Executive Summary

The 2022 Scoping Plan, once final, will be a major milestone, laying out how the fifth largest economy in the world can get to carbon neutrality by 2045 or earlier. This is the first Scoping Plan that adds carbon neutrality as a science-based guide and touchstone beyond statutorily established emission reduction targets. It identifies a technologically feasible, cost-effective and equity-focused path to achieve carbon neutrality by 2045, or earlier, while also assessing the progress the state is making toward reducing its greenhouse gas (GHG) emissions by at least 40 percent below 1990 levels by 2030, as called for in SB 32 and laid out in the 2017 Scoping Plan.[1] Previous plans focused on specific GHG reduction targets for our industrial, energy, and transportation sectors—to meet 1990 levels by 2020, and then the more aggressive 40 percent below that for the 2030 target. Carbon neutrality takes it one step further by expanding actions to capture and store carbon including through natural and working lands and mechanical technologies, while drastically reducing anthropogenic sources of carbon pollution at the same time.

What this means for California is an ambitious and aggressive approach to squeezing the carbon out of every sector of the economy, setting us on course for a more equitable and sustainable future in the face of the greatest existential threat we face, and ensuring that those who benefit from this transformation include those communities now hardest hit by the ongoing use of fossil fuels. The combustion of these fuels has polluted our air, particularly in low-income communities and communities of color, for far too long, and is the root cause of climate change. This Draft Scoping Plan helps us chart the path to a future where race is no longer a predictor of disproportionate burdens from harmful air pollution and climate impacts.

The major element of this unprecedented transformation is the aggressive reduction of fossil fuels wherever they are currently used in California, building on and accelerating carbon reduction programs that have been in place here for a decade and a half. That means rapidly moving to zero-emission transportation, electrifying the cars, buses, trains, and trucks that now constitute California's single largest source of planet-warming pollution. It also means phasing out the use of fossil gas used for heating our homes and buildings. It means clamping down on chemicals and refrigerants that are thousands of times more powerful at trapping heat than carbon dioxide (CO_2). It means providing our communities with sustainable options for walking, biking, and public transit so that people do not have to rely on a car. It means continuing to build out the solar arrays, wind turbine capacity, and other resources that provide clean, renewable

[1] CARB. 2017. Update to the AB 32 Climate Change Scoping Plan. https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf.

energy to displace fossil-fuel fired electrical generation. It also means scaling up new options such as green hydrogen[2] for hard to electrify end uses and renewable gas where needed.

That's on the carbon reduction side. The other side of the equation is a re-envisioning of our forests, shrublands/chaparral, croplands, wetlands, and other lands—what we call Natural and Working Lands—to ensure that they play as robust a role as possible in incorporating and storing more carbon in the trees, plants, soil, and wetlands that cover 90 percent of the state's 105 million acres. And since the goal is to balance carbon output with carbon sequestration, we will need to research, develop, and deploy additional methods of capturing CO_2 that include pulling it from the smokestacks of facilities, or drawing it out of the atmosphere itself and then safely and permanently storing it.

This is a plan that aims to shatter the carbon status quo and take action to achieve a vision of California with a cleaner, more sustainable environment and thriving economy for our children. When final, this ambitious plan will serve as a model for other partners around the world as they consider how to make their transition. As we have so often in the past, California can serve as the successful laboratory of innovation that has produced not only the fifth largest economy on the planet, but ultimately one of the most energy-efficient economies, with a track record of demonstrating the ability to decouple economic growth from carbon pollution. This plan builds upon current and previous environmental justice efforts to integrate environmental justice directly into the plan to ensure that no community is left behind. Specifically, this plan:

- Identifies a path to keep California on track to meet its SB 32 GHG reduction target of at least 40 percent below 1990 emissions by 2030.
- Identifies a technologically feasible, cost-effective path to achieve carbon neutrality by 2045 or earlier.
- Focuses on strategies for reducing California's dependency on petroleum to provide consumers with clean energy options that address climate change, improve air quality, and support economic growth and clean sector jobs.
- Integrates equity and protecting California's most impacted communities as a driving principle throughout the document.
- Incorporates the contribution of natural and working lands to the state's GHG emissions, as well as its role in achieving carbon neutrality.
- Relies on the most up to date science, including the need to deploy all viable tools to address the existential threat that climate change presents, including carbon capture and sequestration as well a direct air capture.

[2] For the purposes of the Draft 2022 Scoping Plan, "green hydrogen" is not limited to only electrolytic hydrogen produced from renewables.

- Evaluates multiple options for achieving our GHG and carbon neutrality targets, as well as the public health benefits and economic impacts associated with each.

The path forward is informed by robust science. The recent *Sixth Assessment Report* (AR6) of the Intergovernmental Panel on Climate Change (IPCC) summarizes the latest scientific consensus on climate change. It finds that atmospheric concentrations of CO_2 have increased by 50 percent since the industrial revolution and continue to increase at a rate of two parts per million each year.[3] By the 2030s, and no later than 2040, the world will exceed 1.5°C warming. While every tenth of a degree matters—every incremental increase in warming brings additional negative impacts—climate-related risks to human health, livelihoods, and biodiversity are projected to increase further under 2°C warming, compared to 1.5°C.[4] In order to remain below 1.5°C with limited or no overshoot of that threshold, global net anthropogenic CO_2 emissions need to reach net zero by 2050.

It has been 16 years since the Global Warming Solutions Act of 2006 was passed and signed into law. In 2017, the second update to the AB 32 Climate Change Scoping Plan[5] (2017 Scoping Plan update) laid out a cost-effective and technologically feasible path to achieve the 2030 GHG reduction target. At the time, many characterized the plan and the AB 32 target as unachievable, citing that it would lead to massive business and job loss, and excessive costs. Those predictions proved to be incorrect as California achieved its AB 32 target four years ahead of schedule all the while growing our economy with the state distinguishing itself as a hub for green technology investment. This Draft 2022 Scoping Plan draws on a decade and a half of proven successes and additional new approaches to provide a balanced and aggressive course of effective actions to achieve carbon neutrality in 2045, if not before, in addition to the 2030 goal.

California's economy is projected to grow vigorously in the coming years and decades. In 2045, under a Reference Scenario, the gross state product would be $5.1 trillion, nearly $2 trillion more than in 2021, and allow growth adding hundreds of thousands of jobs. Under the California Air Resources Board (CARB) staff Proposed Scenario, impacts to this growth would be negligible in both 2035 and 2045, while delivering massive benefits in the form of reduced hospitalizations, asthma cases, and lost work and school days due to cleaner air supported by this plan. This

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[3] IPCC. 2021. *Climate Change 2021: The Physical Science Basis.* Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. In Press. https://www.ipcc.ch/report/ar6/wg1/.

[4] IPCC. 2018. *Global Warming of 1.5°C.* World Meteorological Organization. Geneva, Switzerland. 32 pp. https://www.ipcc.ch/sr15/.

[5] CARB. 2017. *California's 2017 Climate Change Scoping Plan.* https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf.

should come as no surprise given the tremendous growth of California's economy since the Great Recession, even as the state has taken drastic measures to lower emissions. As noted, the savings associated with ambitious climate action are extensive, both in terms of avoided climate impacts and health costs. As described in Chapter 1, the health costs of climate and air pollution in the U.S. are well over $800 billion today and will continue to grow in the coming years[6] without robust action. Similarly, the costs of delayed or insufficient climate action could cost the U.S. upwards of $14.5 trillion over the next 50 years.[7] We can either take action now or pay the cost of inaction, both now and later.

We cannot take on this unprecedented challenge alone. Collaboration with the federal government, other U.S. states, and other jurisdictions around the world, will continue to be fundamental for California to succeed in achieving its climate targets, especially as the pace of our efforts increase in the coming years. We believe this collaboration and coordination also creates a race to the top, encouraging and enabling other jurisdictions to also achieve climate and air quality goals, and often providing lessons for national action.

One example of fruitful collaboration is California's longstanding vehicle emissions standards programs, which have repeatedly been freely adopted by other states consistent with the federal Clean Air Act. California's programs frequently pioneer more rigorous standards or new technologies—including the now-standard catalytic converter—and continue to lead the way. From initial standards for cars and trucks decades ago to the world-leading Advanced Clean Trucks program currently helping to electrify heavy-duty vehicles, this partnership continues to offer regulatory options and spread innovative technologies. A major example of future work is the proposed Advanced Clean Cars 2 program, which lays out California's legally binding path to achieving 100 percent ZEV sales in 2035[8]. CARB continues to work closely with many other states that also see zero emission vehicles as critical to their climate and public health goals and expects many states to choose to adopt this regulation as well. This partnership with other states also creates market certainty for automakers, which in turn helps ensure California consumers have access to a variety of ZEVs at multiple price points.

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[6] Alwis, D. D., and V. S. Limaye. No date. *The Costs of Inaction: The Economic Burden of Fossil Fuels and Climate Change on Health in the United States.* NRDC, The Medical Society Consortium on Climate and Health, and WHPCA. https://www.nrdc.org/sites/default/files/costs-inaction-burden-health-report.pdf.

[7] Deloitte. 2022. *The Turning Point: A New Economic Climate in the United States.* https://www2.deloitte.com/content/dam/Deloitte/us/Documents/about-deloitte/us-the-turning-point-a-new-economic-climate-in-the-united-states-january-2022.pdf?id=us:2el:3dp:wsjspon:awa:WSJSBJ:2021:WSJFY22.

[8] Executive Order N-79-20. *https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf*