

ILLINOIS COMMERCE COMMISSION
Public Notice of Successful Bidders and Average Prices

Illinois Power Agency
December 2021 Procurement of Carbon Mitigation
Credits from Facilities Fueled by Nuclear Power

December 1, 2021

On November 23, 2021, the Illinois Power Agency's ("IPA's") procurement administrator, NERA Economic Consulting, held a procurement event for the sale of carbon mitigation credits ("CMCs") to Commonwealth Edison Company ("ComEd"). A CMC is a tradable credit representing the environmental attributes of one megawatt hour of energy produced by a carbon-free energy resource (which is defined as a facility that (1) is fueled by nuclear power; and (2) is interconnected to PJM Interconnection, LLC ("PJM")). Delivery of the CMCs is for the period beginning June 1, 2022 through the delivery year ending in May 31, 2027. The procurement sought to procure approximately 54,500,000 cost effective CMCs on an annual basis. The procurement process was monitored for the Commission by Bates White. On December 1, 2021, voting in open session, the Commission approved the procurement administrator's selection of winning carbon-free energy resources.

This procurement event undertaken by the IPA is a result of Public Act 102-0662 ("Act"), also known as the Climate and Equitable Jobs Act, which was signed into law and became effective September 15, 2021. As directed by the Act, the IPA filed a Carbon Mitigation Credits Procurement Plan ("CMC Procurement Plan"), which set out detailed evaluation criteria designed to assess the ability of carbon-free energy resources to meet the public interest requirements identified in the Act. The CMC Procurement Plan was approved by the Commission in Docket No. 21-0718¹ and the IPA's evaluation criteria are fully described in the IPA's final approved CMC Procurement Plan.

The Act specifies that carbon-free energy resources shall be selected based on public interest criteria that include, but are not limited to, minimizing carbon dioxide emissions that result from electricity consumed in Illinois and minimizing sulfur dioxide, nitrogen oxide, and particulate matter emissions that adversely affect the citizens of the State of Illinois. The Act further specifies that the selection of winning carbon-free energy resources is to take into account the incremental environmental benefits resulting from the procurement, such as any existing environmental benefits that are preserved by this procurement that would cease to exist if the procurement was not held, including the preservation of carbon-free energy resources.

In order to evaluate the impact of carbon-free energy resources on the amount of carbon dioxide emissions resulting from electricity consumed in Illinois, the fraction of the carbon-free energy resource's replacement generation expected to be consumed in Illinois and the expected carbon content of that replacement generation consumed in Illinois was examined. As described in the CMC Procurement Plan, replacement generation would likely be derived primarily from natural gas and coal units in PJM. Based on public sources and data, the IPA projects that in-state coal and natural gas generation would make up 43% of the replacement generation with the remaining 57% sourced from coal and gas plants outside of the state primarily in other parts of PJM. The relative contributions of coal and natural gas sources to the replacement generation mix were estimated as 65% natural gas and 35% coal. The IPA assessed the impact of replacement generation from other states in PJM

¹ See the Final Order in Docket No. 21-0718:

<https://www.icc.illinois.gov/docket/P20210718/documents/317663/files/553061.pdf>

by comparing the states' output of CO₂ per megawatt hour with the weighted average output of all states located in PJM. To reflect the impact of CO₂ emissions for carbon-free resources located both in and outside of Illinois, the IPA assumed 19.8% of replacement generation produced outside of Illinois, but in PJM, would be consumed in Illinois based on proxy information.

To evaluate the impact of carbon-free energy resources on the amount of non-carbon dioxide emissions impacting Illinois citizens, the degree to which emissions from a carbon-free energy resource's replacement generation would increase the amount of sulfur dioxide ("SO₂"), nitrogen oxide ("NO_x") and particulate matters ("PM") in Illinois and thus have adverse impacts on Illinois citizens was examined. Again, the IPA used the projection that in-state coal and natural gas generation would make up 43% of the replacement generation with the remaining 57% sourced from coal and gas plants outside of the state primarily in other parts of PJM. The IPA assessed the impact of replacement generation from each state by comparing that state's output of SO₂, NO_x, and PM per megawatt hour with the weighted average output of all states located in PJM. The IPA then estimated how much of the air pollution from this replacement generation would reach Illinois by examining the facilities' distance from Illinois and the average amount of time the wind blows from the location into Illinois.

Each facility could receive a maximum score of 25 points for each of the CO₂, SO₂, NO_x, and PM criteria and a maximum overall score from these environmental criteria of 100 points. To get final scores, the emission scores for each facility were multiplied by an Economic Stress Multiplier ("ESM"). The Economic Stress Multiplier estimates the degree to which each facility is at risk of closure due to economic and market conditions. The ESM is calculated as the ratio of a carbon-free energy resource's operating cost per megawatt hour divided \$30.28/MWh, which represents the average earnings opportunity for the sale of energy and capacity during the time period between 2022 and 2027 provided in an Environmental Protection Agency consultant report. The ESM was capped at 1.19 based on a review of the average annual generating costs for multi-unit nuclear plants over the last 10 years as estimated by the Nuclear Energy Institute and reported in the 2020 PJM State of the Market Report.

The successful Carbon-free energy resources in the CMC RFP were those facilities that achieved the highest scores as determined through the evaluation process. If facilities had the same score, the relative ranking of the facilities would be based on the price bid with the lowest bid price receiving the higher relative ranking. The evaluation process selected carbon-free energy resources until an annual target quantity of approximately 54,500,000 CMCs was reached.

| Selected Carbon-free Energy Resources |
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| Braidwood Nuclear Power Station, Unit 1 |
| Braidwood Nuclear Power Station, Unit 2 |
| Byron Nuclear Power Station, Unit 1 |
| Byron Nuclear Power Station, Unit 2 |
| Dresden Nuclear Power Station, Unit 2 |
| Dresden Nuclear Power Station, Unit 3 |

The CMC price paid to each facility in a given delivery year must be less than or equal to a customer protection cap equal to the Baseline Cost, defined in Section 1-75(d-10)(2) of the IPA Act, for that delivery year. The Baseline Costs for each delivery year are the following: (i) \$30.30/MWh for the delivery year beginning June 1, 2022; (ii) \$32.50/MWh for the delivery year beginning June 1, 2023; (iii) \$33.43/MWh for the delivery year beginning June 1, 2024; (iv) \$33.50/MWh for the delivery year beginning June 1, 2025; and (v) \$34.50/MWh for the delivery year beginning June 1, 2026.

The public notice required under Section 1-75(d-10)(3)(E) of the IPA Act also mandates the disclosure of the following information:

- (I) the value of avoided greenhouse gas emissions measured as the product of the carbon-free energy resources' output over the contract term, using generally accepted methodologies for the valuation of avoided emissions; and
- (II) the costs of replacement with other carbon-free energy resources and renewable energy resources, including wind and photovoltaic generation, based upon an assessment of the prices paid for renewable energy credits through programs and procurements conducted pursuant to subsection (c) of Section 1-75 of the IPA Act, and the additional storage necessary to produce the same or similar capability of matching customer usage patterns.

The estimated value of avoided greenhouse gas emissions is calculated based upon the most recent estimates of the cost of carbon emissions contained in the Interagency Working Group on Social Cost of Greenhouse Gases, United States Government's Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990 dated February 2021 and average emissions rates from PJM's report 2016–2020 CO₂, SO₂ and NO_x Emission Rates Dated April 9, 2021.

Using a 3% discount rate, the Interagency Working Group on Social Cost of Greenhouse Gases estimates an annual cost of carbon equal to \$53 to \$59 per metric ton for the years 2022 – 2027. The most recent PJM System Average CO₂ emissions rate is 791 lbs per MWh for 2020, which equates to approximately 0.36 metric tons per MWh of generation. Assuming this emissions value for 2022-

2027, the values of an avoided MWh of CO₂ emissions are approximately \$19.02/MWh, \$19.37/MWh, \$19.73/MWh, \$20.09/MWh, \$20.45/MWh, \$21.17/MWh for the years 2022 – 2027, respectively.

The cumulative value over the expected life of the CMC contracts, June 1, 2022 to May 31, 2027, without adjustments, is \$5,426,329,606. This estimate does not account for additional greenhouse gas costs, such as those associated with methane or other emissions. Estimates would also increase if PJM System Marginal Emissions were used instead of PJM System Average Emissions.

The costs of replacement with other zero carbon dioxide resources, including wind and photovoltaic, can be estimated two different ways. The first approach uses the weighted average of the REC prices paid to the winning bidders in the IPA's utility-scale wind and solar procurements following Illinois Public Act 99-0906 (commonly referred to as the Future Energy Jobs Act) multiplied by the projected annual output over the life of the CMC contracts. This approach yields a value of \$4.22 per REC or an estimated total cost of replacement of \$1,150,040,833 over the life of the five-year CMC contracts.

The second approach uses the weighted average of the REC prices paid for the entire current portfolio of the Illinois RPS from procurements following the Future Energy Jobs Act. This includes the prices for RECs from the 2019 Brownfield Solar procurement, the Adjustable Block Program, and the Illinois Solar For All Program. This approach yields a value of \$14.16 per REC or an estimated total cost of replacement of \$3,859,856,992 over the life of the five-year CMC contracts.

The additional storage necessary to produce the same or similar electricity output of the winning carbon-free energy resource bidders in this RFP has been estimated through modeling conducted by Sandia National Laboratories (SNL), under funding by the DOE Office of Electricity Energy Storage Program. The storage estimates use the locations and estimated capacity factors of the winning bidders in the IPA's utility-scale wind and solar procurements following the Future Energy Jobs Act and they assume that energy storage is 85% efficient. Based on these assumptions and SNL's modeling, the estimated additional storage needed is 11,262 MW of power capacity with an estimated energy capacity of 2,762,770 MWh.