An enhanced MMRTG. D. F. Woerner, Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, CA, 91109, david.f.woerner@jpl.nasa.gov.

Introduction: NASA and the U.S. Department Of Energy (DOE) have developed and flown three different Radioisotope Thermoelectric Generators (RTGs) in the last approximately 39 years, at a fairly sporadic launch rate of about one per decade.

Manufacturing of MHW-RTGs was discontinued after the twin Voyagers were launched in 1977; key staff were disbursed, and the entire manufacturing capability was dismantled. The sunk cost at the time of shuttering the facilities was significant. The subsequent Galileo mission to Jupiter required the DOE to re-establish manufacturing capabilities to produce a space-qualified RTG for deep space missions, which led to the GPHS-RTG, or General-Purpose Heat Source-RTG. However, GPHS-RTG manufacturing was discontinued after Cassini's launch to Saturn in 1997, resulting in a similar damaging loss of experienced staff and manufacturing capability, and significant sunk costs.

The Mars Science Laboratory project required the development of a space-qualified Multi-Mission RTG (MMRTG) capable of meeting deep space and planetary surface operation requirements. MMRTG capabilities and sunk costs would have been lost again without the implementation of a sustainment program described as part of this poster.

NASA and DOE have developed and are implementing a plan to end the damaging effects of such episodic RTG redevelopment cycles for the foreseeable future. MMRTG production will be preserved—a significant achievement in itself. This brings with it the potential for an enhanced MMRTG, or eMMRTG. In short, NASA is sustaining the manufacturing capabilities of key industrial partners,and funding engineering and analyses for a potential eMMRTG. This would pave the way for the DOE to complete a flight system development of an eMMRTG for missions launching in the early to mid 2020s if approved by NASA.

A critical partnership has been formed between researchers, industry, and the government to bring stability to the nation’s capability to provide radioisotope power for space exploration. None of these partners can operate independently. The goal of the partnership is to ensure a continuing capability, inject innovation, and maintian the high safety standard necessary to conduct nuclear missions for planetary science and exploration.

This poster presentation will discuss the status and potential of the eMMRTG, including projected gains over the MMRTG, a discussion of the technologies involved and their risks, and an overview of a notional schedule for a flight development.