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# Argus Air Daily

Environmental commodity markets coverage

Issue 23-4 | Friday 6 January 2023

## MARKETS AND NEWS

- California Carbon Allowances (CCAs) fell during the first week of 2023.
- Regional Greenhouse Gas Initiative (RGGI) CO<sub>2</sub> allowances fell by more than 7pc this week, as mild weather sapped demand and sent the market to nine-month lows.
- Alberta carbon offsets jumped to a new high this month as the province updated its industrial emissions program to keep pace with federal carbon pricing requirements.
- California Low Carbon Fuel Standard (LCFS) sank in the first trade week of the year.
- PJM Class I renewable energy certificates (RECs) inched lower this week but remain near record highs.
- Cross-State Air Pollution Rule (CSAPR) allowances were unchanged this week.

### Global emissions pricing

	Price	±
Global compliance carbon index \$/t	65.38	-0.49
Global green power index \$/MWh	7.29	+0.03

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## KEY MARKET PRICES

Carbon					\$/t
	Vintage	Delivery	MTD	Price	±
CCA	2023	Dec 23		29.52	+0.12
CCA VWA	2021-23	Dec 23	29.41		
RGGI CO <sub>2</sub> allowances	2021-22	Dec 23		13.20	-0.30
RGGI CO <sub>2</sub> VWA	2021-22	Dec 23	13.56		
CCA/CCO 3				11.37	+0.12
CCA/CCO 8				11.57	+0.12
CCA/CCOG				10.72	+0.12

Renewable fuels					¢/RIN
	Vintage	Delivery	Price	±	±2022
LCFS California \$/t		spot	66.50	-0.50	
LCFS Oregon \$/t		spot	121.00	0.00	
Renewable fuel (ethanol D6)	2023		171.50	1.00	-2.00
Biomass-based diesel (D4)	2023		175.00	1.75	-10.00
Cellulosic biofuel (D3)	2023		224.50	-5.00	-18.00
Advanced biofuel (D5)	2023		174.00	1.75	-10.00

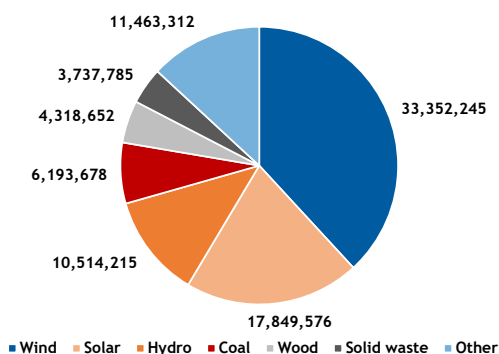
RECs					\$/MWh
	Vintage	Bid	Ask	Price	±
RECs					
Massachusetts Class I	2022	36.00	37.00	36.50	nc
Connecticut Class I	2022	36.00	37.00	36.50	nc
New Jersey Class I	2023	28.70	29.00	28.85	nc
Pennsylvania Tier I	2023	28.30	28.60	28.45	nc
Maryland Tier I	2022	28.50	29.00	28.75	nc
PJM tri-qualified Class I	2023	28.70	29.00	28.85	nc
SRECs					
New Jersey	2023	222.00	225.70	223.85	-1.40
Maryland	2022	59.50	60.50	60.00	nc
Washington DC	2022	375.00	390.00	382.50	nc
Green-e eligible RECs, 6 Jan					
National any	2023	3.35	3.65	3.50	nc
Texas wind	2023	3.30	4.10	3.70	+0.10

SO <sub>2</sub> and NO <sub>x</sub> allowances					\$/st
Vintage	Vintage	Bid	Ask	Price	±
SO <sub>2</sub> Cross-State Group 1	2022	2.00	4.00	3.00	nc
SO <sub>2</sub> Cross-State Group 2	2022	1.00	3.00	2.00	nc
NO <sub>x</sub> Cross-State annual	2022	2.00	4.00	3.00	nc
NO <sub>x</sub> Cross-State Group 2 seasonal	2022	2,000.00	2,600.00	2,300.00	nc
NO <sub>x</sub> Cross-State Group 3 seasonal	2022	13,000.00	20,000.00	16,500.00	nc

\*Tables include hyperlinks to those values maintained in the Argus database.

## MARKET MOVES

PJM RECs by source, 2022 to date



Market movers		
	Price	%±
Largest gains		
RIN advanced biofuel (D5), 2023, €/RIN	174.00	+1.02%
RIN biomass-based diesel (D4), 2023, €/RIN	175.00	+1.01%
Massachusetts Solar, 2022, \$/MWh	339.50	+0.89%
Largest losses		
RGGI US allowance year, 2023, 2021-22, \$/st	13.20	-2.22%
RIN cellulosic biofuel (D3), 2023, €/RIN	224.50	-2.18%
RGGI allowance spot, 2023, Jan 23, \$/st	12.50	-2.11%

## REGULATORY AND MARKET EVENTS CALENDAR

Date	Market	Event	More info
10 Jan	LCFS	California LCFS monthly credit transfer report	<a href="https://ww2.arb.ca.gov/resources/documents/monthly-lcfs-credit-transfer-activity-reports">https://ww2.arb.ca.gov/resources/documents/monthly-lcfs-credit-transfer-activity-reports</a>
14 Jan	CCO	California Carbon Offsets issued	<a href="https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program">https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program</a>
28 Jan	CCO	California Carbon Offsets issued	<a href="https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program">https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program</a>
31 Jan	LCFS	California LCFS 3Q 2022 data release	<a href="https://ww3.arb.ca.gov/fuels/lcfs/lrtqsummaries.htm">https://ww3.arb.ca.gov/fuels/lcfs/lrtqsummaries.htm</a>
11 Feb	CCO	California Carbon Offsets issued	<a href="https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program">https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program</a>
14 Feb	LCFS	California LCFS monthly credit transfer report	<a href="https://ww2.arb.ca.gov/resources/documents/monthly-lcfs-credit-transfer-activity-reports">https://ww2.arb.ca.gov/resources/documents/monthly-lcfs-credit-transfer-activity-reports</a>
25 Feb	CCO	California Carbon Offsets issued	<a href="https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program">https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program</a>
28 Feb	WCA	Washington state carbon allowance auction	<a href="https://ecology.wa.gov/Air-Climate/Climate-Commitment-Act/Cap-and-invest/">https://ecology.wa.gov/Air-Climate/Climate-Commitment-Act/Cap-and-invest/</a>
7 Mar	WCA	Washington state carbon allowance auction results	<a href="https://ecology.wa.gov/Air-Climate/Climate-Commitment-Act/Cap-and-invest/">https://ecology.wa.gov/Air-Climate/Climate-Commitment-Act/Cap-and-invest/</a>
8 Mar	CCO	California Carbon Offsets issued	<a href="https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program">https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program</a>
14 Mar	LCFS	California LCFS monthly credit transfer report	<a href="https://ww2.arb.ca.gov/resources/documents/monthly-lcfs-credit-transfer-activity-reports">https://ww2.arb.ca.gov/resources/documents/monthly-lcfs-credit-transfer-activity-reports</a>
18 Mar	CCO	California Carbon Offsets issued	<a href="https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program">https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program</a>
3 Apr	LCFS	California publishes new maximum LCFS credit price	<a href="https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard">https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard</a>
3 Apr	LCFS	California LCFS 4Q 2022 reporting deadline	<a href="https://ww3.arb.ca.gov/fuels/lcfs/lrtqsummaries.htm">https://ww3.arb.ca.gov/fuels/lcfs/lrtqsummaries.htm</a>
11 Apr	LCFS	California LCFS monthly credit transfer report	<a href="https://ww2.arb.ca.gov/resources/documents/monthly-lcfs-credit-transfer-activity-reports">https://ww2.arb.ca.gov/resources/documents/monthly-lcfs-credit-transfer-activity-reports</a>
28 Apr	LCFS	California LCFS 4Q 2022 data release	<a href="https://ww3.arb.ca.gov/fuels/lcfs/lrtqsummaries.htm">https://ww3.arb.ca.gov/fuels/lcfs/lrtqsummaries.htm</a>
9 May	LCFS	California LCFS monthly credit transfer report	<a href="https://ww2.arb.ca.gov/resources/documents/monthly-lcfs-credit-transfer-activity-reports">https://ww2.arb.ca.gov/resources/documents/monthly-lcfs-credit-transfer-activity-reports</a>

## CARBON MARKETS

## CANADA

Quebec carbon price for gasoline, diesel				CA¢/l
Fuel	Price			±
Gasoline	8.43			-0.01
Diesel	10.49			-0.01
<i>Represents the per-gallon cost of compliance for distributors</i>				
Alberta CO <sub>2</sub> offsets, 6 Jan				C\$/t
Vintage	Bid	Ask	Price	±
Renewable energy 2022	50.00	58.00	54.00	+6.50

## COMMENTARY

## CCAs decline

California Carbon Allowances (CCAs) fell during the first week of 2023.

CCAs for December 2023 delivery decreased by 81¢ over the week to \$29.52/metric tonne. The contract traded 343 times this week for almost 3.9mn t.

Prompt-month CCAs fell by 78¢ to \$27.88/t and traded 24 times for nearly 1.3mn t.

December 2024 allowances are at \$31.52/t. The contract traded once for 18,000t.

Washington Carbon Allowances (WCAs) moved up by \$1 to \$43/t on increased bids and offers. The December 2023 contract did not trade this week.

Seller guaranteed California Carbon Offsets (CCOs) remained at \$18.80/t this week.

CCOs with a three-year invalidation held at \$18.15/t, and CCOs with an eight-year invalidation remained at \$17.95/t.

Regulated entities can use the offsets for up to 4pc of their compliance obligations, with a requirement that at least half come from projects that provide California with direct environmental benefits (DEBS).

CCOs with DEBS held at a \$4.50 premium to non-DEBS CCOs this week.

## RGGI allowances drop to 9-month low

Regional Greenhouse Gas Initiative (RGGI) CO<sub>2</sub> allowances fell by more than 7pc this week, as mild weather sapped demand and sent the market to nine-month lows.

December 2023 allowances moved down by \$1.05 to \$13.20/short ton after trading 58 times for more than 1.5mn st.

## CALIFORNIA

California carbon allowances (CCA)					\$/t
Vintage	Delivery	Bid	Ask	Price	±
2023	Jan 23	27.83	27.93	27.88	+0.14
	Dec 23	29.47	29.57	29.52	+0.12
2024	Dec 24	31.47	31.57	31.52	+0.11

CCA volume-weighted averages					\$/t
Vintage	Delivery	Low	High	VWA	MTD VWA
2021-23	Dec 23	29.35	29.55	29.42	29.41
Vintage	Delivery	Trades	MTD	Volume	MTD
2021-23	Dec 23	20	343	423,000	3,878,000

California carbon price for gasoline, diesel				¢/USG	
Fuel	Price	±	Price	±	
Carbob	Summer		Winter		
	Regular	22.47	+0.12	22.41	+0.12
	Midgrade	22.41	+0.11	22.41	+0.12
	Premium	22.37	+0.11	22.42	+0.11
Distillate			ULSD No. 2		
Ultra-low sulfur diesel			28.54	+0.14	
<i>Represents the per-gallon cost of compliance for distributors</i>					

California Carbon offsets (CCO), 6 Jan				\$/t
	Bid	Ask	Price	±
Seller-guaranteed (CCOG)	18.75	18.85	18.80	nc
3-year invalidation (CCO 3)	18.10	18.20	18.15	nc
8-year invalidation (CCO 8)	17.90	18.00	17.95	nc
CCO-G DEBS	23.25	23.35	23.30	nc
CCO-3 DEBS	22.60	22.70	22.65	nc
CCO-8 DEBS	22.40	22.50	22.45	nc
<i>DEBS represent offsets that provide direct environmental benefits in the state</i>				

California carbon spreads			\$/t
	Price		±
CCA/CCO 3	+11.37		+0.12
CCA/CCO 8	+11.57		+0.12
CCA/CCOG	+10.72		+0.12
CCA Jan 23/CCA Dec 23	-1.64		+0.02
CCA Dec 23/CCA Dec 24	-2.00		+0.01

## WASHINGTON

Washington carbon allowances (WCA)					\$/t
Vintage	Delivery	Bid	Ask	Price	±
2023	Dec 23	40.00	46.00	43.00	nc

## CARBON MARKETS

Prompt-month allowances fell by \$1.04 to \$12.50/st after trading just once for 21,000st.

December 2024 allowances ended the week at \$13.99/st. The contract did not trade.

Prompt-month and December 2023 allowances are now at their lowest prices since a broad sell-off of emissions allowances in the early days of the Russia-Ukraine conflict – more than nine months ago. The RGGI market also has not experienced a steeper week-on-week decline since March 2020, at the beginning of the Covid-19 pandemic.

Allowance prices in the other main US carbon market, the Western Climate Initiative, also slipped this week, but to a lesser degree than in the RGGI market.

For RGGI, unusually mild temperatures across the northeast this week have sapped power demand, depressing natural gas prices and reducing the need for additional coal-fired generation. And while January is often a time of high heating demand for the RGGI states, above-average temperatures are expected to blanket New England through 19 January, according to the private forecaster Commodity Weather Group.

The size of the week's declines – more than 7pc – also resulted from allowance prices generally increasing in December, especially in relation to a brief cold snap that hit the eastern US.

### Alberta offsets hit new high

Alberta carbon offsets jumped to a new high this month as the province updated its industrial emissions program to keep pace with federal carbon pricing requirements.

Alberta offsets rose by C\$6.50 to C\$54/metric tonne (\$40.15/t), following the government's changes to the Technology Innovation and Emission Reduction (TIER), which included new CO<sub>2</sub> requirements and additional flexibility around the use of offsets.

The changes **also include** a higher tech fund payment of C\$65/t this year, keeping in line with the federal carbon price for 2023. That price will increase by C\$15/yr until reaching C\$170/t in 2030.

The basics of the TIER program remain the same. Participating facilities can comply by reducing emissions below set benchmarks, buying credits or offsets from other sources, or paying into a fund that supports low-carbon technologies.

The program automatically applies to industrial facilities

## RGGI

RGGI CO <sub>2</sub> allowances					\$/st
Vintage	Delivery	Bid	Ask	Price	±
2021-22	Jan 23	12.45	12.55	12.50	-0.27
	Dec 23	13.15	13.25	13.20	-0.30
	Dec 24	13.94	14.04	13.99	-0.26

RGGI CO <sub>2</sub> volume-weighted averages					\$/st
Vintage	Delivery	Low	High	Daily	MTD
2021-22	Dec 23	13.01	13.40	13.19	13.56
	Jan 23	12.59	12.59	12.59	12.59

Weekly index, 6 Jan				\$/st
	Delivery	Vintage	Index	±
RGGI CO <sub>2</sub> allowances	Dec 23	2021-22	13.60	+0.25

RGGI CO <sub>2</sub> spreads			\$/t
		Price	±
Jan 23/Dec 23		-0.70	+0.03
Dec 23/Dec 24		-0.79	-0.04

that emit more than 100,000 t/yr of CO<sub>2</sub> and now includes include facilities that import more than 10,000t of hydrogen annually.

The province is also allowing facilities within emissions-intensive, trade-exposed industries that emit 2,000t/yr to opt into the program. Previously the opt-in threshold was 10,000t/yr.

Multiple small oil and gas facilities with a common owner will still be able to join TIER by applying as an aggregate facility.

The new rules also allow facilities to rely more heavily on offsets and emissions credits for compliance. Companies that deploy carbon capture, utilization, and storage technologies on-site, including enhanced oil recovery, can soon generate "sequestration credits" for compliance. And facilities will be able to gradually meet a higher share of their obligations through credits and offsets, from a maximum of 60pc this year to 90pc by 2026.

The updated program took effect on 1 January and will last at least through 2026.

## RENEWABLE FUEL MARKETS

## NEWS INSIDE

US ethanol output falls to 18-month low: EIA 11

## COMMENTARY

## California LCFS credits slip

California Low Carbon Fuel Standard (LCFS) sank in the first trade week of the year.

Spot credits fell by \$2 this week to \$66.50/metric tonne. Credits began the shortened trade week offered higher in the first two sessions and in a widening contango down the curve. Interest focused on second quarter 2023 transfers, where \$69.50/t traded repeatedly on Wednesday. Offers tested higher yesterday, but abruptly dropped near the middle of the session. Third quarter 2023 credits traded at \$67/t today in a wide, slow session.

LCFS credits have traded in a \$60-70/t range since late September. No new data specific to the LCFS market emerged this week. Weekly state gasoline storage data showed that California added to already unseasonably high CARBOB inventories in the final week of 2022. The rising volumes suggest production continued to outpace demand. CARBOB generated almost 80pc of new LCFS deficits in 2021.

Fuel producers and obligated parties await a formal rulemaking announcement from the California Air Resources Board. Staff plan to this year pursue new, tougher targets and potential changes to how the program treats petroleum and renewable fuels as California addresses a record 11.3mn t of unused and available LCFS credits amassed by the middle of last year.

Oregon Clean Fuels Program credits remained at \$121/t this week. Credits briefly dipped in discussion that opened the week but then moved back higher.

Low-carbon fuel standard (LCFS) credits					\$/t
	Delivery	Bid	Ask	Price	±
California	spot	64.00	69.00	66.50	-0.50
	1Q23	65.00	69.00	67.00	nc
	2Q23	65.00	69.00	67.00	nc
	3Q23	66.00	68.00	67.00	-1.00
	4Q23	66.00	69.00	67.50	-0.50
Oregon	spot	119.00	123.00	121.00	nc

LCFS volume-weighted averages					\$/t
	Delivery	Trades	Volume	MTD VWA	
California	Spot	1	10,000	69.00	
	4Q23	0	0	na	

LCFS premium per carbon intensity point				¢/USG
		Price		±
California				
Ethanol		0.54		-0.01
Biodiesel		0.84		-0.01
Alternative jet		0.84		-0.01
Renewable diesel		0.86		-0.01
Oregon				
Ethanol		0.99		nc
Biodiesel		1.53		nc
Alternative jet		1.53		nc
Renewable diesel		1.57		nc

Represents cost savings of using ethanol, biodiesel or alternative jet fuel.

LCFS cost for gasoline, diesel				¢/USG
Fuel	Vintage	Price		±
California				
Carbob (No CI ethanol)	2023	8.99		-0.07
	2024	9.88		-0.07
	2025	10.77		-0.08
Carbob (79.9 CI ethanol)	2023	8.54		-0.06
	2024	9.49		-0.08
	2025	10.45		-0.08
Ultra-low sulphur diesel	2023	10.10		-0.08
	2024	11.23		-0.09
	2025	12.35		-0.09
Crude CI deficit Carbob	2023	0.87		-0.01
Crude CI deficit diesel	2023	0.98		-0.01
Oregon				
E10 gasoline	2023	9.14		nc
B5 diesel	2023	10.41		nc

Represents per-gallon cost of compliance.

Oregon LCFS market biogas value				\$/mmBtu
	Natural gas	Landfill Biogas	Dairy Biogas	
PG&E Malin	16.47	43.35	56.48	

California LCFS market biogas value				\$/mmBtu
	Natural gas	Landfill Biogas	Dairy Biogas	
SoCal Citygates	19.36	46.22	59.35	
PG&E Citygates	17.04	43.91	57.04	

## RENEWABLE FUEL MARKETS

### RINs rise

Federal renewable identification numbers (RINs) mostly rose on Friday.

Vintage 2022 ethanol D6 RIN credits surfaced trading on the day between 173¢-174¢/RIN, rising by 1¢/RIN to 173.5¢/RIN. Vintage 2023 ethanol RINs continued to trade at a 2¢/RIN discount to their prior year counterparts, also rising by 1¢/RIN on the day.

Vintage 2023 biomass-based diesel D4 RIN credits rose by 1.75¢/RIN to 175¢/RIN as they traded at a 3.5¢/RIN premium to concurrent D6 credits. Outright deals done at 175.5¢/RIN marked the high. Vintage 2022 D4 credits exchanged hands at a 10¢/RIN premium to current year biodiesel credits, ticking up by 0.25¢/RIN to 185¢/RIN. Vintage 2021 D4 credits pulled back by 1.75¢/RIN as deals done at an 18¢/RIN premium to 2022 vintage biodiesel credits materialized.

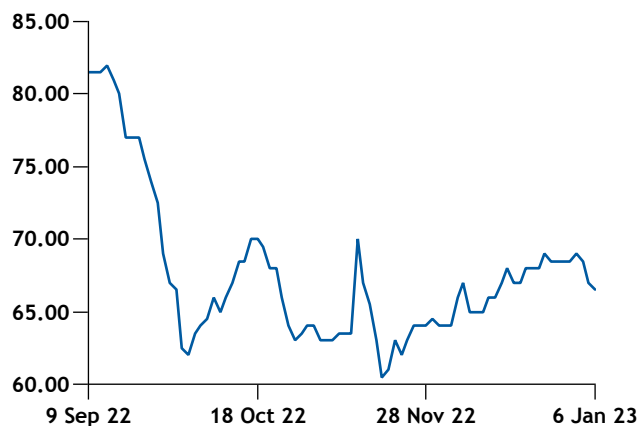
Vintage 2023 cellulosic biofuel D3 credits traded between 224¢-225¢/RIN, extending losses and falling by 5¢/RIN to 224.5¢/RIN.

	Renewable identification numbers (RINs)		¢/RIN
	Low	High	±
<b>Renewable fuel (ethanol D6)</b>			
2020	172.00	173.00	+0.25
2021	172.00	173.00	+0.25
Weighted average, 2023		171.57	
2022	173.00	174.00	+1.00
2023	171.00	172.00	+1.00
<b>Biomass-based diesel (D4)</b>			
2020	201.50	202.50	-1.75
2021	202.50	203.50	-1.75
2022	184.50	185.50	+0.25
2023	174.50	175.50	+1.75
<b>Cellulosic biofuel (D3)</b>			
2020	283.00	284.00	+1.00
2021	283.00	284.00	+1.00
2022	242.00	243.00	-5.00
2023	224.00	225.00	-5.00
<b>Advanced biofuel (D5)</b>			
2020	200.50	201.50	-1.75
2021	201.50	202.50	-1.75
2022	183.50	184.50	+0.25
2023	173.50	174.50	+1.75

Renewable fuel spreads		
	Price	±
LCFS California spot/LCFS California 4Q23, \$/t	-1.00	nc
LCFS California spot/LCFS Oregon spot, \$/t	-54.50	-0.50
Advanced biofuel (D5) RIN 2022/2023 ¢/RIN	+10.00	-1.50

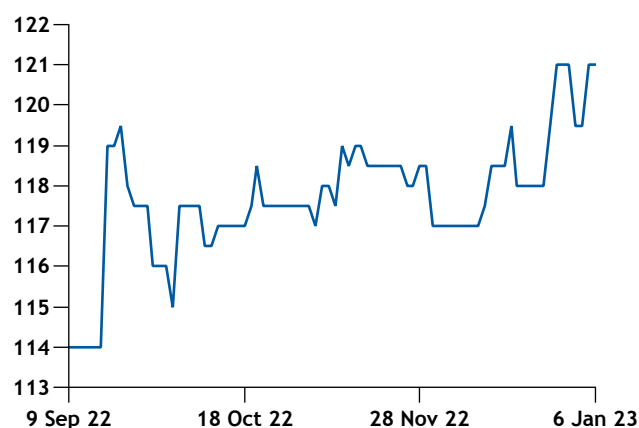
California LCFS spot

\$/t



Oregon LCFS spot

\$/t



## RENEWABLE ENERGY CERTIFICATE (REC) MARKETS

Weekly REC market prices, 6 Jan					\$/MWh
	Vintage	Bid	Ask	Price	±
<b>Connecticut</b>					
Class III	2022	18.00	20.00	19.00	nc
	2023	23.75	24.25	24.00	nc
<b>New Hampshire</b>					
Class I	2022	36.00	37.00	36.50	+0.75
	2023	37.00	38.00	37.50	nc
<b>Rhode Island</b>					
New	2022	36.00	37.00	36.50	+0.75
	2023	37.00	38.00	37.50	nc
<b>New Jersey</b>					
Class II	2023	19.00	20.00	19.50	nc
	2024	21.35	22.75	22.05	nc
<b>New York</b>					
Tier 1	2022	24.00	25.00	24.50	nc
<b>Virginia</b>					
Compliance	2022	13.50	14.00	13.75	+0.25
<b>California</b>					
Category 3	2022	4.50	5.50	5.00	+0.50
<b>Texas</b>					
Compliance	2022	2.45	2.75	2.60	nc
	2023	3.00	3.50	3.25	nc
Solar	2022	3.00	3.50	3.25	nc
	2023	4.10	4.60	4.35	+0.20

Weekly Green-e eligible REC market prices, 6 Jan					\$/MWh
	Vintage	Bid	Ask	Price	±
National any	2023	3.35	3.65	3.50	nc
	2024	4.10	4.50	4.30	na
Texas wind	2023	3.30	4.10	3.70	+0.10
	2024	4.10	4.60	4.35	na

### NEWS INSIDE

[Mass. governor plots wind, solar expansion](#)

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### COMMENTARY

#### PJM RECs dip

PJM Class I renewable energy certificates (RECs) inched lower this week but remain near record highs.

PJM credits for 2023 fell by 5¢ from a week ago to \$28.85/MWh. The 2024 RECs dipped by 10¢ over the week to \$28.85/MWh as well.

REC market prices					\$/MWh
	Vintage	Bid	Ask	Price	±
<b>Massachusetts</b>					
Class I	2022	36.00	37.00	36.50	nc
	2023	37.00	38.00	37.50	nc
SREC I	2022	336.00	343.00	339.50	+3.00
SREC II	2022	280.00	285.00	282.50	nc
<b>Connecticut</b>					
Class I	2022	36.00	37.00	36.50	nc
	2023	37.00	38.00	37.50	nc
<b>Nepool dual class</b>					
Class I	2022	36.00	37.00	36.50	nc
	2023	37.00	38.00	37.50	nc
<b>New Jersey</b>					
Class I	2023	28.70	29.00	28.85	nc
	2024	28.70	29.00	28.85	nc
SREC	2023	222.00	225.70	223.85	-1.40
	2024	214.00	216.00	215.00	nc
<b>Pennsylvania</b>					
Tier I	2023	28.30	28.60	28.45	nc
SREC	2023	46.00	48.00	47.00	nc
<b>Maryland</b>					
SREC	2022	59.50	60.50	60.00	nc
	2023	28.50	29.00	28.75	nc
<b>PJM tri-qualified</b>					
Class I	2023	28.70	29.00	28.85	nc
	2024	28.70	29.00	28.85	nc
<b>District of Columbia</b>					
SREC	2022	375.00	390.00	382.50	nc

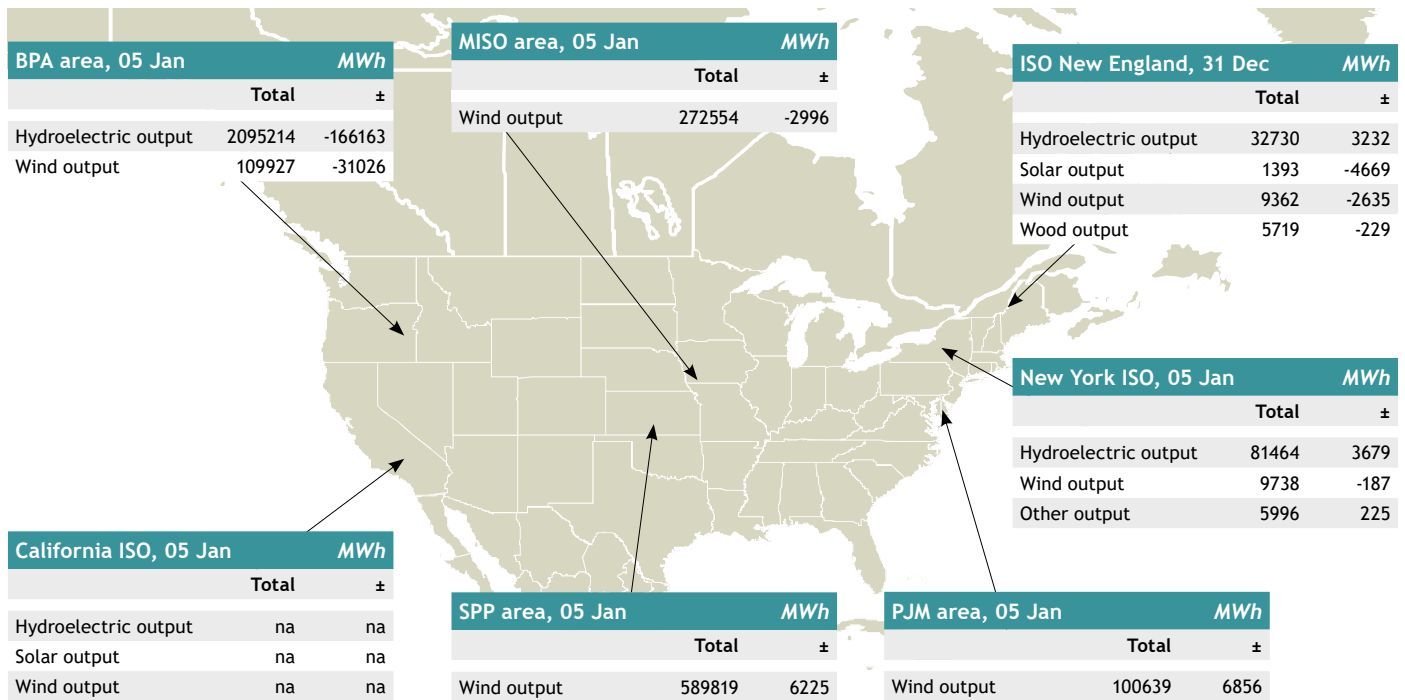
REC spreads		\$/MWh
	Price	±
PJM tri-qualified Class I 2023/2024	0.00	nc
Massachusetts Class I 2022/2023	-1.00	nc
Connecticut Class I 2022/2023	-1.00	nc
New Jersey Class I 2023/2024	0.00	nc
New Jersey SREC 2023/2024	+8.85	-1.40

Many of the PJM trades on the Intercontinental Exchange to start the year were for smaller lots, although other deals were heard over-the-counter later in the week.

Several factors are keeping the markets near their high points, including an updated PJM interconnection queue process that could limit the availability of new REC supplies in the near-term. In addition, the region is entering a stretch with several load auctions, which can bring to the markets speculators and compliance buyers that need to cover their obliga-



## RENEWABLE ENERGY CERTIFICATE (REC) MARKETS



tions under state renewable portfolio standard (RPS) programs.

Maryland will hold the second of four standard offer service auctions, which cover residential load for most of 2023, on 23 January. New Jersey will follow on 3 February with its basic generation service auction.

Interest in Pennsylvania Tier II RECs was solid, with the 2021 and 2022 vintages trading over-the-counter while 2023 and 2024 RECs traded on the Nodal exchange. Pennsylvania utility PPL is seeking an array of Tier I, Tier II and solar credits generated between 1 June 2020-31 May 2023. The solicitation includes 684,000 Tier II RECs, which the state awards to resources such as waste coal and large-scale hydropower. The requirement for Tier II is 10pc/yr.

Proposals are due by 17 January, with a decision from Pennsylvania utility regulators on PPL's selections expected by 19 January.

District of Columbia SRECs rose by \$7.50 over the week to \$382.50/MWh. The Council of the District of Columbia last month voted to raise the solar carve-out in the RPS to 15pc by 2041, from 10pc at present.

The proposal would set the alternative compliance payment (ACP), the de facto ceiling in the SREC market, at \$500/

MWh through 2023. It would then step down by \$20/yr through 2032 and hold at \$300/MWh from 2033-2041. After 2041, the ACP would flatten at \$100/MWh.

The bill's progress through the council process since late July has pushed District SREC higher after they fell as low as \$300/MWh in mid-2022. Mayor Muriel Bowser (D) has until 12 January to sign the bill, allow it to pass without her signature or veto it.

Vintage 2023 Texas RECs from projects eligible for the Green-e program rose by 10¢ from last week to \$3.70/MWh. Their 2024 equivalents are at \$4.35/MWh. Voluntary credits traded over-the-counter and on Nodal.

While voluntary markets are typically driven by demand from large energy buyers with sustainability goals, some market participants have noted that developers have shown interest in Green-e eligible RECs, seeking to backfill contracts for projects in states with RPS mandates. Because compliance programs have stricter limits on project locations, which constrains the supply, developers can typically secure higher prices for RECs in RPS markets. Because they still must honor contracts with voluntary buyers, they can turn to the Green-e markets to replace those credits.



## FEDERAL MARKETS

### NEWS INSIDE

EPA proposes lower particulate matter limits **12**  
 SPP coal generation jumped in December **13**

### COMMENTARY

#### Cross-state allowances hold steady

Cross-State Air Pollution Rule (CSAPR) allowances were unchanged this week.

Group 3 seasonal NO<sub>x</sub> allowances were flat at \$16,500/short ton.

Group 2 seasonal NO<sub>x</sub> allowances held at \$2,300/st this week. The allowances had jumped by 24pc over the prior two weeks, after slipping to a six-month low in November.

Annual NO<sub>x</sub> allowances were flat at \$3/st.

Group 1 SO<sub>2</sub> allowances were unchanged at \$3/st, while Group 2 SO<sub>2</sub> allowances remained at \$2/st.

The US Environmental Protection Agency (EPA) today proposed more stringent air quality standards for particulate matter, which, if finalized, would be the first change since 2012.

The agency is proposing lowering the standards for fine particulates (PM<sub>2.5</sub>) to a level between 9-10 micrograms/m<sup>3</sup> from the current 12 micrograms/m<sup>3</sup> benchmark. If finalized, tighter PM<sub>2.5</sub> standards could later be used to justify lower

SO <sub>2</sub> and NO <sub>x</sub> allowances						
Vintage	Vintage	Bid	Ask	Price	±	
SO <sub>2</sub>						
Acid Rain Program \$/allowance	2022	0.45	0.85	0.65	nc	
Cross-State Group 1 \$/st	2022	2.00	4.00	3.00	nc	
Cross-State Group 2 \$/st	2022	1.00	3.00	2.00	nc	
Cross-State \$/st	Group avg			2.50	nc	
NO <sub>x</sub> \$/st						
Cross-State annual	2022	2.00	4.00	3.00	nc	
Cross-State Group 2 seasonal	2022	2,000.00	2,600.00	2,300.00	nc	
Cross-State Group 3 seasonal	2022	13,000.00	20,000.00	16,500.00	nc	

Weekly index, 6 Jan				\$/allowance	
	Vintage		Index	±	
SO <sub>2</sub>	2022		0.65	nc	

annual SO<sub>2</sub> and NO<sub>x</sub> limits for power plants covered by the CSAPR program, which is currently designed to help areas in the eastern US meet previous particulate matter standards.

EPA has indicated it aims to finalize an update to CSAPR by March this year, in time for ozone season, which runs from 1 May to September 30. In its proposal last year, the agency proposed setting more stringent NO<sub>x</sub> emissions caps, adding more states to the Group 3 market and regularly recalibrating the allowance bank.

A legal challenge to a previous update to CSAPR is still being considered by a federal court.

Texas Emissions Reduction Credit (ERC) program				
Date	Seller	Buyer	Amount st	\$/st
NO <sub>x</sub> trades				
30 Aug 22	Element Markets Emissions	Freeport LNG	7.7	115,000
26 Aug 22	Fathom Energy	Freeport LNG	0.1	115,000
26 Aug 22	Fathom Energy	Freeport LNG	0.8	115,000
26 Aug 22	Fathom Energy	Freeport LNG	1.1	115,000
26 Aug 22	Fathom Energy	Freeport LNG	0.5	115,000
VOC trades				
17 Dec 22	Gaither Petroleum	Dow Chemical	0.3	110,000
1 Dec 22	Element Markets Emissions	Dow Chemical	4.3	148,000
1 Dec 22	Element Markets Emissions	Dow Chemical	1.1	140,000
1 Dec 22	Hilcorp Energy	TPC Group	2.0	117,000
30 Nov 22	Hilcorp Energy	TPC Group	4.0	117,000

## MONTHLY PRICE INDEXES

Carbon markets, December				Renewable fuel markets, December			
	Vintage	Index	±		Vintage	Index	±
CCA prompt \$/t	2023	27.99	+0.37	D5 RINs €/RIN	2022	173.17	-17.70
CCA Dec 23 \$/t	2023	27.96	+0.24	LCFS California \$/t		66.86	+3.11
CCA Dec 24 \$/t	2024	29.90	+0.06	LCFS California 4Q \$/t		66.86	+3.11
RGGI CO <sub>2</sub> prompt \$/st	2021-22	13.22	-0.11	LCFS Oregon \$/t		118.29	+0.06
RGGI Dec 22 \$/t	2021-22	13.20	-0.17				
RGGI Dec 23 \$/t	2023	14.02	-0.21	REC markets, December \$/MWh			
California regular Carbob €/USG	2023	22.56	+0.30		Vintage	Index	±
California midgrade Carbob €/USG	2023	22.50	+0.29	Massachusetts Class I	2022	35.73	+0.09
California premium Carbob €/USG	2023	22.46	+0.29		2023	37.52	+0.52
California distillate ULSD €/USG	2023	28.66	+0.38	Massachusetts SREC I	2022	336.50	nc
Quebec gasoline CA€/l	2023	8.53	+0.19	Massachusetts SREC II	2022	281.86	+1.03
Quebec diesel CA€/l	2023	10.61	+0.24	Connecticut Class I	2022	35.73	+0.09
					2023	37.52	+0.52
Allowance markets, December				NEPOOL dual-qualified	2022	35.98	+0.09
	Vintage	Index	±		2023	37.52	+0.52
SO <sub>2</sub> Acid Rain Program \$/allowance	2022	0.65	nc	New Jersey Class I	2023	28.40	+1.84
SO <sub>2</sub> Cross-State Group 1 \$/st	2022	3.00	nc		2024	28.40	na
SO <sub>2</sub> Cross-State Group 2 \$/st	2022	2.00	nc	New Jersey SREC	2023	225.02	-1.13
Cross-State annual NO <sub>x</sub> \$/st	2022	3.00	nc		2024	214.85	na
Cross-State Group 2 seasonal NO <sub>x</sub> \$/st	2022	1,921.43	-671.07	Pennsylvania Tier I	2023	27.97	+1.71
Cross-State Group 3 seasonal NO <sub>x</sub> \$/st	2022	16,500.00	+2325.00	Pennsylvania SREC	2023	46.50	+0.85
				Maryland Tier I	2022	28.30	+1.92
				Maryland SREC	2022	60.49	-0.42
				PJM tri-qualified	2023	28.41	+1.85
					2024	28.40	+1.79
				District of Columbia SREC	2022	376.43	-8.57

Monthly indexes are calculated as the average daily price published for the named month.

Low-carbon Fuel Standard Program Proposals		
Region	Proposed carbon intensity reduction targets	State of Play
Canada	13pc from 2016 levels by 2030	LCFS to begin in July 2023; registration for early credit generation underway
Washington	20pc from 2017 levels by 2038	LCFS enforcement to begin 1 Jan 2023
New York	20pc by 2030	Scoping plan adopted on 19 December 2022
New Mexico	20pc from 2018 levels by 2030	Legislation failed to pass in 2022 session.
Minnesota	Under study	State agencies discussing LCFS with stakeholders as directed by governor
Michigan	No firm proposal	Climate plan includes LCFS; public comment underway in first half of 2022
Oregon	20pc by 2030	Amendments adopted with 20pc by 2030 target
California	Tougher targets both pre- and post-2030	Climate scoping plan underway; no implementation before 2024
Pennsylvania	22pc by 2040	No rulemaking or established policy. Contemplated as part of 2021 Climate Action Plan

NEWS

RENEWABLE FUELS

US ethanol output falls to 18-month low: EIA

US ethanol production tumbled last week to the lowest in more than 18 months, helping to trim stockpiles of the biofuel, according to Energy Information Administration (EIA) data.

US ethanol production in the week ended 30 December fell by 119,000 b/d to 844,000 b/d, the lowest since 5 June 2020 and the first weekly output below 900,000 b/d since late September. Midcontinent production fell by 112,000 b/d to 794,000 b/d, while the Gulf coast region boosted output by 2,000 b/d.

Compared with a year earlier, US production last week was down by 204,000 b/d.

Domestic ethanol stocks fell to 24.4mn bl, down by 0.8pc from the prior week but holding above 24mn bl for a fourth consecutive week. The west coast led the inventory decline, falling by 171,000 bl to 2.5mn bl, while midcontinent stocks rose on the week by 52,000 bl.

Compared with a year earlier, US ethanol stocks last week were up by 3.1mn bl.

Implied gasoline demand fell from the previous week by 1.8mn b/d to 7.5mn b/d, the lowest since January 2021. Gasoline demand was down by 658,000 b/d compared with a year earlier.

Ethanol blending fell by 127,000 b/d, on the week to 789,000 b/d. Blending was up 7,000 b/d from a year earlier.

By *Conor O'Brien*

RENEWABLE ENERGY CERTIFICATES (RECS)

Mass. governor plots wind, solar expansion

Massachusetts governor Maura Healey (D) is calling for more aggressive solar and offshore wind targets as part of a drive to decarbonize the state's electricity grid.

Healey used her inaugural address on Thursday to provide a window into how she plans to get the state to 100pc zero-emissions electricity by 2030, one of her climate policy pledges during last year's election campaign.

"This legislature has already laid out ambitious goals. I am grateful to them. I share that ambition," Healey said. "I have pledged to double our offshore wind and solar targets, and quadruple our energy storage deployment."

The governor campaigned on raising the offshore wind

target to 10,000MW by 2035, building on a law requiring the state to contract for 5,600MW by 2027. At the time, Healey suggested that she would expand the state's procurements, find "market mechanisms" that would lead to "lowest cost" agreements and pave the way for corporate, municipal and non-profit electricity buyers to contract directly with projects.

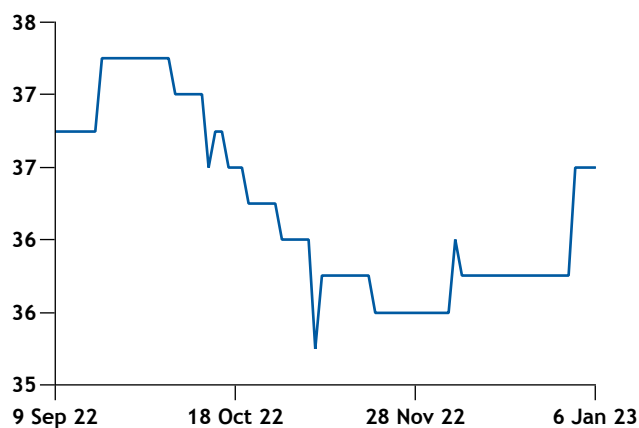
Healey also pledged to bring the state's total solar capacity to 10,000MW by 2030, relying on a combination of rooftop solar in communities with low adoption rates, using "smart siting" to support utility-scale projects and pushing utilities to upgrade the distribution system to support these additions.

The governor's office did not immediately respond to a request for additional details.

Massachusetts is pursuing net-zero greenhouse gas emissions by 2050, and lawmakers in 2021 [adjusted the renewable portfolio standard \(RPS\)](#) to require utilities to use resources like wind and solar for 40pc of their retail sales by 2030. The state also has a clean energy standard that works in tandem with the RPS, obligating utilities to use a broader set of resources, which includes Class I generators, as well as large-scale hydropower and nuclear, for 80pc of their sales by 2050.

Toward those ends, the state has established various procurement targets such as the 5,600MW of offshore wind. Massachusetts, like other states linked with the grid overseen by ISO-New England, is counting on offshore wind farms to provide an increasing share of renewable energy certificates (RECs) in the coming years as state-level mandates ratchet up. New England [has limited space](#) for larger onshore projects.

Massachusetts Class I current year \$/MWh



NEWS

The state last year [expanded its third and current solar program](#), known as the Solar Massachusetts Renewable Target (SMART) initiative, to allow for 3,200MW. While SMART projects do not generate solar RECs, which are used for the previous solar programs, they qualify as Class I REC generators.

Through the third quarter of last year, the state had installed 4,037MW altogether, according to trade group the Solar Energy Industries Association.

And the state in 2018 set a goal of 1,000MWh of storage by 2025. Massachusetts' electricity distributors had installed 320MWh as of February 2022, with another 885MWh in the pipeline, according to the Department of Energy Resources. *By Patrick Zemanek*

FEDERAL

**EPA proposes lower particulate matter limits**

The US Environmental Protection Agency (EPA) is proposing to set more stringent air quality standards for particulate matter, a move that could lead to tougher emissions limits for refineries and other industrial sources.

The agency today proposed lowering the primary health-based National Ambient Air Quality Standard (NAAQS) for fine particulates (PM2.5) to a level between 9-10 micrograms/m<sup>3</sup> from the current 12 micrograms/m<sup>3</sup> benchmark.

"This proposal is anchored in the best available science," EPA administrator Michael Regan said, calling the current standard "no longer protective of public health."

The agency also plans to gather public feedback on potentially setting the standard as low as 8 micrograms/m<sup>3</sup> and as high as 11 micrograms/m<sup>3</sup>.

A decision by EPA to set new PM limits could lead to a number of additional steps, including tighter regulation of industrial sources of particulates, such as refineries, and potentially lower annual SO<sub>2</sub> and NO<sub>x</sub> limits for power plants covered by the Cross-State Air Pollution Rule (CSAPR) emissions-trading program, which is designed to help areas in the eastern US meet previous particulate matter standards.

EPA said a number of other actions it has taken or proposed will help states meet the new standards, including recently adopted emissions standards for heavy-duty trucks and [forthcoming changes](#) to the CSAPR program intended to slash summertime NO<sub>x</sub> emissions from power plants in 25 states, along with new NO<sub>x</sub> limits for industrial sources.

The agency said a standard of 9 micrograms/m<sup>3</sup> would prevent up to 4,200 premature deaths each year and result in as much as \$43bn in net health benefits in 2032.

The proposal is facing push back from industry groups.

The US Chamber of Commerce said it was "disappointed" that EPA did not consider leaving the current standards in place, noting the US already has some of the "best air quality in the world," thanks to major emissions reductions in recent years.

"While it is important to continue making progress, we are concerned that the proposed regulation would stifle manufacturing and industrial investment and exacerbate permitting challenges that continue to hamper the economy," said Chad Whiteman, vice president of environment and regulatory affairs at the Chamber's Global Energy Institute.

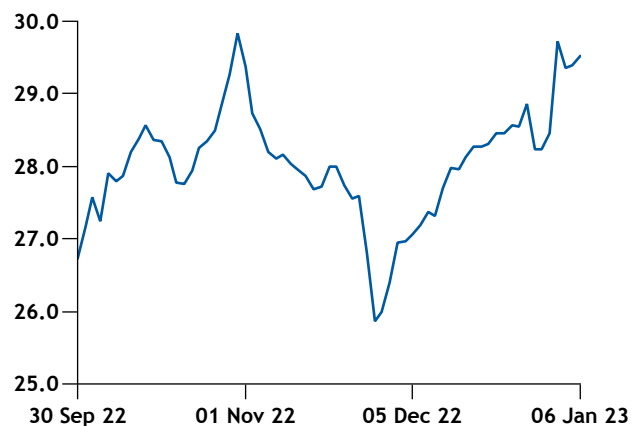
But many environmental groups said EPA's proposal falls short of what is needed to protect public health and called on the agency to adopt an 8 micrograms/m<sup>3</sup> limit.

"EPA is taking an important step forward to address deadly soot pollution, and we urge EPA to issue more protective final standards so that all people can breathe easier," Environmental Defense Fund general counsel Vickie Patton said.

The proposal comes after EPA last year said it would re-evaluate the PM NAAQS, which have not been updated since 2012, citing a "strong body of scientific evidence" showing long- and short-term exposure to fine particles can lead to heart attacks, asthma attacks and premature death. That followed a decision by the agency in late 2020 [not to make any](#)

California Carbon allowances

\$/t



## NEWS

changes to the standards, which a group of 17 states led by California challenged in court last year.

The proposal also calls for changes to air monitoring requirements intended to improve data collection in “overburdened and vulnerable” communities that are subject to disproportionate air pollution risk.

The NAAQS also include 24-hour limits for PM<sub>2.5</sub> and coarse particulate (PM<sub>10</sub>), which EPA is proposing to retain, and which have not been updated since 2006 and 1987, respectively. But the agency will seek feedback on whether to lower those standards, which are meant to provide public welfare protections, including against decreased visibility and damage to animals, crops, vegetation and buildings.

Particulate matter includes dust, soot and smoke, which are linked to health problems, including cancer and respiratory ailments. Most particulates form as the result of reactions between emissions of SO<sub>2</sub> and NO<sub>x</sub>, which often come from power plants, industrial sources and automobiles.

EPA said it will open a 60-day public comment period on the proposal once it is published in the *Federal Register*. The agency also will hold a virtual public hearing over “several days,” with details to be announced later.

By Michael Ball

### SPP coal generation jumped in December

Coal-fired generation in the Southwest Power Pool (SPP) rose in December from year-earlier levels as electricity demand climbed and renewables lagged.

Generators in SPP dispatched 243,059 MWh/d of coal-fired power during the month, up from 206,312 MWh/d a year earlier, grid data show.

The 18pc increase in coal generation surpassed a 12pc rise in total power generation in SPP, which extends from southeast New Mexico and west Texas up to North Dakota and part of Montana. As a result, coal's share of the SPP generation mix rose by 1.5 percentage points from a year earlier to 31pc.

SPP, along with a number of other regions of the US, experienced abnormally cold temperatures at the end of last month, according to the National Oceanic and Atmospheric Administration. The weather conditions boosted electricity demand across much of the country but also challenged system reliability. Neighboring grid Midcontinent Independent System Operator imposed a maximum generation emergency event

across its grid on 23 December and the Department of Energy allowed the Electric Reliability Council of Texas to waive some federal emissions standards so that generators could run at maximum capacity.

SPP declared two level one energy emergency alerts on 23 December amid a surge in electricity demand and had operation conservation advisories in place through 25 December. Generation dispatch in the grid jumped by nearly 20pc between 21-23 December, reaching a four-and-a-half-month high of 1.03mn MWh on 23 December. Two days prior to that, coal power in the grid was at a nearly four-month high of 376,818MWh.

Natural gas generation in SPP also was elevated during the week that temperatures in the grid's footprint plunged, reaching 310,802MWh on 24 December, its highest level since 30 August. For the month as a whole gas-fired generation climbed by 54pc from a year earlier to 172,859 MWh/d.

The day-ahead price for the Natural Gas Pipeline (NGPL) Midcontinent area averaged \$4.750/mmBtu for all of December, up from \$3.431/mmBtu a year earlier. The average for day-ahead natural gas at the NGPL Texok zone also climbed by 30pc from a year earlier to \$4.523/mmBtu.

Coal- and gas-fired generation also bridged some of the decrease in renewable power in SPP in December. Renewable energy sources averaged 324,973 MWh/d last month, down by 3.7pc compared with December 2021, when it totaled 337,518 MWh/d. Wind power fell by 3.9pc on the year prior to 308,330 MWh/d, while solar power rose by 2.6pc from a year earlier to 944 MWh/d. Generation from hydroelectric plants remained nearly flat with December 2021 at 15,699 MWh/d.

Renewables accounted for 42pc of total SPP generation, down from 49pc in December 2021.

Still, for the fourth quarter as a whole, coal's share of SPP's generation mix fell by nearly three percentage points to 30pc as coal dispatch dipped to 211,565 MWh/d from 217,128 MWh/d. And renewables lost 1.3 percentage points to account for 45pc of the grid's power mix despite an increase in generation dispatch. Natural gas rose to 23pc of SPP's fuel mix from 17pc in the last three months of 2022 as its dispatch jumped by 48pc to 163,830 MWh/d.

Overall generation rose by 6.5pc in the fourth quarter when compared with a year prior, to 713,200 MWh/d.

By Elena Vasilyeva

NEWS

OTHER NEWS

**US debuts new guidance for environmental reviews**

Pipelines, federal oil and gas leases, electric transmission lines and other major projects will be subject to more exhaustive climate scrutiny during permitting, the White House said in guidance released today.

The interim guidance offers federal agencies far more explicit instructions on how to analyze greenhouse gas emissions and climate effects when reviewing projects under the National Environmental Policy Act (NEPA). The guidance will take effect on 9 January. The White House intends to make revisions after it receives public comment.

The guidance is part of President Joe Biden's administration push to make climate considerations an explicit part of how the government reaches decisions, following up on past actions prodding agencies to use renewable energy and buy low-carbon materials. The more specific climate guidance will help "avoid legal setbacks" and allow regulators to make more informed decisions, the White House said.

"These updated guidelines will provide greater certainty and predictability for green infrastructure projects" Council on Environmental Quality chair Brenda Mallory said.

The guidance seeks to offer a "common approach" to analyze climate change as part of NEPA reviews, following a period of uneven reviews and former president Donald Trump's administration trying to eliminate climate considerations altogether. Federal regulators have said the lack of explicit

guidance in the past have made it hard to decide the level of detail for climate reviews.

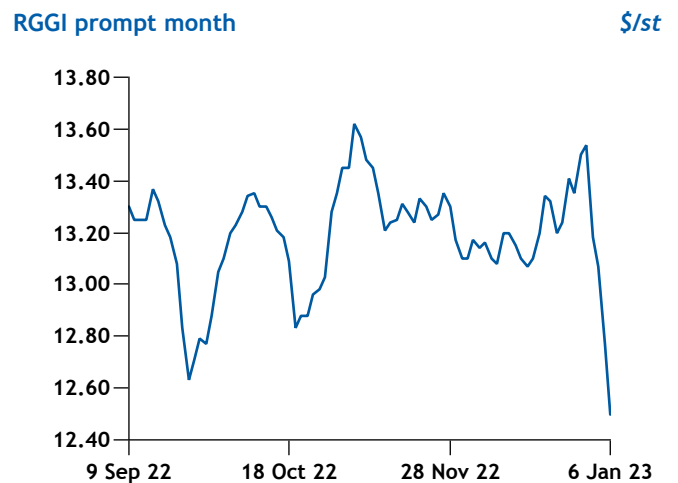
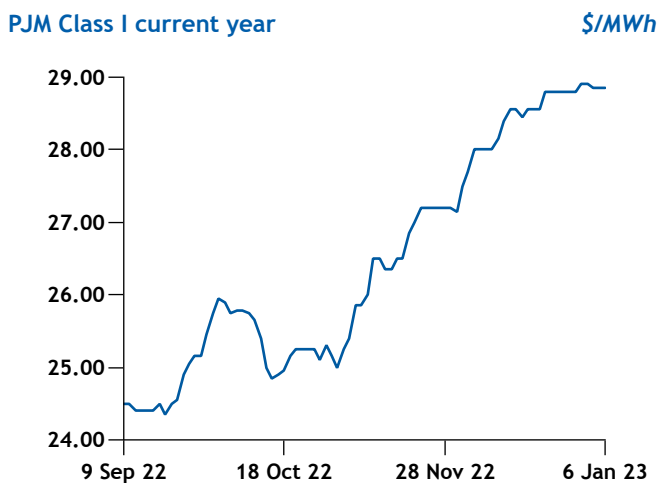
The guidance offers best practices for climate reviews, including recommendations to quantify indirect emissions from projects and using a metric named the "social cost of carbon" to provide a dollar estimate of climate effects. The guidance also says federal agencies should the NEPA process to mitigate gas emissions "to the greatest extent possible."

But the White House wants to avoid requiring exhaustive studies of projects likely to reduce greenhouse gas emissions. The guidance emphasizes a "rule of reason" that says the depth of climate reviews should be proportional to a project's effects, and it says some renewable projects can have a less detailed climate analysis.

Renewable energy groups applauded the guidance. The American Clean Power Association said the guidance recognizes that agencies should not spend time and resources reviewing "relatively minor and short-term greenhouse gas emissions" of building clean energy projects that will reduce emissions over the long term.

Oil and gas industry groups have opposed past attempts for agencies to consider indirect greenhouse gas emissions and seek emission mitigation during the NEPA process. The US Federal Energy Regulatory Commission last year faced intense backlash from the industry over a similar proposal related to natural gas pipeline permitting.

*By Chris Knight*



## MARKET TRADES AND DEALS

### Carbon daily deals summary

Market	Vintage	Delivery	Trades	Total tons	Range \$/t
CCA*	2023	Future (Jan 23)	2	60,000	27.80 - 28.00
CCA*	2023	Future (Mar 23)	1	50,000	28.03 - 28.03
CCA*	2023	Future (Dec 23)	20	423,000	29.35 - 29.55
CCA*	2023	35.00 call (Dec 23)	7	650,000	0.96 - 1.00
CCA*	2023	20.00 put (Dec 23)	1	350,000	0.31 - 0.31
CCA*	2023	Spread (Mar 23/Dec 23)	1	5,000	-1.39 - -1.39
CCA*	2023	Spread (Jan 23/Dec 23)	11	11,000	-1.66 - -1.66
CCA*	2023	Spread (Jan 23/Mar 23)	1	5,000	-0.23 - -0.23
CCA*	2022/2023	Spread (Dec 23)	1	1,000	0.00 - 0.00
RGGI*	2022	Future (Jan 23)	1	21,000	12.59 - 12.59
RGGI*	2023	13.00 put (Dec 23)	1	100,000	0.95 - 0.95
RGGI*	2023	15.00 call (Dec 23)	1	600,000	0.47 - 0.47
RGGI*	2023	Future (Dec 23)	33	572,000	13.01 - 13.40
RGGI*	2023	Spread (Jan23/Dec23)	8	4,800,000	-0.71 - -0.70

### Carbon weekly deals summary

Market	Vintage	Delivery	Trades	Total tons	Value \$
CCA*	2023	Future (Jan 23)	24	1,285,000	35,692,610
CCA*	2023	Future (Mar 23)	13	319,000	8,887,490
CCA*	2023	Future (Dec 23)	343	3,878,000	114,059,300
CCA*	2024	Future (Dec 24)	1	18,000	565,200
RGGI*	2022	Future (Jan 23)	1	21,000	264,390
RGGI*	2023	Future (Dec 23)	58	1,503,000	20,386,450

### RECs daily deals summary

Market	Vintage	Delivery	Trades	Total MWh	Range \$/MWh
MD Tier I*	2024	Futures (Feb 25)	1	700	26.75 - 26.75
MD Tier I*	2025	Futures (Feb 26)	5	7,000	23.95 - 24.53
MD Tier I*	2026	Futures (Feb 27)	1	1,500	21.70 - 21.70
NJ Solar (CBL)	2019	Trade	1	30	222.50 - 222.50
NJ Solar (CBL)	2020	Trade	1	86	222.50 - 222.50
NJ Solar (CBL)	2021	Trade	1	120	222.75 - 222.75
NJ Solar (CBL)	2022	Trade	1	331	223.50 - 223.50
NJ Solar (CBL)	2023	Trade	3	4,858	223.85 - 224.00
PJM Class I*	2023	Futures (Jul 23)	1	800	28.84 - 28.84
PJM Class I*	2024	Futures (Jul 24)	2	3,300	28.84 - 28.84
TX compliance, CRS (Nodal)	BH2023	Futures (Mar 24)	1	25,000	4.10 - 4.10
TX compliance, CRS (Nodal)	FH2023	Futures (Sep 23)	1	50,000	3.20 - 3.20
TX compliance, CRS (Nodal)	FH2024	Futures (Sep 24)	1	60,000	3.80 - 3.80

\*Represents deals executed and/or cleared on ICE



## MARKET TRADES AND DEALS

### Renewable fuels daily deals summary

Market	Vintage	Delivery	Trades	Volume	Range
LCFS		Forward (3Q 23)	1	5,000	67.00 - 67.00
D6	2022		11	9,500	173.50 - 174.00
D6	2023		3	3,500	171.50 - 172.00
D4	2023		1	500	175.50 - 175.50
D3	2023		5	2,500	224.00 - 225.00

### Renewable fuels weekly deals summary

Market	Vintage	Delivery	Trades	Volume	Value \$
LCFS		Trade	1	10,000	690,000
LCFS		Forward (2Q 23)	5	27,000	1,875,500
LCFS		Forward (3Q 23)	1	5,000	335,000
LCFS*		Futures (Dec 23)	11	80,500	5,673,000
LCFS*		Futures (Mar 23)	1	5,000	340,000
LCFS*		Futures (Dec 24)	2	10,100	717,350
LCFS*		Spread (Dec 23/Dec 24)	5	21,000	-47,625
LCFS*		Spread (Dec 24/Dec 25)	2	7,500	-15,000
LCFS*		Futures (Dec 25)	2	3,000	226,750
LCFS*		Spread (Dec 23/Dec 25)	1	2,500	-10,625
D4	2022		3	4,000	740,000
D4	2023		13	10,500	1,821,125
D6	2022		41	36,650	6,287,250
D6	2023		10	10,000	1,700,000
D3	2022		4	2,250	563,500
D3	2023		10	6,250	1,432,000

Trade volumes and values are shown in metric tonnes and \$/t for LCFS or total RINs and €/RIN

\*Represents deals executed and/or cleared on ICE

### SO<sub>2</sub> allowance transfers, 05 Jan

st

Transferor	Transferee	Vintage	Volume	Type
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EPA reported no transfers for today

### Annual NO<sub>x</sub> allowance transfers, 05 Jan

st

Transferor	Transferee	Vintage	Volume	Type
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EPA reported no transfers for today

### Seasonal NO<sub>x</sub> allowance transfers, 05 Jan

st

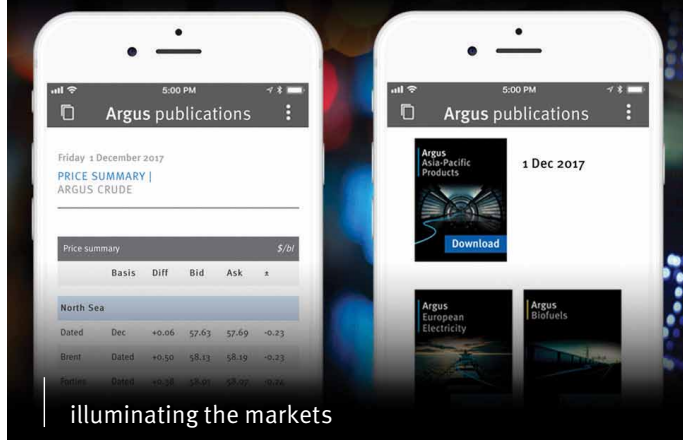
Transferor	Transferee	Vintage	Volume	Type
Evergy	NRG	2019	30	Group 2
Evergy	NRG	2020	3	Group 2
Evergy	NRG	2021	267	Group 2

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**RENEWABLE GENERATION**

**Adjusted heat rates and carbon cost**

Marginal unit	NP15		SP15	
	Heat rate mmBtu/ MWh	Carbon cost \$/MWh	Heat rate mmBtu/ MWh	Carbon cost \$/MWh
Gas-implied	8.92	14.00	8.37	13.14
Carbon-adjusted	8.16	12.81	7.70	12.09
Western grid electric exports				12.64
Bonneville Power Administration exports				0.51
Powerex electric exports				na

**Adjusted spark spreads**

Heat rate	\$/MWh			
	7	8	10	12
<b>NP15</b>				
Gas-implied	32.58	15.60	-18.36	-52.32
Carbon-adjusted	21.59	3.05	-34.05	-71.15
Carbon cost	10.99	12.56	15.69	18.83
<b>SP15</b>				
Gas-implied	24.79	6.74	-29.36	-65.46
Carbon-adjusted	13.80	-5.82	-45.05	-84.29
Carbon cost	10.99	12.56	15.69	18.83

**Associated day-ahead power and natural gas markets**

	Mid	±
Power NP15 peak price \$/MWh	151.44	-4.93
Power NP15 off-peak price \$/MWh	142.85	-4.65
Power SP15 peak price \$/MWh	151.14	-3.78
Power SP15 off-peak price \$/MWh	146.32	-3.66
Natural gas PG&E Citygates index \$/mmBtu	16.98	+0.32
Natural gas SoCal Gas Co index \$/mmBtu	18.05	+0.72



Argus Air Daily is published by Argus Media group

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ISSN: 1538-9332

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