Index Rules & Methodology | January 18, 2023

Introducing the ICE U.S. Carbon Neutral Power Index

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Introducing the ICE U.S. Carbon Neutral Power Index (ICECNPI)

ICE Data Indices, LLC ("IDI") has launched the first index that tracks the broad U.S. electricity market on a carbon neutral basis. The Index is constructed from electricity futures contracts listed by ICE Futures U.S., which represent the most liquid power futures contracts in the U.S., and carbon allowance futures contracts listed by ICE Futures U.S. designed to offset the carbon emissions from the associated electricity generation.

Highlights a key retail and climate transition commodity

On a retail notional basis, electricity is arguably the most generally consumed commodity in the U.S., yet before now there has not been an index of electricity futures on a carbon neutral basis. Moving away from the use of fossil fuels and towards electricity is a key goal in fighting climate change, yet one of the major sources of carbon emissions is power generation. The current fuel mix used in power generation in the U.S. is almost 60% fossil fuels; however, the president of the United States has a stated goal of 0% fossil fuels used in power generation by 2035. As part of the ICECNPI methodology, as the power generation fuel mix shifts to renewable sources and reduces the amount of carbon emissions, the ICECNPI will reduce holdings of carbon allowance futures contracts accordingly.

Unique diversification benefits

Over the nine-year backtest, the ICECNPI has very low performance correlation to both U.S. equity and fixed income indices. Furthermore, the correlation to broad commodities futures and sector indices is also low, meaning from 2014 through 2022 ICECNPI could have contributed largely uncorrelated returns to portfolios of both traditional and alternative assets. Given that, over the nine-year backtest, adding ICECNPI as an option for a portfolio allocating between stocks, bonds and commodities shifts the entire efficient frontier upwards and to the left (i.e., more return per unit of risk).

Introducing the ICE U.S. Carbon Neutral Power Index

Overview

After decades in the background, commodity markets have become popular again. The U.S. Bipartisan Infrastructure Law, post-COVID-19 rebound, global political unrest, uncertain equity markets and volatile fixed income markets have created renewed interest in commodities from investors seeking diversification, inflation protection and sustainability themes. However, many typical broad commodity indexes are actually highly concentrated in a relatively small number of contracts and commodities. For example, oil and gas contracts account for 60% of the weight in the ICE BofA Commodity index eXtra (MLCX). Traditional global production-weighted commodity futures indices have all overlooked electricity. This oversight has become more glaring in relation to the growing importance of electricity in the transition away from fossil fuels, which is fundamentally important for efforts to achieve carbon reduction targets to mitigate the worst effects of climate change.

In order to help investors better track electricity as a critical commodity, ICE Data Indices, LLC ("IDI") has launched the ICE U.S. Carbon Neutral Power Index ("ICECNPI"). The Index provides the markets with a broadly representative performance benchmark for the U.S. electricity market on a carbon neutral basis. The Index:

- **Highlights a key retail and climate transition commodity**
  On a retail notional basis, electricity is arguably the most generally consumed commodity in the U.S., yet before now there was no index of the liquid futures market on a carbon neutral basis.

- **Demonstrates diversification benefits**
  Over the nine-year backtest, the ICECNPI has very low performance correlation to both U.S. equity and fixed income indices. Furthermore, the correlation to broad commodities futures and sectors is also low, meaning ICECNPI represents uncorrelated returns to portfolios of both traditional or alternative assets.

Index Construction

The ICECNPI consists of the most liquid electricity futures contracts from six major U.S. power pools along with an allocation of carbon allowance futures contracts designed to offset the carbon emissions from the electricity generation associated with the electricity futures. The qualifying contracts and weights are determined annually.

- The ICECNPI selects the most liquid qualifying futures contracts listed on ICE Futures U.S. for real-time or day-ahead peak hour electricity for each distinct U.S. based Independent System Operator (ISO) or Regional Transmission Organization (RTO). The weight of each selected electricity contract in the Index is determined based on the average annual load, measured in megawatt hours (MWh) reported by each ISO/RTO represented by an Index-qualifying contract.

- The ICECNPI includes California Carbon Allowance (CCA) futures contracts and Regional Greenhouse Gas Initiative (RGGI) futures contracts according to the amount of carbon emissions produced to generate the electricity represented in the Index. The carbon intensity of power produced by each represented ISO/RTO is used to determine the number of carbon allowance futures contracts needed to offset the carbon emissions.

The full methodology for the ICECNPI is included as the final section in this document ("Index Rules & Methodology"). The additional indices listed below track the electricity and carbon allowance futures separately:

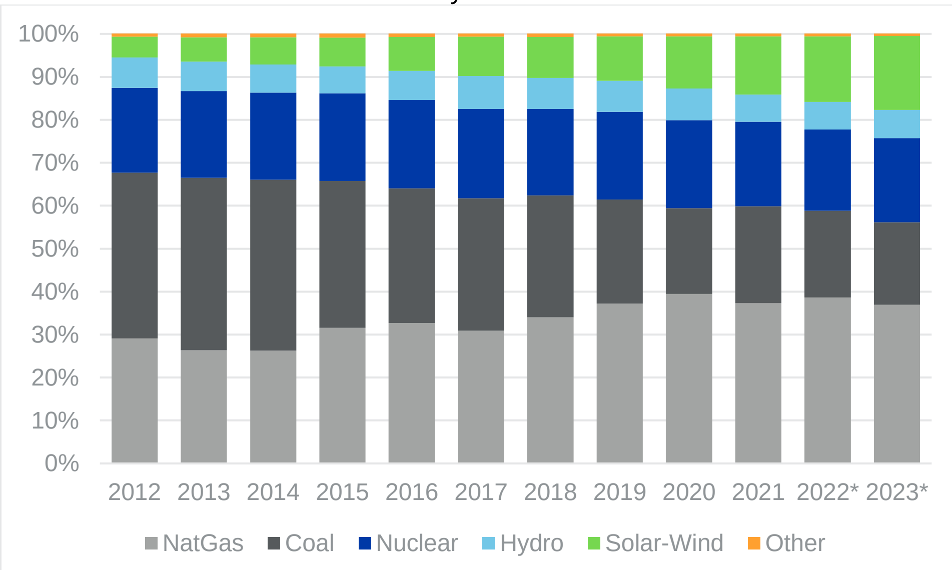
- ICE U.S. Power Index (ICEUPWR);
- ICE U.S. Carbon Futures Excess Return Index (ICEUCBN).

Background

U.S. Electricity Market

It is difficult to imagine a more generally utilized commodity for both individuals and businesses than electricity. Not surprisingly, electricity is a key component in the U.S. Consumer Price Index (CPI) and is expected to only become more relevant in the future with the diminishing use of fossil fuels. Some U.S. states have announced plans to ban new combustion engine cars by 2035,[1] and others are banning any new residential home hookups to natural gas.[2] Naturally, the alternative fuel source will largely be electricity. Furthermore, the Biden administration announced a goal of 100% clean electricity generation by 2035.[3]. In 2023, approximately 37% of U.S. electricity generation is expected to be from natural gas, 19% from coal, and the remainder from nuclear and renewable sources.[4]

Exhibit A: Share of Total Generation by Source



Source: U.S. Energy Information Administration, *Estimated

Electricity was deregulated in the United States in 1978, with subsequent acts allowing competition and consumer choice, culminating in the Federal Energy Regulatory Commission (FERC) orders in 1996 opening access to transmission power grids to enable trade[5]. Soon thereafter the first ISOs and RTOs emerged to offer electricity competition, with two-thirds of U.S. power consumption now managed by an ISO/RTO. There are currently seven ISOs/RTOs operating in the U.S., with a core role of balancing electricity generation and transmission with demand.

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[1] Utility Dive 30Sep2022; New York Begins Implementation of 2035 Ban on New Gas-Powered Cars and Trucks, following California Lead" https://www.utilitydive.com/news/new-york-2035-ban-new-gas-powered-cars-trucks-ICE-vehicles/633041/

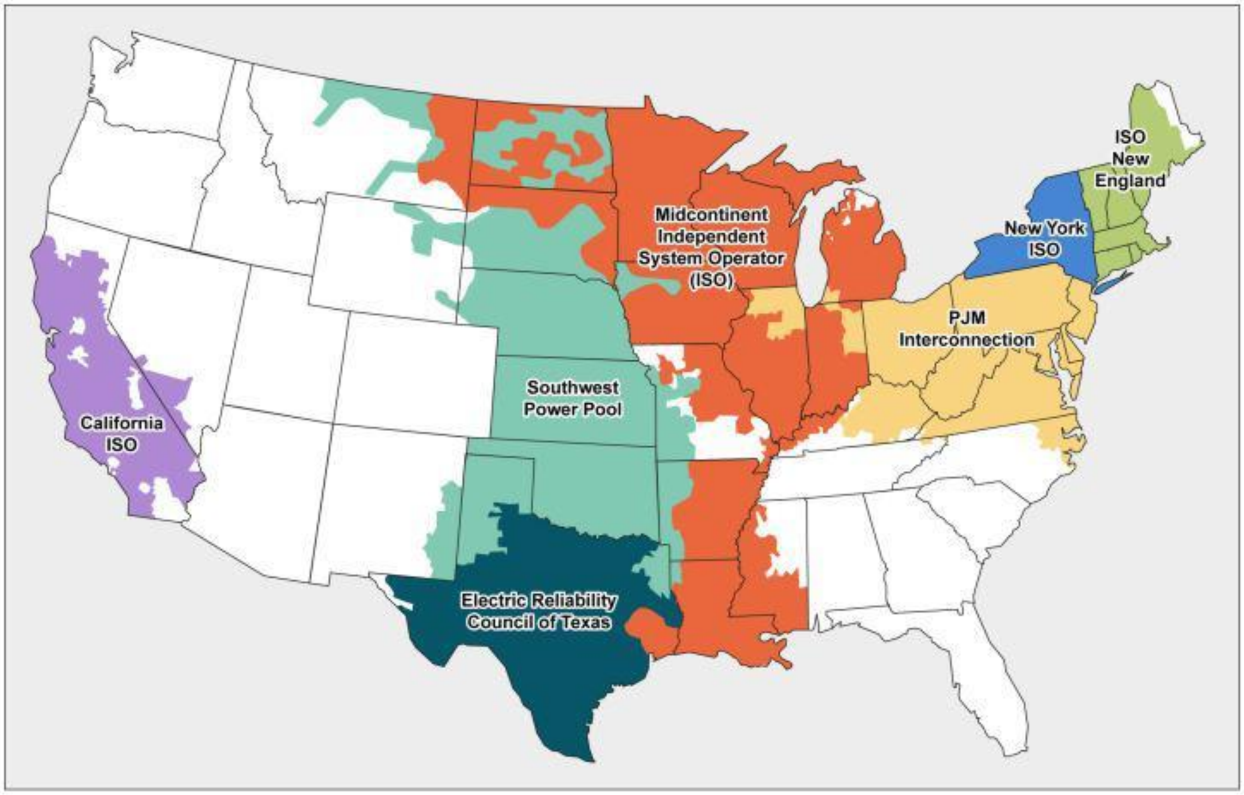
[2] CBS News, 06Dec2019; "Cities are Banning Natural Gas in New Homes, Citing Climate Change" https://www.cbsnews.com/news/cities-are-banning-natural-gas-in-new-homes-because-of-climate-change/

[3] U.S. Department of Energy, May 31, 2022, "Biden Administration Launches Bipartisan Infrastructure Law Initiative to Connect More Clean Energy to the Grid" https://www.energy.gov/articles/biden-administration-launches-bipartisan-infrastructure-law-initiative-connect-more-clean#:~:text=As%20the%20Biden%20Administration%20ramps,roadmap%20development%2C%20and%20technical%20assistance

[4] U.S. Energy Information Administration, December 6, 2022, "Short-Term Energy Outlook" https://www.eia.gov/outlooks/steo/report/electricity.php

[5] ISO/RTO Council, https://isorto.org/#about-section

Exhibit B: U.S. Wholesale Electricity Markets



Source: FERC

Electricity Pricing Dynamics

While there are numerous electricity pricing reports (Bureau of Labor Statistics, Energy Information Association, International Energy Association, and the Federal Energy Regulatory Commission) they tend to focus on the short-term physically delivered market, called the "spot market." The electricity spot market is seasonal, can be extremely volatile[6], and has geographic peculiarities that make it difficult to measure in aggregate due to different weather patterns, different types of generation fuel sources in each region, and different timelines for renewable additions.

Electricity is not a commercially storable commodity. As a result, the traditional elements of forward price curves, supply/demand balance and price elasticity may not apply the same way as for other commodities. The U.S. electricity futures market has recently been steeply "backwardated." Backwardation is a condition in the futures markets where the current immediate delivery, or spot, contract price is higher than the price of the future month's contracts. This condition can provide the ICECNPI with a positive roll yield component as compared to historically negative roll yields from many commodity futures markets that are in "contango," meaning future prices are higher than the spot prices.

There are many factors that can affect whether a commodity's futures contracts are in backwardation or contango. For electricity, the shape of the futures curve can be as volatile as the spot price. But one thing seems clear: if the U.S. continues efforts to build a 100% renewable grid by 2035, backwardation may be reasonably expected to persist over time, as use of one of the most expensive inputs to the generation of electricity, fossil fuels, would continue to decrease.

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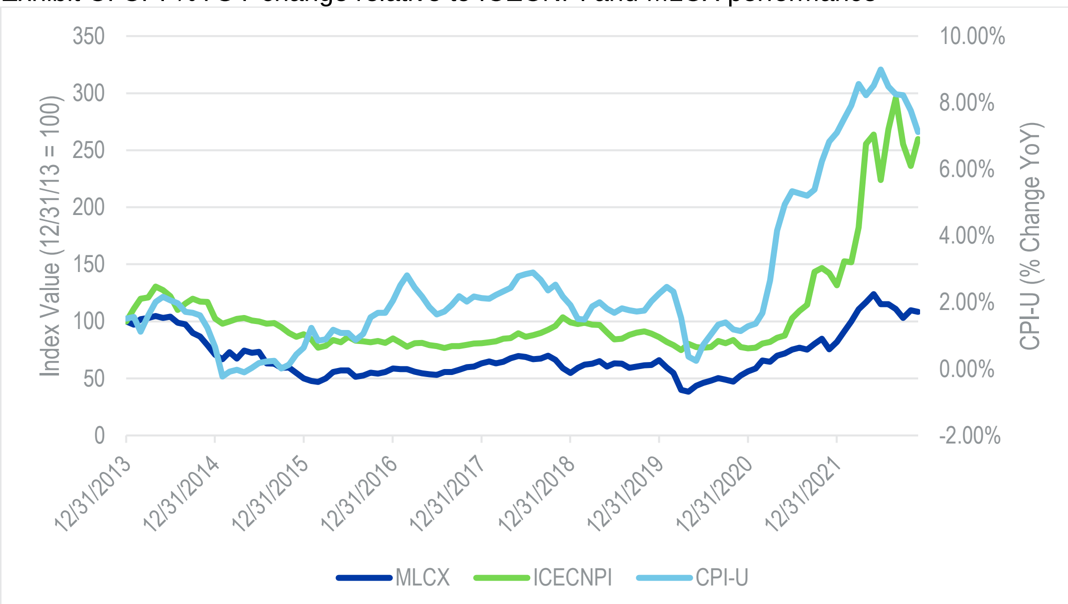
[6] IEA 14Jan2022; Surging Electricity Demand is Putting Power Systems Under Strain Around the World
https://www.iea.org/news/surging-electricity-demand-is-putting-power-systems-under-strain-around-the-world

The wholesale electricity price across the various ISOs/RTOs can be quite different. The methodology of the ICECNPI incorporates a 12-month strip of futures contracts to take into account each power pool's seasonal weather patterns, as well as the different mix of power generation assets associated with each region's electricity demand. This provides an index aligned with the broader price movement of the U.S. power markets while not being overweighted to the spot or prompt month futures contracts, or any specific U.S. power pool or region.

Inflation and Electricity's Growing Relevance

Electricity is a the second-largest contributor to the Energy component of the CPI, and the retail electricity price index as measured by the U.S. Bureau of Labor Statistics (BLS) is up about 16% year-over-year as of December 2022 and about 21% over the last two years[7]. In fact, with the backdrop of Russia's invasion of Ukraine and the associated sanctions-related supply issues for natural gas, calendar year 2022 has witnessed the biggest price jump in electricity since 1981. And according to the U.S. Energy Information Administration (EIA), the price of power is expected to continue higher in 2023.[8]

Exhibit C: CPI %YOY change relative to ICECNPI and MLCX performance



Note: CPI for All Urban Consumers (CPI-U): All items in U.S. city average, all urban consumers, not seasonally adjusted
Source: ICE Data Indices, LLC and BLS

While currently just under a 3% contribution to overall CPI, electricity's importance to the CPI is expected to become even more relevant in coming years as fossil fuel generation continues to decline.

Power's Carbon Footprint

According to the EIA, roughly 60% of U.S. electricity generation in 2022 came from fossil fuels[9]. That is down from 68% ten years ago[10]. Though the fossil fuel share of generation is expected to be 57% in 2023, the Biden administration has set a 0% target for 2035. The methodology of the ICECNPI utilizes the data reported by the Environmental Protection Agency (EPA) to assess the carbon intensity of each electricity contract based on its ISO/RTO's generation mix. As part of the annual review, the ICECNPI

[7] U.S. Bureau of Labor Statistics https://beta.bls.gov/dataViewer/view/timeseries/APU000072610
[8] U.S. Energy Information Administration, January 10, 2023, "Short-Term Energy Outlook" https://www.eia.gov/outlooks/steo/archives/jan23.pdfp
[9] U.S. Energy Information Administration, January 10, 2023, "Short-Term Energy Outlook" https://www.eia.gov/outlooks/steo/archives/jan23.pdfp
[10] U.S. Energy Information Administration

utilizes the carbon intensity factor of the power generated by each ISO/RTO represented in the index to calculate an equivalent amount of exchange-traded carbon allowance futures contracts to offset the carbon footprint of the electricity futures contracts. As the U.S. power grid continues to add renewable generation and the overall carbon intensity decreases, the ICECNPI will include fewer carbon allowance offsets.

Historical Risk/Return

Correlations

As evidenced by nine years of backtested results, the ICECNPI shows low levels of correlation to other asset classes (see Exhibit D). This extends not only to broad indicators of the U.S. equity or fixed income markets, but commodity futures segments as well. Electricity prices are mainly driven by the fundamentals of weather, generator outages, transmission constraints, fuel sources, and other regional supply/demand factors[11]. These power pricing factors generally exhibit minimal influence over the debt and equity markets and have relatively little overlap with other commodities, such as agriculture products.

Exhibit D: Correlation of monthly total return, January 2014 - December 2022

Segment	Ticker	ICECNPI	MLCX	MLCXEN	MLCXPMP	MLCXIM	MLCXAG	ICEUST5	US00	G0QI
U.S. Carbon Neutral Power	ICECNPI	1.0000								
Global Commodity	MLCX	0.2904	1.0000							
Energy	MLCXEN	0.2670	0.9759	1.0000						
Precious Metals	MLCXPMP	-0.1074	0.2309	0.1611	1.0000					
Industrial Metals	MLCXIM	0.0995	0.5454	0.4623	0.4778	1.0000				
Agriculture	MLCXAG	0.1677	0.4020	0.2384	0.1102	0.2417	1.0000			
U.S. Large Cap Equities	ICEUST5	0.0224	0.4427	0.4392	0.2425	0.4570	0.0587	1.0000		
U.S. Fixed Income	US00	-0.1323	-0.1842	-0.1759	0.3232	0.0966	-0.2278	0.2719	1.0000	
U.S. TIPs	G0QI	0.0336	0.0650	0.0469	0.3800	0.2702	-0.0808	0.4488	0.8280	1.0000

Source: ICE Data Indices, LLC

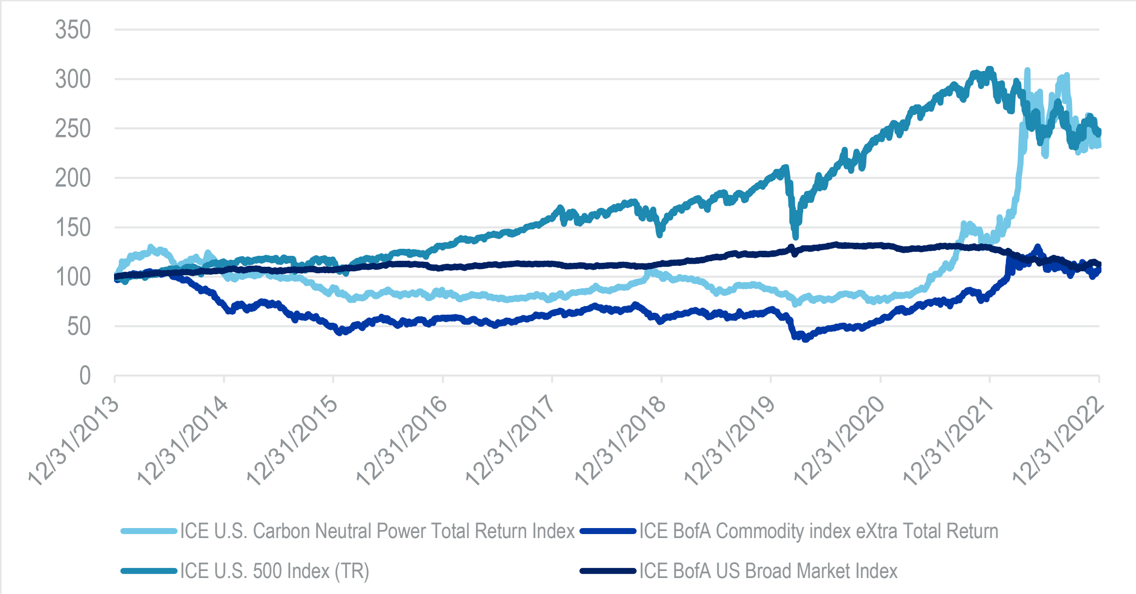
As can be seen in Exhibit D, over the nine years ended 12/31/2022 the ICECNPI was almost exactly uncorrelated with large cap equities, represented by the ICE U.S. 500 Index (ICEUST5). Compared to fixed income indices, the ICECNPI is actually negatively correlated with the investment grade fixed income ICE® BofA® U.S. Broad Market Index (US00, -0.13). Compared to sectors within the ICE® BofA® Commodity Index eXtra (MLCX), ICECNPI is the least correlated to both U.S. equities and fixed income other than Agriculture (MLCXAG). However, ICECNPI has a low positive correlation with MLCXAG (0.18) and to Energy (MLCXEN, 0.27), even with natural gas currently a significant generation fuel source for U.S. power. With the U.S. electric grid continuing to decrease the utilization of fossil fuels, this relatively low positive correlation is expected to continue to decline.

Performance & Volatility

In addition to ICECNPI's lack of correlation to other asset classes, it demonstrates a robust risk/return profile over its nine-year backtest. The historic run-up in electricity prices in early 2022 had quite a bit to do with the Index's ability to rival the return of equities over that full period of time (Exhibit E). In fact the period from the start of the backtest (12/31/2013) through 2021 was strongly negative for both ICECNPI and the broader commodity index (MLXCX). It was only with the onset of inflation that things turned dramatically. The volatility is certainly not unique to ICECNPI, at its annualized volatility is very close to that of MLCX and U.S. large cap equities. And the post-COVID rebound in equities was also quite extreme.

[11] EIA, https://www.eia.gov/energyexplained/electricity/prices-and-factors-affecting-prices.php#:~:text=Changes%20in%20prices%20generally%20reflect,to%20meet%20the%20increased%20demand.

Exhibit E: Total return of ICECNPI compared to other asset segments (100 = 12/31/2013)



Source: ICE Data Indices, LLC

Comparing annualized risk and return statistics across a range of segment benchmarks shows the ICECNPI with not only one of the better absolute returns but also ranking well in terms of return per unit of risk.

Exhibit F: Comparative risk/return statistics (12/31/2013 - 12/31/2022)

	Carbon Neutral Power	Commodity index eXtra	Energy	Precious Metals	Industrial Metals	Agriculture	U.S. Large Cap Equities	U.S. Fixed Income	US High Yield	US Treasury	US TIPs
	ICECNPI	MLCX	MLCXEN	MLCXPMP	MLCXIM	MLCXAG	ICEUST5	US00	H0A0	G0Q0	G0QI
Annualized TR	9.86%	0.80%	-2.46%	4.07%	2.96%	0.13%	10.58%	1.45%	3.57%	1.31%	2.35%
Annualized S.D.	23.68%	26.57%	41.13%	21.45%	21.20%	19.26%	22.07%	4.89%	6.64%	5.68%	6.69%
Sharpe Ratio*	0.13	0.03	0.03	0.08	0.06	0.01	0.20	0.04	0.10	0.01	0.08

*Note: Sharpe ratio calculated vs total return of ICE® BofA® US 3-Month Treasury Bill Index (average monthly excess return / std.dev of monthly total return)

Source: ICE Data Indices, LLC

One aspect of the methodology of the ICECNPI, unlike most other commodity futures indices, is that rather than using a single contract and rolling on a set schedule the index holds a "strip" of 12 monthly expiries. This will tend to smooth out the short-term volatility around electricity spot price fluctuations due to seasonality or weather events. It will also accentuate the carry effect due to the "backwardation" of the electricity markets previously discussed. In fact, the carry/roll component of return is a critical component boosting the performance of the ICECNPI relative to broad commodity futures indices, such as MLCX.

Exhibit G: Return attribution (12/31/2013 - 12/31/2022)

		Spot	Roll/Carry	Collateral	Excess Return	Total Return
ICE U.S. Carbon Neutral Power Index	ICECNPI	80.41	34.96	17.79	115.37	133.16
ICE BofA Commodity index eXtra	MLCX	13.11	-13.85	8.20	-0.74	7.45

NOTE: Roll/Carry: Excess Return - Spot Return

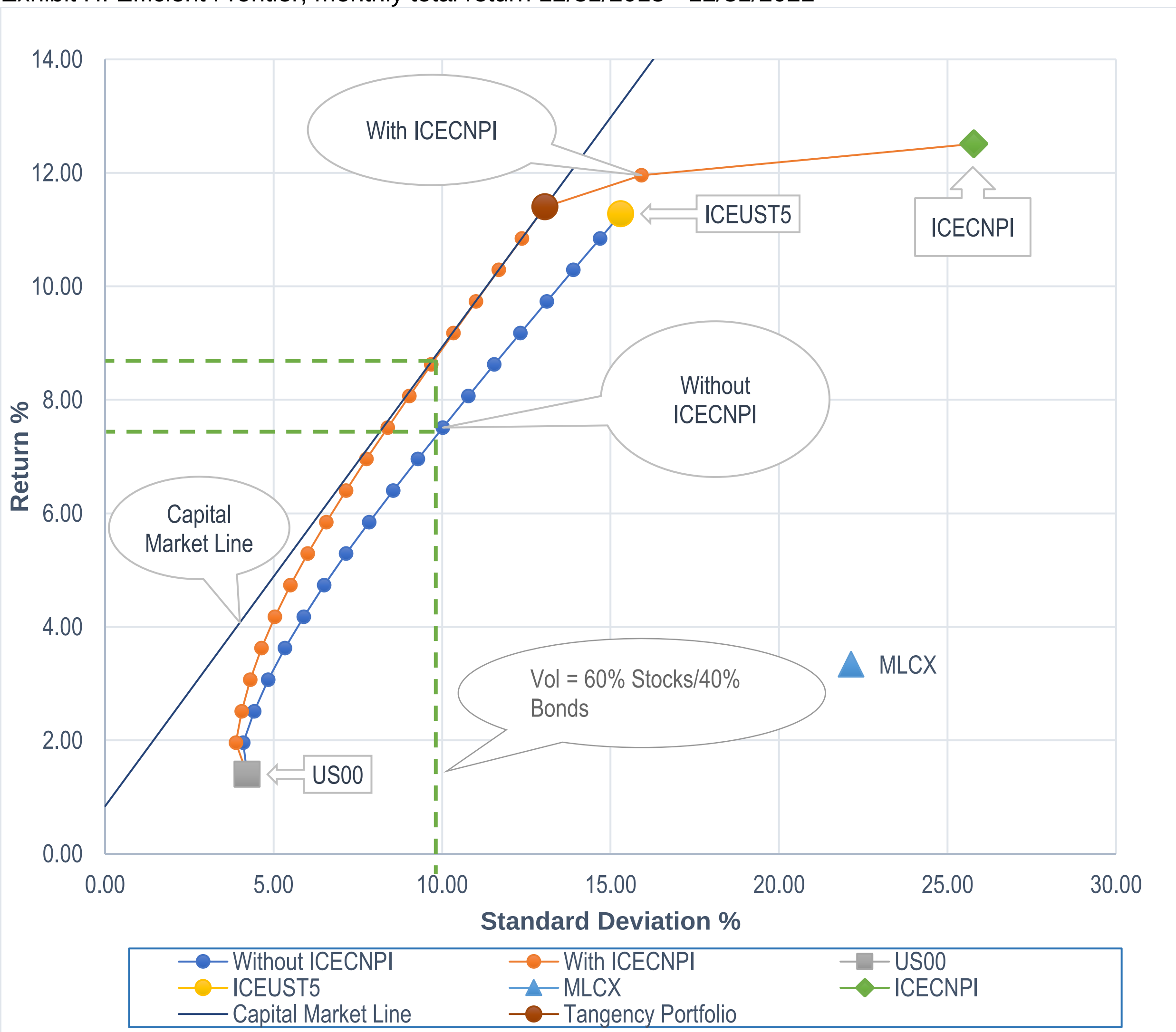
Source: ICE Data Indices, LLC

Efficient Frontier

Utilizing the efficient frontier model for portfolio composition analysis, ICECNPI shows it would be a valuable risk-adjusted addition to a traditional investment portfolio, represented by allocation options of U.S. equity (ICEUST5), U.S. investment grade fixed income (US00) and commodities (MLCX). Simply adding the constituents of the ICECNPI as an allocation option shifts the entire efficient frontier upwards and to the left (i.e., more return per unit of risk) (Exhibit H).

For example, using a standard stock/bond allocation of 60%/40% provides an annualized volatility of roughly 9.5% over the last nine years, based on monthly total return (green broken line in Exhibit H). With the ICECNPI, the optimal blend for the same volatility would add ~+1.4% additional annualized return with a 21% allocation to ICECNPI.

Exhibit H: Efficient Frontier, monthly total return 12/31/2013 - 12/31/2022



Source: ICE Data Indices, LLC

Index Rules & Methodology

ICE U.S. Carbon Neutral Power Index (ICECNPI)

General Description

The ICE U.S. Carbon Neutral Power Index (the "Index") measures the performance of a long-only basket of electricity futures contracts and carbon allowance futures contracts designed to measure the performance of the combined U.S. electricity and carbon markets. The Index is constructed from electricity futures contracts listed by ICE Futures U.S. representing the most liquid[12] U.S. electricity futures contracts in the U.S. with the carbon emissions from the associated electricity production being offset by allocation to carbon allowance futures contracts listed by ICE Futures U.S. The Index utilizes a methodology licensed from CNIC LLC which describes a process to select and weight electricity futures contracts.

The Index currently consists of the following ICE Futures U.S. Contracts:

(i) ICE ERCOT North 345KV Real-Time Peak Fixed Price Contract ("ERCOT Contract"),
ICE PJM Western Hub Real-Time Peak Fixed Price Contract ("PJM Contract"),
ICE NYISO Zone G Day-Ahead Peak Fixed Price Contract ("NYISO Contract"),
ICE ISO New England Massachusetts Hub Day-Ahead Peak Fixed Price Contract ("NEPOOL Contract"),
ICE CAISO SP-15 Day-Ahead Peak Fixed Price Contract ("CAISO SP-15 Contract"), and
ICE MISO Indiana Hub Real-Time Peak Fixed Price Contract ("MISO Contract")
(collectively, the "Power Contracts"), and

(ii) ICE California Carbon Allowance Futures Contract ("CCA Contract"), and
ICE Regional Greenhouse Gas Initiative Futures Contract ("RGGI Contract")
(collectively, the "Carbon Contracts").

The Power Contracts and Carbon Contracts are collectively referred to as the "Contracts".

The ERCOT Contract is a monthly cash settled Futures Contract based upon the mathematical average of daily prices calculated by averaging the peak hourly electricity prices published by The Electric Reliability Council of Texas ("ERCOT") for the ERCOT North Hub.

The PJM Contract is a monthly cash settled Futures Contract based upon the mathematical average of daily prices calculated by averaging the peak hourly electricity prices published by the regional transmission organization, PJM for the PJM Western Hub.

The NYISO Contract is a monthly cash settled Futures Contract based upon the mathematical average of daily prices calculated by averaging the peak hourly electricity prices published by New York Independent System Operator ("NYISO") for NYISO Zone G (Hudson Valley).

The NEPOOL Contract is a monthly cash settled Futures Contract based upon the mathematical average of daily prices calculated by averaging the peak hourly electricity prices published by the regional transmission organization, ISO New England for the ISO New England Massachusetts Hub.

The CAISO SP-15 Contract is a monthly cash settled Futures Contract based upon the mathematical average of daily prices calculated by averaging the peak hourly electricity prices published by the California Independent System Operator ("CAISO") for the CAISO SP-15 Hub.

[12] Based on highest average daily traded volume (ADV)

The MISO Contract is a monthly cash settled Futures Contract based upon the mathematical average of daily prices calculated by averaging the peak hourly electricity prices published by the Midcontinent Independent System Operator ("MISO") for the MISO Indiana Hub.

The CCA Contract is dollar-denominated and represents a lot of 1,000 California Carbon Allowances ("CCA") that are physically delivered greenhouse gas emissions allowances issued by the California Air Resources Board or a linked program under California Assembly Bill 32 "California Global Warming Solutions Act of 2006" and its associated regulations, rules and amendments, collectively known as the "California Cap and Trade Program". Each CCA is an entitlement to emit one metric ton of carbon dioxide equivalent gas.

The RGGI Contract is dollar-denominated and represents a lot of 1,000 Regional Greenhouse Gas Initiative Allowances ("RGGI") that are physically delivered greenhouse gas emissions allowances issued by each state in the RGGI program. The Regional Greenhouse Gas Initiative is a cooperative effort among the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont to cap and reduce power sector carbon dioxide emissions. Each RGGI is an entitlement to emit one short ton of carbon dioxide gas.

ERCOT, PJM, NYISO, NEPOOL, CAISO SP, MISO, CCA and RGGI Contracts trade on ICE Futures U.S. and clear on ICE Clear Europe.

The Index generally utilizes the same calculation methodology that applies to the ICE BofA Commodity Index eXtra (MLCX) family of indices, but with certain modifications. Specifically, the modifications include:

- A different contract eligibility requirement;
- a different contract weighting method, and
- a different contract roll schedule

These modifications are explained in detail below. The ICE BofA Commodity Index eXtra Handbook (the "Handbook") for the MLCX family of indices is available on the ICE Index Platform (https://indices.theice.com) in the Methodologies section.

Annual Rebalancing

The qualifying electricity futures contracts are determined annually, as part of the annual review as outlined in the Handbook. The review is based on data available as of June 30 of each year (Annual Review Date), with qualifying contracts and associated weights updated at the annual rebalancing on January 1 (Annual Rebalancing Date).

Eligible Contracts

An eligible electricity futures contract satisfies the requirements specified below; provided, however, that the Index Advisory Committee, may, in its discretion, determine that a contract that does not satisfy one or more of the requirements set forth below will nevertheless be included in the Index if the inclusion of a contract is, in the judgment of the Index Advisory Committee (with ultimate approval by the Index Governance Committee of IDI), necessary or appropriate for the maintenance of the integrity of the Index and/or the realization of its objectives. An eligible contract:

- is listed on ICE Futures U.S.;
- is for real-time or day-ahead peak hour electricity;
- has monthly expiries
- is cash settled based on prices published by a U.S. based Independent System Operator (ISO) or Regional Transmission Organization (RTO);
- has at least an Average Daily Volume (ADV) of 300 contracts traded based on the preceding one-year period from July 1 to June 30.

If more than one contract is eligible for the same ISO/RTO, the contract with the highest ADV is selected. For a new futures contract to replace an existing and still eligible futures contract, it must be at least 25% more liquid, measured in ADV, than the existing Power Contract in the Index.

Contract Weighting

As part of the annual review, the weight of each selected Power Contract in the Index is determined based on the Average Annual Load, measured in megawatt hours (MWh) reported by each ISO/RTO represented by an Index-qualifying Power Contract. Data as of the Annual Review Date is used to determine the respective weighting for each Power Contract at the Annual Rebalancing Date.

To determine the weights for the Power Contracts and Carbon Contracts the following is calculated:

- The Average Annual Load in MWh reported by each ISO/RTO for the most recent three (3) calendar years;
- The Carbon Intensity of power produced by each ISO/RTO as measured by Total Output Emission Rate (lbs of Carbon Dioxide/MWh) as reported by the U.S. Environmental Protection Agency ("EPA") for the most recent three (3) calendar years.

- **Power Contracts**

The Average Annual Load for each ISO/RTO is calculated as below:

$$AAL_{ISO,current\ average} = \frac{\left(AAL_y + AAL_{y-1} + AAL_{y-2}\right)}{3}$$

Where:

AAL is the Average Annual Load reported by each ISO/RTO for given year *y*

The weight assigned to each Power Contract in the index is calculated as follows:

$$Weight_{ISO} = AAL_{ISO,current\ average} \,/ \sum AAL_{ISO,current\ average}$$

The current relative weights of Power Contracts in the Index can be found in Table 1.

Table 1: Weights of Power Contracts in CNPI by MwH exposure

Contract	Ticker	Exchange	12/31/2022
PJM	PMI	ICE Futures U.S.	33.666503%
ERCOT	ERN	ICE Futures U.S.	16.756956%
NY ISO	NGY	ICE Futures U.S.	6.625788%
ISO NE	NEP	ICE Futures U.S.	5.124508%

CAISO	SPM	ICE Futures U.S.	9.532192%
MISO	CIN	ICE Futures U.S.	28.294053%

For each qualifying Power Contract, the Index will hold a "strip" of 12 consecutive monthly contract expiries, rather than one contract expiry per commodity as in the MLCX indices. The resultant Average Annual Load as calculated above in MWh for each ISO/RTO is converted into an equivalent number of futures contracts for the upcoming calendar year. The number of contracts held in the Index for a given Power Contract expiry is equal to 1/12th of the Average Annual Load for a given ISO/RTO divided by the number of peak hours in that month[13], and adjusted for the relevant contract size. Each contract expiry in the 12-month "strip" will have 1/12 of the MWh exposure for that ISO/RTO.

Thus, the monthly MWh per ISO/RTO is defined as

$$MWh_{ISO,month} = (AAL_{ISO,current\ average})/12$$

and the number of Power Contracts representing each ISO/RTO is calculated as

$$Contracts_{ISO,month} = \ (MWh_{ISO,month}\ /PeakHours_{ISO,month})\ /Contract\ Size$$

See Tables 3 and 4 below for an illustrative example of a 12-month strip, along with the roll schedule.

- **Carbon Contracts**

The combined weight of the Carbon Contracts in the Index is determined based on the reported average carbon intensity (Carbon Intensity)[14] of the Average Annual Load published by the ISO/RTOs on which a Power Contract qualifying for the Index settles against. The Carbon Intensity of the Index is defined as the total metric tons of carbon equivalent emissions per MWh for each ISO/RTO over the most recent three calendar years. Thus the total carbon equivalent emissions (CO) for the Index can be calculated as

$$CO_y = \sum (\ AAL_{ISO,current\ average} * CI_{ISO,current\ average}\ )$$

Where:

CO is the amount of carbon equivalent emissions required to be offset in the Index for year *y*

[13] NERC peak hours / holidays as per https://www.energygps.com/HomeTools/PowerCalendar

[14] As reported/published by the EPA

CI is the Carbon Intensity associated with a given ISO/RTO for the years included in the current calculation, represented as

$$CI_{ISO,current\ average} = \frac{\left(CI_y + CI_{y-1} + CI_{y-2}\right)}{3}$$

The calculated CO is then converted into the amount of Carbon Contracts required to “offset” the Average Annual Load of Power Contracts held in the Index. As each Carbon Contract represents an allowance for 1000 tons of carbon equivalent emissions, RGGI contracts are adjusted by 1.12 as they give the owners the right to emit 1000 short tons (2000 lbs) vs metric tons (2,240 lbs) for CCA contracts. The Carbon Contracts are allocated between CCA contracts and RGGI contracts using weights of 80% and 20%, respectively, which reflects the disparity in trading volume between the two contracts.

The CO is thus converted into Carbon Contracts as follows:

$$CCA_y = CO_y * \frac{0.8}{1000}$$

$$RGGI_y = CO_y * \frac{0.2}{1000} / 1.12$$

Where:

CCA is the amount of CCA Contracts included in the Index for year y

RGGI is the amount of RGGI Contracts included in the Index for year y

Rolling Mechanism

- **Power Contracts**

The rolling mechanism for the Power Contracts is similar to that described in Chapter 3 of the Handbook, with the following modifications. The MLCX indices hold one contract per commodity, the Index holds a “strip” of 12 contracts with consecutive monthly expiries. Each month, the Power Contracts roll by rolling out of the closest expiring contract held and rolling into a contract expiring the month after the furthest expiring contract held. For example, at the start of April, the Index would hold 12 Power Contracts with monthly expiries between May and the following April. During the 15-day roll period in April, the Index would roll out of the May contract and into the following May’s contract. Please see the example in Tables 3 and 4 below:

Table 3: Example "strip" of Power Contracts held at the beginning of April (pre-roll)

Contract	Code	1	2	3	4	5	6	7	8	9	10	11	12
PJM Western Hub	PMI	K	M	N	Q	U	V	X	Z	F+	G+	H+	J+
ERCOT North	ERN	K	M	N	Q	U	V	X	Z	F+	G+	H+	J+
NYISO Zone G	NGY	K	M	N	Q	U	V	X	Z	F+	G+	H+	J+
ISO New England Massachusetts Hub	NEP	K	M	N	Q	U	V	X	Z	F+	G+	H+	J+
CAISO SP	SPM	K	M	N	Q	U	V	X	Z	F+	G+	H+	J+
MISO Indiana Hub	CIN	K	M	N	Q	U	V	X	Z	F+	G+	H+	J+

Table 4: Example "strip" of Power Contracts held at the end of April (post-roll)

Contract	Code	1	2	3	4	5	6	7	8	9	10	11	12
PJM Western Hub	PMI	M	N	Q	U	V	X	Z	F+	G+	H+	J+	K+
ERCOT North	ERN	M	N	Q	U	V	X	Z	F+	G+	H+	J+	K+
NYISO Zone G	NGY	M	N	Q	U	V	X	Z	F+	G+	H+	J+	K+
ISO New England Massachusetts Hub	NEP	M	N	Q	U	V	X	Z	F+	G+	H+	J+	K+
CAISO SP	SPM	M	N	Q	U	V	X	Z	F+	G+	H+	J+	K+
MISO Indiana Hub	CIN	M	N	Q	U	V	X	Z	F+	G+	H+	J+	K+

Each month The Power Contracts in the Index roll according to the following schedule shown in Table 5:

Table 5: Rolling schedule of ICECNPI Power Contracts (reflects the closest expiry among the "strip" of contracts held at the beginning of the month prior to the start of any applicable roll)

Contract	Code	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PJM Western Hub	PMI	G	H	J	K	M	N	Q	U	V	X	Z	F+
ERCOT North	ERN	G	H	J	K	M	N	Q	U	V	X	Z	F+
NYISO Zone G	NGY	G	H	J	K	M	N	Q	U	V	X	Z	F+
ISO New England Massachusetts Hub	NEP	G	H	J	K	M	N	Q	U	V	X	Z	F+
CAISO SP	SPM	G	H	J	K	M	N	Q	U	V	X	Z	F+
MISO Indiana Hub	CIN	G	H	J	K	M	N	Q	U	V	X	Z	F+

Month Letter Code: January F, February G, March H, April J, May K, June M, July N, August Q, September U, October V, November X and December Z. A “+” following the letter indicates a contract of the following year.

- **Carbon Contracts**

The rolling mechanism for Carbon Contracts is similar to that described in Chapter 3 of the Handbook; however, the Index rolls the Carbon Contracts over a three-month Roll Period falling in September, October, and November.

The Index Roll Period for the Carbon Contracts runs from the first to the fifteenth Business Day of the months of September, October, and November.

The Carbon Contracts roll in 33.33% increments per month over the three-month Roll Period. The Carbon Contracts roll from the current year vintage / current year December expiration contract month to the next year vintage / next year December expiration contract month. For example, starting in

September 2022, the Carbon Contracts will start rolling from the Vintage 2022 December 2022 to Vintage 2023 December 2023 vintage / expiration contract month.

Roll Period Month	Roll-In Contract	Roll-Out Contract
September	33.33%	66.67%
October	66.67%	33.33%
November	100.00%	0.00%

Index Specifications

The Index is published in three different variants:

ICECNPIT Total Return
ICECNPIE Excess Return
ICECNPIS Spot Return

The Index is calculated and published every 15 seconds between the hours of 9:00 AM and 7:15 PM New York time to the ICE Consolidated Feed on the ICE Data Indices Commodity Indices channel. The real-time calculation of the Index incorporates trades for the Contracts while the closing calculation of the Index incorporates the daily settlement for the Contracts, typically available at 5:00 PM Eastern time. The Index base currency is in USD. The Index is calculated on all days on which the New York Stock Exchange is open for trading. Index history is available from 12/31/2013.

Historical Backtest

For the historical backtest, weights used in the Index calculations are as described in this Index methodology, with the exception of any years where an ISO/RTO does not have annual load data readily available as per sources cited in the Appendix. In such cases, annual load data for certain ISO/RTOs was estimated and used. The estimates were calculated by using the ratio of the ISO/RTO's oldest reported load in MWh relative to that of the other ISO/RTOs in the Index that reported for the same year, and then applies that ratio to the sum of reported MWh for those same ISO/RTOs for prior years.

Table 2: ISO/RTO Without Available Historical Load Data

ISO/RTO	Earliest Year with Reported Load Data	Years Estimated
MISO	2020	2009-2019
CAISO	2019	2009-2018
ISO New England	2011	2009-2010

Prior to 2018 the EPA provided Carbon Intensity data bi-annually. For the historical backtest the most recently available single calendar year's Carbon Intensity data was used to calculate the amount of Carbon to offset in the Index until 2021, where the three-year average was used, as per the described Index methodology.

Appendix: Sources Used in the Calculation of Index Contract Weights

As per the Handbook, the sources used by the Index Advisory Committee in calculating the weight and carbon intensity for each ISO/RTO defined in Table 6. The weight and carbon intensity calculated for each ISO/RTO is based on sources that the Index Advisory Committee believes to be reliable, but the Index Advisory Committee makes no warranty regarding the reliability or accuracy of such data and reserves the right to change any or all of the sources at any time.

Table 6: ISO/RTO Data, Units and Sources

Contract	Underlying Data	Unit	Source
PJM	Annual Average Hourly Load	MwH	PJM RTO (www.pjm.com)
ERCOT	Annual Average Hourly Load	MwH	ERCOT (www.ercot.com)
New York ISO	Annual Average Hourly Load	MwH	New York ISO (www.nyiso.com)
ISO New England	Annual Average Hourly Load	MwH	ISO New England (www.iso-ne.com)
CAISO	Annual Average Hourly Load	MwH	California ISO (www.caiso.com)
MISO	Annual Average Hourly Load	MwH	Midcontinent ISO (www.misoenergy.org)
Carbon (CCA and RGGI)	Carbon Intensity	lb/MwH	United States EPA (www.epa.gov)

Disclosures

Source: ICE Data Services.

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