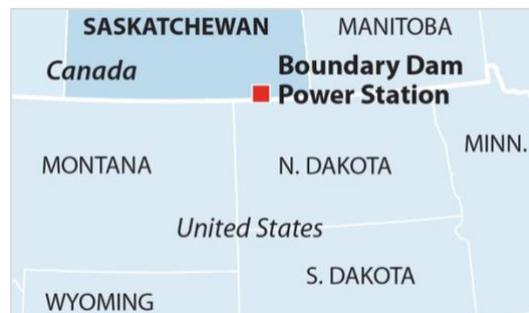


Boundary Dam 3 Coal Plant Achieves Goal of Capturing 4 Million Metric Tons of CO₂ But Reaches the Goal Two Years Late

These have been tough times for advocates of capturing the carbon dioxide (CO₂) produced in coal-fired power plants.

Last May, the hyped Petra Nova project near Houston was indefinitely mothballed because low oil prices made using the captured CO₂ for enhanced oil recovery (EOR) uneconomical. The fact that the project's operating performance was nowhere near expectations—90% carbon capture rate and an 85% capacity factor—was almost overlooked by the owners and in the coverage of Petra Nova's demise.

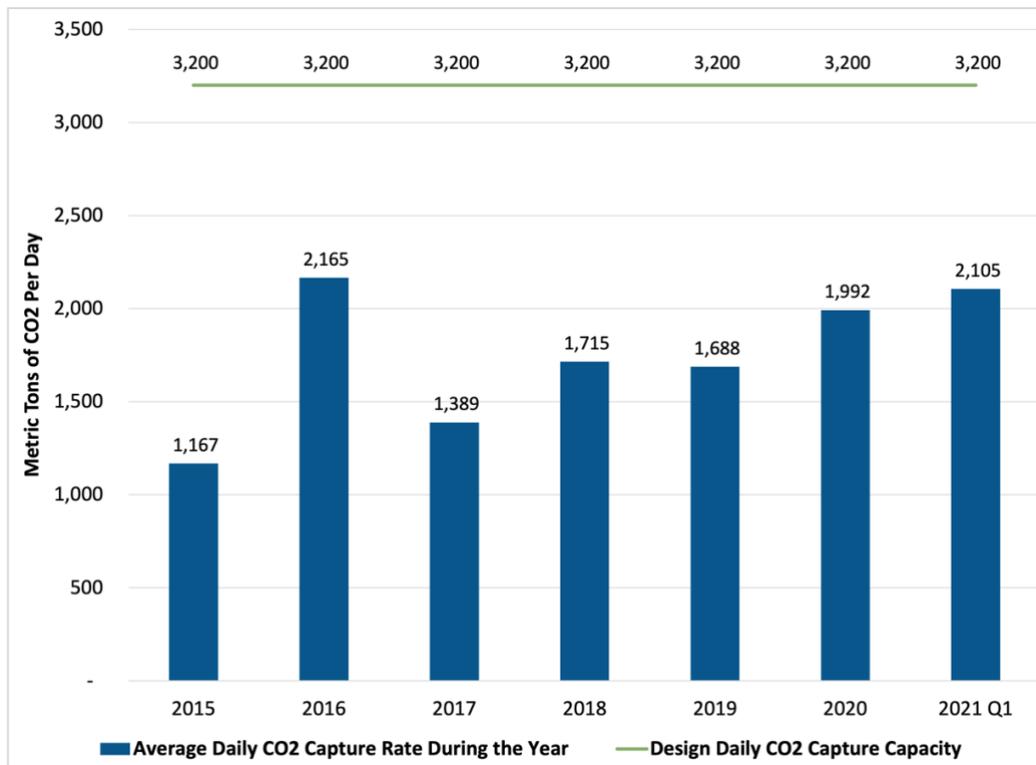
That has left Boundary Dam 3 in Canada as the only project capturing CO₂ from a coal plant. On March 31, SaskPower (Boundary Dam 3's owner) noted that the project had captured a total of 4 million metric tons of CO₂ and claimed this was "another milestone to be proud of."¹



The carbon capture facility at Boundary Dam was designed to capture 3,200 metric tons of CO₂ daily, or slightly more than 1 million metric tons annually. It has barely achieved that goal on any single day and has never done so over any extended period.

¹ SaskPower. [SaskPower CCS Facility Achieves 4 Million Tonnes of CO₂ Captured](#). March 31, 2021.

Figure 1: Projected vs. Actual Boundary Dam CO₂ Capture Rates



Source: SaskPower’s Monthly Boundary Dam 3 Status Updates.

SaskPower commends itself for improving the performance of Boundary Dam 3’s carbon capture facility through upgrades made during plant outages. But, as Figure 1 shows, the plant is still far below the original design goal of capturing 3,200 metric tons of CO₂ per day.

A 2019 paper from the International CCS Knowledge Centre (which is 50% owned by SaskPower) noted that through April 2018, its first three-and-one-half years of operation, the carbon capture facility had only achieved its design capacity for three days.² A review of more recent operating data suggests that it has failed to achieve this design goal any more frequently in the almost three years since—hardly a milestone to be proud of.³

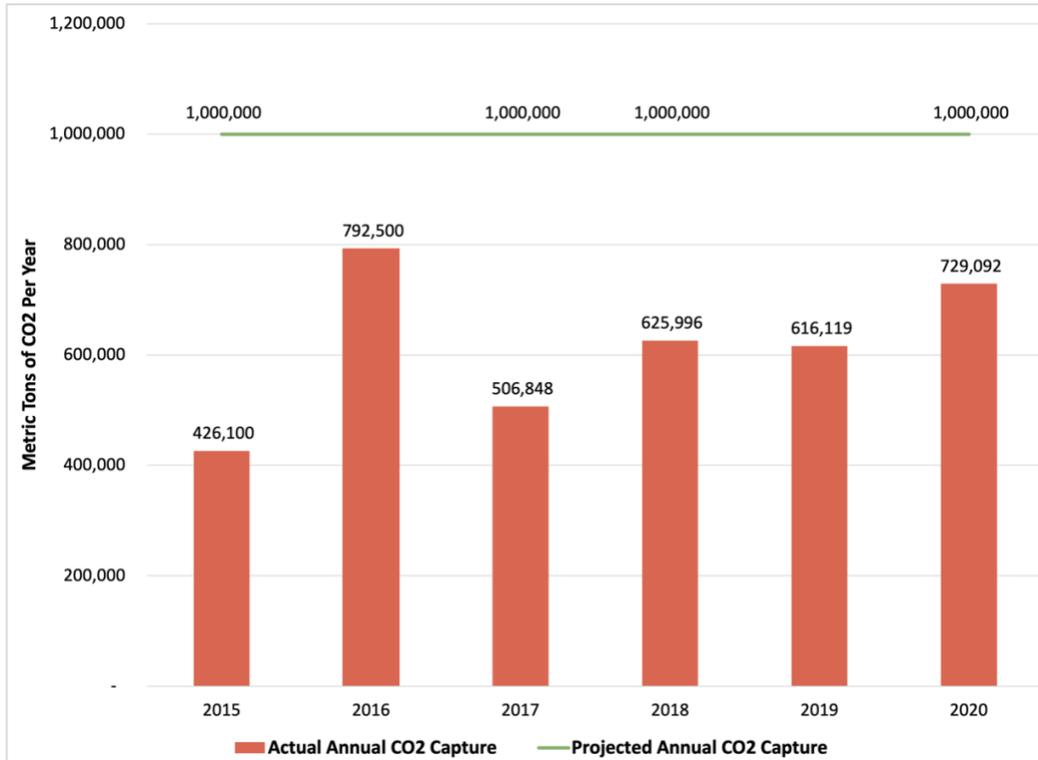
SaskPower’s monthly Boundary Dam 3 status reports reflect that the project no longer has a target of capturing 90% of the CO₂ it produces—the target is now just 65%. It’s another “milestone” for which the company should not be commended.

² International CCS Knowledge Centre. *Boundary Dam 3: Upgrades, updates and performance optimization of the world’s first fully integrated CCS plant on coal*. June 9, 2019.

³ International CCS Knowledge Centre. *SaskPower’s Boundary Dam Unit 3 Carbon Capture Facility – The Journey to Achieving Reliability*. March 2021.

As a result of not achieving the design capacity of 3,200 metric tons per day, the annual amounts of CO₂ captured by Boundary Dam have been far less than originally projected.

Figure 2: Projected vs. Actual Amounts of CO₂ Captured Each Year



Source: SaskPower’s Monthly Boundary Dam 3 Status Updates.

Consequently, it took until March 2021 for Boundary Dam 3 to capture 4 million metric tons of CO₂, instead of the originally projected October 2018 date. This delay occurred despite SaskPower’s repeated claim that the availability and the reliability of Boundary Dam 3’s capture facility has improved over time.⁴

There are three possible reasons for Boundary Dam’s failure to capture as much CO₂ as SaskPower and other supporters of the project originally claimed.

1. The carbon capture technology experienced problems that reduced its capture rate and/or the amount of time it was available to capture CO₂.

⁴ International CCS Knowledge Centre. [Derates and Outages Analysis – A Diagnostic Tool for Performance Monitoring of SaskPower’s Boundary Dam Unit 3 Carbon Capture Facility](#). March 2021.

2. The non-capture portion of the plant experienced problems that reduced its generation and, consequently, the amount of capturable CO₂ it was able to produce.⁵
3. Management made a conscious decision not to capture as much CO₂ as originally planned because operating the carbon capture facility was either too expensive or uneconomic compared to the revenues that could be obtained from selling or permanently storing the captured CO₂.

All of these represent serious risks for any project, especially those which plan to retrofit unproven carbon capture technology to aging coal-fired generators. Increasing government subsidies or increasing the value of tax credits given to developers does not eliminate these risks. It merely transfers the risk from developers to the government and its taxpayers.

Another dubious claim was made by SaskPower concerning the 4 million metric ton milestone—that is, that all of the carbon dioxide and greenhouse gases that were captured “would have gone into the atmosphere ... are instead being safely sequestered away.”⁶ In reality, a substantial portion (if not most) of the CO₂ captured at Boundary Dam is being used for EOR. The additional oil being produced this way is being burned or used for industrial processes, both of which produce CO₂ that is emitted into the atmosphere. So, the claim that Boundary Dam has ultimately reduced CO₂ emissions by 4 million metric tons is untrue. The net amount of global greenhouse gas emissions reduced by CO₂ capture at Boundary Dam 3 may be open to argument, but the ultimate figure is far less than 4 million metric tons.

SaskPower has already decided against retrofitting Boundary Dam 4 and 5 to capture CO₂, planning to shut down the units instead.⁷ If it is true that “continued operation of the [Boundary Dam 3] capture facility will be based on cost effectiveness and efficiency,” as SaskPower’s recently claimed,⁸ then capturing carbon at Boundary Dam can be expected to soon be retired as well.

⁵ SaskPower has said that the major outages and availability of the carbon capture facility were aligned with plant outages and that a significant portion of the time in 2018, 2019 and 2020 when the capture facility was not in operation should be attributed to outages of the unit’s power island and not the capture island. See: International CCS Knowledge Centre. [Derates and Outages Analysis – A Diagnostic Tool for Performance Monitoring of SaskPower’s Boundary Dam Unit 3 Carbon Capture Facility](#). March 2021. While that may be true, failing to capture projected amounts of CO₂ due to outages of the non-capture portions of the plant represents a significant risk that SaskPower accepted when it decided to retrofit Boundary Dam 3.

⁶ Discover Estevan. [Boundary Dam Carbon Capture Facility Surpasses 4 Million Tonnes Captured](#).

⁷ [Boundary Dam Units 4 and 5 to be Retired](#). March 31, 2021.

⁸ International CCS Knowledge Centre, *op. cit.*

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About the Author

David Schlissel

David Schlissel, Director of Resource Planning Analysis for IEEFA, has been a regulatory attorney and consultant on electric utility rate and resource planning issues since 1974. He has testified as an expert witness before regulatory commissions in more than 35 states and before the U.S. Federal Energy Regulatory Commission and Nuclear Regulatory Commission. He also has testified in state and federal court proceedings concerning electric utilities. His clients have included regulatory commissions in Arkansas, Kansas, Arizona, New Mexico and California. He has also consulted for publicly owned utilities, state governments and attorneys general, state consumer advocates, city governments, and national and local environmental organizations. Schlissel has undergraduate and graduate engineering degrees from the Massachusetts Institute of Technology and Stanford University. He has a Juris Doctor degree from Stanford University School of Law.

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