September 3, 2021 | Submitted Electronically

Liane Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Joint POU Comments on the 2022 Scoping Plan Scenario Concepts Technical Workshop

Dear Chair Randolph,

The Southern California Public Power Authority (SCPPA),[1] Northern California Power Agency (NCPA),[2] and California Municipal Utilities Association (CMUA)[3] (collectively, the Joint POUs) appreciate the opportunity to provide these comments on the August 17th technical workshop on scenario concepts for the 2022 Scoping Plan. The members of our organizations each own and operate a publicly owned electric utility (POU) governed by a board of local officials who are directly accountable to their communities. Our members collectively serve nearly 25% of retail electricity load throughout the state.

The primary role of our member utilities is to provide safe and reliable electricity to their local communities – many of which are low-income or disadvantaged – at affordable rates. Beyond their commitment to meet all energy and environmental regulations at the local, state, and federal level, our members are leaders in clean energy and have contributed significantly to California's electricity sector reductions in greenhouse gas (GHG) emissions since the start of the state's GHG emission reduction program. Our members are also diligently planning to achieve the state's ambitious clean energy future.

[1] The Southern California Public Power Authority (SCPPA) is a not-for-profit joint powers agency formed in 1980 to facilitate joint power and transmission projects for its local publicly owned electric utility members. SCPPA consists of eleven municipal utilities and one irrigation district – the cities of Anaheim, Azusa, Banning, Burbank, Cerritos, Colton, Glendale, Los Angeles, Pasadena, Riverside, and Vernon, and the Imperial Irrigation District – who collectively serve nearly five million people throughout Southern California.

[2] The Northern California Power Agency (NCPA) is a nonprofit California joint powers agency established in 1968 to construct and operate renewable and low-emitting generating facilities and assist in meeting the wholesale energy needs of its 16 members: the Cities of Alameda, Biggs, Gridley, Healdsburg, Lodi, Lompoc, Palo Alto, Redding, Roseville, Santa Clara, Shasta Lake, and Ukiah, Plumas-Sierra Rural Electric Cooperative, Port of Oakland, San Francisco Bay Area Rapid Transit (BART), and Truckee Donner Public Utility District—collectively serving nearly 700,000 electric consumers in Central and Northern California.

[3] The California Municipal Utilities Association is a statewide organization of local public agencies in California that provide electricity and water service to California consumers. CMUA membership includes publicly owned electric utilities that operate electric distribution and transmission systems. In total, CMUA members provide approximately 25 percent of the electric load in California.

Two member utilities – the Los Angeles Department of Water & Power[4] and Glendale Water & Power[5] – have commissioned their own feasibility studies on achieving 100% clean electricity in every hour of the year. These studies illustrate the complexity and costs associated with achieving that goal.

The Joint POUs are committed to helping the state achieve its important targets to reduce economywide GHG emissions, as required by Assembly Bill (AB) 32, Senate Bill (SB) 32 and AB 398. The Joint POUs also understand that, at the request of Governor Gavin Newsom, the California Air Resources Board (CARB) will also be evaluating the potential to achieve carbon neutrality earlier than 2045.[6]

Our members have been, and continue to be, the state's partners in reducing emissions in the electricity sector. Our members also assist with the state's decarbonization goals in other sectors, working to build and maintain the energy infrastructure needed to support vehicle and building electrification and developing innovative programs tailored to our specific communities. However, in assessing carbon neutrality options, the Scoping Plan must look critically at what additional reductions are realistically achievable for each sector for a given timeframe. This must consider not only how much each sector has achieved to date, but also the significant effect of wildfire emissions in tilting the carbon neutrality calculation as natural and working lands are a growing carbon source.

The Joint POUs appreciate the importance of studying multiple options in order to identify potential paths and timeframes that could ***feasibly*** support achieving carbon neutrality. It is these "pathways" that will guide subsequent policy decisions impacting our members and the homes and businesses they serve. Given the electricity sector already has and will continue to play a significant role in California's economywide decarbonization scheme (regardless of path or timeframe), it is essential that any GHG reduction scenario that CARB considers feasible for the Scoping Plan does not jeopardize the critically important need for safe, reliable, and affordable electricity.

The Joint POUs offer the comments below for CARB to consider in developing and evaluating GHG Carbon Neutrality modeling scenarios, and to respond to the questions and options for the carbon-free electricity grid that CARB presented at the August 17th workshop. Key points include:

- Accelerating the timeframe or constraining the electricity generation technology options for achieving the state's 100% clean energy policy will likely pose grid reliability challenges and increase costs in many service areas. This could have serious impacts not only for the electricity sector, but also the other sectors seeking to decarbonize through electrification.
- Rapid electrification of other economy sectors simultaneously to support an accelerated carbon neutrality timeframe could exacerbate electricity affordability and reliability concerns in many regions as electricity usage increases and usage patterns change.

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[4] *LA100: The Los Angeles 100% Renewable Energy Study* ("LA100 study"), https://www.nrel.gov/analysis/los-angeles-100-percent-renewable-study.html

[5] *The 100% Clean Energy by 2030 Feasibility Study* ("GWP 100% clean energy study"), https://glendaleca.primegov.com/meeting/attachment/2735.pdf?name=CC_03302021_Exhibit%201_8a

[6] July 9, 2021 letter from Governor Newsom to CARB, https://www.gov.ca.gov/wp-content/uploads/2021/07/CARB-Letter_07.09.2021.pdf

- A feasibility analysis for each carbon neutrality scenario, including a robust assessment of electric system reliability and analysis of affordability impacts, must be completed prior to the CARB Board considering and adopting the Scoping Plan.
- CARB should present the GHG modeling results and feasibility analyses at a public workshop prior to making recommendations in the draft Scoping Plan next spring.

I. Reliable, Affordable Electricity is Essential for All Carbon Neutrality Scenarios

The electricity sector's role in supporting carbon neutrality – and operational impacts from achieving it – must be viewed holistically.

The electricity sector's achievements in reducing GHG emissions provide an important opportunity to assist with emissions reductions in harder-to-decarbonize sectors of the economy. Widespread electrification is a key element of the state's carbon neutrality strategy, but initially this will pose a challenge to many utilities. The important role of the electricity sector is underscored in the August 17th workshop slides, which refer to electrification in scenario options for building decarbonization, fleet electrification, and industry (manufacturing, construction, and agriculture). However, the impacts of these new loads on electricity reliability and affordability have not been addressed.

As additional sectors seek to reduce emissions through electrification, the electricity sector will unequivocally be affected through increased load and challenges to provide a reliable, clean electricity supply in many service territories. The specific impacts will depend on the magnitudes, profiles, location/density and timing of the new loads. Robust modeling based on improved and detailed data sets that account for constraints that could impact reliability and all factors affecting the cost of electricity will be needed to better understand the individual and cumulative impacts of these loads, and their timing, to ensure that load-serving entities, including our members, can plan a resilient and affordable electric power system to serve their customers' electricity needs.

A feasibility analysis, including a robust electric system reliability assessment and an electricity affordability analysis, is needed for each carbon neutrality scenario CARB considers.

To help ensure that the path to carbon neutrality is successful, it is critical to include a holistic analysis of the feasibility and impacts of the proposed scenarios. As the state plans for economywide decarbonization through electrification, we must ensure that electricity remains reliable and affordable for all Californians. Electricity has become increasingly more central to the functions of our daily lives, including fueling vehicles, cooling our homes, running and allowing us to control our appliances, enabling remote education, and powering the businesses and industries that drive our diverse and growing economy. Its importance will only continue to grow. The ability to maintain affordable and reliable electric service as the state pursues an increasingly clean grid and rapid, widespread electrification is a core component in determining the feasibility and potential success of any pathway to carbon neutrality. In addition, further workshops and opportunity for stakeholder input on the definition of carbon neutrality and CARB's proposed accounting methodology are necessary in framing a holistic feasibility analysis.

In the wake of last August's extreme heat events and in light of the projected in-state power shortfall this summer, the importance of electric system reliability cannot be overstated. If homes, schools, businesses, and industry cannot rely on dependable electric service, customers will not adopt electrification as a viable long-term strategy. This summer, due to drought-limited hydroelectric generation, wildfires, and increasingly likely extreme heat events, the state has suspended state and local air quality standards so that emergency generators are ready to bridge a supply gap under emergency grid conditions. Bulk power reliability and contingency planning, especially given the new paradigm of climate-driven extreme weather events, must remain paramount priorities as the state seeks to drive emissions reductions through an increasingly clean electric system and widespread electrification – both of which affect grid operations. An assessment of system reliability must also include a realistic consideration of transmission constraints and the long planning horizons, land-use limitations, political and environmental challenges associated with building new transmission, as not all utilities have transmission access to zero-carbon resources.

Distribution system reliability is another important component of providing reliable power. As more customers start to electrify and add new load, the circuits, distribution lines and substations that are nearing capacity will become stressed and require distribution system upgrades to sustain the increased load. Rapid electrification will accelerate the need for distribution system upgrades on top of transmission upgrades, and the utilities' distribution planning timelines – and the associated costs – must be considered in assessing feasibility.

Furthermore, maintaining affordable electricity rates is key to the success of achieving the state's carbon neutrality goals and ensuring a just and equitable future. The Scoping Plan must account for the economic impacts that the pandemic has had on Californians, as well as the time needed to fully recover from those economic setbacks and losses. Inflated electricity rates will hinder widespread electrification and adversely impact those customers who are already struggling to pay their bills. Higher electricity costs will also raise costs for other essential public services that rely on electricity to operate, including but not limited to the potable water distribution and wastewater systems and telecommunications. Many utility customers are already seeing significant rate increases associated with hardening the existing grid, transmission costs, and wildfire mitigation measures. In assessing affordability, it is necessary to consider future rate increases in the context of the cumulative impacts of electricity rate increases to households and business customers. Moreover, it is imperative that the Scoping Plan recognize and continue to support utilities that aggressively decarbonize their resource mix to mitigate rate impacts to our customers. This continued recognition and support will be an integral part of the transition to an affordable, reliable, and carbon-free grid.

The path the state pursues for carbon neutrality must be balanced with the need to make essential electric service accessible to all Californians. The consequences of decisions that do not sufficiently consider impacts to reliability and affordability can be significant – for example, setting back our emissions reduction progress by discouraging electrification and operating higher-emitting emergency generators under emergency conditions, which can also have significant consequences for public health, and spurring economic and emissions leakage. During the August 17th workshop, CARB staff

noted that the first SB 100 report,[7] jointly developed by the California Energy Commission (CEC), California Public Utilities Commission (CPUC), and CARB and released earlier this year, was the starting point for many scenario options. However, as was raised in a comment at the workshop, the modeling and assumptions relied upon for the SB 100 report may already be out of date and the SB 100 report itself notes that further assessment is needed, especially with regard to reliability.[8]

Therefore, prior to the selection of any scenario for inclusion in the Scoping Plan, potential impacts on electric system reliability and affordability for ratepayers must be considered, as well as any accommodations that may be needed to protect against unintended consequences. The full impacts to POUs, which manage and operate resources necessary to maintain grid reliability, must also be assessed, along with options to mitigate these impacts. These analyses are necessary to minimize the risk of potentially significant repercussions for electricity affordability and reliability and must be an integral part of the scenario selection and evaluation process.

The Joint POUs request that CARB work with the CEC and CPUC, in coordination with the California balancing authorities and utilities, to provide input for and assess the feasibility of all scenarios considered for the Scoping Plan, including modeling impacts due to electrification, assessing electric system reliability and resiliency, and estimating affordability impacts. The Scoping Plan should also leverage the important research and planning efforts of other agencies, such the CEC's current Integrated Energy Policy Report proceeding, in developing and evaluating carbon neutrality scenarios.

CARB should include a step for stakeholder review and feedback on the Scoping Plan modeling results and feasibility analysis for each carbon neutrality scenario prior to developing the draft Scoping Plan

The Scoping Plan is a foundational document for charting the state's path to carbon neutrality, and the scenarios considered and ultimately adopted by the CARB Board will set the course for years to come, even though the specific measures and objectives raised in the Scoping Plan will be implemented through separate rulemakings at CARB and other agencies.

It is therefore critical that all aspects of the Scoping Plan process be transparent and provide stakeholders and the public the opportunity to fully understand and provide input on not just the proposed scenarios, but also the modeling results, feasibility analyses, and recommendations for the Scoping Plan. These steps will help to ensure the potential paths to achieve carbon neutrality are feasible and achievable, the potential consequences of each path are understood, and there is an early opportunity to identify measures needed to mitigate the impacts of those consequences.

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[7] CEC, CPUC, CARB, *Achieving 100 Percent Clean Electricity in California: An Initial Assessment* ("SB 100 report"), https://efiling.energy.ca.gov/EFiling/GetFile.aspx?tn=237167&DocumentContentId=70349. As noted within the report, this analysis is "the first step in an ongoing effort to evaluate and plan for the SB 100 policy" and further analysis is needed to "determine reliability of the portfolios, better capture the impact and value of resources that are either not represented or not well valued in the current modeling framework, […] as well as assess local community impacts." (SB 100 report, p. 17)

[8] While SB 100 specifically required the joint agency report to an evaluation of the potential effects of the law on electric system reliability statewide and locally, the 2021 report acknowledged that "[a]dditional modeling is needed to evaluate whether the projected portfolios meet system reliability requirements," and contemplates conducting a reliability assessment that "will provide the joint agencies a more substantiated assessment of pathways to achieve SB 100 while maintaining reliability." (SB 100 report, p. 133, p. 106)

The Joint POUs request that CARB present the modeling results for the carbon neutrality scenarios, as well as feasibility analyses, at a public workshop *prior* to developing the draft Scoping Plan, so stakeholders can provide input before a particular scenario is recommended. As noted above, the feasibility analyses must address reliability and affordability.

II. Responses to Carbon-Free Electricity Grid Questions

The Joint POUs offer the following responses to the questions on the carbon-free electricity grid that CARB presented at the August 17th workshop:

What year do we have a zero-carbon electricity grid?

> SB 100 established the policy of the state to serve 100% of retail sales with renewable and zero-carbon resources by 2045. SB 100 also tasked the CEC, CARB, and CPUC with evaluating the feasibility of, and various impacts associated with, this policy. The inaugural joint agency SB 100 report, released earlier this year, found that it is technically feasible to achieve the 100% clean electricity policy by 2045, but only through sustained record-breaking rates of construction and potentially *billions of dollars in annual costs*.[9]
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> Furthermore, as noted above, the first SB 100 report did *not* include a system reliability assessment to determine whether the modeled resource portfolios can meet demand in all 8,760 hours of the year. Such an assessment is needed to inform resource portfolio development and to better understand the role of the existing natural gas fleet and energy storage for reliability purposes. Another key component missing from the first SB 100 report is a robust assessment of affordability impacts from the modeled resource portfolios. While the report does model overall system costs, further analysis is needed to understand how these costs could translate to rate increases impacting households and businesses across the state. The SB 100 report notes that the reliability assessment and affordability analysis are important future analyses needed as part of the SB 100 implementation process.[10] These analyses must be completed before moving forward; it is essential that prior to considering accelerating the 100% zero-carbon electricity policy, the state first assess the reliability and affordability impacts of achieving it in 2045.
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> Additionally, accelerating the timeframe to achieve the 100% renewable and zero-carbon electricity policy will likely exacerbate existing reliability challenges as well as significantly impact costs (and thus affordability) in many service territories. Due to the extremely long lead time and challenges associated with new transmission planning, fast-tracking the 100% clean energy policy to 2035 effectively precludes the buildout of new transmission to bring in geographically disparate renewable energy resources to help meet the goal. Allowing for new transmission is especially important for transmission constrained regions. As noted in the SB 100 report, resources dependent

[9] SB 100 report, pp. 10-11.

[10] SB 100 report, pp. 105-106, 125-126.

on new transmission, such as out-of-state wind, require significant time between identification of need and permitting, and can take up to 10 years between initial permitting to completion.[11]

In evaluating study scenarios, the SB 100 report also found that achieving the 100% clean energy policy by 2030, 2035, or 2040 each increased annual resource costs.[12] This is directionally similar to a finding from the Los Angeles Department of Water & Power's LA100 study, which reported that accelerating the target year from 2045 to 2035 increases costs, as the necessary earlier timing for investments both limits the ability to benefit from continued technology cost decreases and also leads to an earlier accumulation of debt.[13] In addition, Glendale Water & Power's (GWP) 100% clean energy study found that the utility could meet 89% of retail load by 2030 with renewable and zero-carbon resources, but at very significant cost.[14] Glendale's transmission import limits and land constraints pose significant barriers to achieving 100% clean energy – the GWP 100% clean energy study noted that including hydrogen technology and new transmission would likely help with the ability to fully meet load, but neither option seemed feasible within a 2030 planning horizon.

Furthermore, reliability challenges and cost impacts are likely to be compounded by the addition of significant amounts of new load due to electrification within other sectors. At a minimum, the state must assess affordability and reliability of 100% zero-carbon electricity in 2045 *before* considering accelerating the 2045 carbon-free electricity timeline.

Any role for biomass combustion to generate electricity? Any role for combustion of renewable natural gas or renewable hydrogen to replace fossil gas for reliability?

The Joint POUs believe that a diverse mix of technology options will be needed for utilities to meet the state's zero-carbon electricity policy while maintaining reliability and mitigating cost impacts,[15] which may be especially challenging for smaller POUs. To mitigate reliability and cost impacts associated with achieving the 100% energy policy, the Joint POUs recommend including contributions from all biofuels and zero-carbon technologies rather than imposing further constraints. Such technologies may include, but are not limited to, green hydrogen and large hydro. Allowing a diverse portfolio of zero-carbon and renewable resources is especially critical given that CARB's own presentation noted that accelerating goals could result in completely driving industries out of California; instead, the Scoping Plan should encourage all available alternative technologies

[11] SB 100 report, p. 131.

[12] SB 100 report, p. 100.

[13] LA100 Executive Summary, p. 31, https://www.nrel.gov/docs/fy21osti/79444-ES.pdf. Note that this scenario assumes the ability to rapidly scale up hydrogen technology.

[14] GWP 100% clean energy study, pp. 29-31.

[15] A key takeaway from the SB 100 report's modeling is that a diverse resource mix lowers overall costs. (SB 100 report, p. 16)

that can be used to replace higher emitting practices.[16] Doing so would support the retention of industries such as glass and steel and also avoid forcing leakage as industries move out of state.[17]

Having local generation resources within the load area serves an important reliability role, especially in transmission-constrained regions like the LA basin. Local generation is needed to balance imported electricity. Furthermore, transmission lines used to import renewable energy over vast geographic areas are vulnerable to extreme climate-driven weather events, wildfires and the threat of wildfires, and other natural disasters such as earthquakes. The availability of local generation is a powerful contingency needed to operate a future electric grid that is both resilient and reliable during infrequent but significant transmission outages.

While resources like local solar coupled with batteries may contribute to local generation resources, there are currently significant limitations. Due to relatively lower power density, solar requires a significant amount of land and/or suitable roof area, which is especially challenging in built-out urban southern California. Batteries may assist with responding to temporary outages or disruptions, but in the event of extended transmission outages, they are limited by both the availability of local generation and the duration of commercially available battery technology. In some cases, local combustion resources will be needed for reliability, but the solar and storage, along with tools like demand response, can limit the amount of time they will be needed.

Technologies like green hydrogen combustion could play an important role as a clean, fast-responding local electricity generation resource. However, that technology is not mature – there is still significant uncertainty around future costs and further technological advancements are needed. In the interim, biofuels and renewable natural gas could help fill the role for low-carbon combustion that can be quickly dispatched when needed. The use of these technologies could provide important system operational and reliability benefits.

Furthermore, the Joint POUs believe the state has *already* signaled that there is a role for combustion of green hydrogen and renewable natural gas to replace fossil gas for reliability. Federal and state agencies are poised to invest considerable resources in research and development (R&D) on the uses of renewable energy, including for power generation. In fact, the use of renewable hydrogen for electric generation and storage was identified by the CEC as one of the priority uses for this resource, as it provides firm dispatchable, decarbonized electric generation.[18] In parallel with this effort, multiple public power utilities are already beginning to make the investments in the necessary equipment to utilize hydrogen for power generation. A transition to the use of renewable hydrogen would allow efficient existing gas-fired power plants to provide a valuable role in system reliability and load shaping to integrate increasing amount of renewable

[16] August 17th CARB workshop presentation, slide 30.

[17] The combined impacts of then importing end-products back to California for end-uses within the state should also be considered.

[18] See Session 1, Presentation - Introduction of EPIC Initiative: The Role of Green Hydrogen in a Decarbonized California; p. 5.

resource through cleaner combustion.[19] In addition to operational and reliability benefits, allowing a range of zero-carbon technology options is likely to lower the costs of achieving 100% clean electricity. As noted above, the SB 100 report estimated that achieving 100% clean electricity by 2045 through RPS-eligible generation technologies, existing large hydro, and existing nuclear could add billions of dollars in total resource costs annually in 2045.[20] Expanding the list of candidate resources to include "generic" zero-carbon firm resources,[21] such as green hydrogen combustion or other renewable fuels, reduces total resource costs in 2045 by approximately $2 billion, based on these resources' modeled cost profiles.[22] Conversely, restricting eligible resources to no-combustion technologies increased the annual total resource by approximately $8 billion in 2045.[23] This is directionally consistent with a finding from the LA100 study that including biofuels as eligible could reduce cumulative costs through 2045 by approximately 21%, while also reducing the risk of relying on less mature technologies.[24]

At a minimum, until the state has completed a rigorous reliability assessment and identified existing or emerging technologies that can feasibly and cost-effectively meet reliability needs *on the specific timeframes being considered*, CARB should *not* limit the technology options that can be used to achieve the 100% clean electricity policy.

Do we accelerate the 2030 RPS target?

As the state has sought to aggressively decarbonize the electricity sector, the paradigm has shifted from a narrow focus on RPS-eligible generation resources to, more appropriately, a broader portfolio of technology-neutral carbon-free options. The RPS is an administratively complex program and compliance is based only on a subset of zero-carbon resources, which our POU members and other utilities have been planning for through their RPS procurement plans and Integrated Resource Plans.

Utilities are currently either working on procuring or in the middle of finalizing negotiations for more resources to meet the 60% by 2030 RPS goal, while ensuring they are making economical purchases for their ratepayers without needing a drastic rate increase. For many of our members, increasing the RPS goals again either by an increase in percentage or to an earlier target year will usurp current negotiations and cause a scramble for resources that may not be built in time or be acquired at a higher market price than necessary. The Joint POUs believe that accelerating the

[19] For additional discussion on the potential role of green hydrogen and state and federal support efforts, refer to comments submitted by NCPA.

[20] These costs increased with earlier timeframes: "Accelerating the SB 100 timeline to achieve the 2045 target by 2030, 2035, or 2040 results in increased total resource costs and required additional capacity in the target year. All scenarios resulted in similar annual resource costs and resource portfolios by 2045." (SB 100 report, p. 17)

[21] The SB 100 report refers to "generic" firm zero-carbon resources that could represent a wide variety of emerging zero-carbon technologies, such as drop-in renewable fuels, as well as existing technologies like biomass or hydrogen fuel cells that are available but not selected by the model due to current cost projections. Refer to SB 100 report, p. 90.

[22] SB 100 report, pp. 12-13.

[23] SB 100 report, p. 13.

[24] LA100 Executive Summary, p. 31

60% RPS target now could add cost pressures for the RPS-eligible subset of zero-carbon resources and increase overall costs without significant benefit to achieving the 100% clean energy policy.

III. Response to Scenario Concept Options for Carbon-Free Electricity Grid

At the August 17th workshop, CARB presented the following scenario concept options:

- Carbon Neutrality by 2035
  - Option A – SB 100 No Combustion Scenario, with total load coverage and no combustion-based generation regardless of fuel.
  - Option B – SB 100 Accelerated Timeline Scenario, using all available technologies.
- Carbon Neutrality by 2045
  - Option C – SB 100 with total load coverage and using all available technologies.
  - Option D – SB 100 Core Scenario, using all available technologies.

The Joint POUs request that CARB clarify the meaning of "all available technologies" as contemplated in Options, B, C, and D.[25] The SB 100 Accelerated Timeline Scenario and SB 100 Core Scenario referenced in Options B and D, respectively, did not include zero-carbon firm resources, such as 100% green hydrogen combustion, that were modeled in other scenarios.[26] The Joint POUs firmly believe the scenarios for achieving a carbon-free electricity grid must be flexible enough to include emerging technologies, such as clean hydrogen, that the state has recognized as sufficiently important to support through R&D.

Assuming that "all available technologies" includes zero-carbon firm resources as modeled in the SB 100 study scenarios, the Joint POUs believe the most feasible of the options presented is Option D (Carbon Neutrality by 2045 with SB 100 Core Scenario, *using all available technologies*), because it is the least likely to exacerbate affordability and reliability issues. Importantly, Option D does not constrain technology options and does not effectively preclude the use of new transmission and emerging technologies by compressing the planning horizon and target date. In addition, the retail sales load coverage, consistent with the SB 100 policy, provides a potentially important reliability contingency. The Joint POUs believe that Option C is the next most feasible option at this time because it shares the same features as Option D except for expanded load coverage. However, further analysis of these scenarios is warranted, especially in consideration of CARB's proposed electrification timelines for other sectors and that some of the modeling from the SB 100 report may already be outdated.

[25] August 17th CARB workshop presentation, slide 16.

[26] Generation technologies included in the SB 100 Core Scenario are: solar PV, solar thermal (existing only), offshore wind, onshore wind, geothermal, bioenergy, fuel cells (using green hydrogen), small hydro (existing only), large hydro (existing only), and nuclear (existing only). The SB 100 Accelerated Timeline Scenario accelerates the SB 100 Core Scenario. The SB 100 study scenarios include generic zero-carbon firm resources. Refer to SB 100 report, p. 8.

However, if “all available technologies” in Options B, C, and D refer only to the candidate resources modeled in the SB 100 Core and Accelerated Timeline scenarios, the Joint POUs believe that a new Option E would be needed to mitigate cost and reliability issues:

- Carbon Neutrality by 2045
    - Option E – SB 100 (retail load coverage) using all available technologies, including firm zero-carbon generation technologies.

The Joint POUs strongly believe that the most feasible and realistic carbon-free electricity scenario would not accelerate the projected carbon neutrality date nor constrain zero-carbon resource eligibility. It does not stand to reason that CARB would preclude from eligibility the emerging generation technologies that the state is seeking to advance through R&D. In addition, constraining the resource mix is likely to increase costs and exclude the clean combustion resources that are needed for reliability.

Furthermore, while the Joint POUs do not recommend Option B (Carbon Neutrality by 2035 with SB 100 Accelerated Timeline Scenario), the Joint POUs urge CARB to include all available technologies – including firm zero-carbon resources – if CARB decides to pursue this scenario.

The Joint POUs believe that Option A – Carbon Neutrality by 2035 with SB 100 No Combustion Scenario, with total load coverage and no combustion-based generation regardless of fuel – is the most likely to create serious reliability and affordability issues because the accelerated timeframe and highly-restrictive technology constraints would limit resource and transmission options and do not allow utilities to benefit from technology cost reductions.

IV. Conclusion

Electricity is an essential service for all Californians. Due to the pivotal role the electricity sector will play in decarbonizing other sectors of the economy, CARB must ensure that any Scoping Plan scenario it adopts does not jeopardize utilities’ ability to provide safe, affordable, and reliable electricity service. Scenarios that would reduce emissions by accelerating the timeline and constraining electricity generation technology or by rapidly electrifying new economy sectors at the same time must be carefully balanced against impacts to affordability and reliability, which can have adverse consequences for the state’s carbon neutrality goals as well as for public health and safety.

The Joint POUs look forward to working with CARB to help preview the modeling results and evaluate feasible and cost-effective scenarios that advance the state’s important climate, environment, and health goals.