SENATE COMMITTEE ON ENERGY, UTILITIES AND COMMUNICATIONS
Senator Josh Becker, Chair
2025 - 2026 Regular

Bill No:	SCR 25	**Hearing Date:**	3/24/2025
Author:	Blakespear		
Version:	2/19/2025 Introduced		
Urgency:		**Fiscal:**	No
Consultant:	Nidia Bautista		

SUBJECT: Nuclear fusion

DIGEST: This resolution celebrates the numerous contributions of public and private sector organizations within California for advancing nuclear fusion energy research and supports developing the fusion energy ecosystem with the goal of siting a first-of-its-kind fusion pilot plant in California by the 2030s.

ANALYSIS:

Existing law:

1) Declares the policy of the state to encourage the use of nuclear energy, wherever feasible, recognizing that such use has the potential of providing direct economic benefit to the public, while helping to conserve limited fossil fuel resources and promoting clean air. (Public Resources Code §800)

2) Prohibits any nuclear fission thermal powerplant from being permitted in the state until the federal government approves technologies to reprocess the spent nuclear fuel rods, and the California Energy Commission (CEC) reports to the Legislature affirmative findings of that federal action. (Public Resources Code §25524.1)

3) Requires the CEC to conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices and use these assessments and forecasts to develop and evaluate energy policies and programs that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety. (Public Resources Code §§25000, *et seq*.)

4) Requires the CEC, as part of its 2027 Integrated Energy Policy Report (IEPR), to include an assessment of the potential of fusion energy to contribute to the state's power supply. Defines "fusion" to mean a reaction in which at least one heavier, more stable nucleus is produced from at least one lighter, less stable nucleus, typically through high temperatures and pressures, and emitting energy as a result.

Defines "fusion energy" to mean the product of fusion reactions inside a fusion device and used to generate electricity or other commercially usable forms of energy. (Public Resources Code §25302.4)

This resolution:

1) Proclaims that the State of California celebrates the numerous contributions of public and private sector organizations within California for advancing nuclear fusion energy research and development.

2) Applauds recent scientific breakthroughs at specified facilities, including at the DIII-D National Fusion Facility in San Diego and the National Ignition Facility at Lawrence Livermore National Laboratory.

3) Recognizes the vast potential of nuclear fusion energy for addressing key climate and national security goals and the contributions of California's private fusion industry.

4) Commends the University of California's Office of the President for its leadership in establishing the Pacific Coalition for Advancing Research, Education, Science, and Technology (CREST) Fusion initiative.

5) Supports developing the fusion energy ecosystem with the goal of siting a first-of-a-kind fusion pilot plant in California by the 2030s.

Background

Nuclear energy. There are two fundamental ways to release energy from nuclear reactions: fission and fusion of atomic nuclei. Nuclear fission is a process where the atomic nucleus splits apart; nuclear fusion is where atomic nuclei combine (or fuse) together. Both processes are theorized to generate energy. In nuclear fission, the process often yields some combination of particles and energy, often with radioactive decay. In nuclear fusion, the process can manifest as either an absorption or release of energy, sometimes with radioactive decay.

Nuclear fission electricity generation is commercially available today, such as the Diablo Canyon Nuclear Powerplant outside San Luis Obispo. Very generally, for fission-based electricity generation, the atomic splitting releases heat and energy which is used to boil water; the water produces steam, which turns a turbine to generate electricity. Electricity generation based on fusion has yet to become commercially viable, and is still in research and development. There are multiple fusion methods that are currently being pursued for use in a commercial reactor

system. Similar to fission, the released energy from a fusion process would be converted to heat, which in turn is converted to electricity via a conventional generator cycle. Although the fusion reaction theoretically does not produce significant or long-lived radioactive byproducts, the high-energy particles irradiate the surrounding reactor vessel and associated components. The irradiated material could pose potential disposal problems similar to those for the irradiated fission reactor vessel.

Nuclear fusion continues to be actively pursued, unlike nuclear fission, there are less waste products, no risk of a nuclear melt down, and fusion power provides more energy for a given weight of fuel than any fuel-consuming energy source currently in use. The aim of any controlled fusion process is to achieve "ignition," which occurs when enough fusion reactions take place for the process to become self-sustaining, with fresh fuel then being added to continue it. Once ignition is achieved, there is net energy yield – about four times as much as with nuclear fission. According to the Massachusetts Institute of Technology, the amount of power produced increases with the square of the pressure, so doubling the pressure leads to a fourfold increase in energy production.

Technological "breakthrough." The world's most powerful laser fusion facility, the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory, was completed in March 2009. Using its 192 laser beams, NIF is able to deliver more than 60 times the energy of any previous laser system to its target. In December 2022, a team at NIF conducted the first controlled fusion experiment in history to reach the ignition milestone, meaning it achieved a net energy gain, producing more energy from fusion than the laser energy used to drive it. Andrew Sowder, senior technical executive at the Electric Power Research Institute (EPRI) was quoted in *POWER Magazine* describing the ignition milestone as akin to getting the first man in orbit. "You're not to the moon yet, but you've shown you can get the person in space. This is kind of a first step."

Fusion energy is nascent technology. Multiple reports have stated that commercially available nuclear fusion technology may be decades away. Determining the potential of fusion energy as a meaningful source of electricity requires a leap ahead of the current stage of research and demonstration, to consider cost and scale. At this stage, cost is astronomical and scale is tiny. Under the Biden-Harris administration, the federal government has announced and pursued efforts to advance fusion energy, including the U.S. Department of Energy's (US DOE) funding and initiatives to support Bold Decadal Vision for Commercial Fusion Energy.

California collaborative. In the hopes of advancing the state's efforts, the University of California's Office of the President established the Pacific CREST Fusion

initiative and the concept of a Pacific CREST Fusion special purpose entity which was approved at the January 22, 2025 meeting of the Board of Regents of the University of California. The vision is to have the Pacific CREST Fusion organization be a University of California led not-for-profit organization to advance fusion energy in California through a public-private partnership. The Pacific CREST Fusion initiative is intended to build off the existing laboratories, research capabilities, and private companies to advance nuclear fusion energy. In addition to the Lawrence Livermore National Laboratory, these include other research and development facilities in the state, specifically: the DIII-D National Fusion Facility in San Diego, Lawrence Berkeley National Laboratory, Sandia National Laboratories, and the SLAC National Accelerator Laboratory at Stanford University, as well as, the world-class researchers at the state's universities, including at several of the University of California campuses.

Need for zero-carbon energy resources. The need for zero-carbon and renewable energy resources is critical to advance the state's clean energy and climate goals, including those for 100% zero-carbon and renewable energy by 2045 as established by SB 100 (De León, Chapter 312, Statutes of 2018) and the interim targets established by SB 1020 (Laird, Chapter 361, Statutes of 2022). Nuclear fusion energy has the potential to become a source of clean and resilient energy, however, many important science and technology challenges remain. The Pacific CREST initiative is largely positioning for potential US DOE funding via the Bold Decadal Vision for Commercial Fusion Energy, as well as, public-private collaboration to advance fusion energy research, development, deployment, and demonstration given the growing need for zero-carbon energy resources.

It is unclear whether the recent change in federal administration and ensuing executive orders, federal employee layoffs, and other actions by the Trump administration will hinder the US DOE efforts on advancing nuclear fusion energy research and development.

Need for amendments. SCR 25 resolves that the State of California supports developing its fusion energy ecosystem with the goal of siting a first-of-a-kind fusion pilot plant in California in the 2030s. This timeframe is a decade earlier than the timeframe noted by the U.S. Fusion Energy Sciences Advisory Committee in its long-range plan, "*Powering the Future: Fusion & Plasmas,"* which calls for constructing the first U.S. fusion pilot plant by the 2040s. In this regard, the Legislature may wish to align its timeframe with that of the expert advisory committee. *As such, the author and committee may wish to amend this resolution to remove references to siting a nuclear fusion energy plant in "the 2030s."Additionally, the author and committee may wish to make additional, largely clarifying amendments, including replacing the*

reference to the "Stanford Linear Accelerator" with the "SLAC National Accelerator Laboratory," replace "promise" with "potential," and other clarifying changes.

Prior/Related Legislation

SB 80 (Caballero) of the current legislative session creates the Fusion Research and Development Innovation Hub Program within the CEC to accelerate the development and growth of fusion energy with the goal of delivering the world's first fusion energy pilot plant in the state in the 2030s. The bill is pending in this Committee.

SB 86 (McNerney) of the current legislative session authorizes the California Alternative Energy and Advanced Transportation Financing Authority to provide financial assistance, in the form of exclusions from sales and use tax, to electrical generation facilities using nuclear fusion technology. The bill is pending before the Senate Revenue and Taxation Committee.

AB 1172 (Calderon, Chapter 360, Statutes 2023) required the CEC as part of its 2025 IEPR to include an assessment of the potential for fusion energy to contribute to California's power supply.

FISCAL EFFECT: Appropriation: Fiscal Com.: No Local:

SUPPORT:

General Atomics, (Sponsor)

OPPOSITION:

None received

ARGUMENTS IN SUPPORT: General Atomics states:

"…SCR 25 recognizes the significant contributions of public and private sector fusion organizations within California for advancing fusion energy research and development, celebrates recent scientific breakthroughs at public research facilities and the important role of California's growing private fusion industry, and recognizes the vast potential of fusion energy for addressing key climate and national security goals. The resolution further commends the University of California's Office of the President (UCOP) for its leadership in establishing the Pacific CREST Fusion initiative and calls for siting a first-of-a-kind fusion pilot plant in California by the 2030s."

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