April 30, 2025 (updated May 5, 2025)

Re: Concerns regarding Converting the Renewable Energy Standard to a Clean Energy Standard

Dear Chair James and the Energy and Digital Infrastructure Committee:

We write to express concern regarding the conversion of Vermont's Renewable Energy Standard (RES) into a Clean Energy Standard (CES). This conversion signals an interest in increased nuclear development at the expense of increasing investment in renewable energy. A new Clean Energy Standard, if adopted via H.289, would result in relatively little cost savings, banks on the development of unproven technology that relies substantially on government subsidies, and risks redirecting investment away from proven, renewable technologies.

What Is a Clean Energy Standard?

The difference between a "Renewable Energy Standard" and a "Clean Energy Standard" is which energy sources count towards a utility's requirements under the law. While a Renewable Energy Standard only allows for more traditional renewable sources (solar, wind, geothermal), a Clean Energy Standard expands the list of qualifying sources beyond renewable energy to include "zero emissions" technologies, namely nuclear. Specifically, here a shift from "renewable" to "clean" energy would mean:

- reducing the total amount of renewable energy required to be purchased by utilities from 100% to 75%;
- defining "clean energy" to include technology that does not emit greenhouse gases (GHGs) as a by-product of energy generation; and
- creating "tradeable zero emissions credits" ("ZECs") alongside already-existing renewable energy credits" ("RECs").[1]

Why Adopting a Clean Energy Standard Should Give Us Pause.

1. <u>A CES incentivizes the development of nuclear energy, which Vermont should approach with caution because the technology being considered is underdeveloped and risky and there exist no good long-term nuclear waste storage options.</u>

A CES would allow a utility to use nuclear facilities to meet up to 25% of its requirement under the law. Roughly 16.5% of the state's post-REC energy mix comes from out-of-state

[1] H. 289 (2025), §§ 4, 2.

nuclear energy.[2] That means Vermont could both retire RECs for its current nuclear use and seek out roughly 9% more energy from nuclear generation.[3] In essence, this signals the state's openness to increased nuclear production. In his testimony, Mr. T.J. Poor testified that a CES would allow Vermont to maintain its existing level of nuclear imports, but "if advanced [or] small nuclear reactors were available and safe," a CES would allow for new nuclear to be developed and deployed.[4]

But advanced nuclear technologies are not close to widespread commercial viability. Advanced nuclear technologies are those that "improve upon earlier generations of nuclear reactors in one or more of the following areas: cost, safety, security, waste management, and versatility."[5] Advanced designs may incorporate one of the following—inherent safety designs, modular design, enhanced-load following capabilities, and high-temperature stability, among others.[6]

Advanced nuclear designs are not currently operational. Take small modular reactors (SMRs) as an example. SMRs have two characteristics. They (1) utilize any of the technologies and design elements listed above and (2) have a generating capacity of less than, or equal to, 300 Megawatts (MW). Only five SMRs are under construction or in operation *in the world*–including one operating in Russia, one in China, and a test operation in Japan.[7]

Even assuming advanced nuclear technologies can overcome licensing and regulatory barriers, adequate supply chains to construct these smaller, modular reactors do not exist.[8]

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[2] Energy Action Network, Annual Progress Report for Vermont 2024 (2024), https://eanvt.org/wp-content/uploads/2025/01/EAN-APR-2024-updatedJan2025.pdf.

[3] Retiring RECs means permanently claiming the environmental benefit attached to a particular form of renewable energy generation. Once retired, RECs cannot be claimed by another producer which guards against double-counting. In that way, each REC is affiliated with a discrete renewable energy generation project. The retiring of the REC is the way producers can demonstrate compliance with renewable energy requirements.

[4] H.289: Vermont Comprehensive Energy Plan–Introduction and Overview: Hearing before the House Energy and Digital Infrastructure Committee, 2025-2025 Session (Mar. 19, 2025) (Statement of T.J. Poor, Director of Regulated Utility Planning at the Dept. of Public Service).

[5] Mark Holt, Cong. Rsch. Serv., R45706, Advanced Nuclear Reactors: Technology Overview and Current Issues 7 (updated Feb. 17, 2023).

[6] *Id.*

[7] The NEA Small Modular Reactor Dashboard: Second Edition, Nuclear Energy Agency 13-14 (2024), https://www.oecd-nea.org/jcms/pl_90816/the-nea-small-modular-reactor-dashboard-second-edition.

[8] Carrie Klein, *Nation's First Small Modular Nuclear Reactors Could Come to Michigan in 2030*, Inside Climate News (Mar. 27, 2025), https://insideclimatenews.org/news/27032025/nations-first-small-modular-nuclear-reactors-could-come-to-michigan-in-2030/.

Further, the development of advanced nuclear technologies is likely to require significant federal investment to "derisk" support.[9] Simply put, investments in new nuclear facilities are not possible without substantial, sustained federal backing before, during, and after construction given the nature of the technology. In a time of market uncertainty, reliance on federal investment is risky.

Increased reliance on nuclear energy also requires thoughtful consideration of nuclear waste management. The U.S. federal government still has not figured out how to deal with nuclear waste. To start, high-level radioactive waste (HLW) from nuclear power generation generally takes thousands of years to decay. Historically, the United States has adopted a "policy in favor of deploying a large nuclear fleet without first coming up with a plan to handle the fleet's eventual [waste]."[10] The National Waste Policy Act of 1982 required nuclear generators to contract with the federal Department of Energy (DOE) to dispose of nuclear waste at a site the federal government was to identify no later than January 31, 1998.[11] Congress then created a new policy with the Nuclear Waste Policy Act of 1987 which identified Yucca Mountain in Nevada as the permanent repository for nuclear waste.[12] While the DOE has spent $15 billion studying and preparing the Yucca site, no nuclear waste has been deposited there—largely due to statewide opposition and protracted litigation.[13]

Nuclear energy development has been plagued by legal conflict. Only a month ago, the U.S. Supreme Court heard oral argument in a case between the Nuclear Regulatory Commission and the state of Texas.[14] There the parties argued about whether federal law permits private parties to receive a license to temporarily store spent nuclear fuel in a state. At its heart, the reason *NRC v. Texas* even exists is because the U.S. government has yet to find a suitable, long-term storage repository for spent nuclear fuel.[15] What happens then is that nuclear sites themselves become de facto long-term storage facilities. There, spent nuclear fuel must cool in a

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[9] Brian Martucci, *As Offshore Wind Struggles, Is Advanced Nuclear a Viable Plan B for Eastern States?*, Utility Dive (Mar. 27, 2025), https://www.utilitydive.com/news/offshore-wind-struggles-advanced-nuclear-east-coast-states/743764/?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202025-03-28%20Utility%20Dive%20Newsletter%20%5Bissue:71749%5D&utm_term=Utility%20Dive.

[10] Lincoln L. Davies, et al., Energy Law and Policy 862 (3d ed. 2022).

[11] *Id.* at 863.

[12] *Id.* at 864.

[13] *Id.* at 865.

[14] *See Nuclear Regulatory Commission et al. v. Texas, et al.,* No. 23-2300 (Mar. 5, 2025).

[15] Transcript of Oral Argument at 23-25, *Nuclear Regulatory Commission et al. v. Texas, et al.,* No. 23-2300 (Mar. 5, 2025).

pool for at least five years after which a facility moves that waste into onsite, cask storage.[16] Just as Nevada and Texas have pushed against having permanent or "temporary" privately-held nuclear waste in their states, other states are likely to resist efforts to construct new facilities without a coordinated, national policy to deal with nuclear waste.

While there has been significant government funding with respect to finding suitable management and disposal of nuclear waste (over $15 billion on Yucca Mountain alone), de facto on-site storage is the only option currently available to the nuclear industry. Reprocessing of spent nuclear fuel has also been unsuccessful in the United States. There are currently no commercial reprocessing facilities operating in the country.[17] The lack of reprocessing facilities is due mostly to limited interest given its high cost.[18]

If Vermont allowed new advanced nuclear to be built in the state, there would likely be significant battles over siting such facilities. State law requires new electricity generation facilities to receive a certificate of public good (CPG) from the state Public Utility Commission (PUC) prior to construction.[19] Individuals may challenge a petition for a CPG based on several statutory criteria, most often regarding undue adverse effects on aesthetics, air and water purity, the natural environment, the use of natural resources, and public health and safety.[20] Without a clear policy to deal with nuclear waste, it is likely groups from across the state would flood PUC dockets to challenge the issuance of a CPG for nuclear development based on environmental and public health concerns.[21] And there would likely be valid cause for concern. Advanced nuclear

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[16] *Id.*

[17] *Reprocessing*, U.S. Nuclear Regulatory Commission, https://www.nrc.gov/materials/reprocessing.html (last visited Apr. 11, 2025).

[18] *Reprocessing*, U.S. Nuclear Regulatory Commission, https://www.nrc.gov/materials/reprocessing.html (last visited Apr. 11, 2025). The Nuclear Regulatory Commission notes, in its regulatory timeline, that rulemaking with respect to constructing and operating reprocessing facility was discontinued "based on limited interest expressed or expected from potential applications for reprocessing facilities in the near-term use of reprocessed spent fuel."

[19] *See* 30 V.S.A. § 248(b).

[20] *See* 30 V.S.A. § 248(b)(5).

[21] *See id.* It is true that there have been few emergency incidents and accidents related to the storage of spent nuclear fuel. But when emergencies occur, their effects may be catastrophic. While there has been debate about the possible severity (in terms of worst-case scenarios) of the nuclear accident at the Fukushima Daiichi Nuclear Power Station in Japan in March 2011, it nevertheless resulted in the evacuation of approximately 86,000 people from around the plant and resulted in a six-mile evacuation perimeter. *See* Lincoln L. Davies, *Beyond Fukushima: Disasters, Nuclear Energy, and Energy Law*, 2011 B.Y.U. L. Rev. 1937, 1943 (2011); *but see* Paul Blustein, *Fukushima's Worst-Case Scenarios*, Slate (Sept. 26, 2013), https://slate.com/technology/2013/09/fukushima-disaster-new-information-about-worst-case-scenarios.html.

technologies, such as SMRs, are so new, there exists no data regarding its safety.[22] And as mentioned above, without a coordinated nuclear waste policy at the federal level, local nuclear sites would become de facto long-term storage facilities.

2. The promotion of "clean" energy diverts resources from renewable energy development and deployment.

Vermont is better off investing in proven carbon-free, renewable energy development and deployment. The Institute for Energy Economics and Financial Analysis (IEEFA) has noted that "[s]ignaling a willingness to increase reliance on nascent nuclear technology will take resources away from [] lower-cost renewable technologies that are available *today* and can push the transition from fossil fuels forward significantly."[23] The IEEFA has pointed out that "[a]t least 375,000 MW of new renewable energy generating capacity is likely to be added to the U.S. grid in the next seven years [while] it is highly unlikely any SMRs will be brought online in that same time frame."[24] Renewable generation paired with battery and long-duration storage should then be the focus of Vermont's pollution-reduction energy policies.

Some may claim renewable energy has its own waste management issues. But recycling for renewable energy waste is a much more manageable issue than the seemingly intractable problem of nuclear waste. Take photovoltaics (PV). As an initial matter, many PV systems are early in their life which generally have an operational lifespan of approximately 30-35 years.[25] PV end-of-life issues are undoubtedly important given that there is projected to be between 0.17 and 1 million tons of PV waste in the United States in 2030—compared to 200 million tons of solid waste recycled and composted materials for comparison.[26] But the renewable energy industry has begun to stand up recycling programs. Groups such as the Solar Energy Industries Association (SEIA) have established recycling programs that allow participants to repair, refurbish, resell, and recycle PV modules, inverters, and other equipment.[27] The U.S. Department

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[22] Bemnet Alemayehu & Matthew McKinzie, Natural Resource Defense Council, Small Modular Nuclear Reactors: More Questions than Answers 3 (2023), https://www.nrdc.org/sites/default/files/2023-12/small-modular-nuclear-reactors-ib.pdf.

[23] David Schlissel & Dennis Wamstead, Institute for Energy Economics and Financial Analysis, Small Modular Reactors: Still Too Expensive, Too Slow and Too Risky 3, (2024), https://ieefa.org/sites/default/files/2024-05/SMRs%20Still%20Too%20Expensive%20Too%20Slow%20Too%20Risky_May%202024.pdf.

[24] *Id.* at 22.

[25] *End-of-Life Solar Photovoltaics,* U.S. Dept. of Energy, https://www.energy.gov/eere/solar/end-life-management-solar-photovoltaics (last visited Apr. 11, 2025).

[26] *Id.*

[27] *Circular Economy*, Solar Energy Industries Association, https://seia.org/initiatives/circular-economy/ (last visited Apr. 11, 2025).

of Energy's Solar Energy Technologies Office (SETO) has provided substantial funding to develop new PV materials and designs to increase the longevity of panels as well as for research into more efficient recycling processes. [28] SETO provides a database of the various entities receiving funding awards regarding research and innovation with respect to enhancing the sustainability of PV systems.[29]

3. A CES provides little cost savings to Vermonters.

Allowing utilities to retire ZECs for its procurement of nuclear energy will not yield substantial savings for Vermont families and businesses. Currently, utilities can procure nuclear energy but cannot use that energy to satisfy any renewable energy requirements. If nuclear energy qualified as a "clean energy" credit (in the form of a ZEC), that would limit how much clean or renewable energy the utility must procure. In short, if nuclear energy generates ZECs, utilities can retire them and not seek additional clean or renewable energy to satisfy the renewable requirement under the current RES.

As Mr. T.J. Poor explained to your committee, the state currently spends approximately $4 million per year on nuclear energy attributes (given the ZECs for nuclear would be somewhere around $4 per Megawatt-hour, adjusted for a tightening market).[30] While $4 million is significant, that number must be understood within Vermont's total spending on electricity. Vermonters currently spend between $900 million and $1 billion each year on electricity. The $4 million that utilities could recover from the retirement of ZECs represents **0.4%** of total electricity spending. Assuming all that money came back to Vermont families and businesses, the savings on bills would be miniscule. For example, if a family's utility bill was $95 (the average monthly electricity bill for Vermont households), they would save $ 0.38 (i.e. 95 x 0.004 = 0.38) per month. Are Vermonters willing to signal openness to unproven and theoretical technologies, like advanced nuclear, for a $0.38 monthly savings?

Conclusion

We understand Vermont officials are "explor[ing[options to maintain system reliability and affordability" and that nobody has committed Vermont to siting nuclear generation in the

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[28] *End-of-Life Solar Photovoltaics,* U.S. DEPT. OF ENERGY, https://www.energy.gov/eere/solar/end-life-management-solar-photovoltaics (last visited Apr. 11, 2025).

[29] *Solar Energy Research Database*, U.S. DEPT. OF ENERGY, https://www.energy.gov/eere/solar/solar-energy-research-database (last visited Apr. 11, 2025).

[30] Renewable Energy for Communities Program: Hearing before the House Energy and Digital Infrastructure Committee, 2025-2025 Session (Apr. 9, 2025) (Statement of T.J. Poor, Director of Regulated Utility Planning at the Dept. of Public Service).

state.[31] We are interested in learning more about the evolution of nuclear technology and the role it may play with respect to emissions reductions. But advanced nuclear technologies are not currently available. Revising the RES to a CES will, to some degree, incentivize new nuclear—likely on already existing facilities outside of the state. Given the limits of, and problems faced by, nuclear generation, Vermont should continue to focus on increasing its development and deployment of renewable energy instead.

Thank you for your consideration.

Sincerely,

350VT
Conservation Law Foundation
Sierra Club
Vermont Businesses for Social Responsibility
Vermont Climate and Health Alliance
Vermont Community Thermal Networks
Vermont Conservation Voters
Vermont Natural Resources Council
Vermont Yankee Decommissioning Alliance
VPIRG

[31] Olivia Geiger, *Gov. Phil Scott and New England Governors Explore Cutting-Edge Nuclear Technology*, VTDigger (Apr. 1, 2025), https://vtdigger.org/2025/04/01/gov-phil-scott-and-new-england-governors-explore-cutting-edge-nuclear-technology/.