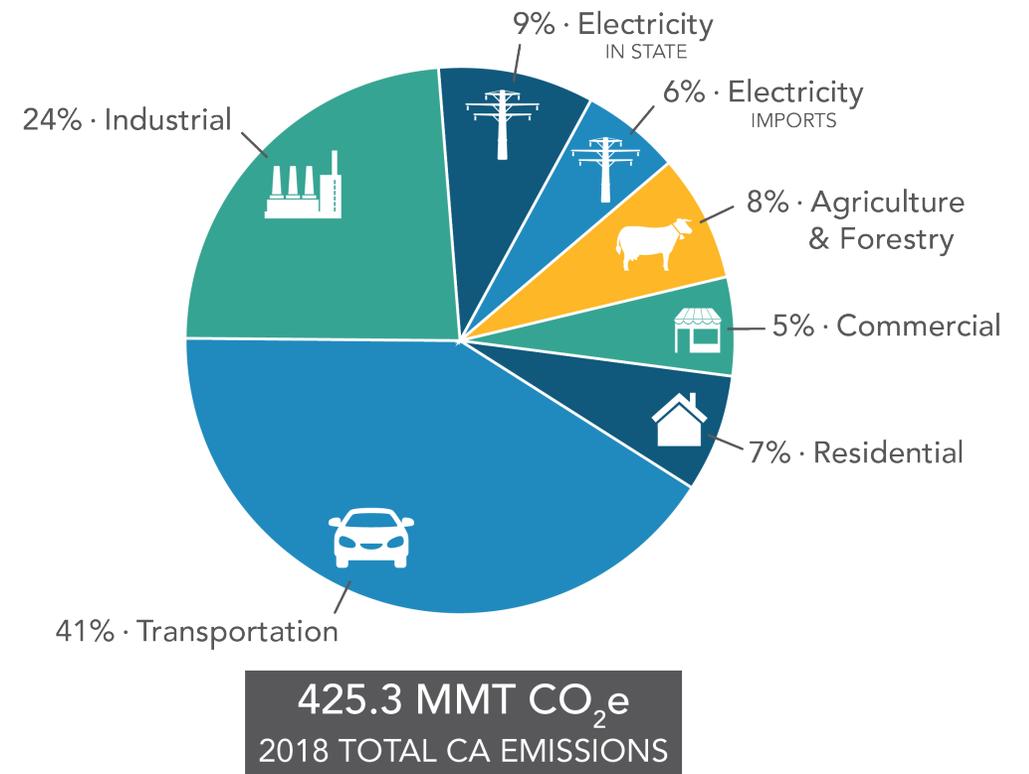
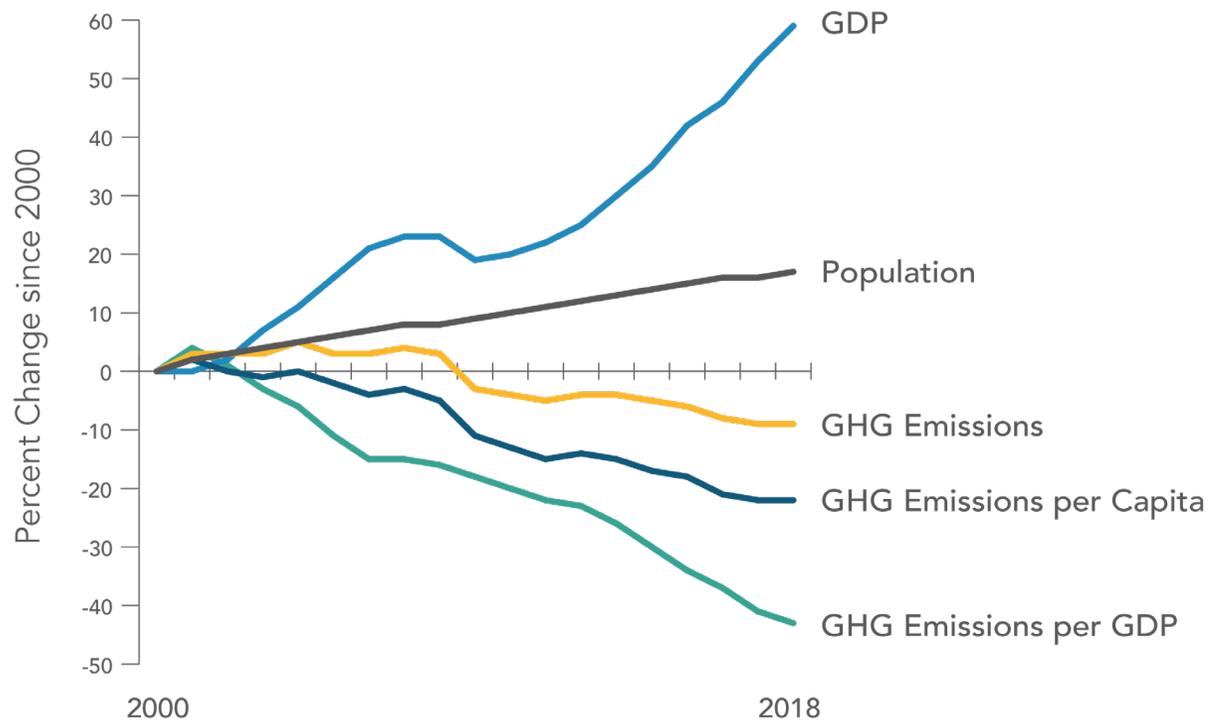


CALIFORNIA'S GREENHOUSE GAS GOALS AND DEEP DECARBONIZATION

NOVEMBER 19, 2020



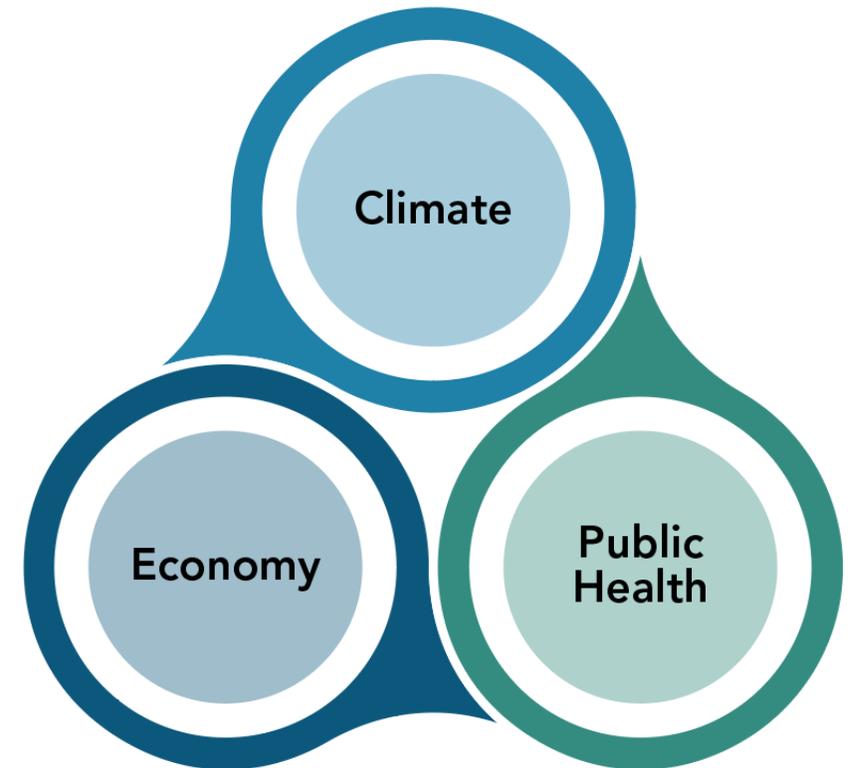
California's Trends



Source: 2020 Edition, California Greenhouse Gas Emission Inventory: 2000-2018

Imperative to Act Now

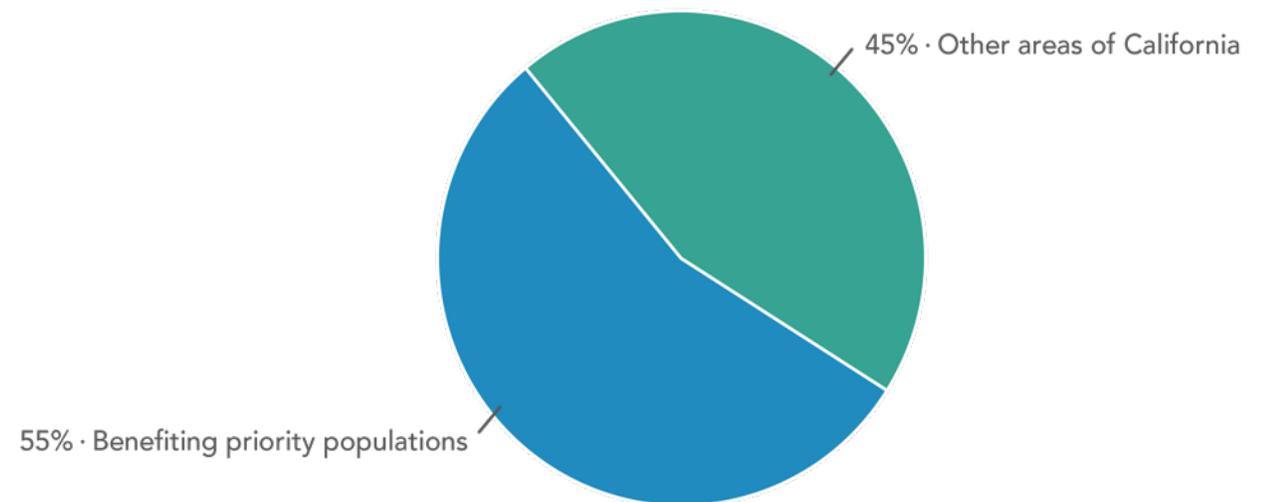
- Climate change is happening and impacting public health and the economy:
 - Disproportionate burdens experienced by frontline communities
 - Increased susceptibility to respiratory illnesses such as COVID-19 due to poor air quality
 - Record-setting wildfires that directly endanger human health and property
 - Extended droughts that damage California's billion \$ agricultural industry



Climate Mitigation and Equity

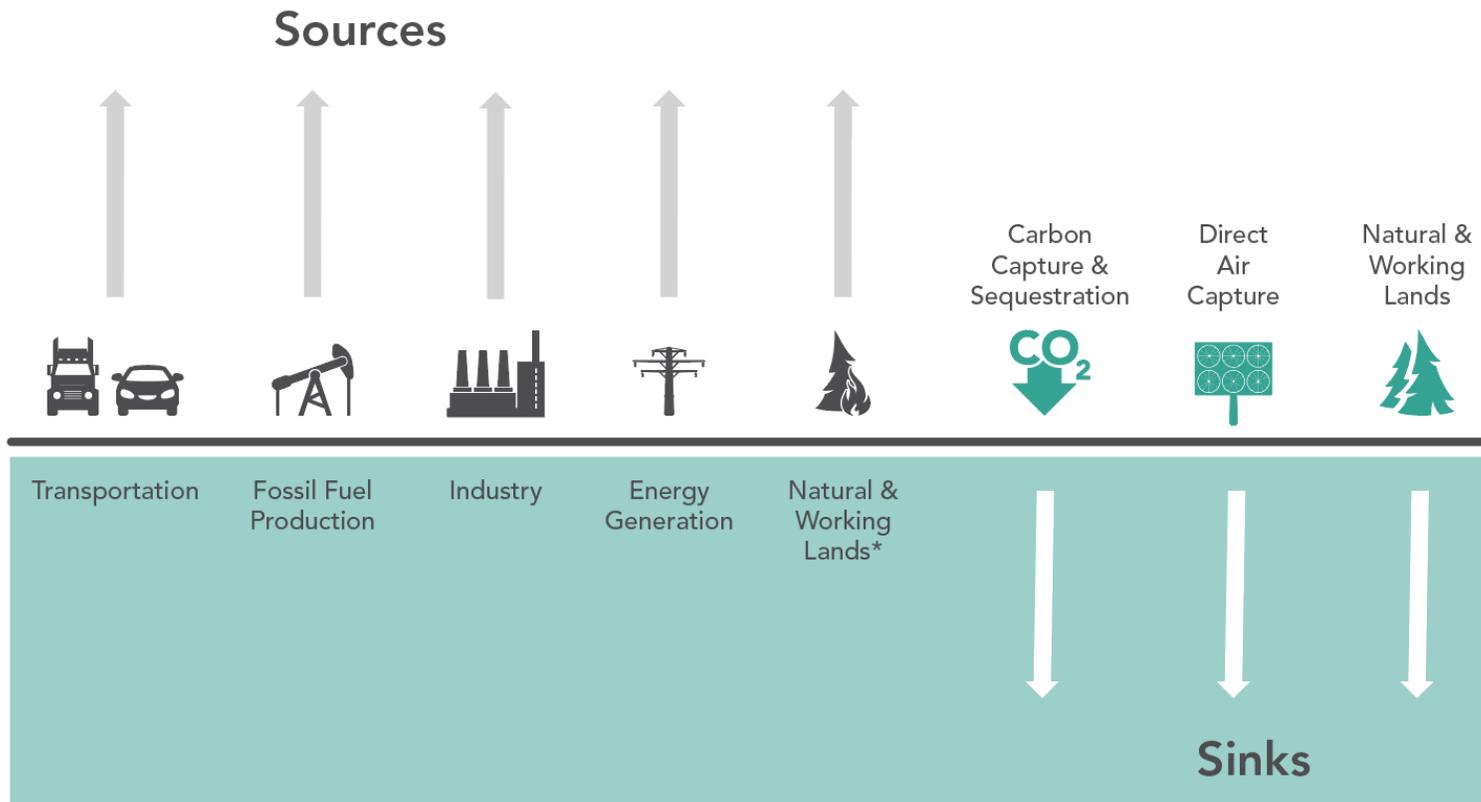
- Actions must protect public health and address opportunity gaps
- Heavily burdened communities must be prioritized to benefit from climate action
- Moving away from combustion of fossil fuels will bring critical air quality and health benefits
- Must ensure an inclusive, just workforce transition that leaves no one behind
- Carbon pricing funds must be reinvested to benefit burdened communities

California Climate Investments Cumulative Benefits to Priority Populations



Science-based Target: Achieve Carbon Neutrality (CO₂e) Mid-Century

Sources equal Sinks



*Natural and working land emissions come from wildfires, disease, land and ag management practices, and others

- Prioritize minimizing emissions from sources
- Maximize sinks
- ZEV Executive Order
 - 100% sales of zero emission LDV by 2035
 - 100% zero emission MDV and HDV by 2045

Illustration: Path for Deep Decarbonization

A scenario with widespread efficiency and electrification paired with zero-carbon electricity, as well as zero-carbon fuels for hard-to-decarbonize sectors

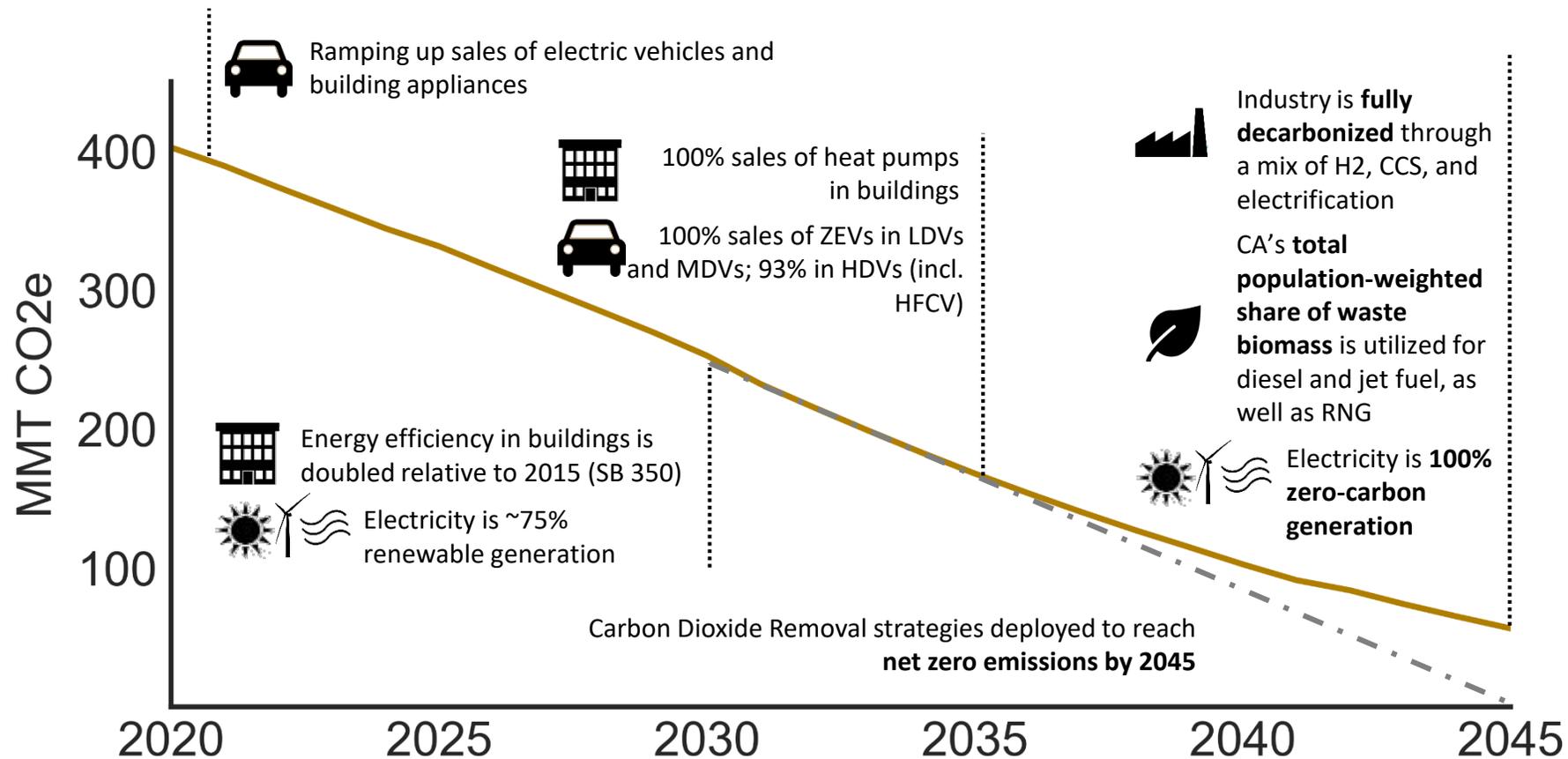
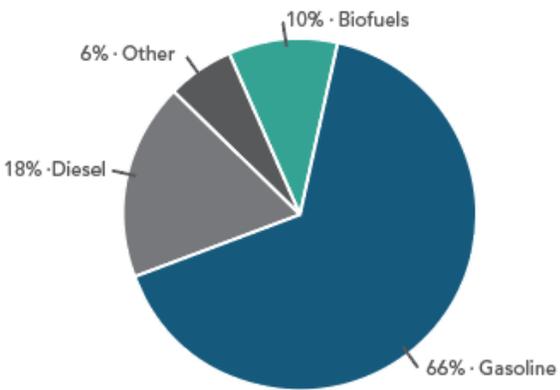
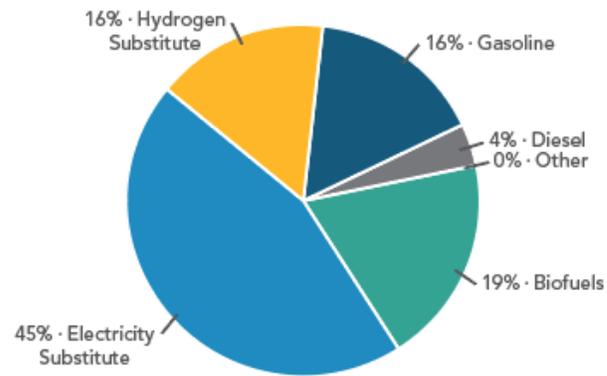


Illustration: Transition of Transportation Sector

Liquid Fuels, 2018



Liquid Fuels & Substitutes, 2045



*Percentage of fuel supplied, by volume

Percent of New Vehicle Sales that are ZEVs

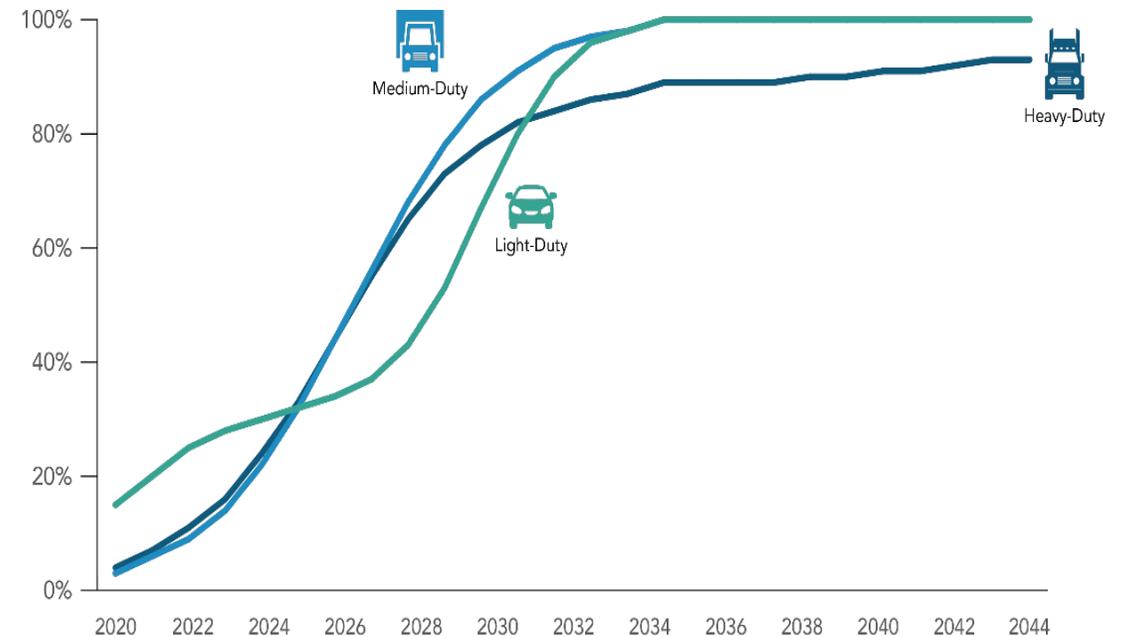
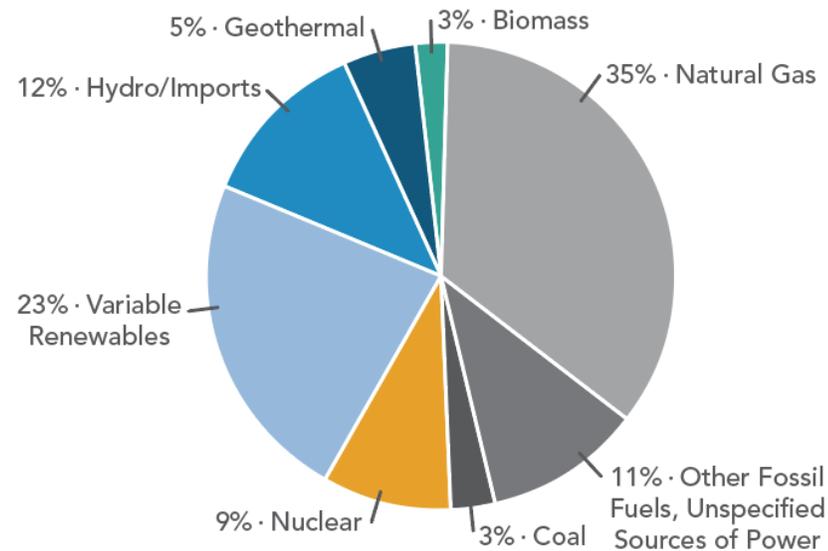


Illustration: Transition of Electricity Sector

- Today, ~35% of electricity generation from fossil natural gas
- Pursue rapid transition to renewable wind and solar, innovative storage technologies and zero-carbon fuels

Electric Generation, 2018



Electric Generation, 2045

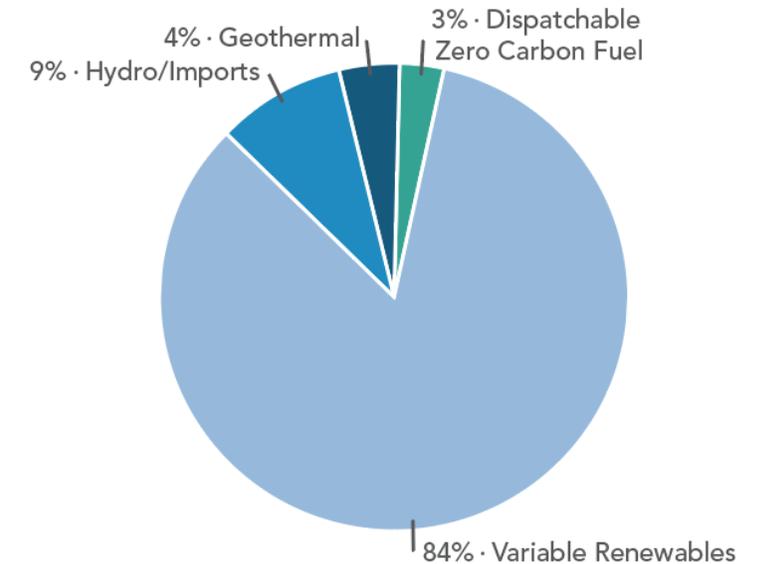
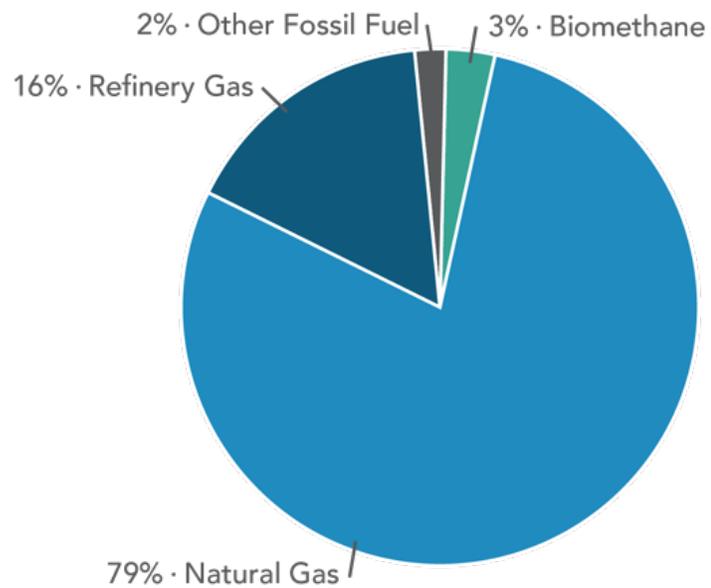
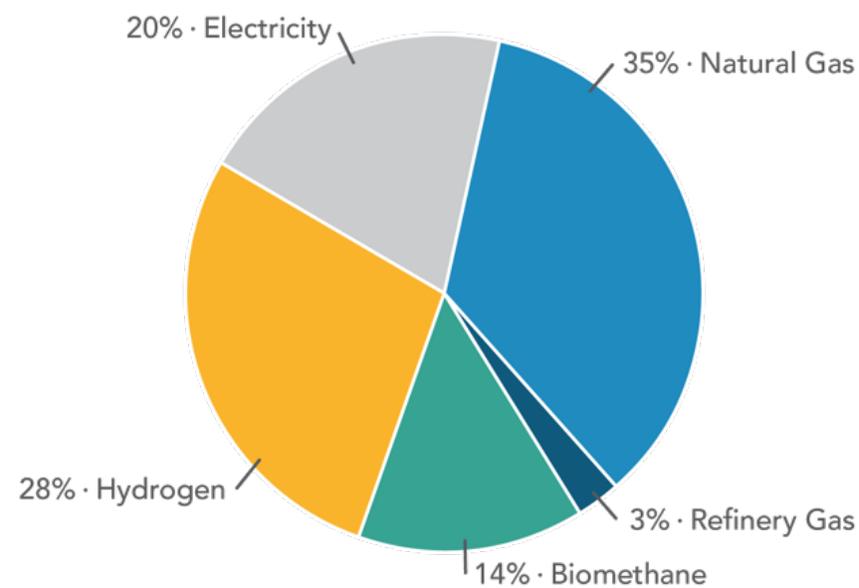


Illustration: Transition from Fossil Gas

Gaseous Fuels, 2018



Gaseous Fuels & Substitutes, 2045



Percentage of fuel supplied, by volume

Illustration: Transition of Building Sector

- Today, about half of building energy demand is supplied by natural gas
- Electrify end-uses that currently rely on natural gas

Percent of appliance sales that are electric

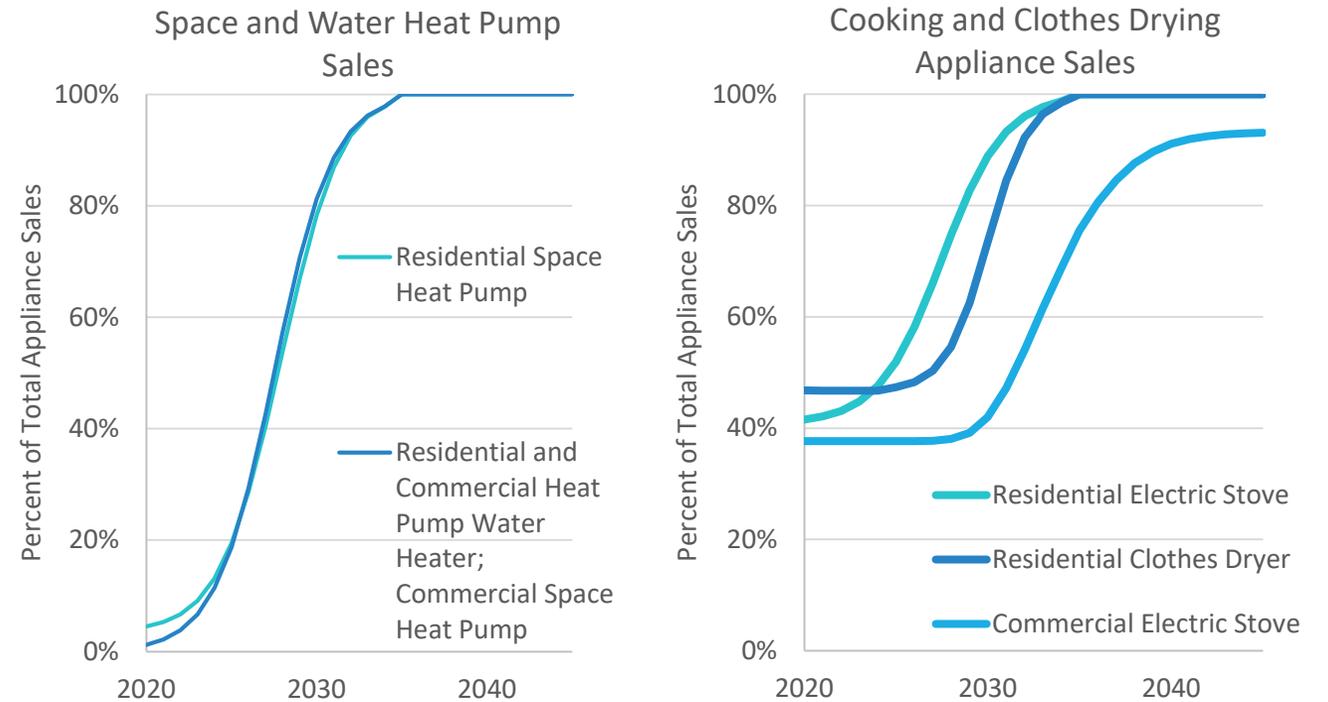
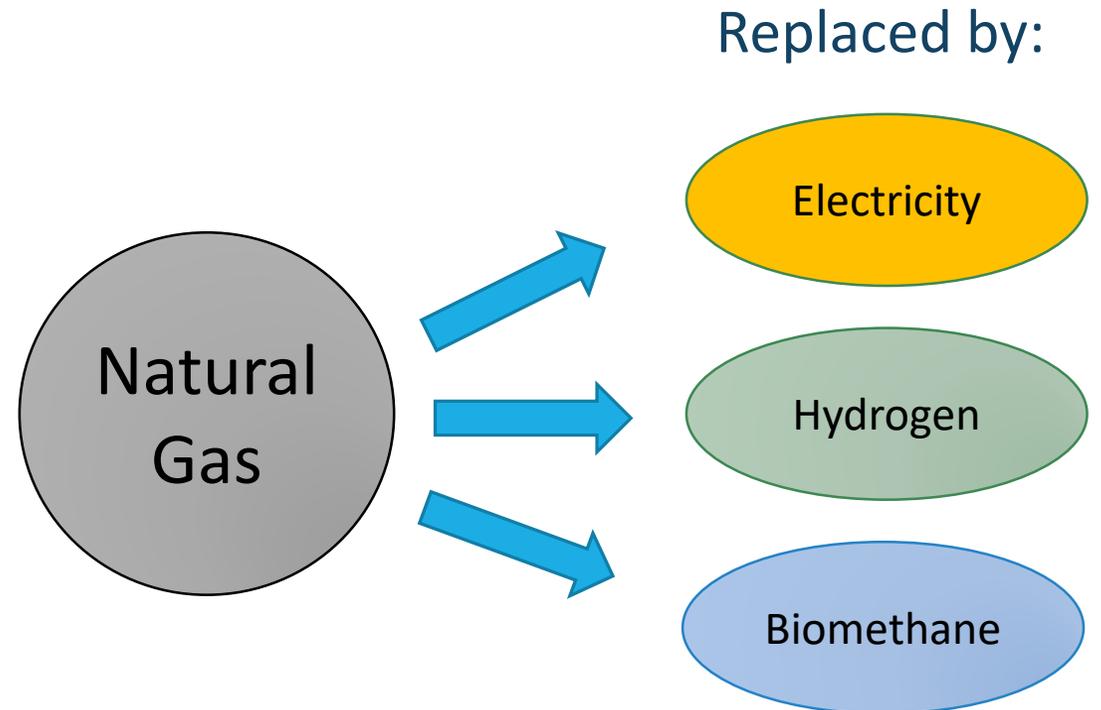


Illustration: Transition of Industrial Sector

- Today, about 64% of industrial energy demand is supplied by natural gas
- Transition to electric equipment where feasible
- Replace natural gas with hydrogen and biomethane where electrification is not possible

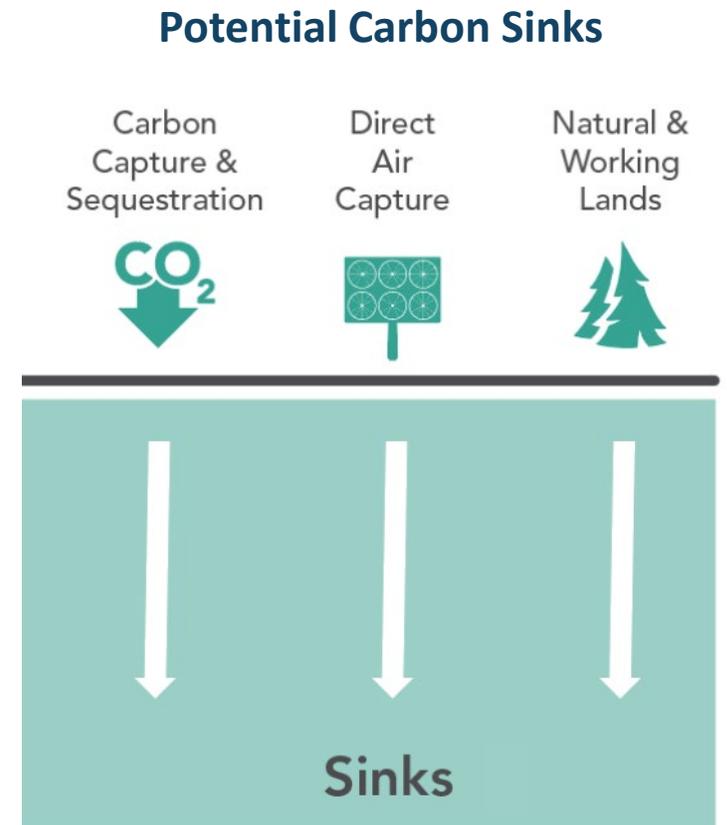


Non-Combustion Greenhouse Gases

- Includes hydrofluorocarbons (HFC), methane, and smaller categories
- Some emissions will remain even if combustion of fossil fuels is eliminated, although emissions can be reduced through implementation of CARB's Short-Lived Climate Pollutant Strategy
 - For example, HFCs are California's fastest-growing source of GHG emissions and will persist with decarbonization strategies that involve electrification
- Upcoming regulatory item to evaluate use of HFCs in stationary refrigeration and air conditioning
- Carbon Dioxide Removal (CDR) strategies are needed to account for remaining emissions

Removing CO₂ from the Atmosphere

- Utilizing our carbon sinks is critical:
 - Natural and Working Lands, both a source and sink
 - Carbon Capture and Sequestration
 - Direct Air Capture
- Recent Executive Order (N-82-20) directs CARB to set a target in the next Scoping Plan for the natural and working lands to support overall carbon neutrality



Carbon Neutrality Insights

Complementary policies and actions support air quality and GHG reduction goals

Existing technology/strategies can get us to carbon neutrality by 2045

Even if we have no fossil fuel combustion, some emissions remain (HFCs)

The next 10 years are critical to achieve carbon neutrality mid-century

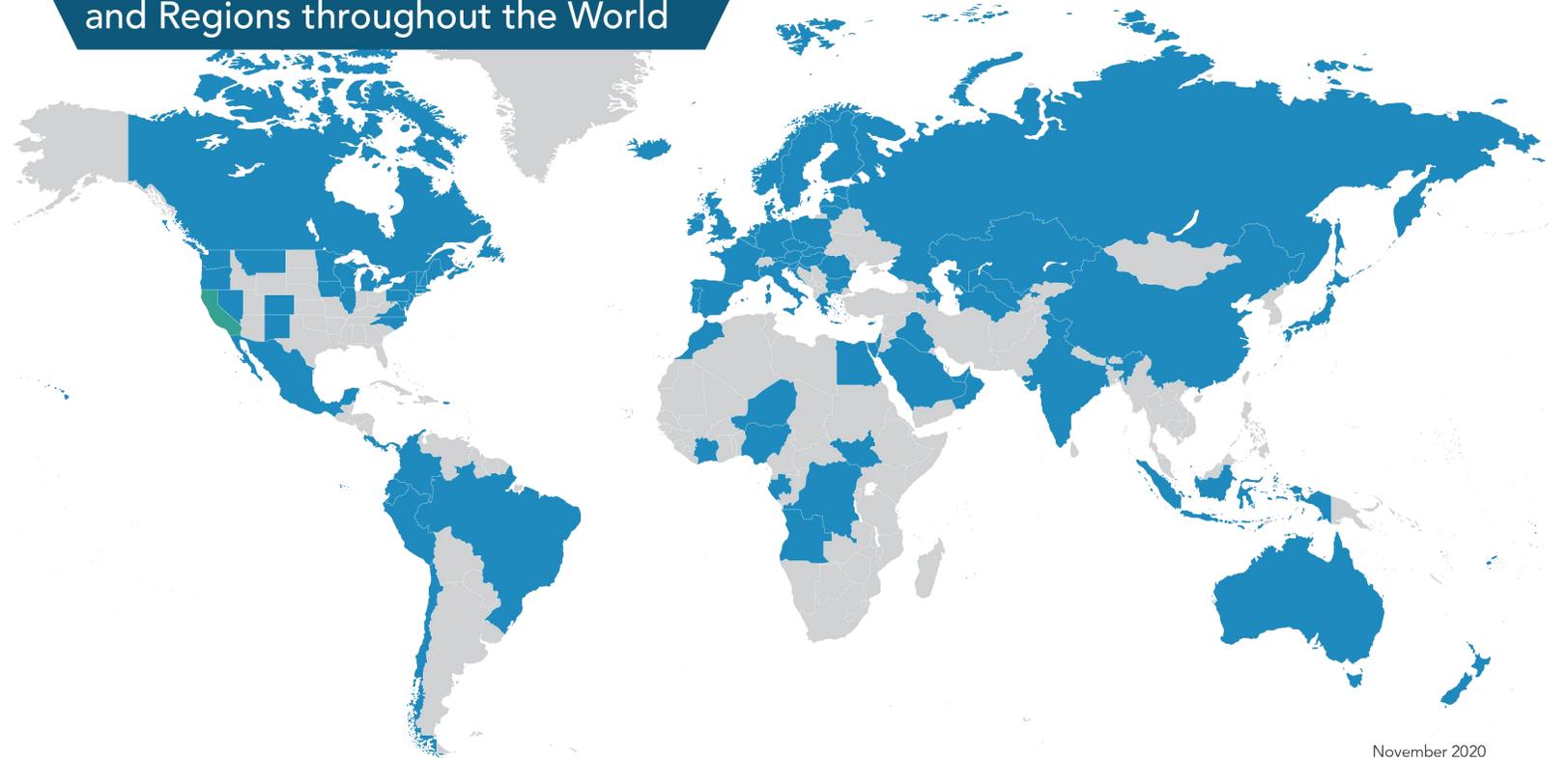
Clear long-term policy and market signals accelerate investment in the actions needed for deep decarbonization

We must work with like-minded partners on this global issue

National and International Collaboration

- California's biggest impact is exportable programs
- Mandate to collaborate at local, subnational, and international levels (AB 32)
- California looks forward to working with the Biden Administration - share experiences and support federal climate policy

California Agreements with States and Regions throughout the World



November 2020

Immediate Least Regret Actions



100% light-duty ZEV sales by 2035



100% zero-emissions medium and heavy-duty vehicle sales by 2045



100% electric appliance sales by 2035



End subsidies for growth in fossil fuel infrastructure for commercial and residential buildings



Accelerate zero-carbon electricity goals in SB 100



Streamline deployment of carbon capture and sequestration and direct air capture



Identify non-combustion use for biomass and diverted waste



Accelerate actions to make forests more resilient and less prone to catastrophic wildfire

Benefits of Reducing and Replacing Fossil Fuels

- Propel new innovations and industries here in California
 - Several oil majors converting their California refineries to produce renewable diesel and alternative jet fuel
- Create new economic and job opportunities for people and businesses through just transition of workforce
- Improve public health, particularly for communities burdened by air pollution
- Save money by avoiding future climate damages



Ongoing Multi-Agency Efforts

CARB interagency collaborations

- AB 74 - Transportation Carbon Neutrality
 - Studies will evaluate how to reduce demand for fossil fuels in the sector and how to manage the subsequent decline for supply
- SB 100 - Zero Carbon Electricity Retail Sales by 2045
- SB 1440 – Consideration of annual biomethane procurement targets for each gas corporation
- EO N-82-20 - NWL Climate Smart Strategy

Program Alignment Can Happen Now

California local and state agencies can start to align policies and regulations with least regret policies and climate Executive Orders

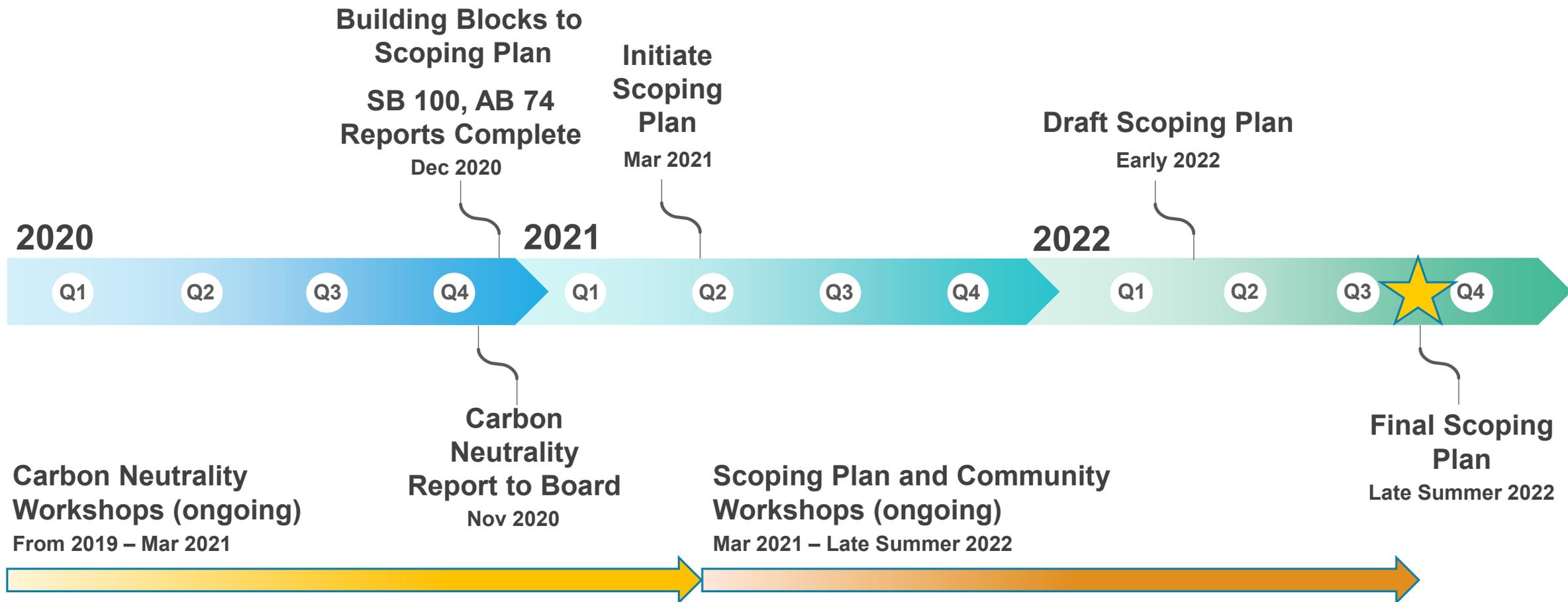
- Since 2017 Scoping Plan Update
 - 2018 IPCC Special Report 1.5°
 - Increased evidence that climate change is happening
 - Multiple national, state, and international studies about achieving carbon neutrality
 - Updated targets by governments to set path to achieve carbon neutrality

Additional Analyses in Scoping Plan

- Cost per ton of measures (AB 197)
- Social cost of carbon (AB 197)
- Estimated air quality benefits (AB 197)
- Public health
- Environmental (CEQA)
- Economic (macro, household, jobs)



2022 Scoping Plan Update Schedule



THANK YOU

