CAISO 2021/22 Transmission Plan: Stakeholder Comments

Submitted by	Company	Date Submitted
Sandeep Arora (sarora@lspower.com) Renae Steichen (RSteichen@lspower.com)	LS Power Development, LLC	3/11/21

LS Power appreciates the opportunity to submit comments on California Independent System Operator's (CAISO's) 2021/22 Draft Transmission Planning Process Unified Planning Assumptions and Study Plan (Feb. 18, 2021).

1. **CAISO should conduct a transmission needs analysis for delivering to the CAISO boundary the 1062 MW of out-of-state (OOS) wind in the California Public Utilities Commission (CPUC) Base Case Portfolio, not just transmission needs within the CAISO boundary.**

a) CAISO should evaluate potential transmission needs to deliver OOS wind to the CAISO boundary. If CAISO only plans its system assuming that OOS generation resources appear at an existing CAISO injection point, the CAISO will not produce a transmission plan that responds to the CPUC's policy directive. The transmission plan must identify transmission solutions needed to bring the generation to CAISO load. Otherwise, the transmission plan will fall short of providing a way for these resources that help diversify the renewable fleet and address in-state reliability concerns to be deliverable.

CAISO's proposed approach of only studying delivery at existing CAISO injection points falls short by leaving a deliverability gap that renders the analysis of OOS resources meaningless. CAISO should identify the more efficient or cost-effective transmission solutions to allow delivery of OOS resources that can be counted as Full Capacity Deliverability Status, which may include transmission solutions that extend the existing CAISO Balancing Authority Area footprint out from existing boundary stations (similar to boundary extensions made possible by Harry Allen to Eldorado project & Colorado River to Delaney project).

CAISO has historically relegated evaluation of OOS transmission projects to the Interregional Transmission Planning (ITP) process, which is inconsistent with the policy guidance provided by the CPUC including the recent CPUC resource portfolio and the state's near-term and long-term carbon reduction and renewable energy goals. The CPUC's Base Case Portfolio identifies a clear regional policy need for OOS wind. The CPUC's final decision D.21-02-008 on Transferring Electric Resource Portfolios to CAISO for 2021-2022 Transmission Planning Process (Decision) includes 1062 MW of OOS wind in the Base Case Portfolio.[1] CAISO's Tariff section 24.4.6.6 on Policy-Driven Solutions

[1] In the Modeling Assumptions Attachment A, CPUC notes that while OOS wind refers to Wyoming wind, CPUC staff acknowledges that various resource types from various states may inject at this [Eldorado]

notes that "CAISO will determine the need for, and identify such policy-driven transmission solutions that efficiently and effectively meet applicable policies under alternative resource location and integration assumptions and scenarios, while mitigating the risk of stranded investment."[2] Further, it lays out criteria to consider, including commercial interest in the applicable geographic area,[3] results and identified priorities of the CPUC's resource planning process, and the potential for a particular transmission solution to provide access to resources needed for integration, such as pumped storage in the case of renewable resources.

The only way to develop a transmission plan that is responsive to the CPUC policy guidance is for CAISO to evaluate interregional projects which help meet CAISO regional needs (i.e., policy, reliability, and/or economic), and recommend these projects for approval under the Regional Transmission Planning framework. CAISO's tariff provides the basis for the transmission plan to accommodate this change: Tariff section 24.13 states that the CAISO may consider potential interregional solutions to regional needs during Phase 2 of the Transmission Planning Process, and this is not limited to only economic, or only reliability, or only policy needs. While OOS transmission could at least in theory be built on a merchant model and sell transmission service to deliver OOS wind, this would significantly limit the benefits of a new import path to CAISO. A new import path controlled by CAISO will help manage flows on other parallel import paths, relieve congestion issues, allow CAISO to access new pool of resources through and address any grid emergencies especially for days like Aug 2020. By studying OOS transmission as a regional project, CAISO could more accurately take into account policy, economic, reliability benefits, access other diverse OOS renewables, and also be able to export excess California solar. Furthermore, reliance on the merchant model rather than considering new transmission that extends beyond the current CAISO boundary to access such OOS renewables increases the risk that those valuable resources will never be developed and will never be delivered to the current CAISO boundary.

The Draft Study Plan states that no further consideration of the ITPs will occur during the 2021-2022 TPP. If CAISO continues to confine its consideration of interregional projects to the ITP, it risks further delays in online dates and delivery of OOS wind, in addition to failing to recognize that a project which expands the footprint could primarily serve a regional need, and after placed in service could in fact be within the region.

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substation and this mapping is not intended to indicate a preference for Wyoming Wind (page 26, footnote 17). Further, in the Decision, CPUC notes that OOS wind interconnecting at Eldorado substation is most likely from Wyoming or Idaho, and OOS wind interconnecting at Palo Verde substation is most likely from New Mexico. CAISO noted in its reply comments that it could study separately injection at both points, CPUC agreed and noted the need to understand better the transmission buildout requirements associated with generation siting in both locations. (pages 34-25 of Decision)

[2] CAISO Fifth Replacement FERC Electric Tariff, Section 24 Comprehensive Transmission Planning Process. https://www.caiso.com/Documents/Section24-ComprehensiveTransmissionPlanningProcess-asof-Aug12-2019.pdf

[3] In D.21-02-008 Conclusion of Law 7 notes that "Demonstration of commercial interest in projects in particular geographic areas, as represented by having a place in the CAISO's *or other regions' interconnection queues* [emphasis added], is reasonable to remain one major driver of the methodology for resource-to-busbar mapping, since it is more likely that those projects will be built compared with projects not in interconnection queues."

Therefore, LS Power suggests language be added to the Study Plan acknowledging and committing to the need to consider transmission solutions to deliver OOS wind:

- In 3.3 Renewable Portfolios to be Studied, add "In evaluating deliverability of OOS wind, CAISO will evaluate OOS interregional transmission solutions submitted to the CAISO to identify the more efficient or cost-effective solution as a CAISO regional policy-driven transmission project to allow delivery of OOS resources."

Given the policy need for OOS wind, LS Power highlights there is a clear case for evaluating OOS transmission to meet CAISO needs. The need to consider delivery of OOS resources is even more important in this cycle given the recent CPUC Administrative Law Judge ruling for procurement of 7500 MW by 2026.[4] California needs more capacity, and increasing access to diverse OOS resources could improve reliability and cost effective procurement. Failure to consider advanced development interregional transmission projects in the near term will significantly hamper the ability to comply with the ALJ ruling, as it is simply too late to propose new transmission projects to complete by 2026. CAISO may also need to consider creating new injection points to the CAISO grid if interregional transmission solutions are found needed to meet regional needs and to address CPUC's policy guidance.

b) LS Power recommends that CAISO conduct three (3) study scenarios for 1062 MW of OOS wind from different locations: Wyoming, Idaho, and New Mexico. Each study should consider transmission required to deliver to the CAISO boundary (as noted above). For instance, the studies for New Mexico wind should include injection at Palo Verde substation and Eldorado *or* Harry Allen substation to be injection points for OOS wind from Idaho and Wyoming. While the CPUC Decision did not note Harry Allen as an injection point, given the completion of the new DesertLink 500 kV transmission line that now extends the CAISO boundary from Eldorado to Harry Allen, CAISO should also consider injection at Harry Allen. ITP projects that were submitted to CAISO in the last ITP request window should be studied for as potential transmission solutions to deliver OOS wind from these locations.

2. CAISO should evaluate potential policy projects including the combined reliability, policy, and economic benefits, as directed by the CPUC.

The CPUC's final Decision included several statements about the need to consider reliability, policy, and economic benefits combined, not just in silos as separate studies, when evaluating projects to recommend for approval. The Decision's Finding of Fact 6 states, "Transmission solutions to support both policy and reliability goals combined with ratepayer savings can provide significant benefits to California." Additionally, Conclusion of Law 3 states, "Based on analysis conducted by Commission staff thus far, utilizing the electric resource portfolio that meets the 46 MMT GHG emissions target as a reliability and policy-driven base case in the TPP will likely result in the need for new transmission investment to make the portfolio deliverable. Transmission projects should be evaluated for reliability, policy, and economic benefits."

Therefore, LS Power suggests CAISO include language in the Study Plan acknowledging and committing to this evaluation:

[4] R.20-05-003, Administrative Law Judge Ruling Seeking Feedback on Mid-Term Reliability Analysis and Proposed Procurement Requirements, February 22, 2021.

- In 3.1 Public Policy Objectives section, add - "Transmission solutions to support both policy and reliability goals combined with ratepayer savings can provide significant benefits to California. Therefore, transmission solutions evaluated for policy needs will also be evaluated for the reliability and economic benefits they provide to ensure that any projects found needed to meet state policy objectives reflect the guidance from the CPUC to consider their combined benefits."

3. Economic Study Request and Economic Project Submission for SWIP-North

LS Power hereby submits an economic study request to CAISO for the 2021-22 Transmission Plan. The request is to study congestion at CAISO's intertie interfaces with the Pacific Northwest, namely the California Oregon Intertie (COI), Pacific AC Intertie (PACI), Nevada-Oregon Border (NOB), PG&E Sierra intertie & Double Tap-Friars 138 kV. All of these congestion issues were prominent in CAISO's 2020-21 TPP and are therefore requested to be studied again. In addition to this request, LS Power is also hereby submitting its Southwest Intertie Project North (SWIP-North) for evaluation as an Economic project. SWIP-North will provide approximately 1050 MW[5] of new transmission capacity to CAISO and will increase CAISO's transfer capability between Idaho Power/PacifiCorp (Midpoint 500kV), NV Energy (NVE) (Robinson Summit 500kV) and CAISO (Harry Allen 500kV). By virtue of the capacity exchanges with NVE that will occur automatically under the terms of the FERC-approved Transmission Use and Capacity Exchange Agreement (TUA) between LS Power affiliates and NVE, the SWIP-North project includes a capacity entitlement over the SWIP-South/ON Line project at no additional capital cost and free of any wheeling charges, such that completion of SWIP-North by CAISO will effectively create a new transmission path for CAISO from Midpoint to Harry Allen. Appendix 2 provides additional details of the SWIP-North path and the TUA. For the SWIP-North economic study, CAISO should also include in its model 1062 MW of Idaho wind consistent with the potential OOS wind identified in the CPUC's Base Case Portfolio. A detailed power flow model for SWIP-North will be separately emailed to CAISO.

LS Power also recommends ensuring that the following changes are included for the SWIP-North economic study in this TPP cycle. Not including these will artificially reduce economic benefits of this project. These are briefly summarized here but are described more fully in Appendix 1.

- Include all facility upgrades required to interconnect SWIP-North in the economic study model, including required upgrades to the existing ON Line 500 kV Transmission Line (Robinson Summit to Harry Allen). See Appendix 2 for details.
- Remove the $9/MWh NVE wheeling charge that is hardcoded in the ADS PCM model. This charge is not applicable to SWIP-North pursuant to the aforementioned TUA.
- Correctly enforce COI path limits to capture only 3200 MW CAISO's share of COI/PACI in the study model, instead of the full 4800 MW limit of this path.
- Quantify additional benefits of SWIP-N as outlined in CAISO's TEAM methodology - Capacity Benefits, Renewable curtailment reduction benefits and diversity

[5] Exact number is currently being developed under the WECC Path Rating study process. LS Power will update CAISO soon as this number is finalized. In the meantime, CAISO should use 1050 MW for its analysis.

benefits. A recently conducted study by Brattle Group[6] shows these benefits as well, which we recommend CAISO use as guiding points to estimate these benefits.

LS Power highlights that interregional cost allocation has already occurred on the overall SWIP path from Midpoint to Harry Allen that will enable ~2000 MW of 500 kV transmission for 506 miles. Pursuant to the FERC-approved TUA described in Appendix 2, the 231-mile ON Line portion of the path (Robinson Summit to Harry Allen) was placed into service in 2014, and has been paid for by NVE and LS Power. LS Power's project proposal for CAISO provides ~1050 MW of transmission capacity from Midpoint to Harry Allen (506 miles), for the cost of building only the 275-mile SWIP-North portion of the path (Midpoint to Robinson Summit). Nearly half of the total SWIP path has already been paid for by other benefitting regions, meaning interregional cost allocation has already taken place.

[6] "SWIP-North Benefits Analysis." February 2021. Michael Hagerty, Johannes Pfeifenberger, and Evan Bennett. The Brattle Group. https://brattlefiles.blob.core.windows.net/files/21438_swip-north_benefits_analysis.pdf

APPENDIX 1: SWIP-North Economic Benefits Study recommendations

1) **SWIP-North line and all associated upgrades should be included** - CAISO should ensure that the existing 500 kV transmission path from Robinson Summit to Harry Allen ("ON Line") is limited to 900 MW in the base case and is increased to 2250 MW only in the case with SWIP-North (1050 MW of which would be dedicated to CAISO under LS Power's proposal). In addition to the new 500 kV transmission line with 70% series compensation between Midpoint and Robinson Summit, the SWIP-North project also requires key upgrades to existing infrastructure including the addition of 70% series compensation on ON Line and phase shifting transformers at Robinson Summit on the existing Robinson Summit-Gonder and Robinson Summit-Falcon 345 kV lines. The main purpose of the phase shifting transformers is to redirect flows away from 345 kV system and shift these towards the 500 kV system. For details related to operating parameters for these phase shifting transformers, LS Power will schedule discussion with CAISO and NVE, so CAISO can appropriately model these in its economic study. All SWIP-North associated upgrades enable increased transfers in the north-to-south (N-S) direction from Midpoint to Harry Allen.

2) **Wheeling charges should be removed** - For the SWIP-North economic study, to correctly calculate economic benefits of a 1050 MW transmission path from Midpoint to Harry Allen, CAISO should model this new 1050 MW path free of any wheeling charges. We understand that the standard ADS PCM model includes a NVE wheeling charge of $9/MWh. Given the FERC-approved Transmission Use and Capacity Exchange Agreement in place between LS Power affiliates & NV Energy, which provides a direct connection between the LS Power facilities and CAISO at Harry Allen, such a wheeling charge does not apply. Including a wheeling charge will create an artificial hurdle across this path resulting in reduced SWIP-North N-S flows and underestimated benefits of SWIP-North.

3) **COI path limits should be correctly enforced for CAISO's share of COI, and Day Ahead PACI congestion should be correctly captured -** For the COI congestion analysis, CAISO used the full 4800 MW path rating as the limit for the COI path in its 2020-21 TPP study. As noted in our previous comments, CAISO's share of the 4800 MW path is only 3200 MW (limit of PACI scheduling interface[7]) with the remaining 1600 MW belonging to members of Transmission Agency of Northern California (TANC), an entity outside CAISO. In addition, as CAISO has noted in its prior TPP presentations, 1200 MW out of the 3200 MW PACI scheduling limit comprises of Existing Transfer Capabilities (ETCs) and Transmission Ownership Rights (TORs) that are owned by entities outside CAISO. This leaves only about 2000 MW of the total 4800 MW COI path that is available to CAISO, and this is what CAISO should use as the COI limit for its economic analysis. The other 2800 MW should be modeled with a

[7] PACI is the CAISO scheduling interface and COI is a WECC path. PACI is a subset of COI and its scheduling capability is limited to 3200 MW.

large hurdle rate such that it becomes mostly unavailable to the CAISO system. Not correctly capturing these scheduling realties makes 2800 MW on this path available for CAISO with little hurdle, artificially reducing COI N-S congestion. If this constraint is correctly modelled, the CAISO study should show PACI, NOB congestion close to historic levels as noted in CAISO DMM reports[8] over last several years.

4) **Additional economic benefits of SWIP-North** - In addition to quantifying production cost savings, we recommend that CAISO also capture additional benefits of SWIP North identified by The Brattle Group[9]. These additional benefits are referenced in Table 4.2-1 of the 2020-21 Draft Transmission Plan and are in line with CAISO's TEAM methodology: 2.5.1 Resource adequacy benefit from incremental importing capability, 2.5.3 Deliverability benefit, 2.5.5 Public-policy benefit, 2.5.6 Renewable integration benefit.

   LS Power's recommendations on how these benefits should be quantified are provided below. The Brattle Study quantified some of these additional benefits as well, which we recommend CAISO use as guiding points to estimate these benefits.

   i. Resource Adequacy (RA) benefit from incremental importing capability

   SWIP-North provides RA benefits to CAISO since the following four conditions noted in CAISO's TEAM methodology are satisfied simultaneously:

   - SWIP-North will increase the import capability into the CAISO controlled grid in the study years. Absent SWIP-North, CAISO's import capability with Idaho Power & PacifiCorp East is limited and the import path between NVE-CAISO in the Sierra Region is congested. SWIP-North will enable a new 1050 MW import capability path between various BAAs.
   - As evident through CAISO's own stack analysis in CPUC proceedings, there is projected insufficient capacity to maintain resource adequacy in the CAISO BAA starting this year in 2021.[10]
   - The existing import capability has been fully utilized to meet RA requirement in the CAISO BAA in the study years. A recent WECC analysis

[8] See Table 8.4 in CAISO's 2019 Annual Report on Market Issues and Performance, June 2020. http://www.caiso.com/Documents/2019AnnualReportonMarketIssuesandPerformance.pdf. California Oregon Intertie (COI) comprises of three transmission lines that have a combined flow limit of 4800 MW N-S. CAISO TPP studies enforce this flow limit and capture any congestion on this path. In the Day Ahead scheduling world, congestion is witnessed across the Pacific AC Intertie (PACI) and Nevada-Oregon Border (NOB) scheduling interfaces. PACI is a subset of COI and has a scheduling limit of 3200 MW which represents scheduling rights of CAISO member entities on COI path. NOB is the scheduling interface for Pacific DC Intertie. It is rated at 3220 MW N-S and the transmission capacity is allocated between CAISO member entities and LADWP.

[9] "SWIP-North Benefits Analysis." February 2021. Michael Hagerty, Johannes Pfeifenberger, and Evan Bennett. The Brattle Group. https://brattlefiles.blob.core.windows.net/files/21438_swip-north_benefits_analysis.pdf

[10] Testimony of Jeff Billinton on behalf of CAISO in R.20-11-003, January 11, 2021

shows that even when all planned internal and import resources are added, Southern California has hours at risk of unserved load.[11]

- The capacity cost in the CAISO BAA is greater than in other BAAs (Idaho Power, PacifiCorp, NV Energy) to which the new transmission connects.

CAISO should estimate the RA/Capacity value of SWIP North based on load diversity (seasonally and hourly) between Idaho and Southern California and capacity cost savings from building new supply in ID vs CA. Recent historical load shapes to determine the reduction in peak requirements should be used for this analysis. Enabling 1050 MW of transmission capacity from CAISO to neighboring regions will allow the flexible ramping requirement for CAISO and the regions to be reduced as they will be able to take advantage of the diversity of resources and shape of the load. These diversity saving benefits should be accounted for. CAISO's Quarterly EIM reports capture these benefits and this is an approach that CAISO Transmission Planning can use as well for this study. The Brattle Group estimates these load diversity benefits to be at least $11 million-$18 million annually.

The value of reduction in peak capacity requirements based on prevailing costs of capacity in Southern California and Idaho should also be estimated. Brattle Study does not estimate these additional capacity benefits based on the ID and CA capacity cost difference of importing up to 1050 MW of firm capacity. However, CAISO has estimated these capacity benefits for other economic transmission projects in past and we recommend CAISO conduct this analysis for SWIP-North project.

ii. Deliverability benefit

SWIP-North will enable deliverability of Out-of-State renewables which are part of Sensitivity portfolio for 2020-21 TPP and will be part of Base and Sensitivity portfolio for 2021-22 TPP.

iii. Public Policy Benefit

SWIP-North will increase the firm import capability with a line that flows directly into the CAISO controlled grid. SWIP-North will have access to thousands of megawatts of diverse renewable energy resources that can help reduce the cost of reaching renewable energy targets. As noted in CAISO's TEAM methodology "*When there is a lot of curtailment of renewable generation, extra renewable generators will need to be built or procured to meet the goal of renewable portfolio standards (RPS). The cost of meeting the RPS goal will increase because of that. By reducing the curtailment of renewable generation, the cost of meeting the RPS*

[11] WECC Western Assessment of Resource Adequacy, Subregional Spotlight: California and Mexico (CAMX). February 12, 2021.
https://www.wecc.org/_layouts/15/WopiFrame.aspx?sourcedoc=/Administrative/Western%20Assessment_California%20and%20Mexico%20Report.pdf&action=default

goal will be reduced. This part of cost saving from avoiding over-build is categorized as public-policy benefit". In CAISO's TPP studies, SWIP-North has shown to help reduce renewable curtailments in CAISO footprint by providing a conduit to export surplus renewable energy from California. These capital cost savings should be captured.

iv. Renewable Integration benefit

As noted in CAISO's Draft 2020-21 Transmission Plan, Interregional coordination can help mitigate integration problems, such as over-supply and curtailment, by allowing sharing energy and ancillary services (A/S) among multiple BAAs.

SWIP-North will increase importing and exporting capability of BAAs (CAISO, NVE, Idaho Power, PacifiCorp) and will facilitate sharing energy among BAAs, so that the potential over-supply and renewable curtailment problems within a single BAA can be relieved by exporting energy to other BAAs, whichever can or need to import energy. SWIP-North will also facilitate sharing A/S Sharing between the areas. The total A/S requirement for the combined areas may reduce if the areas are allowed to share A/S. This benefit should be captured in CAISO's study.

v. GHG reductions and associated savings

GHG reductions in California can be offered by diverse new and existing renewable supply at the other end of SWIP-North.[12] The Brattle Group indicates that SWIP-North will enable delivery of diverse out-of-state renewables into California. Their study analyzed the benefits of 1000 MW of Idaho wind delivered to California, which is more available than solar in evening peak hours to offset fossil fuel generation. The study concluded that Idaho wind on average reduced 146% more GHG emissions as compared to in-state solar. This GHG emissions benefit amounts to approximately $9/MWh in cost savings to CAISO ratepayers.

[12] OATI OASIS for Idaho Power Company, Generation Interconnection Queue, Accessed 12/1/2020 http://www.oasis.oati.com/ipco/

APPENDIX 2: SWIP-North & SWIP-South transmission paths

Project Name	**Southwest Intertie Project – North ("SWIP-North")**
Project Sponsor:	Great Basin Transmission, LLC (GBT)
Planned in-service date:	June 2024
Voltage (base):	500 kV
Project Description:	SWIP-North consists of a 500 kV AC transmission circuit, traversing approximately 275 miles from Idaho Power Company's Midpoint 500 kV substation (near Twin Falls, Idaho) to the Robinson Summit 500 kV substation (near Ely, Nevada) operated by NV Energy. (See also, attached one-line diagram.) The Midpoint-Robinson Summit 500 kV line will feature 70% series compensation. Half of this compensation will be located near Midpoint Substation, while the other half will be located near Robinson Summit Substation. Each end of the line will include two shunt line reactors: 2 x -90.7 MVAR reactors at the Midpoint terminal, and 2 x -90.7 MVAR reactors at the Robinson Summit terminal (MVAR sizes expressed on a 500 kV base voltage). SWIP-North will also include other upgrades to existing infrastructure as described below. These upgrades will allow SWIP-North to achieve its desired rating and will also increase the transfer limit of the existing Robinson Summit-Harry Allen 500 kV line ("ON Line" also known as SWIP-South). SWIP-North is currently in Phase 2B of WECC Path Rating process. The increased transfer limit for ON Line is also being studied in parallel through the SWIP-South path rating process. (1) ON Line upgrade Add 70% series compensation to the existing Robinson Summit-Harry Allen 500 kV line. This compensation will be evenly distributed in 2 or 3 segments, with series capacitors placed at Robinson Summit, Harry Allen, and potentially within the middle third of the circuit. (2) Other System upgrades: • Three (3) +136 MVAR switchable shunt capacitors (500 kV base) located at the Robinson Summit 500 kV bus. • One (1) +150 MVAR shunt capacitor added to the Robinson Summit 345 kV bus. • Two (2) 345/345 kV phase-shifting transformers (+/-48°, each with a normal rating of 600 MVA) at Robinson Summit: one connected towards Falcon, and the other towards Gonder. This circuit represents a new interconnection between the Idaho Power, NV Energy and CAISO Balancing Authorities. GBT is seeking the following approximate Non-Simultaneous Path Ratings for SWIP-North (path metered at the Midpoint terminal):

	• ~2,000-2,100 MW north-to-south (N2S) • ~2,000 MW south-to-north (S2N)
Project Status:	Federal permits secured (NEPA process complete, BLM Rights-of-Way secured); ready for commercialization. SWIP-North was submitted in 2020 (and previously in 2018 and 2016) for review as an Interregional Transmission Project in the regional planning forums of NorthernGrid, WestConnect, and CAISO. SWIP-North interconnection System Impact Studies are in-progress, conducted by Idaho Power Company and NV Energy with an expected completion of ~Q2 2021. WECC Phase 2 Path Rating studies were reactivated in November 2020, and are currently in progress.

SWIP-North: NVE Transmission Use Agreement

Upon completion of SWIP-North, LS Power's affiliate will automatically attain approximately 1050 MW of new transmission capacity that will become available on the existing 500 kV transmission line that connects Robinson Summit to Harry Allen substation ("ON Line"), as per the Transmission Use and Capacity Exchange Agreement ("TUA") between LS Power affiliates and NV Energy, which is further described below. This new additional ~1050 MW capacity entitlement will be dedicated to CAISO for its exclusively use at no charge, and this newly created ON Line capacity entitlement should therefore be considered part of the SWIP-North project for purposes of CAISO's evaluation of SWIP-North. In addition, the new 500 kV line from Harry Allen to Eldorado which was approved by CAISO was placed into service in 2020, making Harry Allen a CAISO delivery point. Hence, if SWIP-North is selected by CAISO, CAISO will have access to a complete 500 kV path from Midpoint to Eldorado, approximately 566 miles.

Pursuant to the TUA with NV Energy, once SWIP-North is built there would be an exchange of capacity between LS Power affiliates and NV Energy. Upon completion of SWIP-North, NV Energy would get a share of the capacity between Midpoint and Robinson Summit and LS Power affiliate Great Basin Transmission would get a share of capacity between Robinson Summit and Harry Allen, without either party having to pay any amount to the other. As a result of this capacity exchange, LS Power's affiliate would have bidirectional transmission capacity on the entire path from Midpoint to Harry Allen, estimated at approximately 1050 MW. Therefore, LS Power's economic study request is that CAISO study the benefits of approximately 1050 MW of bidirectional transmission capacity between Midpoint and Harry Allen, which would be available to the CAISO market upon completion of construction of SWIP-North.

Project Name	**Southwest Intertie Project – South ("SWIP-South")**[13]
Project Sponsor:	Great Basin Transmission, LLC (GBT)[14]
Planned in-service date:	June 2024[15]
Voltage (base):	500 kV
Project Description:	SWIP-South is an upgraded/series-compensated version of the existing Robinson Summit-Harry Allen 500 kV line (also known as "ON Line"). The existing (uncompensated) line was energized in 2014 and traverses 231 miles between the Robinson Summit 500 kV substation (near Ely, Nevada) and Harry Allen 500 kV substation (near Las Vegas, NV). The existing line includes 2 x -90.7 MVAR reactors at each line end (expressed on a 500 kV base voltage). The SWIP-South upgrade will add 70% series compensation to the existing Robinson Summit-Harry Allen 500 kV line. This compensation will be evenly distributed in 2 or 3 segments, with series capacitors placed at Robinson Summit, Harry Allen, and potentially within the middle third of the circuit. The SWIP-South upgrades also include the following supporting facility additions: • Three (3) +136 MVAR switchable shunt capacitors (500 kV base) located at the Robinson Summit 500 kV bus. • One (1) +150 MVAR shunt capacitor added to the Robinson Summit 345 kV bus. • Two (2) 345/345 kV phase-shifting transformers (+/-48°, each with a normal rating of 600 MVA) at Robinson Summit: one connected towards Falcon, and the other towards Gonder. GBT is seeking the following approximate Non-Simultaneous Path Ratings for SWIP-South (path metered at the Robinson Summit terminal): • ~2,000-2,300 MW north-to-south (N2S) • ~2,000 MW south-to-north (S2N)
Project Status:	The Robinson Summit-Harry Allen 500 kV line is already in-service, known as ON Line; the majority of SWIP-South upgrades would be constructed within (or adjacent to) existing substations. System Impact Studies and regional planning analyses of SWIP-North typically also include/model SWIP-South facilities. WECC Phase 2 Path Rating studies were reactivated in November 2020, and are currently in progress.

[13] SWIP-South in this report refers to an upgraded ON Line project (i.e. ON Line plus series capacitor upgrades to support SWIP-North).
[14] GBT is managing the Path Rating process for the upgraded ON Line Project in conjunction with SWIP-North on behalf of the ON Line owners, NV Energy and Great Basin Transmission South, LLC.
[15] ON Line was placed into service in 2014. This Path Rating Study proposes upgrading ON Line with 70% series compensation in conjunction with placing SWIP-North in service.

SWIP-North & SWIP-South transmission paths