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The Rush to Globalize Nuclear Energy

Following the events of WWII, the general perspective towards nuclear fission was quite negative, being known mainly for its ability of mass destruction. While nuclear fission had many other promising uses, especially with energy production, the public had only been exposed to the dark side of nuclear power. In the 1950's, the Eisenhower administration sought to change this view on nuclear energy through the "Atoms for Peace" initiative, which was established following the president's speech promoting peaceful nuclear energy, in 1953. At this time, with much of the world in ruins, demand for energy was higher than ever, and thus, other countries began replicating and developing their own adaptations of the LWR (Light Water Reactor) used in the U.S., such as Great Britain, which began operating its own design, using graphite as moderator and air as coolant. But this did not happen overnight. Following the Atoms for Peace initiative, nuclear power reactors began their experimental phase, where the U.S. pushed for fast commercial implementation of nuclear power plants to demonstrate the peaceful uses of nuclear energy and prove to the public that nuclear energy could be a benefit to daily life, and not just a "weapon of mass death." Similar to the conditions of the Manhattan Project, it was becoming a time crunch, with the goal being to quickly implement nuclear power into the American free market and allow for industrial competition to stimulate growth and decrease costs. Under the guidance of the Atomic Energy Commission (AEC), the Power Reactor Development Program (PRDP) was established to speed up development and experimentation with improved funding. The LWR design by Alvin M. Weinberg, the Oak Ridge Lab director of research, became a huge name after Weinberg collaborated with Hyman G. Rickover in the development of the first working nuclear powered submarine *Nautilus*. With Rickover's influence in the AEC as head of

the Division of Naval Reactors, there was bias in favor of using the LWR design as a template source for nuclear power plants. While the LWR was neither the best nor the cheapest alternative, it could yield reliable results and be developed quickly, which was a key factor in allowing the U.S. to remain the world's scientific and technological leader. After being placed in charge of the Shippingport Atomic Power Station, Rickover was eager to prove that the LWR was the right choice, and sure enough, the plant successfully hosted a "demonstration PWR reactor" that achieved criticality on December 2, 1957, and began producing power to the grid a few weeks later. By the early 1960s, only one reactor type – the PWR – had been repeatedly built with consistent success. At this time, nuclear energy was still much more expensive when compared to coal and oil; however, by the late 1960s, oil prices began to increase, with the first oil crisis occurring in 1973, resulting in a 400 percent rise in oil prices. All of a sudden, nuclear energy prices began to seem much more reasonable. This event led to the "Messmer Plan," in France, which sought to replace power from oil with nuclear alternatives. Between 1975 and 1985, nuclear power had risen from about 10 percent to over 65 percent of the country's total production, which heavily elevated the status of the LWR. By then, the only real competitor to it remained the Canadian CANDU heavy water design, "a success in its home country and several others, like India." While the LWR was being commercialized, Weinberg was leading experimentation with a different type of reactor that was claimed to be "meltdown-proof," and able to produce more energy than traditional LWR designs. This reactor was labeled the Molten Salt Reactor, and in spite of its promising traits, its experimentation was shut down by the Nixon administration. As a result of these events, almost all commercial reactors around the world use the LWR design. However, as Gen IV reactor projects come into play in our modern age, Molten Salt Reactors have come back into the spotlight, and may one day dominate the industry.