

From: Fusion Consultants LLC
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Fairport, NY 14450

Date: Monday, October 7, 2024

To: NYSERDA Offices
17 Columbia Circle
Albany, NY 12203 US.
POC: Ms. Alyse Peterson - alyse.peterson@nyserda.ny.gov

Re: Public comments on “Draft Blueprint for Consideration of Advanced Nuclear Technologies” Report

Greetings,

Our company has reviewed the draft language of the “Draft Blueprint for Consideration of Advanced Nuclear Technologies” being prepared by the Brattle Group on behalf of NYSERDA. The draft sections on fusion power were generally accurate with respect to the state of the industry – but a few points should be added:

“Fusion could become a viable option for New York’s energy supply only if and when a company can demonstrate the ability to achieve net positive power generation from fusion at a competitive cost.”
(Section 3.4, Page 10)

Power Output: To our knowledge, the world record for power balance in a fusion machine is roughly 69 megawatts of energy generated using fusion, with a roughly 100-megawatt driver. This record was set by the Joint European Torus in February 2024. However, since this was a research platform, the machine was not configured to capture energy and given the efficiency of power plants it does not mean that the Q record for fusion is 69%. We anticipate that Commonwealth Fusion Systems will break this world record with the operation of their forthcoming SPARC machine, expected to be operational in 2026; the company predicts net power from this machine.

“No fusion researcher or aspiring reactor manufacturer has created a sustainable fusion reaction that lasts more than a few milliseconds nor creates multiples of the energy used by the process.” (Section 4.5, Page 21).

Run Time: To our knowledge, the current record for runtime is 17 minutes and 36 seconds at 70 million degrees - and this record is held by China. There are longer records at colder temperatures and shorter runtimes at higher temperatures. Tokamak Energy, a private fusion startup in England, has operated a tokamak at cold temperatures for over 24 hours, while Princeton holds the temperature record at 522 million degrees. Shine Medical Technologies (a private company in greater Madison, WI) has sustained fusion reactions in their Thunderbird product for over 181 continuous hours, although this platform is not slated for a power application. There are plans for the W7X machine in Germany to extend run times to 30 minutes in the coming years.



We generally agree with the report's conclusion that New York State needs to stay abreast of developments in the \$7.1 billion private fusion industry. We note that an MIT Energy Initiative published a report in September 2024 stating that a fusion industry could create \$3.6 trillion in global economic value between 2035 and 2100 and to win this huge market NYS needs to start planning now. The general trend in this new industry is the addition of superconducting magnets to established approaches to creating fusion. These magnets are enabling an entirely new generation of fusion machines to be developed; machines that has superior performance, lower cost, smaller footprint and a better chance at commercial viability. New York State already has several companies that are supporting this growing fusion industry - offering superconducting fabrication, tritium handling and consulting services to the space.

Our company is currently engaged in a multi-year study commissioned by the IEEE, focused on exploring public policy options for U.S. states. The goal of the study is to identify policy options that can support local technology development for the fusion industry and attract fusion companies to establish operations within a given state.

Sincerely,

A handwritten signature in black ink, appearing to read "Matt Moynihan", with a long horizontal flourish extending to the right.

Dr. Matt Moynihan
Founder, Fusion Consultants LLC
1-585-451-2158