillion tons with another 1.8 trillion tons in unexplored pockets.

At the present time, supply is running ahead of demand. The coal industry presently has an annual capacity of 850 million tons, while both domestic and foreign demand consumed only 740 million tons last year. This will change as more utilities switch to coal from oil and as some of the exotic synfuel uses for coal pass the planning stage. The synthetic fuel demand is not likely to reach a vast commercial scale until 1990. Coal and shale oil both will probably prove to be in great demand as the synfuel industry progresses.

The synfuel industry should prove to be a great boon for the electrical construction industry in the years ahead, as practically all of the plant and equipment for this industry is yet to be constructed.

President Carter says that we will have 500,000 barrels of synthetic fuel a day by 1985. Realists point out that, with present environmental restrictions, a single 100,000 barrel a day plant would cost in excess of one billion dollars and take ten years.

Coal is not without its liabilities and problems. Strip mining creates some environmental eye sores which, with care, can be minimized. Deep mining still carries with it the threat of black lung disease and other human hazards which, with care, can be minimized.

Environmentalists point to coal as the dirtiest of fuels. The current claim by environmentalists is that, with burning coal and other fossil fuels, we will either cause a new ice age by reflecting sunlight back out into the atmosphere, or heat up the earth through the release of CO₂ and magnify the "greenhouse effect", which means absorb more heat which in turn would melt polar ice caps, flood coastal cities, and create dust bowls. Neither of these allegations have any extensive scientific validation; but the gloom and doom troops, it seems, want to convince us that the only options we have are freezing or roasting.

Coal is an abundant and viable source of energy that will go a long way towards reducing our dependence on petroleum, and we can't afford the luxury of abandoning its energy potential.

SOLAR --

Solar Energy has been abundant from the beginning of time, and man has enjoyed the comforts and benefits of this energy a little more with each succeeding generation.

This energy, as comforting and abundant as it is, has not yet come into its own. Contemporary technology is such that we would have to have acres and acres of photovoltaic cells or heliostats to capture enough of the sun's energy to power anything more than a few light bulbs and motors.

Technology is advancing in this field and much effort is accelerating man's ability to realize the full potential of the sun's beneficent power.

Barstow, California, is the scene for one of the more significant efforts. A pilot plant utilizing giant mirrors or heliostats follow the sun across the sky and focus its rays onto a boiler to form steam. Part of the steam drives a conventional turbine generator and part flows to a large storage tank filled with crushed rock, heat transfer fluids, and a standard heat exchanger. This stored heat can then be used at night or on cloudy days.

This plant will generate ten megawatts of power to feed into the Barstow grid. The technological lessons that will be learned will hasten the day when solar power will be able to make a meaningful contribution to our energy needs. Most experts agree that day won't come much before 2010 and, then, only with "man on the moon" scale of private and governmental effort.

OIL --

Oil is still our number one. It is still the prime source of energy that fuels the American Dream. We still have ample reserves to see us through the transition of developing alternatives.

It is estimated that we have something in the order of 50 to 127 billion barrels of untapped oil in this country, plus proved resources of 40.6 billion barrels. We have explored the outer continental shelf on a very limited basis for additional reserve.

We have certainly experienced disruptions in our supply of petroleum. It has been very easy for the political establishment of this country to cast all of the blame on the OPEC Countries and the oil companies. No doubt they have stirred the pot, but the biggest clown act of all belongs to the Bureaucratic Bunglers, who have over-allocated, under-allocated, decreed and regulated our petroleum supply into a tangled snarl of politics, economics, special interest, and chaos.

Washington can't seem to accept the fact that the American public realizes that the era of the cheap "Fill'er Up" is over. We need more than wishful fantasies to cope with reality. We have been in an energy limbo since the embargo of 1973, despite the obvious and urgent need for decisive action. Simply stated, we just haven't done enough to develop alternative sources of energy, which are there, to loosen the temporary OPEC stranglehold on the American Dream.

If we can eliminate the regulatory overkill and economic dis-incentives, we still have plenty of petroleum to allow time for the development of alternatives.

When the Standard Oil Company pumps the last gallon of gas into a can and carries it to the Smithsonian for enthronement, the American Dream won't have to grind to a halt. It can continue to grow on other sources of energy--provided the regulators and environmentalists don't kill it.

NUCLEAR --

Nuclear energy is undoubtedly the most controversial and most maligned source of power we have.

Nuclear power today generates 13% of our electricity. There are 72 operational nuclear power plants. The total generating capacity is 42,000 megawatts which is greater than the entire generating capacity of the United States in 1946. It would gobble up an additional 1,164,000 barrels of oil per day to replace the energy generated by Nuclear.

In addition to these 72 units, there are 91 new units with a generating capacity of 99,000 megawatts that have received construction permits from the N.R.C. By 1990 these units will be supplying 30% of the American Dream's energy requirements.

The greatest negatives that are stifling nuclear power today are sensationalized, breathless announcers, hysterical headlines, inept government regulators, and a misinformed public. Note, I said "misinformed" not "uniformed". The American public has been spoon fed reams of bad information about nuclear power by experts, whose credentials are substantially more qualified in propoganda and bumper sticker jingles than in knowledge of nuclear power. Personally, the bumper sticker I like best reads "Nukes Are Built Better than Jane Fonda".

We must overcome the irrational fears and perverted public opinion that the media monsters have created. We need to educate our communities not only to the real facts of life about Nuclear Power, but also to the alternatives of how we and the world will get along if we elect to abandon nuclear power.

The two greatest apprehensions that people seem to have are as follows:

1. Radioactive radiation to the degree that will exceed tolerable levels caused either by leakage, or an accidental explosion is sure to happen.
2. Disposal of radioactive waste in a safe manner for this and succeeding generations is impossible.

FACT:

Nuclear power is as safe as any other means we have of generating electricity. There is nothing in this world that is completely risk free. The safety record of commercial nuclear power plants is outstanding. There

has been no known deaths, not even injury to the public, except the stress inflicted by the media. Three Mile Island, which was by far the most serious accident that the industry experienced in this country, released less than two millirems per person, and that is equivalent to the additional amount a resident of Denver receives over a resident of Harrisburg every week of the year.

Doctor Edward Teller has testified that it is impossible for a nuclear reactor to explode like a bomb. He also stated that, if you sat next to a nuclear power plant for a whole year, you would be exposed to less radiation than if you took a round trip flight on a 747 from New York to Los Angeles.

Doctor Teller's statements are validated scientific fact.

In my view, T.M.I., if anything, should attest to the relative safety of nuclear power, because it fulfilled Murphy's law that if anything could go wrong, it would, and did, and even with that the danger and threat was limited to the interior of the facility and a very small non-lethal release of radioactive iodine and noble gas.

The clean-up of T.M.I. can be accomplished with no further risk to the people of Pennsylvania, if the experts are allowed to proceed without media mania and interference.

FACT:

The technology exists today for the disposal of radioactive waste in a reasonably prudent and safe manner. This has been verified by the "Interagency Review Group on Nuclear Waste Management" (IRG).

It should be noted that the bulk of high level waste is generated by the military. Nuclear power plants to date have produced only 283 cubic meters of such waste.

There are a number of techniques available for storage, but the one most likely to be adopted involves mixing the waste into molten glass, which will be formed into cylindrical shapes. This solid glass will then be sealed in welded stainless steel canisters and buried in deep salt beds or rock formations, if the recommendations of the National Academy of Sciences are followed.

Salt beds underlie about one half million square miles of the United States and, according to DOE, that should be sufficient for all we are ever likely to generate.

The need and desirability of nuclear energy is clear and evident to knowledgeable people, and I realize that it is an oversimplification to say what we need are more knowledgeable people, but that's the truth. We must work at removing the veil of uncertainty and misinformation from the minds of the American public.

We, in the electrical industry, must re-establish the creditability of the spokesman, government and private, who make pronouncements on nuclear power. The abandonment of nuclear power would be a serious, if not fatal, blow to the American Dream.

CONSERVATION --

Conservation is the least expensive energy asset of the American Dream. It is also among the least understood. Many people equate conservation with deprivation, "doing without". Tain't necessarily so. Conservation is the sensible use of energy resources with the elimination of waste.

NECA is among the leaders in this phase of our energy independence. We have developed the "Total Energy Management" Program in collaboration with NEMA. This handbook has gained wide acceptance and is an outstanding guide for anyone who wishes to stop wasting energy. It is an opportunity for us, who are in the electrical business, to sell our services and, at the same time, help our customers save increasing amounts of money, as the cost of energy goes up. It makes sense to plan how to conserve energy to suit your particular needs as opposed to enduring brownouts, or having your air conditioner, water heater, or some other electric load shed by radio signal from your utility on a selective basis to avoid brownouts. Yes, radio controlled shedding of loads by Utilities is already the real world in some areas.

There isn't a building in existence, whose energy efficiency couldn't be improved. A 20% improvement in commercial building energy conservation nationwide equals an annual savings of more than 400 million barrels of oil.

Energy efficiency is now really getting priority consideration from building designers, as it should be, but the long awaited DOE's proposed "Energy Performance Standards for New Buildings" (BEPS) is still in the bureaucratic bushes. If the "BEPS", as presently proposed, were made effective, it would be

catastrophic for the electrical construction industry, and less than effective as an energy conserving effort. "BEPS" is now based on "weighting factors", which rely on unsupported assumptions, which are still in the research stage. The really mind boggling part is that they give no consideration to the source fuel and actually encourage the use of scarce fossil fuels, oils, and natural gas. Smart boys, these regulators.

Conservation is and should be an important part of our energy plan, but it must be one that really saves energy resources, instead of perpetuating governmental red tape.

It is time for us to get our act together. There is plenty of energy available to fuel the American Dream, and still have enough left over to help feed and clothe the rest of the world. We can no longer afford the luxury of governmental vacillation and incompetent decisions. It is an unfortunate fact of life today that energy equilibrium for America depends much more on government fiat than on private initiative and capability. Ours is not an energy deficient nation. It need not continue its excessive dependence on shaky foreign sources of supply. Recoverable fossil fuels exist in quantities sufficient to meet our needs for decades.

We have nuclear power and, with the advent of the breeder reactor and fusion, there is a limitless promise of clean, safe, electrical power. We cannot allow the American Dream to hesitate in taking the next step forward in this vital area for, if we do, others will seize the opportunity and take our place. France, Britain, Japan, and the Soviet Union are among the many nations with expanded plans for nuclear power generation, and they will surpass us.

I have a difficult time accepting a philosophy of being "second best".

We Americans have always acknowledged the things that united us were more significant than the things that separated us. We, in the electrical industry, can unite our communities and our country on a reasonable evaluation of energy--and the American Dream.

This country was not built by those whose philosophy was dominated by words; such as, small, less, fewer, or fear. It was built by courageous men and women, whose horizon had no limits. Because they expected more, they built more--and in doing so, they created a higher standard of living, with greater opportunity and freedom for a greater number of people than any system ever devised--that is still the "American Dream"--we have the energy to continue to fulfill that dream, if we but have the will.