Stakeholder Comments on
2012-2013 Draft Transmission Plan and
11 February 2013 Stakeholders Meeting

Submitted by	Company	Date Submitted
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Critical Path Transmission thanks the CAISO for the opportunity to submit stakeholder comments on the recent Transmission Planning Process Stakeholder meeting and the Draft Transmission Plan.

Comment 1 – Phasing of the AV Clearview Project

Based on a more complete understanding of the nature of comparative analysis conducted by the CAISO in determining inclusion of transmission elements in the Transmission Plan, Critical Path Transmission proposes to construct AV Clearview in phases, with the first phase (for inclusion in the 2012/2013 CAISO Transmission Plan) accomplishing every quantified benefit of Coolwater-Lugo (and many more not currently valued) at a **significant savings to ratepayers.**

Additional benefits from subsequent phases can be evaluated through the 2013/2014 Transmission Planning Process.

The phases, as depicted on the next page, consist of the following:

- Phase 1: Interconnection of the existing Windhub and Kramer substations via the new Yeager substation which includes a 640 kV HVDC back-to-back converter station as well as the 115 kV connection to the Edwards substation.

- Phase 2: Interconnection of the DC converter of the Yeager substation via a 640 kV HVDC circuit to the new Tucker converter station / substation, which loops into the two existing Vincent-Lugo 500 kV lines.

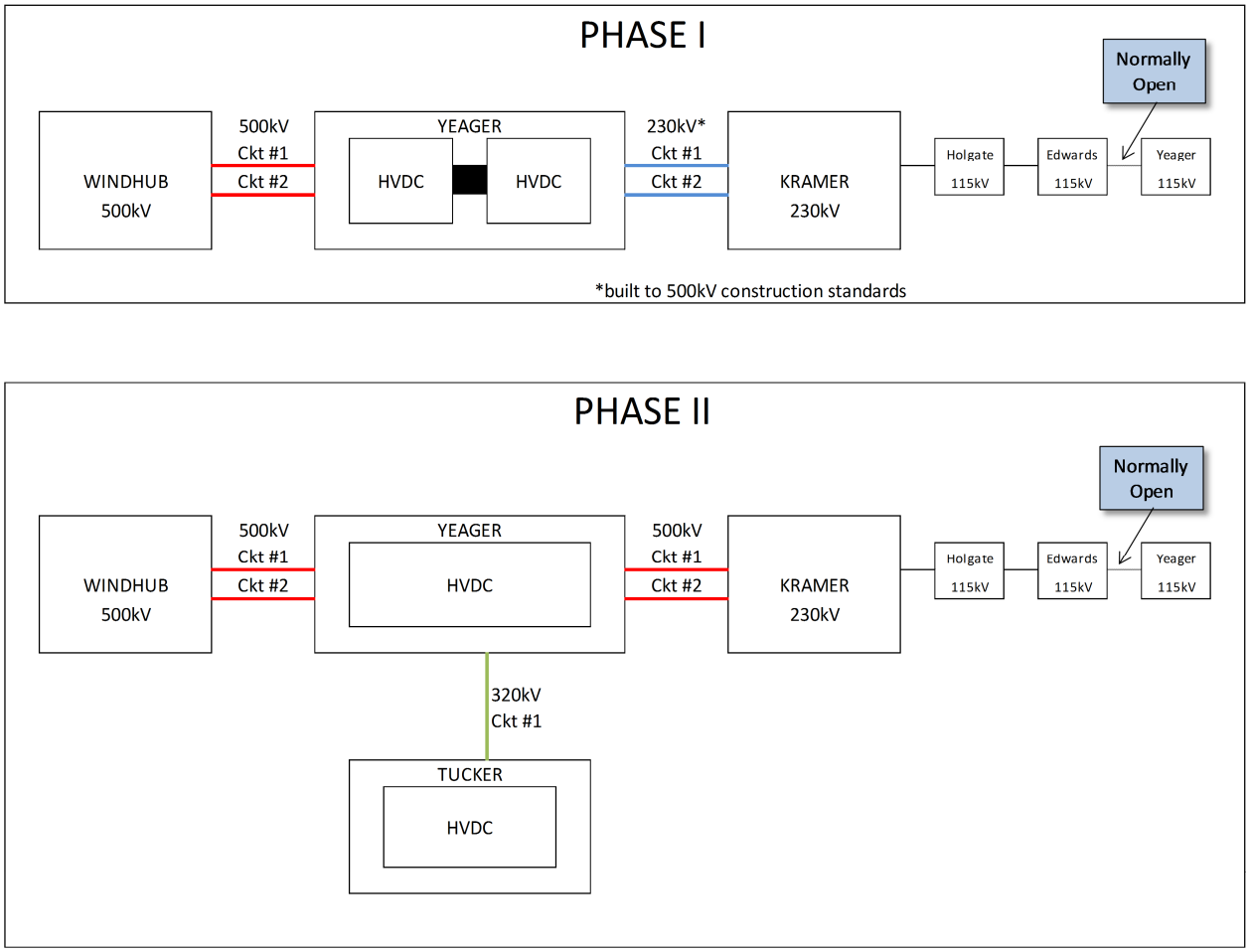
The advantages of this Phased approach are that AV Clearview can provide:

- **A Lower Cost Alternative.** The ratepayers, the CAISO and the LGIA generator have an *immediate* option of a Coolwater-Lugo alternative (AV Clearview Phase 1). This alternative provides, according to CAISO analysis, 100% of the transfer capability required for the CPUC generation scenarios driving the current transmission planning cycle without requiring any special protection schemes or curtailment.

AV Clearview Phase 1 is demonstrably less expensive than Coolwater-Lugo. Construction cost for AV Clearview is an estimated $437 million. SCE estimates that Coolwater-Lugo will cost $542 million (including the third transformer at Lugo, which SCE believes is still required) while the CAISO is carrying an estimate of $480 million (without the third Lugo transformer).

Thus, AV Clearview Phase 1 can be built for between $43 million and $105 million *less* than Coolwater-Lugo.

AV Clearview Transmission Project Phases



- **A Better LGIA solution.** AV Clearview Phase 1 can provide deliverability for the LGIA generator signatory at least two years sooner than Coolwater-Lugo. AV Clearview Phase 1 also has a smaller environmental impact than Coolwater-Lugo. This raises the real possibility that the Coolwater-Lugo project will fail to obtain a CPCN from the CPUC during an expensive and protracted permitting process with no backup plan in place. While we recognize that the CAISO cannot unilaterally abrogate the existing LGIA, the superiority of this solution and the challenges facing Coolwater-Lugo through

the CPCN process merit inclusion of AV Clearview Phase 1 within the ISO Transmission Plan as a 'preferred alternative', should one be required.

- **2X Transfer Capability.** With the use of equivalent RAS (remedial action schemes), AV Clearview Phase 1 can provide more than twice the transfer capability of Coolwater-Lugo.

  Using CAISO methodologies, AV Clearview Phase 1 can provide transfer capability to more than 2000MW, which is more renewable generation than the CPUC base case generation scenario assumptions for both Coolwater-Lugo and Pisgah-Lugo combined. Such a substitution would save the ratepayers approximately $800 million[1] over these two approved projects.

- **A Better Solution for Western Mojave Generators.** The new Yeager substation/converter station can serve as a collector station for local generators that can address the shortcomings of the Windhub substation design identified by SCE in their 14 December 2013 stakeholder comments:

  > For example, the baseline option for the AV Clearview Transmission Project involves two 230 kV connections to the Windhub Substation. This option is infeasible without further expansion of the 230 kV switchrack at Windhub due to substation design and unavailable positions. Currently, all positions at Windhub have been assigned to support a generation tie-line, 500/230 kV transformer bank, or 230/66 kV transformer bank. Further expansion of the substation is physically impossible without tearing out wind turbines that have already been installed or without eliminating turbines that will be installed all around the Windhub Substation.

  Straightforward solutions do exist to the issues raised by SCE and are incorporated in the Phase 1 design. A collector substation, directly necessitated by the inadequate design of the Windhub substation, has been requested for years by Kern County and the renewable generation community and will eventually have to be constructed if the Tehachapi line is to reach its 4,500 MW capacity.

  Furthermore, many renewable generators are facing the challenge of interconnecting prior to the ITC deadline of January 1, 2017. Of the two western Mojave transmission alternatives, only AV Clearview Phase 1 has a construction schedule that can support this important requirement.

- **A Better Solution for the Region.** AV Clearview Phase 1 provides economic activity that is important to the state and local economic growth two years *sooner* than Coolwater-Lugo. Moreover, AV Clearview Phase 1 provides important energy redundancy to Edwards AFB that Coolwater-Lugo cannot provide.

- **Operational Benefits**. AV Clearview Phase 1 offers difficult-to-quantify yet real operational benefits including, among others, the ability to increase power transfer capability to load centers via DC phase shifting as well as reactive power support currently needed by nearby 115kV lines and that are critical to ongoing integration of renewable generation in the area.

[1] SCE Petition for Declaratory Order and Incentive Rate Treatment dated August 2010

- **Low Cost Future Expansion Opportunities.** The full benefits of Phase 2 of AV Clearview can be demonstrated in the 2013/2014 Planning Cycle to efficiently and economically address the upcoming needs of cluster 5 generation and potentially costly reliability issues south of Vincent, among other issues.

Using the CAISO analysis methodology and evaluation criteria, the AV Clearview Project (Phase 1) is a clearly superior alternative to Coolwater-Lugo and should therefore be included in the 2012/2103 Transmission Plan as a preferred alternative to the Coolwater-Lugo LGIA. AV Clearview Phase 1 can be constructed faster and less expensively than Coolwater-Lugo, with greater quantifiable and non-quantifiable benefits to ratepayers, renewable generators, the CAISO grid, the Department of Defense and the local and state economy.

Inclusion of AV Clearview Phase 1 in the 2012/2013 ISO Plan as the preferred alternative to the Coolwater-Lugo LGIA allows for a straightforward evaluation in terms of ratepayer benefits and environmental impact by the CPUC in the upcoming CPCN process, and will encourage a collaborative solution with the all parties of the existing LGIA contract.

Comment 2 – Operations and Planning Benefits of AV Clearview

The AV Clearview Phase 1 elements consist of east-west 500 and 230 kV AC lines that will connect the Tehachapi and Kramer renewable resources areas (via the Windhub and Kramer substations respectively) and through a 640 kV HVDC link at the intermediary Yeager substation.

The HVDC back-to-back link will provide operational control to an area with major renewable resource penetration and growth potential. The ability to manipulate real and reactive flows in an area with a high amount of variable generation will be a valued tool for CAISO system operators[2]. Additionally, the link is close (electrical proximity) to the important Path 26 line. The project provides the ability to shift or transfer power away from Path 26 and on to the AV Clearview infrastructure, which provides congestion management or relief during periods of high north-south flows.

The following discussion elaborates on those benefits of AV Clearview Phase 1 that are traditionally difficult to quantify, but deserve consideration in the CAISO comparative analysis. The benefits are broken down into two groups: operations/congestion management and RPS/planning.

Operations/Congestion Management

- *A DC link offers increased power transfer capability to load centers.*
  The HVDC portion of the project offers major operational flexibility that allows CAISO operators the ability to shift more power across the link between the Tehachapi and

[2] NERC Reliability Standard TOP-002.21b R2 reads: Each Balancing Authority and Transmission Operator shall ensure its operating personnel participate in the system planning and design study processes, so that these studies contain the operating personnel perspective and system operating personnel are aware of the planning purpose.

Kramer CREZ areas. Flows across the link would supplement the north-south transfer capability currently provided by Path 26.

- *Improves voltage support in an area with voltage issues.*
  In addition to the ability to adjust the amount of real power (megawatts) that flows across the HVDC link, the HVDC converter stations will provide reactive capability and voltage support to the area. In its transmission planning presentation on December 11, 2012 the CAISO noted that there were voltage constraints in the North of Lugo area. AV Clearview's Phase 1 HVDC component would provide the operational flexibility to deliver the needed voltage support to keep the North of Lugo area (a weak area particularly susceptible to voltage issues) reliable.

- *Reduces operational costs for California ratepayers for renewable resource integration.*
  As variable or intermittent generators, renewable resources do not directly provide operational flexibility that is needed for a dynamic grid. AV Clearview provides real and reactive power management that compensates for the lack of flexibility offered by renewable resources. As such, the project can reduce costs associated with renewable resource integration and provide operators with the tools to better manage variable resources.

- *Improves operational control for path flows for CAISO system operators, which reduces costs to California ratepayers.*
  Presently, operators have a limited set of tools to control flows on the grid. Aside from costly redispatch of units and calling on limited demand side resources, operators would likely appreciate and utilize any additional tools they have to adjust flows on the system for reliability conditions. The HVDC technology utilized by AV Clearview Phase 1 provides operators the ability to adjust the transmission system so as to manipulate flows in the Kramer and Tehachapi area. This adjustment typically referred to as phase shifting is a powerful tool to control transmission flows when needed for reliability or congestion management purposes. Unlike redispatch, the adjustments to the HVDC settings do not incur costs so the benefits are achieved without operational costs.

- *AV Clearview's DC link can reduce the congestion management cost due to its operational flexibility.*
  The AV Clearview project will be electrically connected to Path 26. As a congestion management tool, operators can adjust the phase shifting controls on the HVDC portion of AV Clearview and shift flows from Path 26 and onto AV Clearview. Again, these adjustments would not incur costs like typical congestion management tools currently available. The net economic value of congestion relief on Path 26 is evidently of uncertain value since its resolution (mostly) involves a redistribution of cost-incidence between northern and southern California ratepayers. Congestion is nonetheless an issue that the CAISO typically prefers to resolve, and the value placed on this benefit may change over time.

RPS/Planning

- *The Project could avoid near-term build out for needed upgrades on Path 26.*
  As mentioned previously, since the HVDC portion of AV Clearview Phase 1 can shift flows from Path 26 on to its own link, the need to upgrade portions of Path 26 may be

indefinitely deferred. In its economic assessment of Path 26 on 11 December 2012, the CAISO noted that upgrades were needed for Path 26. The AV Clearview project represents achieves a reduction in congestion as a side benefit.

- *AV Clearview improves the build out of future renewable generation in the Tehachapi, Antelope Valley and Kramer region.*
  The Tehachapi and Kramer areas represent some of the largest and highest capacity renewable generation zones in California. Moreover, Kramer is a region that the DRECP advocates as one of the most suitable for renewable development. AV Clearview would increase the amount of generation deliverable from these zones and provides an outlet for these resources to the rest of the California. The project enables the current CPUC projection of renewable resources in the Kramer area, with an additional 600MW fully deliverable, or more than 1300MW with the use of RAS. The future transmission capacity provided by AV Clearview represents a value to the ratepayers as future incremental transmission additions are deferred. In addition, the available capacity will attract more renewable developers, which could in turn serve to lower PPA prices—also a major benefit to ratepayers.

- *Improves California's ability to meet ongoing RPS goals.*
  As AV Clearview Phase 1 provides a needed outlet for renewable resources in the Tehachapi and Kramer areas, it helps California achieve its overall RPS goals. The project would enable the renewable resource developer that triggered the LGIA to achieve deliverability two years ahead of schedule. The ability of this resource and any new or additional resources in the area to interconnect and achieve deliverability would represent an opportunity to displace fossil generation, lower GHG and NOx levels in the State of California as well as serving to lower the price of energy in the CAISO market.

System reliability is a key component that has the misfortune of being challenging to quantify in the present process of Transmission Project evaluation. The CAISO has made significant strides with new market products and tariff changes to assist the system operators in controlling the quickly changing grid physical and operating characteristics. Renewable resource integration with intermittent generation has produced large power swings on a daily, sometimes hourly, basis. This also impacts voltage, reactive power flows and frequency stability. The AC-DC component of the AV Clearview project has tremendous value to the system operators' ability to address the acknowledged ramping issues of intermittent generation. Although difficult to quantify in dollar terms, any comparative evaluation of alternate transmission projects needs to take into consideration any significant improvement in reliability between two projects. In the comparative case of AV Clearview and Coolwater-Lugo, the significant improvement in reliability clearly favors the AV Clearview project.

Comment 3 – Miscellaneous Cost and Schedule Issues

The CAISO has not publicly provided the basis for the revised Coolwater-Lugo cost estimate of $480 million. SCE claims the cost of the Coolwater-Lugo Project is $542 million.[3] SCE has given no indication that it plans to *not* build the 3rd transformer at Lugo included in the Coolwater-Lugo Project that the CAISO has deducted from the Coolwater-Lugo estimated cost. In fact, it has been reported widely in the industry that the 3rd transformer at Lugo is indeed

[3] SCE Petition for Declaratory Order for Incentive Rate Treatment dated Dec 2010, Volume 1, Page 14

required for Coolwater-Lugo to meet its anticipated interconnection requirements. Critical Path suggests that the SCE estimate of $542 be used as the base “estimate of record” for the Coolwater-Lugo Project.

Critical Path also again suggests that the CAISO consider at least a confidence interval on the $542 million cost estimate in its comparative analysis of the Coolwater-Lugo Project and AV Clearview Phase 1, in light of the extraordinary variance between the actual cost of the both the TRTP and Devers-Colorado River projects from the PTO’s original estimates.

Finally, given the delay in the submission of the Coolwater-Lugo CPCN application to the PUC, Critical Path recommends that that the CAISO reevaluate the assumed timelines of the Coolwater-Lugo Project in its comparative analysis between the alternate solutions in the South of Kramer area.