Case 19-T-0684
Exhibit __ (CVEC-4)

CRICKET VALLEY ENERGY CENTER ECONOMIC IMPACT ANALYSIS

Date: September 1, 2020

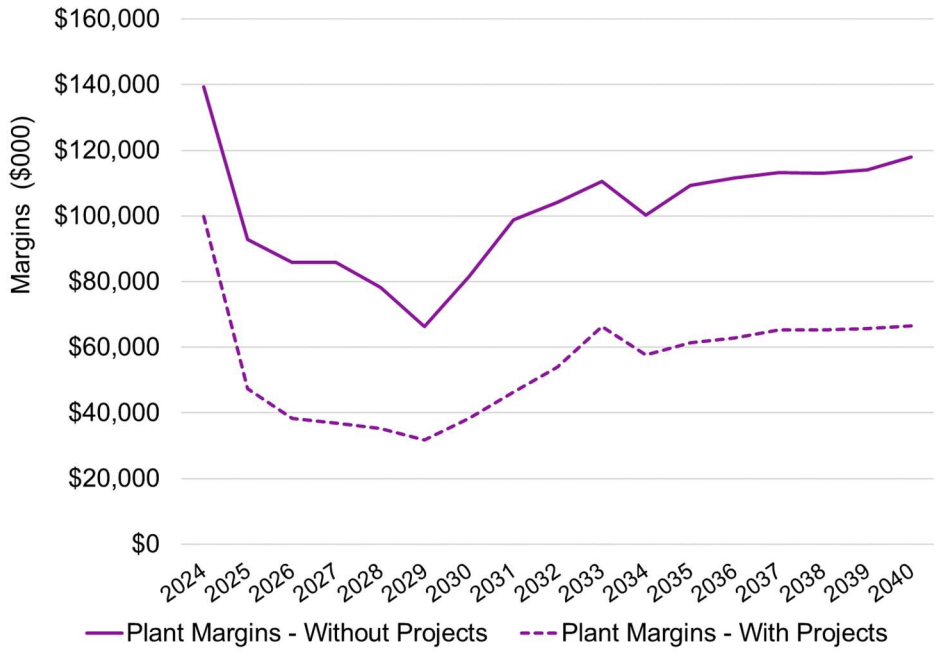
Cricket Valley Energy Center Economic Impact Analysis

1. RESULTS

Guidehouse undertook an analysis in which it forecasted the impact of the NYISO PPTN transmission projects ("the Projects") on plant margins for the Cricket Valley Energy Center (CVEC). Cricket Valley Energy Center is a 1,070 MW natural gas-fired power plant currently operating in Dover, New York. In its assessment, Guidehouse utilized its commercially-licensed and proprietary models to forecast CVEC's revenues and resulting margins from the NYISO markets with and without the Projects. The assumed in-service date for the Projects is 2024. The results of the analysis are discussed below.

Figure 1 shows CVEC's forecasted gross margins (total revenues less total expenses, including fixed O&M) with and without the Projects. Guidehouse forecasts that the Projects will lead to a significant decline in CVEC's gross margins. Over the 2025-2040 period, gross margins are an average of 48% lower in the case with the Projects than in the case without the Projects.

Figure 1. CVEC Annual Gross Margins (nominal $000) – Base Case with and without the Projects



Source: Guidehouse Base Case with and without the Projects

Table 1. CVEC Annual Gross Margins (nominal $000) – Base Case with and without the Projects

	Without Projects	With Projects
2024	$139,304	$99,773
2025	$92,872	$47,437
2026	$85,862	$38,325
2027	$85,943	$36,946
2028	$78,267	$35,191
2029	$66,258	$31,729
2030	$81,545	$38,315
2031	$98,914	$46,475
2032	$104,248	$53,906
2033	$110,630	$66,329
2034	$100,277	$57,709
2035	$109,290	$61,448
2036	$111,504	$62,770
2037	$113,183	$65,374
2038	$113,087	$65,378
2039	$114,078	$65,736
2040	$117,922	$66,629

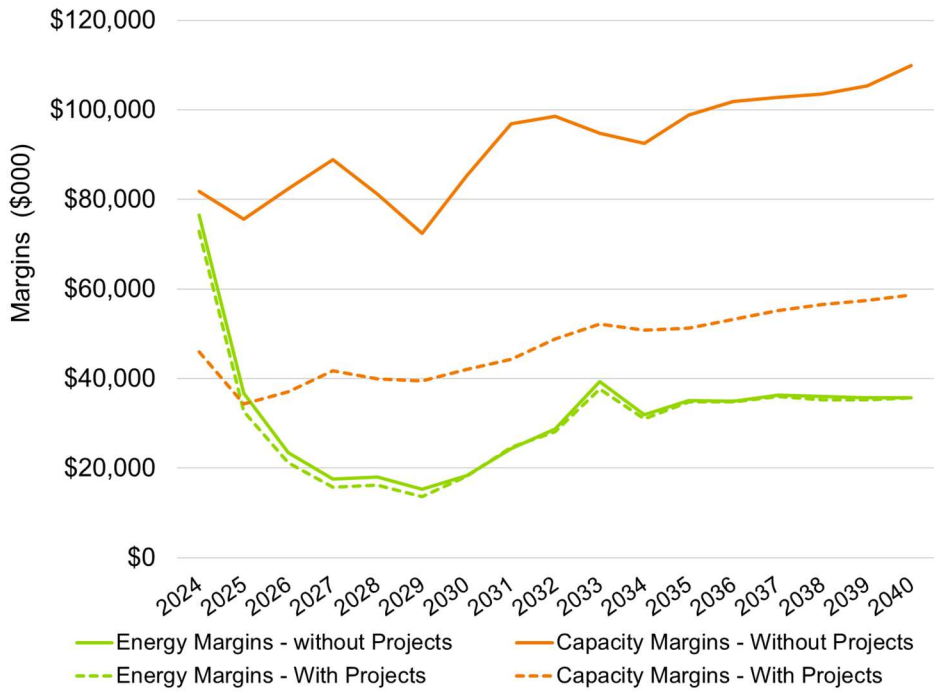
Source: Guidehouse Base Case with and without the Projects

Lost capacity market revenues are the main driver of lower plant margins in the case with the Projects. By increasing transfer capability from upstate to downstate, the Projects would reduce the NYISO's locational minimum installed capacity requirement (LCR) for the Lower Hudson valley (G-J Locality. Guidehouse assumes an LCR reduction of 8.6%[1] with the lines. This reduction in LCR leads to a leftward shift of the Lower Hudson Valley (LHV) capacity demand curve and substantial reduction in G-J Locality capacity prices. Historically, G-J Locality capacity prices have cleared significantly above Rest of State (ROS); however, with the leftward shift of the LHV demand curve due to the Projects, the G-J Locality price no longer clears notably above the ROS capacity price. The downward pressure on capacity market prices leads to a sharp drop in CVEC's capacity margins (shown in Figure 2 and Table 2) beginning in 2024.

Of certain significance of converging G-J Locality capacity prices with ROS is that this results in Zone G generation, currently located in a mitigated capacity zone with Buyer Side Mitigation (BSM) measures in place to prevent price distortion from new subsidized generation, now competing directly with subsidized or state owned capacity resources located in ROS. This impact is significant and shows that the PPTN Projects enable significant amounts of state subsidized wind and nuclear generation and NYPA owned hydro resources to compete directly with unsubsidized merchant generation in Zone G.

[1] The 8.6% was estimated based on the reduction in Transmission Security Limits (which serve as a hard floor for LCRs) from Table A-8 in the NYISO's *AC Transmission Public Policy Plan Transmission Plan* report

Figure 2. CVEC Annual Energy and Capacity Margins (nominal $000) – Base Case with and without the Projects



Source: Guidehouse Base Case with and without the Projects

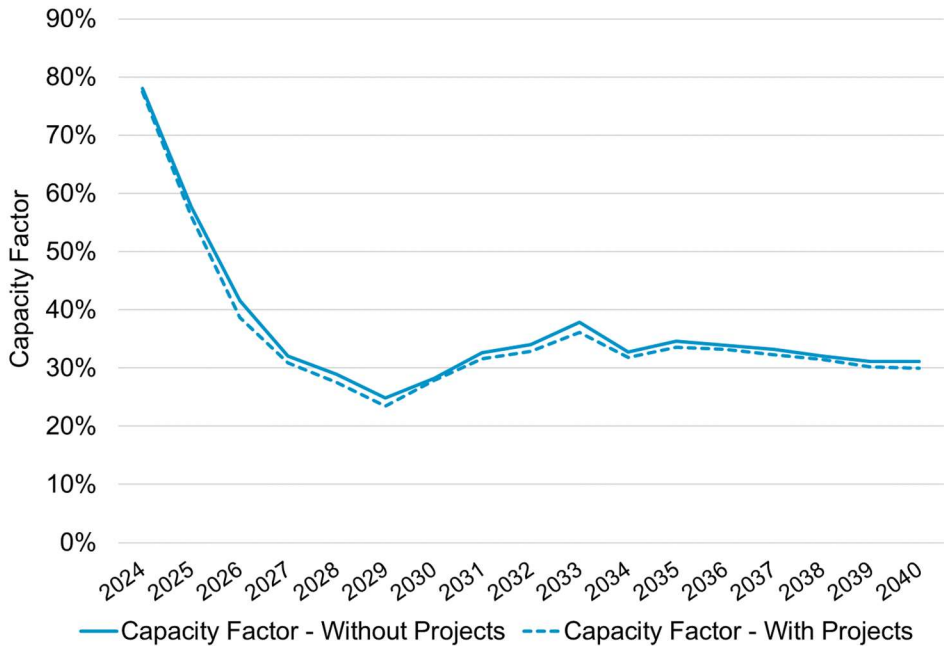
Table 2. CVEC Annual Energy and Capacity Margins (nominal $000) - Base Case with and without the Projects

	Margins without the Projects		Margins with the Projects		Margin losses due to Projects	
	Energy	Capacity	Energy	Capacity	Energy	Capacity
2024	$76,543	$81,835	$72,848	$45,999	($3,695)	($35,836)
2025	$36,756	$75,642	$32,643	$34,320	($4,113)	($41,322)
2026	$23,390	$82,460	$21,197	$37,116	($2,193)	($45,344)
2027	$17,505	$88,896	$15,714	$41,689	($1,791)	($47,206)
2028	$18,094	$81,112	$16,175	$39,956	($1,920)	($41,156)
2029	$15,340	$72,350	$13,689	$39,472	($1,651)	($32,878)
2030	$18,302	$85,180	$18,191	$42,061	($111)	($43,119)
2031	$24,435	$96,933	$24,607	$44,322	$172	($52,611)
2032	$28,703	$98,527	$28,079	$48,809	($624)	($49,718)
2033	$39,345	$94,809	$37,708	$52,144	($1,636)	($42,665)
2034	$31,913	$92,441	$31,009	$50,777	($904)	($41,664)
2035	$35,098	$98,835	$34,857	$51,234	($241)	($47,601)
2036	$34,922	$101,806	$34,737	$53,256	($185)	($48,550)
2037	$36,248	$102,751	$35,972	$55,219	($276)	($47,533)
2038	$35,966	$103,547	$35,205	$56,598	($760)	($46,949)
2039	$35,746	$105,378	$35,258	$57,525	($489)	($47,853)
2040	$35,749	$109,856	$35,635	$58,678	($115)	($51,178)

Source: Guidehouse Base Case with and without the Projects

Energy margins (also shown in Figure 2 and Table 2) decline slightly in the first five years of the forecast due to downward pressure on LMPs from some easing of congestion between zones A-F and G-K, and due to a slight decline in CVEC's annual capacity factors resulting from the increased supply of generation from upstate. As more renewable generation, particularly offshore wind, comes online, the impacts of the Projects on energy prices and energy margins diminishes.

Figure 3. CVEC Annual Capacity Factors – Base Case with and without the Projects



Source: Guidehouse Base Case with and without the Projects

The results of Guidehouse's analysis indicate that the Projects would cause a significant overall decline in CVEC's operating margins, driven by a significant drop in capacity margins as capacity market prices collapse, as well as a more moderate drop in energy margins.

2. METHODOLOGY

Guidehouse simulated the NYISO system with and without the Projects under a scenario based on the 2019 CARIS buildplan. CARIS is the NYISO's transmission planning process. The Guidehouse case ("Base Case") reflects most of the resource mix assumptions of the 2019 CARIS, including full compliance with the New York Climate Leadership and Community Protection Act ("CLCPA"), but does not include a new HVDC line from Hydro-Quebec. While the HVDC line has been incorporated into NYISO's long term transmission planning, the lack of any forward progress in development at this time means we cannot reasonably assume it will be coming online in the CARIS timeframe in an independent project impact analysis. Other market assumptions beyond the future resource mix are Guidehouse's independent view of the NYISO power system, developed with the involvement of numerous subject matter experts with specific knowledge and understanding of fundamental market assumptions, such as fuel pricing and environmental regulations. This simulation used a suite of market models to forecast the system operation, energy market prices, and capacity market prices.

Guidehouse forecasted NYISO wholesale energy prices with and without the PPTN lines using the commercially available PROMOD software. PROMOD is a detailed energy production cost model that simulates hourly chronological operation of generation and transmission resources on a nodal basis in wholesale electric markets. PROMOD dispatches generating resources to match hourly electricity

demand, dispatching the least expensive generation first. The choice of generation is determined by the generator's total variable cost given operating constraints such as ramp rates (for fossil resources) or water availability (for hydraulic resources), and transmission constraints. The total variable cost of the marginally dispatched unit in each hour sets the hourly market clearing price. The simulation considers a detailed representation of the NYISO transmission system. Guidehouse ran the PROMOD simulations for the 2024-2033 period. Energy prices were extrapolated for 2034 through 2040.

The energy prices from PROMOD were then inputted into Guidehouse's proprietary Electric Valuation Model (EVM), a dispatch model used to evaluate bidding behavior, volatility, and arbitrage opportunities. It generates a single unit's dispatch based on input forecast prices. Using an hourly price stream from PROMOD, EVM models the plant as a price-taker, dispatching the unit over a horizon of expected prices. By repeatedly solving a weekly (or longer) problem to optimality, EVM replicates bidding patterns that reflect the plant operator's profit maximizing strategy.

Using EVM, Guidehouse modeled the hourly operation of CVEC from 2024 through December 2040. CVEC is modeled using the parameters shown in Table 3.

Table 3. EVM Plant Parameters

Parameter	CVEC
Summer Maximum Capacity (MW)	1,016
Winter Maximum Capacity (MW)	1,069.5
Summer Full Load Heat Rate (Btu/kWh)	6,940
Winter Full Load Heat Rate (Btu/kWh)	6,680
VOM (2018 $/MWh)	$0.61
Forced Outage Rage (%)	4%

Guidehouse forecasted capacity revenues using its proprietary Capacity Price Forecast model to estimate clearing prices in the NYISO capacity market. The basic structure is to determine the intersection of supply and demand for capacity in each locational subzone of the markets subject to import constraints from other subzones. The NYISO demand curves are constructed based on most recent parameters released by NYISO. Parameters such as peak demand and net CONE change over study period, while others such as locational reserve requirements are assumed constant over the study period. The supply curves are determined for each plant using the plant energy margins from our PROMOD production cost modeling runs and their fixed costs.

The results of Guidehouse's PROMOD, EVM and Capacity Price Forecast results are presented for this analysis in monthly and annual proformas in real 2018 and nominal dollars. The proformas show CVEC's forecasted energy and capacity revenues, as well as total plant expenses (including fuel and emissions costs, operation & maintenance expenses, and fixed startup costs). The proformas' bottom lines show the calculated energy margins and gross margins for the plant resulting from the forecasted revenue streams and expenses.