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INVEST WITH PURPOSE

# Cap & Trade: Implementation

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# Topics

- Paris Agreement
- EU Emission Trading Scheme
- China pilot/national progress
- Regional Greenhouse Gas Initiative
- California's AB32

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## History

- The Oregon Legislature established the Oregon Carbon Dioxide Standard in 1997, requiring power plants to mitigate a portion of their GHG emissions.
- TCT board made up of 7 Oregon Offset Directors to oversee the CO2 Standard
- Managed over $43 million in carbon financing for greenhouse gas emission reduction projects and seven national programs.
- Expertise in developing carbon offset credit protocols, monitoring & verification plans, quality standards, and peer reviewed research.


Report every 5 years to EFSC

## Key Metrics Dashboard

**3.3 MILLION**
Total tons greenhouse gas reduced

**5.5 MILLION**
Contracted emissions reductions (tons)

**$5.5 MILLION**
Fund I dollars to deploy

**$34 MILLION**
Total committed to projects

**46**
Total projects

**$5.5 MILLION +**
Second anticipated deployment

# TCT Portfolio


- Biogas
- Agriculture
- Compost & Landfill
- Forestry
- Renewable Energy
- Energy Efficiency
- Transportation
- Material Substitution

# Paris Agreement

- The U.S. joined 194 signatories under the Paris Agreement committing to limit the increase in global average temperature to well below 2°C above pre-industrial levels.
- Roughly half of submitted INDCs feature market-based instruments to meet their national climate targets.
- Article 6:
  *"Countries can meet their emissions reductions targets by trading emissions reductions among each other, and they can create their own governance structures to manage the process, but they must make sure the trading promotes sustainable development, and they must follow accounting principles approved by the UNFCCC."*

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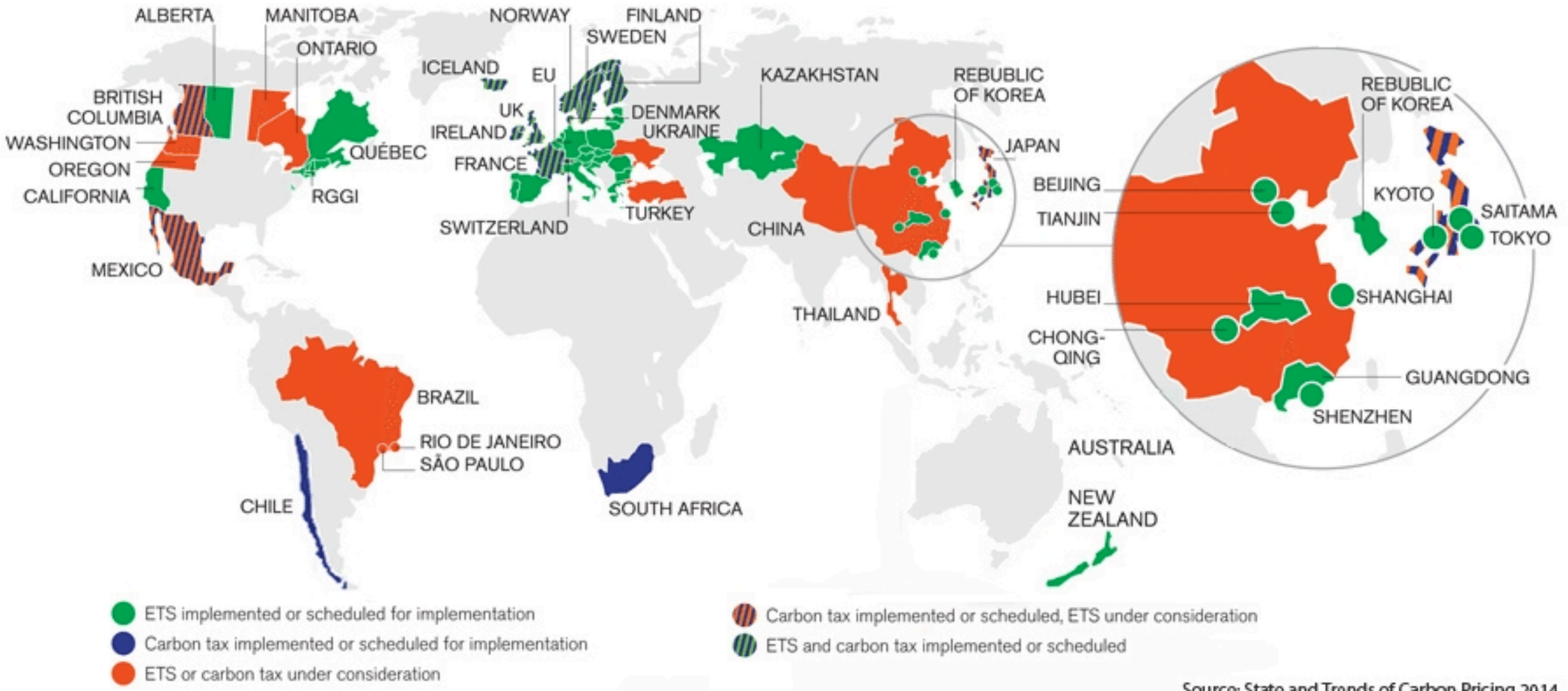
# Locations of Existing, Emerging & Considered Carbon Pricing Instruments




Source: State and Trends of Carbon Pricing 2014

- Countries responsible for ~50% of global CO2 emissions already have carbon price mechanism planned or in place.
- Only one of the ten largest economies in the world does NOT have a carbon price (USA)

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# Central Role for Cap and Trade Mechanism

- Cap and trade supports specific sector programs (clean fuels, RPS, etc.) that achieve bulk of reductions
- Acts as an elastic back-stop to guarantee that depending on program performance, GHG goal is attained with certainty.
- Most effective emission reductions at least cost

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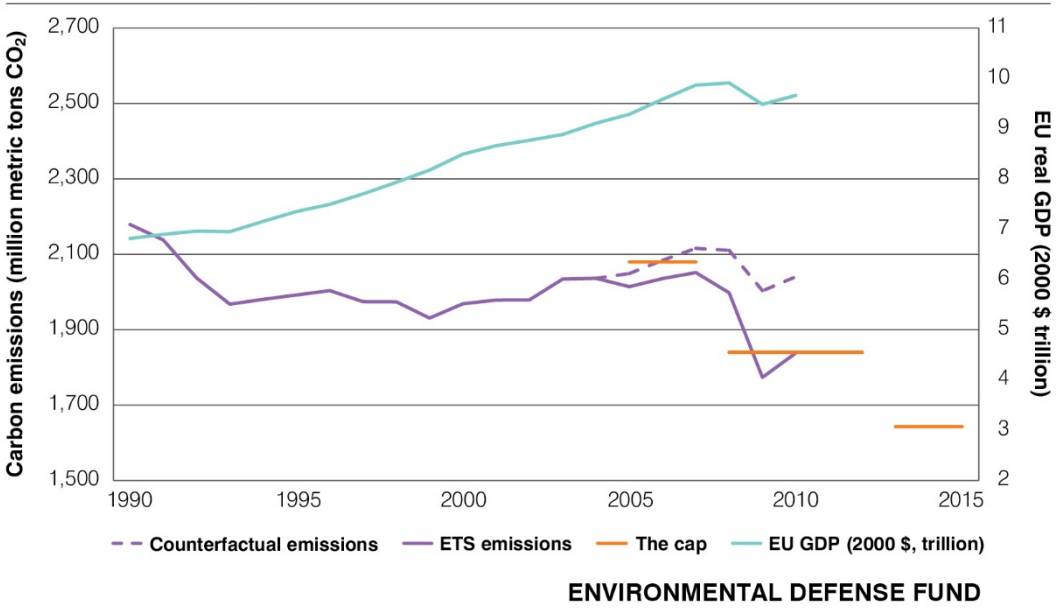
# EU Emissions Trading Scheme: 45% coverage

- EUETS is the world's first & largest GHG trading system
- Carbon dioxide (CO2) (Power & heat generation, energy-intensive industry sectors, commercial aviation). Nitrous oxide (N2O) & Perfluorocarbons (PFCs) (aluminum production)
- The EU grew its GDP by 45% between 1990 and 2012, while reducing emissions 19%
- Current amendments align the cap with 2030 target to reduce GHG emissions by at least 40%
- Improve free allocation rules & readjust the declining cap to 2.2%/year
- Support low-carbon innovation & energy sector modernization.

FIGURE 1

EU ETS sector emissions (million metric tons $CO_2$), emissions caps, and EU GDP, 1990–2015

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# EU ETS Challenges

- Adopted Market Stability Reserve (MSR) to address the accumulated allowance surplus which depressed the allowance prices
- MSR will start operating in January 2019
- Allowances added to the reserve if allowances in circulation higher than 833 million allowances.
- 900 million back-loaded allowances, which were withdrawn from auctions from 2014-2016 will be placed directly into the reserve.

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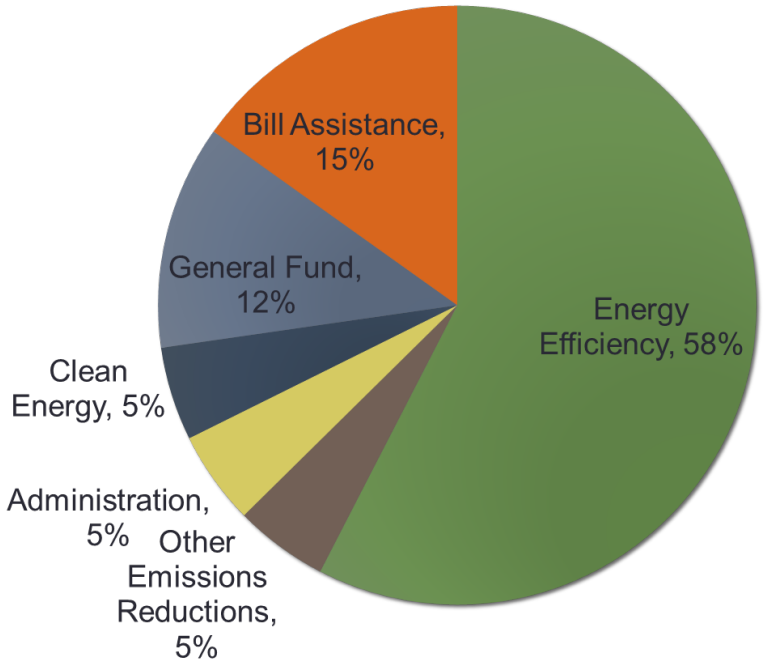
# Regional Greenhouse Gas Initiative:

- Nation's first regional regulatory program designed to reduce GHG emissions from large electric power plants
- RGGI is not and was never meant to be an economic-development program. Purpose is to reduce emissions of CO2 from power plants to mitigate the economic, social, and environmental risks of climate change
- RGGI CO2 cap declines 2.5% each year from 2015 to 2020.
- Quarterly allowance auctions
- Offset emissions reductions outside the capped sector designed to provide compliance flexibility & create opportunities for low-cost emissions reductions & other co-benefits across sectors.
- Offset sectors include: Landfill methane capture, forestry conservation, end-use energy efficiency, avoided manure methane.




**Revenue expenditures**

Credit: Sightline Institute

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# 2009 – 2014 RGGI Impacts

- 9 RGGI states on track to achieve reductions of GHG emissions of 45% below 2005 levels by 2020
- Raised nearly $3 billion to support investments in energy efficiency, renewable generation, & other public benefit programs.
- Economic impacts amount to average of over $31 in value added per capita in the region
- Health and productivity benefits estimated at cumulative $5.7 billion ($3.0 billion low-end, $8.3 billion high-end).
- Multiple states in the mid-Atlantic and New England regions experienced significant health benefits from RGGI-induced changes to air quality.
- Efficiency & distribution improvements made using RGGI funds delivered downward pressure on wholesale electricity prices.
- Consumers of electricity saved $341 million, and natural gas and heating oil saved $118 million and added 30,000 job years (a.o end ‘15)
- Finding: market-based carbon emissions pricing approach does not negatively impact power system reliability.
- Reduced fossil fuel spending outside their region by over $1.27 billion (‘12 – ’14).

Americans for Prosperity: RGGI would lead to "higher taxes, lost jobs, and less freedom" in addition to a doubling of electric rates.

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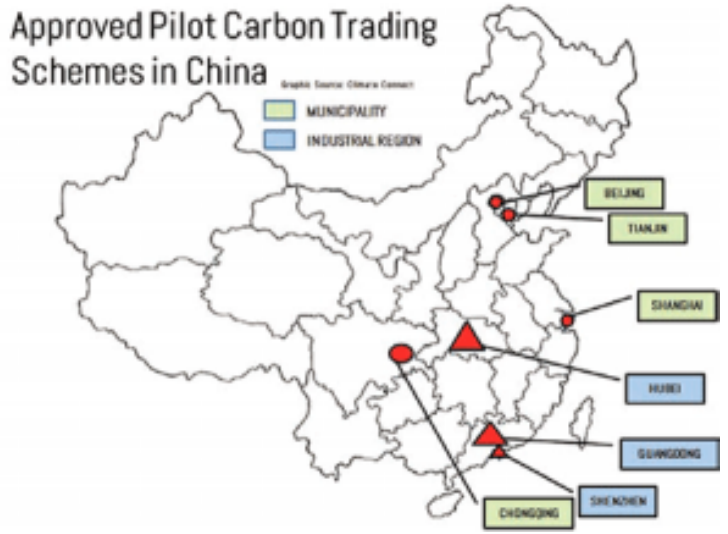
# China

- Launched 7 regional ETS pilots in 2013
- 2017 Chinese national ETS will cover twice the volume of emissions covered by the EU ETS.
- Includes carbon emission trading market to “realize the objective of controlling greenhouse gas emissions at minimum cost”.
- 8 sectors and 15 sub-sectors which consume +10,000 tons of coal equivalent per year included in China’s national ETS
- Goals:
  - Reduce CO2 per unit of GDP by 40-45% relative to 2005 and increase the ratio of non-fossil energy to 15% of primary energy consumption by 2020
  - Peak its CO2 emissions by 2030 (try to reach this peak as early as possible)

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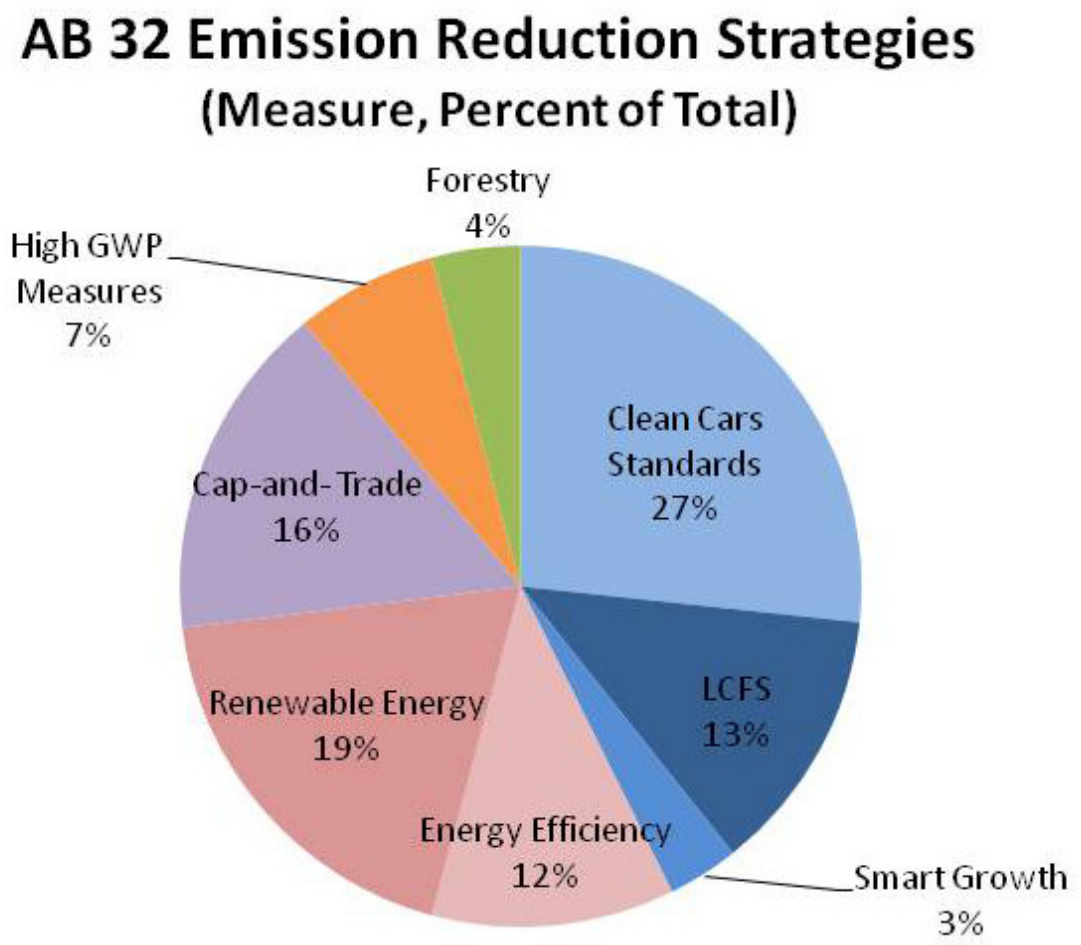
# California C&T as a back stop

- Cap and Trade program designed to address ~16% of emissions for the state
- Relies on complementary targeted programs to achieve bulk of reductions




Sources: CARB, Scoping Plan; Emissions Reductions from Scoping Plan Measures (last updated Oct. 28, 2010); 2020 GHG Emissions Forecast (last updated Oct. 28, 2010).

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# California AB32: covers 85% of emission sources

- Covers electricity generators and importers, large industrial emitters, and suppliers of natural gas and transportation fuels
- C&T works  in concert Low Carbon Fuel Standard, Clean Car Program and California's Renewables Portfolio Standard (RE 50% by 2030)
- Cap declines at 3% per year
- California on track to reach its 2020 target (reducing its emissions to 431 million metric tons (MMT) of carbon dioxide)
- SB32 extends California's landmark climate goals to 2030 by requiring reductions of greenhouse gas emissions by 40% below 1990 levels.
- AB197 requires ARB to "prioritize… emission reduction rules and regulations that result in direct emission reductions" while considering the impact on disadvantaged communities
- Facilitate sub-national and national collaboration
- 2030 TARGET SCOPING PLAN UPDATE states "Natural and working lands are integral to the State's climate change strategy. Storing carbon in trees, plants, aquatic vegetation, and in the soil is one of the most effective ways to remove GHGs from the atmosphere."
- Offset markets allow the pathway to tapping that sector's potential.

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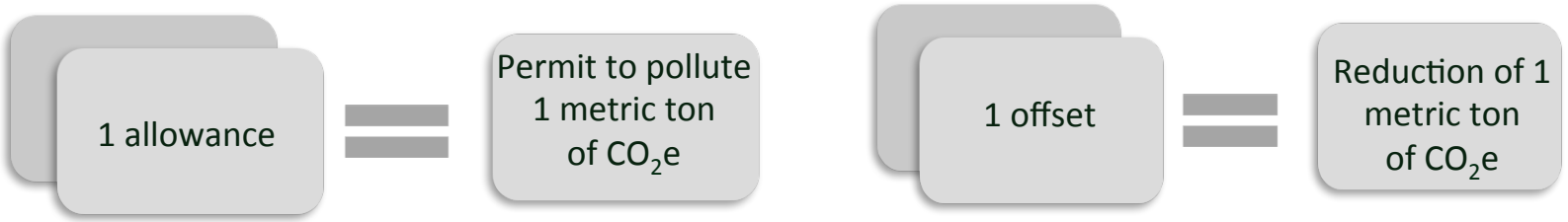
# AB 32 Cap and Trade Compliance

- Covered entities must:
  - Report emissions annually, with independent 3rd party verification
  - Compliance achieved by submitting to ARB compliance instruments equal to their annual GHG emissions
  - Reduction in emissions equates to a reduction in compliance instruments needed
    - Allowances are primary compliance instrument
    - Offsets provide a limited optional compliance instrument (up to 8% permitted)
  - Severe penalty for non-compliance

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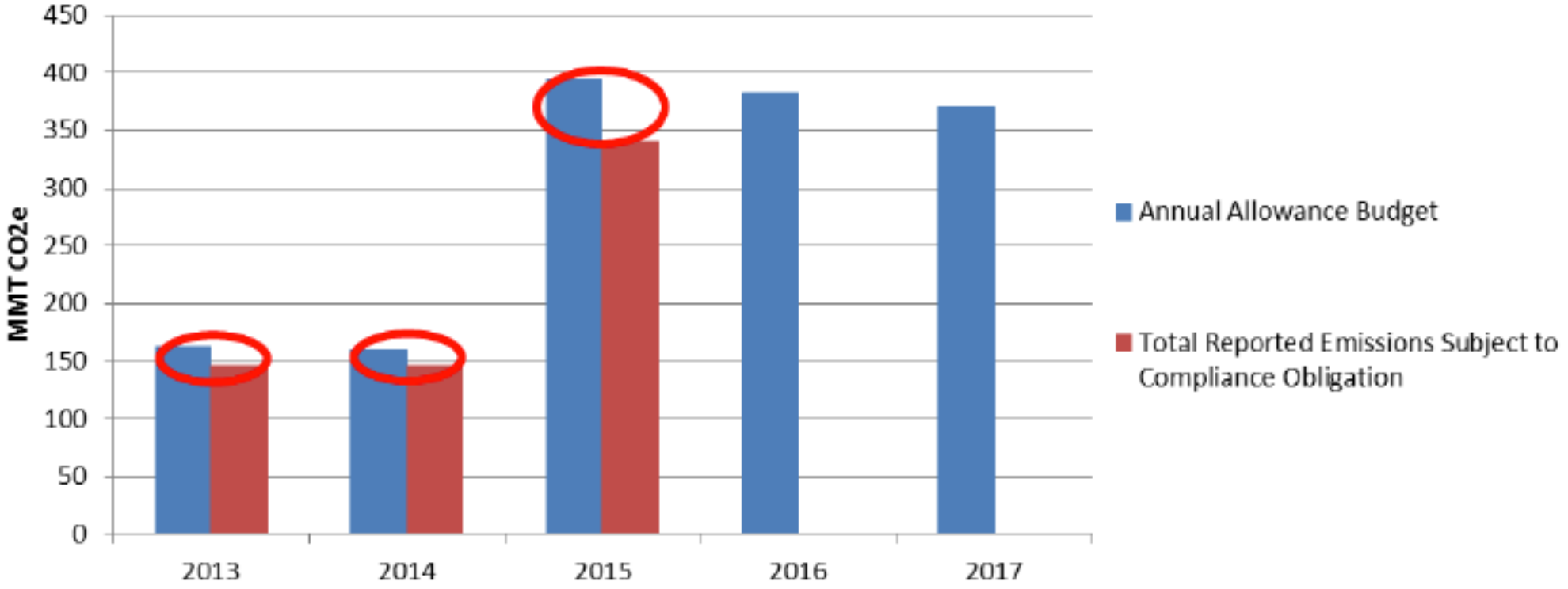
# Cap-and-Trade Program GHG Emissions




- Emissions in covered sectors have declined more rapidly than expected
- Trading allowances and offsets is regarded as key flexibility that enables the state to achieve emission reductions at the lowest cost.
- Not shown: 54 million MT CO2e of offset credits issued for emissions reductions outside of the cap (~4.4% of 8% used)

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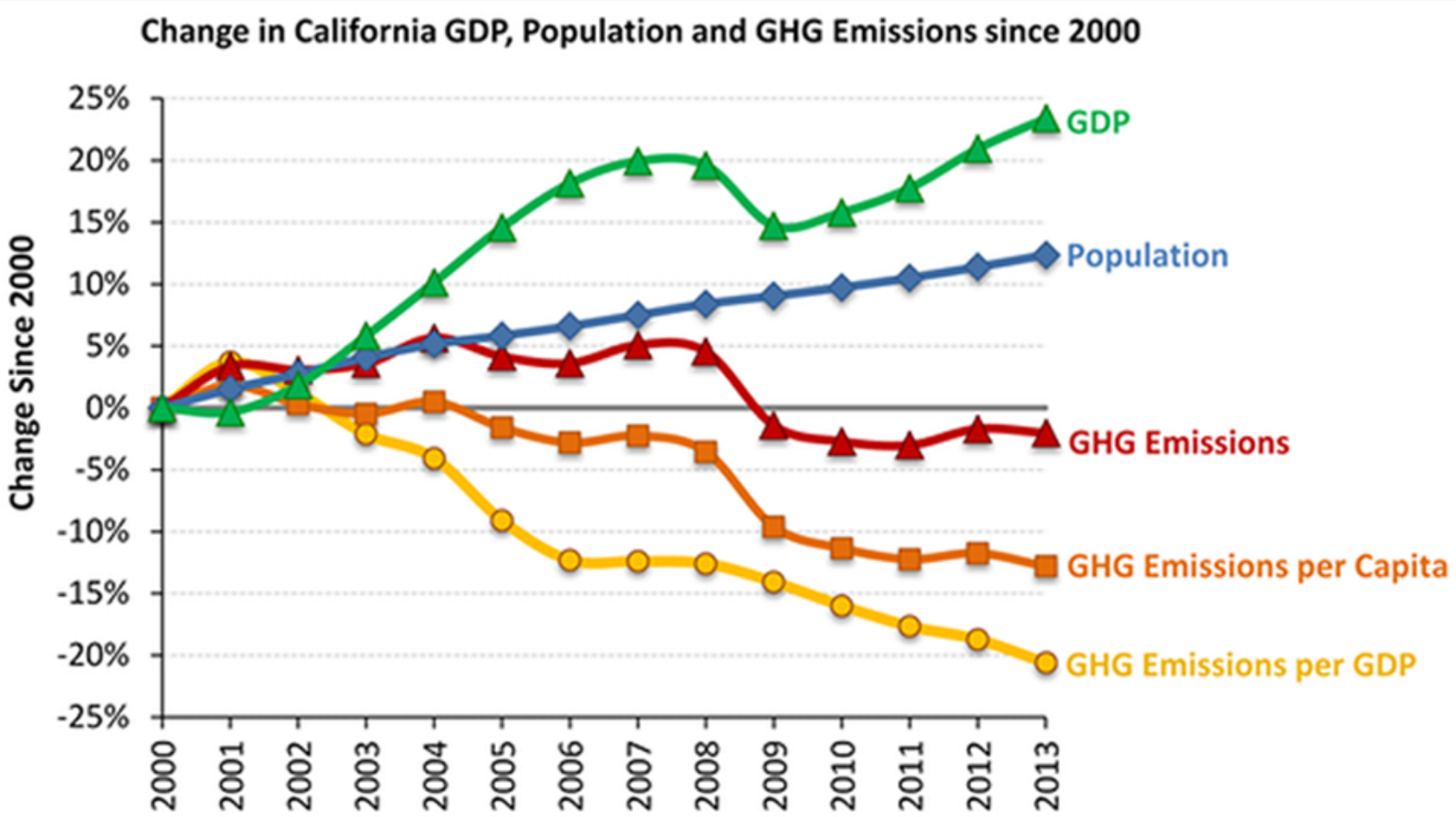
# California Trends under AB32




Source: US Clean Tech Leadership Index, Clean Edge Inc.

- Emissions are down by 3.8% for covered entities
- CA grew its economy 6.6% between 2010 and 2013
- CA attracted $21B in clean energy investment capital since signing of AB32. In 2015, California attracted more clean tech investment than any other state - $9.8 billion – an increase of 35% from the previous year.
- 3.3% job growth; national 2.5%
- 50 new jobs were created for every job forgone in the oil, gas and electric power sector.
- 25% of program revenue targeted at disadvantaged communities
- California leads the nation with the highest total manufacturing output ($239B) of any state

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# AB32 Impacts

WSJ 2010: …" the new energy cap dooms the state to bankruptcy."

- Since 2006, California's economy has moved from the eighth- to the sixth-largest in the world.
- In the first eight years of AB 32, California's petroleum consumption decreased more than 14%.
- Estimated climate benefits (the avoided economic damages) of California's climate measures will be between $2.4 and $11 billion by 2030
- Luskin report: Low income protected from C&T compliance costs passed through from electric (+ve $215 - $246), natural gas (+ve $44 - $88), and gasoline providers ($350 - $700) related to complimentary policies outside of C&T).
- 50% of the $1 billion implemented under C&T system has been directed to disadvantaged communities. $12 - $45B estimated for 2012 – 2025 period.
- Employment in the state's advanced energy industry grew 18% in 2015, six times the rate of statewide employment growth.
- Question whether $2.2B for 2017-2018 budget cycle will be achieved given lawsuit and post-2020 outlook that has led to under subscription at recent auctions ($167,915,180)
- Linked to Quebec in 2014. Ontario to launch this year.

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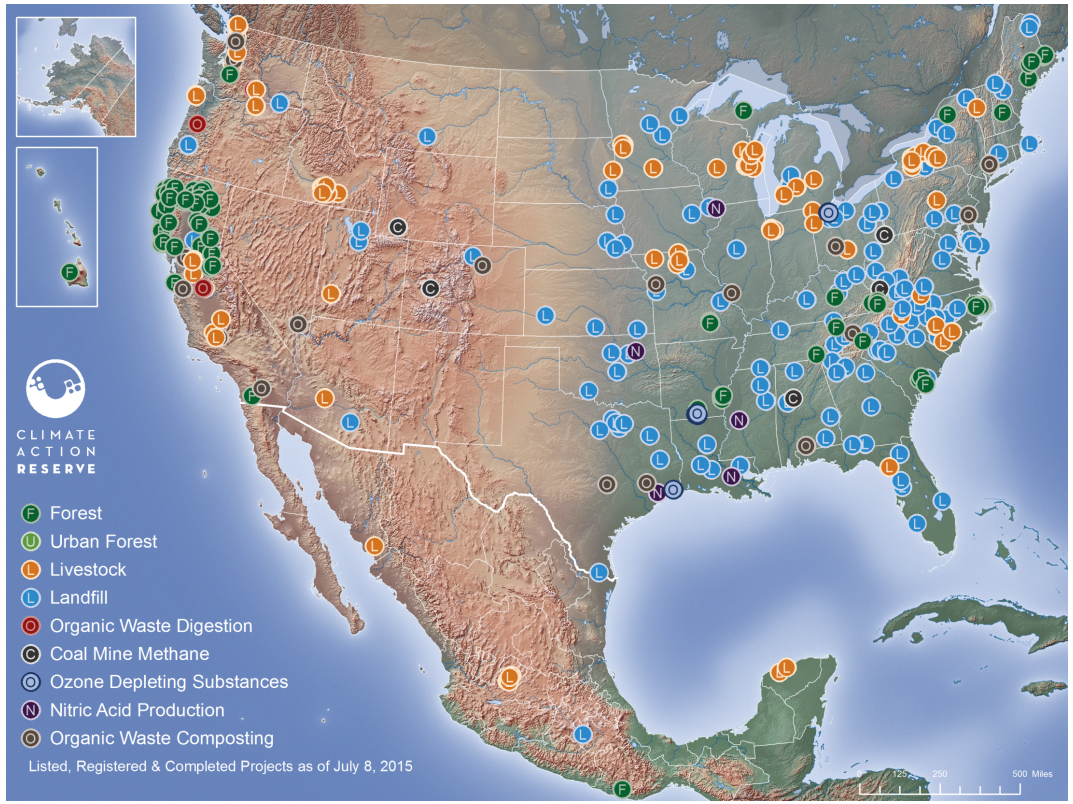
# Uncapped sectors

- Six offset protocols have been adopted:
  1. U.S. forest (17,384,601 credits)
  2. Urban forest (0)
  3. Livestock digesters (1,174,769 credits)
  4. Ozone depleting substances (ODS) (6,770,370 credits)
  5. Mine methane capture (MMC) (694,160 credits)
  6. Rice cultivation (0)
- Offsets represent real avoidance of 54 million metric tons of $CO_{2e}$ from 260 projects across the U.S.
- 16 million credits across 54 projects were developed from project activities in California, 22 of which occurred in disadvantaged communities in California.
- Designed to offer cost containment & linkage potential
- Pathway for private capital & promote innovation
- Can deliver additional co-benefits




Courtesy: Climate Action Reserve

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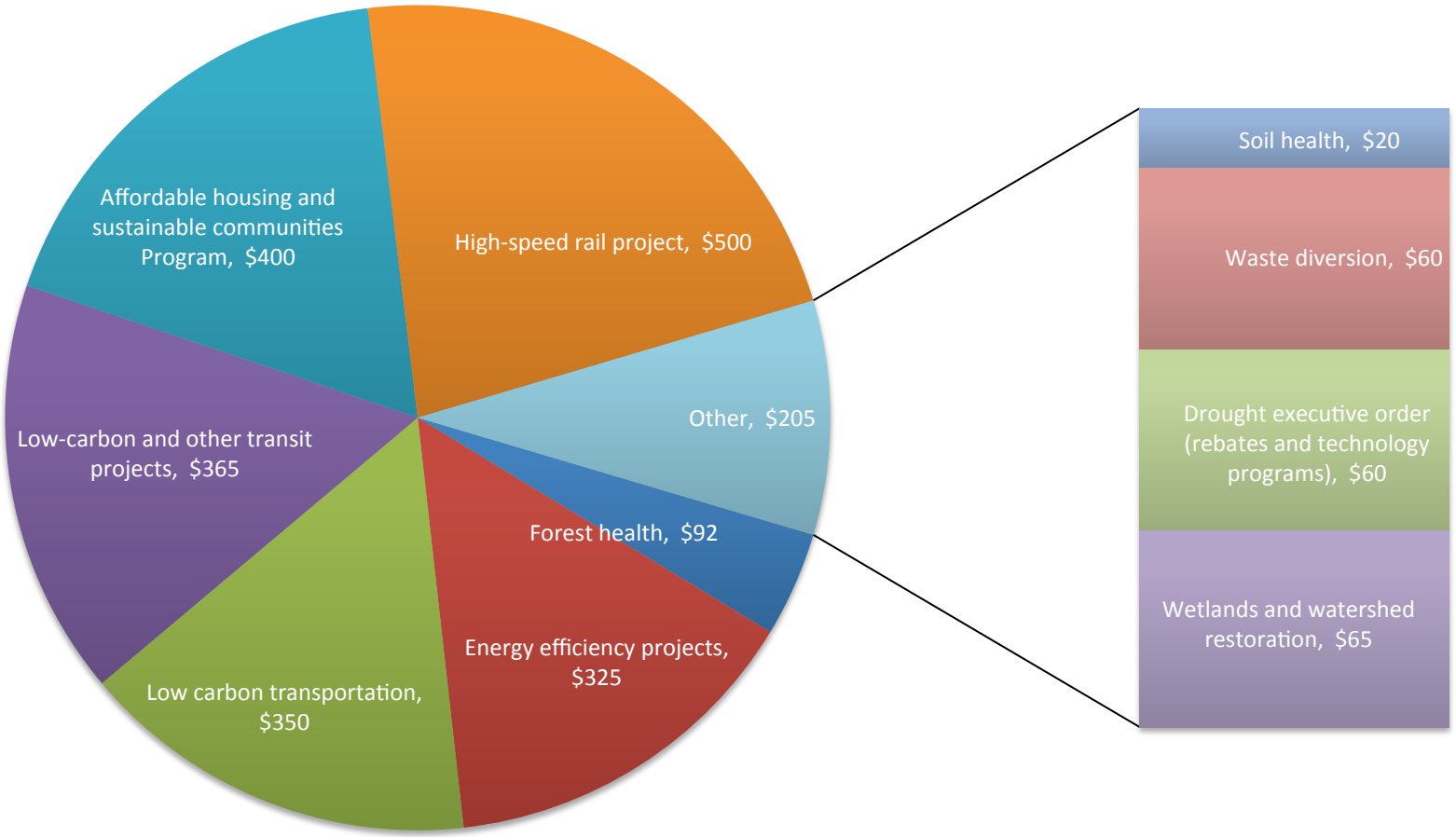
## 2015-2016 California Auction Revenue Budget in millions




# California's approach, based on the 2015-2016 budget

- Funds totaled over $2.2 billion

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