Nuclear Power is the Future – What is America Waiting For?

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“We all remember the Chernobyl nuclear power plant disaster in 1986, but few realize it was a result of poor Soviet-era designs and mismanagement of operations, not solely to generate electricity, but also plutonium for nuclear weapons.

As indicated by Campbell, et al., 2020, over the past few decades, uranium mining and now 93 nuclear power reactors in operation today in the US, and some 441 in operation worldwide (plus 54 under construction in China, Russia, India, etc.), have demonstrated safety records *far exceeding* those of natural gas (line explosions), coal (underground mining accidents), and renewables (wind and solar) in terms of injuries and fatalities during construction and repairs and inherent failings of the technologies.

Serious competition is now underway to determine which energy source will dominate the power grid in the foreseeable future. With coal unfortunately in decline, natural gas, nuclear, hydroelectric power, and renewables (wind and solar) are all in the running. Both natural gas and nuclear power are providing backup to wind and solar power when the wind does not blow, and there is insufficient sunshine. Because California has retired many of its nuclear power plants based on ill-founded, unsound reasons, burning natural gas has taken its place in the power grid in supporting California’s unstable renewable energy systems.

Renewables’ inherent failings have been made even more apparent by the need for backup batteries during zero or low-power output, which are unusually expensive to buy and maintain. Furthermore, as recently constructed wind and solar projects mature, the cost of

the electricity they are producing is rising rapidly, not only because of low energy conversion production efficiencies, but also because the costs of operation and maintenance (O&M) of these projects have been overlooked and underestimated during the economic evaluations in the project design stages. This makes cost comparisons between large-scale wind and solar projects and nuclear power artificial and illogical without including the O&M costs.

Sufficient uranium will be available to fuel US nuclear power plants well into the future. Uranium fuel costs represent only about 5 percent of the operating cost of nuclear plant generation of electricity. In contrast, the fuel costs of natural gas power plants are much higher. But the principal difference between nuclear and natural gas is the volume of fuel needed: one uranium fuel pellet contains the energy equivalent of about 17,000 cubic feet of natural gas.

The matter of nuclear waste is a common point of contention among the anti-uranium mining and anti-nuclear groups. But they do not seem to recognize that the total amount of nuclear waste produced by the United States since the 1950s – only about 90,000 metric tons – is small enough in volume to fit into an area of a football field 30 feet deep. The federal government was required by legislation in the 1980s to build a storage site, but some politicians in Nevada and Washington, DC, obstructed, and a few geoscientists vetoed the completion of the Yucca Mountain facility in Nevada based on hydrogeological issues. Consequently, nuclear wastes are currently being held at plant sites in secure casks as temporary storage until the government manages the issue by constructing facilities for storing the nuclear waste for recycling and future use.

SMR will transported by truck and/or rail one soon

When the Small Modular Reactors (SMRs) and new nuclear technologies emerge, it will soon become clear to everyone that nuclear power has no equal. In the coming decade, we will begin to see Small Modular Reactors (SMRs) being constructed around the US within and near cities, towns, neighborhoods, and in remote areas with the support of local, state, and federal governments. SMRs offer strong safety features, lower capital costs, will be reasonably priced to operate, and require minimal waste handling by removing and replacing spent fuel with new fuel in sealed containers built to be transported by truck or rail.

Eventually, SMRs are widely expected to replace many of the current wind and solar projects now operating and, in the future, will be installed and well-received in remote areas as well as in small towns and metropolitan neighborhoods. This is because of their safe designs,

lower cost to construct, and lower cost to operate than natural gas facilities and natural gas distribution systems. The SMRs should initiate operations within the next five years.

Radiation is an issue that is not related to science or technology, but to psychology. The fear of radiation associated with nuclear power plant operations and its waste products continues to be at the core of a relatively small number of opponents of nuclear power and even to mining for uranium. Understandably, this fear originated when the atomic bombs were dropped on Japan to end the war. Despite condemnation by those who do not understand the difficult choices President Truman faced, the atom bombs saved hundreds of thousands of American soldiers' lives that would have been lost if the allies had had to invade Japan, then led by a recalcitrant fascist government.

While the incident at the Three-Mile Island, Unit 2 reactor in Pennsylvania allowed very low levels of radiation to escape, no one was irradiated or killed during the process of controlling the incident. Nevertheless, we are still dealing with the after-effect of excessively sensationalist media coverage that seriously damaged the reputation of nuclear power.

Then 25 years later, in 2011, an earthquake far offshore, followed by a tsunami, resulted in a major impact on Japan. Thousands of deaths were caused by the tsunami but none by escaping radiation. The tsunami flooded the Fukushima nuclear power plant, which was incapacitated, but the meltdown was properly managed. A few years after the nuclear incident, almost all of the residents moved back to their homes.

Again, however, the media stroked fear for years, and so-called experts opined on TV news about the possible damage to the surrounding area. So, even though these claims turned out to be gross exaggerations, soon after the incident, Japan began to turn off all of its nuclear power plants to examine the safety issues involved. Years went by while they evaluated the issues, and in the meantime, they turned to renewable and imported natural gas.

Not surprisingly, consumer electricity prices began to soar since they could not get sufficient power from renewables because land requirements and local weather did not cooperate in providing sufficient wind and sunny days. Soon, Japan began to apply new safety features to their nuclear power plants, and now many have returned to operation.

> Seeing the sensationalist news coverage of the Fukushima incident, Germany, which had been operating 17 nuclear power plants since 1986, promptly decided to terminate the nuclear power plant construction projects then underway. After Fukushima, Germany began to shutter all their nuclear power plants, replacing the power requirements by building up renewables, and recently began buying natural gas from Russia since they are not getting the power needed from wind and solar. As could easily be forecast, energy costs have tripled.

Communist China and Russia have decided to undertake major new nuclear power plant construction projects and have exported their capabilities to other countries in the Middle East, Southeast Asia, and even the United Kingdom. Along with construction, both countries

have offered to finance the entire projects, even with operation and maintenance guarantees.

So, while Japan, Germany, Switzerland, Finland, and other countries are about to start up shuttered nuclear plans or are about to fund and begin new construction, the United States sits in a doldrum. Until American state and federal governments assemble a rational energy policy, little of this worldwide nuclear Renaissance will take place here. Not surprisingly, the uranium mining industry is reluctant to resume production and expand exploration into old and new areas. Yet, were they to do so, discoveries that would provide hundreds of years of available uranium resources, as well as byproducts such as vanadium, molybdenum, selenium, rare earths, and thorium from a variety of secure sites would be the result. What are we waiting for? You can help by spreading the good news on nuclear power !

“The weekend of Saturday and Sunday, September 3th and 4th, 2022 at both 11 am (EDT) and 8 pm (EDT) *THE OTHER SIDE OF THE STORY* radio program was broadcast on ***America Out Loud Talk Radio***, our guest will be nuclear power expert Michael D. Campbell to discuss the future of nuclear power in the U.S. and the world.”

The above article was based on an article by Campbell, et al., "Beyond Hydrocarbons ... The Rest of the Story," (here).

Other publications mentioned during the interview:

Campbell, M. D., et al., "Confronting Media and other Bias against Uranium Exploration and Mining, Nuclear Power, and Associated Environmental Issues," (here).

Campbell, M. D., "Uranium and Nuclear Power are on the Move ... Again !," (here).

Campbell, M. D., "The U.S. Uranium and REE Supply Chains: A Brief Discussion," (here).

Campbell, M. D., et al., "Sources of Rare Earth Elements in the U.S. and the World, (here).

Campbell, M. D., "A New Meteor Crater, Old Uranium, Thorium & REE Mineralization, &
A New Roll-Front Uranium District … All in Eastern Seward Peninsula, Alaska?" (here).

The I2M Web Portal Introduction (here) and on **Nuclear Power Updates** (here).

Other publication of interest:

From AAPG: "Net-Zero Emissions by 2050? Not Without Nuclear," Part 1 of 2 (here).

From World Nuclear News: "US Uranium Miners Ready to Support Nuclear Power, says Uranium Committee (here).

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