



of radioisotopes into electricity have not evolved since the invention of radioisotope power systems and fission reactors over 70 years ago and remain unoptimized,” the RFI says. They rely on thermal heat transfer, and “in each step of this indirect conversion method neutrons, heat, and energy are lost to the shielding material, working fluid, and other system materials.”

Advanced reactor designs that use alternative coolants, including helium, sodium, and salts, would still use what DARPA calls “heritage nuclear power conversion technology” with water and steam as the working fluids, as would the fusion power plants being planned today.

Tabitha Dodson, the program manager for DARPA DSO, which is launching the RFI, told *Nuclear News* that “two big things” are driving the interest.

“One is the extreme surge of investment in small and advanced nuclear technologies, such as in fusion and space reactors, which



AI-generated concept image. (Image: DARPA)

do not have a concurrent pairing of advanced power generation methods that doesn’t involve liquid-based heat transfer,” she said. “Next, there has been an order of magnitude improvement in radiation tolerance and efficiency for voltaics in recent years with encouraging performance that indicates radiovoltaics could scale up as an array usable in nuclear reactors.”

Continued

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