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Additional submitted attachment is included below.

Draft 2022 INTEGRATED ENERGY POLICY REPORT UPDATE
Comments Submitted to CEC December 7, 2022

Climate Action California (formerly 350 Silicon Valley), with more than 5,000 supporters around the state, is pleased to submit these comments on elements of the current draft Update. We recognize the importance of policies from numerous state agencies, including the Energy Commission (CEC), in realizing the goals in the Air Resources Board's Scoping Plan (final draft to be considered in December), and we thank you for stepping up in key areas of action for the state.

HIGHEST PRIORITY: DECARBONIZING THE GRID

The electric power sector feeds all other sectors. The replacement of dirty energy with clean energy in our grid will have broad decarbonization effects in all other sectors. An analysis in the context of other sectors is provided by Harvey.

To ensure that this sector is leading the pack, we recommend that the CEC and the CPUC plan to develop surplus clean generation to exceed interim targets every two years, to meet the goals set forth in SB 1020. Surplus power will provide more grid resilience and reliability and decrease the need to develop more costly storage reserves (1)

1. Hal Harvey, 2022, The Big Fix, NY: Simon & Schuster

GRID RELIABILITY AND RESILIENCE

The most effective policies for improving grid reliability are load-balancing (demand-response) measures like time of use pricing; expanding and modernizing the Western States grid; developing a diversity of distributed energy resources (DER); and storage. Sufficient development of these should eradicate the need for baseload peaker plants such as fossil gas plants as well as fossil-powered stationary and portable generators.

SCOPE 4

In addition to Scopes 1, 2, and 3, a fourth Scope should be included in cost to benefit evaluations. Scope 4, or "avoided emissions," includes consequences of actions such as site remediation, reuse, and recycling. These emissions occur only after consumption and decommissioning of production infrastructure. Some technologies which appear to have a low environmental impact, at least during the operating phase, have a high environmental impact when Scope 4 is included in the analysis. Nuclear reactors are an example.

COST TO BENEFIT ANALYSIS

Cost-benefit analysis and accurate computation of return on investment (ROI) are critical to good energy policy – but only if assumptions are accurate and inputs are comprehensive. While critics of the clean energy revolution claim that the gross up-front cost of decarbonization is highest in the early years, they often fail to consider the net cost of mitigation, which is gross investment minus savings from avoided costs in future years. Scientific research on the topic indicates that maximization of investment in early years produces the greatest reduction in future costs and the highest ROI. Accurate accounting of ROI necessitates factoring in current

and future costs of premature mortality, morbidity, diminished productivity, adaptation (infrastructure investments to protect human settlement from drought and sea level rise, for example), agricultural sustainability, reaching tipping points that entail skyrocketing expenses and spiral out of our control, net job loss (relative to net job gains if mitigation were pursued aggressively), social conflict and unrest, etc. Such comprehensive accounting is liable to reveal that the prudent course is to follow the precautionary principle and invest in more mitigation than we think is required to solve climate change. If we reach targets ahead of schedule, it is easy to slow the pace of investment. If we reach targets later than scheduled, it may be too late to prevent severe consequences.

In analyses, we urge the CEC to use the Social Cost of Carbon (and NOx and CH4) released in November 2022 by EPA. We recommend using their 1% discount rate, which is most considerate of intergenerational effects.

In addition to consideration of the warming impacts of short-lived climate pollutants, we recommend calculating 20-year global warming potential, rather than the customary 100-year GWP in your analyses.

CLARIFYING THE LOW COST OF ELECTRICITY

One of the objectives of federal and California government policies is to lower the cost of electricity. There are several ways to accomplish this:

- Externalized costs borne by IOUs, such as wildfire mitigation and legal settlements, must be separated from the rate structure, either by clarifying utility bills, or moving those expenditures to the state budget.

- Externalities associated with fossil energy should be internalized into the market price of fossil fuels (see below). California could develop a Clean Energy Performance Plan (CEPP). Proposed for federal legislation, it would increase clean generation, decrease dirty generation, and lower prices of clean energy relative to dirty. Wright's Law and economies of scale would be propelled by a CEPP.

- The cost utilities charge ratepayers for fossil gas should reflect those externalities. Rates tiered in this way (time of use, for instance) would incentivize conservation.

- The net cost of rooftop solar must be minimized for consumers. To achieve this, net energy metering must compensate consumers who generate electricity behind the meter. Current rates of compensation are driving the solar revolution. Accordingly, we urge the CEC to call upon the CPUC to reject the current Proposed Decision on NEM 3.0 in favor of a new policy that incentivises DER, including rooftop solar, maximally. Rooftop solar requires little or no expansion of the grid whereas development of utility-scale solar by shareholder utilities requires many miles of new transmission lines. These are pricey, driving up electricity costs, and take years to build. Rooftop solar, combined with local battery storage and microgrids will significantly reduce the need for long distance transmission lines with attendant vulnerability to wildfire. Because utilities benefit from the sale of electricity, they should be required to invest in clean energy

storage. Individual households should receive credit for behind the meter generation sufficient to incentivize widespread adoption of solar batteries.

COST OF GASOLINE

Policies that incorporate externalized costs into the price of gasoline and other fossil fuels will expedite the clean energy revolution. Thus, taxes on fossil fuel production and use should raise their market price to a level that is well above the market price of clean electricity and the proceeds should be used to incentivize the development of clean DER. All proceeds from Cap & Trade funneled into the Greenhouse Gas Reduction Fund should be allocated to this development until our grid has 100% clean energy.

HYDROGEN

The only kind of hydrogen production and sale that should be permitted in CA is the one with the lowest lifecycle carbon intensity. This is electrolytic generation powered by 100% clean energy. H2 should not be blended with RNG or fossil NG in existing pipelines. Due to its high price tag, inefficiency, and risks, H2 should only be used for displacing dirty energy from applications that are difficult to decarbonize.

An example is aviation. There are many alternatives to fossil fuel combustion for air transport. Two power sources with the lowest carbon intensity are H2 fuel cells and battery electric motors. Biofuels have not been studied sufficiently to determine their lifecycle GHG intensity, but they do not appear to be promising for many reasons. Hydrogen fuel cell blimps are well suited for non-urgent cargo shipping and travel and tourism over scenic terrain where passengers prefer a leisurely pace (2).

2. https://ark-invest.com/wrights-law/

LOW CARBON FUEL STANDARD

Is the lifecycle carbon intensity of biofuels lower than that of fossil fuel combustion? Insufficient research has been conducted. Most research has used a truncated definition of the lifecycle and shown that the CI of biofuels is 10 to 20% lower than that of fossil fuels. However, research using a more complete definition of lifecycle has revealed that the CI of biofuels is equal to or greater than that of fossil fuels. LCFS credits for “reduction of emissions” should be discontinued until further research clarifies the CI of biofuels over the sum of 4 Scopes.

GEOTHERMAL

The draft report is, surprisingly, mostly silent on geothermal energy development or deployment. This renewable energy source is plentiful throughout California and is capable of providing clean energy for heat and electricity 24/7 - without toxic emissions. Developing this, along with offshore wind, should be a high priority for decarbonization of our economy. Geothermal has the potential to create thousands of jobs in many regions of California. Please add a discussion of geothermal to the final version of the report that includes approaches to make it more cost effective. Consider joint development in other states or imports from Western states where the cost of labor and land is significantly lower than it is in CA.

SMOKESTACK CARBON CAPTURE

This exorbitantly expensive technology has not been proven economic or effective. Fossil fuel companies' support of what may be a pipe dream delays progress in emissions mitigation and does not remove toxic co-pollutants from the flue stream. Co-pollutants typically including black carbon, and NOx have GWPs many times higher than that of methane. For example, the GWP of N2O is 300 and the GWP of black carbon is up to 4,000. EJ interests have consistently opposed such technology. Sub-sectors which are easy to decarbonize, such as fossil fuel plants, should not use CCS equipment. Instead, the plants should be replaced with clean energy plants. This would significantly decrease the cost of electricity, GHG emissions, and toxic emissions. Stanford University Professor Mark Jacobson has calculated these effects and published them in his book cited below (6).

Research has not been published that demonstrates CCS to have a net GHG reducing effect. Lifecycle analyses have been incomplete and reveal significant increases in GHG emissions from powering the CCS equipment as well as fugitive sources.

CCS should only be considered as a temporary measure for industries that are difficult to decarbonize. Examples include metals manufacturing, concrete production, and perhaps fertilizer. However, there are proven technologies for decreasing the carbon intensity (CI) of each of these products. CCS should be considered as a late-stage adjunct to upgrades to proven cleaner technologies (3, 4).

3. https://www.epa.gov/ghgemissions/overview-greenhouse-gases
   EPA, 2022, Overview of Greenhouse Gasses
4. https://en.wikipedia.org/wiki/Black_carbon
   Wikipedia, 2022, Black Carbon

BIOMASS

The cost of heavily subsidized biomass electricity is about 50% higher than that of unsubsidized clean electricity. Use of woody biomass as fuel has a CI that is equal to or significantly higher than that of coal combustion. Biomass plants lack pollution controls. This industry has been obsolescent for over a decade, but is kept on life support by heavy subsidies. It should be replaced by clean energy distributed energy resources which would generate net job creation where biomass plants are shuttered. Ultimately, burning any form of biomass in fireplaces should be prohibited. Electric heat pumps and electric fireplaces are much more efficient for heating, do not emit toxins, and may be incentivized by the Inflation Reduction Act.

NUCLEAR REACTORS

Reactors have a substantial list of advantages over fossil power plants. However, they have few advantages over clean energy and a long list of disadvantages. Reactors continually spew toxic ionizing radiation and leave solid fissile waste, which is extremely poisonous for over 200,000 years. There is no cost-effective storage solution. Water vapor, a GHG, is emitted continuously during operation. The economic cost alone of reactor electricity should be enough to rule it out. It is by far the most expensive option at 3 to 15 times the cost of clean electricity. The life of Diablo Canyon must not be extended past its new statutory extension (5, 6)

5. https://www.sciencedirect.com/science/article/pii/S1040619022000483, https://doi.org/10.1016/j.tej.2022.107122 Lovins, Amory, 2022, US Nuclear Power, The Electricity Journal, 35, 4, 107122
6. https://web.stanford.edu/group/efmh/jacobson/Articles/I/NuclearVsWWS.pdf

Jacobson, Mark, 2020, Evaluation of Nuclear Power as a Solution to Global Warming, In 100% Clean Renewable Energy and Storage for Everything, NY: Cambridge University Press, 2020.

ALL ELECTRIC BUILDINGS

CEC has pioneered progressive changes in new and retrofit building codes. Please go further to require that all kinds of new buildings are methane-free and powered completely by clean electricity. Also, retrofit codes and incentives are urgently needed because buildings often last more than a century. The Inflation Reduction Act provides many kinds of incentives for retrofitting appliances and increasing efficiency. In particular, the funding in the IRA for heat pumps should be used as a catalyst to require all heating and cooling systems in California to be run by efficient electricity.

NEW FOSSIL INFRASTRUCTURE

CEC should work with other agencies to deny permits for new fossil fuel infrastructure in California, including pipelines, power plants, and transport hubs for coal.

SITING OF SOLAR PANELS

To minimize land use, install panels over brownfields, canals, reservoirs, parking lots, driveways, freeways, atop marine ships, and of course rooftops. Pursuant to Wiener's bill SB-379, the state should fast-track permitting for these panels and other forms of clean energy. A canopy of solar collectors is suitable for agriculture, providing partial shade and decreasing irrigation requirements.

INFLATION REDUCTION ACT

This provides billions of dollars for clean energy upgrades. Each state must develop an administrative structure to process receipt of federal funds. Please collaborate in planning this administrative organization so that CA residents may receive incentives without undue delays.

D.B

David Bezanson, Ph.D.

Steering Committee, CAC