

A CIRCULAR ECONOMY VISION FOR NEXT-GEN NUCLEAR POWER

The 94 nuclear reactors in the U.S. collectively produce about 20% of the nation's electricity at >90% capacity factors and with a stellar safety record. More importantly, nuclear accounts for 50% of America's carbon-free generation. However, compared to the lofty expectations of its pioneers, nuclear energy has unfortunately proven inadequate. Despite its reliability and proven scalability, the public's perception of nuclear power remains less favorable compared to other zero-carbon power sources. Polls show that the issue of "nuclear waste" consistently ranks at or near the top of the arguments posed for objecting to the expanded use of nuclear power.

The politics surrounding the federal program to store nuclear waste in a geologic repository in Yucca Mountain, Nevada, has led to a spectacular impasse. As a result, the nation's inventory has grown to nearly 90,000 metric tons and is stored in some 75 locations across 35 states.

Unknown to many, however, is that "nuclear waste" or "spent nuclear fuel" is neither *waste* nor *totally spent*. Technically speaking, it is *partially used nuclear fuel*. For instance, the energy content within the accumulated transuranics (or heavier-than-uranium elements) alone represents energy equivalent to 1% of the world's natural gas reserves. Challenges related to economics and risks of nuclear proliferation have prevented commercial recycling of this material in the U.S.

With pollution, climate change, and the need to alleviate energy poverty all weighing heavily on the public conscience, nuclear power is in a resurgence with several proprietors of advanced reactor designs heading for commercial deployment. But their experience has shown that yesterday's nuclear waste is holding back tomorrow's nuclear reactors from gaining public acceptance.

NuCycle™ is Curio's next-generation process that recycles nuclear waste efficiently to recover an array of commercial products. With NuCycle coupled with its next-gen reactor design, HOPE™, Curio is laying the foundation for a long-awaited circular economy that will bolster the case for wider adoption of nuclear power.