Colorado SB23-070: Should nuclear energy be classified as a Clean Energy resource?
Testimony by Ripudaman Malhotra, PhD.

My name is Ripudaman Malhotra, and I am retired scientist with over 36 years of experience in research on the chemistry of energy conversion at SRI International, Menlo Park, CA. This work made me acutely aware of the looming global energy crisis. To improve the quality of life we must double the energy supply, particularly in the form of electricity. However, more than 80% of the energy currently comes from fossil fuels, whose use is directly responsible for the global climate change.

Reducing CO_2 emissions is essential for mitigating climate change as well as ocean acidification that threatens our food supply. On a life-cycle basis, nuclear power has the lowest emissions and the smallest environmental footprint to build and operate. Per DoE analsyes, wind and solar plants require ten to fifteen time more of commodity materials like steel, glass, concrete, and copper. Procuring these at the required rates will require encroaching wild habitats.

Nuclear power also the best safety record, especially in terms of fatalities for a given amount of energy delivered. These attributes make nuclear energy ideal for decarbonizing our energy system. Indeed, countries like France and Sweden that have succeeded in deeply decarbonizing their energy supply, have relied heavily on nuclear power.

As we electrify our transport system, promote self-driving vehicles, electrify home appliances, and expand cloud computing services, we will need ever increasing supplies of clean energy. Nuclear energy can fulfill this need. Yet, instead of building nuclear plants we are prematurely closing them down, often a result of policies designed to promote "renewable energy." Scientifically speaking, none of the sources of energy are "renewable." Energy does not *renew* itself; it is always *dissipated*. Because "renewable" sources are intermittent, we currently back them up with natural gas plants. As we transition away from fossil fuels, we will have to use batteries or other storage technologies that will raise the cost and life-cycle emissions of "renewables." By relying on wind and solar, we would be making our energy more reliant on climate at a time when the climate is undergoing major changes. In contrast, nuclear power is reliable and always dispatchable.

"Renewable" sources qualify for financial incentives such as investment and production tax credits (ITC and PTC), and renewable energy certificates (REC). Renewable portfolio standards (RPS) give priority to renewables forcing other plants to ramp down when they are plentiful (such as at high noon). These policies distort the market and unduly handicap baseload power plants like nuclear, forcing their closures. By classifying nuclear as a clean source, which it is, will allow nuclear power to access these incentive programs, thus forestalling premature shuttering and promoting its expansion.

If permitting is streamlined for developing small modular reactors, these walk-away safe nuclear plants would be the cheapest source of electricity. Some of the new designs also offer the possibility of using the "waste" nuclear fuel, currently being stored in dry concrete casks at nuclear power plants. We should be treating this "waste" as the resource it actually is.

There are hundreds of coal-fired power plants in the US that could be retrofitted with these modular reactors. These shuttered or soon to be shuttered power plants are already connected to the grid and have most of the workforce at hand. They offer a quick path to expanding the use of clean nuclear power.

I therefore urge that the Senate adopt SB23-079 and classify nuclear power as "clean power."

Respectfully,
Ripudaman Malhotra