Senate Transportation & Energy

01/24/2024 Upon Adjournment Joint Transportation

SB24-039 Nuclear Energy as a Clean Energy Resource

Typed Text of Testimony Submitted

Name, Position, Representing	**Typed Text of Testimony**
Tom Corlett Against themself	I wholeheartedly reject the concept of nuclear fission electric generation as a 'clean' activity when one considers the very large extraction and enrichment processes and the dangerous transportation of such radioactive fuel across the country. One can only imagine the disaster of a train derailment while traveling through our city. In addition, there's the radioactive waste that must currently be stored on-site of fission reaction for thousands of years. Can you ever imagine that fuel being relocated? We must call it what it is, and push it to the future because there's no trust, no need, and no hurry. We have wonderful new renewable and storage resources that must be employed immediately and not be distracted by nuclear and parsing it's description. Thank you, Tom Corlett
Chris Hoffman Against themself	I looked in my dictionary. The dictionary defines “clean” as “1. Free from dirt, stain, or impurities; unsoiled. 2. Free from foreign mattery; unadulterated. 3. Producing little radioactive fallout or contamination.” Calling nuclear energy clean fails the dictionary test. It also fails the test of common sense. Hydro power? We drink water, so hydro is clean. Solar power? We walk around all day in the sun. That’s clean. Wind power? We breathe air in order to stay alive. Clean. But nuclear power? Everybody knows that you don’t want to be exposed to radioactivity. It can lead to cancer and a horrible death. If you define as “clean” something that everybody knows is dirty, you’ll look ridiculous. Don’t do it. You can redefine “down” as “up” as much as you’d like, nevertheless, if you trip on the stairs you’ll still fall flat on your face.

Emily Tracy Against themself	I Chair the Community Advisory Group for the Lincoln Park/Cotter Superfund site in Cañon City. I also serve as an advisor to the nonprofit Colorado Citizens Against ToxicWaste, and I am an elected City Council member for the City of Cañon City. However, I am representing only myself with these comments. SB24-039, if enacted, would add nuclear energy to the statutory definition of "clean energy" to make nuclear power projects eligible for clean energy project financing. I object to the proposal – the nuclear fuel cycle can in no way be called clean energy. The Lincoln Park/Cotter Superfund site is the site of a former uranium mill which for years produced "yellowcake," the basic raw material for manufacturing nuclear fuel. The processing of uranium ore and disposal of the mill tailings contaminated the soils and groundwater at the site and in nearby neighborhoods with radioactive materials, heavy metals, and other toxic chemicals. The Cotter Corporation which owned the mill and mill site from the 1950's until 2018 was never required to cease operating though the contamination was verified as early as the 1970's. This year, the community will "celebrate" the 40th year that the Lincoln Park/Cotter cite has been a Superfund site under federal law. The site has not only not been cleaned up, but it continues to contribute contamination to nearby residential neighborhoods. The extent and danger of the contamination has not yet been fully assessed by the federal or state government. It is an insult to the residents of the Cañon City area - still waiting not only for a cleanup of the contamination but also for a comprehensive health study to determine to what extent the contamination has led to serious health issues over a period of decades – to try to redefine nuclear energy as "clean" energy. There is nothing clean about the damage the front end of the nuclear fuel cycle has done to this community.
Jan Rose Against CO Coalition for a Livable Climate	Please vote no on SB24-039. It's too expensive to put on the backs of ratepayers already paying more than they can afford. They take decades to build and always come in hundreds of millions over budget and we don't have the time.

	We are leading our coal communities on with discussion of SMRs or conventional nuke plants when we know we need more variable-load energy generation sources and nuclear can't adapt to the increasing use of renewables on the grid.
Doni Angell Against themself	I have been a board member and secretary of the Community Advisory Group for the Lincoln Park/Cotter Superfund site in Cañon City for the past eleven years. I also serve as secretary for the nonprofit Colorado Citizens Against ToxicWaste. The comments below however are mine alone and not a representation of the community groups to which I belong. I strenuously object to SB24-039. Nuclear energy is anything but "clean." Excavation for uranium is dangerous to the workers involved; the milling process to create yellowcake (necessary for the manufacturing of nuclear energy) leaves behind radioactive toxins that remain in perpetuity. The communities living near such mining and milling sites - often economically depressed communities and/or communities of color - are the ones left to deal with the consequences of companies' (often foreign) extractive practices, of the transportation of radioactive materials, and of the milling of the mined resource. Having worked for eleven years to help get a clean-up of the Cotter Corporation's former uranium mill site in my community - listed on the National Priorities List in 1984 - I know how impossible it seems to return a contaminated site to a state where it can either be somewhat safe or have millions of pounds of radioactive wastes merely contained. At the Lincoln Park/Cotter Superfund site, neither of these options has been achieved - and they may never be. To allow nuclear energy to be considered "clean" energy is preposterous, given the multitude of sites around Colorado and the entire Southwest that have yet to be cleaned from decades-old contamination. In Cañon City, residents have suffered health problems from immune diseases to cancers from the toxicity left from the milling process; groundwater contamination continues, and it may forever. People don't think of the processing of resources needed to create nuclear energy when considering how safe, or how green or clean the end result of that energy may be. These processes cannot be ignored - they create generations-worth of toxicity; they are dangerous, deadly, and anything but clean. The companies that will reap financial benefits from mining and milling will be long gone

	when the communities left behind face a legacy of radioactive contamination and health issues to deal with indefinitely. The cost to human and environmental health is not worth it.
Lois McLauchlan For themself	After recognizing the existence and implications of the threat, then getting over my small but unhelpful partisanship hurdle to advocate for durable, effective national climate change policy solutions since 2018, I now see that we are at a crossroads. We are determined to decarbonize deeply and quickly but have fears about allowing even consideration for use nuclear energy; a tried-and-true tool. We would rather avoid it, vilify it, misrepresent it, box it out, stack the market rules & regulations against it, pretend it doesn't exist…I've seen and heard it all. The latest is that it's not the 'right' kind of power to compliment' the backbone of variable renewable energy we have planned. It remains to be seen whether Colorado will decarbonize in the particular manner which it prefers, and to the extent and in the timeframe it aspires to, maintain grid stability and energy affordability, and avoid social backlash and deepening of divisions as a consequence. We certainly do not want the 'cure to be worse than the disease'. By quickly shifting away from fossil fuels and at the same time limiting the utilization of known substitution options, we are inviting an energy shortfall that will risk unrest and suffering. Classifying nuclear energy honestly as the low carbon, clean type it undeniably is is a step in the direction of proving our true commitment to decarbonizing in the long term; securely, and in a way less fortunate other regions may benefit. Increasing nuclear power has gained significant support both nationally and internationally by climate-concerned political leadership. As a leader among states, Colorado could and should do its part by accurately calling nuclear energy by its right name.
Ryan Pickering For themself	Hello Assemblymembers, My name is Ryan Pickering, and I am a solar power installer from Littleton, Colorado.I have helped build hundreds of solar power systems in the greater Denver area. I am calling today to support nuclear energy as a clean source of reliable baseload energy to help supercharge our renewable effoert.

	I have seen models from the Department of Energy Liftoff Reports that show that renewables and nuclear energy can work together to reduce our reliance on fossil fuels. Those models are available at liftoff.energy.gov Renewables, fossil fuels, and nuclear energy coexist today in the United States. It is our responsibility to guide Colorado's grid towards a future that solves the energy trilemma of affordability, reliability and sustainability. Looking forward to rising to this opportunity together. Thank you
Guido Nunez For The Anthropocene Institute	My name is Guido Núñez-Mujica. I am an immigrant, and here in the United States, I started a career as a data scientist in tech, but two years ago I decided to work on climate change, one of the most pressing problems of our time, because I care about our survival as a civilization and I understand what's at stake. I am one of the group of activists who got together to successfully save our last nuclear power plant in California, Diablo Canyon. Colorado's electricity generation is still 64% fossil fuels. Coal is still the source for nearly 40% of Colorado's electricity. The state needs every single possible source of energy to make a meaningful reduction of CO2 emissions. We are in a climate emergency, we do not have the luxury of rejecting useful solutions because of ignorance and fear. Nuclear power is safe, causes no CO2 emissions and it has been a proven source of decarbonization in several countries. Colorado needs to avoid repeating the same mistake that Germany is making right now. They thought they did not need nuclear, they spent hundreds of billions on solar and wind and they still have emissions nearly 10 times higher than France, and are now in a deep energy and economic crisis, desperately relying on coal, after gas from Russia is no longer available. This truly should give us pause. If Germany cannot make this work without nuclear energy, what makes us think we can? Allowing nuclear plants in places like Pueblo, in order to replace toxic coal plants is necessary not only to meet our climate goals, but to offer high paying, high quality, permanent jobs to local communities,

	and opportunities for our children. Young men and women growing up in rural areas and smaller cities deserve to have opportunities available without leaving their communities. This is the reason why Unions like IBEW support nuclear. I urge everyone present to acknowledge the true magnitude of the climate crisis and if they really care about climate change. While our house is on fire, some people are complaining about hypothetical water damage. Get real!
Heidi Leathwood Against 350 Colorado	I am in the committee hearing but I am not sure if I will be able to stay in the meeting long enough to give my comment, so here it is: Thank you for the opportunity to submit public comment. I urge you to reject this bill. There are very real concerns about the safety issues of nuclear, the fact that it generates waste that is extremely dangerous with no good disposal strategies, and the fact it would put frontline communities at risk. The bill states that it wants to define nuclear as clean so that it is eligible for clean funding at city and county level and so it can used by utilities to meet the clean energy target. Nuclear has never been defined as clean in Colorado, and to do it now in order to get funding works against our climate goals. The IPCC AR6 synthesis report shows that wind and solar have far more potential for reducing emissions (4 times as much globally) while costing a fraction of the amount per ton of CO2 reduced. We cannot divert our attention and funding away from the renewable energy sources that are getting us to our goals without jeopardizing communities. The IEA and UNEP pathways to a net zero future show that we need to triple renewables by 2030. Colorado is making good progress but Xcel's latest ERP shows they plan to double renewables, not triple. Now is not the time to sink state money into nuclear. It is not the time to incentivize utilities to spend their money on a power source that will cost ratepayers 5 times more than wind, solar, storage and transmission. We can't get distracted – we must make sure that money goes to technologies that are proven to get us to our goals at a lower cost.

Mark Hinaman For themself	Nuclear energy is objectively the cleanest form of energy available to humanity. Of all the primary energy sources, it utilizes the least amount of land, has the least amount of waste, and causes the least amount of air pollution. To exclude it from a list of clean energy sources is both naive and ignorant, and Colorado has an opportunity to correct that mistake with this bill. I urge you to vote yes to move the bill from the committee to the general assembly.
Judith Haynes For themself	I am a registered Democrat and I strongly support nuclear energy for Colorado. Nuclear has zero carbon emissions, by definition, clean energy. Its is a constant energy source that is absolutely needed to provide for approximately 75% of our energy needs that can not be generated by solar (night, weather) or wind intermittency. Although batteriy storage will continue to expand as a country we are way far behind in battery production. The real choice we face is weather we build more gas fired plants, better than coal that will reduce our carbon emissions by 50% or nuclear power driving emissions to 0%. We can wave our hands and say somehow solar and wind alone will get us to zero., magically or understand that real engineering and science pony to nuclear. I nuclear is safe(Us Navy mom here) because we have been powering or boats for over 50 years without losing a sailor to a meltdown . Nuclear replaces coal powere 1-1 with good paying union jobs and can save toowns and counties from abandonment. I am frustrated that our Democrats are so anti nuclear and unwilling to update their uninformed opinions on nuclear power. It is a real bipartisan issue to work together on climate change solutions
Michael Sax For themself	Nuclear energy is the most reliable and cleanest source of energy humans have at our disposal. It is also one of the safest forms of energy especially when factoring emissions and waste product of other traditional fossil fuels and other renewable sources. Another benefit is that nuclear produces a lot of energy for a small land foot print so we can further decrease human activity in habitats. Nuclear must be a part of the clean energy answer. Aside from nuclear truly being an amazing source of clean and safe energy, it is critical to having reliable energy as we transition away from carbon emitting sources. Colorado has an opportunity to be at the forefront on the World's clean energy story, bringing new industries, labor skills, and jobs to our wonderful state. Please don't put Colorado at a disadvantage by not passing this, our future is at risk. Please vote yes.

Jeri L Fry on behalf of Colorado Citizens Against ToxicWaste Inc - Testimony on **Senate Bill 24-039**

Senate Transportation and Energy Committee Hearing
Wednesday January 24, 2024
1:30pm

Thank you for this opportunity to testify in committee today on SB24-039. My name is Jeri Fry from Canon City on behalf of Colorado Citizens Against ToxicWaste Inc.

This bill would label nuclear as clean. And would make funds available to nuclear development. Such a funding channel will invite opportunistic activity outside the current law; this could be horrific to regulate. Surely you don't want to exchange carbon pollution for a panoply of other toxins and hazardous materials in our environment.

Nuclear development must coordinate with Colorado's existing Agreement State statis with the NRC.

We have seen Colorado legislation get crosswise with other legislation before. Avoid this and vote no on SB24-039 and find a way to coordinate appropriately.

The promise of energy from nuclear has a dark side that must be acknowledged and embrace responsibly. But this bill is not how to start.

Nuclear is clean only at the reactor and it is disturbingly costly there – in more ways than money. The front end of the nuclear fuel cycle is a filthy radioactive business at every phase on its way to the reactor. That means at the mine, at the mill, at the enrichment plant and the conversion plant. Plus, all the handling and transportation in between. A singular focus on removing carbon through nuclear threatens radioactive contamination to the air and groundwater and entire ecosystem.

I have a unique second-generation involvement with the front end of the nuclear fuel cycle by way of Cotter Corporation in Canon City. Cotter moved eleven families to Canon City in 1958. My father's family was one. I was two years old. He was the Chief Chemist and then . . . the whistleblower.

Cotter applied political pressure to get their first license. Couple that with a lack of understanding of the consequences of putting waste on the bare ground, and with a break-neck rush toward the future and my community today has a Superfund Site with over 5million tons of radioactive waste upstream, upwind and over the fence from Canon City. Nuclear is not a clean energy resource.

I urge you to set a better intention, vote no on SB24-039

Thank you

Company Ownership RFP Bids

Generation Technology	# of Bids*	Bid MW**	Median Bid Price ($/kW Installed)
Gas	25	10,397	$965
Biomass	1	19	small sample
Solar	66	19,493	$1,635
Solar/Storage	61	28,712	$1,628
Storage	11	2,065	$1,627
Wind	96	36,206	$1,822
Wind/Solar	2	601	small sample

Renewable and Dispatchable RFP Bids

Generation Technology	# of Bids*	Bid MW**	Median Bid Price ($/MWh levelized)	Median Bid Price ($/kW-mo levelized)
Gas	13	3,347	-	$10.65
Other***	3	163	small sample	small sample
Solar	210	55,212	$32.73	-
Solar/Storage	223	110,119	$39.89	$ 9.69
Storage	80	14,833	-	$12.14
Wind	210	84,533	$21.99	-
Wind/Solar	10	15,801	$28.67	-
Wind/Solar/Storage	40	19,703	$38.20	$6.94
Wind/Storage	6	3,156	$19.62	$12.61

* # of Bids reflects number of proposals, the unique projects are less than this value
** Bid MW column provides total MW bid across all proposals, the MWs of unique projects are less than this value
*** Includes biomass and compressed air storage.

"Voice of the Western Slope since 1953"
A coalition of counties, communities, businesses & individuals

(970) 242-3264 ★ FAX (970) 245-8300
P.O. Box 4795 ★ Grand Junction, CO 81502
www.club20.org

January 24, 2024

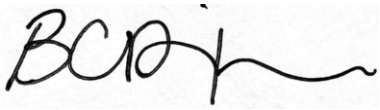
Submitted Through the Written Testimony Portal
Chair Senator Faith Winter
Senate Committee on Transportation and Energy
Wednesday at 1:30pm, SCR 352

Dear Chairman Winter and Esteemed Committee Members:

As the "Voice of the Western Slope," Club 20 is proud to represent businesses, individuals, and communities that reside west of the continental divide on issues at the state and national level. For seven decades, Club 20 has worked tirelessly to ensure the voice of our region is not stifled. Our nonpartisan collection of members come from all sides of the aisle and range from small business owners, elected officials, and members of some of the biggest industries in our region, such as agriculture and energy production.

Club 20 recognizes that we must find alternatives to energy resources as we move towards the future. However, we also recognize how important it is for our western communities to thrive economically and protect what it is that makes their communities unique. Club 20 policy supports a mission to improve the balance and overall capability of all energy resources that will strengthen economic growth, promote energy price stability, improve the environment, maximize diversified resource supplies; as well as promote the integrations of conventional/traditional, unconventional, and renewable and alternative energy resource technologies.

Sincerely,



Brittany Dixon
Executive Director
Club 20

Jan 24, 2024

CRES Opposes SB24-039 – Nuclear Energy as a Clean Resource

Dear Bill Sponsors: Senator Larry Liston,
and the members of the Senate Transportation & Energy Committee:

The Colorado Renewable Energy Society (CRES) opposes this bill for a number of reasons. First, nuclear power plants generate nuclear waste and are not clean. While nuclear energy does not produce CO2 while generating electricity, there are a number of other issues, including cost, storage of nuclear waste, and lack of grid flexibility as a generating resource.

CRES is a nonpartisan, science-based nonprofit with thousands of members throughout the state. The CRES Policy Committee brings together a broad range of energy policy and technology experts who review energy bills before the Colorado state legislature to provide our perspective.

CRES urges all legislators involved to oppose this bill because nuclear energy is not clean, not renewable, not safe, not economical, has a long lead time (won't be installed in time to help reduce emissions now), and lacks flexibility to integrate with the clean grid now and cleaner grid of the future. CRES does not support nuclear in Colorado, and instead urges your support of truly clean and renewable resources such as wind and solar. Storage is clearly becoming a more viable option for integration into the grid and the cost of storage is coming down every year.

Thank you for opposing this bill, and for all that you do for Colorado!

Sincerely,

Vincent Calvano

Chair of the Colorado Renewable Energy Society Policy Committee

James Hopf Testimony in Support of SB24-039

I'll start by addressing the basic scientific question that should govern whether nuclear is classified as a clean energy source, i.e., is nuclear actually clean.

There is a clear scientific consensus on this question. Objective analysis, based on nuclear's over 50-year operational record, including accidents, shows that nuclear's public health risks and climate impacts are negligible compared to those of fossil power generation, and are similar to those of renewables like solar and wind. The world's formal scientific bodies have concluded that nuclear is as good as solar and wind, in terms of environmental impacts. For that reason, the European Union has included nuclear in its taxonomy of clean power sources.

So, the answer to the question is clear. Nuclear IS a clean energy source.

There is also broad consensus that non-intermittent clean sources like nuclear will be needed in order to fully decarbonize the grid. While solar and wind are cheaper on a raw, per kW-hr basis, we can't get all of our power from such intermittent sources, while maintaining grid reliability. Analyses show that a mix of nuclear and renewable sources would yield the lowest overall cost for a carbon-free grid. So, not only is nuclear clean, but its inclusion will have economic and grid reliability benefits.

Finally, nuclear provides profound economic advantages to local host communities. It is a particularly good option for places where the local coal plant is being retired.

A committee of local leaders in Pueblo concluded that nuclear would be the best option for replacing its retiring coal plant, because it was far better than all other options in terms of local job creation and contribution to the local tax base. Their clear message was that only

nuclear could “make them whole” by replacing the jobs and economic benefits that were provided by the coal plant. Polls show that nuclear has majority support in the area.

NUCLEAR ENERGY INSTITUTE
1201 F Street NW • Suite 1100
Washington, DC 20004
nei.org

Nuclear Energy Institute Public Comments
Senate Committee on Transportation & Energy
Hearing on SB24-039: Nuclear Energy as a Clean Energy Resource
1/24/2024

Dear Chair Winter and Vice Chair Priola,

Good afternoon and thank you to the Chair and Committee for the opportunity to express our support for the bill. My name is Kati Austgen; I'm a nuclear engineer and Senior Project Manager with the New Nuclear team at the Nuclear Energy Institute (NEI). NEI is the nuclear energy industry's premier trade group, representing 345 members from all facets of industry, universities, research laboratories, and labor unions.

NEI applauds the bill sponsors for introducing this bill and recognizing nuclear as a clean energy resource. Last year, Idaho, Tennessee, and North Carolina passed similar measures while Michigan and Minnesota passed clean energy standards that recognized nuclear energy as clean.

I'm here today to share with you information about the next generation of nuclear energy. Currently there are over 25 projects planned or considered in 16 states with another half dozen in Canada. Additionally, there is global interest in deploying new nuclear energy as evidenced most recently at the 28th Conference of the Parties (COP28) by the leaders of 24 countries signing on in agreement to triple nuclear energy worldwide by 2050.

Next generation nuclear designs take the lessons learned and operating experience of today's fleet and incorporate that information to further enhance the safety and economics for deployment of reliable, clean energy in amounts suited to the needs of customers. Whether you need a lot of clean energy at a grid scale, or smaller increments of addition or replacement, next generation nuclear offers right-sized energy generation in the form of electricity or high heat. This is particularly valuable as we look beyond electrification to decarbonizing the full energy economy.

Finally, I'll note that next generation nuclear encompasses a variety of technologies from light-water cooled small modular reactors, to non-water-cooled designs in three categories 1) high-temperature gas cooled, 2) liquid metal cooled, and 3) molten salt cooled. I would be happy to share more about these technologies at the Committee's discretion.

Sincerely,

Kati Austgen

Kati Austgen
Senior Project Manager, New Nuclear
Nuclear Energy Institute
1201 F Street NW, Suite 1100 | Washington, DC 20004
Email: kra@nei.org Mobile: 202.340.1224

ROCKY MOUNTAIN PEACE AND JUSTICE CENTER

January 24th, 2024

Dear Colorado Senate Transportation and Energy Committee,

Please vote NO on SB24-039 (Designating nuclear as a clean energy technology).

It is simply dishonest to claim that nuclear energy is clean. A fair examination of history will make this point clear. Nuclear energy proponents are attempting to rebrand the technology as "advanced nuclear", yet the risks to public health and future generations remain.

To claim nuclear energy is clean is to ignore the following:

- The toxic legacy of Uranium mining and it's devastating impact on the Navajo nation.
    - This is a generational trauma that is far from reconciliation.
- Major nuclear accidents such as 3 Mile Island, Chernobyl, and Fukushima.
- The debate over nuclear waste storage and it's long term implications. The Western Shoshone, Nevada elected officials, and Nevada citizens adamantly oppose a nuclear waste repository at Yucca Mountain.
    - The Western Shoshone nation has also been severely impacted by nuclear bomb testing. The U.S. has violated treaties with the Western Shoshone nation.
- The risks of transportation of nuclear waste.
- There was a major fire at the Waste Isolation Pilot Plant, New Mexico in 2014.
- Fossil fuels are involved in Uranium mining, transportation, building and maintaining infrastructure for nuclear power plants, Uranium milling, and reclamation.
    - It cannot be legitimately claimed that nuclear energy is "carbon free".
- Nuclear energy and nuclear weapons are both operated through the U.S. Department of Energy and their histories are connected. The DOE currently subsidizes nuclear energy infrastructure while also promoting a new nuclear arms race, a $2 trillion nuclear weapon modernization program over the next 30 years.

In summary, the points are glaring with a fair evaluation of history and the impacts of nuclear technology. The U.S. Department of Energy has not handled the technology responsibly. We must not ignore the facts to pretend nuclear energy is "clean". We must stop the paradigm of militarism and extractive technologies which drains our energy, resources, and sows violence. Instead, let's plant the seeds for more sustainable systems, reduce consumption, value diverse cultural heritage, and practice a nonviolent, holistic approach to clean energy and civilization.

Sincerely,

Christopher Allred
Nuclear Guardianship Coordinator

PO Box 1156, Boulder, CO 80306 ~ www.rmpjc.org ~ admin@rmpjc.org ~ 303-444-6981

HB24-039 Nuclear Energy as a Clean Energy Resource

NRDC testimony

January 23, 2024

Dear members of the Transportation & Energy committee,

Thank you for the opportunity to submit testimony on SB24-039. I am the Colorado Policy Director covering climate & energy issues at Natural Resources Defense Council (NRDC). NRDC has decades of experience working on nuclear energy, and – based on the science, data, and facts about current nuclear technologies – we are in opposition to this bill. Putting attention and resources into this speculative technology threatens to undermine less expensive climate solutions that are available today to reduce emissions from Colorado's energy sector.

Nuclear power derived from fission is not 'clean' and should not be labeled as such by Colorado statute. It has tremendous health and environmental problems, including contamination from uranium mining, safety and security of reactor operations, nuclear weapons security risks and associated radioactive cleanup efforts and spent nuclear fuel disposal. Critically, even with subsidies, new nuclear facilities cannot compete in the electricity market against cheaper and proven renewable energy.

Nuclear plants are uneconomic and new designs are decades away from commercialization; therefore, nuclear is not a near or even mid-term solution to the climate crisis. Globally and in the U.S., nuclear energy is declining. In the U.S., nuclear energy has reached its lowest level in 25 years and existing plants are closing well before their licensed lifetimes despite receiving billions of dollars in subsidies.

New nuclear designs aren't a feasible solution either. Recent NRDC analysis on small modular nuclear reactors (SMRs) finds that even with incentives, this concept for new, smaller nuclear facilities cannot compete against cheaper, proven clean energy like wind, solar and batteries. SMRs have not ever been built in the U.S. and are not manufactured at scale, so any arguments supporting them are theoretical. In fact, a decade-long plan to build the country's first commercial SMR in Idaho was canceled in November, after costs had more than doubled to $9.3 billion and the project was deemed economically infeasible, despite receiving generous federal funding. Even in a rapid adoption scenario, the soonest SMRs could be deployed would be in the 2030s, when Colorado utilities will already be on a pathway to 100% zero emission electricity.

Ignoring the infeasibility of developing new nuclear reactors, this technology has large health and environmental problems. To dig into one issue that hits close to home in the American West, uranium mining is inherently invasive and destructive. Mining uranium has had a disproportionate impact on native populations, leaving a legacy of public health concerns and contaminated land and water. To this day, there are over 500 abandoned uranium mines on Navajo land. Furthermore, mining for uranium uses massive amounts of water, as our state and region face ongoing water shortages.

For nuclear power to play any role in a clean energy future, it must address the challenges of cost, environmental radiation, nuclear waste and nuclear weapons proliferation. Absent a pathway to meet those challenges, nuclear fission technology is a false solution for Colorado to act on climate.

Thank you,

Alana

Alana Miller
Colorado Policy Director
Climate & Energy Program
Natural Resources Defense Council (NRDC)

I am chairperson of the Colorado Citizens Against Toxic Waste in Cañon City, Fremont County. This non-profit has been working to educate our community about the Lincoln Park/Cotter Superfund site for nearly 22 years. In addition, we have extended our concerns to the Uranium exploration and drilling in the Tallahassee area during the several efforts to explore for the element.

SB24-039, if enacted, would add nuclear energy to the statutory definition of "clean energy" to make nuclear power projects eligible for clean energy project financing. The mining, milling, and production of yellowcake for the nuclear power industry is anything but clean. If Okapi Resources, an Australian company now operating as Tallahassee Exploration Project, proceeds with drilling 10-20 holes as they are allowed by DRMS, the residents of the immediate area have no assurance that their water sources will not be contaminated by the drilling or the tailings. The Tallahassee area watershed feeds into the Arkansas River, the lifeblood of Cañon City, and many downstream communities that have to spend money to remove and dispose of excess uranium in their water.

The exploration company says they have told the City of Cañon City that they will be buying treated water at the City Bulk Water resource--water that citizens of Cañon City pay to have treated and distributed. The water that is our precious resource will not be replaced in the same pristine condition once it is injected into a borehole with chemicals and brought up through the uranium ore body.

This inefficient process to extract low-grade uranium ore to create nuclear fuel for an "expensive way to boil water" should never be termed as clean. Therefore, I urge you legislators who have the power to decide to defeat this bill in committee.

RE: No on SB24-039—Designating nuclear energy as a clean resource

January 24, 2024

Dear Members of the Senate Transportation and Energy Committee,

My name is Leslie Glustrom. I am trained as a chemist and biochemist and have spent the last 20 years as an intervenor and participant at the Colorado PUC.

I am writing to urge a "No" vote on SB24-039 to designate nuclear as a clean resource for the reasons summarized below.

Not Clean: Nuclear energy is clearly not clean given the wastes produced in the generation of nuclear electricity as well as all of the radioactive waste produced in the mining and milling of nuclear energy. Colorado has already dealt with many nuclear waste sites ranging from Rocky Flats to the Fort Saint Vrain nuclear plant to the Cotter Mill near Canon City to the Uravan superfund site near Nucla. No source of energy is perfectly clean, but the radioactive wastes generated during the nuclear life cycle are particularly problematic given the very long life time of these wastes. The sites below will help make it clear why Colorado would be very unwise to declare nuclear energy as "clean."

Mini nuclear power stations may produce more waste than large ones | New Scientist

Colorado and nation face 70,000-ton nuclear waste burden – The Denver Post

DOE-Managed Spent Nuclear Fuel | Department of Energy

Fort Saint Vrain Nuclear Power Plant - Wikipedia

Who will fight to cleanup the Cotter Uranium Mill Superfund site next? (coloradosun.com)

Uravan: The Uranium Town That Was | Inside Energy

Not Cost Effective: We know from the bids submitted at the Colorado PUC that Colorado utilities can obtain thousands of MW of wind, solar and storage at costs well below 4 cents/kwh. (See Attachment A to the 30 Day Report in Colorado PUC Proceeding 21A-0141E—available on request.) **In contrast, nuclear**

generation (including from Small Modular Reactors) is likely to be over 9 cents/kwh. Again, the links below provide more information and documentation.

IEEFA U.S.: Small modular reactor "too late, too expensive, too risky and too uncertain" | IEEFA

Eye-popping new cost estimates released for NuScale small modular reactor | IEEFA

https://www.woodmac.com/news/opinion/major-setback-for-nuclear-power/#

Nuclear energy too slow, too expensive to save climate: report | Reuters

Nuclear power: Too expensive and inefficient? – DW – 03/11/2021

Amory Lovins 2022--Detailed academic study
US nuclear power: Status, prospects, and climate implications - ScienceDirect

Baseload is Not the Right Resource for This Century: Pro-nuclear advocates often talk about providing 24/7 power, but this "baseload" power is no longer the right solution for electric utilities in this century. As utilities move to ever higher forms of variable wind and solar, the key is to use **flexible** resources to pair with these renewable resources. Baseload just gets in the way because it is not flexible enough and so doesn't pair well with wind and solar. I often say that "Baseload is to electric utilities in the 21st century what typewriters are to newspapers in the 21st century." Baseload is NOT what is needed now. This is one of the most fundamental reasons why it doesn't make sense for Colorado with its abundance of very low-cost wind and solar to promote the obsolete concept of "baseload" generation. The need for flexible resources is now widely accepted at the Colorado PUC but those advocating for nuclear power in Colorado do not seem to recognize or understand this. Below are a couple of links that elaborate on why "baseload" is not the right concept for this century—especially in Colorado.

Debunking Three Myths About "Baseload" (nrdc.org)

Baseload power is a myth: even intermittent renewables will work (theconversation.com)

Finally, I would like to state my **very strong** support for the Pueblo community—and part of that support means not holding out "false hope."

Nuclear energy is not likely to be the right solution for Colorado so every minute and day spent promoting nuclear energy is time that could very likely be better spent helping Pueblo develop realistic plans for the coming years and decades. **False hope is cruel.** I object in the strongest possible way to those that profess to be helping Pueblo but who are actually holding out false hope for the community.

Thank you to the Committee members for your service to our state and your careful assessment of this effort in SB24-039 to designate nuclear energy as "clean."

Sincerely,

Leslie Glustrom
4492 Burr Place
Boulder, Colorado

Testimony For Consideration on SB24-039

Matthew Ayres

Sponsor: Liston
Senate Committees: Transportation & Energy

1. Page 2, lines 9-10 state that nuclear energy "does not produce carbon dioxide, thus offsetting carbon emissions". However, renewable energy is less costly to build. Future renewables would save 3-13 times more carbon than future nuclear[1]. In addition, creating nuclear reactors does not qualify as a carbon offset as defined.
2. Page 2, lines 13-15 state that by enabling nuclear energy to be defined as clean, Colorado can "continue to spearhead energy innovations that align with the state's goals of keeping energy affordable". However, future nuclear technologies are projected to have an average of a negative costs.[2]
3. Page 3, lines 1-3 state that nuclear energy can be used with "existing clean energy sources to lower energy costs for Coloradans and maintain a reliable source of electricity". However, nuclear energy can be up to five times more expensive than wind and solar.[3]

Costs of future nuclear energy development far outweigh benefits. Solar and wind energy are getting cheaper, while nuclear is getting more expensive. A simple CBA would support future wind, solar, geothermal, and biomass projects over future solar projects.

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[1] Lovins, A. B. (2022). US Nuclear Power: Status, prospects, and climate implications. *The Electricity Journal*, *35*(4), 107122. https://doi.org/10.1016/j.tej.2022.107122

[2] Steigerwald, B., Weibezahn, J., Slowik, M., & von Hirschhausen, C. (2023). Uncertainties in estimating production costs of Future Nuclear Technologies: A model-based analysis of small modular reactors. *Energy*, *281*, 128204. https://doi.org/10.1016/j.energy.2023.128204

[3] Lazard. (2023). Lazard's LCOE+.

Testimony for the Record

Colorado Senate Committee on Transportation & Energy

Hearing on SB24-039 "Nuclear Energy as a Clean Energy Resource"

January 24, 2024

Thank you madam Chair and members of the Committee. My name is Adam Eckman and I am the President & CEO of the Colorado Mining Association, the oldest professional mining industry trade association in the country. I appreciate the opportunity to testify in support of Senate Bill 39, concerning the classification of nuclear energy as a clean energy resource sponsored by Senator Liston.

Mining is the front end of the supply chain for every energy source in the United States. This includes uranium mining which provides the necessary fuel to supply carbon-neutral nuclear energy to homes and businesses. Nuclear energy contributes to a diversified energy grid by providing clean, reliable, readily dispatchable energy with a comparatively small land-use footprint while generating zero greenhouse gas emissions. Including nuclear power as a part of our diversified energy portfolio helps complement other energy sources by providing baseload power and driving down overall energy prices. Nuclear energy is a vital component of Colorado's carbon emissions reduction goals.

The nuclear energy development supply chain also offers significant economic benefits for Colorado. Uranium exploration and production operations are underway in Mesa, Fremont, and Moffat counties. These operations can provide much needed jobs

in rural communities. Additionally, the Pueblo Innovative Energy Solutions Advisory Committee recently recommended construction of an advanced nuclear power plant.

The U.S. Department of Energy has recently underscored the need to maintain the existing nuclear fleet and build out advanced nuclear reactors. CMA supports this objective and Senate Bill 39 is a common-sense step towards helping Colorado become a leader in the new clean energy economy by taking advantage of our uranium reserves, embracing nuclear energy as the clean energy source that it is, and classifying it appropriately so that Colorado can lead the way in attracting investment for the production of this vital clean energy source. Thank you again for the opportunity to provide this testimony.

Testimony on SB24-039 to the Senate Transportation and Energy Committee

Testimony to the Senate Committee

First, let me say that the light water reactor designs that have given nuclear such a bad reputation represent a centralized generation paradigm collapsing under its weight, not unlike its vertical market sibling, coal. These designs will go the way of coal-fired plants. The next generation of nuclear power is targeted at the decentralized model that we all understand will be necessary for security, safety, resilience, cost, reliability, and environmental concerns. When I speak of Nuclear, I look forward to a global future of increased demand for clean electricity due to beneficial electrification and population growth: thinking globally and acting locally is advisable.

You will hear a lot of well-meaning but reflexive opposition to defining nuclear energy as a source of clean energy. You will hear confusion about the behemoth Light-water reactors of yesterday and the distributed small modular designs of today. You will hear our need is now, and nuclear will not deliver in time. This is all very well-intentioned and from people I respect and admire.

I also offer you that other people, who are much smarter than any of us, are convinced that a decarbonized electrified world will require a combination of clean, intermittent (mainly Solar and Wind), and clean dispatchable power sources (including Nuclear). I will list the proponents and offer you further background as an appendix.

The organizations that support Nuclear as a clean energy source (see details in Appendix) are the International Energy Agency (IEA), the Joint Institute for Strategic Energy Analysis (JISEA), the Department of Energy (DOE), the Citizen's Climate Lobby (CCL), and the National Renewable Energy Laboratory (NREL).

Individuals who support Nuclear as a Clean Energy source (see details in Appendix) are Stewart Brand (Whole Earth), Jim Hansen (testified to Congress as NASA climate scientist), Saul Griffith (MacArthur Genius and founder of Rewiring America), David McKay (physicist and author of the book Sustainable Energy), Al Gore (An Inconvenient Truth and Climate Reality Project), Rip Anderson (the leading expert on nuclear risk assessment at Sandia National Laboratories), Peter Schwartz (Global Business Network), and others.

In 1990, when AT&T was confronted with cell phones, they laughed off the prospect of decentralized phone service. Are we laughing off the next generation of decentralized power generation?

APPENDIX

Stewart Brand: Debate: Does the world need nuclear energy? 22:43, Stewart Brand + Mark Z. Jacobson: But one of the things we're discovering is that wind, like solar, is an actually relatively dilute source of energy. And so it takes a very large footprint on the land, a very large footprint in

terms of materials, five to 10 times what you'd use for nuclear, and typically to get one gigawatt of electricity is on the order of 250 square miles of wind farm. In places like Denmark and Germany, they've maxed out on wind already. They've run out of good sites. The power lines are getting overloaded. And you peak out. Likewise, with solar, especially here in California, we're discovering that the 80 solar farm schemes that are going forward want to basically bulldoze 1,000 square miles of southern California desert. Well, as an nvironmentalist, we would rather that didn't happen.

Jim Hansen: A classic example is James Hansen, a NASA climatologist pushing for 350 parts per million carbon dioxide in the atmosphere. He came out with a wonderful book recently called "Storms of My Grandchildren." And Hansen is hard over for nuclear power.

Saul Griffith: Saul Griffith did the numbers and figured out what it would take to get 13 clean terawatts of energy from wind, solar, and biofuels, and that area would be roughly the size of the United States, an area he refers to as "Renewistan."

David McKay: a physicist in England, and in his wonderful book, "Sustainable Energy," among other things, he says, "I'm not trying to be pro-nuclear. I'm just pro-arithmetic."

International Energy Agency (IEA): Amid today's global energy crisis, reducing reliance on imported fossil fuels has become the top energy security priority. No less important is the climate crisis: reaching net zero emissions of greenhouse gases by mid-century requires a rapid and complete decarbonisation of electricity generation and heat production. Nuclear energy, with around 413 gigawatts (GW) of capacity operating in 32 countries, contributes to both goals by avoiding 1.5 gigatonnes (Gt) of global emissions and 180 billion cubic metres (bcm) of global gas demand a year.

While wind and solar PV are expected to lead the push to replace fossil fuels, they need to be complemented by dispatchable resources. As today's second largest source of low emissions power after hydropower, and with its dispatchability and growth potential, nuclear – in countries where it is accepted – can help ensure secure, diverse low emissions electricity systems.

> **What is the role of nuclear power in clean energy transitions**
> Nuclear power accounts for about 10% of electricity generation globally, rising to almost 20% in advanced economies. It has historically been one of the largest global contributors of carbon-free electricity and while it faces challenges in some countries, it has significant potential to contribute to power sector decarbonisation.
>
> **Why does it matter to energy security?**
> Nuclear power plants contribute to electricity security in multiple ways by keeping power grids stable and complementing decarbonisation strategies since, to a certain extent, they can adjust their output to accompany shifts in demand and supply. As the share of variable renewables like wind and solar photovoltaics (PV) rises, the need for such services will increase.
>
> **What are the challenges?**

Nuclear power faces a contrasted future despite its ability to produce emissions-free power. With large up-front costs, long lead times and an often-poor record of on-time delivery, nuclear power projects have trouble in some jurisdictions competing against faster-to-install alternatives, such as natural gas or modern renewables. It also faces public opposition in many countries. Its uncertain future could result in billions of tonnes of additional carbon emissions.

Recommendations to Policy Makers
Establish policy frameworks for nuclear power to reduce investment risk, enable financing and support innovation, while ensuring efficient and independent safety regulations.

CCL Nuclear Power: This training reviews how nuclear power will contribute to a clean and stable electric grid.

Al Gore (Climate Reality): 'A Critical Part of the Solution' Al Gore and the Nuclear Debate - Al Gore, Johnny Isakson and Lamar Alexander

Now, there's a new generation of reactors coming along that has a smaller increment. They may be more reliable and more standardized. We may get a solution to the waste issue. So I mean, I'm not a reflexive opponent of nuclear - I just happen to think it's only going to play a small role.

The Long Now – Power to Save the World: The best introduction to nuclear power's current realities and benefits is Gwyneth Cravens' forthcoming book "Power to Save the World: The Truth About Nuclear Energy." A science journalist and novelist, and long an activist against nuclear, Cravens had her assumptions shaken through friendship with the leading expert on nuclear risk assessment at Sandia National Laboratories, D. Richard Anderson, known as "Rip." Both are professional skeptics. They took their skepticism on the road to travel the uranium atom's path in America from mine to refinery to reactor to short-term and long-term storage, with a side trip to the coal alternative. It is a revelatory journey.

The Long Now – Nuclear and Climate Change: In Climate change and nuclear prospects, anti-nuke Ralph Cavanagh from Natural Resources Defense Counsel or pro-nuke Peter Schwartz from Global Business Network— debate Nuclear.

Department of Energy: DOE Announces Next Steps to Build Domestic Uranium Supply for Advanced Nuclear Reactors As Part of President Biden's Investing in America Agenda - January 9, 2024 - *New Request for Proposals to Establish Domestic Supply Chain of High-Assay Low-Enriched Uranium Required for Smaller, More Versatile Reactors Will Increase Energy Security and Strengthen U.S. Competitiveness.* A member of Nuclear Innovation: Clean Energy Future Nuclear Innovation: Clean Energy Future (NICE Future) is an international initiative of the Clean Energy Ministerial. Led by the United States, Canada and Japan, other participating countries include Argentina, Poland, Romania, Russia, the United Arab Emirates, and the United Kingdom.

NREL and JISEA: Nuclear–Renewable Synergies for Clean Energy Solutions. The definition of clean energy does not always include nuclear energy, but it is one of the world's largest sources of low-carbon electricity, second only to hydropower. When considering greenhouse gas emissions, nuclear has the

potential to be a key part of clean energy solutions. Since 2011, the Joint Institute for Strategic Energy Analysis (JISEA) has explored the potential for increased integration of nuclear and renewables in the evolving power grid. "When we think outside of the box with nuclear energy, there are many valuable roles that it can play in harmony with renewables to add resilience and flexibility to the power grid," said Jordan Cox, a JISEA/National Renewable Energy Laboratory (NREL) analyst who focuses on nuclear research.

So what is happening right now?: From Canary Media When will the next nuclear plant come online in the US? No one knows January 18, 2024. *In search of the most optimistic answer to this question, I identified myself as a journalist and unscientifically polled my network on LinkedIn, Twitter and Reddit to ask folks on nuclear affinity groups what the next reactor to go online might be. I didn't press people on the timing of the next reactor, just its location. The leading answer was the restart of the shuttered Palisades plant in Michigan, followed by the launch of Bill Gates' Natrium reactor in Wyoming, along with the Tennessee Valley Authority's plan to deploy a BWRX-300 small modular reactor from GE Hitachi.*