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## Carbon Markets: What We Know and What to Expect

May 5, 2021

# MCLE Certificate Information

- Most participants should anticipate receiving their certificate of attendance via email approximately four weeks following the webcast.
- Virginia Bar Association members should anticipate receiving their certificate of attendance eight weeks following the webcast.
- Please direct all questions regarding MCLE to [CLE@gibsondunn.com](mailto:CLE@gibsondunn.com).

# Agenda

- **Cap and Trade Overview**
- **US and EU Cap and Trade Systems**
  - ✓ California
  - ✓ Regional Greenhouse Gas Initiative (“RGGI”)
  - ✓ EU Emissions Trading System
- **Trading Carbon Allowances**
- **How Does Carbon Impact Energy Markets?**
- **Lessons Learned from Existing Systems**
- **Where Are We Going?**

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# Cap and Trade – An Overview

# Cap and Trade - A Vision of What Is to Come?

**Bloomberg Green**

## **The Carbon Market Gold Rush in American Agriculture**

**THE WALL STREET JOURNAL.**

**Carbon Tax Sidelined in Biden's Push on Climate, Taxes**

**Forbes**

**As Biden Administration Prepares Climate Policy Push, Cap & Trade Falls Flat In Democratic-Run States**

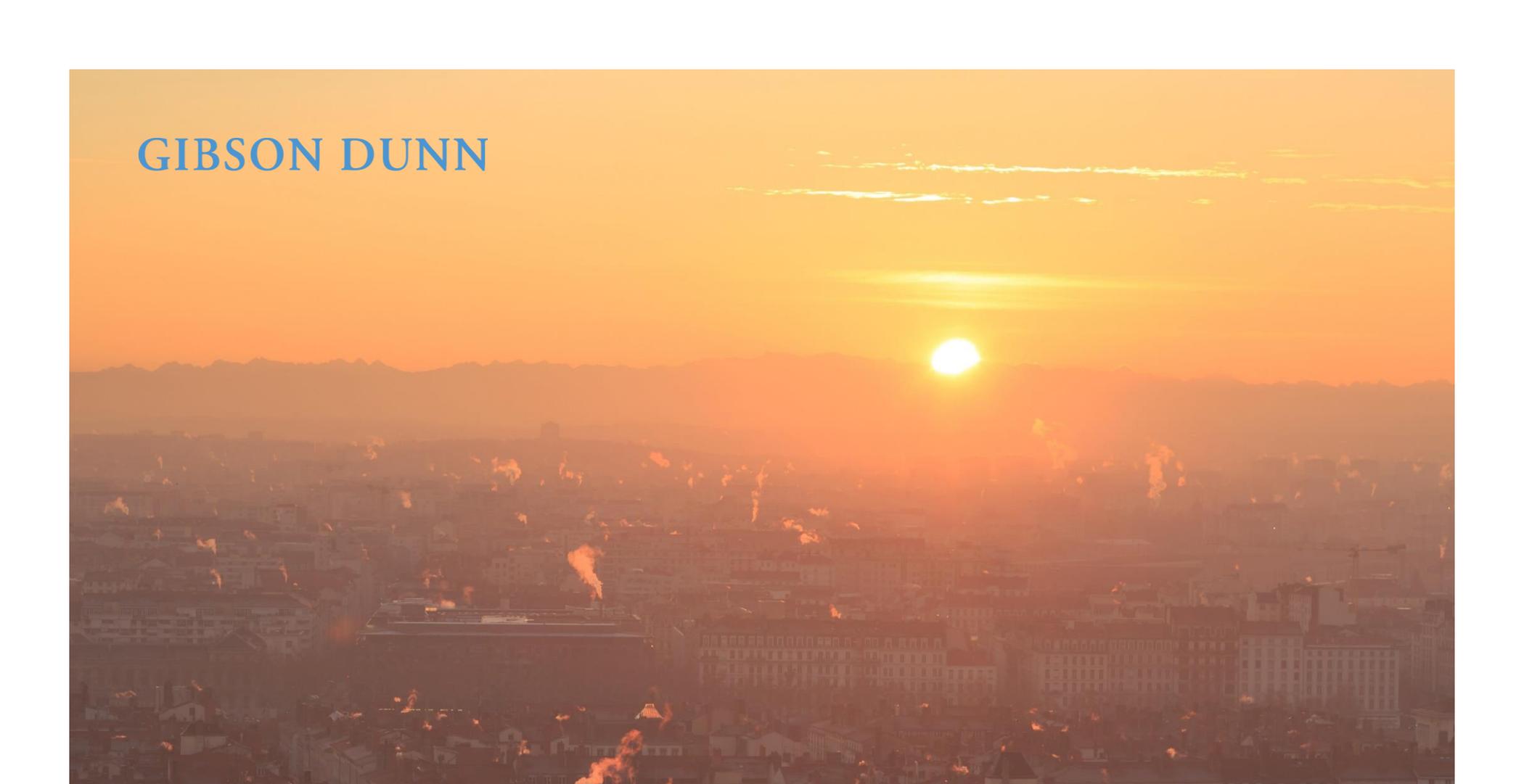
**The Washington Post**

**Biden plans to cut emissions at least in half by 2030**

# What Is Cap and Trade?

- The government puts a cap on total emissions and then issues permits that specify how much each particular factory or power plant can emit (*i.e.*, emissions allowances)
- The cap tightens over time and the number of emissions allowances is reduced
- In order for a company to comply with caps on its emissions, it can:
  - ✓ Install new technologies that reduce its greenhouse gas emissions or invest in renewable power
  - ✓ Purchase allowances/carbon offsets to offset excess emissions
    - ❖ This is the “trade” part of the “cap and trade”
  - ✓ Choose to pay fines assessed by regulators for exceeding emissions caps
- Trading can happen on exchanges, or it can occur over-the-counter between buyers and sellers



An aerial photograph of a city at sunset. The sun is low on the horizon, casting a warm orange glow over the scene. In the foreground, numerous smokestacks are visible, each emitting a plume of white smoke that rises into the air. The city buildings are silhouetted against the bright sky. In the background, a range of mountains is visible under the hazy sky.

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# US and EU Cap and Trade Systems

# A Few Words on California's Cap and Trade Program

- Introduced in 2012 as part of a comprehensive system to reduce greenhouse gas emissions
- The California Air Resources Board (“CARB”) runs and enforces the program
- The program is unique to California, but it is linked with Quebec's program



# A Few Words on the Regional Greenhouse Gas Initiative (RGGI)

**RGGI Inc.**



- Regional cooperation
- States covered: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Virginia, and Vermont; Pennsylvania is proposed
- All signed a Memorandum of Understanding and adopted a common framework (Model Rule) for state-level rules implementing the common framework
- Local Control: Individual States have passed the Model Rule as statutes/regulations and enforce the system

# A Few Words on the EU Emission Trading System (EU ETS)

- EU regulation introduced EU Emission Trading System with rules directly applicable in each European Economic Area (EEA) Member State (the 27 EU Member States plus Norway, Iceland, and Lichtenstein – EEA MS)
  - ✓ Each EU MS must report its volume of emissions in base year (2005) to the EU
  - ✓ The total is reduced with a reduction factor (in 2013: 1.74%; in 2020: 2.2%) and on that basis each EU MS is allocated a max number of allowances
  - ✓ Local control: each EU MS has introduced legislation obliging entities to have allowances corresponding to their emissions



# Emission Reduction Targets and Gases Covered by Each System

## ➤ **Ultimate emission targets**

- **California** has a carbon neutrality and a 100% carbon free electricity target by 2045
- The **EU** has a target of zero emissions by 2050
- **RGGI's** goal is to stabilize and reduce emissions 30% below 2020 levels by 2030

## ➤ **Gases covered**

- **California and the EU** cover the same gases of carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), perfluorocarbons (PFCs) while California also covers a few others such as sulfur hexafluoride (SF<sub>6</sub>),
- **RGGI**: CO<sub>2</sub>

## Sectors Covered by Each System

- **California:** The following entities that emit over 25,000 tons annually
  - ✓ Electric generators (including importers of electricity)
  - ✓ Industrial plants
  - ✓ Oil and natural gas distributors
- **RGGI:** Fossil-fuel-fired electric power generators with a capacity of 25 megawatts or greater
- **EU:** Power and heat generators as well as energy-intensive industry (*e.g.*, steel, aluminum, metal, cement, lime, glass, ceramics, pulp, paper, cardboard, acids, chemicals) and commercial aviation with flights going to or from the EEA

## Carbon Offsets in Each System

- **California:** Instead of buying an allowance, entities may apply to procure a carbon offset credit covering verified GHG reductions or removal enhancements that are “real, additional, quantifiable, permanent, verifiable, and enforceable” (*e.g.*, projects for livestock, mine methane capture, ozone depleting substances, U.S./urban forests)
  - ✓ Carbon offsets may cover 8% of compliance requirements through 2021; 4% for 2021-2025; 6% from 2026-2030
- **RGGI:** Certain states, but not every state, issues carbon offset credits through one of five approved projects
  - ✓ Carbon offsets may cover only 3.3% of a power plant’s compliance obligations
- **EU: No carbon offsets any longer**

# Auction Prices and Allocation Under Each System

- **California:** Each year a portion is allocated for free to those with mandatory compliance obligations (power generators, large industrial users, natural gas/oil) and the remaining portion is sold on quarterly auctions
  - ✓ Prices began at \$10 in 2012 and increase 5% annually over inflation. Additional allowances are available for sale if prices reach a threshold (\$65 in 2021, increasing 5% annually, adjusted for inflation) – unlimited supply will be available at this price
- **RGGI:** In the past two years, prices have ranged from \$5.61 to \$7.60; each State may hold allowances in a reserve to be sold if price is too high; Emissions Containment Reserve (Beginning in 2021); States may also withhold allowances if prices are too low
- **EU:** Each year a portion is allocated for free (down from 43% to 30%); remaining portion is sold at auction
  - ✓ Prior to the auction, a minimum “auction reserve price” is set based on the prevailing market price: if clearing price is below auction reserve price, auction is cancelled. No price maximum applies. In 2007 the price was zero due (due to over allocation), and in 2010 it was 14 EUR due to the financial crisis. Average 2020 price is 24.76 EUR.

# Mandatory and Voluntary Entity Surrender Obligations

- **California:** Entities with an office in the U.S. with approved Compliance Instrument Tracking System Service (CITSS) accounts
  - ✓ **Entities with mandatory compliance obligations:** power plants, large industrial plants, and fuel distributors (*e.g.*, natural gas and petroleum) emitting  $\geq 25,000$  metric tons of CO<sub>2</sub>
  - ✓ **Opt-ins with mandatory compliance obligation:** entity within a sector covered by the annual GHG emission program: **below the inclusion threshold** that elect to participate
- **RGGI:** Fossil-fuel-fired electric power generators with a capacity of 25 megawatts or greater
- **EU:** Entities within an installation in the EEA and airline operators flying to and from the EEA: all have mandatory obligations
  - ✓ Each EEA MS can opt-in to certain sectors but no voluntary opt-in

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# Trading Carbon Allowances

# Trading Carbon Allowances - Overview

Trading of allowances can occur in two ways:

## ✓ Auctions

- ❖ **California and RGGI:** Quarterly auctions; both are online
- ❖ **EU ETS:** Joint (M/T/R) auctions for EU 25 and Norway, Iceland, Lichtenstein; separate weekly auctions for Germany and Poland

## ✓ Secondary Markets

- ❖ Physical allowances and financial derivatives are traded on Intercontinental Exchange and CME Group (California) and Intercontinental Exchange and Nodal Exchange (RGGI), and European Energy Exchange (EEA)
- ❖ Trades can take place either over-the-counter or on the EEX (spots and derivatives). The trades are regulated in the EU under the Markets in Financial Instruments Directive 2



# Trading: Auctions – Who Can Participate?

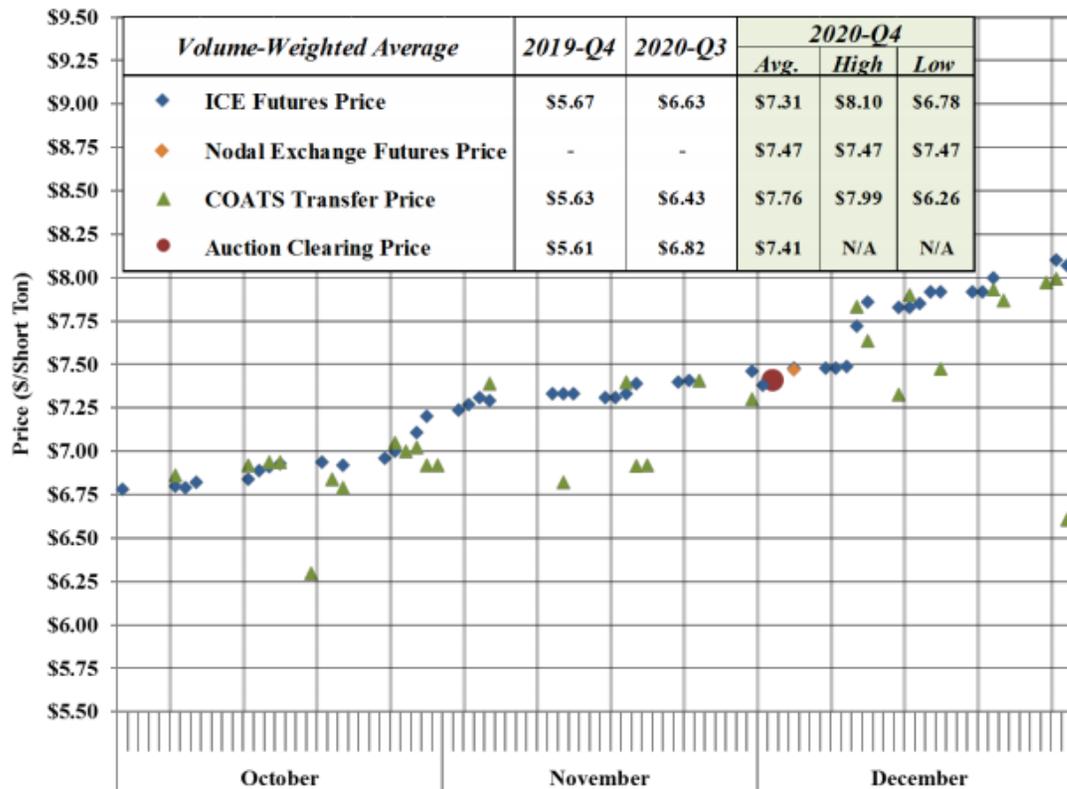
- **California** – Entities with an office located within the US with approved Compliance Instrument Tracking System Service (CITSS) accounts are eligible to participate
- **RGGI** – Anyone (including non-US firms) is eligible to participate in allowance auctions, “including but not limited to corporations, individuals, non-profit corporations, environmental organizations, brokers, and other interested parties”
- **EU** – (i) Regulated entities with an installation in the EEA, (ii) airline operators provided they fly to or from an EEA MS, and (iii) financial investment firms/credit institutions (intermediaries) established in the EEA and authorized by any EEA MS – irrespective of whether they act on their own behalf or on behalf of companies established outside the EEA
  - All participants need an account on the EEA-wide Union Registry

## Trading: Secondary Markets – Who Can Participate?

- **California** – Those that qualify for access to the Intercontinental Exchange and/or CME group to either trade directly or through their futures commission merchant (FCM); any company if bilateral OTC
- **RGGI** – Those that qualify for access to the Intercontinental Exchange and/or Nodal Exchange to either trade directly or through their FCM; any company if bilateral OTC
- **EU** – Any company irrespective of where they are established or whether they have a Union Registry Account

# Trading: Secondary Markets (RGGI Example)

Figure 2: Prices in the Secondary Market for RGGI CO<sub>2</sub> Allowances<sup>5</sup>  
October 1 to December 31, 2020<sup>6</sup>



- Trading activity in RGGI futures contracts increased compared to the previous quarter
- Futures trading volume was 128.3 million CO<sub>2</sub> allowances in the fourth quarter of 2020, up more than three times from the previous quarter and 10% from the fourth quarter of 2019
- Physical allowance transfers between unaffiliated firms increased 10 times from the previous quarter and nearly doubled from the fourth quarter of 2019
- There were 231 million CO<sub>2</sub> allowances in circulation at the end of the quarter. Compliance-oriented entities held approximately 155 million of the allowances in circulation (67%). Approximately 167 million of the allowances in circulation (72%) are believed to be held for compliance purposes

Source: Potomac Economics

# Allowance Banking and Placement in Reserves - Overview

## **California**

- Entities may hold a limited number of allowances, but allowances never expire

## **RGGI**

- Each allowance that is held in a compliance account (banked) remains valid
- RGGI may reduce allowances in future years to offset number of banked allowances (this happened on March 15, 2021 where allowances were reduced with 95.45 million over five years between 2021-2025)

## **EU ETS**

- Allowances held by entities remain valid
- If the total number of valid allowances exceeds 833 million, a share is placed in reserve
- The EU has placed allowances in a reserve in response to overallocation

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# How Does Carbon Impact Energy Markets?

# California's Wholesale Electric Markets

## ➤ **California Independent System Operator (“CAISO”)**

- Nonprofit entity that manages the flow of electricity across transmission lines in California and operates a wholesale energy market
- Electric generators (including those located within California and those outside California that wish to move their electricity into the state) offer electricity generated into CAISO's wholesale market
- CAISO purchases electricity from generators based on reliability-constrained, least-cost dispatch model
- Cost of last MW of electricity needed to satisfy demand sets the price

# CAISO Dispatch Example – No Carbon Pricing



## **Generator A**

Natural gas-fired plant  
Bid price: \$30/MW  
100 MW output



## **Generator B**

Coal-fired plant  
Bid price: \$25/MW  
100 MW output



## **Generator C**

Wind-powered plant  
Bid price: \$10/MW  
100 MW output

**Electricity demand = 200 MW**

# CAISO Dispatch Example – No Carbon Pricing



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Wind-powered plant  
**Bid price: \$10/MW**  
100 MW output

**Electricity demand = 200 MW**

**CAISO Dispatches Generators B and C**

# How California's Cap and Trade Program Impacts Electricity Prices

- Generators bid the electricity they produce into the CAISO markets
- One component of the generator bid is variable costs, which is permitted to include the cost of carbon allowances
  - “Cost” of carbon allowance in generator bid typically based on replacement cost, not actual cost
- To the extent a carbon-emitting generator is the price-setting resource at a given node, then the price of carbon raises electricity prices



# CAISO Dispatch Example – With Carbon Pricing



## **Generator A**

Natural gas-fired plant  
Bid price: \$35/MW  
100 MW output



## **Generator B**

Coal-fired plant  
Bid price: \$40/MW  
100 MW output



## **Generator C**

Wind-powered plant  
Bid price: \$10/MW  
100 MW output

**Electricity demand = 200 MW**

# CAISO Dispatch Example – With Carbon Pricing



## Generator A

Natural gas-fired plant

**Bid price: \$35/MW**

100 MW output

## Generator B

Coal-fired plant

Bid price: \$40/MW

100 MW output

## Generator C

Wind-powered plant

**Bid price: \$10/MW**

100 MW output

**Electricity demand = 200 MW**

**CAISO Dispatches Generators A and C**

# RGGI: How Does the Program Impact Electricity Prices?

- Many RGGI states have their own transmission system operators (like CAISO in California) that sell wholesale energy
  - ✓ ISO New England - Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
  - ✓ New York ISO - New York
  - ✓ PJM Interconnection - serves all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia

\*\*green = RGGI state, red = non-RGGI state, blue = RGGI status pending

## RGGI: PJM Leakage Issues

- PJM's service territory includes both RGGI and non-RGGI states
- Leakage occurs when carbon-emitting generators in non-RGGI states sell electricity into RGGI states, thus undermining the policy goals
  - ✓ Because generators include the cost of carbon in their bids, generators in non-RGGI states that are otherwise equivalent are “cheaper” to dispatch than those located within RGGI states
  - ✓ Result = generators in non-RGGI states produce electricity more often, leading to higher emissions in neighboring states
- PJM is studying leakage mitigation efforts to counter this problem, including making either one-way or two-way border adjustments

## ETS Impact on Electricity Prices

- In the EEA, electricity prices are determined at the various energy exchanges in the EEA
- Given that electricity prices at the energy exchanges are determined on the basis of the cost of the last MW of electricity needed to satisfy demand, the energy prices are set in a similar way as under the California cap and trade program
- If an energy-intensive company buys electricity from a power generator, it pays for allowances twice
  - ✓ First, through the electricity purchased (which covers the emissions of the energy generator)
  - ✓ Second, through having to buy allowances for its own emissions

## EU ETS Leakage Issues

- Leakage takes place if regulated entities leave the EU or transfer production outside the EU, in which case their total emissions will increase
- Leakage in the EEA is thus different than leakage under RGGI
- Leakage is currently prevented through granting subsidies to those entities most at risk of de-locating to other countries outside the EU

## Subsidies to Counter Carbon Leakage EU Allowances Are Value Papers

- EU allowances are “value papers” meaning that: if the allowances are granted for free it constitutes state aid which must be authorised by the EU Commission
- The EU Guidelines on ETS apply for authorising aid through allowances



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# Lessons Learned from Existing Systems

# California and RGGI: Lessons Learned

## ➤ Key benefits

- Auctions generate substantial revenue for government, inter alia, used on clean power programs
- RGGI: price controls have been effective at creating floor and ceiling to allowance prices

## ➤ Drawbacks

- Allowances may be banked indefinitely, which allow industry to abstain from reducing emissions (*e.g.*, RGGI rules allow adjustments of allowances auctioned to account for allowances currently banked).
- RGGI:
  - ✓ Leakage problem is severe for state or regional programs; particularly for power-sector program because of interconnected grids. (Leakage is where energy is imported in from nonmember states at a lower rate.)
  - ✓ Three-year control periods means problems are not caught as quickly
  - ✓ Low prices for allowances may provide less incentive for emissions producers to innovate (*e.g.*, California set higher floors that automatically increase)
  - ✓ Only regulates power plants; there are many other sources of emissions that are not part of the cap and trade system

## EU ETS: Lessons Learned

- **Key benefits:** The EU ETS is the world's largest carbon market and the first transboundary cap and trade system which broadens the possibility to find buyers for allowances, thus encouraging participants to pursue emissions reduction patterns
- **Drawbacks**
  - ✓ EU ETS excludes transport other than aviation and agriculture
  - ✓ In 2005-2008, allowed for windfall profits based on free allowances
  - ✓ Over-allocation in 2005-2012 (in 2005-2007, states had too much influence on the number of allowances to be allocated and the 2010 financial crisis caused companies to fail) and the carbon price collapsed (in 2007 it was almost zero, and in 2010 it was 14 EUR). Lacking a stable market price signal, firms postponed costly investments in low-carbon technologies
  - ✓ Monitoring problems also by national registries lead to fraud during 2005-2012
  - ✓ Carbon leakage problems

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Where Are We Going?

# Where Are Things Going?

*“The first recommendation of the [CFTC’s Market Risk Advisory Committee Report titled Managing Climate Risk in the U.S. Financial System] is also one that requires Congressional action: The U.S. should establish a price on carbon.”*

- Rostin Behnam, Acting CFTC Chairman

*“Reaching net-zero global carbon emissions as early as 2050 will take a wholesale transformation of the global economy. And the success of that transformation will depend in large part on leadership from the private sector—firms, investors, and innovators.”*

- John Kerry, U.S. Special Presidential Envoy for Climate

*“Establish an enforcement mechanism to achieve net-zero emissions no later than 2050, including a target no later than the end of Biden’s first term in 2025 to ensure we get to the finish line. This enforcement mechanism will be based on the principles that polluters must bear the full cost of the carbon pollution they are emitting and that our economy must achieve ambitious reductions in emissions economy-wide instead of having just a few sectors carry the burden of change. The enforcement mechanism will achieve clear, legally-binding emissions reductions with environmental integrity.”*

- Biden for President, *The Biden Plan for a Clean Energy Revolution and Environmental Justice*