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Scoping Plan staff  
California Air Resources Board

Submitted Electronically to: <https://www.arb.ca.gov/lispub/comm2/bcsubform.php?listname=sp22-modelresults-ws&commperiod=1>

**Re: 2022 Scoping Plan Update: Initial Modeling Results**

Dear ARB staff:

Phillips 66 Company (Phillips 66) appreciates the opportunity to comment on the 2022 Scoping Plan Update: Initial Modeling Results shared at the Air Resources Board (ARB) workshop on March 15, 2022. Phillips 66 operates refineries and related operations in California that provide a broad range of petroleum and renewable fuel products for California and other western states. The 2022 Update to the Scoping Plan will establish policies that will impact our business strategies and operations.

The State and California businesses should take pride in the significant statewide GHG reductions since the 2004 peak, and in meeting the 2020 GHG goal.

As a company involved in the energy transition, Phillips 66 is charting a path to a lower-carbon future. In 2021, the company formed the Emerging Energy business focused on lower-carbon technologies. Last year, the company also announced it intends to reduce greenhouse gas emissions intensity from its operations and energy products, setting impactful, attainable and measurable targets. The targets for 2030 are to reduce Scope 1 and Scope 2 emissions intensity from operations by 30% and Scope 3 emissions intensity of energy products by 15%, below 2019 levels. This year, we extended our targets to reducing Scope 1 and 2 manufacturing-related emissions intensity companywide 50% by 2050.

We comment on both the Scoping Plan update more generally and on the Initial Modeling results. We support the comments submitted by the Western States Petroleum Association (WSPA) and offer these comments to further reinforce the WSPA comments.

## General Comments

### Public Process and Modeling Details

We do appreciate the many workshops over the past two years where ARB gathered stakeholder input on technologies and policies to reduce GHG emissions. We also appreciate ARB's open process in developing the four modeled Alternatives. While we don't fully agree with the Alternatives modeled, they are starting to yield some basic findings.

Phillips 66 is a major fuel provider in California and has and will provide important input. In fact, we have formed a new Emerging Energy group tasked with commercial development of lower-carbon technologies as described later in these comments. However, it is unfortunate that ARB has not yet shared the detailed assumptions and E3 output for the four modeled Alternatives. ARB's limited release of modeling results to-date is constraining our review. The charts and graphs shared on March 15 are helpful and directional but don't contain the assumptions and detail that stakeholders need to fully analyze and understand the results. We understand that ARB may release more details with the draft Scoping Plan in May, but that will leave inadequate time for proper feedback to ARB before the draft Scoping Plan is presented to the Board in June.

Recommendation: ARB should share more detail on the assumptions and results from the E3 Alternatives modeling before the draft Scoping Plan is issued in May.

### Achieving the 2030 Goals

Prior Scoping Plans focused on achieving the 2020 and 2030 GHG goals. ARB's initial modeling results indicate that the 2030 goal of 40% GHG reduction may be attainable but will rely on rapid implementation of certain technologies. We understand that the E3 modeling exercise was focused on pathways for achieving carbon neutrality by 2035-2045. However, we encourage ARB to give equal attention to the 2030 goal. Technology and policy selection for 2030 must be directionally consistent with longer-term goals to avoid stranded investments. We also expect that new technologies (innovation) beyond those in E3's modeling will be needed to achieve future goals.

Recommendation: ARB should increase emphasis on the 2030 goals in the Scoping Plan update.

### Scoping Plan should Embrace Innovation

ARB should make every effort to embrace technology innovation and flexibility in crafting policies and regulations to achieve GHG reductions. California will need every tool in the toolbox. It is far too early to rule out certain technologies that could prove to be the best technology-ready and cost-efficient long-term solutions. As one example, certain transportation applications may be best served by petroleum and biofuels versus mandating use of ZEV technology. As another example, fast-growing demand for hydrogen for transportation, industrial use and blending to natural gas may demand that hydrogen be produced with all available technologies versus only from renewable natural gas or electrolysis. ARB and California should continue its successful tradition of setting emission performance standards versus mandating technologies. ARB and other California agencies should also continue to

utilize market mechanisms (e.g. electricity RPS, Cap-and-Trade) to encourage innovation. Mandates discourage innovation.

Recommendation: ARB should exercise caution in mandating technologies. Instead, ARB should encourage innovation by setting technology-neutral performance standards and should support market mechanisms.

#### Efficient project permitting is critical for low-carbon technologies

The required scale and pace of building new technologies to reduce GHG emissions is unprecedented. The proposed changes to the electricity system alone are massive. This will require a nimble stakeholder process that may include streamlined CEQA review and project permitting. California should also utilize new funding mechanisms to promote public and private GHG reduction projects.

Recommendation: ARB should address this need for project permitting streamlining in the Scoping Plan to expedite project development.

### **Modeling Assumptions and initial Modeling Results**

We are pleased to see that ARB and E3's work finds that renewable liquid fuels (biofuels), hydrogen, batteries, and carbon capture, utilization and storage (CCUS) play a major role in Alternatives 3 and 4. Our new Phillips 66 Emerging Energy business has activities in each of these areas. We provide these brief examples of work underway at Phillips 66:

- **Renewable Fuels:** Our Humber (England) and Rodeo (California) refineries already produce renewable diesel. We are planning a major conversion of the Rodeo Refinery to discontinue processing crude oil and transform it to be one of the world's largest producers of renewable fuels in 2024. Humber recently delivered its first batches of Sustainable Aviation Fuel (SAF) to British Airways in the United Kingdom. Phillips 66 and Southwest Airlines signed a memorandum of understanding to advance the commercialization of SAF.
- **Hydrogen:** Phillips 66 and H2 Energy Europe are developing a hydrogen refueling network in Germany, Austria and Denmark. Humber has announced plans to pursue the use of lower-carbon hydrogen to refuel industrial heaters. Phillips 66 and Plug Power signed a memorandum of understanding to collaborate on the development of low-carbon hydrogen business opportunities.
- **Batteries:** We already produce high-quality carbon for vehicle electric battery manufacturing. Phillips 66 has invested in NOVONIX and signed a technology development agreement with the company to advance the production and commercialization of next-generation anode materials for lithium-ion batteries.
- **CCUS:** We are pursuing agreements with the UK government and other industries in northern England to develop a CCUS network and potential hydrogen hub. In the U.S., Phillips 66 is a member of coalitions exploring large-scale CCUS development in the Houston area and elsewhere.



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## Technology Assumptions

We offer below additional comments on modeled Alternatives 3 and 4:

### Renewable Liquid Fuels (Biofuels)

As mentioned, Phillips 66 is currently producing low-carbon-intensity renewable diesel (RD) fuel at our Rodeo, California refinery and is planning a full conversion of that refinery by 2024 to be one of the largest producers of RD in the world. Depending on market opportunities, Rodeo could also produce, SAF, renewable naphtha/gasoline and renewable propane. This and other companies' announced projects could produce over 100,000 barrels per day of RD for California use. ARB should ensure a continuing role for RD in the Scoping Plan and in regulation (e.g. LCFS, Advanced Clean Fleets, offroad applications). An all-ZEV strategy for medium and heavy-duty vehicle applications fails to take full advantage of near-term and long-term RD supply and could result in stranded RD capital investments. While Alternatives 3 and 4 show biofuels as part of the energy mix in 2045, this role could be clarified and expanded in the modeling output and Scoping Plan update.

Recommendation: Biofuels should have a prominent role for transportation and non-road engines in the Scoping Plan.

### Hydrogen

Hydrogen could prove to be one of the fastest growing energy sources for California. The E3 modeling describes a role for hydrogen but it is not summarized with clarity. The Scoping Plan should present the full hydrogen opportunity including describing production options (steam-methane reforming using natural gas and/or renewable natural gas with/without CCUS, BECCS, and electrolysis) and consumption options (transportation, industrial fuel, blending to pipeline natural gas).

Recommendation: Hydrogen production and consumption should have a more prominent role in the Scoping Plan.

### Vehicles and Batteries

Phillips 66 supports WSPA's position that an all-ZEV strategy for California vehicles may not be optimal for at least two reasons. First, as demonstrated by WSPA and Ramboll and submitted in comments to ARB, the expected slower adoption of ZEVs in medium and heavy-duty vehicles could fail to reduce NOx and lifecycle carbon reductions that could be accomplished faster with earlier application of low-NOx vehicles operating on biofuels. Second, the very large required increase in electricity load, grid expansion and recharging infrastructure may not be possible per the timelines assumed in Alternatives 3 and 4. The State could be better served by setting emission performance standards and letting technologies evolve to meet those standards, whether they be ICE, BEV or FCEV. That said, Phillips 66 recognizes that use of ZEVs will grow globally and is now producing carbon for batteries and investing in battery development.

Recommendation: ARB should establish technology neutral performance standards for vehicles versus mandating ZEV technology and present this option in the Scoping Plan.

### Refineries

The E3 modeling assumes a phasedown of California refining consistent with an assumed phasedown in petroleum gasoline and diesel demand that results from ZEV mandates and higher vehicle fuel efficiency standards. This assumption is likely incorrect for at least four reasons. First, many refineries will continue to operate to meet ongoing demand for petroleum fuels still required in some applications. And, refineries produce a broad range of products that will continue to be needed (e.g. aviation fuels, marine fuels, propane, butane, petroleum coke for industrial fuel, lubricating oils, greases and waxes, petrochemical feedstock). Second, California refineries operate in a global marketplace and also supply products to Arizona, Nevada, other western states and globally. The narrow assumption that California refineries exist to only meet California demand is flawed. Third, and as evidenced by our announced Rodeo project and other projects, some California refineries will continue to operate to produce increasing volumes of biofuels. Finally, refineries and their existing on-site hydrogen plants will likely be hubs for producing hydrogen for all future uses.

Recommendation: The Scoping Plan should correct the flawed assumption that California refineries will phase-down at the pace assumed in Alternatives 1-4. Instead, some refineries may convert to producing low-carbon alternative fuels, others will meet ongoing petroleum fuel demand, and some may do both.

### CCUS and Carbon Dioxide Removal

The modeling generally suggests that reaching carbon neutrality will prove challenging and that CCUS can play a major role towards that goal. The modeling is informative in that none of the Alternatives modeled were able to reach carbon neutrality, even with the assumptions of CCUS applied to refineries and other industrial sources. Carbon neutrality was achieved only after assuming between 37 and 120 MMtpy of carbon dioxide removal (e.g. DAC). This highlights that the Scoping Plan should support all segments of CCUS including carbon dioxide capture at industrial sites, CO2 pipeline development and geologic sequestration.

Recommendation: California and the Scoping Plan should make firm policy statements supporting the development of and long-term sustained operation of CCUS projects and should support streamlining CCUS project development and project permitting

### Electricity Load

The modeled Alternatives (March 15 presentation, slide 24) found that electricity loads would increase by 60-90% by 2045, driven largely by transportation and building electrification. It also notes that this load increase does not include the additional load for hydrogen production via electrolysis or for direct

air capture (DAC) because these loads are “assumed to be provided by off-grid renewables.” We are not clear on why E3 and ARB make this distinction. Slide 6 does offer some clarification stating that the additional solar load required for hydrogen production via electrolysis would be 31-47 GW. A more detailed summary of all electricity load, both on-grid and off-grid, is needed in the modeling output and Scoping Plan update.

Recommendation: ARB should provide more transparent detail on the increase in electricity load due to ZEV mandates, building and industry electrification, hydrogen production via electrolysis, and DAC.

**Thank you for this opportunity to submit comments. You can reach me at 832-765-1779 or [steven.d.smith@p66.com](mailto:steven.d.smith@p66.com).**

**Best Regards,**

**Steven D. Smith**



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