Ekotransport 2030

26 April 2017, Stockholm, SWEDEN

California's policies for low-carbon vehicles and the transition to mainstream electrification

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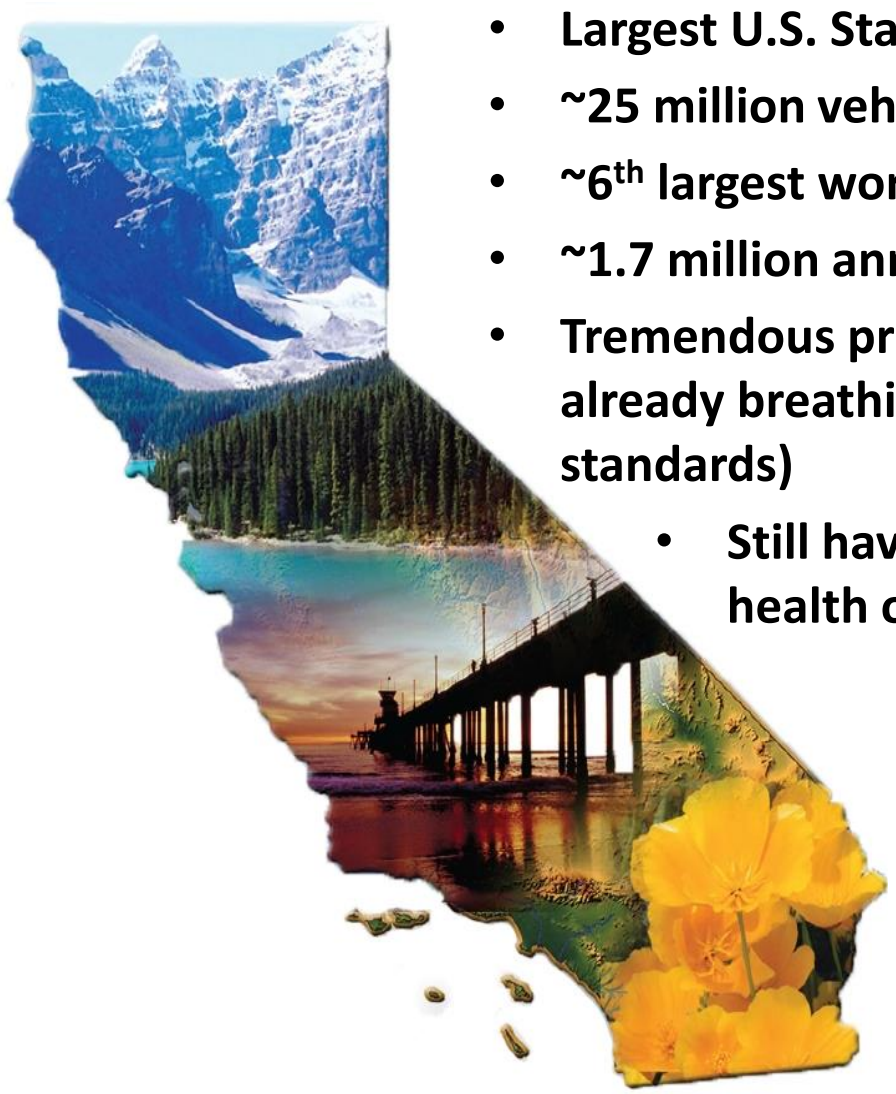
CALIFORNIA AIR RESOURCES BOARD

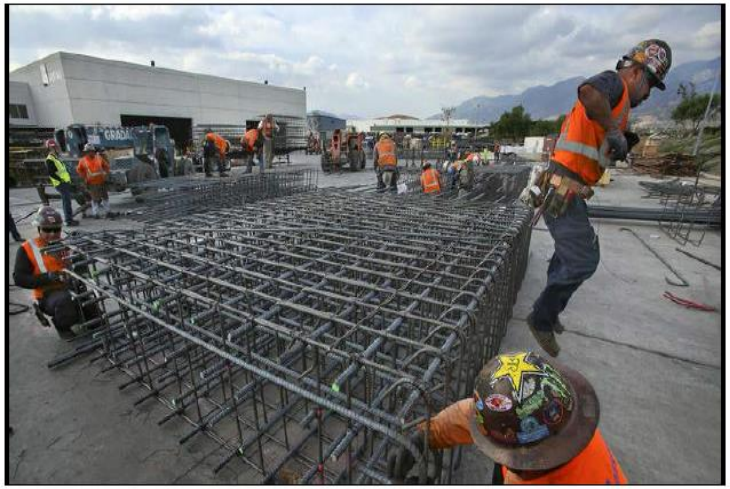
CALIFORNIA - the "*nation-state*" and its unique authority over pollution control



- Largest U.S. State - ~39 million Californians
- ~25 million vehicles, ~1.3 million diesel engines
- ~6th largest world economy
- ~1.7 million annual new car sales
- Tremendous progress on clean air (20 million Californians already breathing air that meets ambient air quality standards)
  - Still have most polluted air in U.S., impacting health of 16 millions Californians
    - Transport sector is largest source of air pollution and GHG emissions
    - U.S. clean air law gives California ability to set own vehicle and engine emission standards
    - Other states can follow California

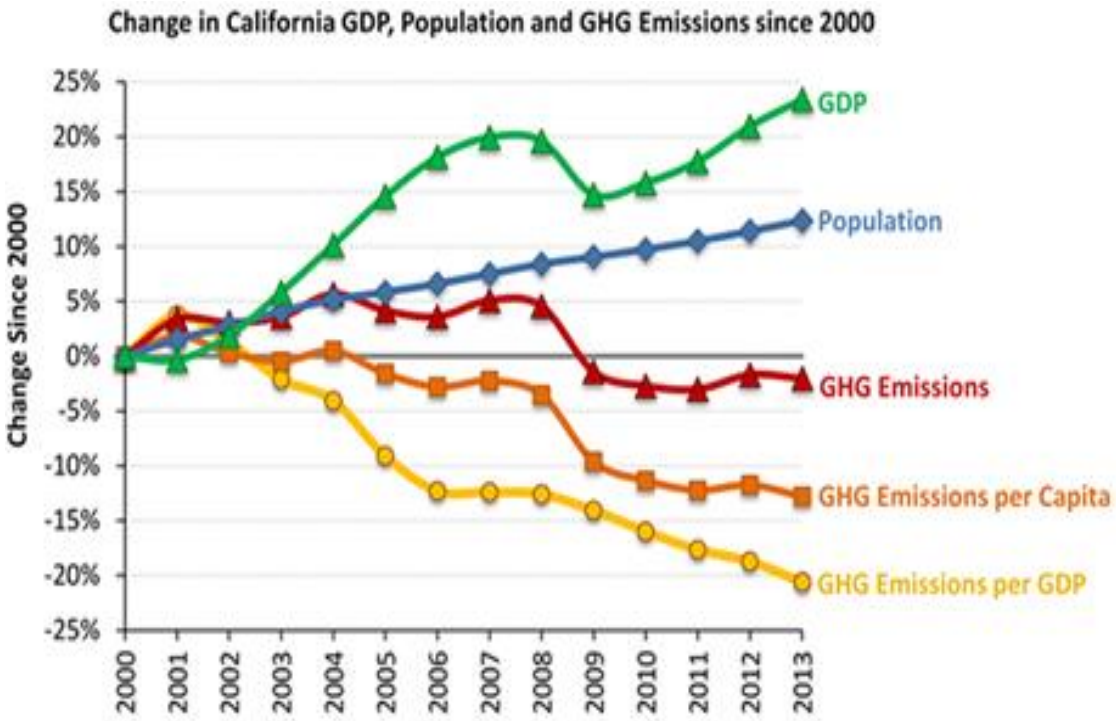
Progress on environmental protection and the economy

California economy is projected to grow faster than U.S. through 2020



Iron workers fabricate rebar walls at Gerdau's San Bernardino Reinforcing Steel Plant as part of the New Wilshire Grand Project, under construction in downtown Los Angeles. The construction industry has grown jobs at one of the fastest rates in California over the last year.

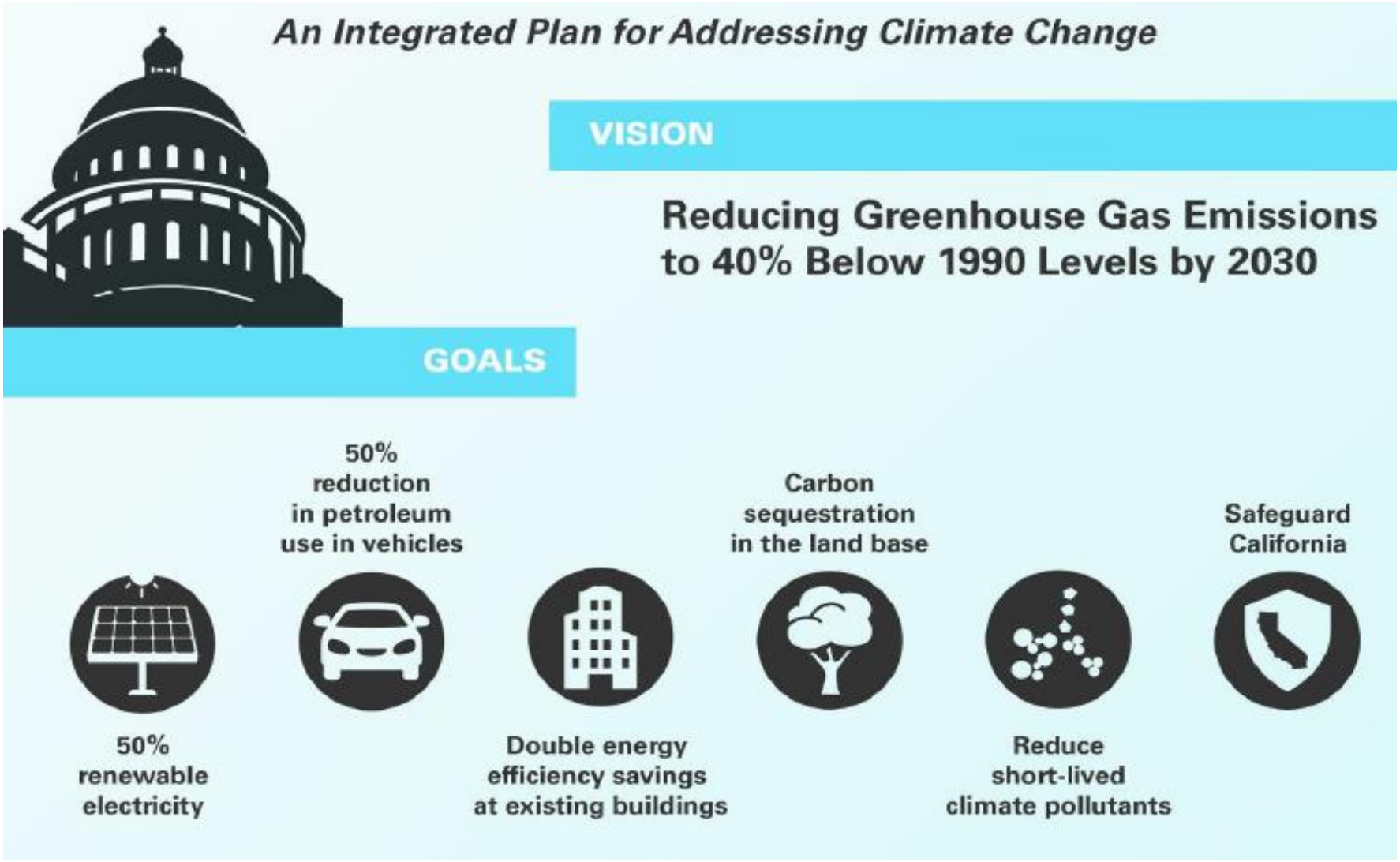
(Mel Melcon / Los Angeles Times)



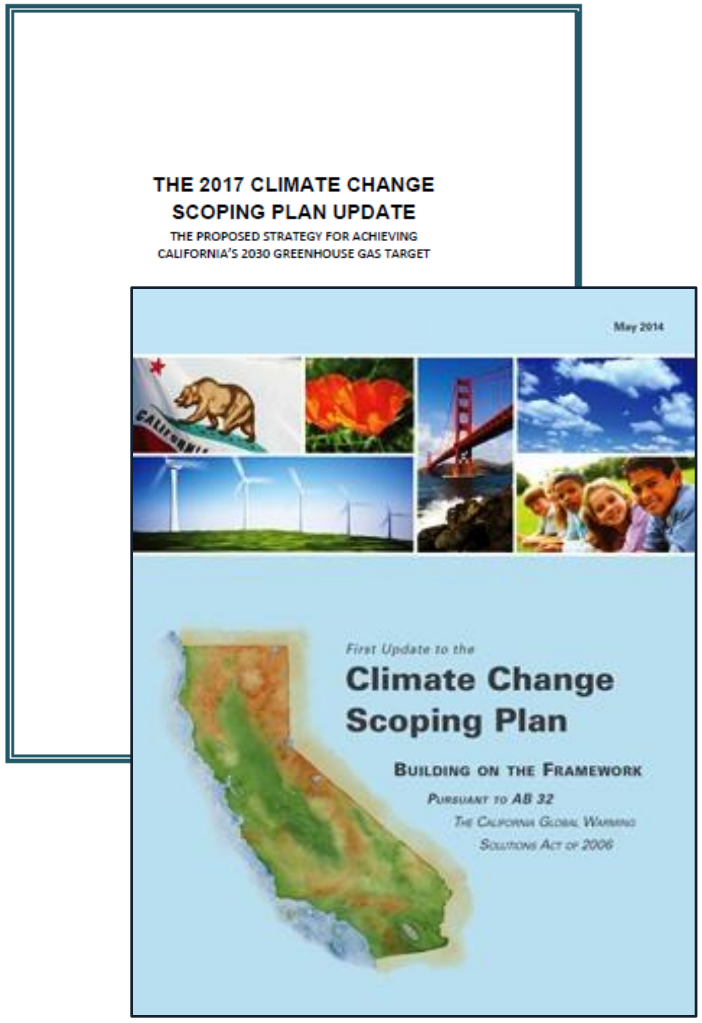
The policy drivers for action

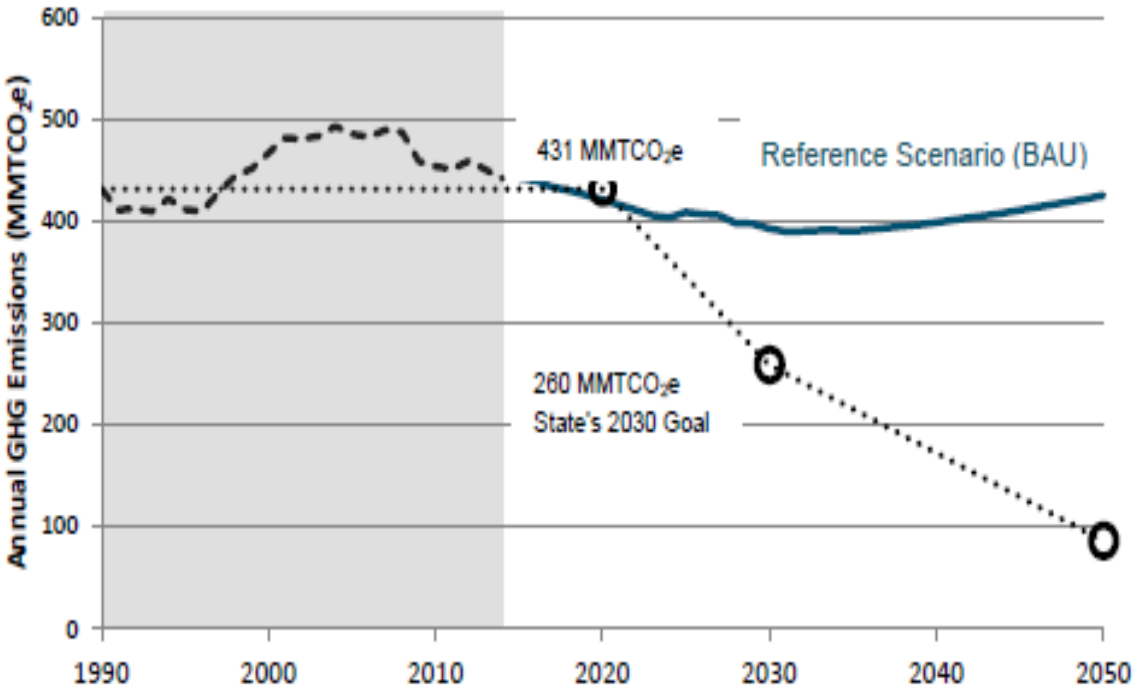
The need for air and climate pollution emission reductions

40 by 30 Legislative Climate Target



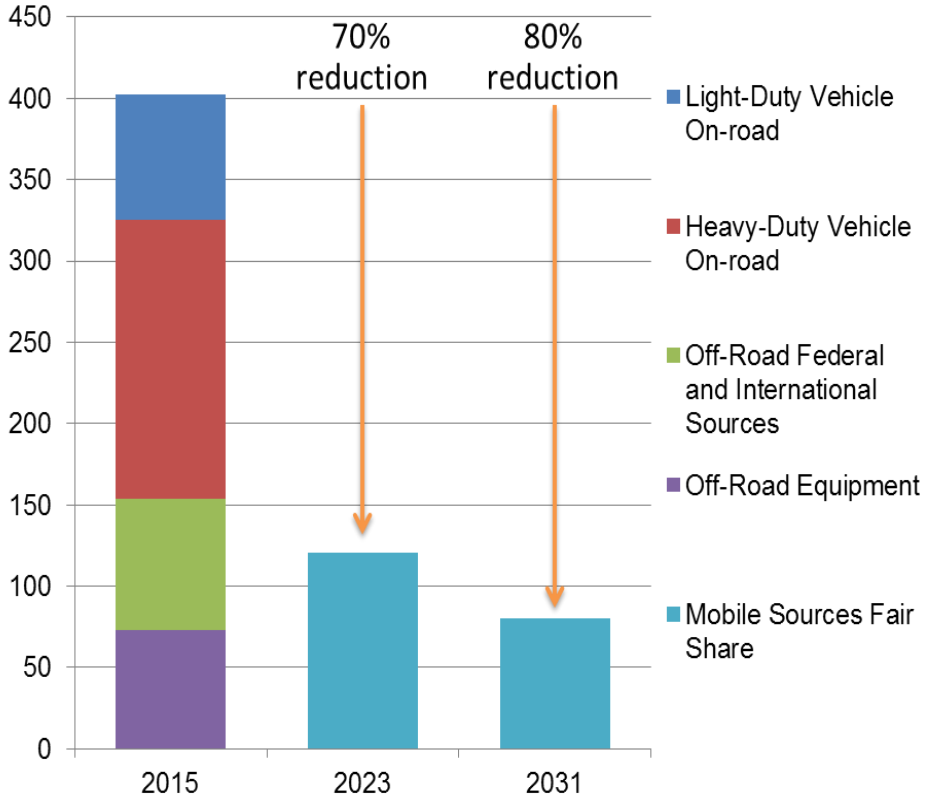
Scoping Plan – A blueprint for the 2050 target





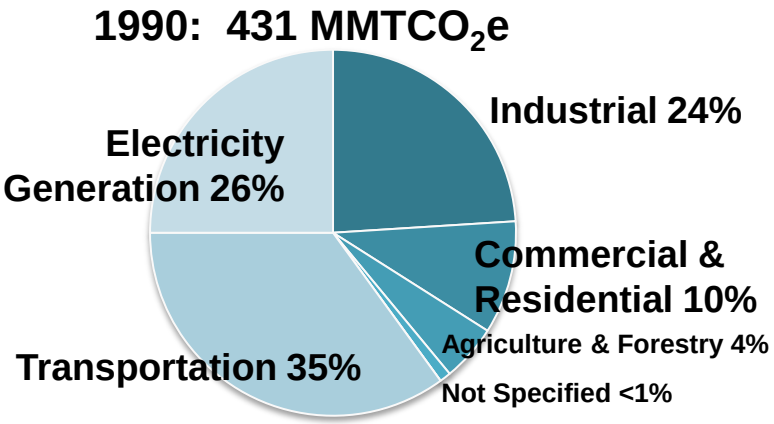
Air and climate pollution reductions from transport are necessary to meet goals

NOx emissions



Mobile Source Emissions
South Coast Air Basin (tons per day)

GHG emissions



Our approach

A balance of supply-side investments and demand-side regulatory polices

DEMAND-SIDE

SUPPLY-SIDE

California LEV Standards and the One National Program

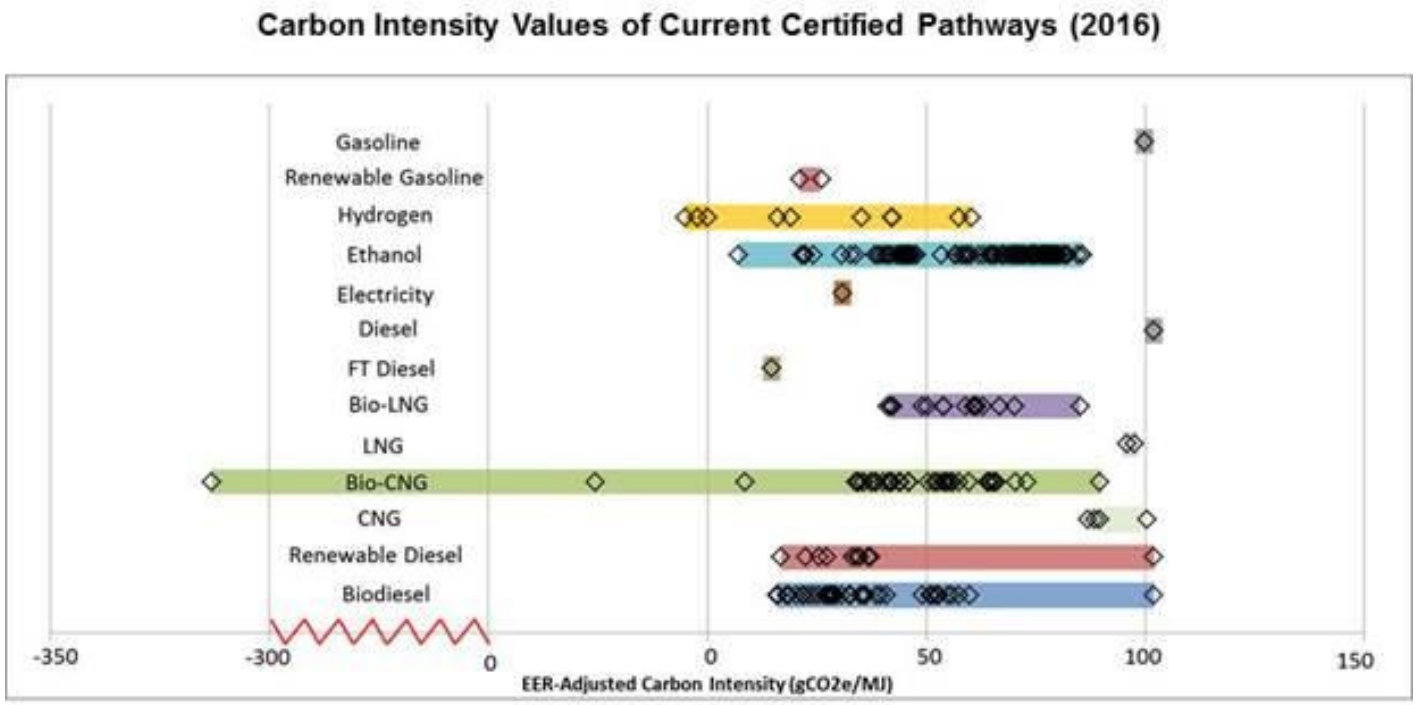
New Post-2025 LEV Standards

California Phase 2 HD GHG Standards

New HD Lower NOx Standards

Supply-side clear and strong regulatory policies

California's Low Carbon Fuel Standard



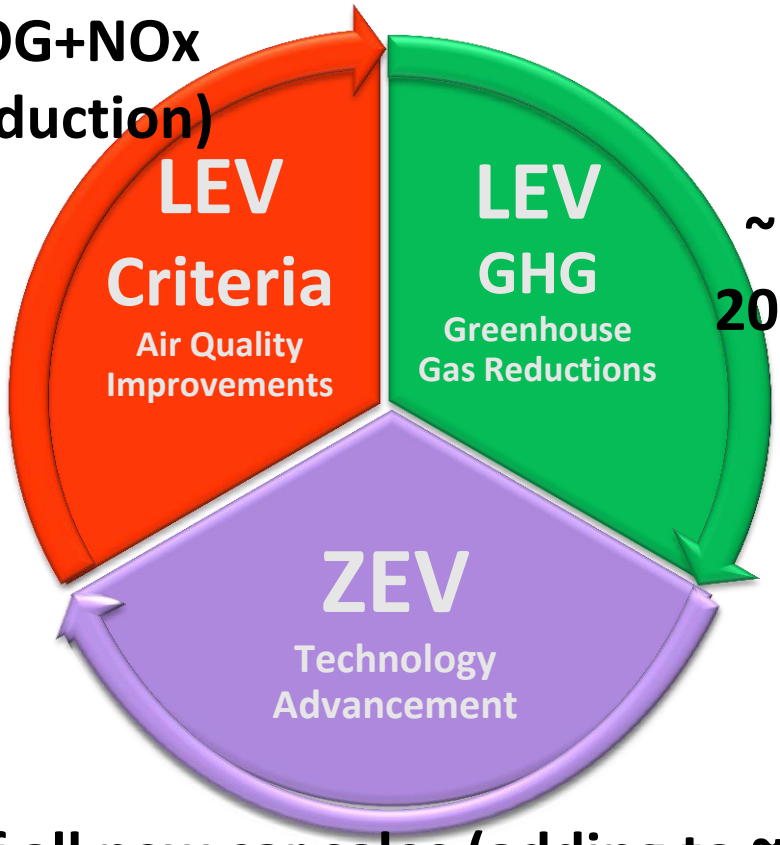
Last Updated 12/22/2016

Each marker represents an individual certified fuel pathway carbon intensity (CI), adjusted by the Energy Economy Ratio (EER). The length of each bar indicates the range of carbon intensity that may be achieved by a fuel pathway. The wide range of carbon intensities is due to the life cycle emissions methodology of the LCFS; variations in feedstock types, origin, raw material production, processing efficiencies, and transportation all contribute to an individual producer's fuel pathway CI. All valid CI values shown here are certified in 2016 including the legacy, Tier 1, Tier 2, and the Lookup Table.

[1] The alternative fuel's CI value is divided by its Energy Economy Ratio (EER) in order to obtain the EER-adjusted CI value, representing the emissions which occur from the alternative fuel *per MJ of conventional fuel displaced*.

Clear and strong regulatory policy –
existing vehicle standards and the ZEV Mandate

30 mg/mile NMOG+NOx by 2025 (~75% reduction)



~166 gCO2e/mile by 2025 (~34% reduction)

~15% of all new car sales (adding to ~1.5M ZEVs)

Electrons and H_2 molecules - *the "no compromise, cheat-free" alternative to petroleum combustion*

California, U.S., and Global ZEV Markets

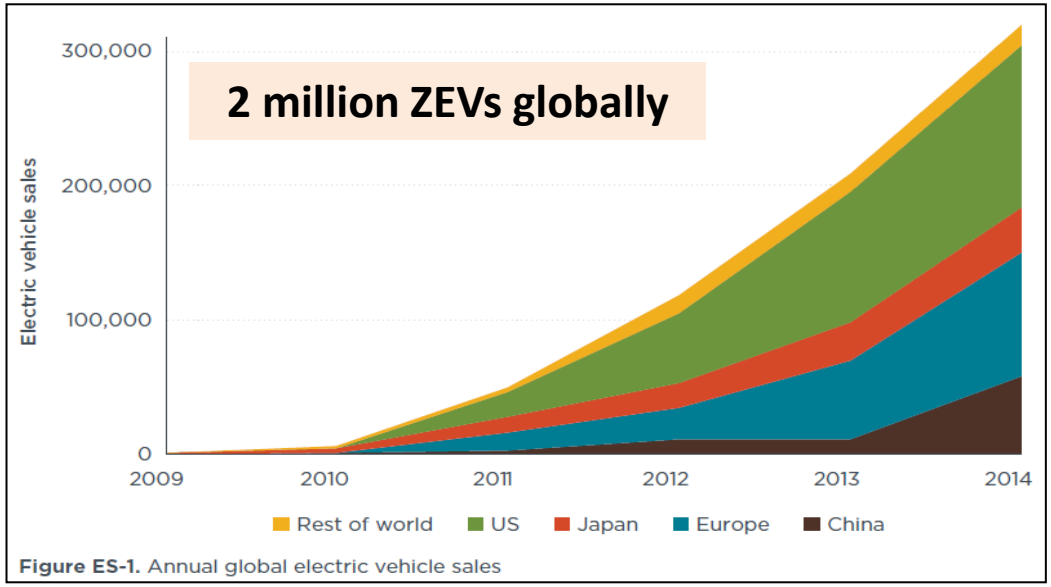


Figure ES-1. Annual global electric vehicle sales

Source: ICCT, "Transition to a Global Zero Emission Vehicle Fleet," Aug 2015

CALIFORNIA PLUG-IN ELECTRIC VEHICLE COLLABORATIVE

* Approximation assumes CA sales are 52% of National Sales
Reference: www.hybridcars.com

NATIONAL SALES
September 2016: 16,069
2016 Sales: 111,594
Cumulative 2011-present: 512,259

CALIFORNIA SALES*
September 2016: 8,356
2016 Sales: 58,873
Cumulative 2011-present: 239,838

View Data Calculation
www.pevcollaborative.org/data-caculation

The case for the mainstream ZEV market and post-2025 ZEV policy design

Integrated Truck Strategy

More stringent NOx standards and RD&D investments

90% cleaner

No more scandals!

Volkswagen

Toyota's Fuel Cell Truck

Demand-side strategic investments in technology/fuel solutions

Investing Cap-and-Trade proceeds in the transformation towards a sustainable future

- **California Global Warming Solutions Act of 2006***
- **California-Canada link (Quebec and soon Ontario)**
- **$3.7 billion appropriated to date**
- **Of that, $2.4 billion to transportation related investments**
- **$1.7 billion in implemented projects**
- **15.2 MMTCO$_2$e GHG reductions in benefit and many additional co-benefits**

**California Assembly Bill 32 (AB 32); Núñez, Chapter 488, Statutes of 2006*

MOVING CALIFORNIA

cleaner transportation for all communities

CALIFORNIA CLIMATE INVESTMENTS
Cap and Trade Dollars at Work

$688 million appropriate to date

LIGHT-DUTY VEHICLE SECTOR INVESTMENTS


Car Scrap & Replace (EFMP and EFMP Plus-Up)


Statewide Clean Vehicle Rebate Project (CVRP)


Vehicle Financing Assistance for Lower-Income Consumers


Car Sharing & Mobility Options


Agricultural Worker Vanpools in San Joaquin Valley


Increased Public Fleet Incentives for CVRP-Eligible Vehicles

HEAVY-DUTY VEHICLE SECTOR INVESTMENTS


Hybrid & Zero-Emission Truck & Bus Voucher Incentive Project (HVIP)


Clean Urban Transit Buses


Clean School Buses


Clean Delivery Trucks


Clean Drayage Trucks


Clean Trucks at Rail Yards & Freight Distribution Centers


Multiple Clean Technologies Used in Goods Movement

ZEV Infrastructure Critical to Market Development

Public/private investment for 100 hydrogen fueling stations

Utilities, government, private sector deploying charging infrastructure

Collaboration and partnerships

Sweden enters Under2 Global Pact

California Governor Edmund G. Brown Jr.

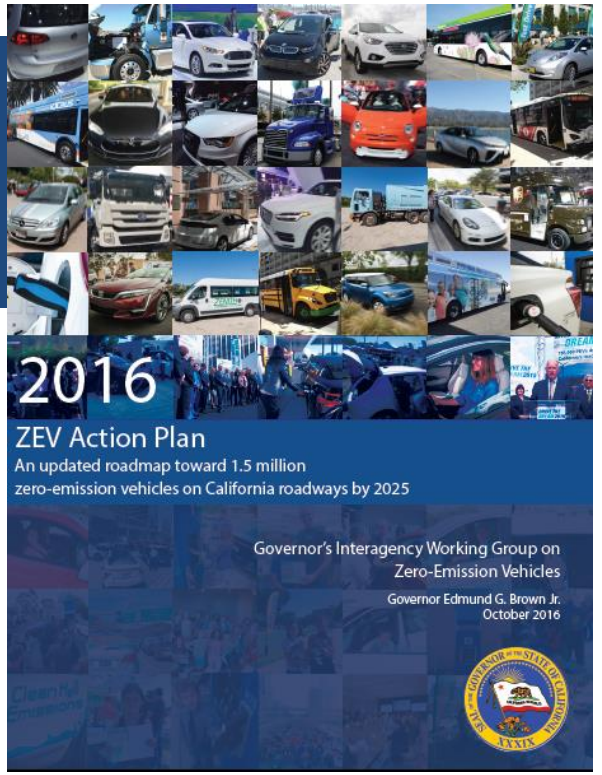
Swedish Deputy Prime Minister Isabella Lövin

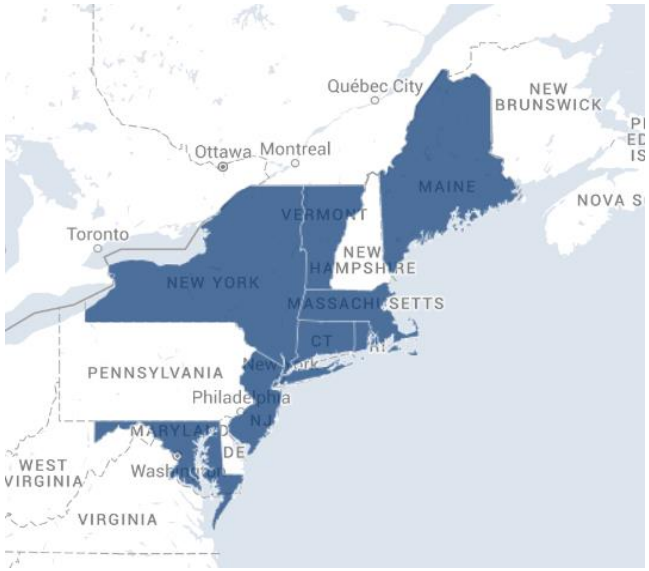
"Sweden and California will push for higher global ambition on climate change and will work individually and together to draw more international attention to the actions and ambitious reduction goals that are needed," said Minister Lövin. April 19, 2017. Sacramento, California.

**Under2 Global Pact among cities, states and countries to limit the increase in global average temperature to below 2°C. Coalition members also pledge to limit GHG to 2 tons per capita or 80-95% below 1990 levels by 2050.*

Clear commitments and partnerships for

- Administration-wide commitment to ZEVs
- Multi-State regulatory requirements
- Global alliance of leading jurisdictions
- Public-private partnerships

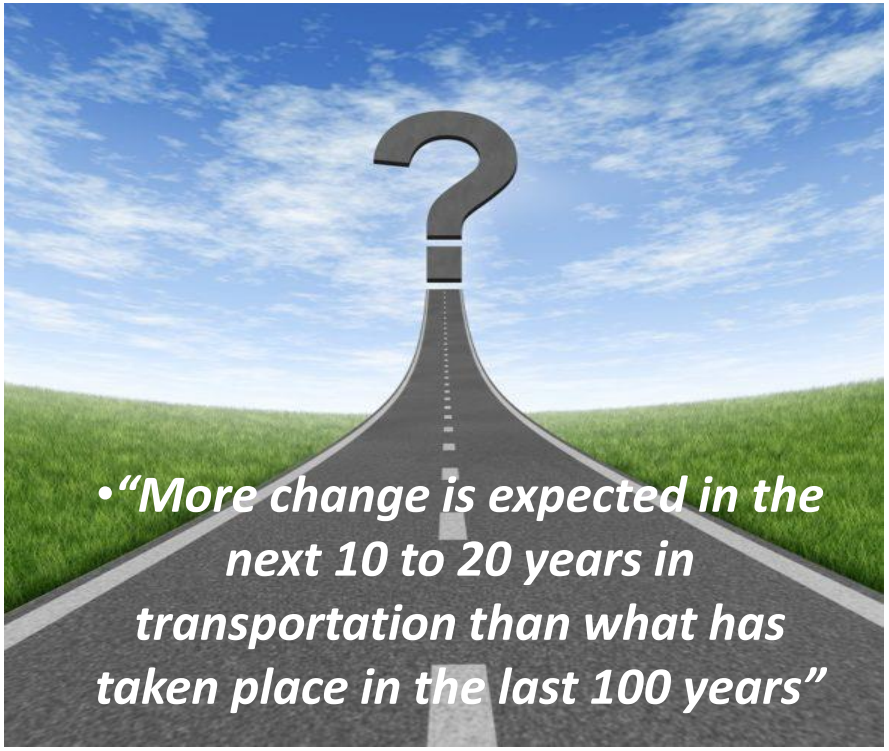




zev ALLIANCE

California FUEL CELL PARTNERSHIP DRIVING FOR THE FUTURE

CALIFORNIA PLUG-IN ELECTRIC VEHICLE COLLABORATIVE



Preparing for revolution and evolution

Towards a zero-emission light-duty vehicle fleet