Driving California Forward

A Report on Public Health and Societal Economic Benefits of California's AB 32 Transportation Fuel Policies

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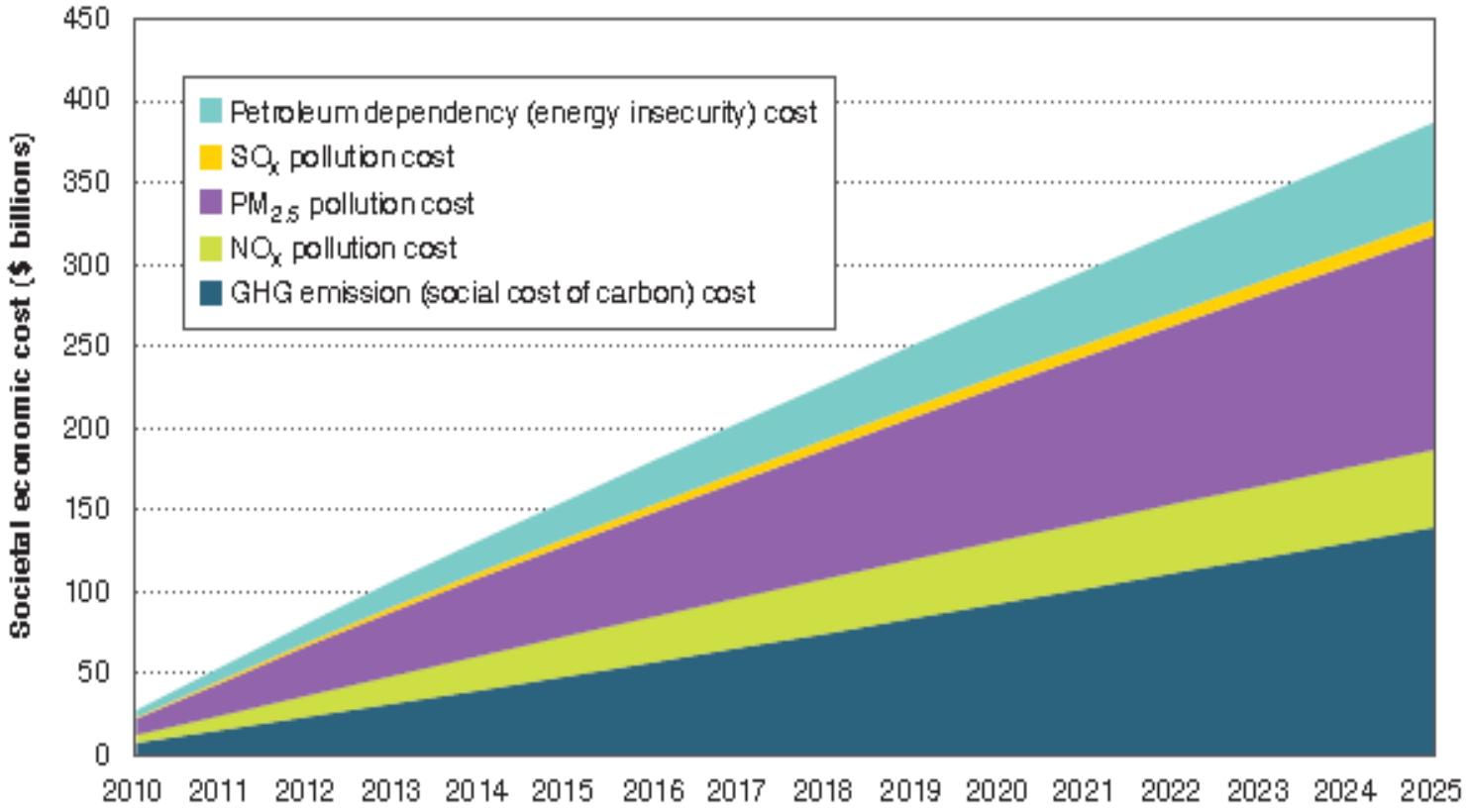
LCFS AND CAP-AND-TRADE REGULATIONS

Problem: California's vehicle and fuel mix results in significant public health and societal economic costs

- **Public health costs:**
  - Missed work days, asthma attacks, hospitalizations, and premature deaths due to air pollution
- **Petroleum dependency costs:**
  - Reliance on fossil fuels (over half of which are imported) results in energy insecurity, making economy vulnerable to price fluctuations and import availability
- **Climate change costs ("social cost of carbon"):**
  - Extreme weather events, changing precipitation patterns, and sea level rise hurt agricultural productivity, commercial prosperity, and human health

The public health and societal costs of the transportation system are large and growing

Societal economic costs without LCFS and C&T (cumulative)



Costs will reach over $100 billion by 2014

Background:
Low Carbon Fuel Standard (LCFS)

LCFS is a market based regulation directly applied to the transportation fuel mix, which requires a phased reduction in the carbon intensity of transportation fuels in the state, leading to a 10% reduction by 2020.

Results in new investments for a cleaner, more diversified, lower carbon fuel mix

Background:
AB 32 Cap-and-Trade (C&T)

The C&T program is a centerpiece of the pollution-reducing policies developed under AB32. C&T sets a cap on emissions from polluting sectors of the economy - starting in 2015, pollution from combustion of transportation fuels from tailpipe emissions will be included under the cap.

Results in new investments for a cleaner, more diversified, lower carbon fuel mix

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With input from academic, industry, & government agencies, **two scenarios were developed and compared**:

Scenario 1) No LCFS and C&T scenario*

*What the California vehicle and fuel market would look like if the LCFS and C&T did not exist (does account for federal mileage standards)

Scenario 2) LCFS and C&T Implementation Scenario**

**What the California vehicle and fuel market will look like between now and 2020 / 2025 because of the LCFS and C&T - tracks CARB's Vision and CEC's IEPR documents for fossil fuels, biofuels, natural gas, ZEVs, etc.

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Results: California's AB 32 transportation policies will ***improve public health***

By 2025, public health benefits of LCFS and C&T will include approximately:

- **900** fewer premature deaths
- **600** fewer heart attacks
- **640** fewer hospitalizations
- **38,000** fewer asthma attacks
- **74,000** fewer lost work days

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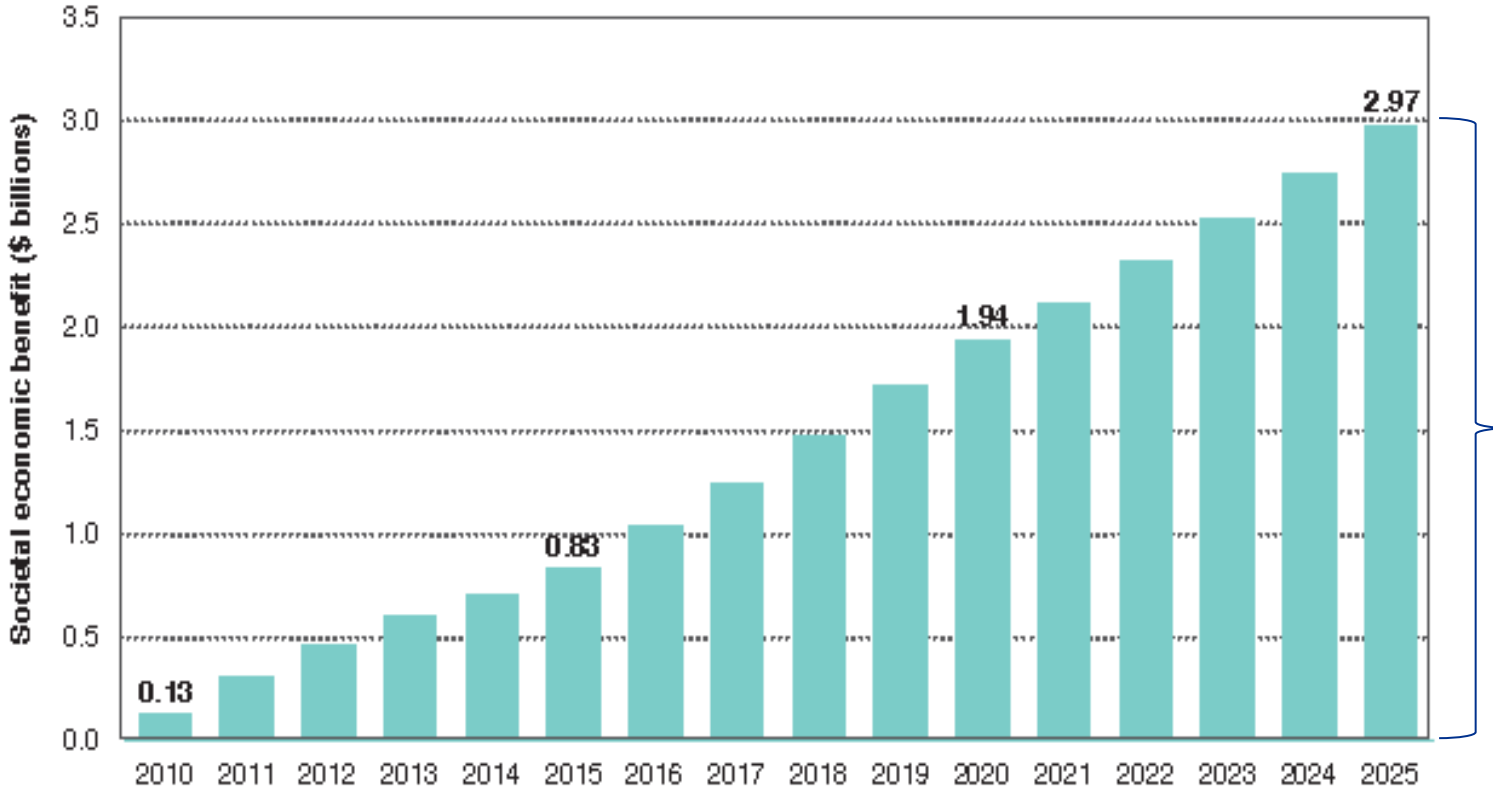
Results: California's AB 32 transportation policies will ***save money***

Implementation of LCFS and C&T will result in avoided costs of $23.1 billion by 2025 due to:

- Avoided public health costs ($8.3 billion)
- Avoided fossil fuel dependence costs ($7.9 billion)
- Avoided climate change-related costs ($6.9 billion)

Finding: The benefits of California's AB 32 transportation fuel policies are large, growing, and cannot be ignored

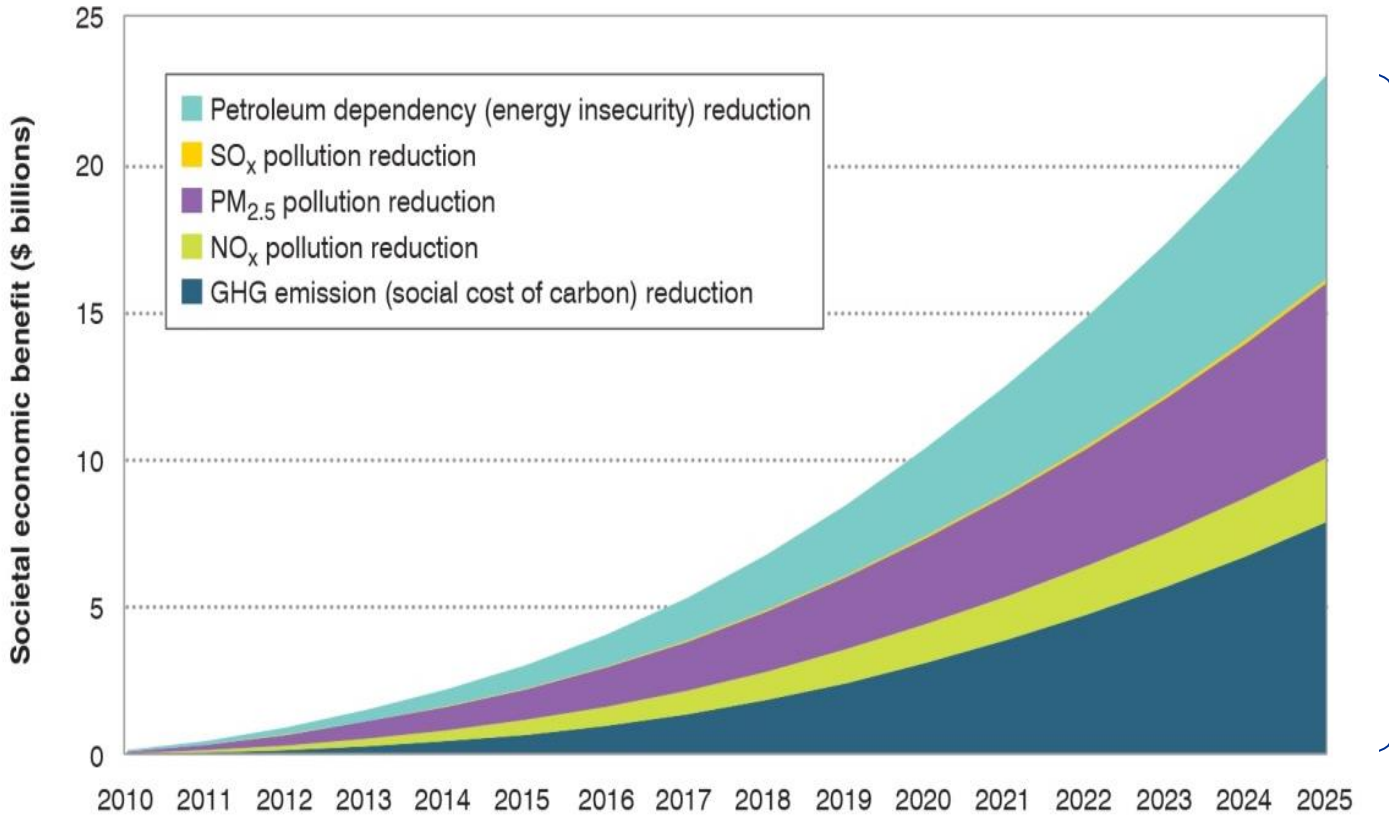
Societal economic benefits of LCFS and C&T (annual in $ billions)



By 2025, the annual benefit of the LCFS and C&T will **reach about $3 billion per year**

Finding: The benefits of California's AB 32 transportation fuel policies accelerate

Societal economic benefits of LCFS and C&T (cumulative)

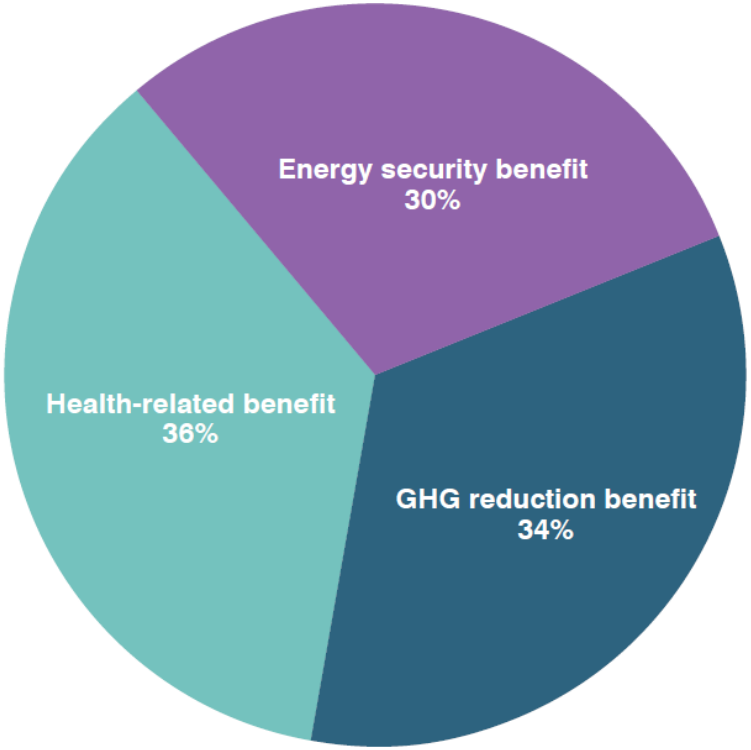


By 2025, cumulative benefit of the LCFS and C&T will **reach $23.1 billion**

Effect of AB32 Transportation Fuel Policies

Categories evaluated for societal economic benefits under AB 32

- Public Health
- Energy Security (Petroleum dependency)
- Climate Change (Social cost of carbon)



Public health component

- Californians are suffering from missed work days, asthma attacks, hospitalizations and premature deaths due to air pollution (particulate matter and ground-level ozone)
  - Motor vehicles are among biggest contributors of these pollutants
- 30 million Californians (77% of state's population) live in counties with a failing air quality grade
- 9 California cities appear among the lists of the 10 American cities most polluted by ozone, short-term and long-term particulate pollution. (State of the Air 2014, ALA in California)

Public health component

- By 2025 implementation of LCFS and C&T will result in the reduction of approximately:
  - 167,000 tons NO_X
  - 9,000 tons $PM_{2.5}$
  - 3,850 tons SO_X
- Reduction of these harmful pollutants will result in many improved health outcomes – with increasing benefits every year as cleaner vehicles and fuels penetrate further into the market
- Savings of $4.3 billion by 2020 and $8.3 billion by 2025 (economic analysis used is consistent with US EPA analysis of Clean Air Act benefits)

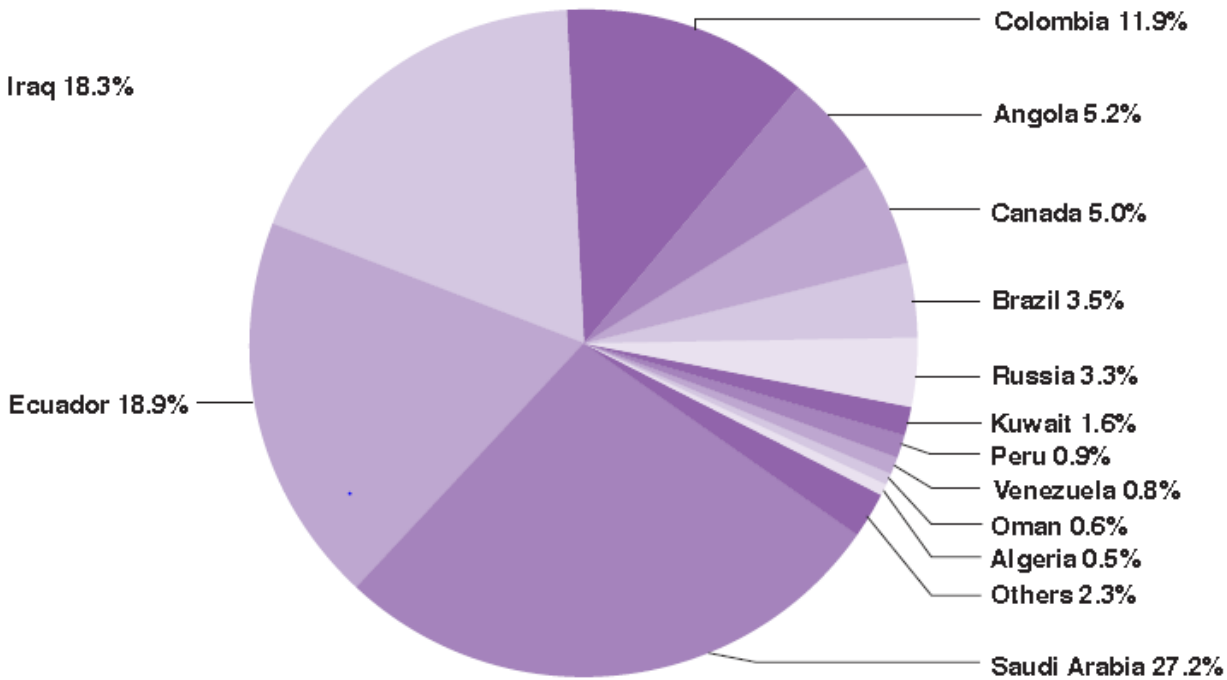
Public health component

Impacts Avoided	Benefit By 2020	Benefit By 2025
Premature deaths	- 470	- 882
Asthma attacks	- 20,645	- 38,321
Heart attacks	- 311	- 597
Lost work days	- 40,316	- 74,339
Hospitalizations	- 340	- 643

Energy security component

- Over 60% of California's fossil fuels were imported from out-of-state in 2012

Foreign sources of crude oil used in California (2012)

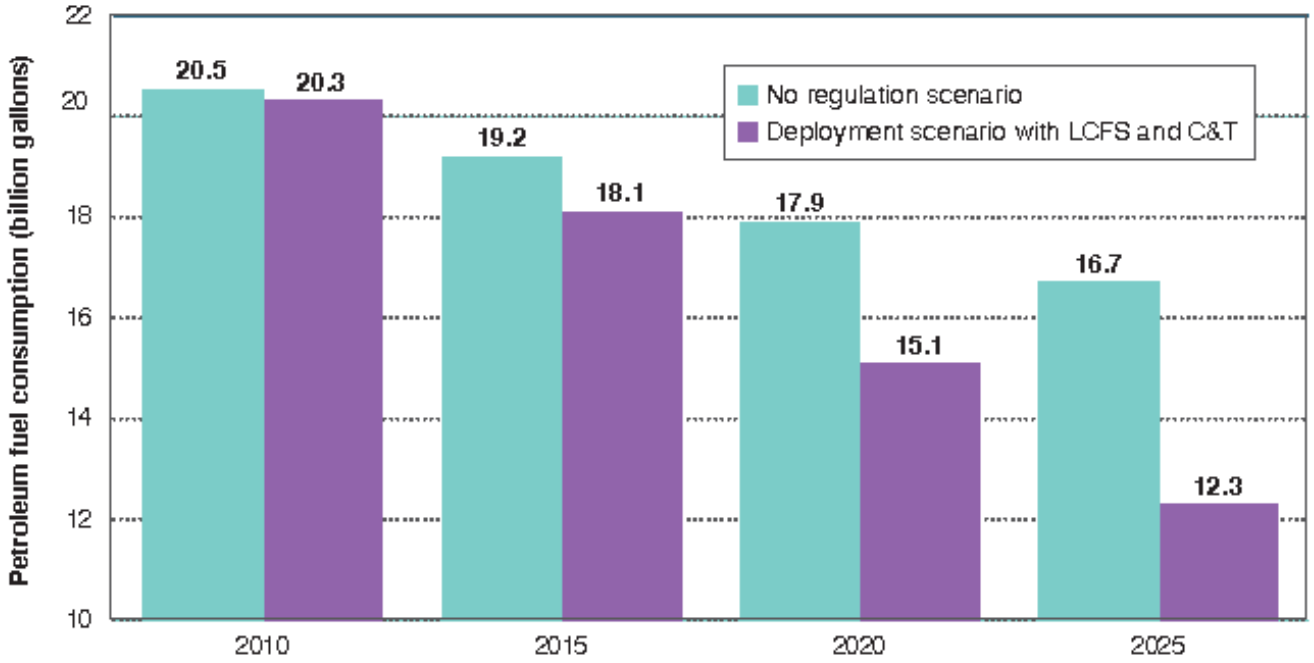


Source: California Energy Commission, Energy Almanac[14]

Energy security component

- LCFS and C&T will facilitate transition away from dependence on foreign fossil fuels
  - Total reduced consumption of gasoline by 21.4 billion gallons and diesel by 11.8 billion gallons through 2025 (50% from imported energy)

Gas and diesel consumption effect of LCFS and C&T (billion gals)

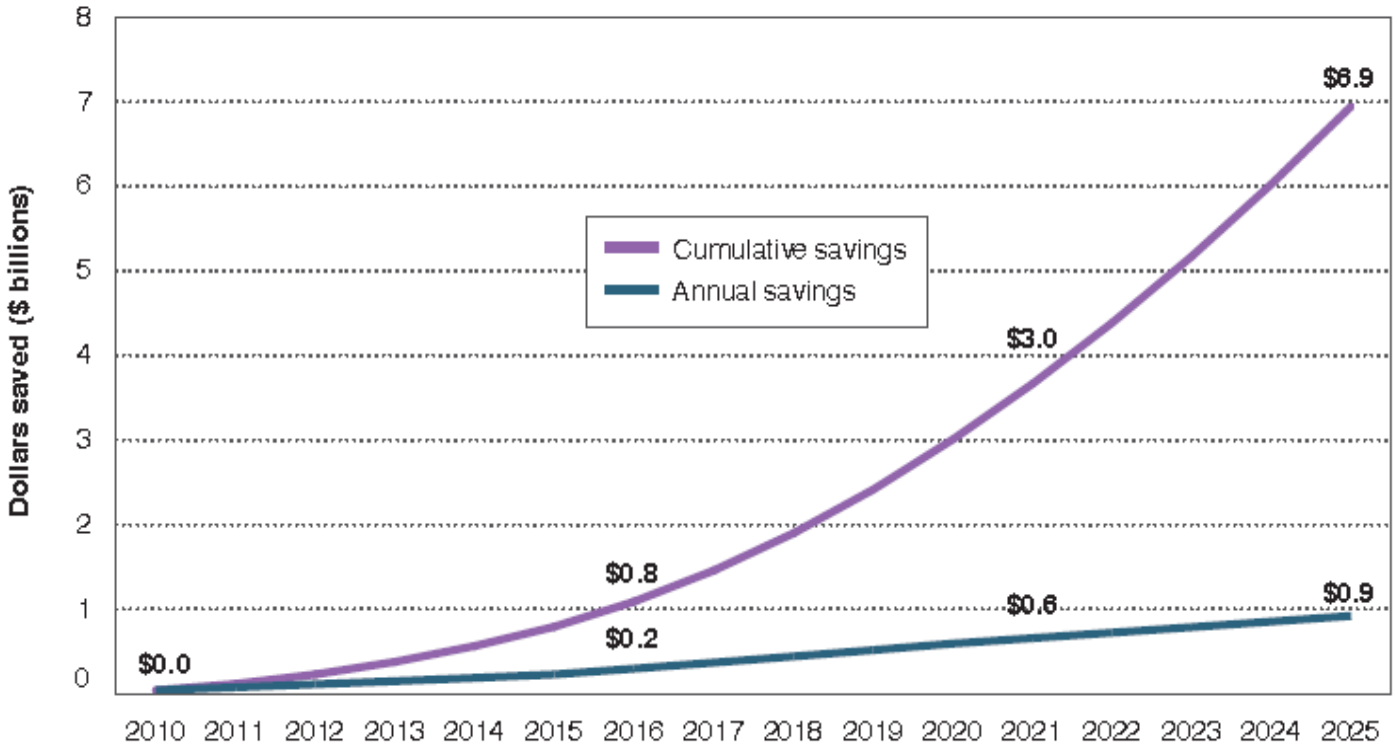


By 2025, 4.5 billion gallons less of gas and diesel will be needed **every year**.

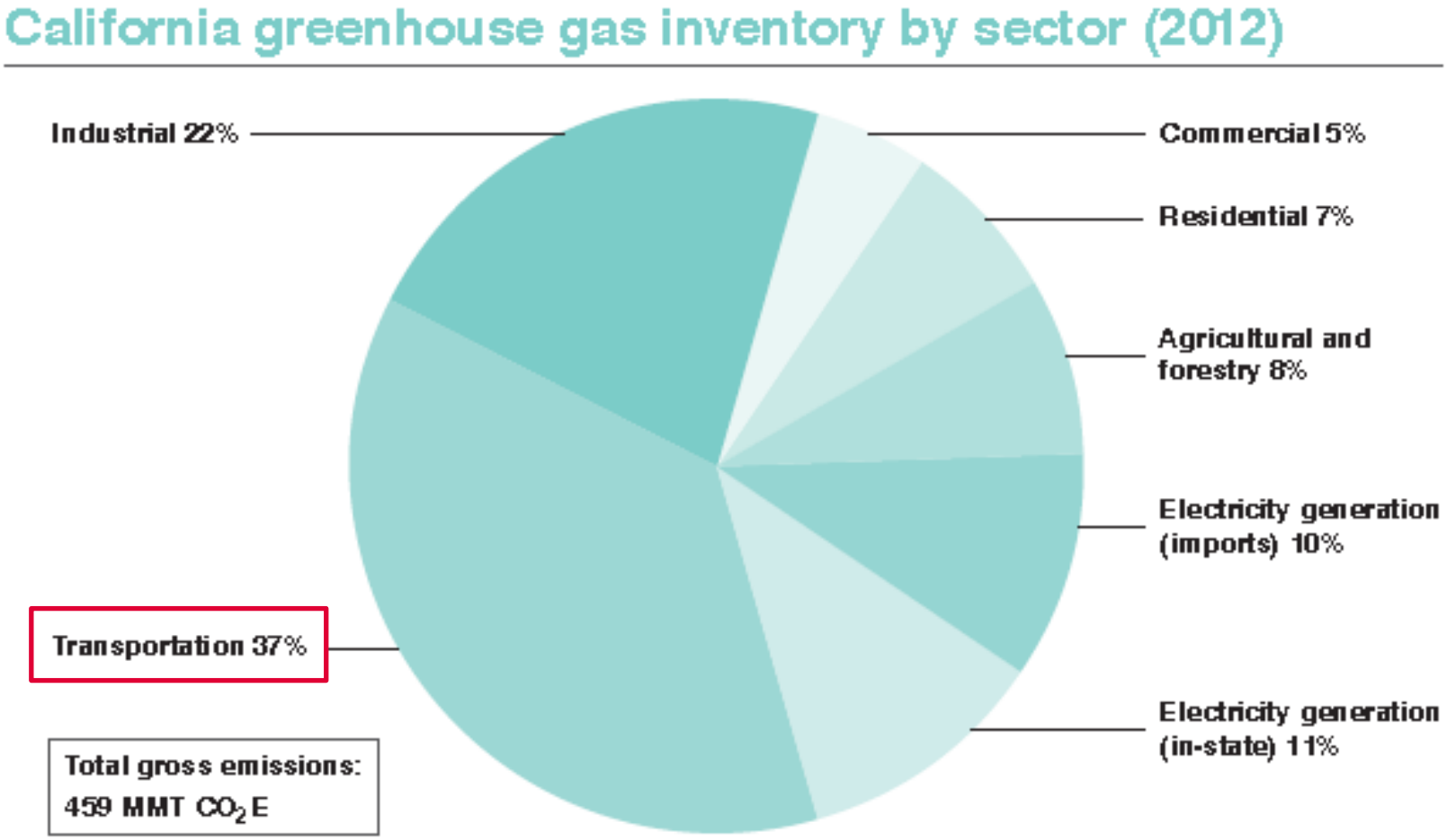
Energy security component

- Reduced demand for fossil fuels will avoid costs of $3.0 billion by 2020 and $6.9 billion by 2025

Energy security benefits of LCFS and C&T ($ billions)



Climate change (social cost of carbon) component

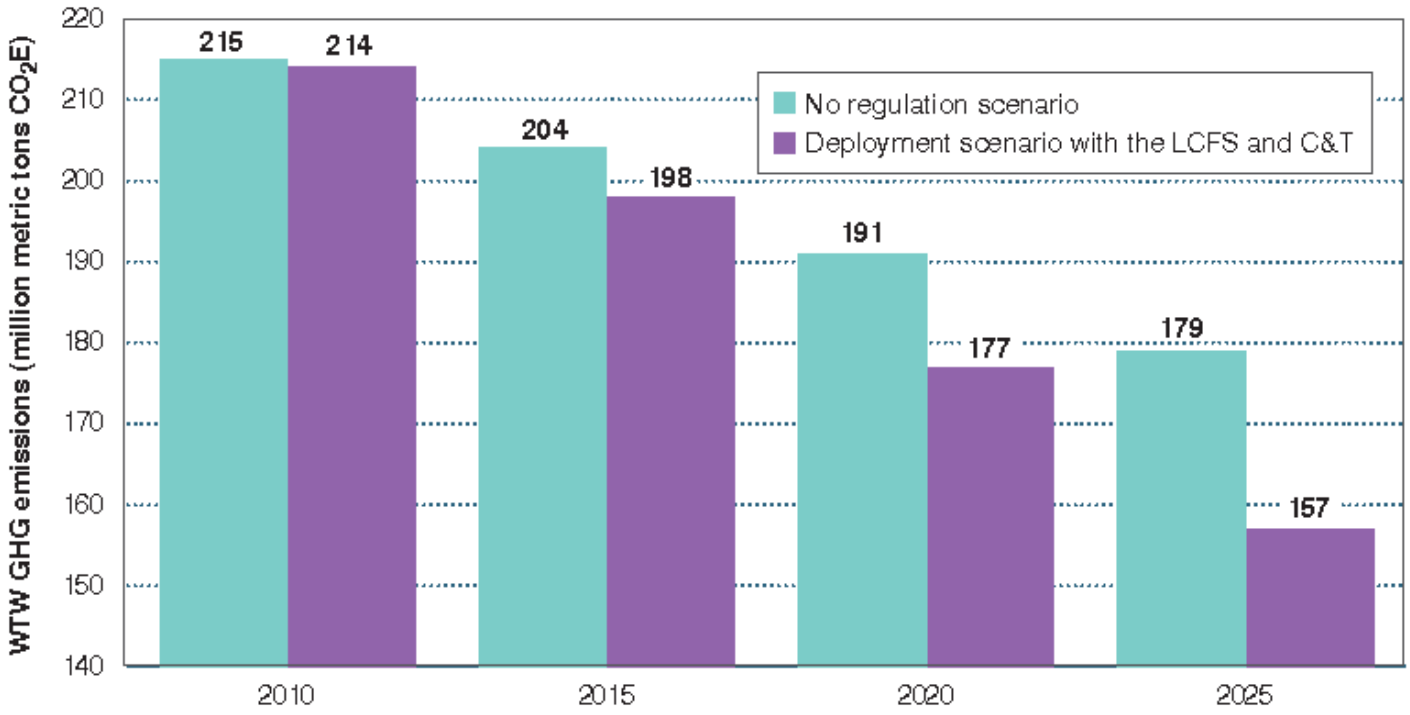


Source: California Air Resources Board [17]

Climate change (social cost of carbon) component

- US EPA calculates the social cost of carbon at $36/metric ton of GHG emissions in 2010, increasing to $53/metric ton in 2025 (conservative estimate)

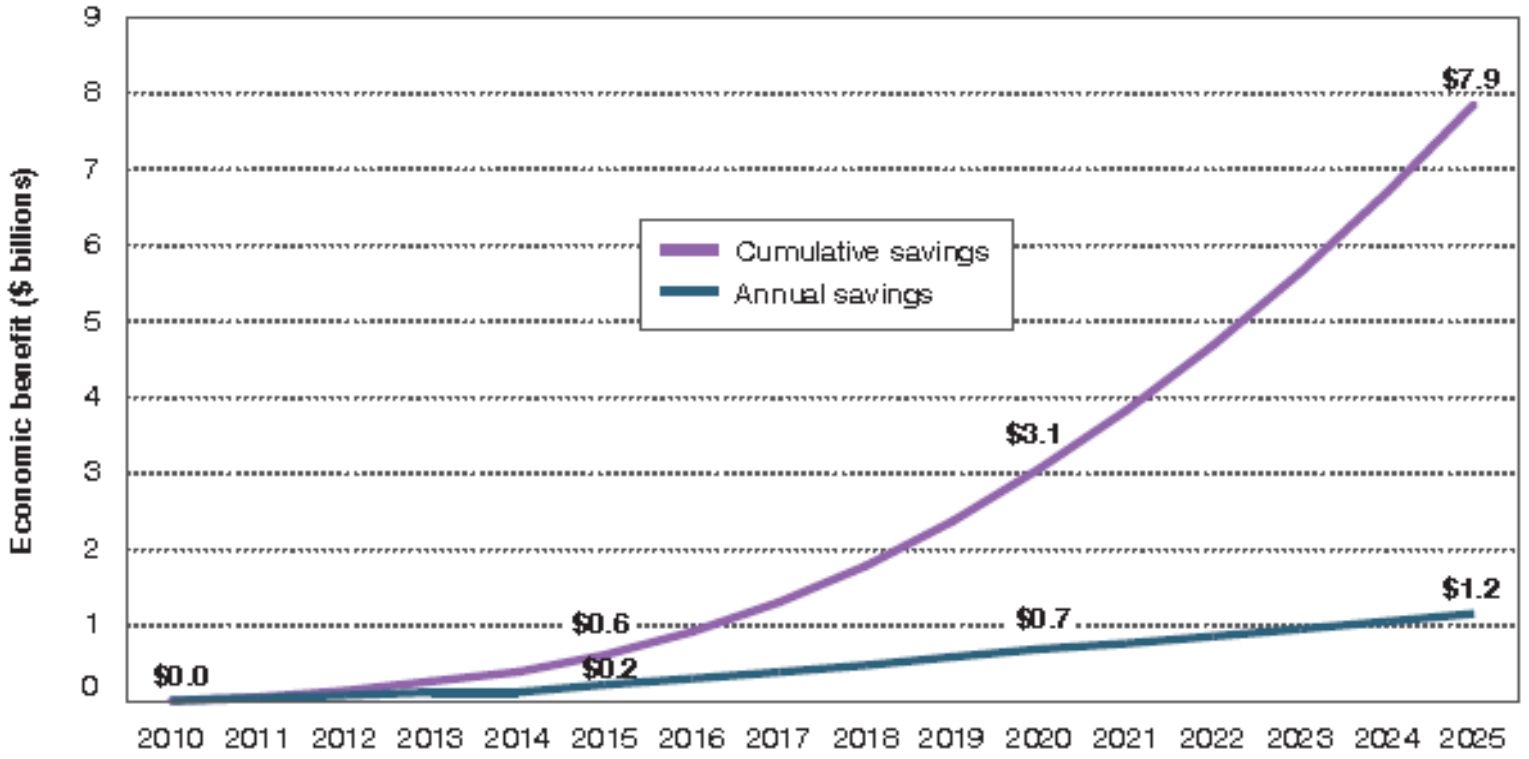
GHG emissions reductions from LCFS and C&T (MMT CO_2E)



Climate change (social cost of carbon) component

- LCFS and C&T will reduce emissions by almost 165 million metric tons CO_2E cumulatively by 2025

Social cost of carbon benefits of LCFS and C&T ($ billions)



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