



January 7, 2022

California Air Resources Board
2022 Scoping Plan
1001 I St.
Sacramento, CA 95814

RE: ULCSA Comments on the 2022 Scoping Plan Building Decarbonization Workshop

On behalf of the Ultra Low-Carbon Solar Alliance, I welcome the opportunity to submit these comments in response to the California Air Resources Board's December 13, 2021, Scoping Plan Workshop on Building Decarbonization.

The Alliance consists of companies across the solar PV value chain who, through decarbonized grids, technology innovation and energy efficient manufacturing, are producing solar components from polysilicon through finished modules with markedly lower embodied supply chain carbon emissions than modules from other participants in the solar supply chain. Our members believe that expanded market awareness and deployment of ultra low-carbon solar create a virtuous circle in which near term solar supply chain carbon emissions are reduced while sending an important market demand signal to incentivize more sustainable and resilient solar manufacturing. This can help to ensure that the substantial new manufacturing capacity needed to meet global solar goals follows a lower carbon trajectory, which will mean in part expanding solar manufacturing in lower carbon economies.

This diversification of the solar supply chain is critical to ensuring adequate future supply of solar modules, as concerns about sustainability in parts of the current supply chain are contributing to significant supply disruptions in solar. We see this in the Customs and Border Protection's Withhold Release Order on solar modules whose supply chains reach into Xinjiang China, a major solar manufacturing center, and the recently signed Uyghur Forced Labor Protection Act, aimed at broadly preventing imports of products from China that may be produced with forced labor and which specifically cites solar grade polysilicon as a concern. If solar manufacturing continues to grow primarily in China we will see both significant excess carbon emissions (estimated by the Renewable Energy Buyers Alliance at 14-18 gigatonnes by 2040) and increasing supply uncertainty.

We are pleased to see CARB address Building Decarbonization in its upcoming Scoping Plan update, but the Alliance would like to see the Scoping Plan place a larger focus on embodied carbon within building materials. We believe that Scope 3 emissions should be taken into consideration as part of the state's plan to decarbonize its economy. Other agencies, like the California Energy Commission, are already beginning conversations to address embodied carbon in building materials in the next Integrated Energy Policy Report (IEPR). During the

December 13 workshop, we observed that solar was largely omitted from the conversation. Among other applications, solar will play a large role in the overall building decarbonization strategy going forward and faces many of the same embodied carbon supply chain challenges as other building materials. As a newly required component of all new home construction, solar is increasingly becoming a basic construction product. Therefore, the Alliance recommends expanding the scope to include the embodied carbon of solar panels.

The solar supply chain has become heavily concentrated in China, and many of the vital components of that supply chain are made with heavy use of coal-fired electricity¹, such that the resulting solar modules have roughly twice the embodied carbon emissions as modules from more decarbonized elements of the global solar supply chain. Because CO₂ is a long-lived gas in the atmosphere, these manufacturing related carbon emissions needlessly degrade the long-term zero-carbon generating benefits of solar energy. In addition, that concentration in solar manufacturing means that the global supply of solar modules could be readily disrupted through market or political actions. For example, more than 98% of the world's manufacturing capacity for polysilicon wafers, a critical component in the majority of solar panels, is located in China.^{2,3} These supply risks are highlighted by recent actions by the U.S. Customs and Border Protection issuing a Withhold Release Order against a broad range of Chinese produced solar materials and modules, essentially banning them from import into the U.S. over alleged forced labor practices.⁴

There is growing awareness that an important element of creating a more resilient and sustainable solar supply chain is to expand manufacturing across that supply chain in a more distributed fashion, with more manufacturing capacity in relatively decarbonized economies such as our own. The U.S. Congress and the Biden Administration are seeking to incentivize greater solar manufacturing in the U.S., with an emphasis on elements of the supply chain that we currently lack at scale, including silicon ingots, wafers and cells. For example, the Solar Energy Manufacturing for America Act has been introduced in the U.S. Senate and is a policy element that we anticipate proceeding either in the context of the Build back Better Act or tax legislation.⁵ Similar efforts are underway in Europe and India. In addition to these production incentives, we believe market demand signals, such as preferred purchasing of solar modules with lower levels of embodied carbon, can be a powerful incentive to investing in US solar manufacturing. The U.S. already has significant manufacturing capacity at the front end of the solar supply chain, solar grade polysilicon, and at the back end, solar modules (both thin film

¹ <https://www.wsj.com/articles/behind-the-rise-of-u-s-solar-power-a-mountain-of-chinese-coal-11627734770>

² <https://www.bernreuter.com/solar-industry/value-chain/>

³ <https://www.forbes.com/sites/kenrapoza/2021/03/14/how-chinas-solar-industry-is-set-up-to-be-the-new-green-opec/?sh=42c7673c1446>

⁴ <https://www.cbp.gov/newsroom/national-media-release/department-homeland-security-issues-withhold-release-order-silica>

⁵ <https://www.congress.gov/bill/117th-congress/senate-bill/2140?q=%7B%22search%22%3A%5B%22solar+energy+manufacturing+for+america%22%5D%7D&s=1&r=1>

and crystalline silicon) but lacks the critical components in the middle of the supply chain that would make for a far more resilient domestic solar manufacturing sector.

Fortunately, market awareness of sustainability issues in the Chinese solar supply chain is leading buyers to seek more sustainably produced solar modules and that market signal is motivating rapid expansion in solar manufacturing outside of China, including expansion across the entire supply chain here in the U.S.. We are seeing investments that span the supply chain from metallurgical grade silicon (the raw material for polysilicon), solar grade polysilicon, solar cells and finished modules, and see interest in investing by solar ingot/wafer producers seeking to take advantage of currently idled U.S. polysilicon production capacity. We believe that a broad and sustained market demand signal for better solar modules will accelerate that investment and lead to a rapid scale up of solar manufacturing in the U.S. and elsewhere outside of China.

The Global Electronics Council (GEC), stewards of the EPEAT eco-label for sustainable electronics products, is engaged in a broad multi-stakeholder process to include ultra low-carbon solar into its existing EPEAT PV sustainability eco-label to facilitate such preferred purchasing. EPEAT PV currently addresses sustainability topics from energy and water use to topics and forced labor and will soon include rigorous demonstration of embodied carbon in PV modules. Participating stakeholders include solar manufacturers, solar buyers, research institutes, and government representatives from the U.S. Environmental Protection Agency and the Department of Energy National Renewable Energy Laboratory. The GEC anticipates the completion of the eco-label development by mid-2022, and multiple solar panel producers are preparing to seek certification for the use of the label. Such Tier I ecolabels can facilitate better solar procurements by public entities and energy providers to improve sourcing and ESG transparency in solar by their inclusion as value-added criteria or as a specification. The GEC process is drawing on existing the methodologies from existing programs in France and South Korea that favor lower embodied carbon solar in public procurement as well as solar environmental product declarations developed in the European Union.

Given these developments and the leadership role of CARB on climate policy in California, the Alliance strongly encourages that CARB acknowledge and examine the importance of addressing embodied carbon in the solar supply chain in the 2022 Scoping Plan.

We thank you for the consideration of our comments and would be happy to talk with staff and provide more information on this topic.

Sincerely,

Michael Parr
Executive Director
The Ultra Low-Carbon Solar Alliance

