The energy backbone of a new scientific golden age

The Editorial team

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In July 2026, the White House Office of Science and Technology Policy released "Science: A New Golden Age," framed as the long-awaited successor to Vannevar Bush's 1945 report. Its diagnosis is bracing: U.S. scientific productivity has slowed, institutional incentives reward conformity over daring, and China now matches U.S. R&D spending on a purchasing-power-parity basis. Among its many recommendations, the report is unusually explicit about one variable that earlier Bush-style documents treated as a background utility: energy. The Golden Age, it argues, will not arrive unless the United States decisively fixes how it produces, regulates and thinks about power.

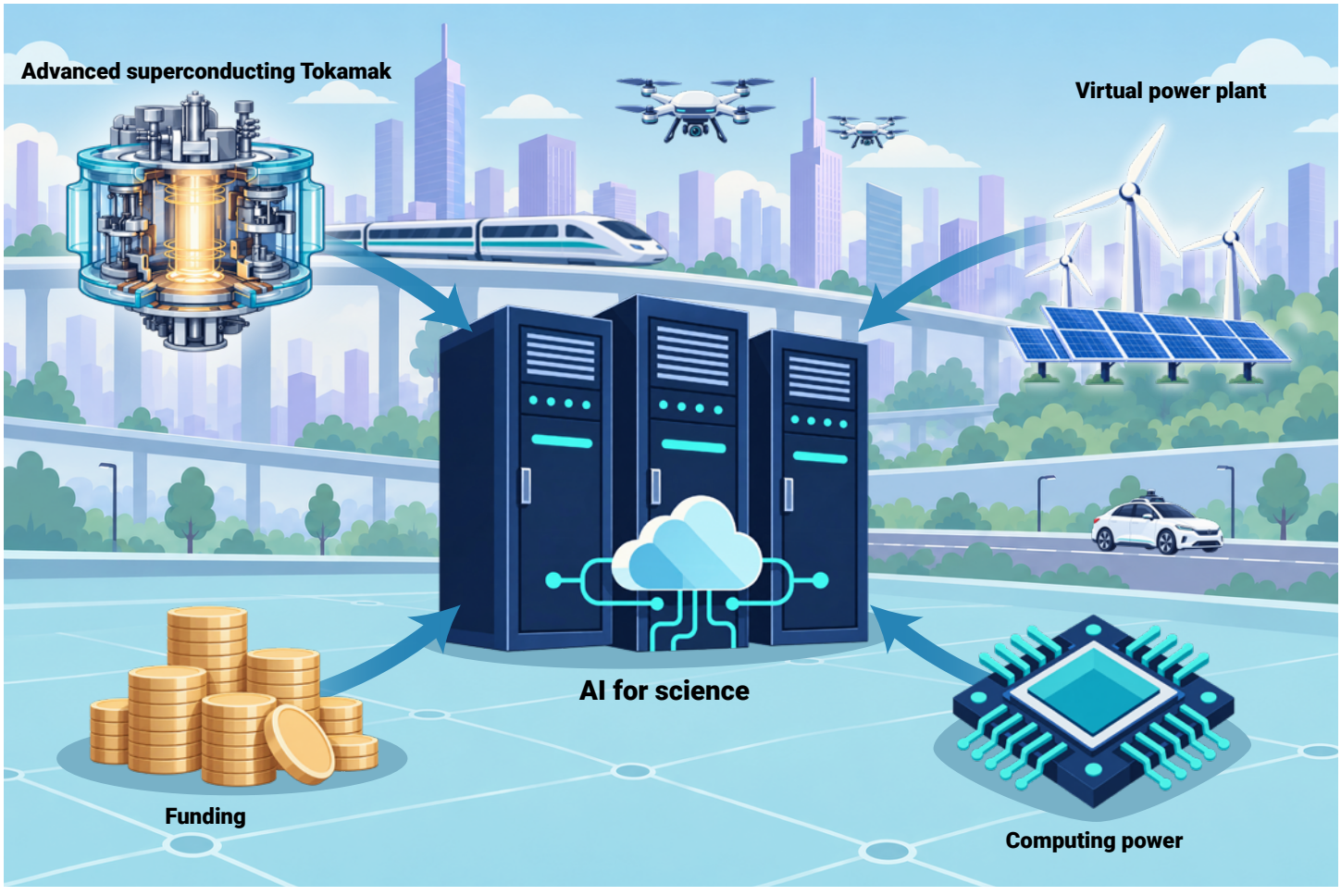
WHAT THE REPORT GETS RIGHT

The report's energy chapters are a striking break from prior White House science strategy documents. It names and shames the nuclear regulatory morass that has, for half a century, turned a U.S. leadership advantage into a cautionary tale: a startup seeking to build a single advanced reactor must complete five to six years of pre-application discussions with the Nuclear Regulatory Commission, followed by a four-year design-certification process; one filing ran to 12,000 pages, supported by more than two million pages of technical documentation, on which the Department of Energy spent roughly $600 million before a shovelful of concrete was poured. The report endorses the four nuclear executive orders signed in May 2025—an 18-month deadline for NRC reform, licensing caps, five gigawatts of uprates at existing plants, ten new reactors under construction by 2030, and Defense Production Act authorities to secure domestic fuel supplies—and calls them "the most sweeping nuclear reforms in a generation."

It is equally direct about fusion. The Genesis Mission, launched by the President in November 2025 and executed through DOE's 17 national laboratories, is tasked with doubling U.S. scientific productivity within a decade by connecting supercomputers, AI models and experimental facilities—and it explicitly lists nuclear fission and fusion among at least 20 "national-importance" grand challenges, alongside advanced manufacturing, critical materials and quantum. The report already notes that AI is being used to design novel proteins, control tokamak plasmas, and run autonomous laboratories; the Lawrence Livermore National Laboratory's August 2025 collaboration on the Vulcan supercomputer is cited as a model.

THE MISSING CHAPTER: DEMAND SIDE FLEXIBILITY

Here, however, the report's energy vision runs into its own blind spot. It treats energy overwhelmingly as a supply problem—build more reactors, reform the NRC, scale fusion venture capital, modernize transmission. What it underplays is the demand side, and specifically the most consequential new load of the century: the data centers and AI supercomputers that the report itself celebrates. The document notes that U.S. companies committed more than $400 billion to AI infrastructure in 2025 alone—more, in inflation-adjusted terms, than the Apollo and Manhattan Projects combined—yet it says almost nothing about how that load will interact with the grid, absorb variable wind and solar, or provide reliability services in return.



This is a notable omission precisely because the report is about science institutions. Elsewhere in the world—most visibly in China—grid operators are already treating data-center workloads not as fixed baseload but as dispatchable, time-shiftable capacity: cross-province "computing follows green power" pilots, megawatt-scale demand response, and operating systems that map individual AI tasks to their electricity and carbon footprint. The United States is pursuing a parallel path through virtual power plants, distributed energy resources and DOE loan guarantees—an 80–160 GW VPP target by 2030 is on the table—but the Golden Age report does not connect those dots. A reactor ordered today takes a decade to build; a flexible workload can be redirected in milliseconds. Ignoring that asymmetry is a strategic error.

THE PHOTONICS OPPORTUNITY

Photonics belongs at the center of this agenda, and not only because laser inertial confinement fusion is one of the most plausible long-term paths to commercial fusion. Photonics is simultaneously part of the problem and part of the solution. It is part of the problem: extreme-ultraviolet lithography, III–V optoelectronics and high-performance data-center interconnects are energy- and capital-intensive industries whose manufacturing footprint scales with the very AI build-out the report celebrates. But it is also the solution. Photonic devices underpin higher-efficiency power electronics, next-generation solar cells, the fiber backbone that lets demand response work at continental scale, and the laser systems that will drive fusion, quantum sensing and precision manufacturing. A Golden Age built only on fission and transmission reforms, without a deliberate photonics strategy, would be a half-built Golden Age.

CONCLUSION

Bush's 1945 report succeeded because it matched institutional ambition to the science of its moment. The science of our moment is electromagnetic, computational and energy-intensive all at once. A Golden Age that takes energy seriously—on both the supply and demand sides, and through the photonics that connects them—is one worth building. A Golden Age that does not will spend its first decade waiting for reactors that should have been ordered yesterday.

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1. The White House. (2026). Science: A golden age. https://www.whitehouse.gov/science/

DECLARATION OF INTERESTS

The author declares no competing interests.