SPP DISIS-2021-001 AFS STUDY REPORT

INTRODUCTION

Associated Electric Cooperative Inc. (AECI), through coordination with the Southwest Power Pool (SPP), has performed the analysis for generator interconnection requests (GIRs) within the DISIS-2021-001 Study Cycle (the "Study Cycle") for an Affected System Study (AFS) evaluation on the AECI transmission system (the "Study"). The restudy has been conducted to include the withdrawal of seventeen (17) SPP Study Cycle requests as listed in Table 1 below.

Table 1: Withdrawn Study Cycle Requests

Project #	CA	Capacity (MW)	Fuel Type	POI
GEN-2021-004	OGE	250	Hybrid	Poolville 138kV Substation
GEN-2021-007	NPPD	600	Wind	Turtle Creek 345 kV Substation
GEN-2021-008	BEPC	200	Solar	BEPC Patent Gate 345 kV Substation
GEN-2021-010	OGE	233.98	Solar	Border 345 kV Substation
GEN-2021-012	OGE	227	Battery/Storage	Border 345 kV Substation
GEN-2021-014	OGE	233.98	Solar	Border 345 kV Substation
GEN-2021-024	WAPA	203.04	Wind	WAPA 230 kV Jamestown Substation
GEN-2021-028	WFEC	204.12	Solar	Western Farmers 138 kV Mooreland Substation
GEN-2021-037	NPPD	244.22	Wind	NPPD Sidney to Keystone 345 kV Line
GEN-2021-050	KCPL	200	Solar	Stilwell - Clinton 161 kV Line
GEN-2021-051	KCPL	75	Battery/Storage	Stilwell - Clinton 161 kV Line
GEN-2021-072	BEPC	600	Solar	345kV Transmission Line from Antelope Valley to Leland Olds Substation
GEN-2021-073	NPPD	240	Solar	Tap on the Sweetwater to Gerald Gentleman 345 kV Line
GEN-2021-075	AEP	300	Hybrid	CAMPCOR4 138 kV Substation
GEN-2021-086	AEP	165	Hybrid	Okay - Turk 138 kV Line
GEN-2021-098	OGE	160	Hybrid	Dewey District 138 kV Substation
GEN-2021-106	NPPD	102.06	Solar	Hebron North 115 kV Substation

The full list of Study Cycle requests included in the Study are listed in Table 2 below.

Table 2: Study Cycle Requests Evaluated

Project	CA	MW (Studied)	Fuel Type	POI
GEN-2021-001	OGE	100	Battery/Storage	Brown 138 kV Substation
GEN-2021-005	WERE	350	Battery/Storage	Summit 345 kV Substation
GEN-2021-006	WERE	300	Battery/Storage	Neosho 345 kV Substation
GEN-2021-016	AEP	250	Wind	Sunnyside - Johnston 345 kV Line

Project	CA	MW (Studied)	Fuel Type	POI
GEN-2021-018	OGE	235.35	Solar	Sooner 345 kV Substation
GEN-2021-019	OGE	75.89	Battery/Storage	Sooner 345 kV Substation
GEN-2021-023	WERE	306.18	Solar	Wild Plains 345 kV Substation
GEN-2021-025	WFEC	203.04	Wind	Western Farmers Mooreland 138 kV Substation
GEN-2021-027	NPPD	102.06	Solar	Olive Creek 115 kV Substation
GEN-2021-029	KCPL	253.8	Battery/Storage	La Cygne - Stillwell 345 kV Substation
GEN-2021-030	KCPL	510.3	Solar	La Cygne - Stillwell 345 kV Substation
GEN-2021-033	OGE	204.12	Solar	Branch 161 kV Substation
GEN-2021-034	LES	113	Solar	Rokeby 115 kV Substation
GEN-2021-036	AEP	204.12	Solar	Craig - Patterson 138 kV Line
GEN-2021-038	AEP	200	Battery/Storage	Welsh 345 kV Substation
GEN-2021-039	OPPD	100	Battery/Storage	New 161kV substation looping in OPPD 161 kV lines S1211 to S1220 and S1211 to S1299
GEN-2021-040	OPPD	200	Battery/Storage	Cass County Power Plant 345 kV Substation
GEN-2021-041	OGE	100.657	Battery/Storage	Mustang 138 kV Substation
GEN-2021-042	INDN	50	Battery/Storage	Blue Valley Substation 161 kV Substation
GEN-2021-043	LES	250	Battery/Storage	Rokeby 115 kV Substation
GEN-2021-047	GRDA	250	Solar	Tulsa - Igloo 345 kV Line
GEN-2021-048	LES	75	Battery/Storage	Wagener 115 kV Substation
GEN-2021-049	LES	225	Solar	Wagener 115 kV Substation
GEN-2021-053	OGE	300	Solar	Pecan Creek 345 kV Substation
GEN-2021-056	WERE	300	Wind	Viola 345 kV Substation
GEN-2021-057	NPPD	300	Wind	Antelope 345 kV Substation
GEN-2021-063	AEP	155	Hybrid	Craig JCT 138 kV Substation
GEN-2021-064	AEP	100	Hybrid	Carnegie South 138 kV Substation
GEN-2021-068	SUNC	249.6	Wind	SUNC Spearville - Holcomb 345 kV Line
GEN-2021-069	SUNC	249.6	Wind	SUNC Spearville - Holcomb 345 kV Line
GEN-2021-070	SUNC	504	Wind	SUNC Spearville - Holcomb 345 kV Line
GEN-2021-077	GMO	95	Hybrid	Windsor - AEC Sedalia 161 kV Line
GEN-2021-088	OGE	100	Battery/Storage	Cedar Lane - Canadian 138 kV Line
GEN-2021-090	SPS	400	Hybrid	Yoakum 345 kV Substation
GEN-2021-096	WERE	500	Solar	Wolf Creek - Benton 345 kV Line
GEN-2021-101	WERE	159	Solar	Evergy's Midland 115 kV Substation
GEN-2021-103	WERE	150	Battery/Storage	Evergy's Atlantic 115 kV Substation
GEN-2021-107	WERE	201.6	Solar	Evergy Jeffrey Energy Center 345 kV Substation
GEN-2021-108	OPPD	182.25	Solar	Cass County 345 kV Substation

Network upgrades from the following studies were added to models prior to the addition of the Study Cycle requests.

- Network Upgrades from AECI Expansion Plan
- Network Upgrades from AECI GI-083 request
- Network Upgrades from AECI GI-101/102 requests
- Network Upgrades from AECI GI-103 request
- Network Upgrades from AECI GI-104 request
- Network Upgrades from AECI's AFS of MISO DPP-2019-Cycle requests
- SPP 2024 Integrated Transmission Planning System Upgrades
- MISO Tranche 1 Project Lines

The Network Upgrades included from these requests are detailed in Table 7. Should these upgrades no longer be tagged to the higher queued studies, AECI may restudy the Study Cycle.

INPUTS AND ASSUMPTIONS

Each of the SERC member transmission planners is responsible for submitting system modeling data to SERC for development of the power flow models. Power flow analysis utilized the latest Long-Term Working Group (LTWG) models as developed by SERC Reliability Corporation (SERC). Each of the power flow models for the steady state analysis was modified to include appropriate higher-queued generation interconnection requests. Modeling parameters from the SPP DISIS-2021-001 steady state models were referenced for each of the Study Cycle requests.

Full details of the inputs and assumptions are provided in Appendix A.

METHODOLOGY

Steady state analysis was performed to confirm the reliability impacts on the AECI system under a variety of system conditions and outages. AECI's transmission system must be capable of operating within the applicable normal ratings, emergency ratings, and voltage limits of AECI planning criteria. AECI is a member of SERC, one of eight Electric Reliability Organizations under the North American Electric Reliability Corporation (NERC). As a member of SERC, AECI develops its planning criteria consistent with NERC Reliability Planning Standards and the SERC planning criteria. The NERC TPL-001-5 Planning Standard Table 1 requires that, for normal and contingency conditions, line and equipment loading shall be within applicable thermal limits, voltage levels shall be maintained within applicable limits, all customer demands shall be supplied (except as noted), and stability of the network shall be maintained.

In evaluating the impacts of the Study Cycle requests, the following thermal and voltage limits were applied to the analysis for P0 or normal system conditions:

- Thermal Limits within Applicable Rating – Applicable Rating shall be defined as the Normal Rating. The thermal limit shall be 100% of Rating A.
- Voltage Limits within Applicable Rating – Applicable Rating shall have the meaning of Nominal Voltage. Voltage limits shall be set at plus or minus five percent (+/- 5%), 0.95 p.u. - 1.05 p.u. for systems operating at 60 kV or above on load serving buses.

The following thermal and voltage limits were applied to the analysis for contingency conditions under P1 and P2EHV planning events:

- Thermal Limits within Applicable Rating – Applicable Rating shall be defined as the Emergency Rating. The thermal limit shall be 100% of Rating B.
- Voltage Limits within Applicable Rating – Applicable Rating shall have the meaning of Nominal Voltage. Voltage limits shall be set at plus five percent to minus ten percent (+5%/-10%), 0.90 p.u. – 1.05 p.u. for systems operating at 60 kV or above on load serving buses.

In order for the Study Cycle requests to have a negative impact (i.e. criteria violation) on the system, the Study Cycle must cause a three percent (3%) or greater increase in flow on an overloaded facility based upon the rating of the facility. In order for the Project to have a negative voltage impact on the system, the Project must cause a voltage violation and have a two percent (2%) or greater change in the voltage.

System upgrades are required for constraints resulting from the addition of the Study Cycle requests under P0, P1, P2.1, P2.2 (EHV only), and P2.3 (EHV only) system conditions. For the purpose of this study, P2.1

events are included as part of the P1 contingency file. As such, these events will be denoted as a P1 event in the results. All improvements were developed and studied in coordination with AECI.

AECI will perform an annual limited operations study which will indicate seasonal operating limits for SPP/MISO/AECI generation interconnection requests that will reach commercial operation in the 12-month horizon but whose AECI network upgrades have not yet been energized.

STEADY STATE ANALYSIS RESULTS

Steady state analysis results showed one (1) constraint reported on the AECI transmission system, as shown in Table 3, which are attributed to the Study Cycle requests. Transmission upgrades were evaluated to mitigate the impacts reported from the analysis as a result of the Study Cycle requests. Simulations were performed on each of the scenarios with the identified network upgrade and contingent network upgrades included.

The upgrades shown in Table 9 were evaluated in order to mitigate the reported steady state constraint for the Study Cycle requests; results from the simulations found that the network upgrades were able to mitigate the reported overload conditions as shown in Table 3.

Table 3: Steady State Constraints for the Study Cycle Requests with Upgrades

Constraint ID	Event	Monitored Facility	Contingency	Season	Base Loading	Project Loading	Upgrade Loading
NU01	P2EHV	300045 7MORGAN 345.00 301622 5MORGANXF1 161.00 1	OPEN BRANCH FROM BUS 300042 [7HUBEN 345.00] TO BUS 300045 [7MORGAN 345.00] CKT 1 OPEN BRANCH FROM BUS 300045 [7MORGAN 345.00] TO BUS 549984 [BROOKLINE 345.00] CKT 1	28S	88.8	108.2	64.6
				28W	98.5	114.2	68.2
				33S	89.9	108.9	65.0
				33W	97.7	113.8	68.0

CONTINGENT FACILITY RESULTS

Eight (8) facilities were reported as Contingent Facilities with the addition of the Study Cycle requests, as shown in Table 4. Contingent Facilities are those facilities identified that are the responsibility of higher-queued generators or are included in the Transmission Provider's transmission expansion plan and that if not included in the Study may otherwise be the responsibility of the Study Cycle requests as necessary to interconnect to the transmission system.

The transmission upgrades for the Contingent Facilities were evaluated in order to confirm that the planned system adjustments were sufficient to mitigate the overload seen for the addition of the Study Cycle requests. Simulations were performed on each of the scenarios with the identified network upgrade and contingent network upgrades included. The upgrades shown in Table 7 were evaluated in order to mitigate the reported constraints as listed in Table 4 below.

Table 4: Steady State Contingent Constraints for the Study Cycle Requests with Upgrades

Constraint ID	Event	Monitored Facility	Season	Base Loading	Project Loading	Upgrade Loading	Contingent Generator(s)
CF01	P1	300530 2GEOGT2 69.000 300541 2SEDALI 69.000 1	28S	109.5	133.0	90.4	GI-091
			33S	108.3	131.3	89.7	
CF02	P1	300541 2SEDALI 69.000 300545 2SYLVAN 69.000 1	28W	103.5	111.4	61.5	GI-091
			33W	107.1	114.9	63.5	
CF03	P1	300069 5CHOTEAU1 161.00 512648 MAID 5 161.00 1	28S	97.6	106.7	60.2	SPP DISIS-2017-002
			33S	97.8	106.7	60.3	
CF04	P1	300115 5STFRANB2 161.00 338202 5JIM HILL% 161.00 1	28H	107.5	110.6	74.6	MISO DPP-2019
			28W	115.4	118.8	78.8	
			33W	113.2	116.5	77.3	
	P2EHV		28H	98.9	104.5	70.2	
			28W	115.4	118.8	78.8	
			33W	113.2	116.5	77.3	
CF05	P1	300651 2LAMR 69.000 300794 5LAMAR 161.00 1	28S	101.3	120.4	75.9	Tranche 1 Network Upgrades
			28W	105.0	122.2	79.5	
			33S	103.6	122.6	76.2	
			33W	101.6	119.6	78.2	
	P2EHV		28S	102.9	121.8	76.8	
			28W	105.2	122.5	79.8	
			33S	105.4	124.1	77.1	
			33W	101.9	119.9	78.3	
CF06	P1	300772 2COFMAN 69.000 300779 2J&7 69.000 1	28W	104.2	110.3	41.3	Tranche 1 Network Upgrades
			33W	103.8	109.5	41.0	
CF07	P1	300772 2COFMAN 69.000 300780 2KNOBBY 69.000 1	28S	97.1	101.7	34.7	Tranche 1 Network Upgrades
			28W	111.2	117.3	44.3	
			33S	96.9	101.7	34.6	
			33W	111.2	116.9	44.2	
CF08	P1	300780 2KNOBBY 69.000 301401 2TURKEYCRK 69.000 1	28S	109.7	114.2	38.8	Tranche 1 Network Upgrades

Constraint ID	Event	Monitored Facility	Season	Base Loading	Project Loading	Upgrade Loading	Contingent Generator(s)
			28W	122.4	128.5	48.6	
			33S	110.3	115.1	39.1	
			33W	122.9	128.6	48.7	

NEIGHBORING SYSTEM RESULTS

The Study has identified impacts from the Study Cycle requests on the AECI ties with neighboring systems. The most limiting component of the AECI owned portion of the facility was evaluated and if found inadequate, a network upgrade for the AECI equipment was determined. Network upgrades for transmission facilities limited by non-AECI equipment are not captured and may need to be coordinated with the appropriate transmission owner.

One (1) facility was impacted on AECI tie lines with neighboring systems with the addition of the Study Cycle requests. The most severe constraints are shown in Table 5.

Table 5: Steady State Neighboring System Constraints for the Study Cycle Requests

Constraint ID	Event	Monitored Facility	Area	Season	Base Loading	Project Loading
AFS01	P1	300097 5MARYVB2 161.00 652560 CRESTON5 161.00 1	AECI/WAPA	28S	128.1	131.3
				33S	131.8	135.1

NETWORK UPGRADES

Transmission upgrades were evaluated to mitigate the impacts reported from the analyses as a result of the Study Cycle projects. The upgrades shown in Table 6 were evaluated in order to mitigate the reported steady state constraints for the Study Cycle as listed in Table 3.

Table 6: Network Upgrades for the Study Cycle Constraints

Constraint ID	Monitored Facility	Network Upgrade
NU01	300045 7MORGAN 345.00 301622 5MORGANXF1 161.00 1	Replace the Morgan 345/161 kV transformer with a unit rated 712 MVA Summer and 811 MVA Winter. Upgrade 161 kV breaker switchers (Switch 2022), equipment, bus, and relay limits to 3,000 amps.

The upgrades shown in Table 7 were evaluated in order to mitigate the reported steady state contingent constraints for the Study Cycle requests as listed in Table 4.

Table 7: Network Upgrades for the Study Cycle Contingent Constraints

Constraint ID	Monitored Facility	Network Upgrade
-	300101 5MORGAN 161.00 505498 STOCKTN5 161.00 1	**Contingent on SPP 2024 Integrated Transmission Planning System Upgrades:** Tap the 345 kV line between Brookline and Flint Creek with a new Monett 345 kV station. Build a new 345 kV line between Monett 345 kV and Delaware 345 kV. Build a new 345 kV line between Delaware 345 kV and Buffalo 345 kV. Install a new 345/161 kV transformer at the Monett 345 kV station. Cut the Compton-Roark 161 kV in and out of the Monett 161 kV station. Cut the Branson-Reeds Spring 161 kV line in and out of the Monett 161 kV station. Cut the Cape Fair-Nixa 161 kV line in and out of the Monett 161 kV station. Install a reactor at on the new 345 kV Monett bus.
-	301201 2DONIPH 69.000 505440 DONIPHN5 161.00 1	
-	300101 5MORGAN 161.00 549969 BROOKLINE 5161.00 1	
-	300534 2LINCLN 69.000 300558 2MTHULD 69.000 1	
-	300101 5MORGAN 161.00 301622 5MORGANXF1 161.00 1	
-	300101 5MORGAN 161.00 547478 DAD368 5 161.00 1	
-	300044 7MCCRED 345.00 41454 J1145 POI 345.00 1	**Contingent on MISO Tranche 1 Project Lines:** Build new 345 kV line from Orient 345 kV substation (Ameren) to Fairport 345 kV substation (Ameren/AECI). Build new 345 kV line from Fairport 345 kV substation to Zachary 345 kV substation (Ameren). Build new 345 kV line from Thomas Hill 345 kV substation (AECI) to Zachary 345 kV substation. Build new 345 kV line from Zachary 345 kV substation to Maywood 345 kV substation (Ameren). Build new 345 kV line from Meredosia 345 kV substation (Ameren) to Maywood 345 kV substation. Tap the existing 161 kV line from Adair 161 kV substation to Appanoose 161 kV substation with the Zachary 161 kV substation.
-	300133 5THMHLB3 161.00 344004 5ADAIR1 161.00 1	
-	300520 2REFORM 69.000 300626 2CHAMOI 69.000 1	
CF01	300530 2GEOGT2 69.000 300541 2SEDALI 69.000 1	**Contingent on GI-091:** Upgrade bushing CTs (via breaker upgrade), breaker switchers on Georgetown-Sedalia 69 kV line (at Sedalia) to 1200 amp rating.
CF02	300541 2SEDALI 69.000 300545 2SYLVAN 69.000 1	**Contingent on GI-091:** Upgrade bushing CTs (via breaker upgrade), breaker switchers on Sylvan-Sedalia 69 kV line (at Sedalia) to 1200 amp rating.

Constraint ID	Monitored Facility	Network Upgrade
CF03	300069 5CHOTEAU1 161.00 512648 MAID 5 161.00 1	**Contingent on SPP DISIS-2017-002:** Construct a new 161 kV switch yard (Patrol Road) on the Maid-Gerald 161 kV line ~1 mile from Maid. (GRDA SCOPE) Replace (4) 69 kV switches and associated jumpers/hardware at Afton Substation. (GRDA Scope) Construct a new 0.8 mile long 161 kV line from Chouteau-Patrol Road switch yard. Construct as double bundle 1590 ACSR at 100C. Assume series reactor installed on line to match impedance of reactor on existing Chouteau-Maid line. All terminal equipment/reactors rated for 4,000 amps. Add 4,000 amp breaker and associated equipment to the existing Chouteau-Maid line at Chouteau. Add a 161 kV terminal and associated equipment at Chouteau for the new 161 kV line to Patrol Road. Upgrade Chouteau West Yard E-W bus from 5" to 6" bus.
CF04	300115 5STFRANB2 161.00 338202 5JIM HILL% 161.00 1	**Contingent on MISO DPP-2019:** Rebuild 9.9 mile-long St. Francis to Jim Hill 161 kV line to 1192 ACSS at 250C. Replace jumpers at St. Francis with 1192 ACSS at 250C. Replace disconnect switches at St. Francis 161 kV bus on Jim hill line with 2000A switches.
CF05	300651 2LAMR 69.000 300794 5LAMAR 161.00 1	**Contingent on MISO Tranche 1 Upgrades:** - Install a second Lamar 161/69 kV transformer rated at 84 MVA Summer, 95 MVA Winter unit.
CF06	300772 2COFMAN 69.000 300779 2J&7 69.000 1	**Contingent on MISO Tranche 1 Upgrades:** - Rebuild 6.30 mile Coffman Bend - J-7 69 kV line with 795 ACSR rated at 100C.
CF07	300772 2COFMAN 69.000 300780 2KNOBBY 69.000 1	**Contingent on MISO Tranche 1 Upgrades:** - Rebuild 4.70 mile Coffman Bend - Knobby 69 kV line with 795 ACSR rated at 100C.
CF08	300780 2KNOBBY 69.000 301401 2TURKEYCRK 69.000 1	**Contingent on MISO Tranche 1 Upgrades:** - Rebuild 12.1 mile Knobby to Turkey Creek 69 kV with 795 ASCR, 100C.

No upgrades were evaluated for the neighboring system constraints listed in Table 5. The upgrades for these impacts may need to be resolved through coordination with the transmission owner as listed in Table 8 below.

Table 8: Neighboring System Constraints

Constraint ID	Monitored Facility	Network Upgrade
AFS01	300097 5MARYVB2 161.00 652560 CRESTON5 161.00 1	WAPA Owned; no upgrade evaluated. Elements owned by AECI on this line are not overloaded.

AECI developed non-binding, good faith estimates of the timing and cost estimates for upgrades needed as a result of the addition of the Study Cycle requests as shown in Table 9.

Table 9: Network Upgrade Costs

ID	Option/Description	Estimated Cost	Estimated Lead Time[1]
NU01	Replace the Morgan 345/161 kV transformer with a unit rated 712 MVA Summer and 811 MVA Winter. Upgrade 161 kV breaker switchers (Switch 2022), equipment, bus, and relay limits to 3,000 amps.	$14,000,000	60 months
	Total Cost:	$14,000,000	

Cost allocations for each of the impacted facilities are discussed in the Cost Allocation section below.

[1] Estimated Lead Time is the estimated time to place a network upgrade in service once AECI has received Provision of Security equal to the total Estimated Cost of the Network Upgrade.

COST ALLOCATION

Network upgrade costs are allocated to each of the Study Cycle projects based on the worst MW impact[2] each project had on the constraint and as described in the steps below:

1. Determine the MW impact each Study Cycle project had on each constraint using the size of each request in the season it was reported:

$$Project\ X\ MW\ Impact\ on\ Constraint\ 1 = DFAX\ (X) * MW\ (X) = X1$$

$$Project\ Y\ MW\ Impact\ on\ Constraint\ 1 = DFAX\ (Y) * MW\ (Y) = Y1$$

$$Project\ Z\ MW\ Impact\ on\ Constraint\ 1 = DFAX\ (Z) * MW\ (Z) = Z1$$

2. Determine the maximum MW% impact each generator has as a percentage of the total Study Cycle impact on a given constraint.

$$X2\ =\ Project\ X\ MW\ impact\ \%\ = \frac{X1}{Total\ MW\ Impact\ of\ Study\ Cycle\ on\ Constraint}$$

$$Y2\ =\ Project\ Y\ MW\ impact\ \%\ = \frac{Y1}{Total\ MW\ Impact\ of\ Study\ Cycle\ on\ Constraint}$$

$$Z2\ =\ Project\ Z\ MW\ impact\ \%\ = \frac{Z1}{Total\ MW\ Impact\ of\ Study\ Cycle\ on\ Constraint}$$

3. Apply three percent (3%) MW impact De Minimis Threshold: If a Study Cycle project MW% impact is less than 3% for a particular constraint then the project MW% impact is adjusted to 0 for that constraint and the Study Cycle project will not be allocated cost for that particular constraint.

4. Determine the cost allocated to each remaining Study Cycle project for each upgrade using the total cost of a given upgrade:

$$Project\ X\ Upgrade\ 1\ Cost\ Allocation\ (\$) = \frac{Network\ Upgrade\ 1\ Cost\ (\$) * X2}{X2 + Y2 + Z2}$$

The associated cost allocation of the network upgrades to each of the Study Cycle projects is shown below in Table 10. Further breakdown of costs is provided in Appendix B.

[2] All negative MW impacts (helpers) were set to 0 MW impact.

Table 10: Network Upgrade Cost Allocation

Project	Cluster Group	POI	MW	Estimated Cost
GEN-2021-001	SOUTHEAST	Brown 138 kV Substation	100	$0
GEN-2021-005	CENTRAL	Summit 345 kV Substation	350	$622,207
GEN-2021-006	CENTRAL	Neosho 345 kV Substation	300	$2,753,223
GEN-2021-016	SOUTHEAST	Sunnyside - Johnston 345 kV Line	250	$0
GEN-2021-018	SOUTHEAST	Sooner 345 kV Substation	235.35	$506,428
GEN-2021-019	SOUTHEAST	Sooner 345 kV Substation	75.89	$0
GEN-2021-023	SOUTHEAST	Wild Plains 345 kV Substation	306.18	$1,225,943
GEN-2021-025	SOUTHEAST	Western Farmers Mooreland 138 kV Substation	203.04	$0
GEN-2021-027	NEBRASKA	Olive Creek 115 kV Substation	102.06	$0
GEN-2021-029	CENTRAL	La Cygne - Stillwell 345 kV Substation	253.8	$844,310
GEN-2021-030	CENTRAL	La Cygne - Stillwell 345 kV Substation	510.3	$1,697,602
GEN-2021-033	SOUTHEAST	Branch 161 kV Substation	204.12	$0
GEN-2021-034	NEBRASKA	Rokeby 115 kV Substation	113	$0
GEN-2021-036	SOUTHEAST	Craig - Patterson 138 kV Line	204.12	$0
GEN-2021-038	SOUTHEAST	Welsh 345 kV Substation	200	$0
GEN-2021-039	NEBRASKA	New 161kV substation looping in OPPD 161 kV lines S1211 to S1220 and S1211 to S1299	100	$0
GEN-2021-040	NEBRASKA	Cass County Power Plant 345 kV Substation	200	$0
GEN-2021-041	SOUTHEAST	Mustang 138 kV Substation	100.657	$0
GEN-2021-042	CENTRAL	Blue Valley Substation 161 kV Substation	50	$0
GEN-2021-043	NEBRASKA	Rokeby 115 kV Substation	250	$0
GEN-2021-047	SOUTHEAST	Tulsa - Igloo 345 kV Line	250	$578,354
GEN-2021-048	NEBRASKA	Wagener 115 kV Substation	75	$0
GEN-2021-049	NEBRASKA	Wagener 115 kV Substation	225	$0
GEN-2021-053	SOUTHEAST	Pecan Creek 345 kV Substation	300	$0
GEN-2021-056	CENTRAL	Viola 345 kV Substation	300	$863,991
GEN-2021-057	NEBRASKA	Antelope 345 kV Substation	300	$0
GEN-2021-063	SOUTHEAST	Craig JCT 138 kV Substation	155	$0
GEN-2021-064	SOUTHEAST	Carnegie South 138 kV Substation	100	$0
GEN-2021-068	CENTRAL	SUNC Spearville - Holcomb 345 kV Line	249.6	$0
GEN-2021-069	CENTRAL	SUNC Spearville - Holcomb 345 kV Line	249.6	$0
GEN-2021-070	CENTRAL	SUNC Spearville - Holcomb 345 kV Line	504	$755,954
GEN-2021-077	CENTRAL	Windsor - AEC Sedalia 161 kV Line	95	$0
GEN-2021-088	SOUTHEAST	Cedar Lane - Canadian 138 kV Line	100	$0
GEN-2021-090	SOUTHWEST	Yoakum 345 kV Substation	400	$573,815
GEN-2021-096	CENTRAL	Wolf Creek - Benton 345 kV Line	500	$3,578,173
GEN-2021-101	CENTRAL	Evergy's Midland 115 kV Substation	159	$0
GEN-2021-103	CENTRAL	Evergy's Atlantic 115 kV Substation	150	$0

Project	Cluster Group	POI	MW	Estimated Cost
GEN-2021-107	CENTRAL	Evergy Jeffrey Energy Center 345 kV Substation	201.6	$0
GEN-2021-108	NEBRASKA	Cass County 345 kV Substation	182.25	$0
			Total:	$14,000,000

VERSION HISTORY

Version Number and Date	Author	Change Description
V0 – 06/20/2024	AECI	Initial release
V1 – 02/02/2026	AECI	Withdrawal of seventeen (17) SPP request(s) from Study Cycle. Withdrawal of MISO, SPP, and AECI higher queued requests.