Why America Needs To Build Nuclear Power Plants—Fast

by Paul Gallagher

The vague vaporings of the George W. Bush Administration about "getting back to designing some nuclear power plants by 2010" (the President on Aug. 8 in New Mexico), are worse than inadequate to the United States' immediate need to have a sizable nuclear power construction program under way—tomorrow. The same White House which has exhaustively mounted a desperate bully pulpit trying to undo 70 years of Social Security, has done nothing more to revive nuclear power, than occasionally to indicate its generally favorable views on the subject. Combined with an increasingly deregulated, "market-driven" power industry—which is interested in monopolizing existing nuclear power plants because they produce electricity so efficiently, but little interested in expending the capital and risk to build new ones—White House policy is aimed toward building a molehill, of perhaps two or three new nuclear plants by 2015 or so.

The 2005 energy legislation just passed by Congress, initially the work of Dick Cheney's oil dollar-hungry "energy task force," gives the power industry protection against long regulatory delays, for only six prospective new nuclear plants. Meanwhile, it pushes further the disastrous deregulation of the power industry (see following article). There are various "incentives" to nuclear power in the legislation, and there are petitions from cities and towns which want plants built; but the electric power industry sees even the three-plants-by-2015 goal as ambitious.

The nation needs, by contrast—in the hard and minimal estimations of engineers and experts on the power industry—to build *30 times that many nuclear power units* by the middle of the next decade, if it hopes to revive manufacturing, industry, and infrastructure. And it needs to swiftly *re-regulate* the electric power industry, as well as to take other steps to forcefully revive national capabilities to produce power components, or else such a necessary nuclear construction drive simply cannot occur.

Coal-fired additions to power generation in America have essentially ceased. Recent exclusive reliance on new natural gas-fired turbine plants, most of which add only "part-time power," is lowering the efficiency and raising the cost of producing more electricity. The only technology capable of large-scale additions to continuous baseload power generation, highly efficient and energy-dense, safe, and pollution-free, is nuclear power.

Aging Coal Infrastructure

U.S. electricity generation fired by coal has increased by only 9.6% in the ten years from 1994-2004, and coal-electric generation in 2005 is projected to be no greater than that of 2003. Very few coal-fired electric plants have been added to the U.S. grid, and the existing stock of plants is aging and badly polluting. Ohio, for example, which has among the highest dependence upon coal for electricity of any state, leads all states in carbon monoxide and carbon dioxide air pollution, and is second in sulfur dioxide pollution.

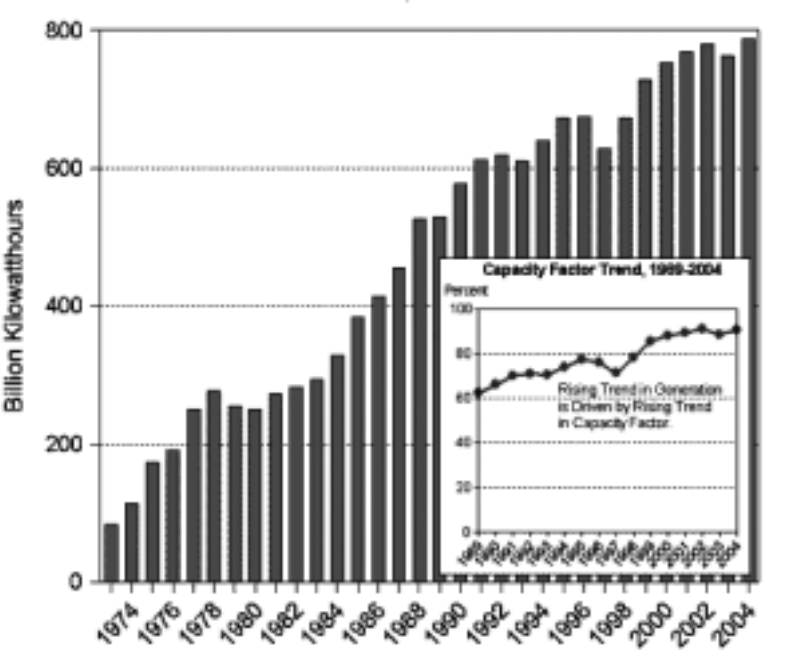
The retrofitting of a 40-year-old coal-burning plant to meet anti-pollution standards, in many cases is as great an investment as building an entirely new plant. Hundreds of coal-electric plants will either have to be expensively upgraded, or replaced in the next ten years. But the Energy Information Administration (EIA) forecasts (in its May 2005 *Annual Energy Outlook*) the almost-negligible addition of only 6,000 megawatts of new coal-fired electric capacity in the ten years to 2015.

An example: On Dec. 3, 2004, Cincinnati Gas and Electric (which goes by the new-age moniker Cinergy, in the Enron age of deregulated power-merchant companies), with 20% of Ohio's power capacity, announced that it wanted to add 800 megawatts by building a new coal-gas electric plant. CG&E

hasn't brought any new capacity on line since the coal-fired Zimmer power plant—14 years ago. The new plant, if built and running by, say, 2008, would complete an addition of only about 4% to Southwest Ohio's power capacity over a 17-year period 1991-2008. Ohio's population growth has turned negative over that period, while the state's once-dominant industry has collapsed and poverty has overwhelmed its once-booming cities. Furthermore, since Ohio's legislature in 2000 adopted the cutthroat "electricity deregulation" regime, Cinergy is demanding a rate increase of 5% from its customers to pay for the plant, *before* it builds it. During 2005, two other major Ohio utilities have also moved for rate increases. The state has only one operating nuclear plant, the 1,200-megawatt Perry unit near Cleveland, and depends almost entirely on coal and natural gas-fueled electricity capacity.

Large amounts of coal, for Ohio and many other states' power production, is moved down the Ohio River, and this coal delivery depends upon a system of locks and dams, which itself is 40-50 years old, and older. If those locks and dams go out of maintenance, coal barges on the Ohio River stop flowing. The nation's major freight railroads, particularly the Union Pacific and CSX, are running so many "unit trains" to haul coal for power stations across the country, that rail transport of *all other kinds of freight* has been squeezed into steady decline for more than 30 years.

FIGURE 1
Nuclear Generation, 1973-2004



Source: U.S. Energy Information Administration.

Technological improvements in existing U.S. nuclear power plants have increased their efficiency—and therefore, power generation—so dramatically in the past ten years, that the effect is as if 20 new nuclear plants had been built and added to the national electricity grid. This "virtual" added capacity now has to lead to rapid construction of actual new nuclear plants.

Depending on 'Virtual' Nuclear Power Additions

Where, then, have the major additions to baseline, year-round power production and consumption come from, since 1994? The answer is ironic, and economically significant: from nuclear power.

Total nuclear-electric power production has increased from about 630,000 gigawatt-hours in 1994, to 790,000 gigawatt-hours in 2004, a steady rise of 26% in ten years—without bringing a single new nuclear unit of electric generating capacity on line; and in fact, having retired or idled about 7,000 megawatts of peak capacity during that time. Technological improvements have rapidly increased the efficiency and "load factor" of all nuclear power plants combined—essentially, the percentage of the year's time they spend producing at or near full capacity—from 70% to over 90%, far higher than power from other fuels (see **Figure 1**).

This increase has given *the virtual equivalent of adding at least 20 full-sized nuclear power plants to the grid during that decade.* This is why there has been such a "free-market" rush by power marketers to buy nuclear plants, leading to their near-monopoly by three large companies, Excelon, Entergy, and Dominion Power—while the same companies have not built any new nuclear units.

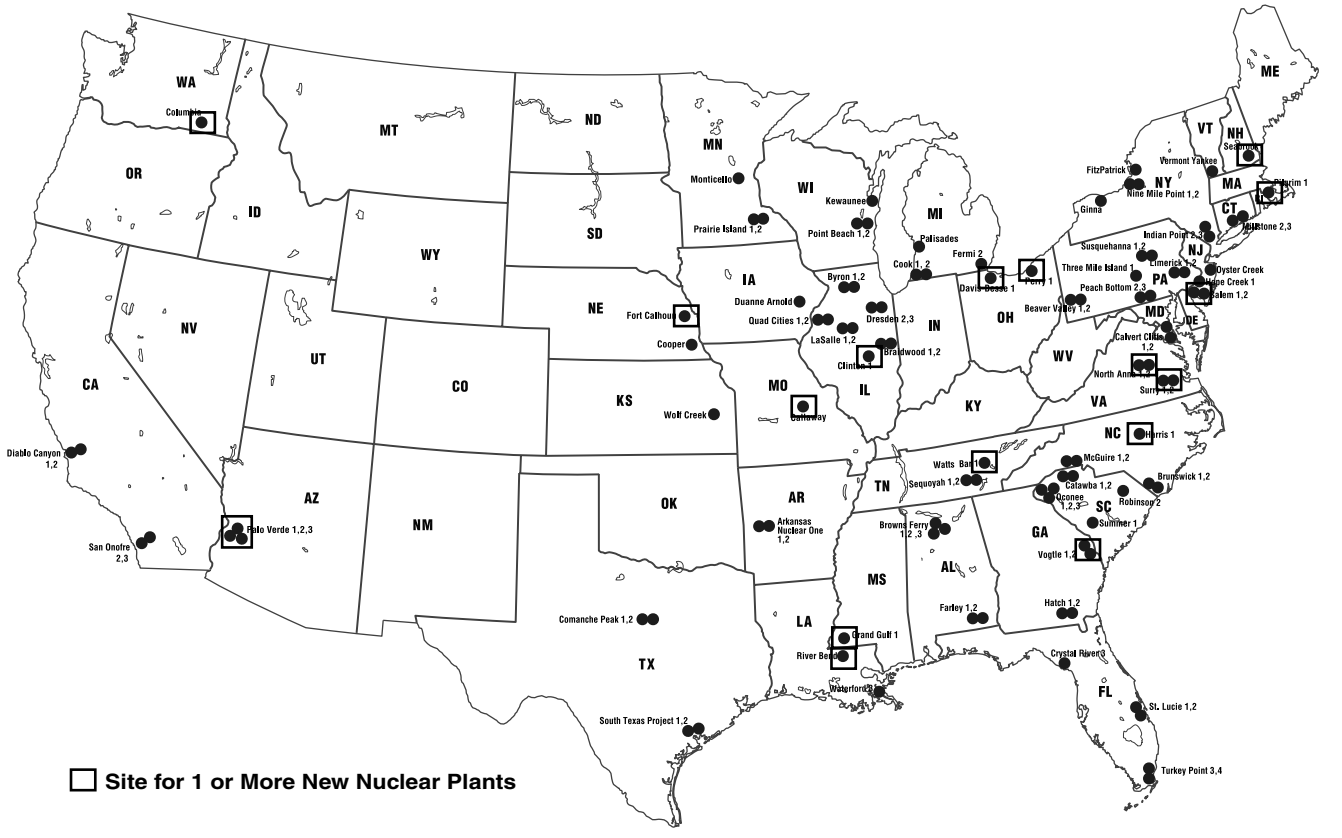
But this "virtual capacity" increase is now essentially fully accomplished. The only way to continue it, is to add actual new capacity—build new nuclear plants.

Otherwise, natural gas turbine plants, usually as small as 50-200 megawatts, have accounted for over 90% of the number of plants added to America's electric capacity in the decade since 1995; and the EIA currently thinks they will account for more than 80% of capacity additions over the next ten years as well.

This is a case of growing economic folly. The small gas-electric turbines have spread in the deregulated power industry because they are quick, cheap, and easy to build. But they don't really add to "baseline" power load capacity, especially that needed by industry, because most of them are used only during Summer and Winter "consumer use-peaking" periods; and their wild proliferation has been associated with an abrupt tripling of the cost of natural gas in North America. Thus, their use is inherently economically inefficient, and is now building up a powerful pressure to balloon electricity rates upwards. The cost of gas to electricity generating companies, in dollars per thousand BTU-equivalent of electricity generation, is already ten times that of nuclear fuel.

FIGURE 2

Ready Sites for 28 New Nuclear Plants, at 17 Current Nuclear Power Locations



Source: Nuclear Energy Institute.

New Plants Needed This Decade

The chairman of the Nuclear Energy Institute, Adm. Frank "Skip" Bowman, as reported in the Aug. 15 *Washington Times,* estimated that the United States needs to build and operate 60 new nuclear plants within the next 10 years. The head of the Federal Nuclear Regulatory Commission, Dr. Nils Diaz, earlier this year estimated a current need for 100 more American nuclear units.

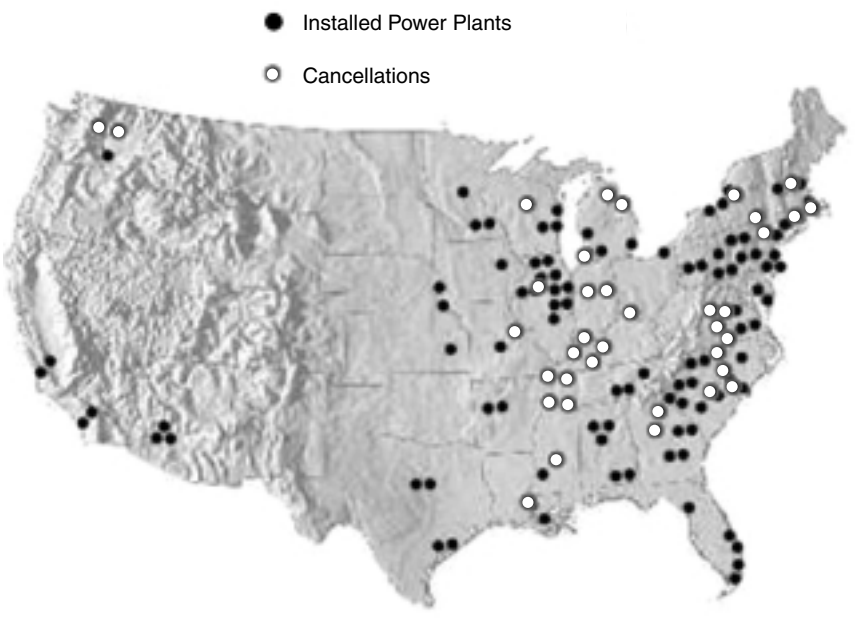
These estimates—so far out of line with Bush's "hope" that design of a few new nukes might start by 2010—are necessary just to maintain nuclear's current share of electric power in America, if electricity use grows during that period with infrastructure building, industrial revival, and population growth; and assuming some of the oldest operating nuclear plants may go out of service.

Since 2000, in the world as a whole, 22 new nuclear electric plants have been put on line. Some 25 more are in construction phases now—and recently, nuclear power plants have been completed very rapidly in some Asian countries—but that includes none in the United States, and only three in European countries outside Russia. The overall global number is still very small, compared to the 6,000 nuclear units which engineers have long known are needed, if the nations of the world are to have and use anything like the electricity per capita, per year, which is used in Western Europe, the United States, and Japan (see James Muckerheide, "How To Build 6,000 Nuclear Plants by 2050," *EIR,* June 17, 2005).

The United States now has 104 of the world's 430 operating nuclear plants; but America had 112 operating in 1991. Since that time, about 7,000 megawatts of nuclear (the equivalent of about seven large nuclear-electric units) have been taken off line because of age and/or the economic costs of refurbishing or relicensing; and 6,000 megawatts of those units' capacity has been decommissioned; that is, permanently shut down. During the next 10 years, another 30 nuclear power units will reach their original licensed operating lifetime age of 30 or 40 years; many of them have either already been relicensed to keep operating, or have such relicensings under review by the Nuclear Regulatory Commission; but half a dozen have not yet had any step taken by their operating power companies toward relicensing.

So by 2015, without forceful intervention by government, it could be 25 years since nuclear power plants stopped going

FIGURE 3
U.S. Nuclear Power Plants and Cancellations Since 1980



on line in America; and we may well have lost the equivalent of 10-12 full-sized nuclear units, because of age, in that quarter-century.

Yet the most "ambitious" plans of the George W. Bush Administration so far—as emphasized again by the President when he signed the new energy act on Aug. 8—aim at adding those two to three new nuclear plants to the U.S. electricity grid by 2015! Compare this to the baseline necessity for construction of 100 new plants, as estimated by NRC head Nils Diaz.

Can We Build Them?

In several Asian nations, the time needed actually to construct a nuclear plant and bring it on line, has recently been as little as four years. But American industry is in the same paradoxical situation with regard to building nuclear power plants, as it is for going to the Moon: We did it in the past; we cannot do it now, without having to import major elements in the process.

In order to restart the nuclear construction critically needed for the U.S. power grid, the government will have to intervene to guarantee quick approval of both sites and advanced designs, committing credits to construction if necessary. **Figure 2** shows, for example, 17 locations around the nation where up to 28 new plants could be built on sites which already have operating nuclear power units. **Figure 3** indicates where another 36 nuclear plants were cancelled over the years, many after their site selection had been approved.

But the Congress also immediately has to re-regulate the electric power industry, to place the emphasis back upon utilities *producing* growing volumes of reliable power and transmission capability, rather than on the Enron model of *buying, moving, and marketing* electricity across state lines.

And Congress will also need to launch a national investigation and inventory of the industrial capabilities the nation still has for production of nuclear plant components and systems, and those it no longer has; so as to guide an immediate intervention, with credit and incentives, to bring back those industrial capacities which have been lost, but at 21st Century levels of nuclear technology.

Such an immediate initiative for fact-finding, and then Congressional re-regulation of the economy to revive its ability to build modern infrastructure, is a critical aspect of the policy Lyndon LaRouche circulated to Congress and the country in March, under the heading *Recreate Our Economy.*