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Public Comment on the
Draft Scoping Order for the California Energy Commission's
Integrated Energy Policy Report 2021 Update

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Submitted on behalf of the 350 Silicon Valley Science Review Panel, February 19, 2021

350 Silicon Valley, with membership of more than 5,000 Californians, thanks the Energy Commission for years of progress in scaling-up clean energy in our state, and for the impressive Joint Agency Report issued in December 2020. Please consider the actionable comments below to guide rule-making and consultation with other agencies as you develop the Integrated Energy Policy Report, 2021 Update.

CONTENTS

I. POWER SECTOR AS FIRST PRIORITY FOR DECARBONIZATION

When our grid is delivering only 100 percent carbon-free energy, the other sectors considered by the Air Resources Board (CARB) will have much lower carbon footprints. If we focus on electrification of other sectors first, a) they will be powered by carbon-intensive energy sources (Scope 2), thus perpetuating demand for those sources; and, b) we may have more power outages due to demand exceeding supply. Decarbonization of the grid requires incorporation of smart load-balancing features and energy storage. **We urge the CEC to scale up the generation of renewable energy, with urgency.** (1,2).

II. RPS TARGET DATES

President Biden's stated plan is to reach 100 percent clean energy by 2035, ten years earlier than the target of SB 100. We believe that California must accelerate our move to 100 percent, and that setting interim RPS targets will be essential to achieving that goal. E.g., to verify progress toward a ten year target, increase the RPS percentage target every 2 years. Consider increasing the RPS target by 10 percent (of the 2020 percentage) every 2 years until 2030. This would increase the total from 33 percent to 83 percent by 2030. **We must consider 2035 as the CA target for 100 percent RPS** (3,4,5,6,7).

III. AIRBORNE TOXICS

All combustion of biofuels, biomass, and fossil fuels emits toxic co-pollutants. The number one source of toxics in the US is fossil fuel combustion. Worldwide, annually, between 7 and 9 million people die as a result of exposure to airborne toxics (8,9,10,11).

Biomass electricity generation emits many of the same toxic co-pollutants as fossil fuels and at least as much GHGs/kW as coal. There are about two dozen biomass electricity plants in California. Their average age is about 30 years old and they are inefficient. **Power plants burning biomass should be shut down, and the biomass used as fuel converted to products that will sequester carbon for significant periods** (12,13). See the Sierra Club's report on alternative uses of these materials.

Life cycle analyses of nuclear reactors show that they also emit significant amounts of GHGs, exceeding the lifecycle GHG emissions of renewables. Nuclear power plants continuously emit toxic ionizing radiation into proximal water and air, which is harmful to all species. The isotopes of uranium and plutonium used in reactors have a half-life of at least 24 millennia (14,15,16). **We must rapidly phase out all forms of energy that emit more GHGs or toxics than renewables.**

IV. SOURCES of GHG-EMITTING COMBUSTION, CONSIDERING SCOPES 1, 2, and 3

Fossil fuels, biomass, and biofuels emit GHGs in each scope. **California must rapidly phase out all three fuels and scale up development of clean energy, which has significantly lower total emissions in scopes 1, 2, and 3.** Clean alternatives include each of the sources of energy that qualify as RPS in SB 100 (17,18).

V. SELECT THE MOST COST-EFFECTIVE SOURCES OF CLEAN ENERGY

Subsidies by government and utility customers have propped up the nuclear, fossil fuel, and biomass electricity industries for decades. As President Biden has indicated, government subsidies must end for fossil fuel industries; and California should lead in ending subsidies for nuclear and biomass. Prospective power users should be educated and consulted about the hazards and exorbitant costs of these sources before permits are issued. Customers should be informed about renewable options.

While nuclear reactor failures are infrequent, meltdowns inflict catastrophic damage for many decades over areas covering hundreds of square miles. The cost of nuclear energy is rising while the cost of wind and solar are declining. Currently, the cost/kW of nuclear electricity is four times higher than the cost/kW of wind and solar. Building a utility-scale nuclear reactor takes at least ten years in the US. The global supply of reactor-grade uranium is dwindling. Enriching low-grade uranium requires rotation in centrifuges powered by electricity, increasing Scope 2 emissions. The nuclear industry claims that Small Modular Reactors are safer than full-size reactors; however, no SMRs have been constructed (19,20,21,22,23,24,25,26,27).

The cost of biomass electricity is significantly higher than that of solar and wind. And the cost of the former is rising while the cost of the latter two are falling.

Renewables that generate electricity 24/7, but are more costly than wind and solar, should be scaled up to improve grid reliability—especially at night. One example is geothermal. There are many areas in California outside of the Geysers and the Salton Sea plant complex where geothermal energy could be developed. Tidal energy is another option that should be considered for increased reliability. **An essential complement to development of these sources is to increase clean energy storage, e.g., via batteries (28).**

VI. CARBON CAPTURE: TECHNOLOGY v NATURE

Carbon capture technologies (CCT) are not cost-effective and may do more harm than good (29). In 2020, the cost of capturing CO2 fell to $100/ton. However, this operating cost does not factor in many variables and externalities included in comprehensive life cycle analyses, e.g., mining, manufacture, transport, installation, creating subterranean storage vaults, etc. CCT has been available for 15 years, but is used on a very limited scale due to being cost-prohibitive. The only power plant in the US using CCT recently closed. Furthermore, CCT does not remove toxic co-pollutants.

A much more economical means of sequestering and storing carbon is to preserve forests, especially old growth. Forests sequester more atmospheric carbon than any other terrestrial habitat; and *natural* forests (where there is no logging or need for removal of other biomass) retain more carbon than monoculture tree plantations. Over a half century, conserved forested land will store significantly more carbon than planting billions of seedlings at the beginning of the period. The reason is that the amount of sequestration is dependent on the volume of biomass, not the number of trees. Globally we are "harvesting" more trees and fallen biomass than we are planting or growing by deferring logging. In the USA, we harvest double the amount that is replaced with new growth each year. Harvesting biomass from monoculture "forests" only contributes to deforestation and significantly decreases ecosystem services.

Ocean conservation to restore the growth of phytoplankton is another proven approach for carbon sequestration (29,30,31,32).

VII. HYDROGEN— GRAY, BLUE, and GREEN

We must **rapidly phase out gray and blue hydrogen, and replace it with green hydrogen, which is produced with 100 percent renewable electricity** (33,34).

VIII. SOLAR ENERGY FROM PHOTOVOLTAICS

We must incentivize and scale up the domestic manufacture of PV panels that have low carbon emissions in their production chain and high-efficiency. California should adopt policies to phase out incentives for the installation of new PV panels that do not meet these criteria (35,36).

IX. NATURAL GAS IS NOT A "BRIDGE" FUEL

Methane (a.k.a. Natural gas, or NG) leaks from pipeline infrastructure are significantly higher than EPA estimates (37). During its initial 20 years in the atmosphere, methane traps 83 times more heat than CO2. After 20 years, it degrades into H2O and CO2. As we know, the latter traps heat for centuries. California has 650,000 miles of NG pipelines. In California, over 100,000 MT of methane leak into our atmosphere annually (38).

Another source of anthropogenic NG emissions is venting and flaring at well heads. Industry claims to be working to decrease leakage. However, data showing that they are doing so is sparse.

Investments in NG siphon funds away from development of renewables. **When extraction (e.g., via fracking), flaring, venting, and pipeline leaks are factored into emissions analyses, greenhouse gas emissions from NG are equal to those from coal** (37).

X. CHANGE POLICIES THAT INCENTIVIZE CONSUMPTION OF CARBON-INTENSIVE ENERGY

An example is the PCIA charged by investor-owned utilities (IOUs). Customers enrolled in community choice aggregators (CCAs) are, in effect, paying the cost of past decisions made by IOUs to enter into long-term contracts to purchase carbon-intensive energy. Many of these decisions were made years before CCAs were established. **Consider phased policies that will allow utilities to cancel their long-term fossil fuel sourced contracts without penalty.** E.g., utilities would be allowed to decrease the quantity of such electricity by 10% annually. However, the utilities would be required to abide by contracts to the extent that energy generation companies provide renewable energy.

XI. SOCIAL COST OF CARBON AND CARBON PRICING

As computed by the US EPA in 2017, the social cost of carbon (SCC) accounts for premature deaths; medical costs; degradation of natural resources; decreased GDP; property damage from climate-induced sea level rise, floods, windstorms, drought, and wildfires; and increased cost of food. It excludes extraction of GHG emissions from the atmosphere. It also excludes the sunk costs of millions of taxpayer dollars spent annually for decades to create regulatory policies and agencies that deal with pollution (38). A July 2020 article published in *Nature Climate Change* estimates the current SCC to be between $100 and $200/MT. (39). The Biden Administration is currently re-figuring the SCC (40).

There is widespread scientific consensus that the SCC will continue to increase annually unless we achieve deep decarbonization. Per the Air Resources Board (CARB), a total of 424 MMT of CO2e was emitted in 2017 and in 2018 (42). The total annual SCC from CA emissions is 424 MMT CO2e x $150/MT CO2e = $63,600,000,000 ($63.6 billion).

Note that the CO2e emissions data from CARB excludes many sources of GHGs, e.g., leaks from NG infrastructure. CARB's SCC also excludes the social cost of other fossil fuel emissions. These toxic co-pollutants include benzene, carbon monoxide, nitrogen oxides, sulphur oxides, ground-level ozone, and particulate matter. Each of these increases the incidence of cardiovascular disease, cancer, and respiratory illnesses. Collectively, they drive up costs of public health care, e.g., MediCal.

In contrast to the price determined in the above research, the mean tax in 42 nations and U.S. states was only $8/MT in 2018. Governments have attempted, but failed, to impose significantly higher carbon taxes. Failing to impose a scientifically-credible price perpetuates the burden upon society of paying for externalities. A credible price on carbon would shift the cost to the fossil fuel industry.

It is easy to establish carbon pricing in some sectors, but more difficult in others. Regulation of emission limits is more likely to be effective than carbon taxes, especially in the latter. However, in suitable sectors, the combination of regulation and carbon taxes is likely to be more effective than either alone for catalyzing innovation, decreasing demand for carbon-intensive products and services, and raising tax revenue needed to mitigate climate change (40).

XII. REVENUE SOURCES AND INCENTIVES

To fund decarbonization of our economy, consider the following policies. Many of these obtain funds from carbon-intensive industries and allocate funds only to clean energy priorities.

Phase out tax incentives for outdated technologies. E.g., phase out tax credits for the installation of solar PV panels that are less than 20% efficient and have a moderate to high carbon footprint in their production. Simultaneously increase incentives for panels with the most efficiency and lowest carbon standards.

To engage the fossil fuel industry and invite them to be part of the solution rather than the problem, these companies should receive tax credits for replacing production of fossil fuels with renewable electricity. For example, if a company's fossil fuel production falls by 10 percent from the prior year while its generation of renewable electricity increases by 10 percent, it would qualify for the lowest credit. If the percent change of each reaches at least 90%, they would qualify for the highest credit.

The credit and other costs of this legislation could be funded by any of the following:

- Increase corporate taxes of fossil fuel firms to a percentage high enough to offset the effect of federal subsidies plus SCC
- Increase the floor auction price of cap and trade carbon emission allowances to the current SCC, i.e., $150/MT CO2e. Discontinue offering free allowances, set an expiration date for allowances that have been banked, and decrease credits for offsets. In their book *Making Climate Policy Work*, released Dec. 2020, Cullenward and Victor propose other ways of making cap and trade more effective. All of these bring us closer to paying the actual cost of fossil fuel use and mitigation of that use.
- Increase taxes annually on propane, NG, diesel,and gasoline announced in the year of passage for the upcoming 5 years
- Enact carbon tax legislation to complement cap and trade. This would be at the SCC rate and apply to all stationary source polluters (not merely the largest 10 or 20 percent of firms). A severance tax, mentioned below, is one kind of carbon tax.
- Impose an annual permit renewal fee for active and idle wells
- Increase mandatory fees to decommission retired wells
- Issue municipal bonds for publicly-owned green energy and infrastructure
- Create an oil and gas severance tax (most states have this)
- Increase airport taxes and flight fees
- Increase taxes on sales, leases, rental, and subscription plans; smog check fees, and annual registration fees for used and new internal combustion vehicles (ground, air, and marine) and ICE off-road equipment

One objective of the above is to increase the cost of fossil fuels, which will increase demand for renewable energy. To offset cost increases for less affluent people, progressive measures should also be enacted, e.g., individual income tax credits.

Thank you for considering these suggestions. We look forward to the post-comments version of the Integrated Energy Policy Report Scoping Document, and the public process to follow. Please reach out if you have any questions or would like to discuss any of these ideas.

Yours sincerely,

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ENDNOTES

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