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Re Response to SB 423 Emerging Renewable and Firm Zero-Carbon Resources Report

Additional submitted attachment is included below.

Date: May 15, 2026

To: The California Energy Commission

From: Mary Fitzpatrick

Re: Response to SB 423 Emerging Renewable and Firm Zero-Carbon Resources Report

Thank you for producing SB 423 Emerging Renewable and Firm Zero-Carbon Resources Report. The public needs to know how the California Energy Commission is envisioning and planning the state's energy future.

The focus of the analysis in the SB 423 report is grid reliability. Reliability matters, but black-outs and brown-outs are temporary crises, while harm to the climate, human health, the environment, and even the economy are and will be far more significant and longer-lasting catastrophes. Rather than examining energy technologies primarily through the lens of reliability, the California Energy Commission should look at new energy sources and emerging technologies through the lenses of climate, health, environment, and economic impacts. The report acknowledges these impacts, but de-emphasizes them by locating them in the appendices and calling them "barriers" which readers may see not as significant problems but rather as hurdles that can be managed.

Climate. The report looks at emissions during generation only, creating an incorrect impression of climate impacts: An accurate, honest assessment of climate impacts must be based on the complete lifecycle impacts of each emerging technology. For instance, nuclear fission creates no greenhouse gases during generation, but produces significant lifecycle emissions through opportunity costs; uranium mining, refining, and transport; nuclear plant construction, maintenance, and decommissioning; and storing and protecting spent fuel for an infinite term.

For the SB 423 report, the California Energy Commission (CEC) selected energy sources it terms "renewable." "Renewability" refers to the ability of a fuel source to naturally replenish itself. The sense of "renewability" therefore varies from one technology to another, and examining the range of variation reveals "renewability" to be a rather meaningless label. What the CEC should use in evaluating emerging technologies is a strict, comprehensive lifecycle analysis of the global warming potential (GWP) of each technology. The Intergovernmental Panel on Climate Change published statistics on the GWP of solar PV, wind, hydro, geothermal, natural gas, biomass, and nuclear in 2014,¹ and the commission should rely on this measure.

The SB 423 report's focus on "zero-carbon" energy resources likewise misleads the public. None of these emerging technologies is "zero-carbon" over its lifetime. More importantly, Californians need to understand that carbon is the leading -- but not the only -- greenhouse gas (GHG)

emitted in energy production, and that the others – methane (CH₄), nitrous oxide (N₂O), and the GHG precursor, nitrogen oxides (NO_x) -- are increasing atmospheric warming. The public needs to know that California's top energy source, methane, is responsible for 25 to 80 times the warming potential of CO₂ during the 12 years it remains in the atmosphere and that methane leaks from wells, pipelines, gas plants, and even carbon capture technology. When reviewing renewable natural gas (RNG), the emerging technology sourced from manure digesters, the CEC needs to provide a complete lifecycle analysis that includes methane from bovine eructation, evaporation from manure lagoons, and digester and pipeline leakage.

Health: The SB 423 report de-emphasizes the health impacts of emerging technologies on frontline communities and workers. All emerging technologies – but especially small modular reactors, hydrogen, renewable natural gas, and carbon capture – merit a thorough analysis of their lifecycle public health impacts and safety risks. Uranium mining and processing are well documented as associated with cancers, and working in and living near nuclear plants has been associated with a higher cancer risk. Hydrogen is flammable and explosive, and, like methane, produces nitrogen oxides (NO_x) during combustion; NO_x, which chemically transform into ozone, are associated with respiratory illness, asthma, heart disease, and premature death. Renewable natural gas from large dairies using manure digesters also poses health risks. Digester use promotes economies of scale, and according to Johns Hopkins University, industrial livestock operations pollute air, water, and soil with “particulate matter, odors, pathogens, nitrates, [and] drug residues.” Communities near concentrated animal feeding operations risk respiratory conditions and antibiotic-resistant infections, and nitrate-rich groundwater has been associated with cancer, birth defects, and thyroid problems.² Manure digesters can increase ammonia emissions by up to 81%, and burning biogas on-site releases high levels of nitrogen oxides, sulfur oxides, and volatile organic compounds.

Carbon capture is being pursued to enable continuing methane combustion in energy production, and so long as methane is burned to generate electricity, the health of workers and frontline communities will be endangered by harmful emissions containing nitrogen dioxide (NO₂), carbon monoxide (CO), nitrogen oxides (NO_x), Sulphur dioxide (SO₂), fine particulate matter (PM_{2.5}), and other harmful chemicals such as ammonia and formaldehyde.

Environment: The SB 423 report looks at the narrowest possible version of environmental impact: a measure of land use in hectares. Every hectare of land is the home of a community of living things that depend on that hectare's clean soil, air, and water. Land that is altered for energy production no longer supports an intact plant and animal community. The impact of an emerging technology on soil, air, and water often appears only gradually over years and is difficult to locate and document. For instance, stored CO₂ from carbon capture can leak into aquifers, where it can form carbonic acid, a toxin that can contaminate water supplies. Biomass

removal takes away soil carbon and nutrients that are critical to the web of life, and these nutrient losses reverberate throughout the system for hundreds of years.

A complete, responsibly executed analysis of emerging energy technologies must assess and emphasize lifecycle impacts on soil, air, water, and biodiversity. For instance, analysis of small modular reactors must include all procedural phases -- mining, manufacturing, installation, operation, decommissioning, site restoration, waste containment and/or disposal. Failing to document the scale of impacts over time and space misleads and is thus not a public service.

Economic impacts. Many emerging technologies are costly and inefficient. For instance, smokestack carbon capture increases a power plant or industrial facility's energy consumption by 20 to 30 percent, and the source is usually fossil fuel energy. Making hydrogen from biogas from manure or from biomass is a costly multi-stage process. While expensive hydrogen could play a useful role in decarbonizing steel and cement manufacturing, hydrogen combustion to produce electricity would not be cost effective. The levelized cost of nuclear energy does not account for the \$300,000 to \$8 million annual cost in current dollar values of storing nuclear waste for hundreds of thousands of years for each reactor. The public always has a right to know the real cost of each new technology, but during an affordability crisis, cost comparisons deserve special emphasis. To prevent the possible interpretation that the CEC recommends "all of the above", cost-to-benefit analysis deserves equal weight with reliability. To provide a complete analysis, emerging technologies need to be compared with all in-use technologies, especially solar and wind.

Californians need to see which emerging technologies would best fill the gaps in the state's current and future energy portfolio and at the same time have the fewest possible climate, health, environmental, and economic impacts. I hope to see a future report from the California Energy Commission that elevates these vital priorities and highlights the emerging technologies that merit our investment.