2022 SCOPING PLAN UPDATE MARCH 15 WEBINAR

2022 Scoping Plan Update – Initial Modeling Results Workshop | California Air Resources Board

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This webinar was valuable because it highlighted decisions we need to make in order to achieve our climate and net GHG emissions objectives. For the sake of brevity, the comments below are primarily policy recommendations, with sparse didactic content and references. CARB staff are well-informed. However, background material is available upon request re. recommendations in these comments, in the unlikely event that CARB has insufficient data on hand. Some of the policies herein require involvement of federal agencies.

The term renewable herein does not conform to the CARB definition. Renewable energy is generated from non-carbonaceous feedstocks and sources. During Scopes 1, 2, and 3 renewables do not emit airborne toxics, e.g. ionizing radiation, and do not emit airborne GHGs during Scopes 2 and 3. Renewables include hydrogen produced by electrolysis using ZE Scope 2 electricity, geothermal, PV solar, and wind turbines. Renewables exclude hydropower, nuclear reactors, “low carbon” biofuels, and carbonaceous combustion. The E3 presentation did not address geothermal energy, a major omission - given our vast potential geothermal energy resources.

WHAT PACE OF DECARBONIZATION IS MOST EFFECTIVE AND ECONOMICAL?
Research indicates that paths that achieve net neutrality at the earliest dates are most economical. This is because the sum of energy and non-energy benefits from decarbonization exceed the costs of decarbonization. Deferring decarbonization requires increasing annual expenditures in order to achieve a fixed quantity of benefits. Thus, Alternative 1 for achieving neutrality by 2035 and Scenario 1 (minimal disturbance of NWL) are preferred. The most economical approach to decarbonization is efficiency.

KINDS OF GHGs to TARGET
Throughout these comments, the acronym GHG refers to emissions of common warming gasses such as CO2, CH4, HFCs, O3, hydrogen, and nitrous oxides. Each of these in sufficient concentrations has toxic effects. In addition, many other toxics have GHG effects. An example is particulate matter (PM). Whether widely regarded as a GHG or as a toxic, if an airborne emission has a GHG effect, it is useful to monitor it. The Scoping Plan would be more accurate and effective if this comprehensive *de facto* definition of GHG were used.

MORTALITY FROM EMISSIONS AND CLIMATE CHANGE
In 2018, 8.7 million people suffered premature mortality from FF industry particulate matter (PM) emissions. A 2021 study estimated 10.2 million. Estimates of the number of annual premature deaths from FF PM in the US range from 335,000 and 355,000. Using 340,000 and dividing this by the population of the US in 2018 (327 million) equals 0.1%. The CA population in 2018 was 39 million. 0.1% of 39 million is 39,000. The value of a statistical life in the US is $10,000,000. Thus, the annual value of lives lost is $390 billion (39,000 times ten million).

Combustion of FF emits about one dozen toxics. Mortality from the other toxic co-pollutants was not estimated. Many of these toxics are also GHGs, which are the foremost cause of climate change.

What is the death toll from climate change (that is not due to toxic airborne pollution)? One estimate is 150,000 annually. This is very conservative because cause-of-death records rarely mention air pollution. There is a high probability that premature mortality from climate change, as well as toxic co-pollutants, will continue to increase as long as FF combustion continues. Between 2030 and 2050, over 250,000 deaths per year are projected to be caused by weather extremes. Notice how small these numbers are when contrasted with premature mortality from FF PM.

The UCSB presentation excluded toxics. These contribute more to premature mortality than all other causes. A revision of their modeling is warranted.

There is widespread scientific consensus that the FF energy sector is unsustainable. This is the case even if climate change is proven to be a hoax. The rising tolls of chronic illness and premature death from toxic airborne FF emissions are unacceptable to the majority of stakeholders in our society. This is verified by CA legislation, Executive Orders, and regulations that have emissions-decreasing provisions. In order to meet carbon-reduction objectives, Gov. Newsom, the legislature, and the CA Air Resources Board (CARB) are planning to significantly downsize and eventually “phase-out” the FF sector.

FF sector labor and residents of proximal “sacrifice zones” are exposed to high levels of toxics. They would benefit more from the reduction of air pollution than the general population.

The ability of pollution control devices to curtail toxic emissions from stationary sources (e.g., power plants and refineries) is very limited. Technologies are available to remove a percentage of only a few of the FF toxic emissions. Carbon capture equipment does not extract toxic pollutants. At present, CCS and DAC technologies are incapable of significantly reducing carbon pollution at the scale required to meet the 1.5C degree limit established by COP25 & COP26. These technologies are extremely energy intensive and, when powered by FF energy, have not been proven to achieve a net decrease of carbon. It is unlikely that these technologies can be scaled in time to achieve our 2050 objectives. Other technologies are available, e.g. mineralization, that have many advantages over CCS.
CARBON CAPTURE DECISION TREE - Google Docs

COST : BENEFIT ANALYSES
The value of each of the following variables is to be included.
Social Cost of Carbon (CO_2e from all GHGs) is to be calculated at a zero discount rate in order to fairly account for intergenerational impact.
The number of new jobs created annually to build a clean economy (minus job loss in the fossil fuel sector).

Income tax revenue (individual and business) from renewable energy generation, storage, and efficiency - minus revenue from the FF sector
Increase in GDP as the transition unfolds.
As air quality improves, productivity is likely to increase while medical expenses decrease.
Decrease in size and number of Toxic Hot Spots would decrease need for expenditures to protect residents (e.g. residential air filters, MediCal)
As renewables become our predominant source of energy, the efficacy of lobbying by the FF industry to obstruct climate legislation and regulation will wane. This will decrease expenditures by the Legislature and regulatory agencies.

HFCs and REFRIGERANTS
CA EPA and CARB should modify regulations to permit the manufacture and sale of natural refrigerants having a GWP below 15. This includes CO2, ammonia, and propane. These should be incentivized for refrigeration, HVAC, and heat pump water heaters for residential and commercial operations. Those with a GWP over 15 should be rapidly phased out. Higher standards of leak prevention, collection, and recycling are needed.

ANESTHETICS
General anesthetics for surgery have a 100-year GWP over 1,000. The exceptions are nitrous oxide, which has a GWP of nearly 300, and sevoflurane with a GWP of 150. Only anesthetics having a GWP <300 should be permitted. This will expedite research to create novel anesthetics with a GWP <300 and less toxicity.

HYDROGEN
This should be used as an energy and storage source only for applications that are difficult to electrify. This includes aviation, metals and cement manufacturing, heavy duty trucks, and moderate to large maritime vessels. The only technology for H2 production that should be permitted is renewable electrolytic hydrogen in CA. No other kind should be imported or sold in CA.

LOW CARBON FUEL STANDARD
Electrification of our energy sector, transportation sector, and building sector trumps the LCFS. That is, even if the LCFS achieved its target of a 20% decrease in GHG emissions, this amount is small in contrast to the decrease in GHG emissions and increased efficiency from replacing combustion engines and turbines with renewable electricity-powered vehicles and appliances. These replacements decrease GHG emissions by 70% in many cases.

Recent research has demonstrated that a comprehensive lifecycle analysis of corn ethanol (as a biofuel) fails to decrease GHGs. Instead, it significantly increases GHG emissions. Research fails to include the GHG impact of many toxic co-pollutants that are inevitably released by combustion of biomass. Nor are the effects of these upon premature mortality accounted for in cost : benefit studies of biofuels. No lifecycle research has been published on the efficacy of biomass energy with CCS. It is unknown

whether this results in a net increase or decrease in GHGs. Closure of the LCFS program and incentives is recommended. Instead, incentivize electrification.

IMPORT and EXPORT LIMITATIONS

CA should conserve its natural resources by phasing out emissions-intensive exports. This includes lumber, water, metals, cement, livestock products, and fossil fuels (raw and refined). This decreases our need for imports. The reduction of imports and exports, including low-efficiency appliances and high-embodied carbon products, would diminish shipping emissions.

Imports of dirty electricity (e.g. thermal coal sourced) should be rapidly phased out by accelerating the pace of generation of renewable electricity within CA. We need more clean energy jobs in CA to provide opportunities in greener pastures for workers leaving the contracting FF industry.

NATURAL AND WORKING LANDS

Policies to incentivize the transition from livestock production to organic, regenerative crop farming are needed. Digesters have not been proven effective for achieving net capture of CH4 over the lifecycle of Scopes 1, 2, and 3. Instead, decrease in herd sizes, especially of ruminants, is effective for mitigation. Conduct demonstration projects of feed additives, e.g. NOP and kelp, for ruminants. Raise sales taxes on meat and dairy and use revenue to subsidize organic, regenerative produce.

Prioritize preservation of old growth forest. Cease thinning and logging thereof. Set a minimum 50 year rotation for commercial timber harvest. Prohibit development near forests. To further decrease wildfire risk, set more stringent GHG emission limits.

Include sequestration of C by botanicals in CA coastal ocean waters in NWL inventories. This includes phytoplankton and kelp. Establish policies to increase the growth of these.

NG INFRASTRUCTURE

The leak rate is estimated to be between 1 and 3% of volume. Place a moratorium on permitting of new NG infrastructure, including wells, until the leak rate is below 0.5%.

CONSUMPTION DETERMINES AIR QUALITY AND CLIMATE CHANGE

Using existing technology and all Scoping Plan policies, it is unlikely that we can conquer climate change. Our success depends upon curbing *per capita* consumption and the statewide population growth rate. The product of these two determines total consumption. Citizens of the first world generate more GHG and toxic pollution than

citizens of second and third world nations. It is our responsibility to set a constructive example for the world by establishing policies that downsize population and consumption. CA should target a maximum GDP rate of 1% annually. Voluntary policies to encourage families to have no more than two carbon bombs are called for.

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